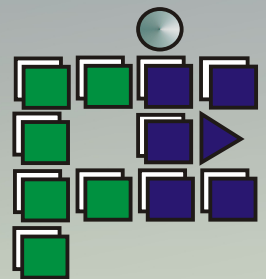


Appendix E

Hydraulics



PLANNERS
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E 1.0 FLOODPLAIN HYDRAULICS

E 1.1 Introduction

This section describes the hydraulic analysis that was carried out on Forbes Creek, upon which the floodline mapping was determined. The hydraulic analysis was performed in accordance with the Technical Guidelines for Floodplain Management in Ontario. Flood routing was performed using the U.S. Army Corps of Engineers HEC-RAS hydraulic modelling software (v. 3.0). Cross-section input for the HEC-RAS model of Forbes Creek was generated using City of Cambridge digital topographic data as well as the results of a GPS survey conducted by Planning and Engineering Initiatives in June 2001. Flood levels were then generated for the 2, 5, 10, 25, 50 and 100-year design storm events and the Regional Storm using flows generated by the hydrologic modelling described in Section B 2.0 and Appendix D of this report.

E 1.2 Hydraulic Model Development

Channel Cross-Sections

To develop the hydraulic model, Forbes Creek was defined by a series of cross-sections to represent the form creek channel and floodplain for the step-backwater calculations performed by the modelling software. Cross-sections were developed along the east, west and main branches of the creek at regular, representative locations as well as at locations where significant changes to the form of the channel or floodplain occurred. Cross-sections extended across the entire floodplain and were established to be perpendicular to the estimated flow path. Cross-sections were developed primarily using digital contour data from the City of Cambridge with 1.0 m contour resolution (0.5 m interpolated). Data from the GPS topographic survey, where available, was used to supplement the City of Cambridge data and provide additional detail. All of the cross-sections used in the model are presented below.

Channel Structures

All structures, including culverts, weirs, and bridges along Forbes Creek were measured during the topographic survey of the study area. The survey results and field reconnaissance were used to define structure geometry and dimensions, configuration of inlet and outlet, invert elevations, slopes, and top of road and embankment profiles in the HEC-RAS model. Data sheets characterizing all of the channel structures are included in below.

Channel and Floodplain Characteristics

The roughness characteristics of the channel and floodplain were determine through a combination of field reconnaissance and air photo analysis. Manning's roughness coefficients for channel and overbank areas were determined based on vegetation patterns and observed channel bed configuration. Roughness coefficients were determined based on typical values published by Chow (1959).

Model Configuration

The west and east branches of Forbes Creek were modeled separately and combined at a junction downstream of Blackbridge road to form the main branch. Water surface elevations stream junctions are calculated in HEC-RAS by balancing the energy of the receiving channel with that of the flow in the tributaries. The location of the stream junction in the model was determined iteratively to ensure that the calculated flood elevation at the junction indicated combined flow.

Model Boundary Conditions

The starting water surface elevations used for the model were the Hespeler Mill Pond flood elevations from the GRCA Speed River HEC-2 model. Flood elevations were available for the 2 through 100 year return period flows as well as for the Regional Storm event. Elevations were taken for cross-section 7670 of the GRCA model, which is located on the Mill Pond immediately downstream of the confluence of Forbes Creek. Using these starting water elevations results in a conservative estimate of flooding at the downstream end of Forbes Creek as it assumes that flood events in the creek and the Speed River may occur at the same time.

E 1.3 Results

Model Results

Flow profiles were calculated in HEC-RAS for the 2 through 100-year design storm events and the Regional Storm using flows determined in the hydrological analysis. Results for the 2, 5, 10, 25, 50 and 100-year events and for the Regional Storm event are presented in tabular form below. Cross-section and longitudinal profile results for the Regional Storm event are also presented graphically.

Floodline Mapping

Based on the results of the HEC-RAS hydraulic model, the Regional Storm floodline elevations for Forbes Creek have been determined using the City of Cambridge digital topographic data. Map 1, attached, shows the floodline mapping for the creek. Floodline elevations are displayed to the nearest centimeter. A spill area located at the north end of the subwatershed on the east branch is shown on Map 1. Regional flows at this location will partially overflow to the subwatershed at the northeast. No existing buildings were found to be located within the floodplain.

HEC-RAS Plan: ds River: Forbes Cr. Reach: East Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
East Branch	2603	0.52	306	306.07	306.01	306.07	0.000172	0.06	8.48	129.61	0.08
East Branch	2603	1.17	306	306.1	306.02	306.1	0.000214	0.09	13.04	131.01	0.09
East Branch	2603	2.17	306	306.14	306.03	306.14	0.000263	0.12	17.83	132.46	0.11
East Branch	2603	3.18	306	306.17	306.04	306.17	0.000283	0.14	22.03	133.69	0.11
East Branch	2603	3.91	306	306.19	306.05	306.19	0.000292	0.16	24.76	134.47	0.12
East Branch	2603	6.54	306	306.27	306.06	306.27	0.000246	0.18	35.78	137.58	0.11
East Branch	2603	7.48	306	306.29	306.07	306.3	0.000243	0.19	39.08	138.5	0.12
East Branch	2530	0.52	306	306.03	306.02	306.03	0.003907	0.18	2.83	86.9	0.32
East Branch	2530	1.17	306	306.06	306.03	306.06	0.003246	0.24	4.9	87.2	0.32
East Branch	2530	2.17	306	306.09	306.04	306.09	0.002397	0.28	7.79	87.62	0.3
East Branch	2530	3.18	306	306.12		306.13	0.001827	0.3	10.65	88.04	0.27
East Branch	2530	3.91	306	306.15		306.15	0.001536	0.31	12.71	88.34	0.26
East Branch	2530	6.54	306	306.24		306.24	0.00085	0.31	20.79	89.52	0.21
East Branch	2530	7.48	306	306.26		306.27	0.000795	0.33	23	89.84	0.2
East Branch	2437	0.52	305.26	305.6	305.55	305.61	0.005449	0.48	1.08	9.77	0.46
East Branch	2437	1.17	305.26	305.68	305.6	305.69	0.004789	0.62	1.89	10.66	0.47
East Branch	2437	2.17	305.26	305.77	305.66	305.79	0.00444	0.75	2.91	11.67	0.48
East Branch	2437	3.18	305.26	305.84	305.7	305.88	0.004182	0.83	3.83	12.51	0.48
East Branch	2437	3.91	305.26	305.89	305.74	305.93	0.004046	0.88	4.45	13.04	0.48
East Branch	2437	6.54	305.26	306.04	305.84	306.09	0.003866	1.01	6.46	14.8	0.49
East Branch	2437	7.48	305.26	306.04	305.87	306.11	0.004779	1.14	6.59	14.89	0.54
East Branch	2389	0.52	304.73	305.04	305.04	305.11	0.024816	1.2	0.43	2.99	1.01
East Branch	2389	1.17	304.73	305.15	305.15	305.25	0.022991	1.4	0.84	4.35	1.02
East Branch	2389	2.17	304.73	305.26	305.26	305.38	0.020838	1.56	1.39	5.7	1
East Branch	2389	3.18	304.73	305.34	305.34	305.48	0.020159	1.68	1.89	6.67	1.01
East Branch	2389	3.91	304.73	305.39	305.39	305.54	0.019848	1.76	2.22	7.25	1.02
East Branch	2389	6.54	304.73	305.53	305.53	305.72	0.018548	1.95	3.36	8.95	1.02
East Branch	2389	7.48	304.73	305.69		305.81	0.008287	1.5	5	10.9	0.7
East Branch	2290	0.52	304.43	304.81	304.58	304.81	0.000171	0.12	4.27	23.19	0.09
East Branch	2290	1.17	304.43	304.91	304.63	304.91	0.000227	0.17	7.07	29.65	0.11
East Branch	2290	2.17	304.43	305.01	304.69	305.02	0.000264	0.21	10.34	34.64	0.12
East Branch	2290	3.18	304.43	305.08	304.73	305.09	0.00029	0.25	12.78	38.01	0.13
East Branch	2290	3.91	304.43	305.13	304.75	305.13	0.0003	0.28	14.51	40.23	0.14
East Branch	2290	6.54	304.43	305.34	304.83	305.35	0.000195	0.29	24.43	51.66	0.12
East Branch	2290	7.48	304.43	305.75		305.76	0.000039	0.18	51.83	81.19	0.06
East Branch	2226	0.52	304.5	304.76	304.7	304.78	0.006462	0.58	0.89	6.85	0.52
East Branch	2226	1.17	304.5	304.84	304.77	304.87	0.007289	0.75	1.56	9.09	0.58
East Branch	2226	2.17	304.5	304.92	304.85	304.97	0.008128	0.91	2.39	11.24	0.63
East Branch	2226	3.18	304.5	304.96	304.91	305.02	0.011973	1.16	2.75	12.08	0.77
East Branch	2226	3.91	304.5	304.94	304.94	305.06	0.020772	1.5	2.61	11.77	1.01
East Branch	2226	6.54	304.5	305.28		305.31	0.002872	0.79	8.33	22.42	0.41
East Branch	2226	7.48	304.5	305.74		305.75	0.000241	0.38	20.65	31.02	0.14
East Branch	2171	0.52	304	304.07	304.07	304.11	0.029825	0.81	0.64	9.52	1
East Branch	2171	1.17	304	304.12	304.12	304.18	0.026231	1.04	1.13	10.59	1.02
East Branch	2171	2.17	304	304.18	304.18	304.26	0.022941	1.22	1.78	11.87	1.01
East Branch	2171	3.18	304	304.26		304.32	0.013422	1.15	2.76	13.47	0.81
East Branch	2171	3.91	304	304.43	304.26	304.46	0.002911	0.72	5.44	17.02	0.41
East Branch	2171	6.54	304	305.29		305.29	0.000086	0.29	26.21	31.78	0.09
East Branch	2171	7.48	304	305.74		305.75	0.000032	0.22	42.49	38.86	0.06
East Branch	2159	0.52	303.24	303.53	303.41	303.55	0.003777	0.66	0.78	3.14	0.43
East Branch	2159	1.17	303.24	303.74	303.52	303.77	0.002729	0.77	1.52	3.77	0.39
East Branch	2159	2.17	303.24	304.01	303.65	304.04	0.001881	0.84	2.59	7.25	0.34
East Branch	2159	3.18	303.24	304.24	303.75	304.28	0.001411	0.89	3.55	9.74	0.31
East Branch	2159	3.91	303.24	304.39	303.82	304.43	0.001233	0.93	4.19	13.57	0.3

HEC-RAS Plan: ds River: Forbes Cr. Reach: East Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
East Branch	2159	6.54	303.24	305.25	304.01	305.28	0.000434	0.84	7.8	33.48	0.2
East Branch	2159	7.48	303.24	305.71	304.07	305.74	0.00027	0.77	9.75	40.45	0.16
East Branch	2135	Culvert									
East Branch	2104	0.52	302.94	303.25	303.11	303.27	0.002649	0.57	0.91	3.65	0.36
East Branch	2104	1.17	302.94	303.34	303.22	303.39	0.005023	0.94	1.25	4.07	0.52
East Branch	2104	2.17	302.94	303.43	303.33	303.52	0.008395	1.38	1.58	4.47	0.69
East Branch	2104	3.18	302.94	303.47	303.43	303.64	0.013263	1.83	1.74	4.66	0.88
East Branch	2104	3.91	302.94	303.49	303.49	303.72	0.016771	2.12	1.85	4.78	1
East Branch	2104	6.54	302.94	303.68	303.68	304	0.015122	2.48	2.64	5.67	1
East Branch	2104	7.48	302.94	303.74	303.74	304.09	0.014777	2.6	2.88	5.94	1
East Branch	2088	0.52	303	303.13	303.13	303.16	0.029184	0.82	0.63	9.18	1
East Branch	2088	1.17	303	303.18	303.18	303.23	0.027351	0.97	1.21	13.09	1.01
East Branch	2088	2.17	303	303.24	303.24	303.29	0.024782	1.06	2.05	17.85	1
East Branch	2088	3.18	303	303.28	303.28	303.34	0.021248	1.1	3	27.64	0.95
East Branch	2088	3.91	303	303.29	303.3	303.36	0.022052	1.19	3.48	29.08	0.99
East Branch	2088	6.54	303	303.29	303.35	303.5	0.070972	2.08	3.3	28.64	1.76
East Branch	2088	7.48	303	303.29	303.37	303.57	0.094569	2.4	3.28	28.57	2.03
East Branch	2035	0.52	302	302.31	302.04	302.31	0.000041	0.08	6.8	25.61	0.05
East Branch	2035	1.17	302	302.37	302.07	302.37	0.000105	0.14	8.5	26.92	0.08
East Branch	2035	2.17	302	302.45	302.11	302.45	0.000172	0.2	10.75	28.99	0.1
East Branch	2035	3.18	302	302.51	302.14	302.52	0.00023	0.26	12.54	30.42	0.12
East Branch	2035	3.91	302	302.56	302.16	302.56	0.000254	0.29	13.92	31.45	0.13
East Branch	2035	6.54	302	302.65	302.22	302.66	0.000398	0.41	16.94	35.08	0.17
East Branch	2035	7.48	302	302.81	302.24	302.81	0.000229	0.36	22.56	42.79	0.13
East Branch	1962	0.52	302	302.31		302.31	0.00002	0.05	10.7	46.16	0.03
East Branch	1962	1.17	302	302.37		302.37	0.000049	0.09	13.56	48.07	0.05
East Branch	1962	2.17	302	302.45		302.45	0.000078	0.12	17.45	50.54	0.07
East Branch	1962	3.18	302	302.51		302.51	0.000103	0.16	20.48	52.35	0.08
East Branch	1962	3.91	302	302.55		302.55	0.000109	0.17	22.82	53.34	0.08
East Branch	1962	6.54	302	302.64		302.64	0.000167	0.24	27.47	55.19	0.11
East Branch	1962	7.48	302	302.8		302.81	0.000086	0.21	37.02	58.47	0.08
East Branch	1907	0.52	302.5	302.31		302.31	0		159.68	313.45	0
East Branch	1907	1.17	302.5	302.37		302.37	0.000001		178.69	324.9	0
East Branch	1907	2.17	302.5	302.45		302.45	0.000002		205.01	339.86	0
East Branch	1907	3.18	302.5	302.5		302.5	0.000004	0	225.47	353.08	0.01
East Branch	1907	3.91	302.5	302.55		302.55	0.000004	0.01	241.14	356.63	0.01
East Branch	1907	6.54	302.5	302.63		302.63	0.000008	0.02	271.73	361.16	0.02
East Branch	1907	7.48	302.5	302.8		302.8	0.000006	0.02	333.13	367.03	0.02
East Branch	1819	0.52	302	302.31		302.31	0.000016	0.05	10.93	40.95	0.03
East Branch	1819	1.17	302	302.36		302.36	0.000044	0.09	13.37	42.95	0.05
East Branch	1819	2.17	302	302.44		302.44	0.000073	0.13	16.77	45.6	0.07
East Branch	1819	3.18	302	302.5		302.5	0.000097	0.17	19.58	47.68	0.08
East Branch	1819	3.91	302	302.54		302.55	0.000108	0.19	21.67	49.06	0.08
East Branch	1819	6.54	302	302.63		302.63	0.000178	0.26	25.89	52.09	0.11
East Branch	1819	7.48	302	302.8		302.8	0.000096	0.23	35.28	58.27	0.09
East Branch	1720	0.52	301.95	302.31		302.31	0.000004	0.02	29.07	94.66	0.01
East Branch	1720	1.17	301.95	302.36		302.36	0.00001	0.04	34.59	99.69	0.02
East Branch	1720	2.17	301.95	302.44		302.44	0.000019	0.07	42.26	106.23	0.03
East Branch	1720	3.18	301.95	302.5		302.5	0.000027	0.09	48.91	111.51	0.04
East Branch	1720	3.91	301.95	302.54		302.54	0.00003	0.1	53.83	117.94	0.04
East Branch	1720	6.54	301.95	302.62		302.62	0.000051	0.14	63.71	124.32	0.06
East Branch	1720	7.48	301.95	302.8		302.8	0.000027	0.12	86.48	137.45	0.05

HEC-RAS Plan: ds River: Forbes Cr. Reach: East Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
East Branch	1644	0.52	301.68	302.31		302.31	0.000004	0.04	37.62	131.57	0.02
East Branch	1644	1.17	301.68	302.36		302.36	0.000012	0.07	45.03	136.13	0.03
East Branch	1644	2.17	301.68	302.43		302.43	0.000023	0.11	55.07	142.06	0.04
East Branch	1644	3.18	301.68	302.5		302.5	0.000031	0.13	64.03	147.16	0.05
East Branch	1644	3.91	301.68	302.54		302.54	0.000036	0.15	70.25	150.76	0.05
East Branch	1644	6.54	301.68	302.62		302.62	0.000061	0.2	82.87	155.32	0.07
East Branch	1644	7.48	301.68	302.79		302.79	0.000034	0.17	111.54	171.32	0.05
East Branch	1541	0.48	301.48	302.31		302.31	0.000001	0.02	67.4	165.27	0.01
East Branch	1541	1.49	301.48	302.36		302.36	0.000004	0.05	76.39	168.22	0.02
East Branch	1541	2.81	301.48	302.43		302.43	0.00001	0.08	88.26	172.02	0.03
East Branch	1541	4.21	301.48	302.49		302.49	0.000016	0.1	99.7	189.26	0.04
East Branch	1541	5.2	301.48	302.53		302.53	0.000021	0.12	108.05	209.49	0.04
East Branch	1541	8.27	301.48	302.62		302.62	0.000035	0.16	125.79	215.97	0.05
East Branch	1541	10.5	301.48	302.79		302.79	0.000026	0.16	164.47	224.09	0.05
East Branch	1512	0.48	301.51	302.24	301.92	302.3	0.002383	1.11	0.43	20.11	0.42
East Branch	1512	1.49	301.51	302.36	302.3	302.36	0.000086	0.15	9.96	23.48	0.07
East Branch	1512	2.81	301.51	302.43	302.3	302.43	0.000204	0.24	11.61	25.35	0.11
East Branch	1512	4.21	301.51	302.49	302.3	302.49	0.000327	0.32	13.19	27.02	0.15
East Branch	1512	5.2	301.51	302.52	302.3	302.53	0.000405	0.36	14.25	28.09	0.16
East Branch	1512	8.27	301.51	302.6	302.3	302.61	0.000697	0.5	16.47	30.19	0.22
East Branch	1512	15.4	301.51	302.76	302.3	302.79	0.001159	0.71	21.69	34.66	0.29
East Branch	1507	Culvert									
East Branch	1431	0.48	301.4	301.82	301.82	302.02	0.016257	1.97	0.24	6.74	0.99
East Branch	1431	1.49	301.4	302.3	302.3	302.3	0.000192	0.23	6.44	17.08	0.11
East Branch	1431	2.81	301.4	302.3	302.3	302.31	0.000684	0.44	6.44	17.08	0.21
East Branch	1431	4.21	301.4	302.3	302.3	302.32	0.001536	0.66	6.44	17.08	0.31
East Branch	1431	5.2	301.4	302.3	302.3	302.33	0.002343	0.81	6.44	17.08	0.38
East Branch	1431	8.27	301.4	302.3	302.3	302.38	0.005927	1.29	6.44	17.08	0.61
East Branch	1431	15.4	301.4	302.39	302.39	302.58	0.010652	1.93	9.05	35.19	0.84
East Branch	1342	0.48	301.4	301.78	301.56	301.78	0.000278	0.16	3.03	15.9	0.12
East Branch	1342	1.49	301.4	301.88	301.65	301.88	0.000806	0.31	4.77	19.95	0.2
East Branch	1342	2.81	301.4	301.97	301.72	301.98	0.001084	0.41	6.87	23.94	0.24
East Branch	1342	4.21	301.4	302.04	301.78	302.05	0.001237	0.49	9.27	73.04	0.27
East Branch	1342	5.2	301.4	302.11	301.82	302.12	0.000954	0.48	12.44	80.17	0.24
East Branch	1342	8.27	301.4	302.19	301.9	302.21	0.001147	0.6	16.84	89.17	0.27
East Branch	1342	15.4	301.4	302.31	302.06	302.34	0.001681	0.84	25.8	138.83	0.34
East Branch	1285	0.48	301.5	301.78	301.55	301.78	0.000011	0.04	15.26	76.1	0.02
East Branch	1285	1.49	301.5	301.88	301.59	301.88	0.000031	0.08	22.95	84.65	0.04
East Branch	1285	2.81	301.5	301.97	301.61	301.97	0.000046	0.11	31.35	93.09	0.05
East Branch	1285	4.21	301.5	302.04	301.63	302.04	0.000062	0.14	38.38	121.39	0.06
East Branch	1285	5.2	301.5	302.1	301.64	302.1	0.000058	0.15	46.24	128.02	0.06
East Branch	1285	8.27	301.5	302.19	301.68	302.19	0.000086	0.2	56.26	133.86	0.08
East Branch	1285	15.4	301.5	302.3	301.74	302.31	0.000156	0.3	70.79	141.7	0.11
East Branch	1241	0.51	301.35	301.78	301.42	301.78	0.000003	0.02	25.54	90.58	0.01
East Branch	1241	1.64	301.35	301.87	301.46	301.87	0.000011	0.06	34.58	100.75	0.03
East Branch	1241	3.14	301.35	301.97	301.49	301.97	0.000021	0.09	44.41	109.27	0.04
East Branch	1241	4.76	301.35	302.03	301.51	302.04	0.000031	0.11	52.04	140.44	0.05
East Branch	1241	5.88	301.35	302.1	301.52	302.1	0.000032	0.12	59.75	145.1	0.05
East Branch	1241	9.42	301.35	302.18	301.56	302.18	0.000054	0.17	69.43	150.49	0.06
East Branch	1241	16.8	301.35	302.3	301.63	302.3	0.000101	0.26	83.8	158.73	0.09

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	1184	1.83	301.32	301.78		301.78	0.000125	0.05	37.15	129.12	0.03
Main Branch	1184	3.49	301.32	301.87		301.87	0.000181	0.07	49.32	132.06	0.04
Main Branch	1184	5.76	301.32	301.96		301.96	0.00024	0.1	61.6	134.97	0.04
Main Branch	1184	7.87	301.32	302.03		302.03	0.000292	0.11	72.01	180.05	0.05
Main Branch	1184	9.5	301.32	302.1		302.1	0.000278	0.12	84.15	185.04	0.05
Main Branch	1184	14.4	301.32	302.18		302.18	0.000405	0.16	98.89	190.89	0.06
Main Branch	1184	22.7	301.32	302.28		302.28	0.000582	0.21	119.71	198.74	0.07
Main Branch	1108	1.83	301.44	301.75	301.59	301.75	0.005787	0.23	7.98	48.25	0.18
Main Branch	1108	3.49	301.44	301.83	301.63	301.83	0.006429	0.28	12.37	59.26	0.2
Main Branch	1108	5.76	301.44	301.91	301.68	301.91	0.006921	0.33	17.46	69.88	0.21
Main Branch	1108	7.87	301.44	301.96	301.71	301.97	0.00755	0.36	21.59	79.43	0.22
Main Branch	1108	9.5	301.44	302.03	301.74	302.04	0.009628	0.32	29.82	161.24	0.24
Main Branch	1108	14.4	301.44	302.08	301.79	302.09	0.009488	0.37	38.63	163.18	0.24
Main Branch	1108	22.7	301.44	302.16	301.87	302.17	0.009258	0.44	51.27	165.54	0.25
Main Branch	1049	1.83	301.32	301.46	301.4	301.47	0.00403	0.28	6.65	65.8	0.28
Main Branch	1049	3.49	301.32	301.51	301.42	301.52	0.004484	0.34	10.27	81.87	0.3
Main Branch	1049	5.76	301.32	301.55	301.45	301.56	0.00527	0.44	13.33	86.25	0.34
Main Branch	1049	7.87	301.32	301.58	301.48	301.59	0.005464	0.5	16.06	89.98	0.36
Main Branch	1049	9.5	301.32	301.6	301.49	301.62	0.005433	0.53	18.15	92.74	0.37
Main Branch	1049	14.4	301.32	301.66	301.53	301.68	0.005347	0.62	23.91	100.19	0.38
Main Branch	1049	22.7	301.32	301.75	301.59	301.77	0.005212	0.73	33.2	123.09	0.39
Main Branch	983	1.83	300.67	301.02	300.95	301.03	0.013055	0.39	5.46	83.4	0.36
Main Branch	983	3.49	300.67	301.07	301.01	301.08	0.011427	0.46	9.56	86.57	0.36
Main Branch	983	5.76	300.67	301.13		301.14	0.008191	0.48	15.19	90.73	0.32
Main Branch	983	7.87	300.67	301.18		301.19	0.007546	0.52	19.28	94.97	0.32
Main Branch	983	9.5	300.67	301.21		301.22	0.007395	0.55	22.04	98.87	0.32
Main Branch	983	14.4	300.67	301.28		301.29	0.007211	0.63	29.32	107.02	0.33
Main Branch	983	22.7	300.67	301.37		301.39	0.007221	0.73	39.58	116.67	0.34
Main Branch	954	1.83	300.75	300.84		300.84	0.004518	0.15	9.67	70.7	0.19
Main Branch	954	3.49	300.75	300.92		300.92	0.003498	0.23	15.86	75.73	0.19
Main Branch	954	5.76	300.75	301		301.01	0.00342	0.29	22.34	114.29	0.21
Main Branch	954	7.87	300.75	301.04		301.05	0.003871	0.35	26.81	117.06	0.22
Main Branch	954	9.5	300.75	301.07		301.07	0.004065	0.38	29.88	119	0.23
Main Branch	954	14.4	300.75	301.13		301.14	0.004522	0.46	37.55	123.34	0.26
Main Branch	954	22.7	300.75	301.21		301.22	0.005278	0.58	47.29	128.5	0.29
Main Branch	901	1.83	300.28	300.55	300.52	300.56	0.006969	0.49	5.39	73.69	0.39
Main Branch	901	3.49	300.28	300.56	300.55	300.59	0.018186	0.82	6.09	74.59	0.64
Main Branch	901	5.76	300.28	300.58	300.58	300.62	0.030785	1.12	7.22	76.03	0.84
Main Branch	901	7.87	300.28	300.61	300.6	300.65	0.023353	1.1	9.86	79.27	0.76
Main Branch	901	9.5	300.28	300.63	300.62	300.68	0.021394	1.12	11.54	81.26	0.73
Main Branch	901	14.4	300.28	300.69	300.65	300.74	0.017639	1.17	16.29	86.66	0.69
Main Branch	901	22.7	300.28	300.78	300.7	300.83	0.012393	1.18	24.93	95.7	0.61
Main Branch	856	1.83	300	300.19	300.15	300.19	0.008632	0.35	5.35	71.51	0.39
Main Branch	856	3.49	300	300.26		300.27	0.003339	0.33	11.09	80.77	0.27
Main Branch	856	5.76	300	300.34		300.34	0.002238	0.35	17.38	88.89	0.24
Main Branch	856	7.87	300	300.38		300.39	0.002247	0.39	21.31	93.6	0.24
Main Branch	856	9.5	300	300.41		300.42	0.002134	0.42	24.57	97.35	0.24
Main Branch	856	14.4	300	300.51		300.52	0.001844	0.46	34.14	106.03	0.23
Main Branch	856	22.7	300	300.61		300.63	0.001863	0.55	45.69	108.62	0.25
Main Branch	796	1.83	299.84	300.13		300.13	0.000404	0.14	14.26	83.9	0.1
Main Branch	796	3.49	299.84	300.21		300.21	0.000398	0.18	21.68	87.88	0.1
Main Branch	796	5.76	299.84	300.29		300.29	0.00047	0.22	28.32	91.29	0.12
Main Branch	796	7.87	299.84	300.32		300.32	0.000653	0.28	31.16	92.7	0.14
Main Branch	796	9.5	299.84	300.35		300.35	0.00072	0.31	34.09	94.08	0.15

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	796	14.4	299.84	300.44		300.45	0.000808	0.37	42.98	97.98	0.16
Main Branch	796	22.7	299.84	300.54		300.55	0.0011	0.48	52.41	102.72	0.2
Main Branch	745	1.83	299.43	300.12		300.12	0.000022	0.05	34.96	90.89	0.03
Main Branch	745	3.49	299.43	300.21		300.21	0.000043	0.09	43.02	96.58	0.04
Main Branch	745	5.76	299.43	300.28		300.28	0.000074	0.12	50.31	101.45	0.05
Main Branch	745	7.87	299.43	300.31		300.31	0.00012	0.16	52.9	103.12	0.06
Main Branch	745	9.5	299.43	300.34		300.34	0.000148	0.18	55.97	105.08	0.07
Main Branch	745	14.4	299.43	300.43		300.43	0.000216	0.24	65.52	110.93	0.09
Main Branch	745	22.7	299.43	300.51		300.52	0.000361	0.34	75.32	117.06	0.12
Main Branch	685	1.83	299.73	300.12		300.12	0.000029	0.07	26.6	96.46	0.04
Main Branch	685	3.49	299.73	300.21		300.21	0.000046	0.11	35.46	104.32	0.05
Main Branch	685	5.76	299.73	300.28		300.28	0.000073	0.15	43.02	110.58	0.07
Main Branch	685	7.87	299.73	300.3		300.3	0.000117	0.2	45.54	112.6	0.09
Main Branch	685	9.5	299.73	300.33		300.33	0.000141	0.23	48.72	115.08	0.1
Main Branch	685	14.4	299.73	300.41		300.42	0.000194	0.29	58.8	122.08	0.12
Main Branch	685	22.7	299.73	300.49		300.5	0.000324	0.41	68.07	127.51	0.15
Main Branch	623	1.09	299.5	300.12		300.12	0.000001	0.02	52.48	96.55	0.01
Main Branch	623	2.78	299.5	300.21		300.21	0.000005	0.05	61.35	99.44	0.02
Main Branch	623	5.08	299.5	300.28		300.28	0.000012	0.08	68.37	101.55	0.03
Main Branch	623	7.64	299.5	300.3		300.3	0.000024	0.12	70.47	102.18	0.04
Main Branch	623	9.37	299.5	300.33		300.33	0.000033	0.14	73.21	102.98	0.05
Main Branch	623	16	299.5	300.41		300.41	0.000069	0.22	81.82	105.48	0.07
Main Branch	623	22.8	299.5	300.48		300.48	0.000108	0.29	89.4	107.64	0.09
Main Branch	593	1.09	299.5	300.12		300.12	0.000003	0.04	31.06	61.4	0.02
Main Branch	593	2.78	299.5	300.21		300.21	0.000013	0.08	36.94	65.5	0.03
Main Branch	593	5.08	299.5	300.28		300.28	0.000032	0.13	41.59	68.64	0.05
Main Branch	593	7.64	299.5	300.3		300.3	0.000066	0.2	42.87	69.49	0.07
Main Branch	593	9.37	299.5	300.32		300.32	0.000089	0.23	44.67	70.66	0.08
Main Branch	593	16	299.5	300.4		300.41	0.000188	0.36	50.52	82.37	0.12
Main Branch	593	22.8	299.5	300.47		300.48	0.000295	0.47	56.29	90.1	0.16
Main Branch	569	1.09	299.21	300.11	299.56	300.11	0.00029	0.4	2.73	55.47	0.15
Main Branch	569	2.78	299.21	300.21	299.75	300.21	0.00002	0.1	30.98	67.55	0.04
Main Branch	569	5.08	299.21	300.04	299.94	300.25	0.008398	2.03	2.5	48.52	0.78
Main Branch	569	7.64	299.21	300.29	300.12	300.3	0.0001	0.24	36.98	73.05	0.09
Main Branch	569	9.37	299.21	300.32	300.12	300.32	0.000134	0.29	38.78	74.57	0.1
Main Branch	569	16	299.21	300.39	300.12	300.4	0.000289	0.45	44.3	78.1	0.15
Main Branch	569	22.8	299.21	300.45	300.12	300.47	0.000461	0.59	49.14	81.06	0.19
Main Branch	568	Inline Weir									
Main Branch	567	1.09	298.62	299.67	299	299.68	0.00042	0.41	2.66	32.05	0.14
Main Branch	567	2.78	298.62	299.76	299.23	299.8	0.00212	0.95	2.91	33.89	0.31
Main Branch	567	5.08	298.62	299.8	299.45	299.94	0.006356	1.68	3.03	34.79	0.53
Main Branch	567	7.64	298.62	299.74	299.65	300.1	0.017084	2.68	2.85	33.37	0.88
Main Branch	567	9.37	298.62	300.1	300.1	300.11	0.000356	0.42	27.15	52.38	0.15
Main Branch	567	16	298.62	300.13	300.1	300.15	0.000909	0.68	28.81	56.38	0.24
Main Branch	567	22.8	298.62	300.23	300.1	300.27	0.001215	0.85	35.07	67.57	0.28
Main Branch	548	1.09	299.39	299.67		299.67	0.000519	0.2	5.35	30.76	0.16
Main Branch	548	2.78	299.39	299.76		299.77	0.000806	0.34	8.29	31.76	0.21
Main Branch	548	5.08	299.39	299.85		299.86	0.001075	0.47	11.01	32.66	0.25
Main Branch	548	7.64	299.39	299.92		299.94	0.001312	0.58	13.36	33.41	0.29
Main Branch	548	9.37	299.39	299.96	299.71	299.98	0.00148	0.66	14.63	33.81	0.31
Main Branch	548	16	299.39	300.09		300.13	0.00183	0.87	19.49	40.72	0.36
Main Branch	548	22.8	299.39	300.18		300.23	0.002317	1.07	23.4	49.37	0.41

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	495	1.09	299.5	299.65		299.65	0.000392	0.16	6.96	48.09	0.13
Main Branch	495	2.78	299.5	299.73		299.73	0.000591	0.26	10.89	49.41	0.17
Main Branch	495	5.08	299.5	299.8		299.81	0.000751	0.35	14.67	50.63	0.2
Main Branch	495	7.64	299.5	299.87		299.88	0.000888	0.43	17.92	51.63	0.23
Main Branch	495	9.37	299.5	299.9		299.91	0.001007	0.49	19.57	52.28	0.25
Main Branch	495	16	299.5	300.03		300.05	0.001134	0.62	26.51	56.4	0.28
Main Branch	495	22.8	299.5	300.1		300.13	0.001504	0.78	30.62	60.99	0.32
Main Branch	459	1.09	299.5	299.64		299.64	0.000383	0.15	7.5	56.52	0.13
Main Branch	459	2.78	299.5	299.71		299.71	0.000578	0.24	11.73	57.85	0.17
Main Branch	459	5.08	299.5	299.78		299.79	0.000721	0.32	15.86	59.06	0.2
Main Branch	459	7.64	299.5	299.84	299.63	299.85	0.000838	0.39	19.41	60.07	0.22
Main Branch	459	9.37	299.5	299.87		299.88	0.000967	0.45	21.05	60.53	0.24
Main Branch	459	16	299.5	299.99		300.01	0.001026	0.56	28.79	62.67	0.26
Main Branch	459	22.8	299.5	300.05		300.08	0.001435	0.72	32.4	64.85	0.31
Main Branch	389	1.13	299.46	299.53	299.53	299.54	0.037961	0.54	2.08	68.32	0.99
Main Branch	389	2.85	299.46	299.56	299.56	299.58	0.03107	0.74	3.86	68.74	0.99
Main Branch	389	5.34	299.46	299.58	299.58	299.63	0.027112	0.91	5.87	69.31	1
Main Branch	389	8.05	299.46	299.61	299.61	299.67	0.025658	1.05	7.65	69.79	1.01
Main Branch	389	9.9	299.46	299.65		299.7	0.013914	0.95	10.45	70.54	0.78
Main Branch	389	20.1	299.46	299.83		299.87	0.004069	0.87	23.53	73.75	0.48
Main Branch	389	23.9	299.46	299.88		299.92	0.003539	0.89	27.34	74.65	0.46
Main Branch	360	1.13	299	299.26	299.09	299.27	0.000693	0.31	3.69	42.79	0.19
Main Branch	360	2.85	299	299.42	299.16	299.43	0.00048	0.34	8.39	44.12	0.17
Main Branch	360	5.34	299	299.55	299.25	299.55	0.000154	0.23	23.53	50.99	0.1
Main Branch	360	8.05	299	299.61	299.27	299.62	0.000234	0.31	26.98	54.74	0.13
Main Branch	360	9.9	299	299.65	299.3	299.66	0.000282	0.35	29.22	56.96	0.14
Main Branch	360	20.1	299	299.81	299.47	299.83	0.000519	0.55	39.16	63.88	0.2
Main Branch	360	23.9	299	299.86	299.47	299.88	0.000591	0.62	42.36	65.33	0.22
Main Branch	358	Inline Weir									
Main Branch	355	1.13	297.84	298.18	298.18	298.3	0.022735	1.59	0.71	4.43	1
Main Branch	355	2.85	297.84	298.39	298.39	298.63	0.021647	2.15	1.33	6.48	1
Main Branch	355	5.34	297.84	298.64	298.64	299	0.022502	2.66	2.01	8.75	1
Main Branch	355	8.05	297.84	299.07	299.07	299.25	0.019673	1.86	4.32	43.59	0.99
Main Branch	355	9.9	297.84	299.12	299.12	299.33	0.01888	2	4.96	44.34	1
Main Branch	355	20.1	297.84	299.29	299.29	299.52	0.017315	2.12	9.49	48.63	1
Main Branch	355	23.9	297.84	299.35	299.35	299.6	0.016826	2.23	10.72	49.67	1.01
Main Branch	341	1.13	296.77	297.23	297.4	297.72	0.095366	3.1	0.37	2.05	1.87
Main Branch	341	2.85	296.77	297.39	297.56	298.06	0.102813	3.95	1.01	6.9	1.99
Main Branch	341	5.34	296.77	297.49	297.73	298.4	0.124409	4.9	1.57	7.83	2.2
Main Branch	341	8.05	296.77	297.59	297.87	298.66	0.130597	5.48	2.1	8.79	2.26
Main Branch	341	9.9	296.77	297.66	297.96	298.76	0.123668	5.63	2.48	9.22	2.19
Main Branch	341	20.1	296.77	298.09	298.15	299.1	0.074067	5.42	4.84	11.95	1.65
Main Branch	341	23.9	296.77	298.22	298.22	298.58	0.026926	3.02	9.62	13.22	1.14
Main Branch	331	1.13	297	297.46	297.13	297.46	0.000314	0.26	4.41	12.11	0.14
Main Branch	331	2.85	297	297.6	297.23	297.61	0.000698	0.46	6.26	13.2	0.21
Main Branch	331	5.34	297	297.69	297.35	297.72	0.001461	0.72	7.46	13.84	0.31
Main Branch	331	8.05	297	297.76	297.44	297.8	0.002335	0.96	8.41	14.32	0.4
Main Branch	331	9.9	297	297.8	297.5	297.86	0.00287	1.1	9.02	14.63	0.45
Main Branch	331	20.1	297	297.51	297.75	298.3	0.064442	3.95	5.09	12.53	1.98
Main Branch	331	23.9	297	298.16	297.83	298.29	0.004216	1.61	14.88	18.13	0.57
Main Branch	318	1.13	296.92	297.43	297.19	297.45	0.001434	0.62	1.82	13.17	0.3
Main Branch	318	2.85	296.92	297.6	297.5	297.6	0.000546	0.39	8.11	26.13	0.19
Main Branch	318	5.34	296.92	297.68	297.5	297.7	0.001009	0.59	10.34	26.85	0.26

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	318	8.05	296.92	297.75	297.5	297.78	0.001448	0.77	12.23	27.45	0.32
Main Branch	318	9.9	296.92	297.79	297.5	297.83	0.001729	0.87	13.32	27.79	0.35
Main Branch	318	20.1	296.92	298.06	297.7	298.12	0.00199	1.19	21.22	32.77	0.4
Main Branch	318	23.9	296.92	298.17	297.75	298.24	0.001846	1.24	25.06	36.26	0.39
Main Branch	317	Inline Weir									
Main Branch	310	1.13	296.14	296.9	296.52	296.92	0.001178	0.57	2	8.23	0.23
Main Branch	310	2.85	296.14	297.04	296.72	297.1	0.004098	1.16	2.45	9.59	0.43
Main Branch	310	5.34	296.14	297.16	296.94	297.34	0.009162	1.87	2.86	10.76	0.64
Main Branch	310	8.05	296.14	297.48	297.27	297.51	0.001638	0.79	11.14	24.54	0.29
Main Branch	310	9.9	296.14	297.64	297.27	297.66	0.001173	0.76	15.18	26.23	0.25
Main Branch	310	20.1	296.14	298.06	297.33	298.09	0.001092	0.94	27.52	33.96	0.26
Main Branch	310	23.9	296.14	298.17	297.46	298.21	0.00112	1.01	31.47	36.89	0.27
Main Branch	308	1.13	296.11	296.91	296.34	296.91	0.000149	0.23	4.98	9.88	0.1
Main Branch	308	2.85	296.11	297.08	296.48	297.08	0.000399	0.43	6.56	17.25	0.17
Main Branch	308	5.34	296.11	297.26	296.64	297.28	0.000637	0.63	8.42	21.98	0.22
Main Branch	308	8.05	296.11	297.47	296.78	297.5	0.000695	0.77	10.49	24.91	0.24
Main Branch	308	9.9	296.11	297.64	296.85	297.66	0.000434	0.63	20.01	27.58	0.19
Main Branch	308	20.1	296.11	298.06	297.16	298.09	0.000523	0.84	33.18	34.8	0.22
Main Branch	308	23.9	296.11	298.17	297.25	298.2	0.000563	0.92	37.19	37.37	0.23
Main Branch	304	1.13	296.23	296.9	296.58	296.91	0.000518	0.37	3.05	9.59	0.18
Main Branch	304	2.85	296.23	297.06	296.72	297.08	0.001187	0.69	4.15	14.83	0.28
Main Branch	304	5.34	296.23	297.23	296.85	297.28	0.001796	1	5.34	20.46	0.37
Main Branch	304	8.05	296.23	297.42	296.97	297.49	0.001916	1.2	6.7	23.16	0.39
Main Branch	304	9.9	296.23	297.63	297.05	297.66	0.000675	0.69	16.44	26.41	0.23
Main Branch	304	20.1	296.23	298.05	297.41	298.09	0.000608	0.83	30.23	33.82	0.23
Main Branch	304	23.9	296.23	298.17	297.53	298.2	0.000637	0.89	34.15	36.68	0.24
Main Branch	301	Bridge									
Main Branch	299	1.13	295.94	296.9	296.26	296.9	0.000124	0.24	4.8	8.99	0.09
Main Branch	299	2.85	295.94	297.05	296.42	297.06	0.000428	0.49	5.83	11.02	0.17
Main Branch	299	5.34	295.94	297.18	296.58	297.22	0.000905	0.79	6.79	14.77	0.25
Main Branch	299	8.05	295.94	297.29	296.71	297.35	0.001467	1.07	7.51	17.61	0.33
Main Branch	299	9.9	295.94	297.34	296.79	297.42	0.001879	1.25	7.9	19.12	0.38
Main Branch	299	20.1	295.94	297.59	297.16	297.72	0.002789	1.62	15.26	25.04	0.47
Main Branch	299	23.9	295.94	297.65	297.27	297.81	0.003303	1.83	16.52	26.19	0.52
Main Branch	287	1.13	296.6	296.82	296.82	296.89	0.11172	1.14	0.99	7.66	1.01
Main Branch	287	2.85	296.6	296.94	296.94	297.04	0.097426	1.38	2.06	10.71	1.01
Main Branch	287	5.34	296.6	297.05	297.05	297.18	0.09	1.59	3.37	13.44	1.01
Main Branch	287	8.05	296.6	297.14	297.14	297.29	0.085045	1.73	4.66	15.71	1.01
Main Branch	287	9.9	296.6	297.19	297.19	297.35	0.082777	1.8	5.5	17.05	1.01
Main Branch	287	20.1	296.6	297.4	297.4	297.62	0.070869	2.1	9.62	22.35	0.99
Main Branch	287	23.9	296.6	297.46	297.46	297.7	0.068037	2.2	10.99	23.91	0.99
Main Branch	270	1.13	295.3	296.02	295.72	296.03	0.002598	0.5	2.27	6.49	0.27
Main Branch	270	2.85	295.3	296.21	295.91	296.24	0.004632	0.77	3.72	8.58	0.37
Main Branch	270	5.34	295.3	296.37	296.09	296.42	0.006672	1.02	5.22	10.26	0.46
Main Branch	270	8.05	295.3	296.49	296.23	296.57	0.008476	1.24	6.49	11.48	0.53
Main Branch	270	9.9	295.3	296.56	296.3	296.65	0.009796	1.34	7.38	12.95	0.57
Main Branch	270	20.1	295.3	296.82	296.64	296.98	0.01477	1.75	11.51	18.6	0.71
Main Branch	270	23.9	295.3	296.89	296.73	297.07	0.01589	1.86	12.87	20.03	0.74
Main Branch	251	1.13	295.59	295.83	295.83	295.9	0.050027	1.15	0.99	7.57	1.01
Main Branch	251	2.85	295.59	295.95	295.95	296.04	0.04512	1.33	2.14	12.22	1.01
Main Branch	251	5.34	295.59	296.04	296.04	296.16	0.041633	1.51	3.53	15.6	1.02
Main Branch	251	8.05	295.59	296.13	296.13	296.26	0.039227	1.64	4.91	18.39	1.01

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

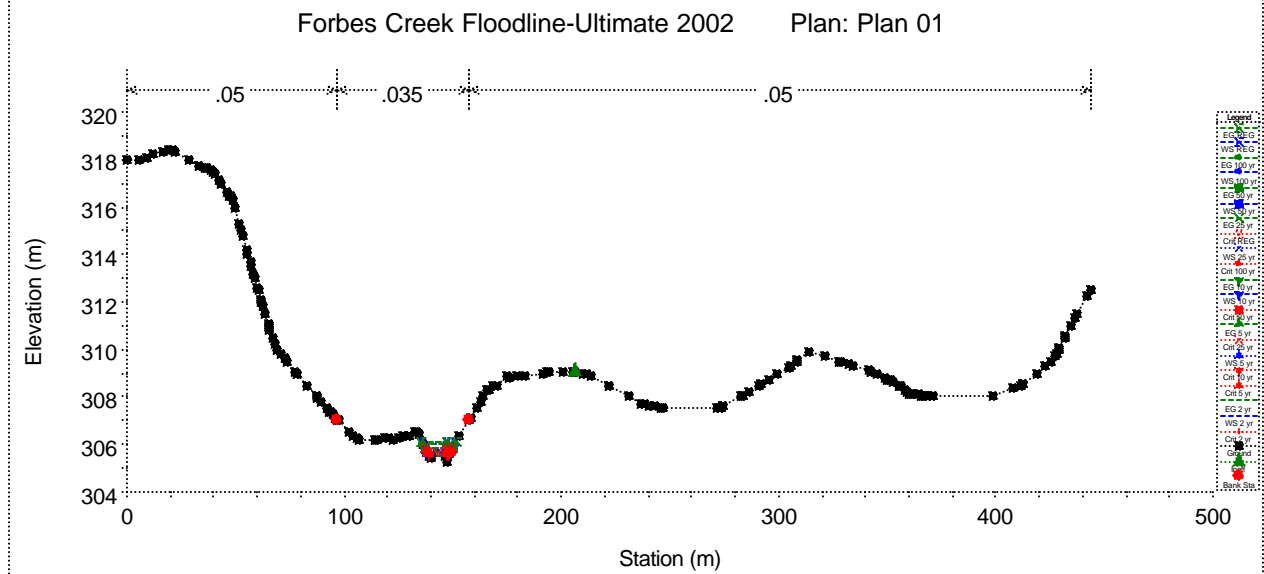
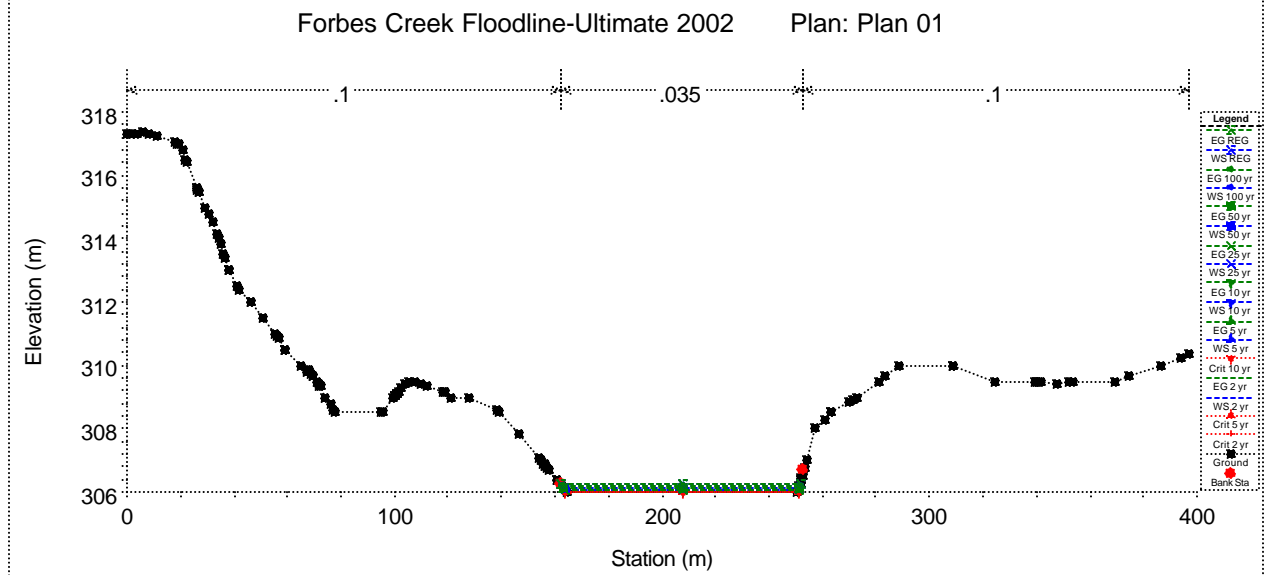
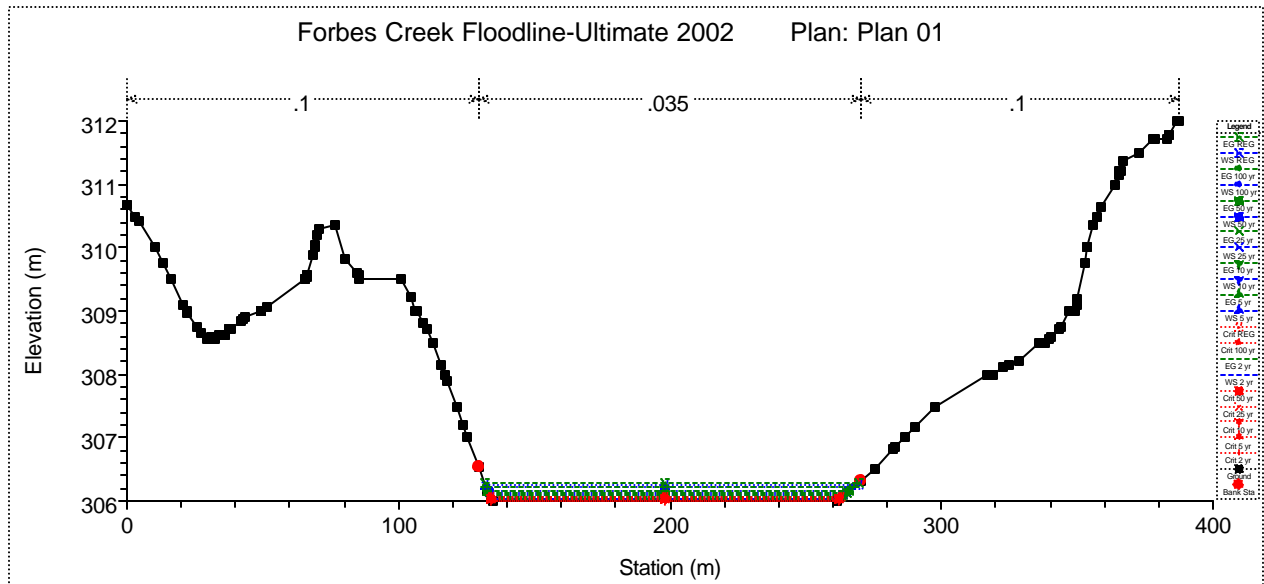
Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	251	9.9	295.59	296.17	296.17	296.32	0.038504	1.72	5.76	19.83	1.02
Main Branch	251	20.1	295.59	296.36	296.36	296.57	0.034064	2.05	9.81	23.66	1.02
Main Branch	251	23.9	295.59	296.41	296.41	296.65	0.03296	2.14	11.17	24.61	1.01
Main Branch	223	1.13	295	295.16	295.06	295.17	0.001378	0.3	3.71	24.07	0.25
Main Branch	223	2.85	295	295.25	295.12	295.26	0.002128	0.49	5.79	25.38	0.33
Main Branch	223	5.34	295	295.33	295.18	295.36	0.002685	0.66	8.04	26.72	0.39
Main Branch	223	8.05	295	295.41	295.24	295.44	0.002921	0.79	10.22	27.96	0.42
Main Branch	223	9.9	295	295.46	295.27	295.5	0.002959	0.85	11.59	28.69	0.43
Main Branch	223	20.1	295	295.68	295.42	295.75	0.002851	1.12	18.35	32.06	0.45
Main Branch	223	23.9	295	295.75	295.47	295.82	0.002858	1.2	20.54	33.08	0.46
Main Branch	191	1.13	295	295.12		295.12	0.001557	0.27	4.26	37.32	0.25
Main Branch	191	2.85	295	295.18		295.19	0.002389	0.43	6.59	38.25	0.33
Main Branch	191	5.34	295	295.26		295.27	0.002388	0.55	9.73	39.48	0.35
Main Branch	191	8.05	295	295.35		295.37	0.002051	0.61	13.21	40.8	0.34
Main Branch	191	9.9	295	295.4		295.42	0.001898	0.64	15.43	41.62	0.34
Main Branch	191	20.1	295	295.64		295.67	0.001525	0.77	26.03	45.46	0.32
Main Branch	191	23.9	295	295.72		295.75	0.001451	0.81	29.4	46.54	0.32
Main Branch	181	1.13	294.99	295.05	295.05	295.07	0.033323	0.68	1.65	34.88	1
Main Branch	181	2.85	294.99	295.1		295.13	0.016414	0.79	3.62	36.22	0.8
Main Branch	181	5.34	294.99	295.22		295.24	0.004687	0.68	7.9	38.89	0.48
Main Branch	181	8.05	294.99	295.31		295.34	0.002979	0.68	11.81	40.81	0.4
Main Branch	181	9.9	294.99	295.37		295.4	0.002536	0.7	14.19	41.95	0.38
Main Branch	181	20.1	294.99	295.62		295.66	0.001755	0.79	25.34	46.93	0.34
Main Branch	181	23.9	294.99	295.7		295.73	0.001648	0.83	28.9	48.42	0.34
Main Branch	167	1.13	294.3	294.93	294.68	294.94	0.001077	0.52	3.82	23.2	0.25
Main Branch	167	2.85	294.3	295.02	294.87	295.06	0.003066	0.99	6.12	30.92	0.44
Main Branch	167	5.34	294.3	295.11	295.03	295.18	0.004843	1.39	9.09	34.48	0.57
Main Branch	167	8.05	294.3	295.19	295.11	295.28	0.005993	1.68	12.01	37.64	0.65
Main Branch	167	9.9	294.3	295.23	295.17	295.34	0.0067	1.85	13.71	39.28	0.69
Main Branch	167	20.1	294.3	295.43	295.37	295.6	0.008829	2.5	22.21	46.5	0.83
Main Branch	167	23.9	294.3	295.49	295.43	295.68	0.009359	2.68	24.98	48.43	0.86
Main Branch	166	Inline Weir									
Main Branch	165	1.13	294.72	294.92		294.94	0.053884	0.88	1.95	20.47	0.69
Main Branch	165	2.85	294.72	295.01		295.04	0.041244	1.04	4.45	30.51	0.65
Main Branch	165	5.34	294.72	295.1		295.14	0.033406	1.14	7.39	34.08	0.61
Main Branch	165	8.05	294.72	295.19		295.22	0.029325	1.23	10.27	37.26	0.59
Main Branch	165	9.9	294.72	295.23		295.27	0.028664	1.3	11.96	39	0.6
Main Branch	165	20.1	294.72	295.43		295.49	0.025768	1.55	20.44	46.71	0.6
Main Branch	165	23.9	294.72	295.49		295.55	0.025421	1.62	23.24	48.99	0.6
Main Branch	156	1.13	294.51	294.73		294.73	0.012593	0.4	3.35	25.23	0.33
Main Branch	156	2.85	294.51	294.82		294.83	0.014598	0.59	5.92	29.25	0.38
Main Branch	156	5.34	294.51	294.9		294.92	0.017995	0.8	8.38	31.54	0.44
Main Branch	156	8.05	294.51	294.97		295	0.020302	0.96	10.6	33.47	0.49
Main Branch	156	9.9	294.51	295.01		295.05	0.021658	1.06	11.94	34.73	0.51
Main Branch	156	20.1	294.51	295.19		295.26	0.0242	1.41	18.98	42.22	0.57
Main Branch	156	23.9	294.51	295.24		295.32	0.025037	1.51	21.25	44.33	0.59
Main Branch	143	1.13	294.16	294.42	294.39	294.44	0.059475	0.75	1.71	21.27	0.69
Main Branch	143	2.85	294.16	294.5	294.47	294.54	0.051387	0.95	3.82	30.46	0.69
Main Branch	143	5.34	294.16	294.58	294.54	294.62	0.040501	1.03	6.68	35.27	0.64
Main Branch	143	8.05	294.16	294.65	294.58	294.7	0.035255	1.09	9.3	37.18	0.62
Main Branch	143	9.9	294.16	294.7	294.61	294.75	0.033095	1.13	10.94	38.25	0.61
Main Branch	143	20.1	294.16	294.85	294.73	294.92	0.03812	1.44	16.85	41.9	0.68
Main Branch	143	23.9	294.16	294.9	294.77	294.98	0.037302	1.5	19.1	43.21	0.68

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

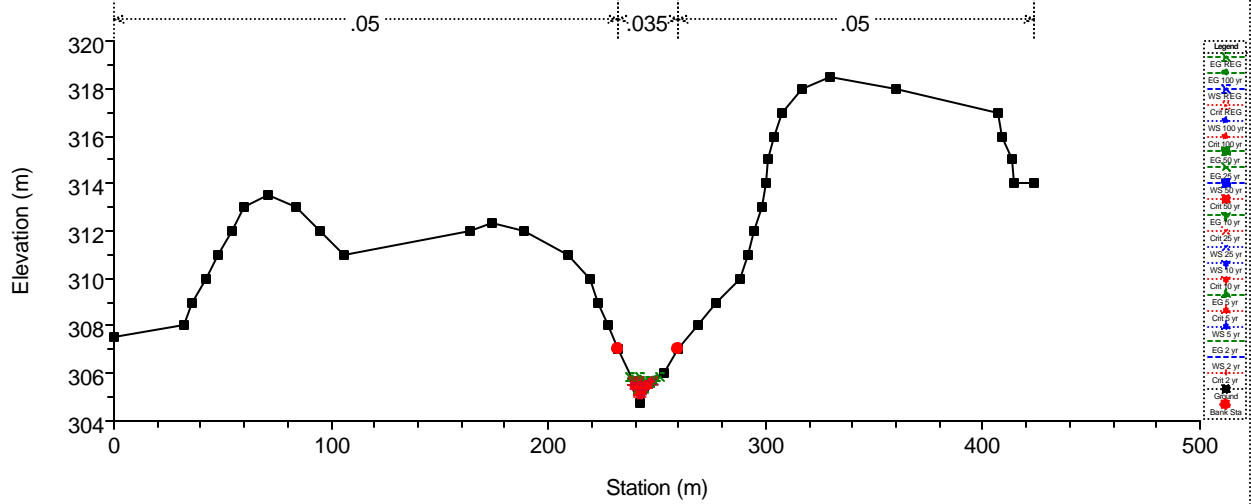
Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	127	1.13	292.7	293.07	293.07	293.19	0.110459	1.51	0.75	3.26	1.01
Main Branch	127	2.85	292.7	293.27	293.27	293.45	0.096955	1.87	1.52	4.32	1.01
Main Branch	127	5.34	292.7	293.5	293.5	293.7	0.093437	1.98	2.7	6.91	1.01
Main Branch	127	8.05	292.7	293.65	293.65	293.87	0.089323	2.07	3.89	9	1
Main Branch	127	9.9	292.7	293.75	293.75	293.96	0.086999	2.03	4.88	11.43	0.99
Main Branch	127	20.1	292.7	294.11		294.23	0.055206	1.51	13.3	35.32	0.79
Main Branch	127	23.9	292.7	294.16		294.29	0.056797	1.57	15.19	38.85	0.8
Main Branch	107	1.13	292.09	292.77	292.35	292.78	0.001996	0.31	3.68	8.83	0.15
Main Branch	107	2.85	292.09	292.94	292.52	292.95	0.00485	0.54	5.29	10.66	0.24
Main Branch	107	5.34	292.09	293.1	292.67	293.13	0.008327	0.74	7.19	13.45	0.32
Main Branch	107	8.05	292.09	293.22	292.8	293.26	0.011703	0.9	8.96	16.29	0.39
Main Branch	107	9.9	292.09	293.34	292.87	293.38	0.011989	0.88	11.23	21.43	0.39
Main Branch	107	20.1	292.09	293.59		293.66	0.016797	1.12	17.93	30.79	0.47
Main Branch	107	23.9	292.09	293.75		293.81	0.012403	1.02	23.34	36.98	0.41
Main Branch	91	3.98	291.98	292.53	292.39	292.59	0.030275	1.12	3.55	9.51	0.58
Main Branch	91	5.9	291.98	292.66	292.48	292.73	0.027715	1.19	4.97	11.38	0.57
Main Branch	91	8.26	291.98	292.79	292.59	292.87	0.026124	1.26	6.56	13.19	0.57
Main Branch	91	10.3	291.98	292.89	292.66	292.97	0.025343	1.31	7.85	14.49	0.57
Main Branch	91	13	291.98	292.98	292.75	293.08	0.025349	1.39	9.36	15.87	0.58
Main Branch	91	19.8	291.98	293.12	292.92	293.27	0.035747	1.7	11.63	18.81	0.69
Main Branch	91	27.4	291.98	293.25	293.09	293.43	0.04529	1.9	14.43	23.68	0.78
Main Branch	63	3.98	291.27	292.1	291.93	292.16	0.009796	1.04	3.81	9.77	0.53
Main Branch	63	5.9	291.27	292.2		292.28	0.011161	1.21	4.87	11.01	0.58
Main Branch	63	8.26	291.27	292.32		292.41	0.011985	1.32	6.27	13.2	0.61
Main Branch	63	10.3	291.27	292.41		292.5	0.012332	1.35	7.64	15.88	0.62
Main Branch	63	13	291.27	292.53		292.62	0.012239	1.34	9.71	20.5	0.62
Main Branch	63	19.8	291.27	292.75		292.84	0.008237	1.35	14.89	24.64	0.53
Main Branch	63	27.4	291.27	292.97		293.06	0.005902	1.38	20.54	27.03	0.47
Main Branch	49	3.98	291.42	292	291.81	292.04	0.006504	0.83	4.8	12.88	0.43
Main Branch	49	5.9	291.42	292.1	291.89	292.15	0.006602	0.98	6.11	13.84	0.45
Main Branch	49	8.26	291.42	292.22		292.28	0.006194	1.09	7.78	14.98	0.45
Main Branch	49	10.3	291.42	292.31		292.38	0.005794	1.17	9.25	15.91	0.45
Main Branch	49	13	291.42	292.42		292.5	0.005629	1.27	11	17.01	0.45
Main Branch	49	19.8	291.42	292.63		292.74	0.005737	1.5	14.96	20.52	0.48
Main Branch	49	27.4	291.42	292.85		292.98	0.005417	1.66	19.84	24.12	0.48
Main Branch	32	3.98	291.07	291.67	291.67	291.83	0.025695	1.87	2.95	11.21	0.89
Main Branch	32	5.9	291.07	291.84		291.97	0.015612	1.81	5.08	13.77	0.73
Main Branch	32	8.26	291.07	291.99		292.12	0.01252	1.87	7.35	16.03	0.68
Main Branch	32	10.3	291.07	292.09		292.24	0.012056	1.99	9.04	18.27	0.68
Main Branch	32	13	291.07	292.19		292.35	0.012405	2.16	10.93	20.55	0.7
Main Branch	32	19.8	291.07	292.36		292.58	0.014061	2.58	14.93	24.69	0.77
Main Branch	32	27.4	291.07	292.69		292.86	0.008838	2.41	24.23	32.45	0.63
Main Branch	21	3.98	290.1	291.68	290.8	291.72	0.002365	0.87	5.99	12.36	0.24
Main Branch	21	5.9	290.1	291.83	290.99	291.88	0.003102	1.08	7.98	13.86	0.28
Main Branch	21	8.26	290.1	291.97	291.19	292.04	0.003939	1.28	9.95	15.16	0.32
Main Branch	21	10.3	290.1	292.06	291.35	292.14	0.00465	1.45	11.42	17.54	0.35
Main Branch	21	13	290.1	292.14	291.72	292.25	0.005856	1.68	12.94	20.27	0.4
Main Branch	21	19.8	290.1	292.27	291.98	292.45	0.009295	2.22	15.9	24.5	0.51
Main Branch	21	27.4	290.1	292.64	292.22	292.77	0.006466	2.08	27.14	36.03	0.44
Main Branch	18.5	Culvert									
Main Branch	16	3.98	290.14	290.88	290.74	291.06	0.015892	1.88	2.12	3.65	0.71
Main Branch	16	5.9	290.14	291.21	290.91	291.39	0.009953	1.91	3.08	4.98	0.6

HEC-RAS Plan: ds River: Forbes Cr. Reach: Main Branch

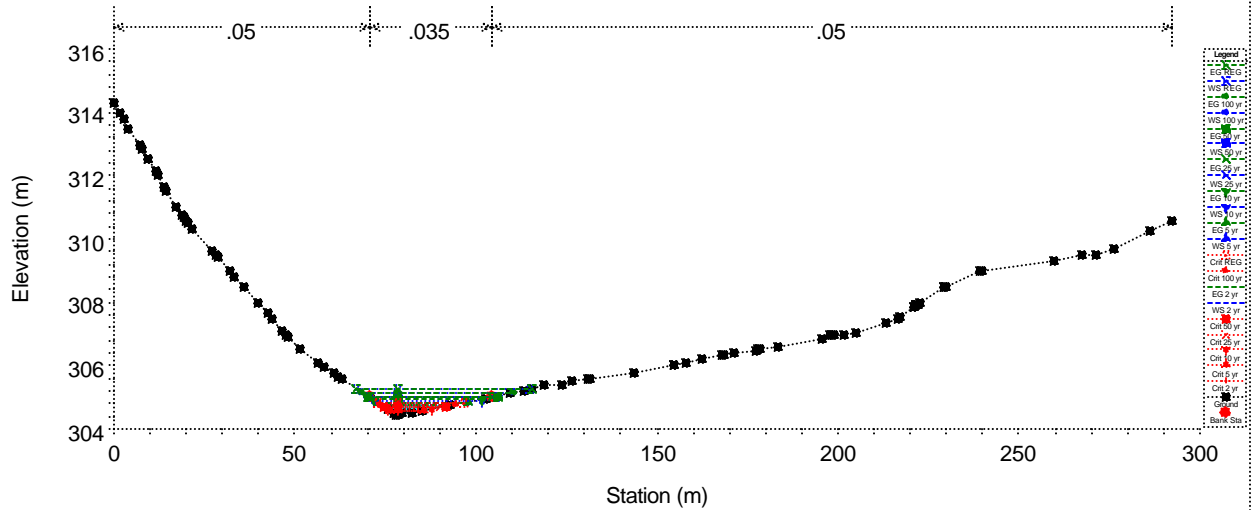
Reach	River Sta	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Main Branch	16	8.26	290.14	291.67	291.09	291.74	0.005179	1.15	7.35	11.37	0.41
Main Branch	16	10.3	290.14	291.97	291.24	292.02	0.002659	1.02	11.43	16.26	0.31
Main Branch	16	13	290.14	292.13	291.53	292.19	0.002565	1.1	14.28	19.34	0.31
Main Branch	16	19.8	290.14	292.33	291.68	292.42	0.00339	1.39	18.55	23.45	0.37
Main Branch	16	27.4	290.14	292.66	291.88	292.75	0.002888	1.47	28.19	35.95	0.35
Main Branch	13.*	3.98	289.96	290.9	290.55	290.99	0.008285	1.33	2.99	4.16	0.48
Main Branch	13.*	5.9	289.96	291.24	290.73	291.33	0.005499	1.37	4.3	5.11	0.41
Main Branch	13.*	8.26	289.96	291.61	290.89	291.71	0.004128	1.44	5.73	6.72	0.38
Main Branch	13.*	10.3	289.96	291.94	291.02	292.01	0.00298	1.11	9.76	13.25	0.32
Main Branch	13.*	13	289.96	292.1	291.17	292.18	0.00305	1.22	12.25	17.96	0.33
Main Branch	13.*	19.8	289.96	292.28	291.51	292.4	0.004447	1.59	15.84	23.01	0.41
Main Branch	13.*	27.4	289.96	292.61	291.83	292.73	0.003745	1.66	25.65	36.84	0.39
Main Branch	10	3.98	289.77	290.89	290.35	290.95	0.004339	1.03	3.85	4.16	0.34
Main Branch	10	5.9	289.77	291.24	290.51	291.3	0.003659	1.1	5.36	4.61	0.32
Main Branch	10	8.26	289.77	291.62	290.68	291.69	0.003151	1.17	7.04	5.18	0.3
Main Branch	10	10.3	289.77	291.91	290.81	291.99	0.002825	1.22	8.42	5.86	0.29
Main Branch	10	13	289.77	292.07	290.97	292.16	0.003607	1.32	10.36	15.49	0.33
Main Branch	10	19.8	289.77	292.2	291.29	292.37	0.006204	1.83	12.84	22.21	0.44
Main Branch	10	27.4	289.77	292.55	291.61	292.71	0.005224	1.89	22.9	36.75	0.41
Main Branch	7.5	Culvert									
Main Branch	5	3.98	289.54	290.43	290.12	290.53	0.010191	1.43	2.77	3.54	0.52
Main Branch	5	5.9	289.54	290.68	290.29	290.81	0.009652	1.62	3.65	3.77	0.51
Main Branch	5	8.26	289.54	290.8	290.46	291.01	0.01322	2.01	4.11	3.89	0.6
Main Branch	5	10.3	289.54	290.91	290.6	291.18	0.015438	2.28	4.52	4	0.66
Main Branch	5	13	289.54	291.05	290.76	291.39	0.017365	2.59	5.02	4.23	0.71
Main Branch	5	19.8	289.54	291.13	291.13	291.84	0.033613	3.73	5.3	4.45	1
Main Branch	5	27.4	289.54	292.49	291.47	292.62	0.003819	1.76	28.23	51.78	0.36
Main Branch	0	3.98	289.17	290.37	290.07	290.43	0.007085	1.05	3.8	6.91	0.45
Main Branch	0	5.9	289.17	290.69	290.21	290.72	0.00289	0.87	9.42	26.71	0.31
Main Branch	0	8.26	289.17	290.87	290.34	290.9	0.002321	0.89	14.55	30.22	0.28
Main Branch	0	10.3	289.17	291.03	290.42	291.06	0.001858	0.88	19.95	37	0.26
Main Branch	0	13	289.17	291.23	290.62	291.26	0.001386	0.84	27.66	40.13	0.23
Main Branch	0	19.8	289.17	291.39	290.79	291.43	0.001904	1.06	34.28	42.66	0.28
Main Branch	0	27.4	289.17	292.57	290.93	292.58	0.000248	0.56	110.01	94.08	0.11



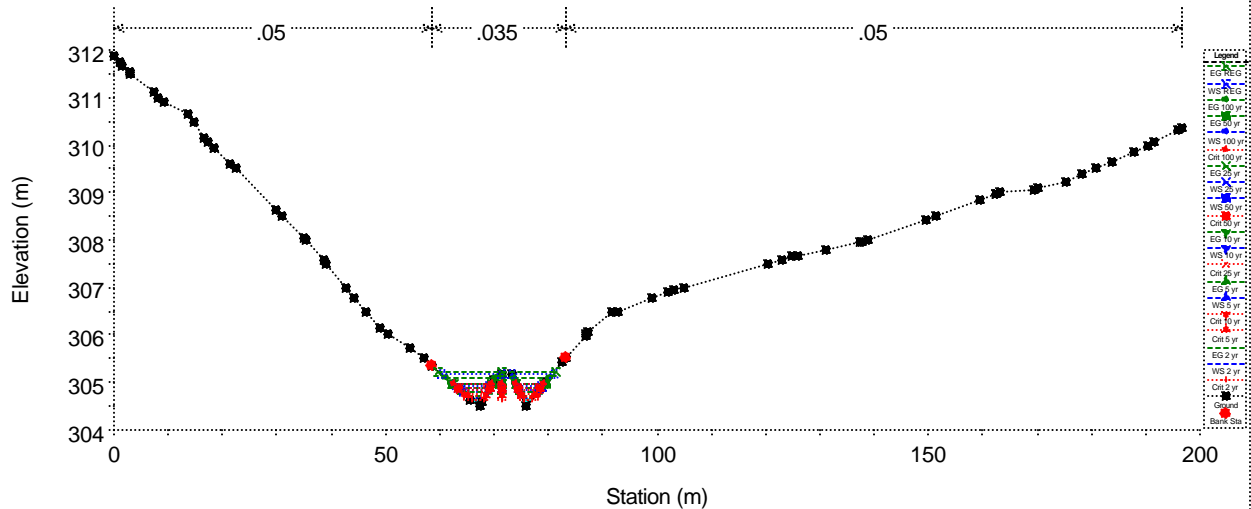
Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01

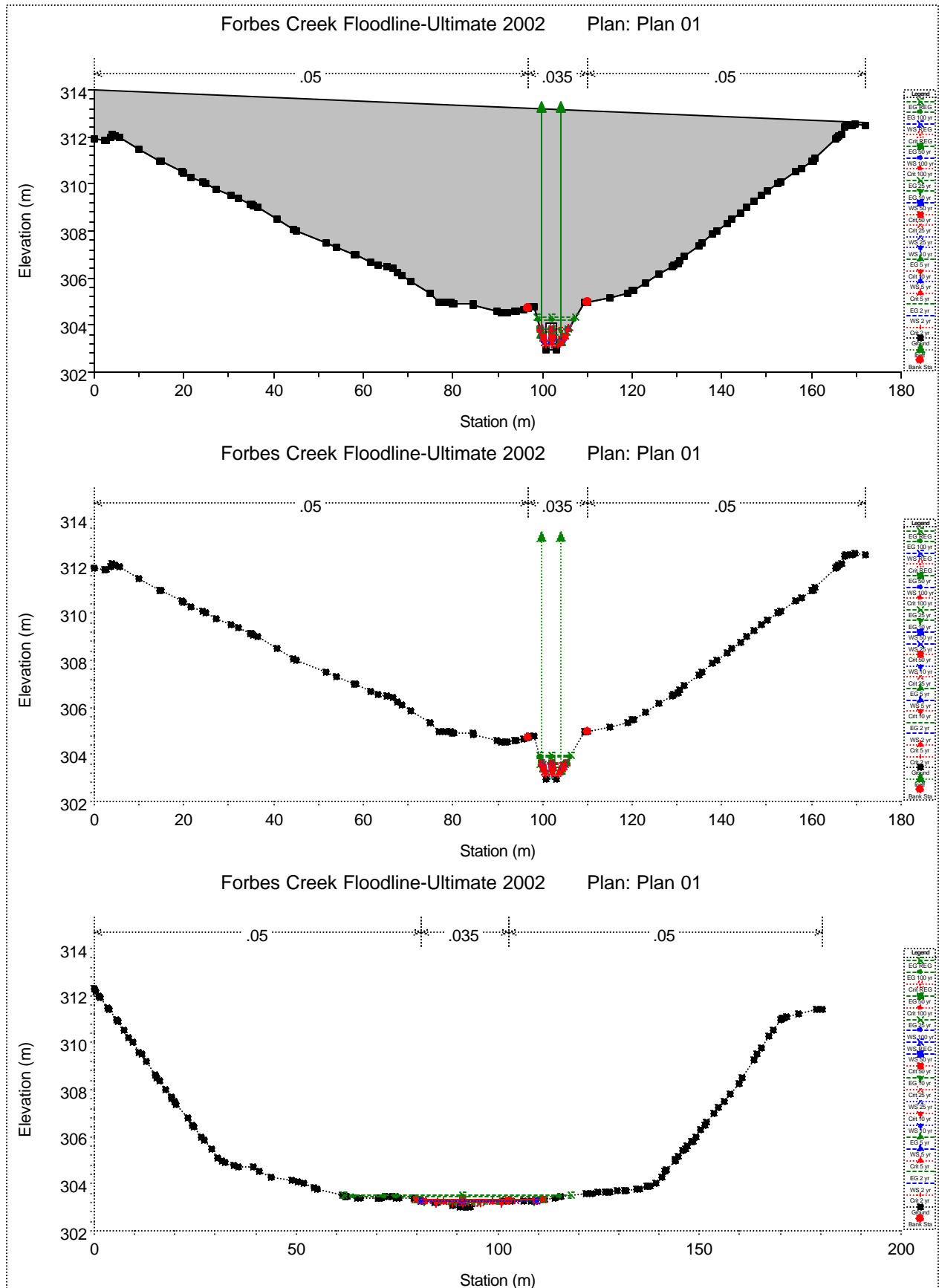


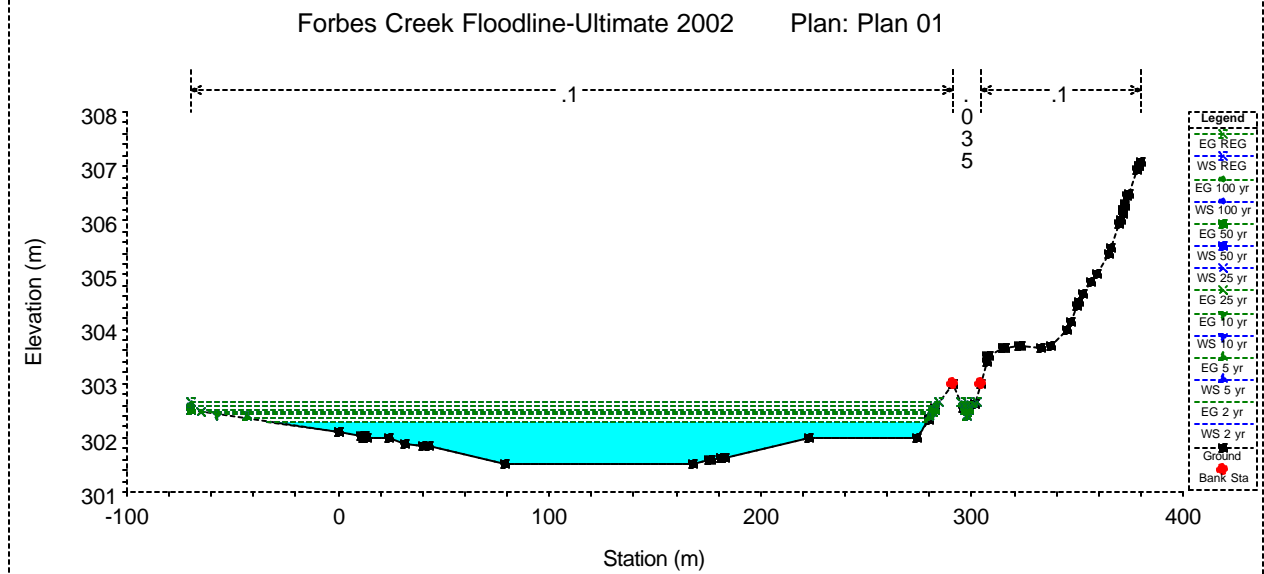
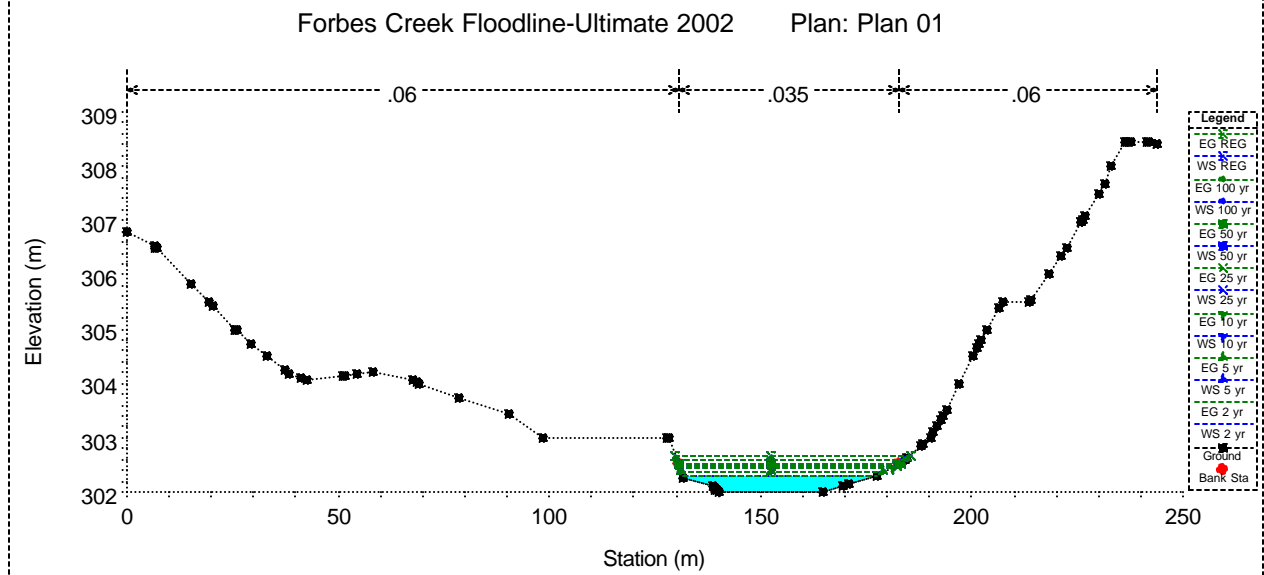
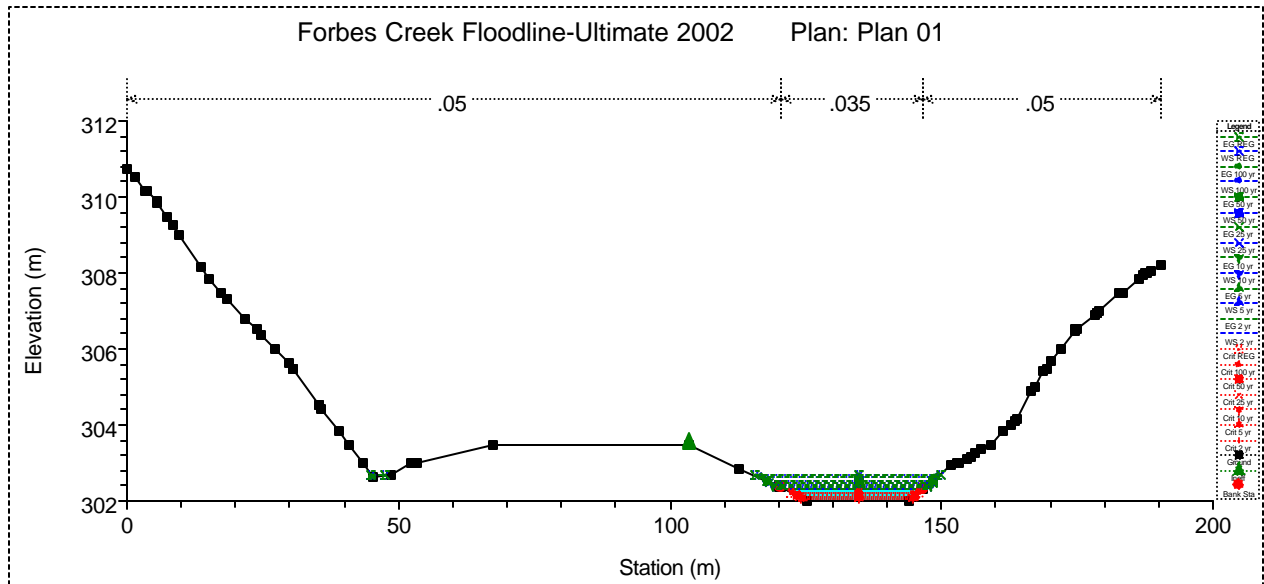
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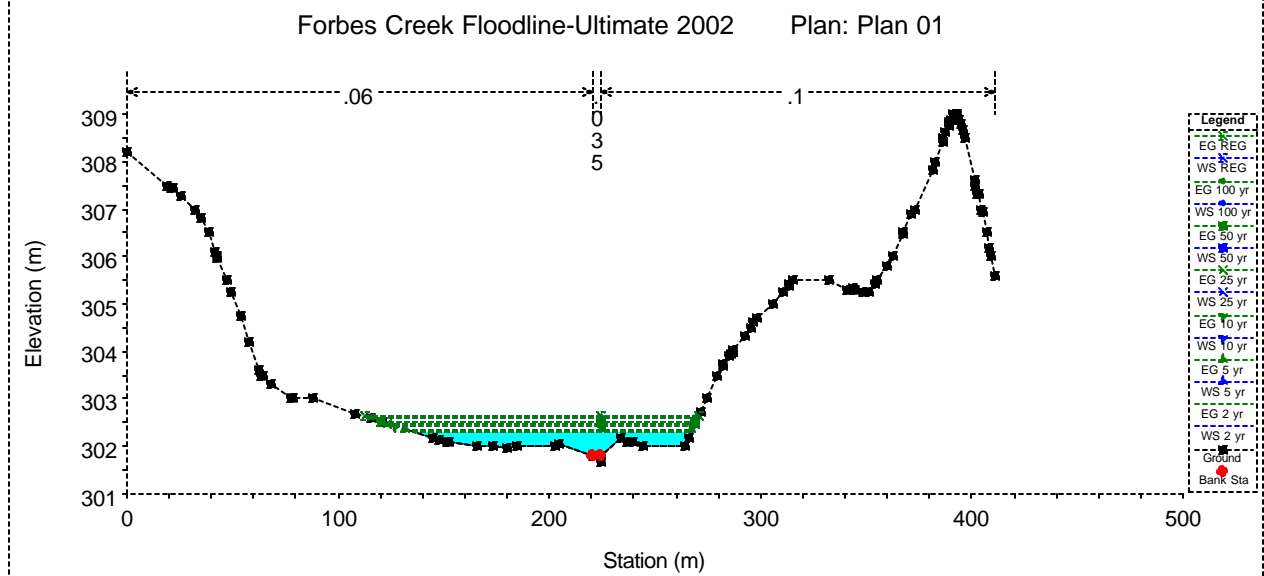
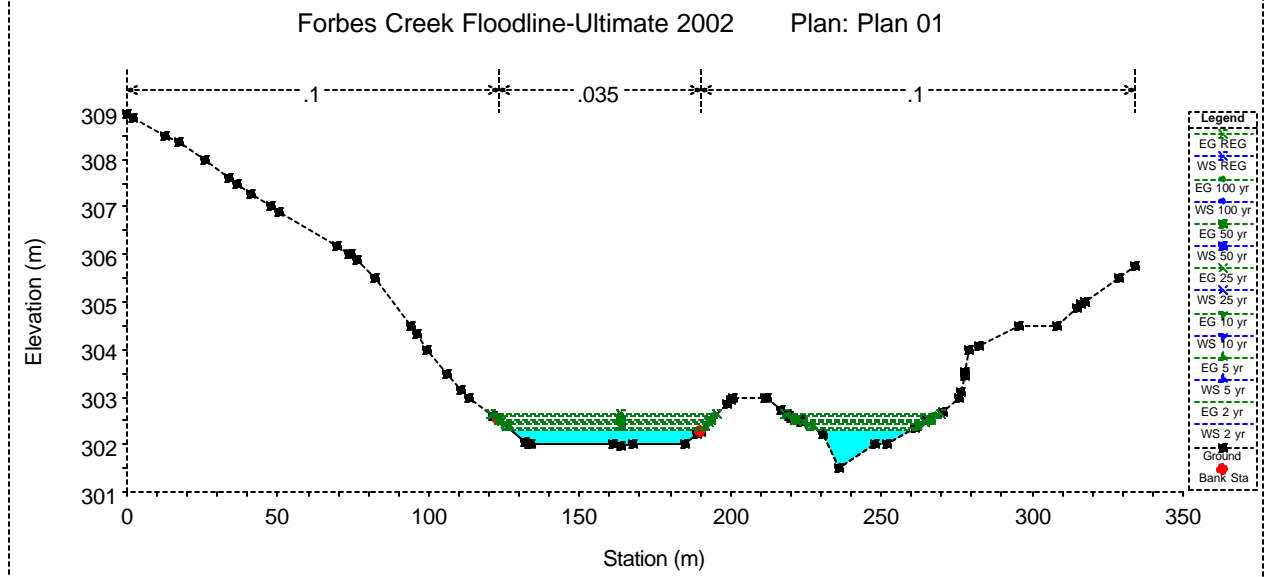
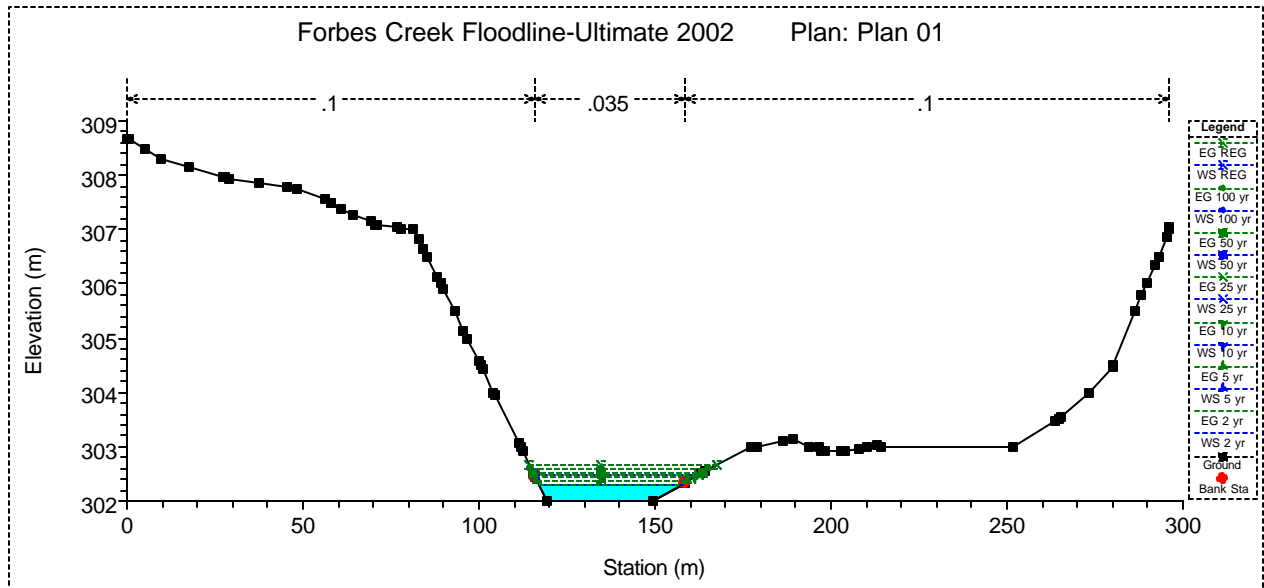


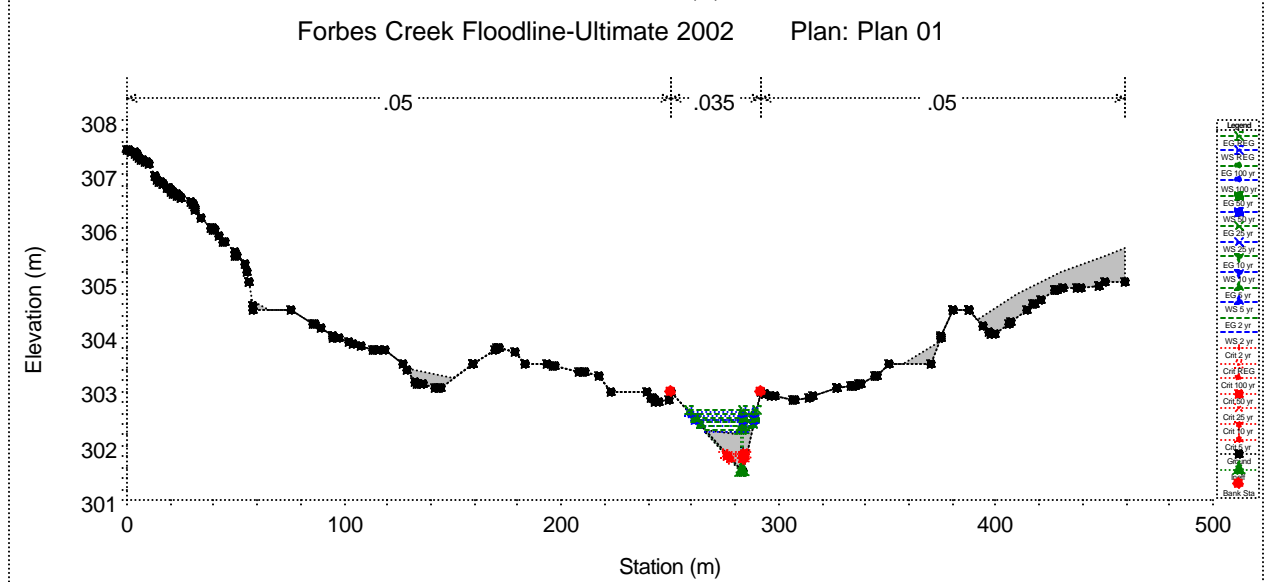
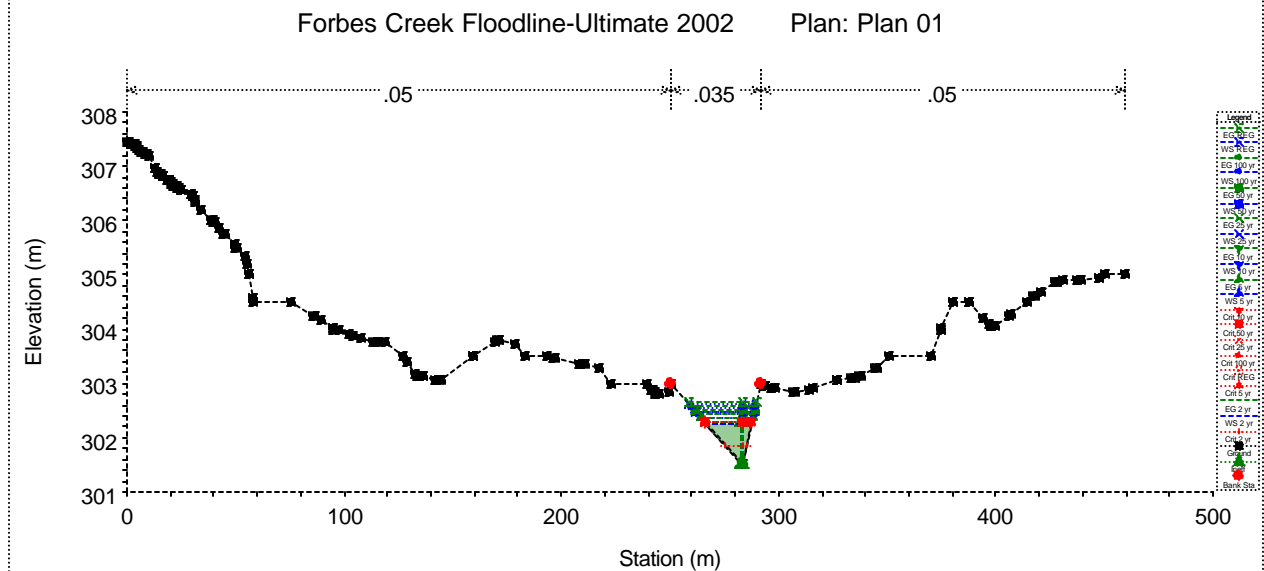
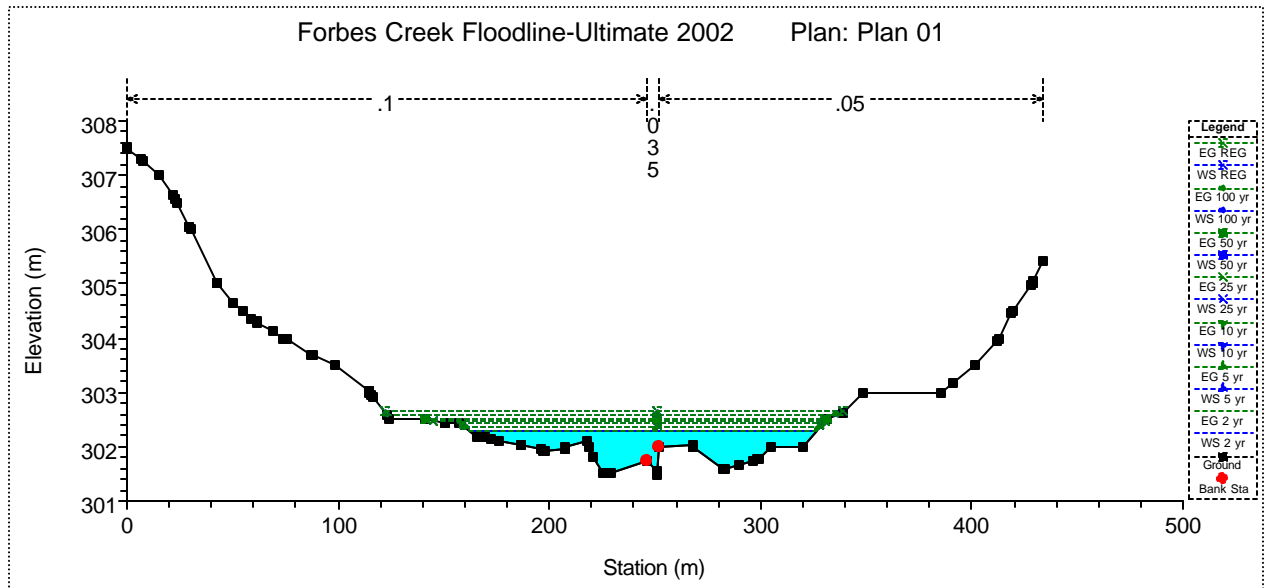
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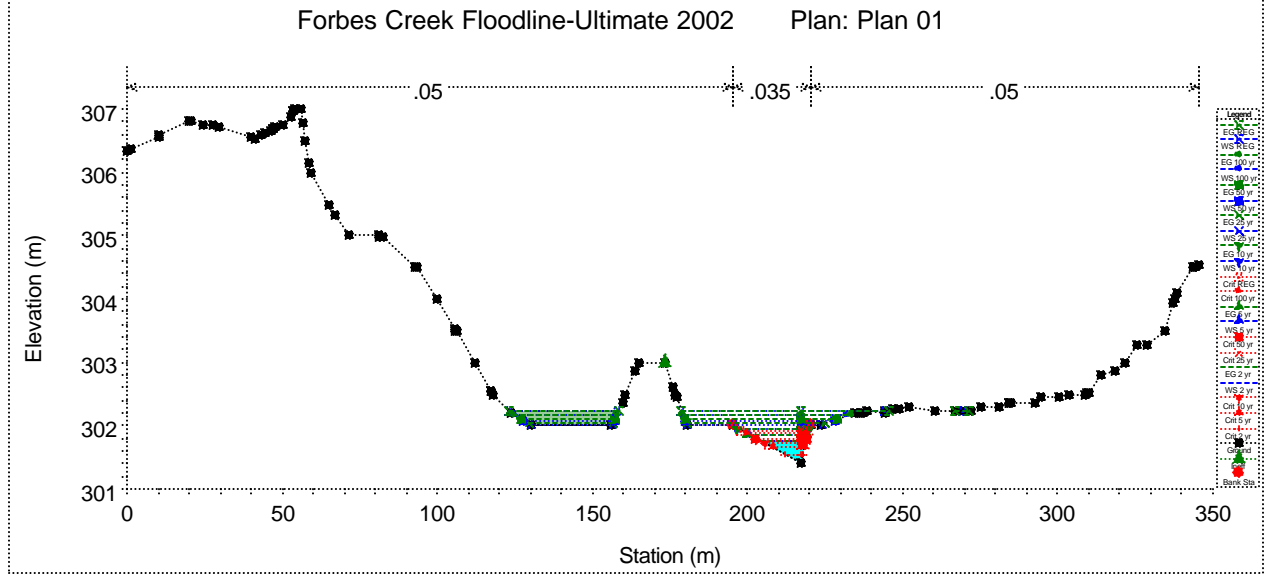
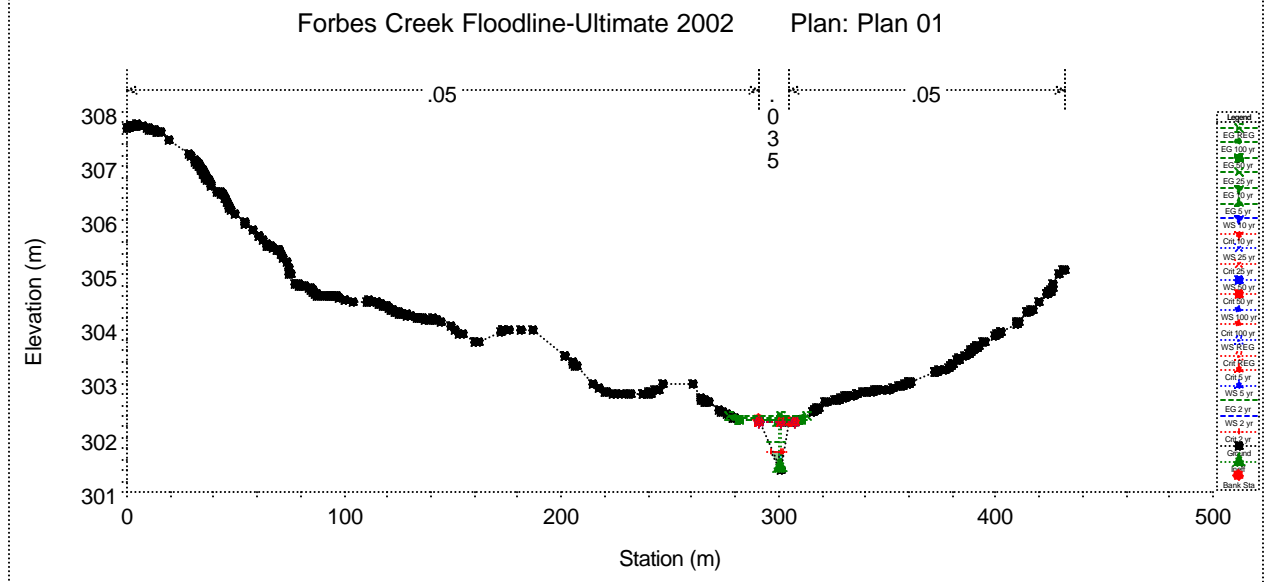
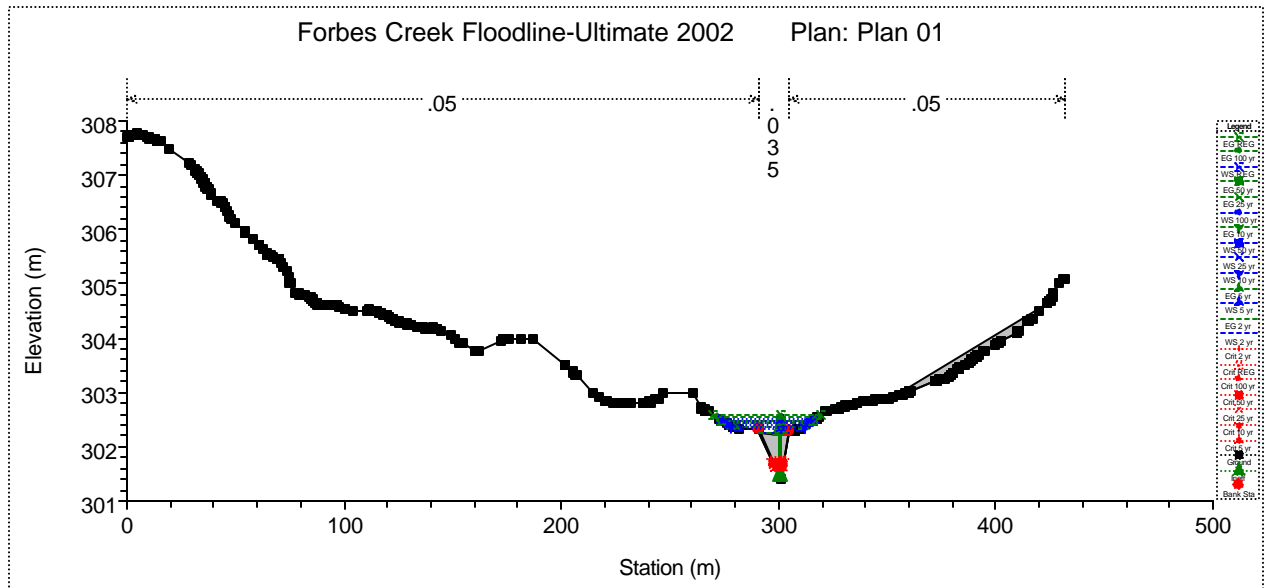




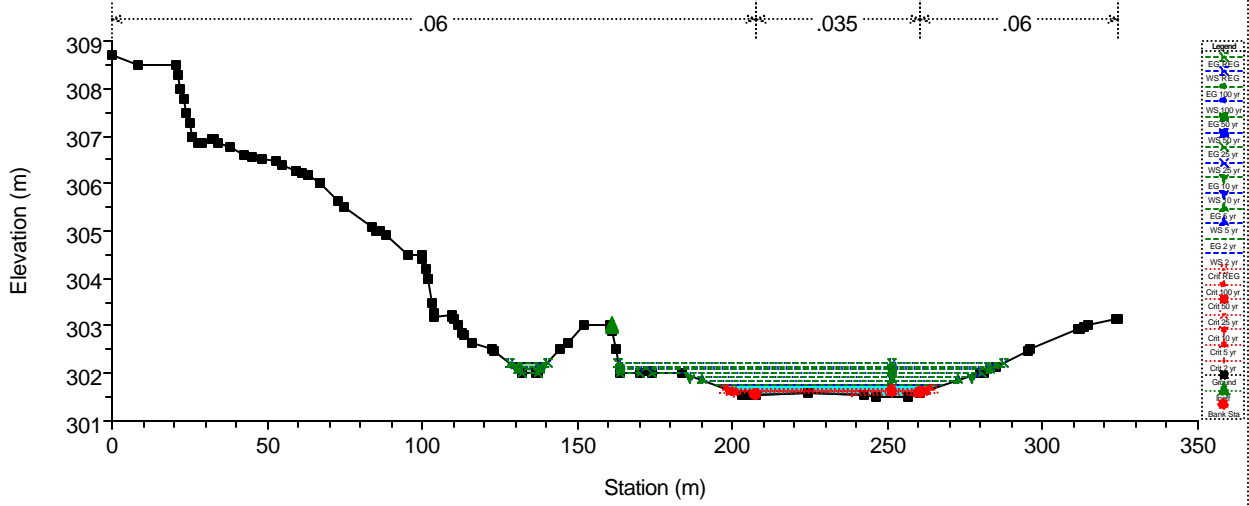




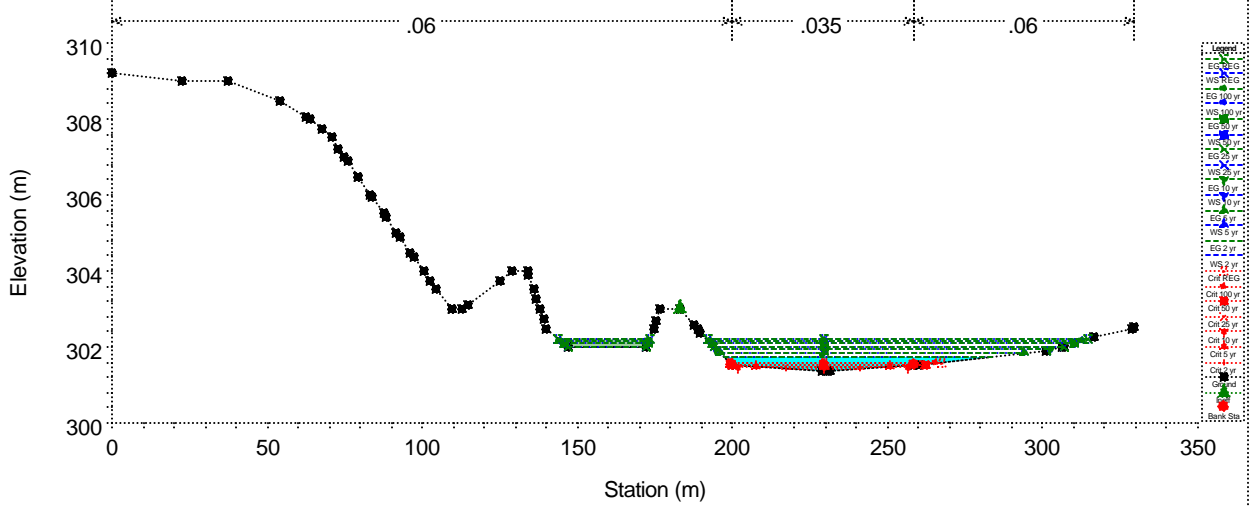




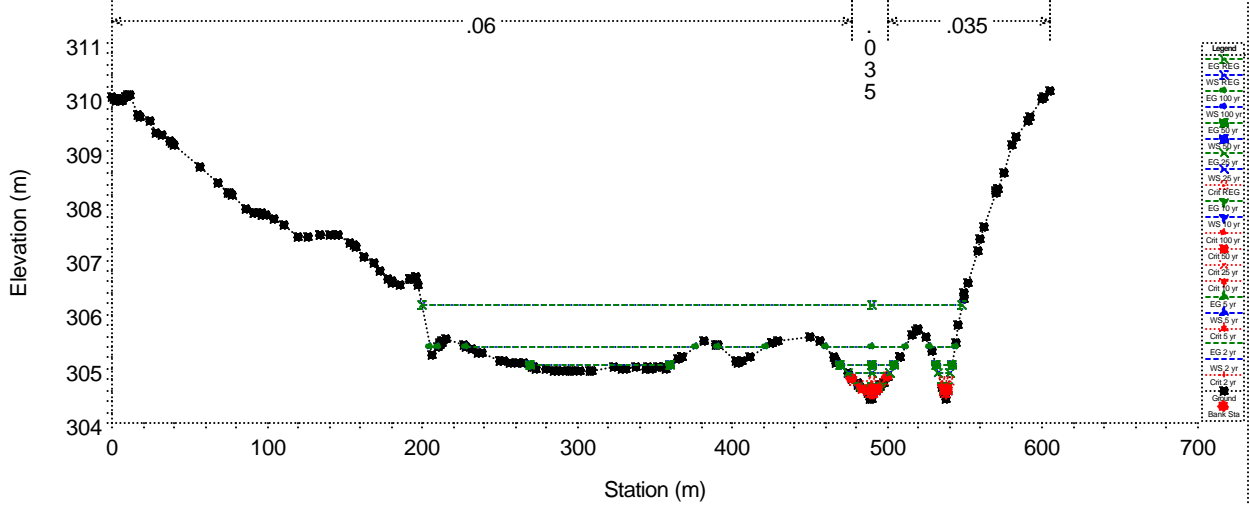
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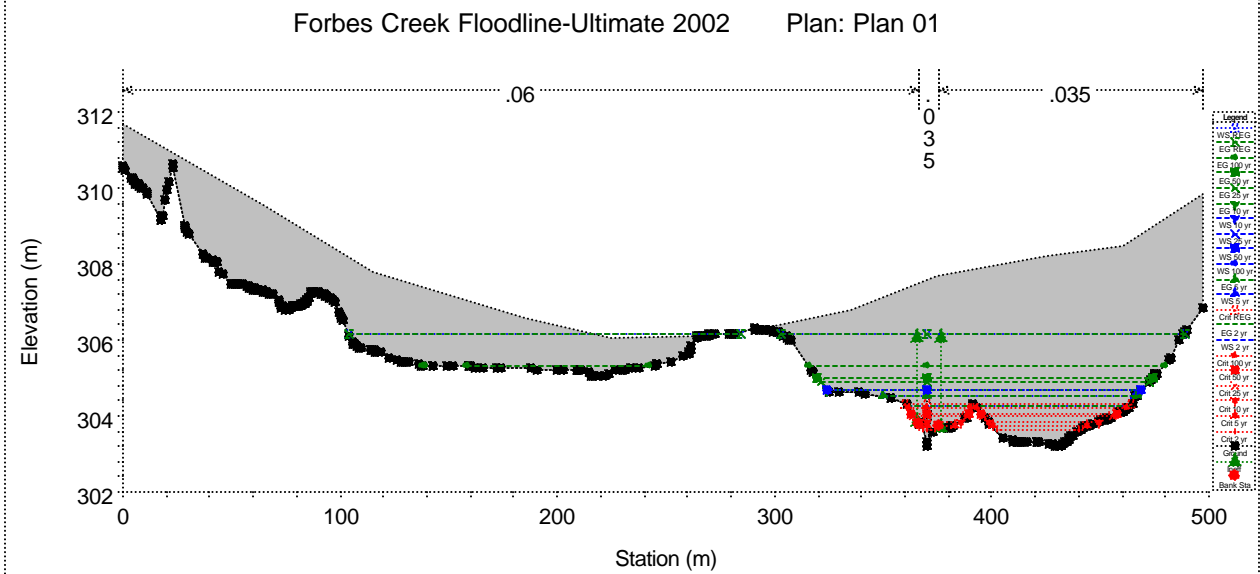
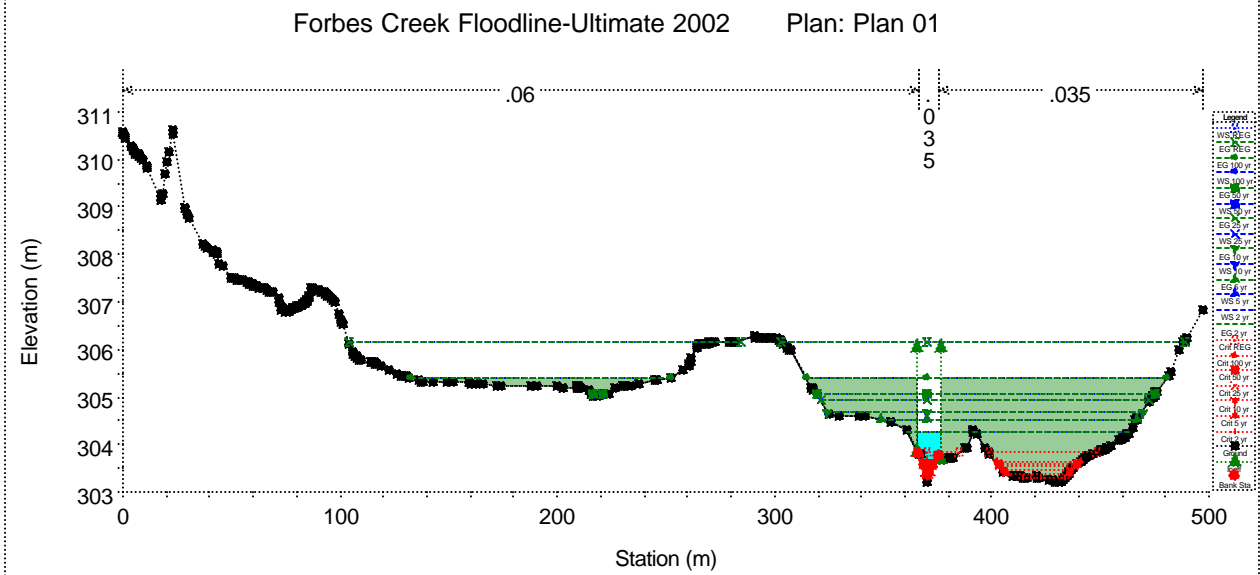
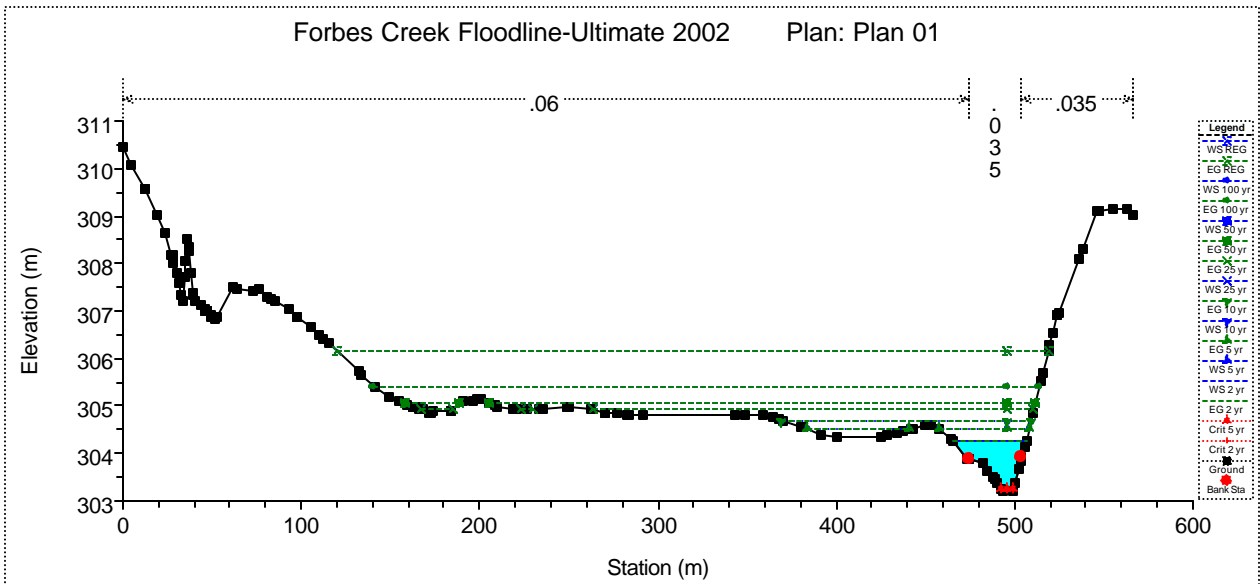


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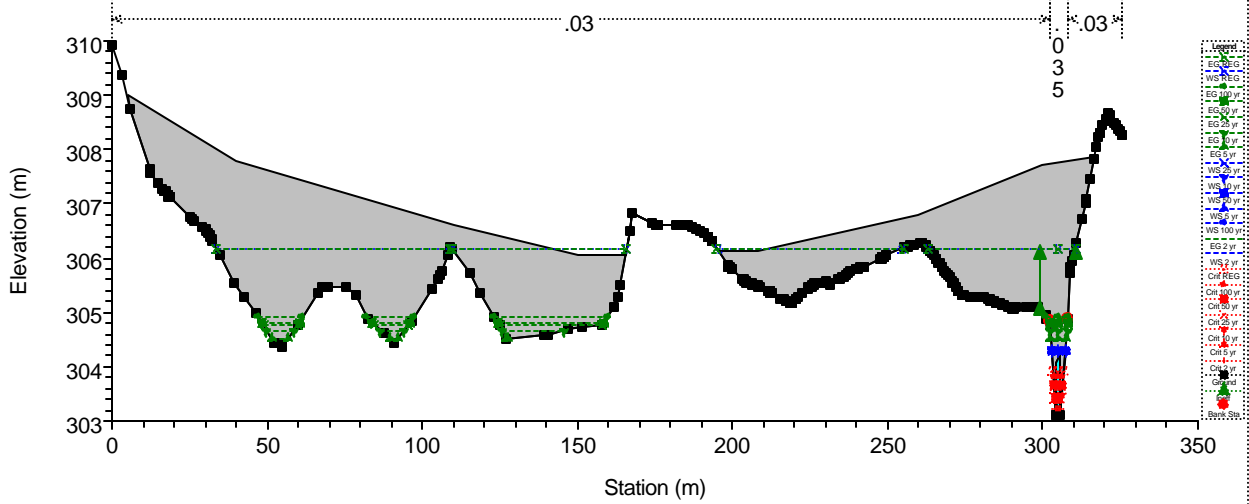


Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01

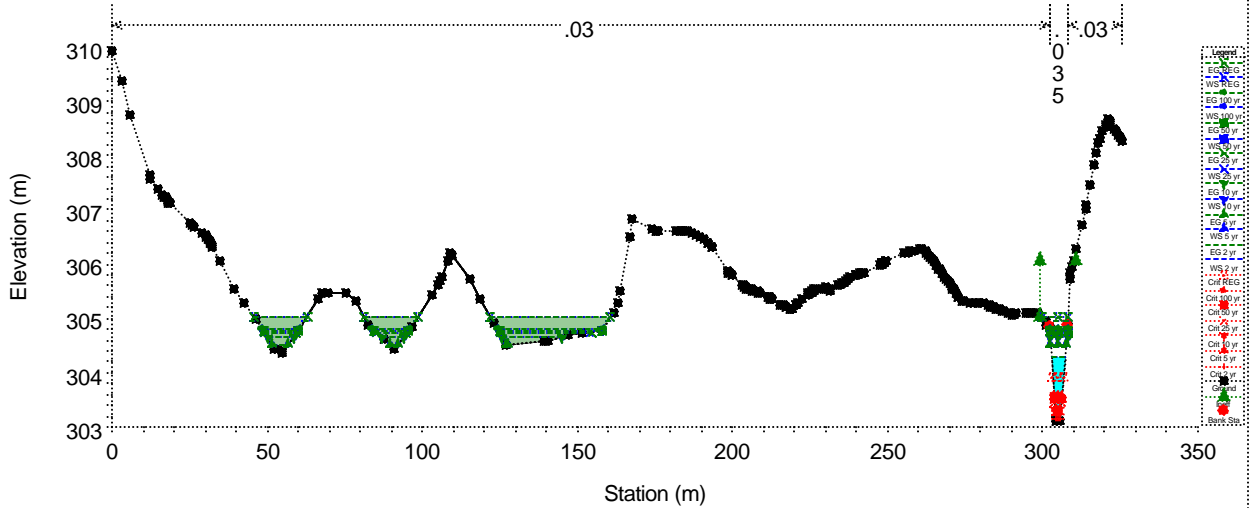




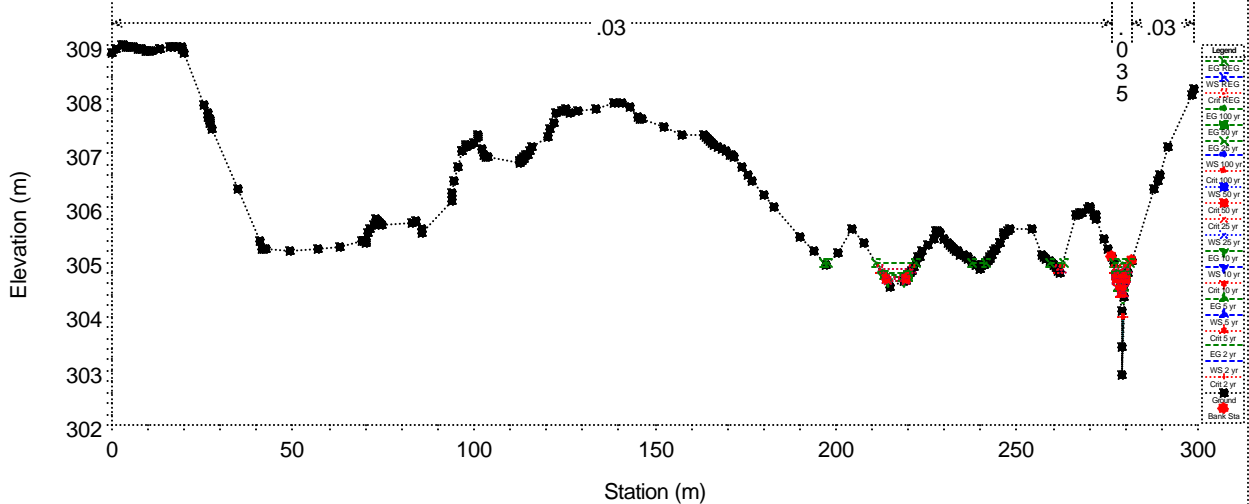
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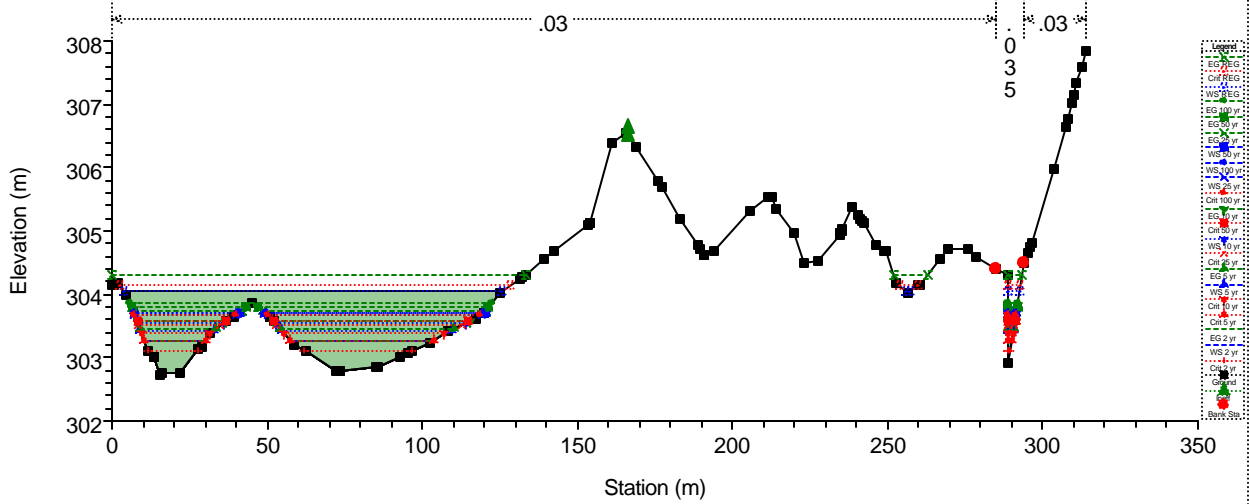
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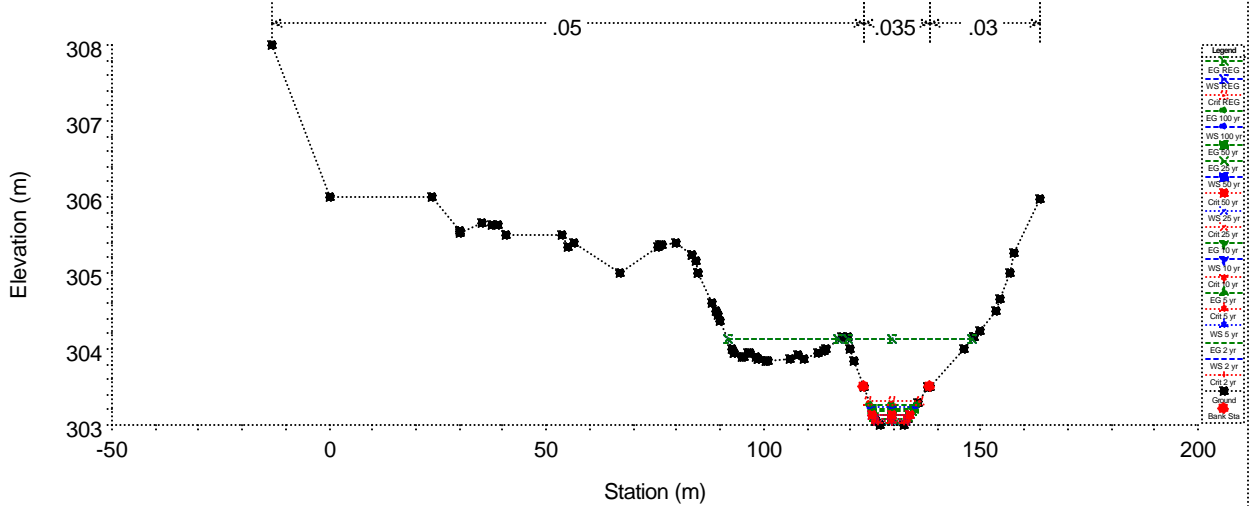
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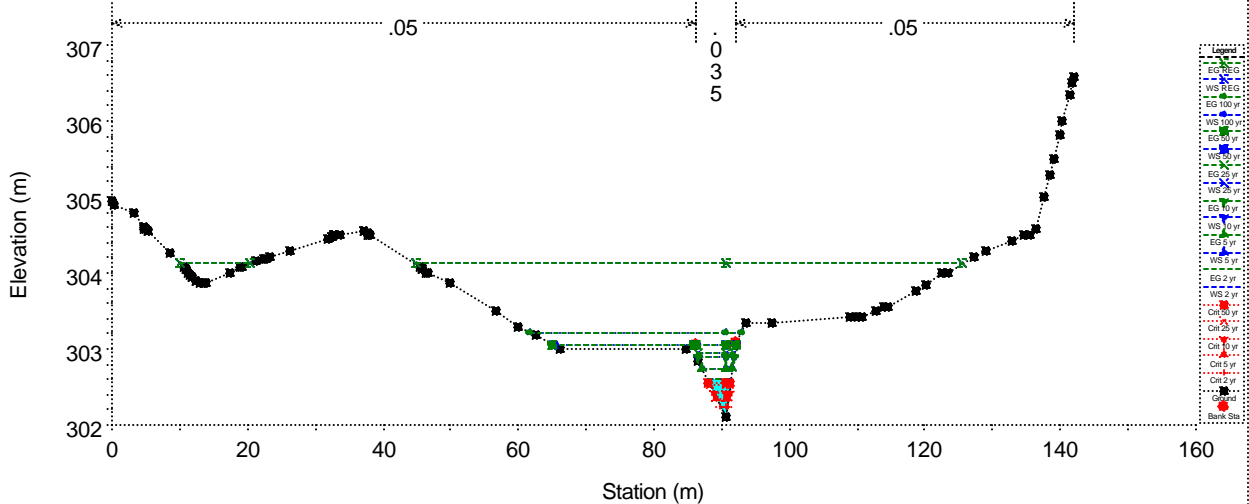
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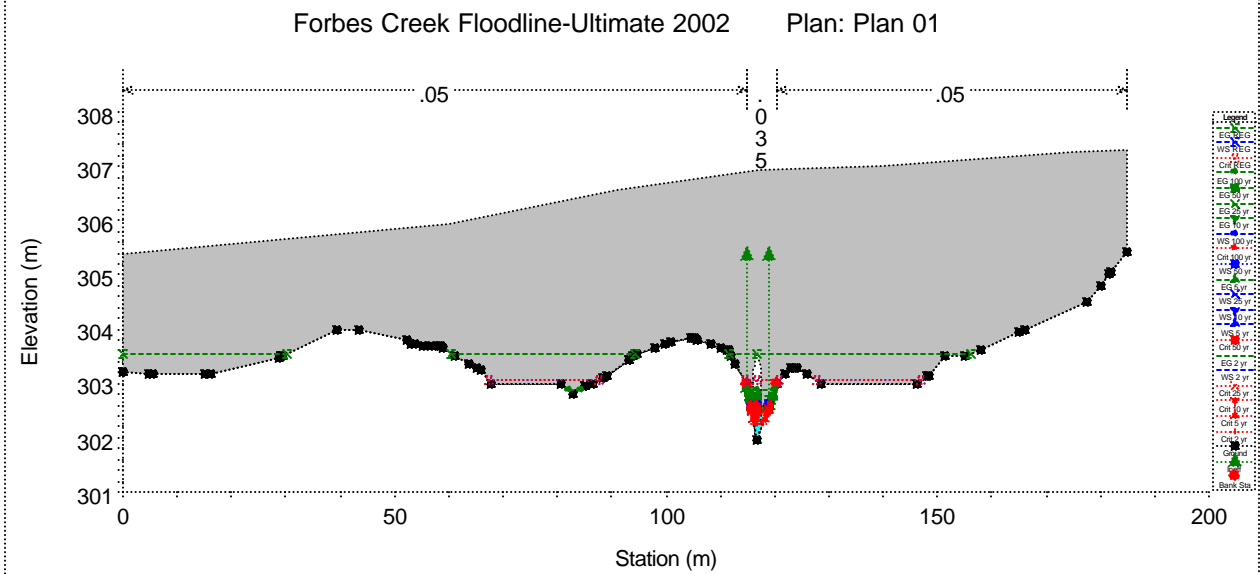
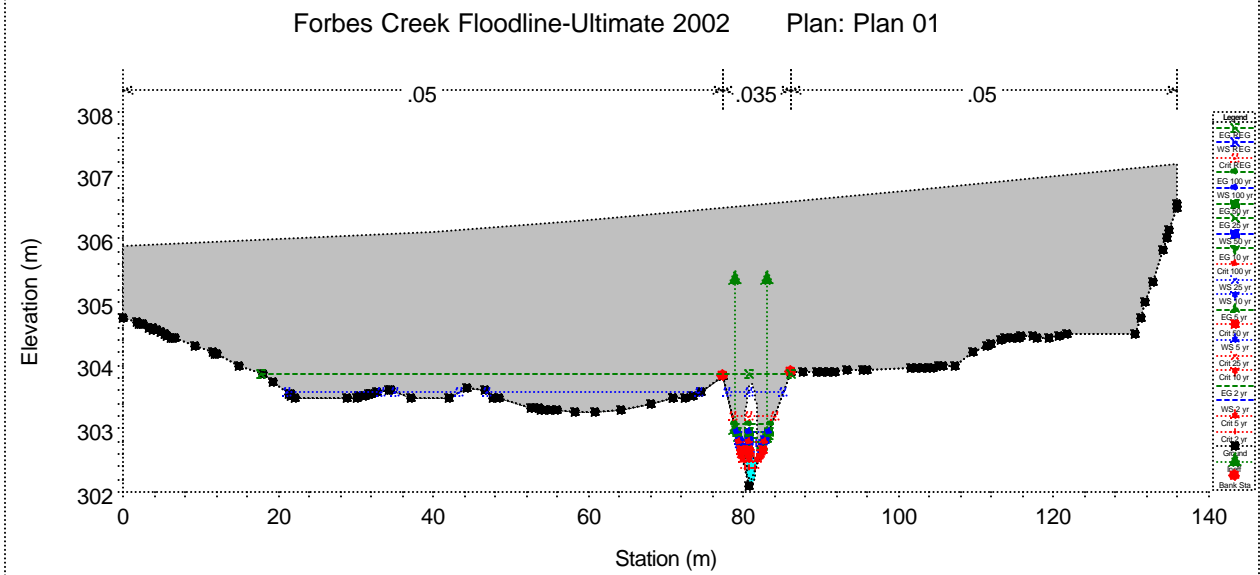
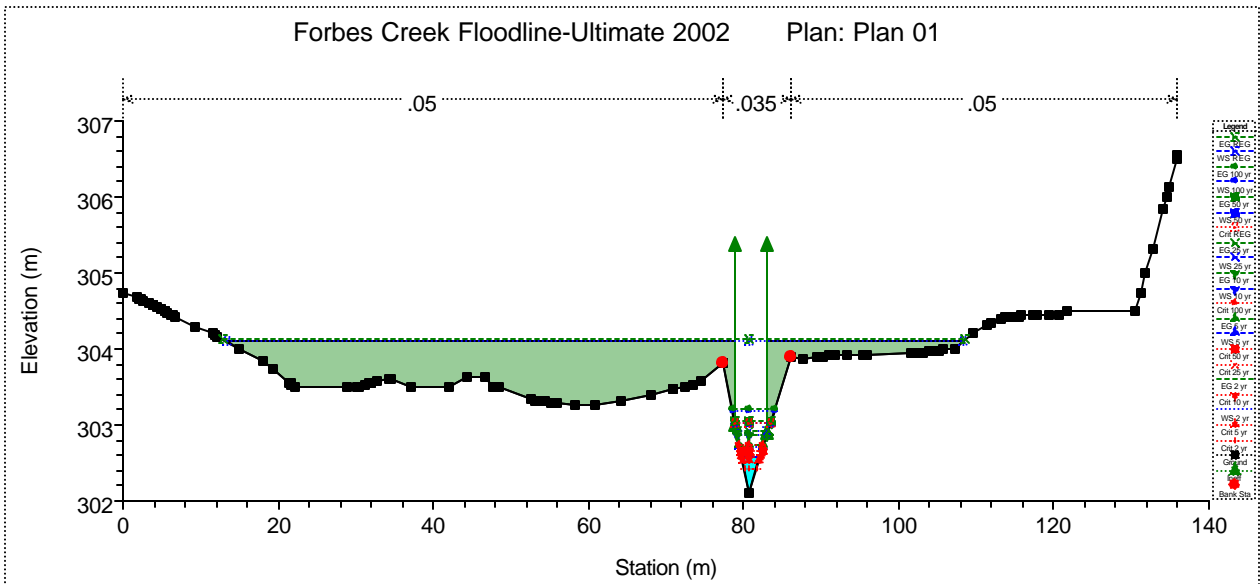


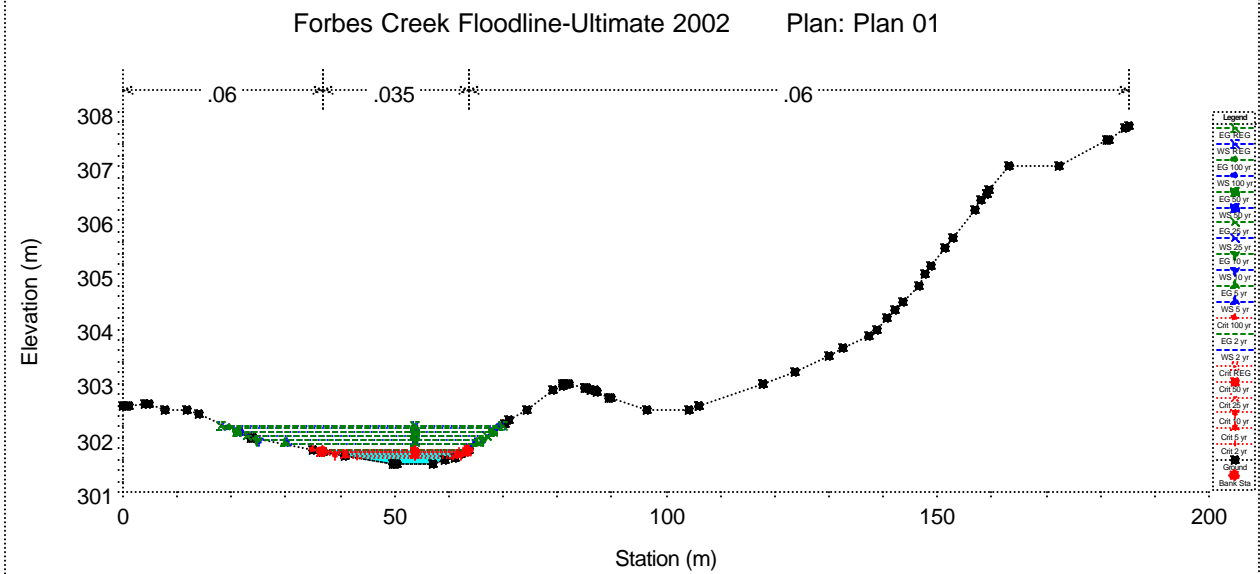
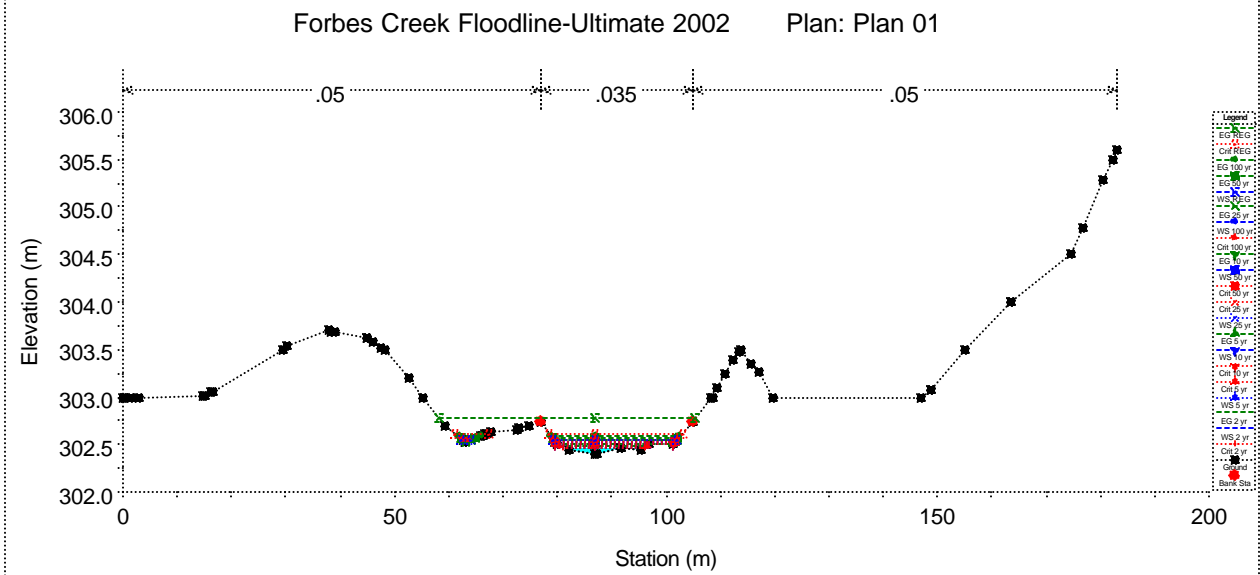
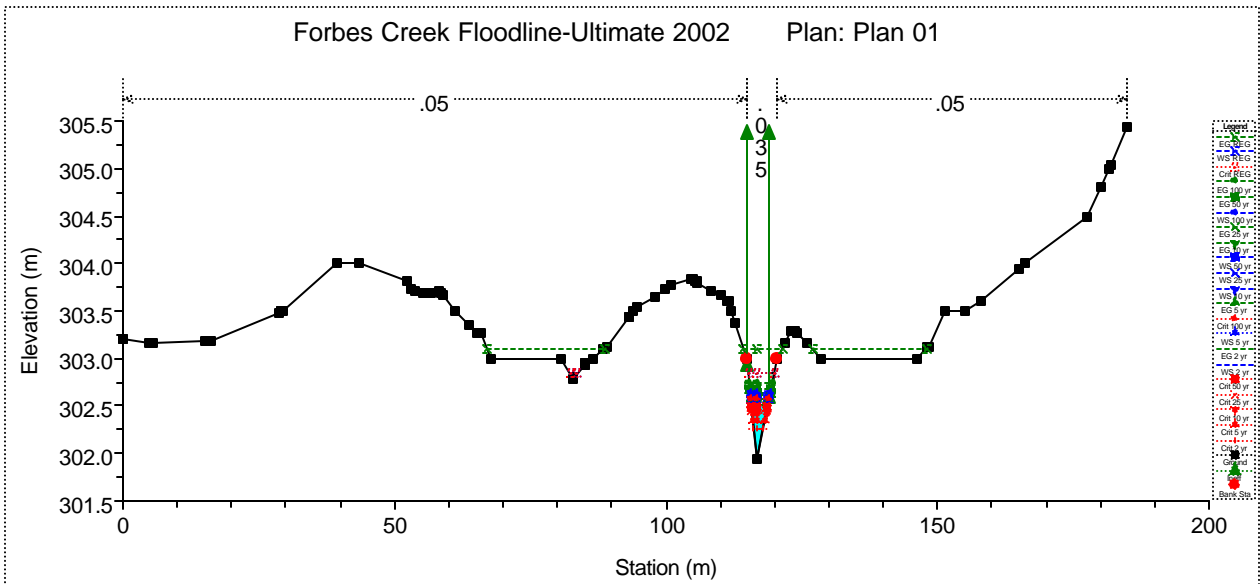
Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01

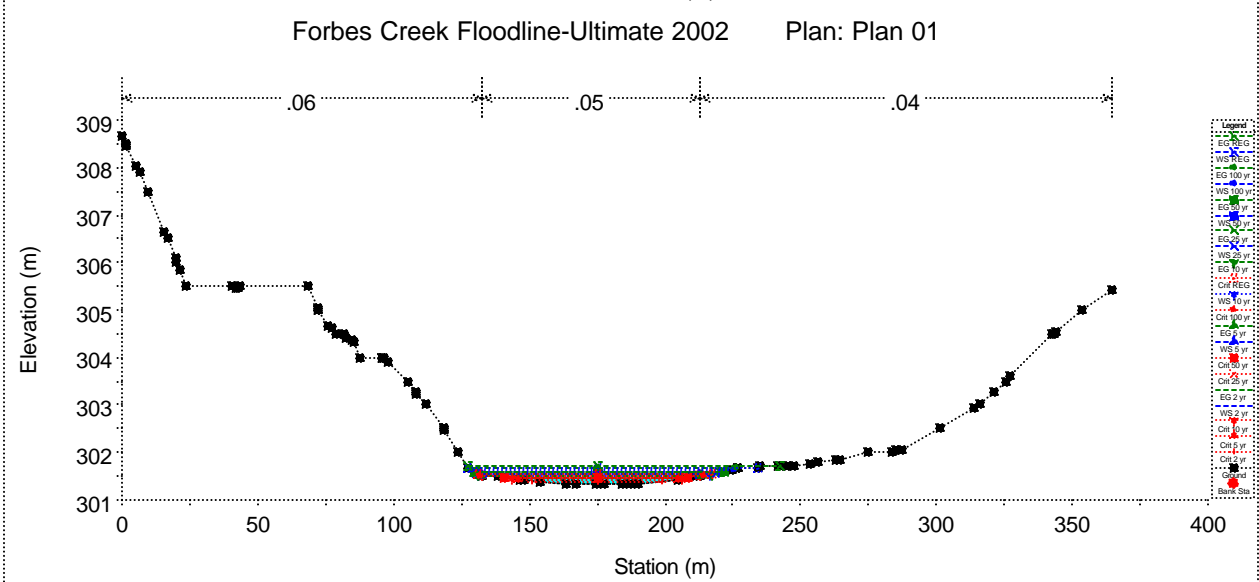
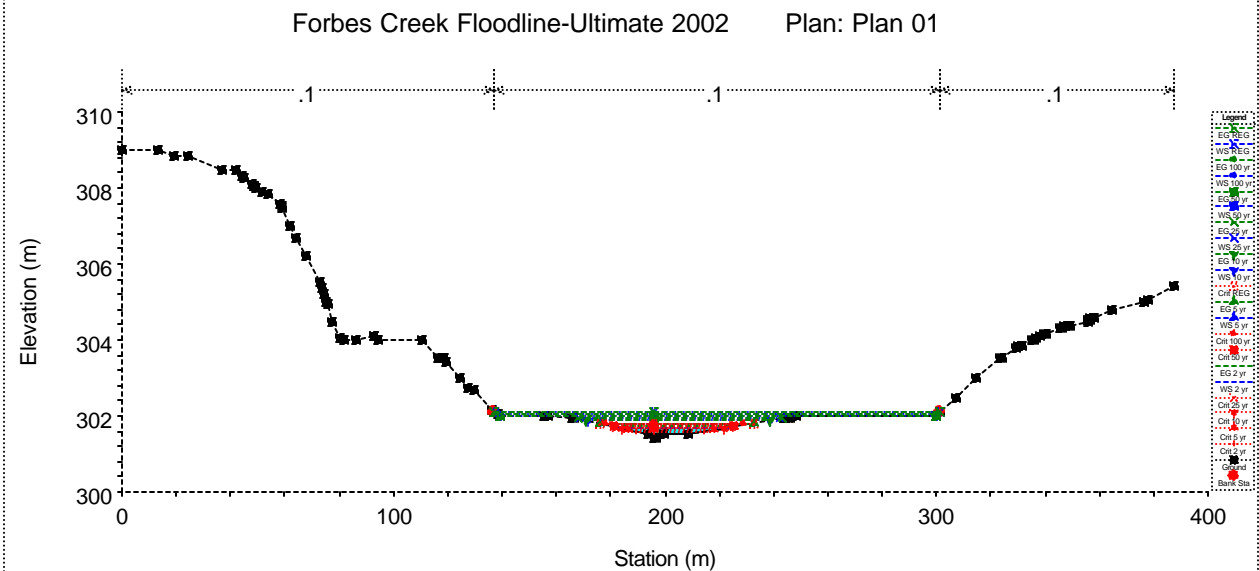
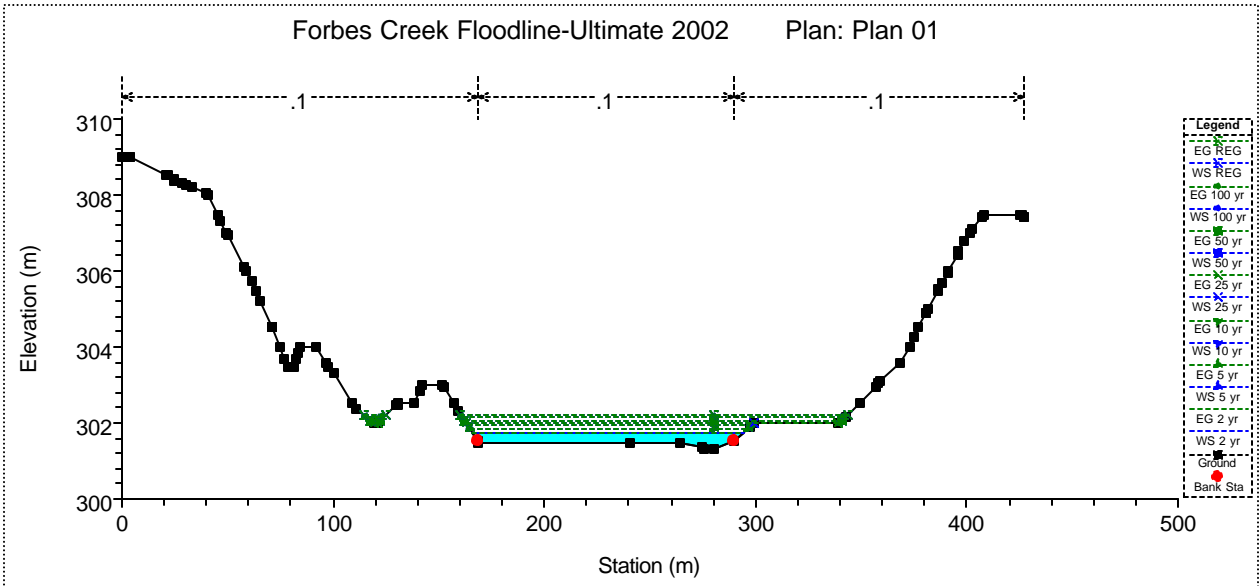


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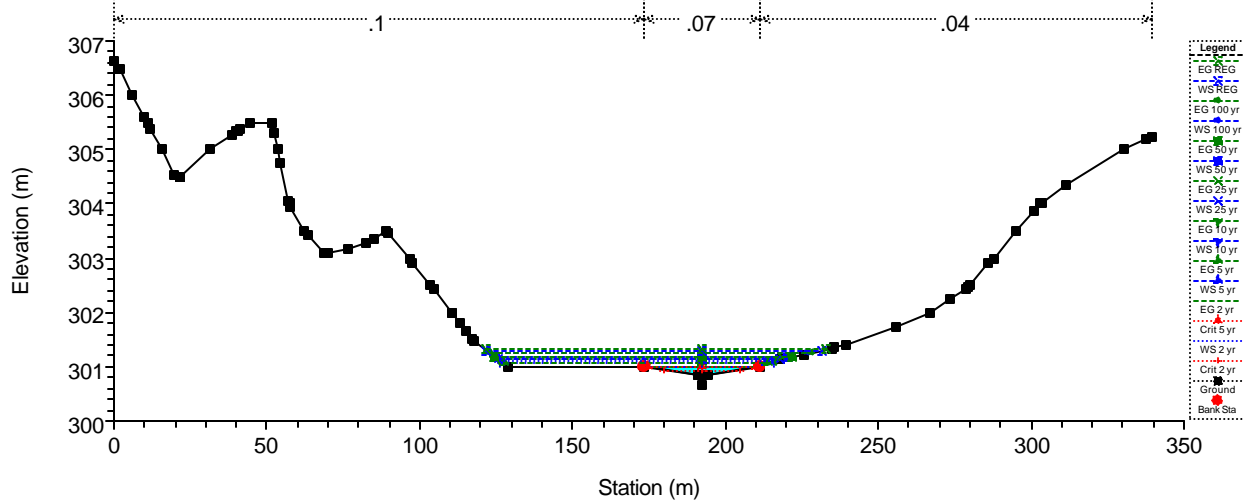




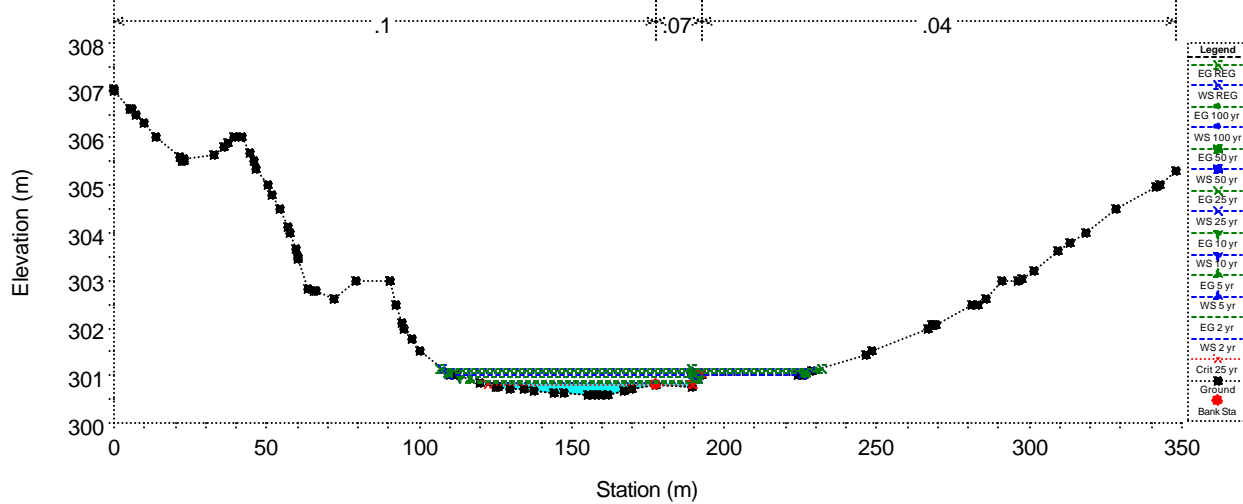




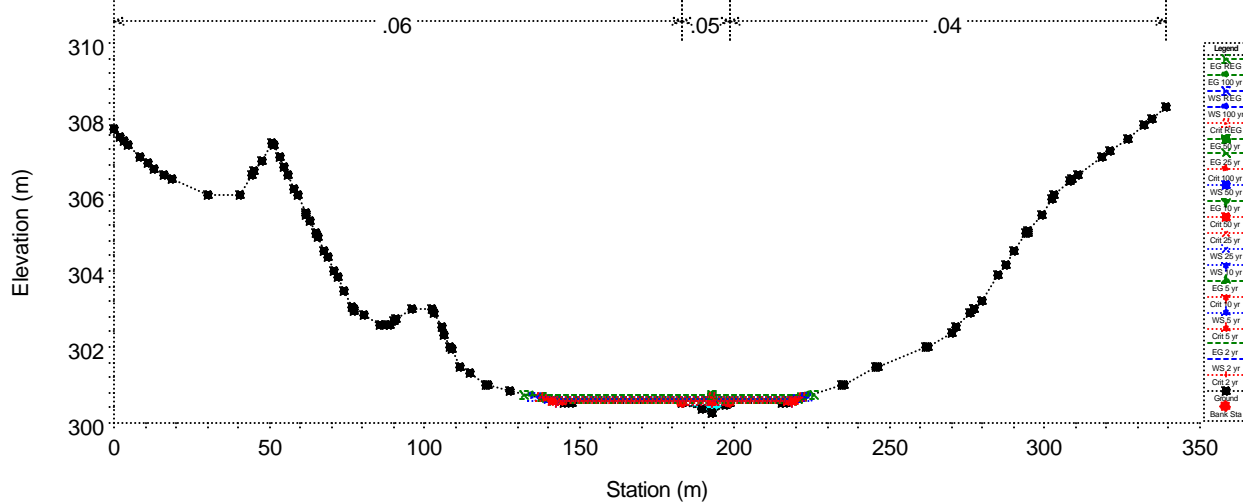
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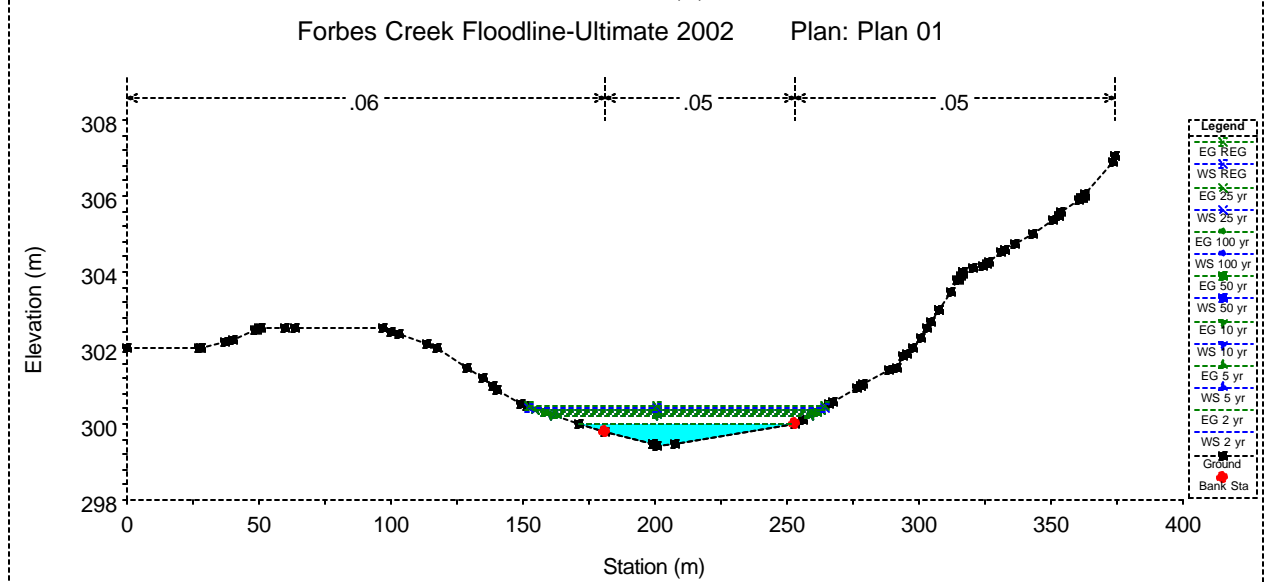
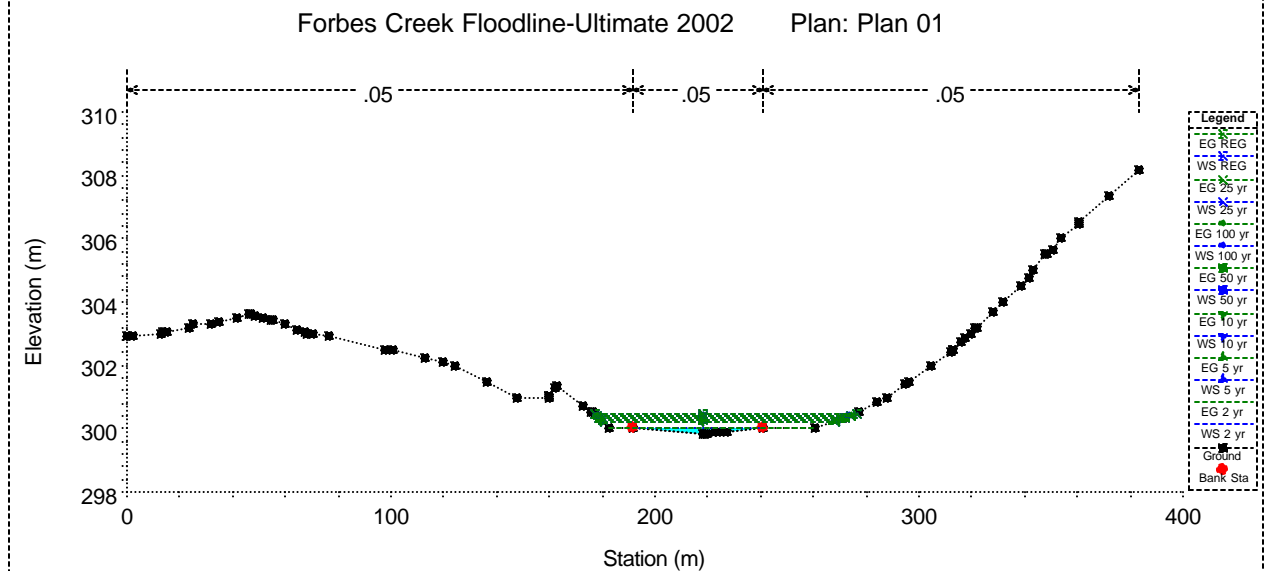
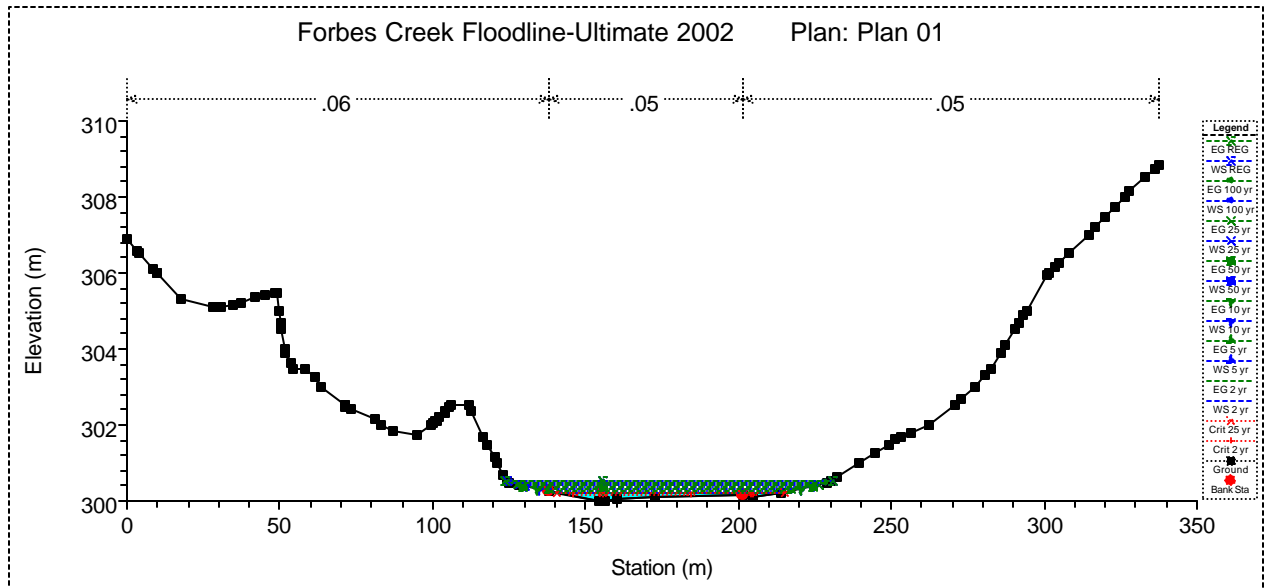


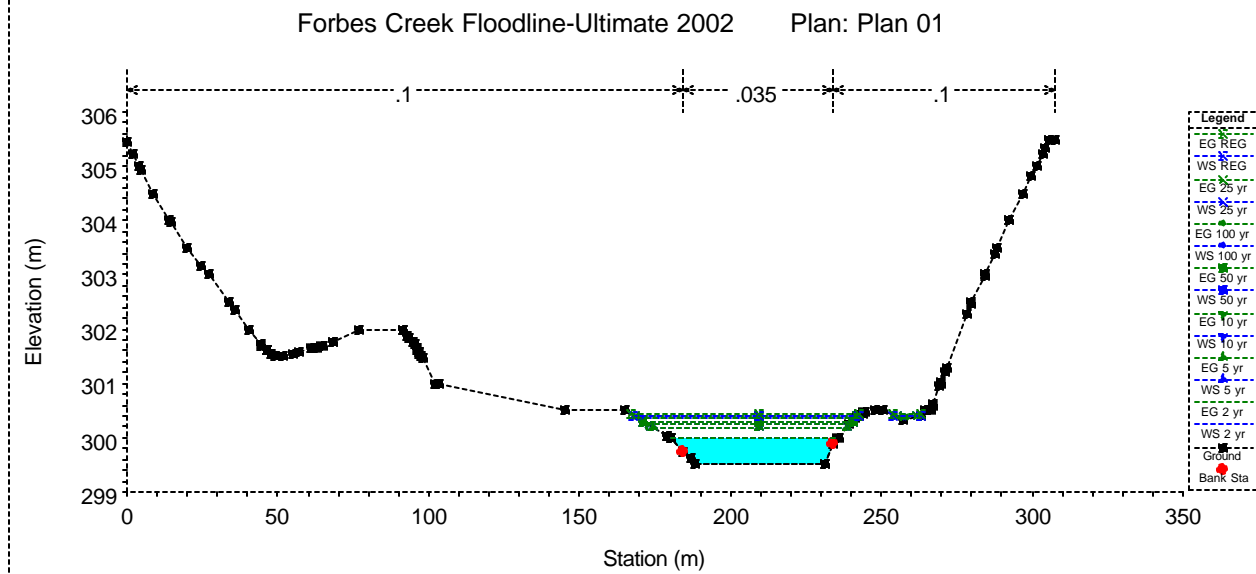
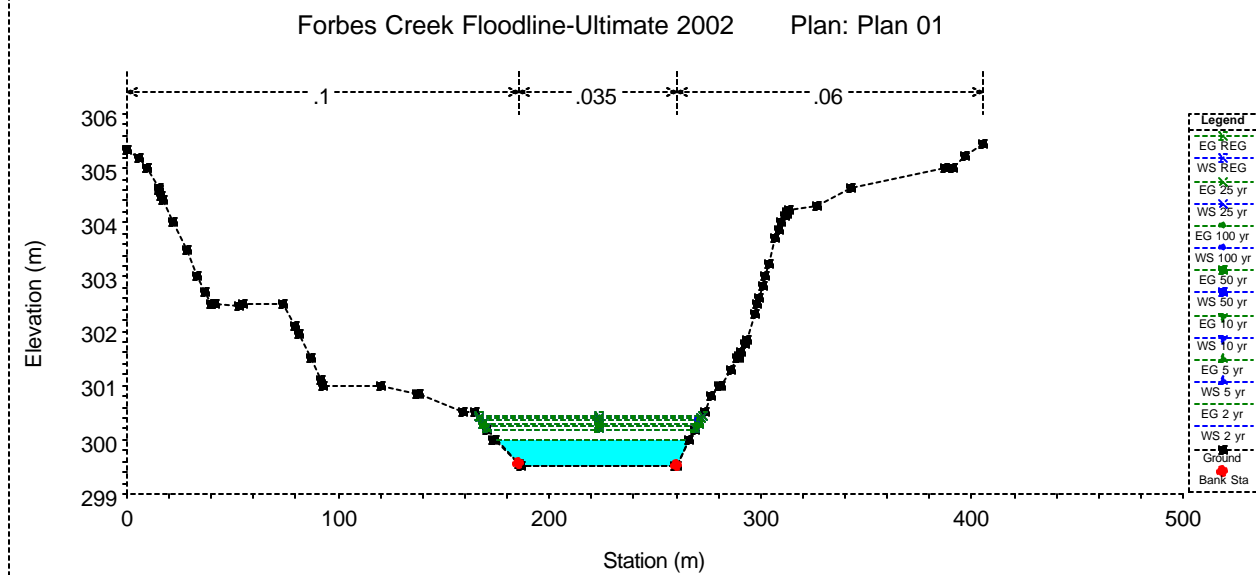
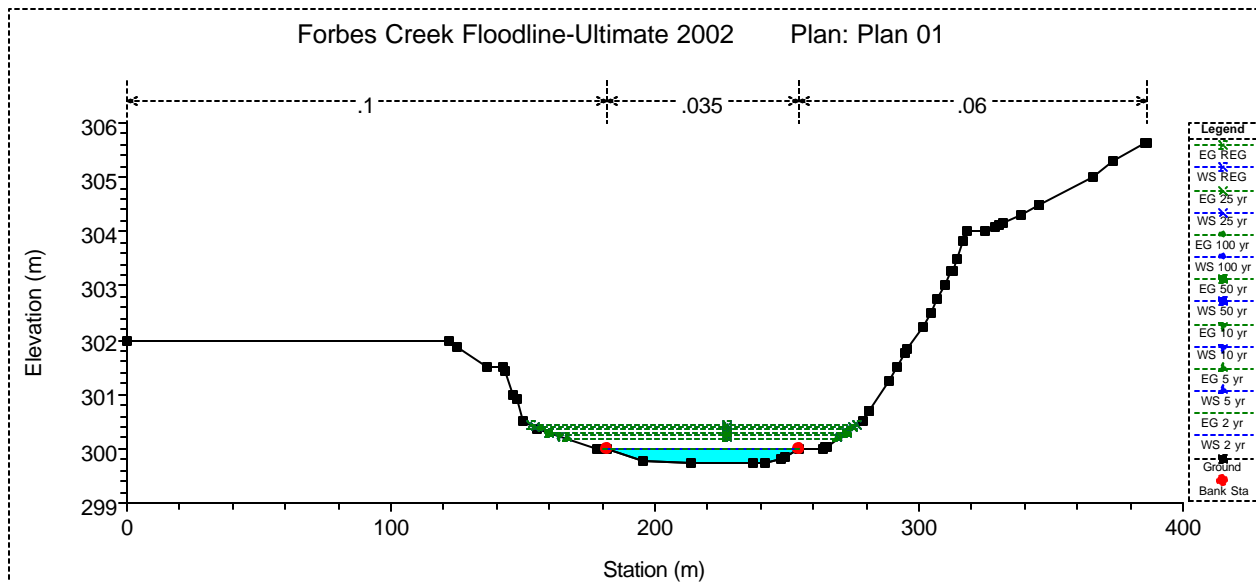
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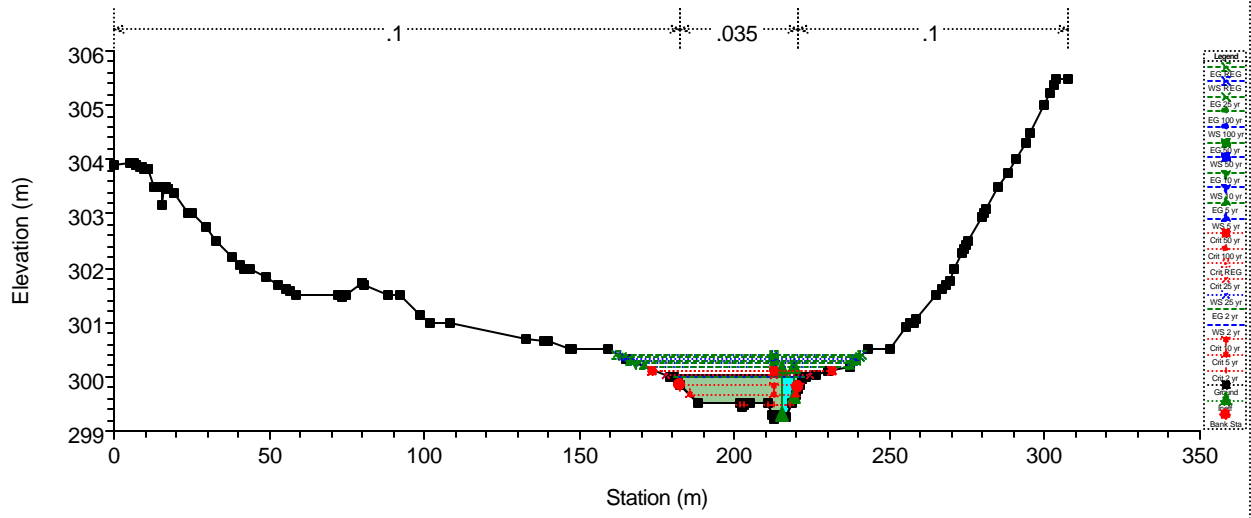
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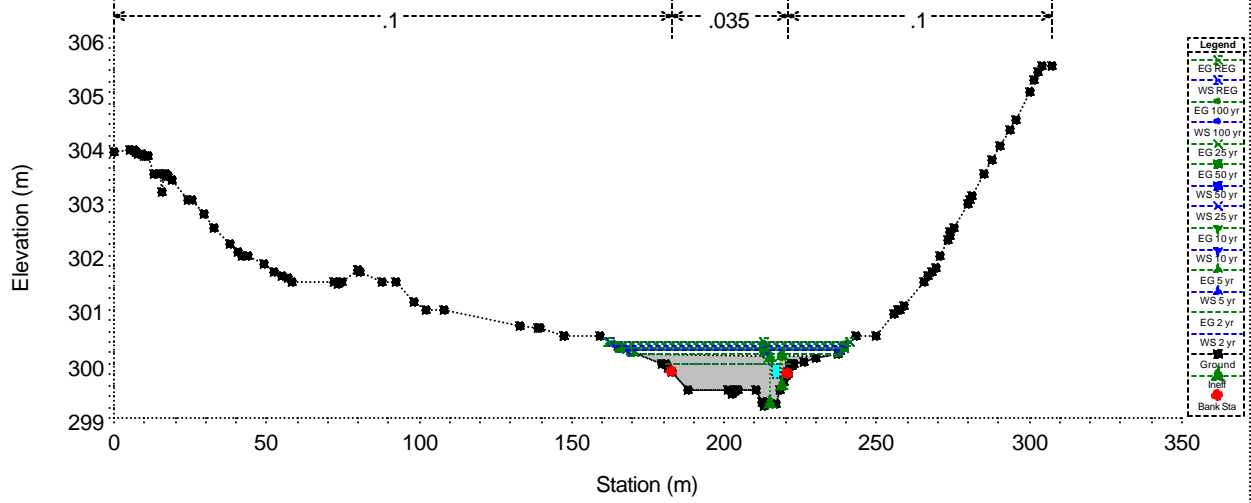


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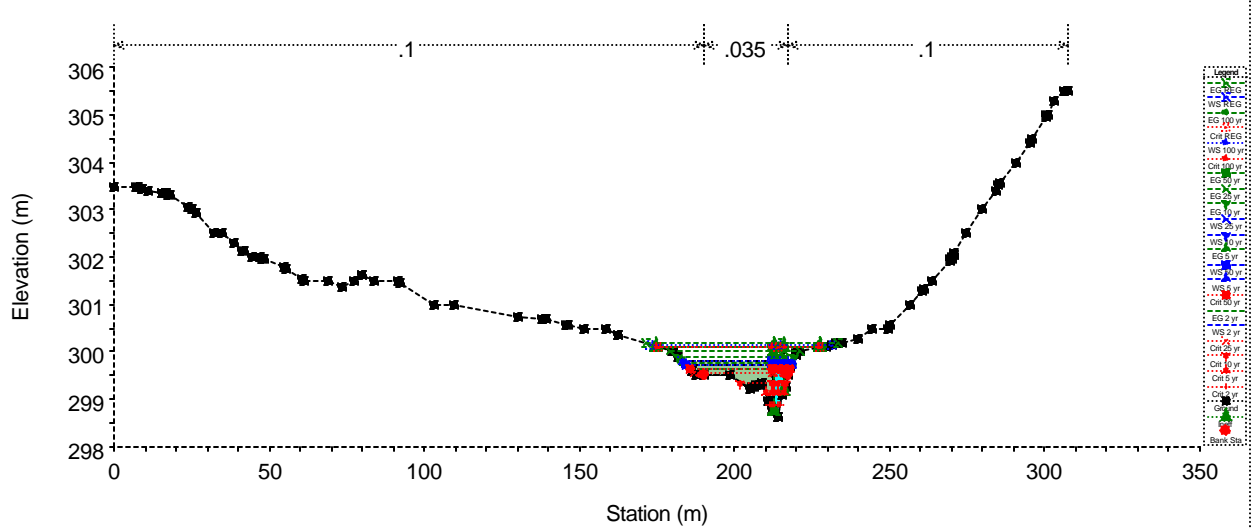


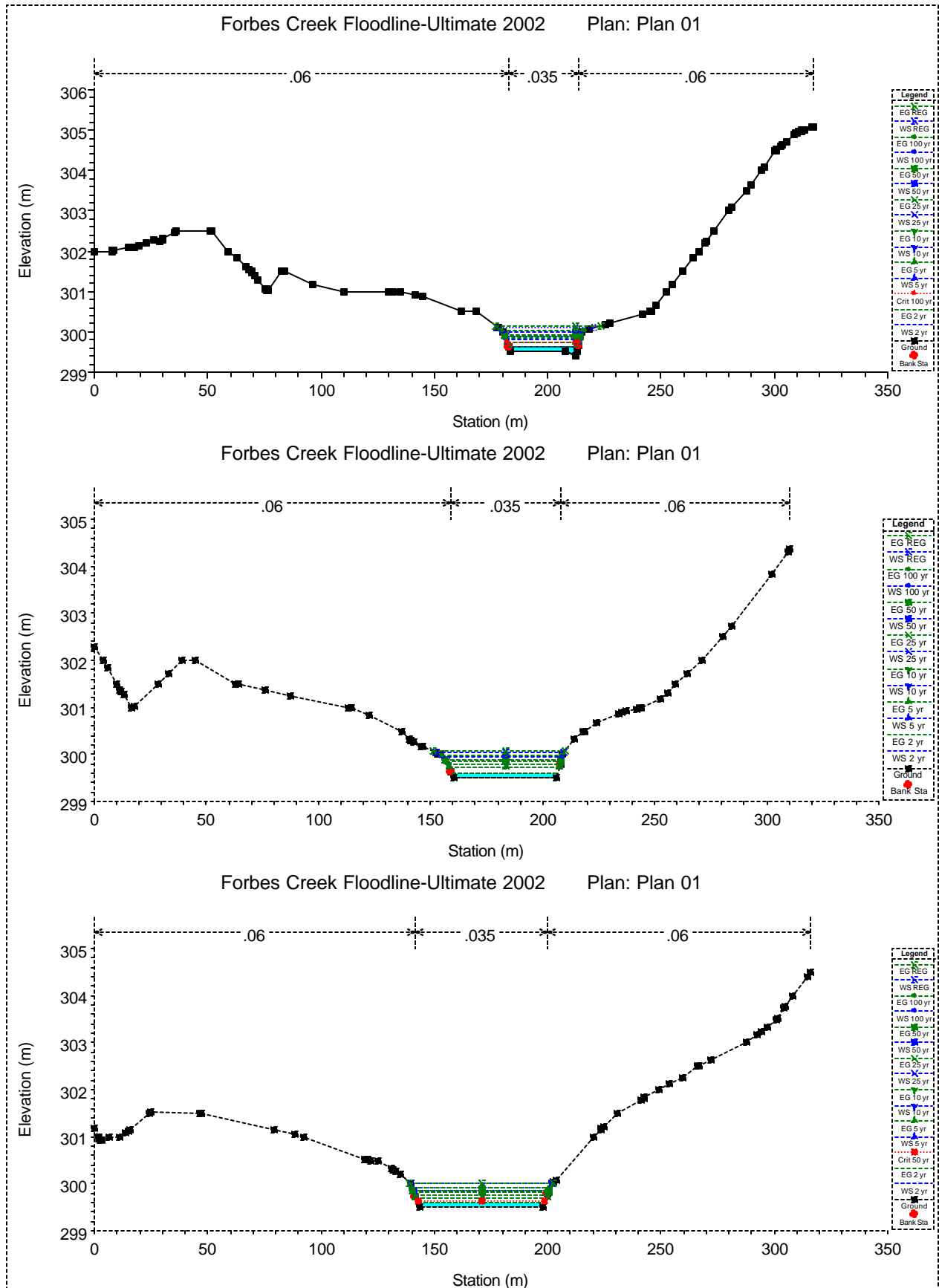
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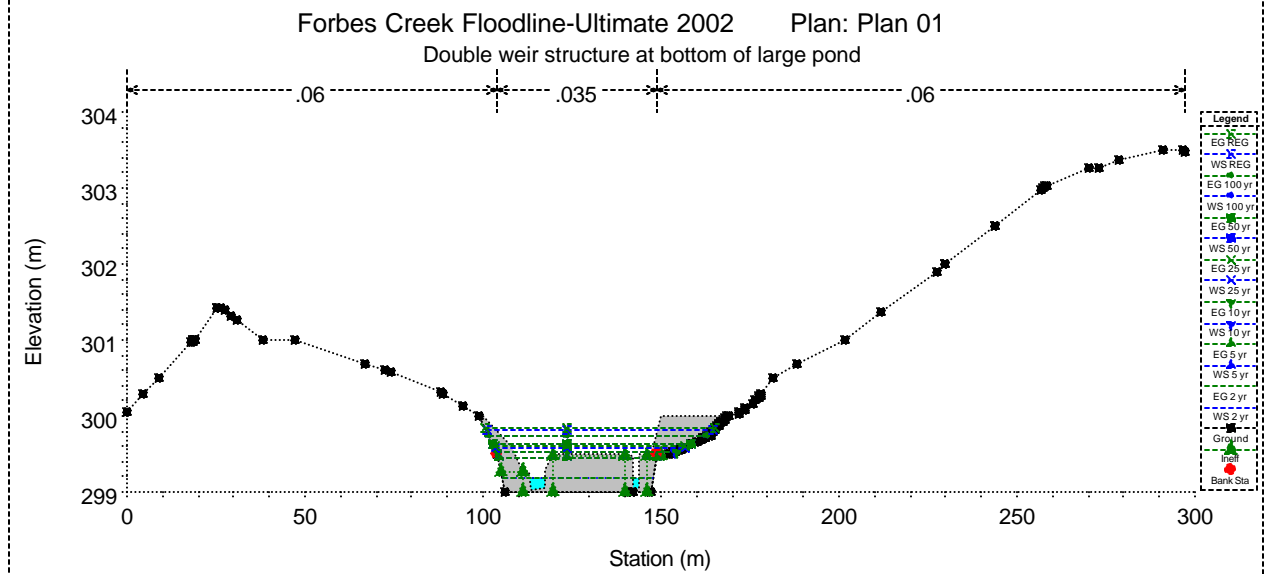
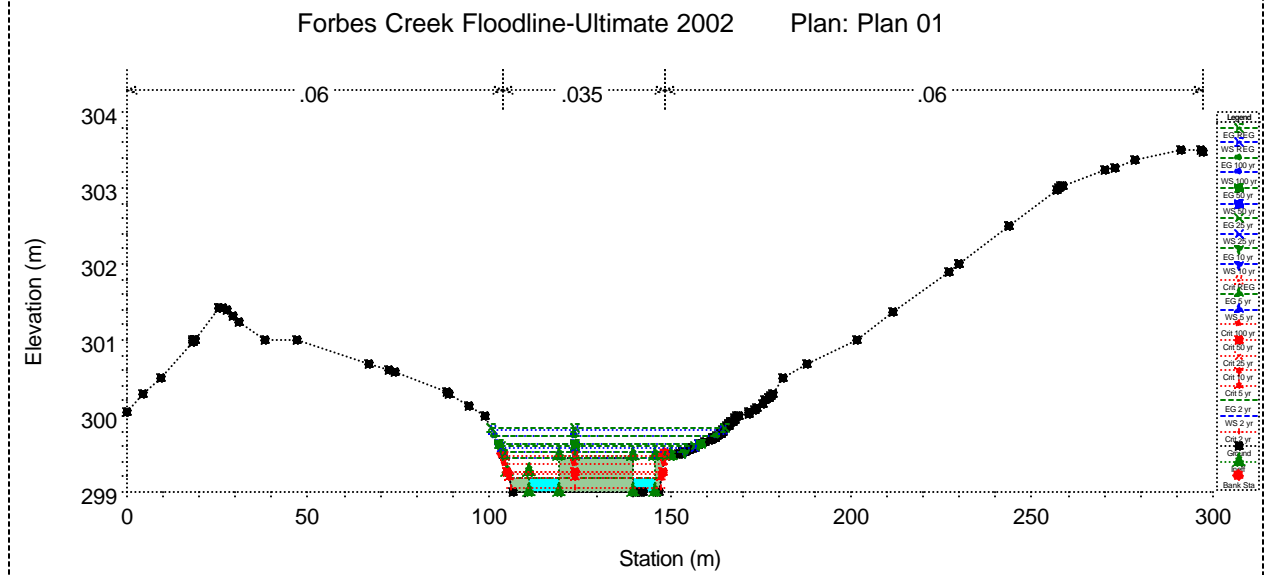
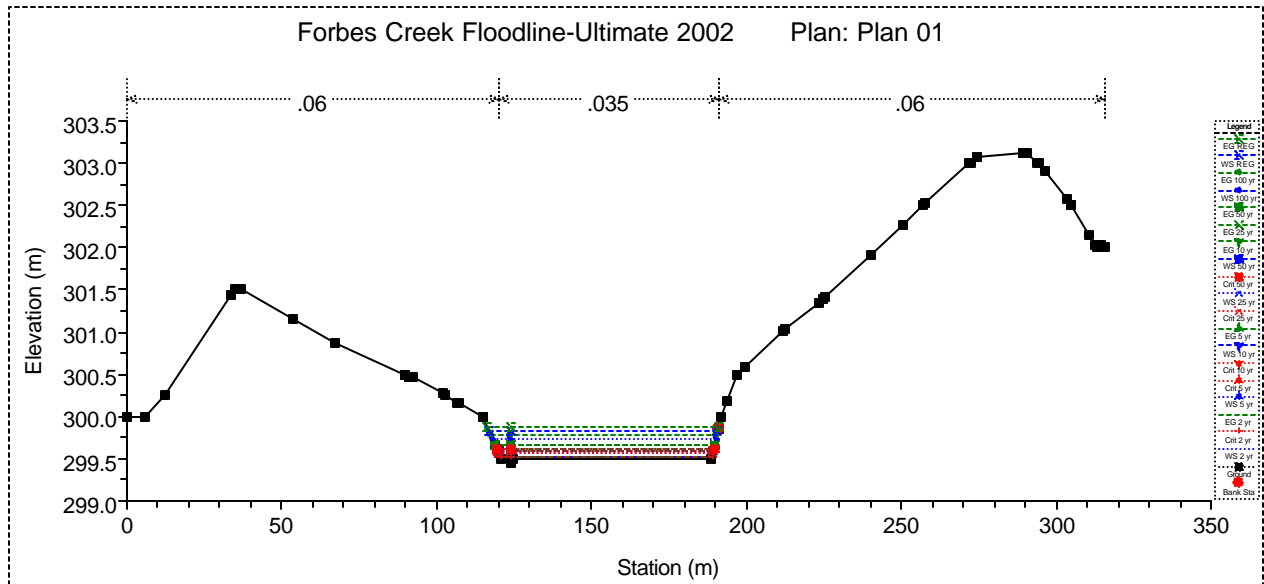
Small log weir with wingwalls between ponds

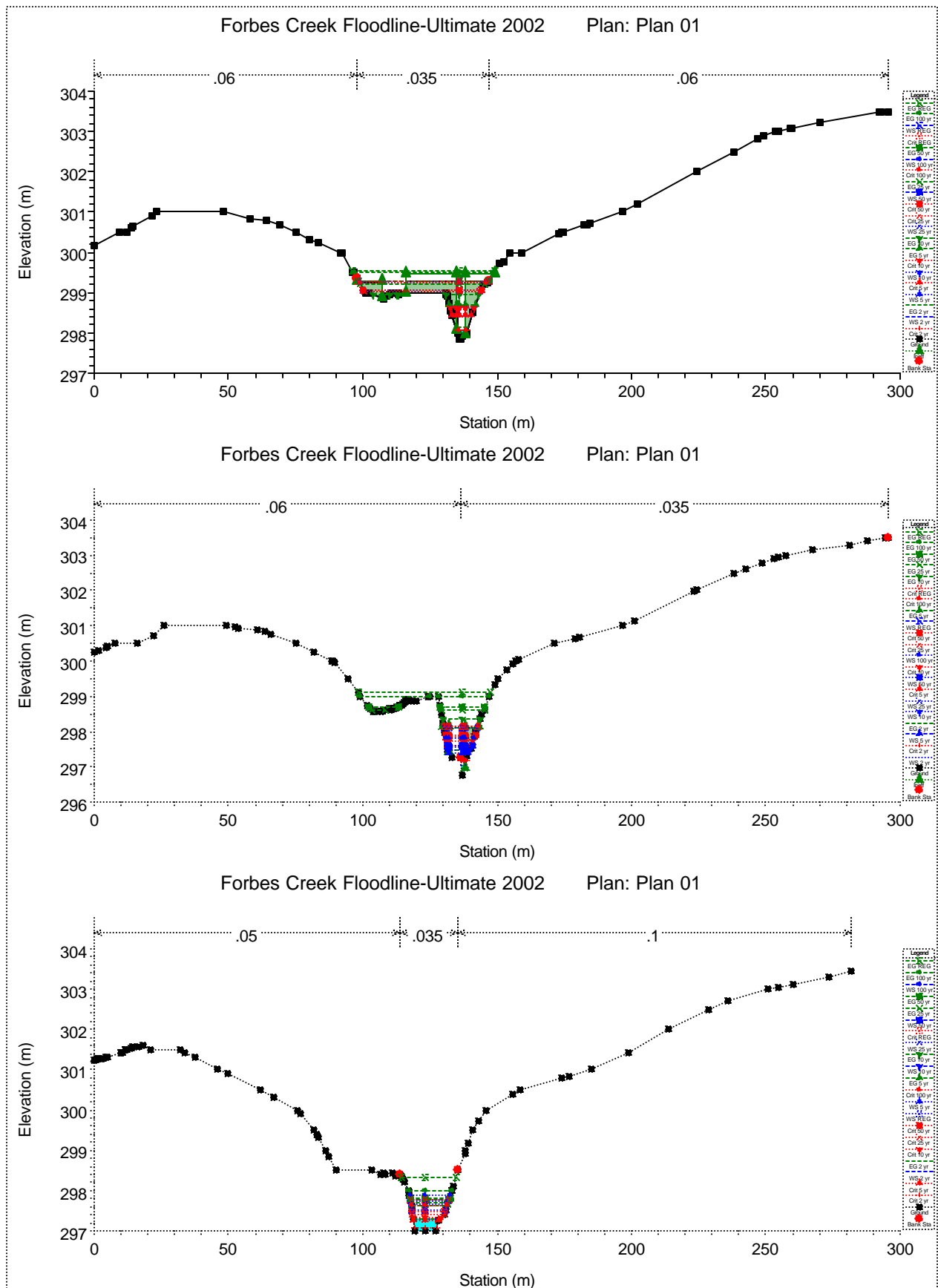


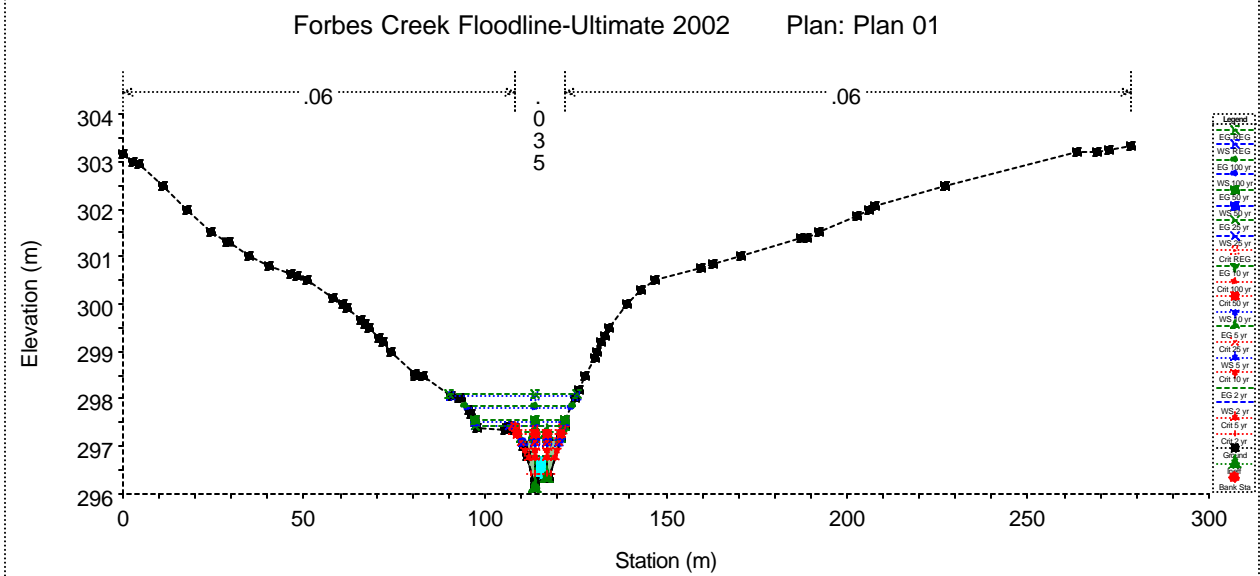
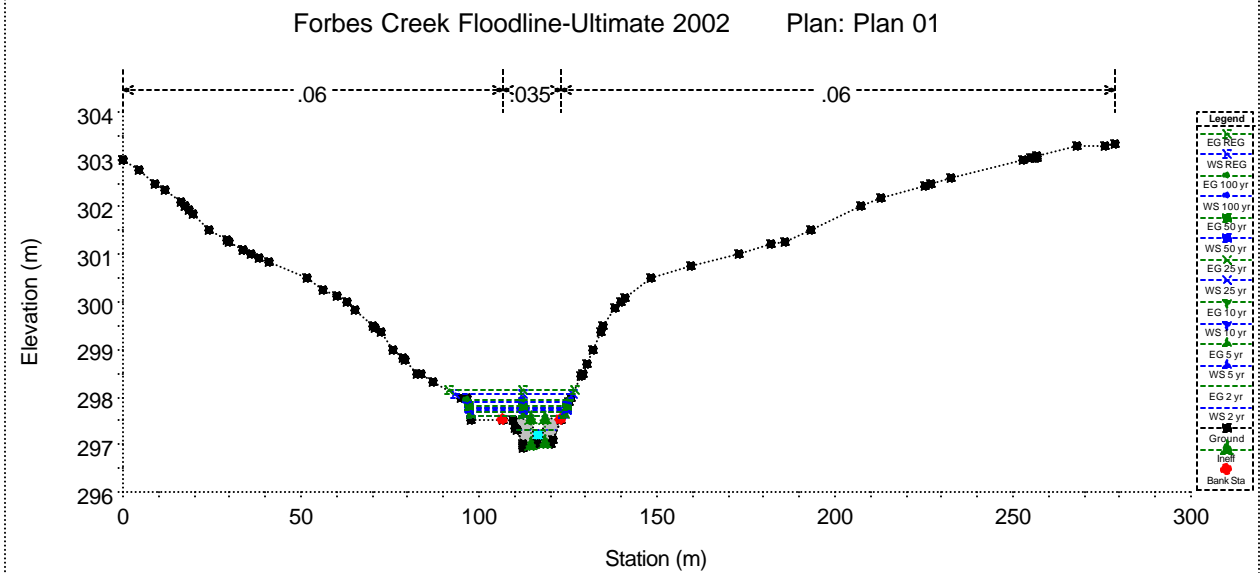
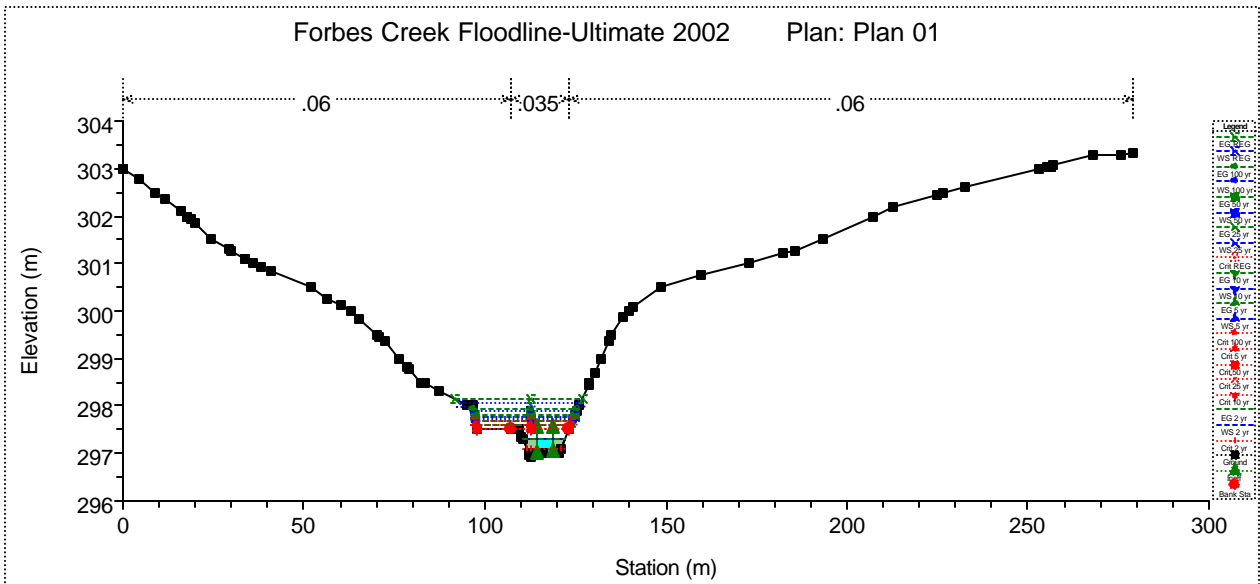
Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01



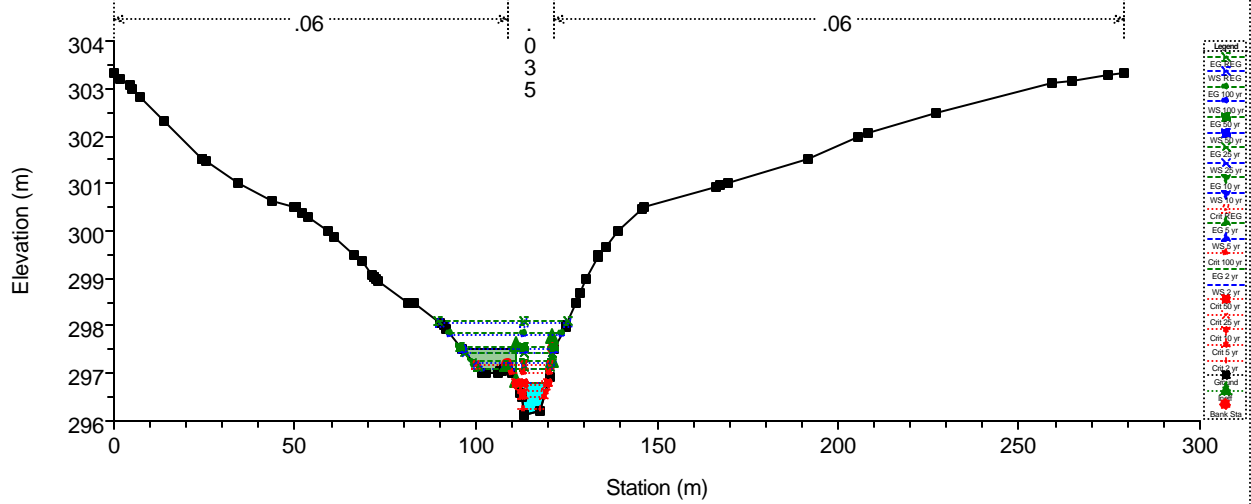




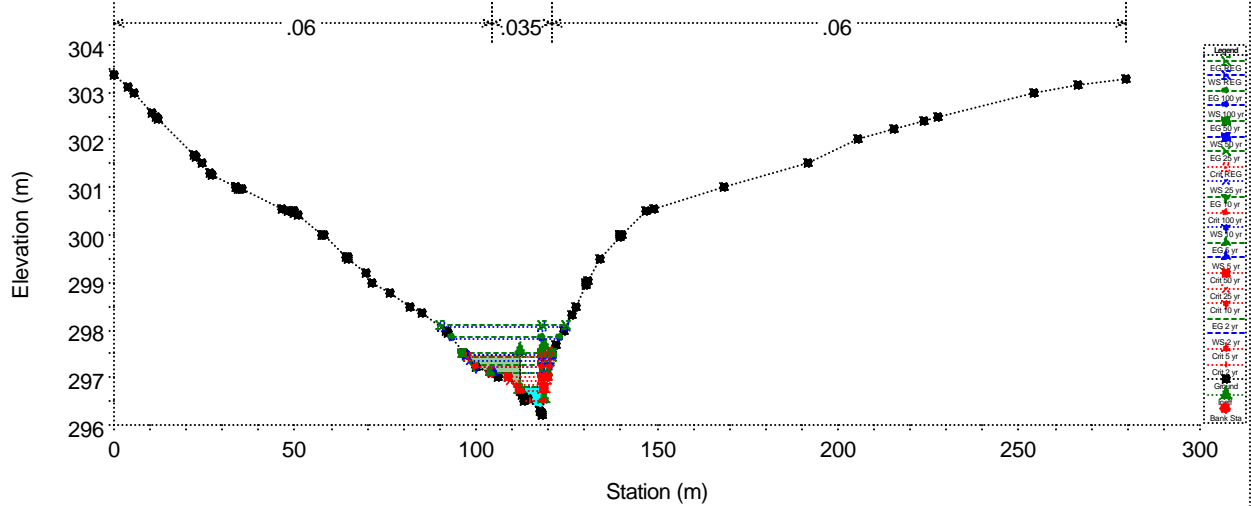




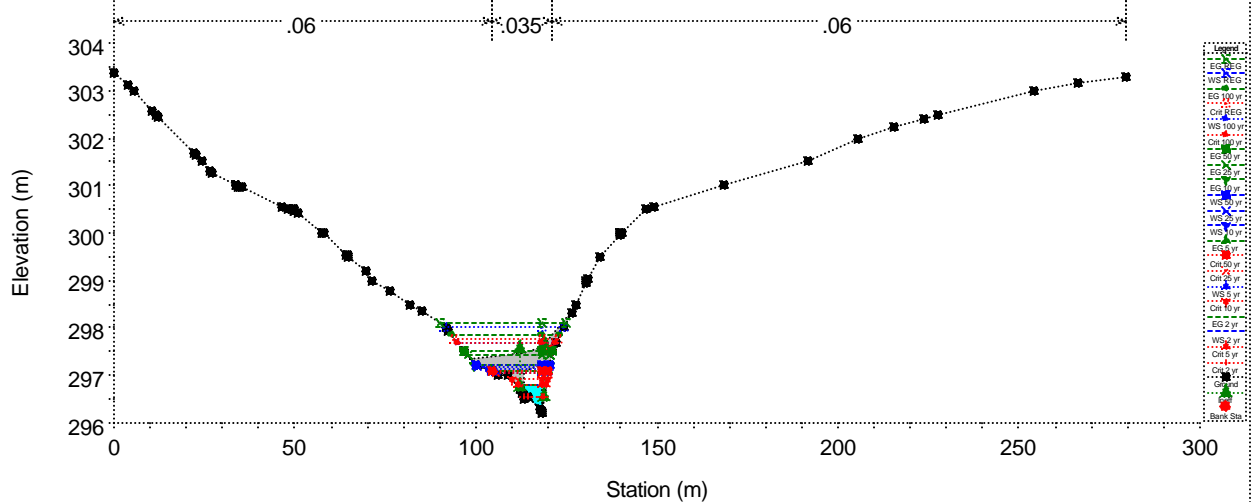
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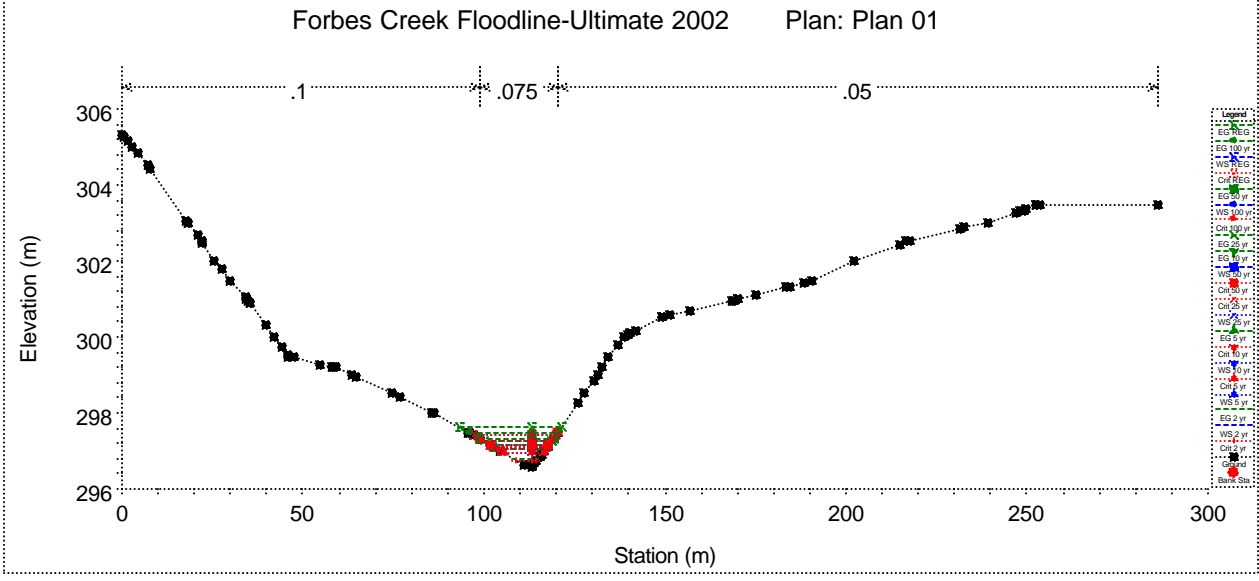
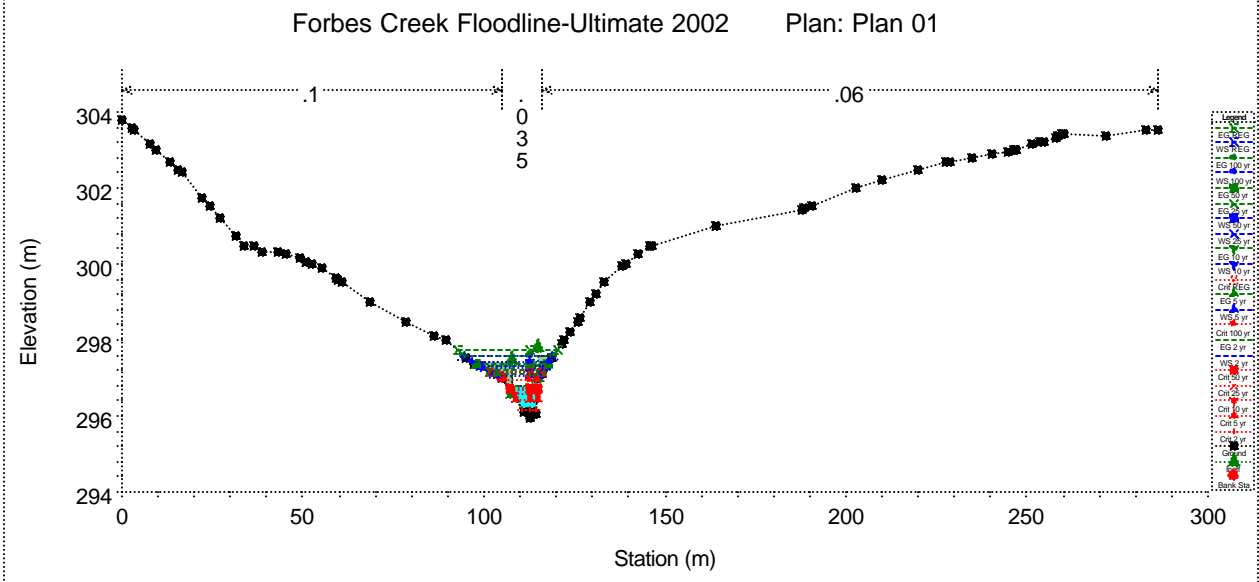
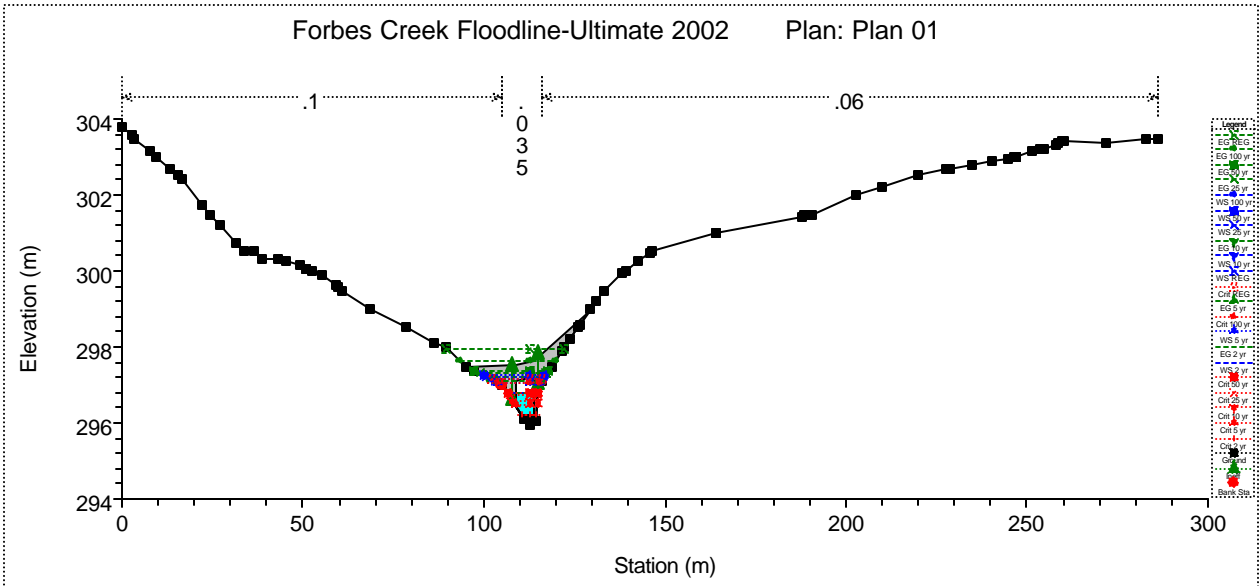


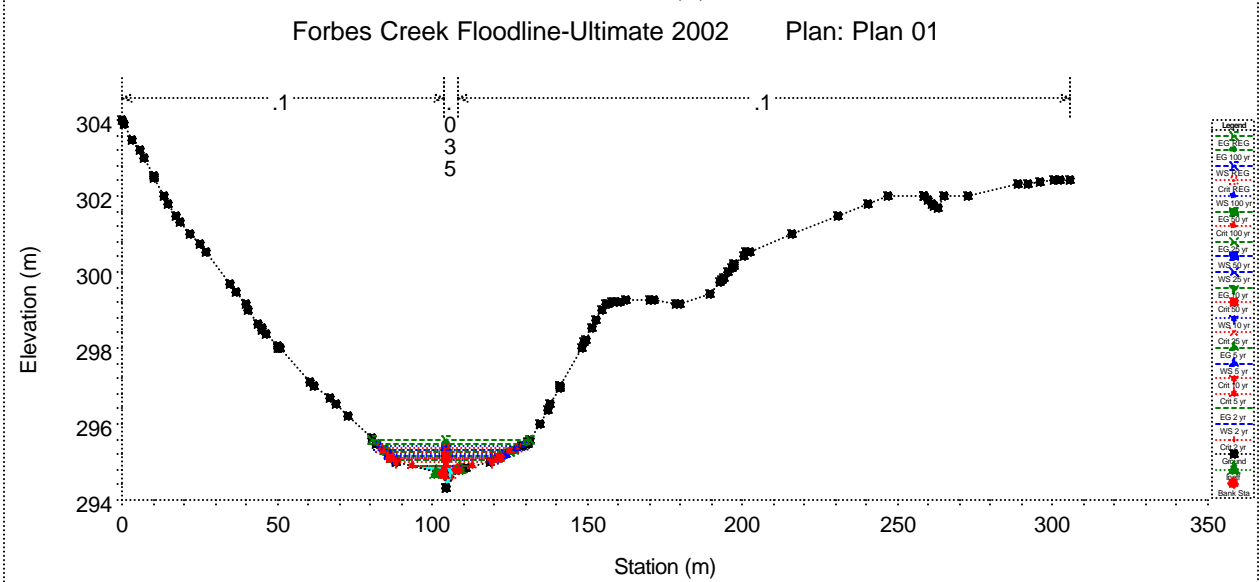
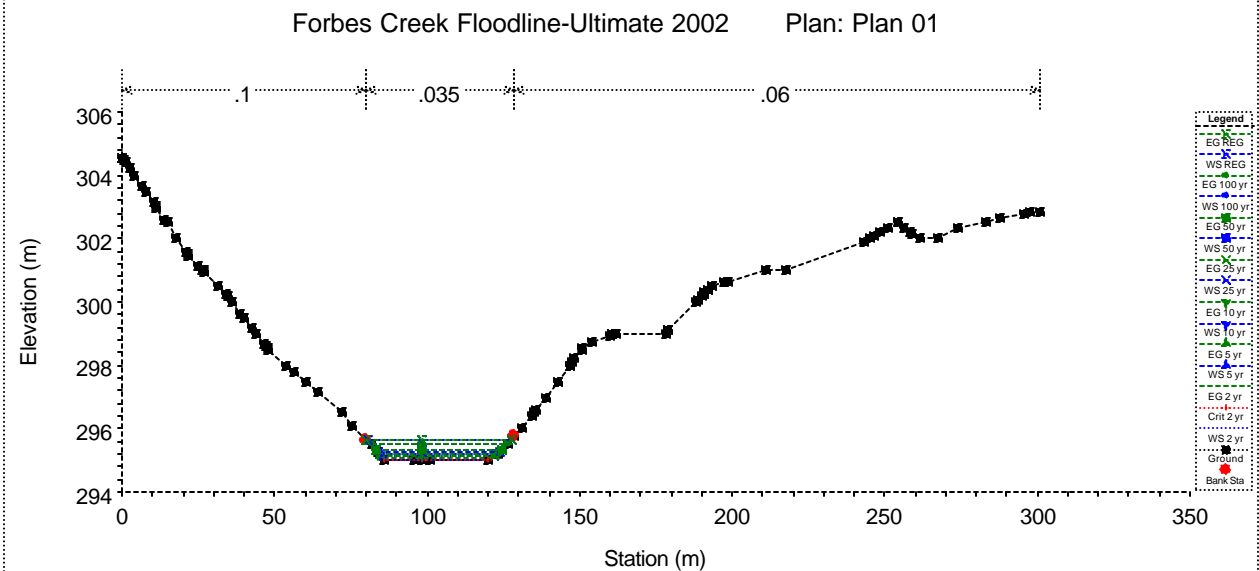
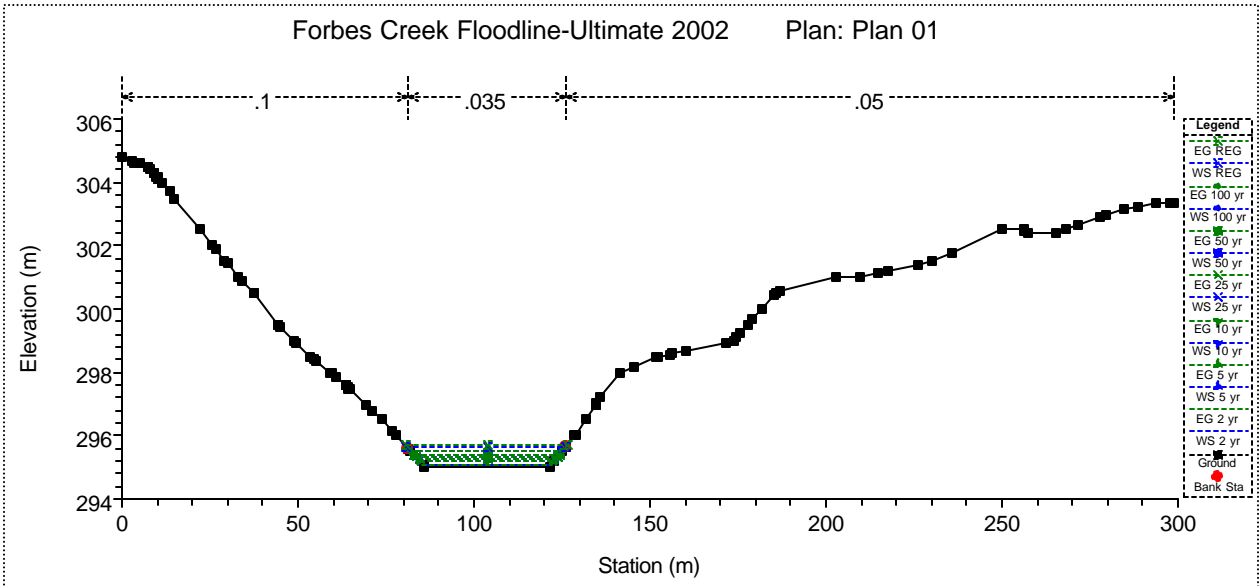
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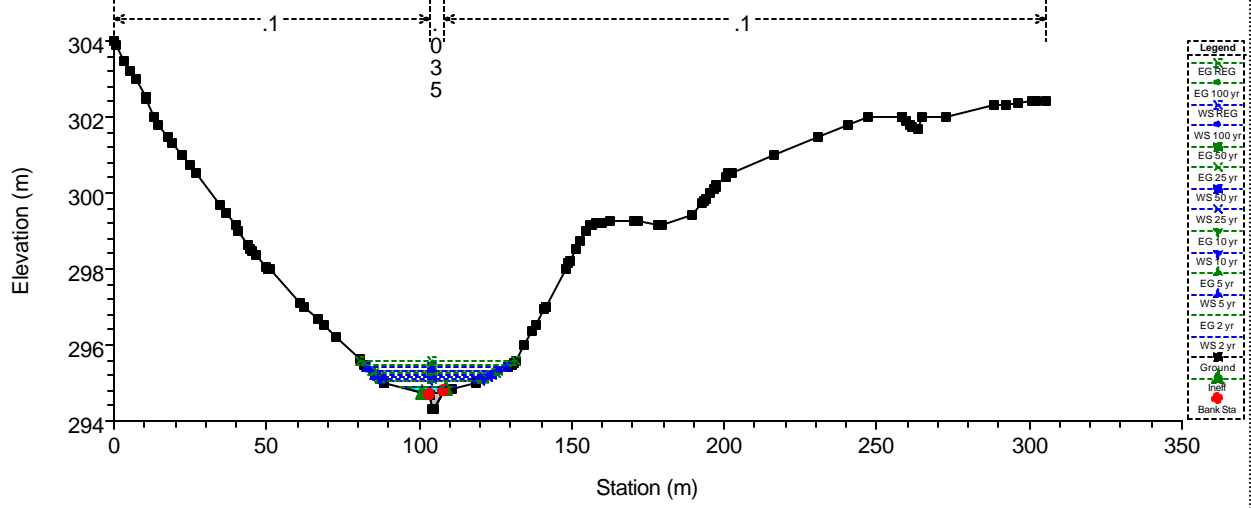
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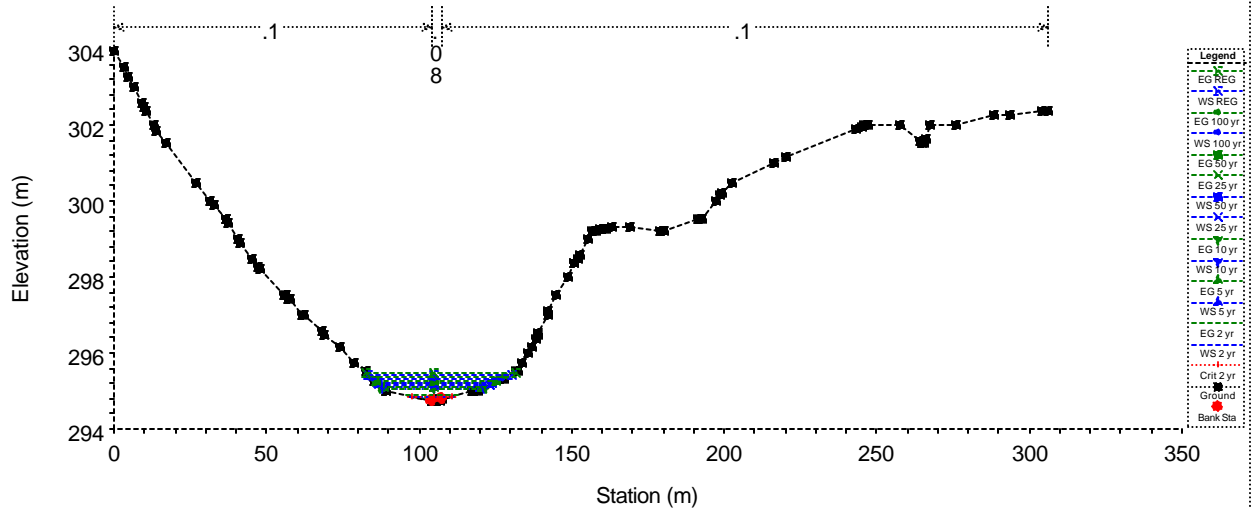




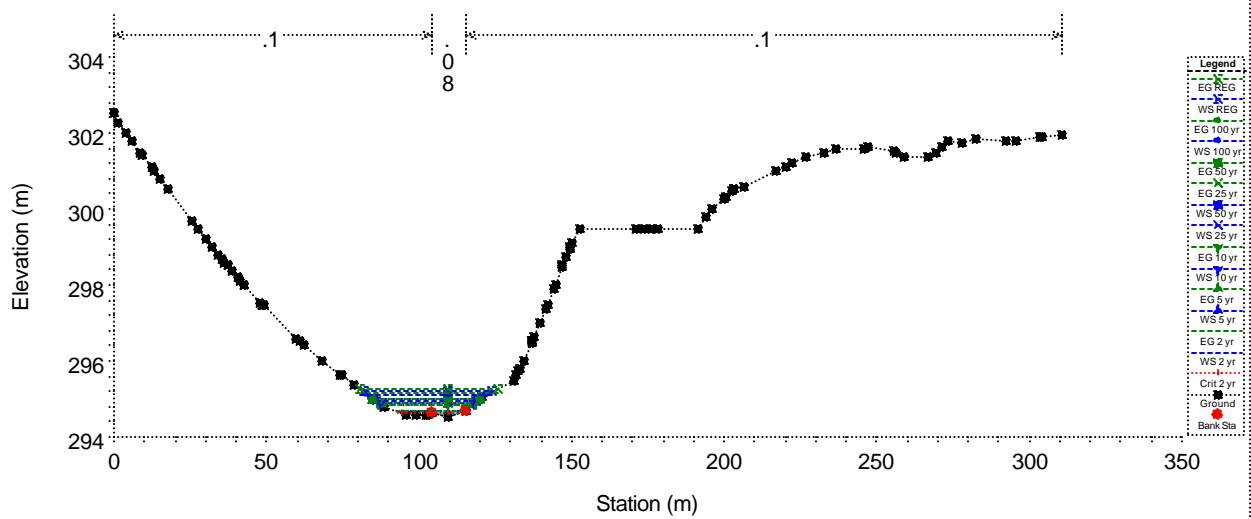
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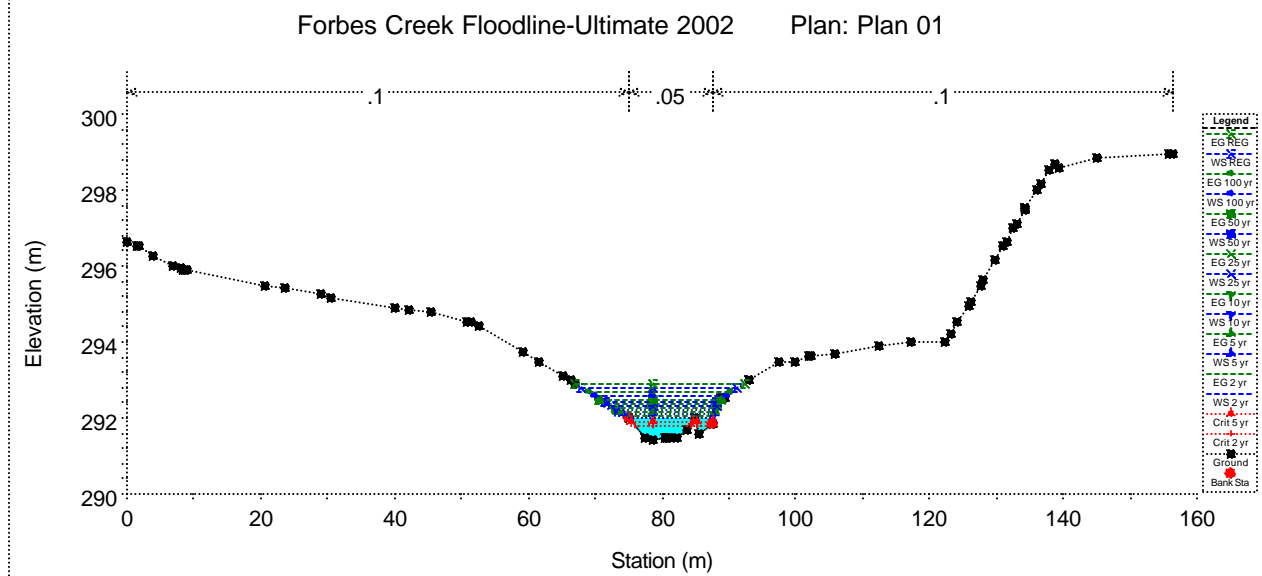
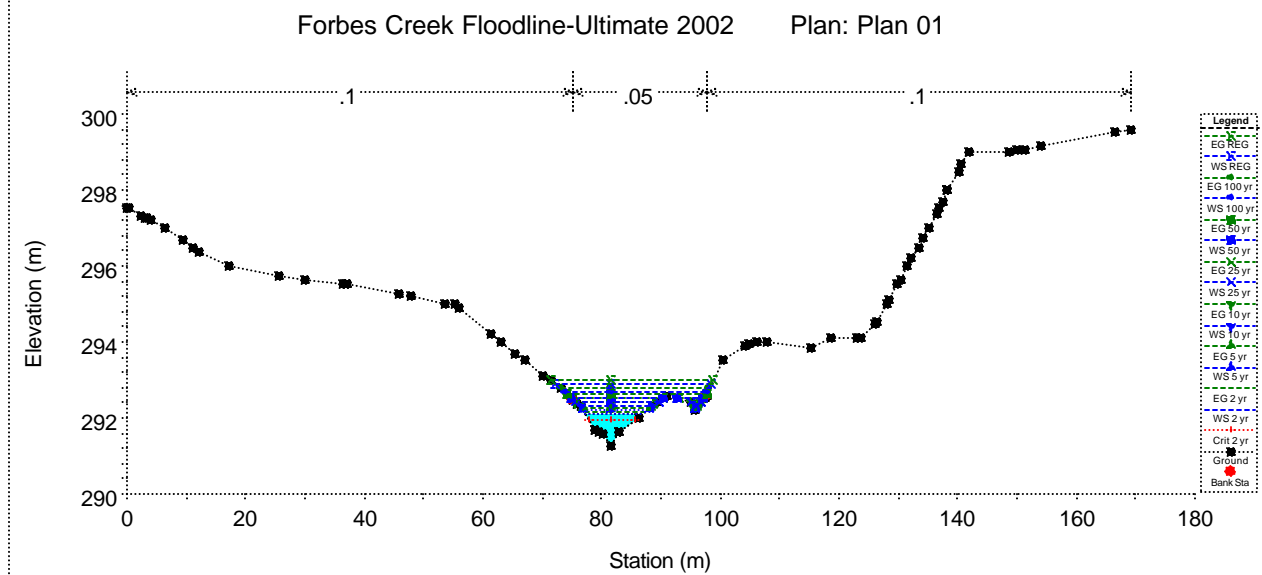
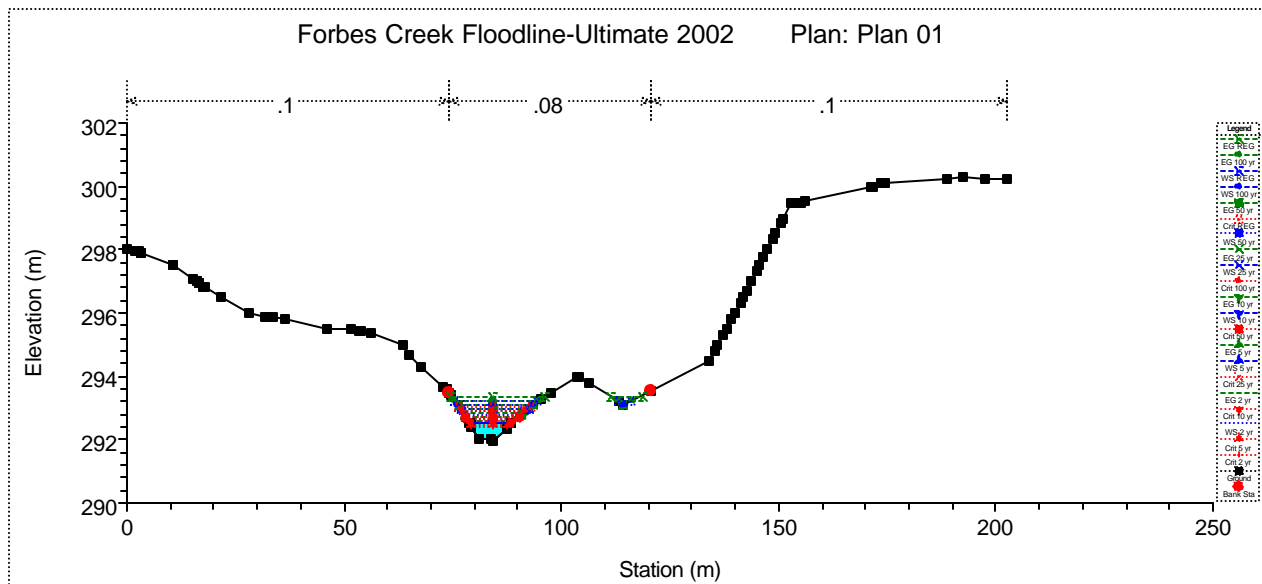


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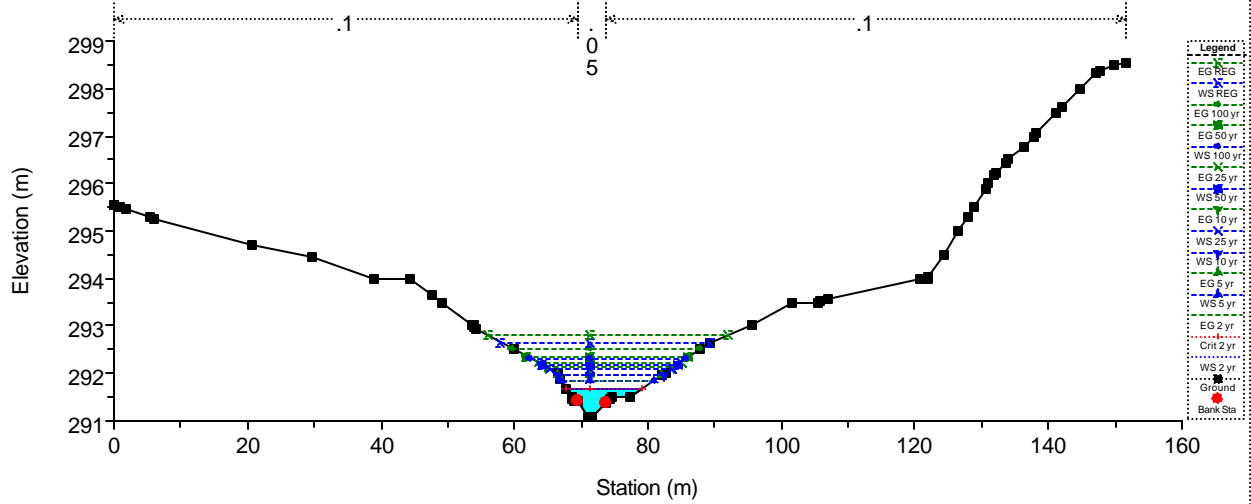


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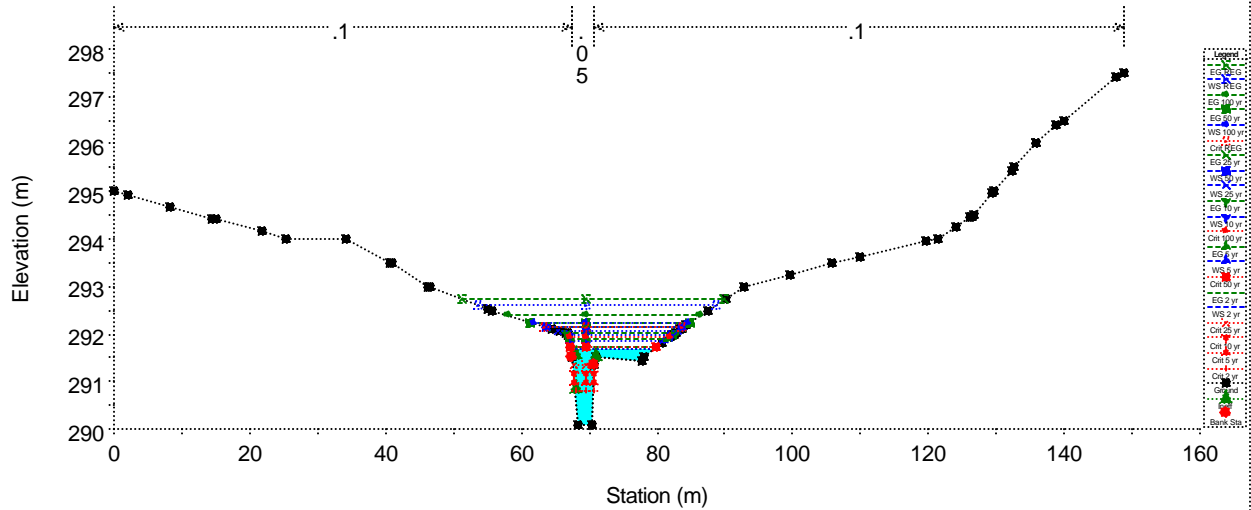




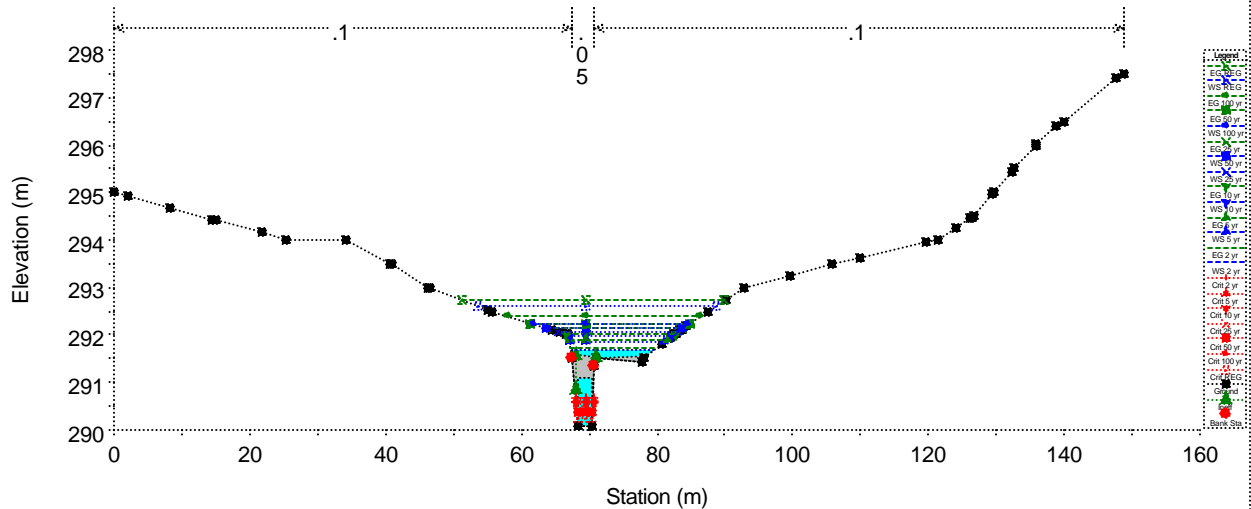
Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01



Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01



Forbes Creek Floodline-Ultimate 2002 Plan: Plan 01



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek West Branch

STRUCTURE TYPE: Circular Culvert

LOCATION: Regional Road 24

U.T.M. GRID REFERENCE (NAD 83):

N: 4810934 m

HEC-RAS SECTION: 325a

E: 555352 m

SPECIFICATIONS:

MATERIAL: C.S.P.

DIAMETER: 1.2 m

SPAN: - m

LENGTH: 62.0 m

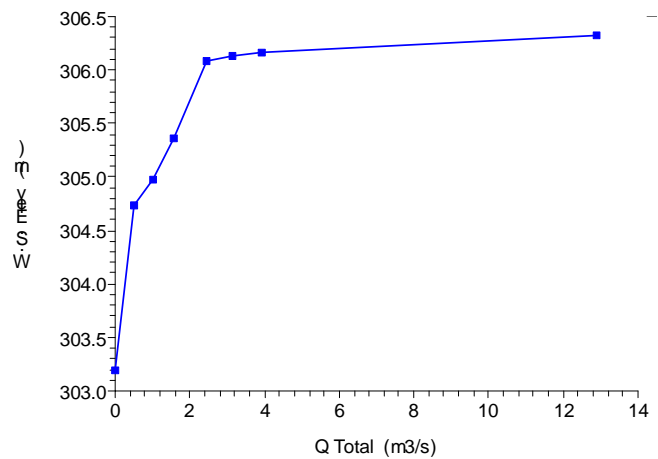
SLOPE: 0.00127 m/m

UPSTREAM INVERT ELEVATION: 303.49 m

TOP OF EMBANKMENT ELEVATION: 306.04 m

EFFECTIVE FLOW AREA: 1.13 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek East Branch

STRUCTURE TYPE: Box Culvert

LOCATION: Regional Road 24

U.T.M. GRID REFERENCE (NAD 83):

N: 4811436 m

HEC-RAS SECTION: 2135

E: 555610 m

SPECIFICATIONS:

MATERIAL: Concrete

RISE: 1.14 m

SPAN: 2.20 m

LENGTH: 52.8 m

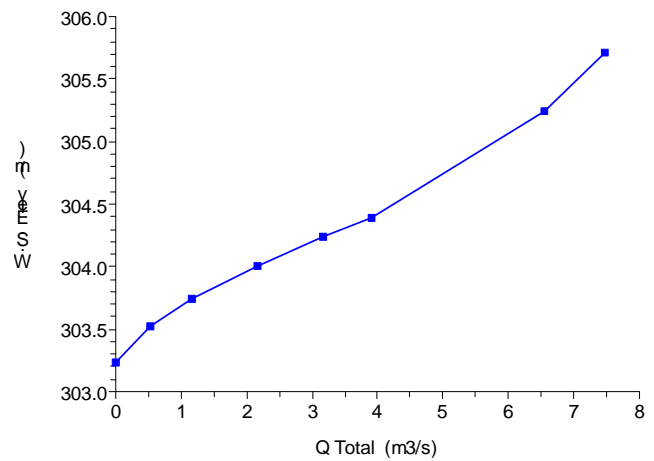
SLOPE: 0.00568 m/m

UPSTREAM INVERT ELEVATION: 303.24 m

TOP OF ROAD ELEVATION: 313.20 m

EFFECTIVE FLOW AREA: 2.51 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek East Branch

STRUCTURE TYPE: Circular Culvert

LOCATION: Blackbridge Rd.

U.T.M. GRID REFERENCE (NAD 83):

N: 4810960 m

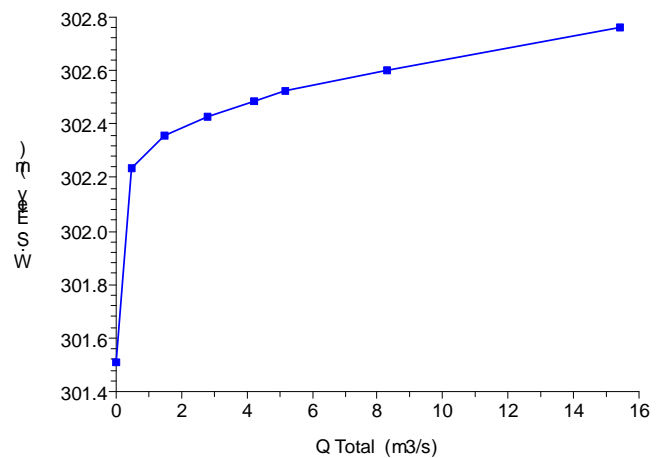
HEC-RAS SECTION: 1507

E: 555695 m

SPECIFICATIONS:

MATERIAL: C.S.P.
DIAMETER: 0.50 m
SPAN: - m
LENGTH: 9.3 m
SLOPE: 0.00568 m/m
UPSTREAM INVERT ELEVATION: 301.51 m
TOP OF ROAD ELEVATION: 302.20 m
EFFECTIVE FLOW AREA: 0.20 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek West Branch

STRUCTURE TYPE: Circular Culvert

LOCATION: Blackbridge Road

U.T.M. GRID REFERENCE (NAD 83):

N: 4810824 m

HEC-RAS SECTION: 96a

E: 555461 m

SPECIFICATIONS:

MATERIAL: C.S.P.

DIAMETER: 1.60 m

SPAN: - m

LENGTH: 32.5 m

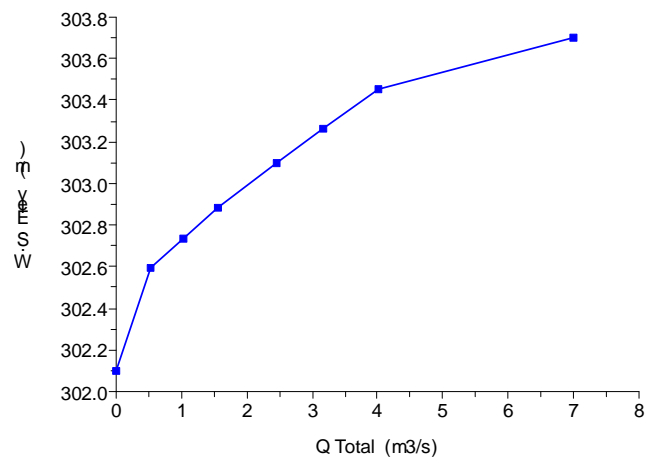
SLOPE: 0.00462 m/m

UPSTREAM INVERT ELEVATION: 302.10 m

TOP OF EMBANKMENT ELEVATION: 305.90 m

EFFECTIVE FLOW AREA: 2.01 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek Main Branch

STRUCTURE TYPE: Inline Weir

LOCATION: Pond G

U.T.M. GRID REFERENCE (NAD 83):

N: 4810196 m

HEC-RAS SECTION: 568

E: 555773 m

SPECIFICATIONS:

MATERIAL: Concrete/Wood

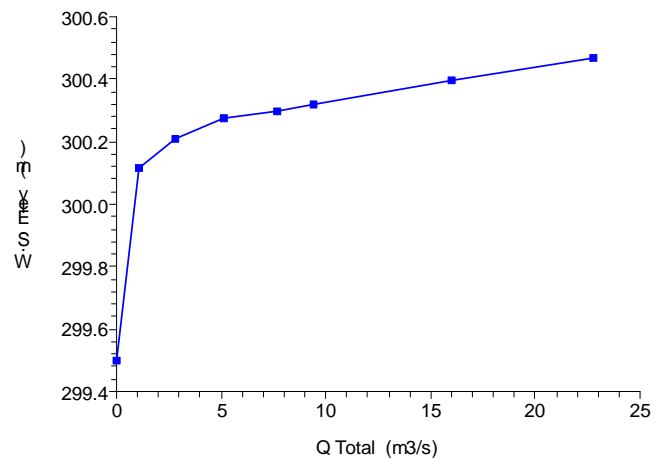
CREST ELEVATION: 299.72 m

CREST LENGTH: 2.66 m

CREST WIDTH: 0.30 m

DOWNSTREAM CREEK
INVERT ELEVATION: 298.62 m

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek Main Branch

STRUCTURE TYPE: Inline Weir

LOCATION: Pond D

U.T.M. GRID REFERENCE (NAD 83):

N: 4810012 m

HEC-RAS SECTION: 358

E: 555862 m

SPECIFICATIONS:

MATERIAL: Concrete/Wood

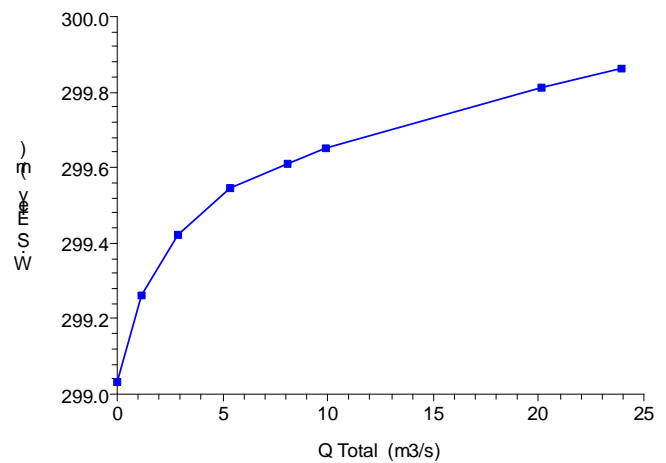
CREST ELEVATION west: 299.03 m
east: 299.03 m

CREST LENGTH west: 2.02 m
east: 4.21 m

CREST WIDTH west: 0.4 m
east: 0.4 m

DOWNSTREAM CREEK
INVERT ELEVATION: 297.84 m

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



West Structure



East Structure

HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek Main Branch

STRUCTURE TYPE: Bridge

LOCATION: Milton Ave.

U.T.M. GRID REFERENCE (NAD 83):

N: 4809970 m

HEC-RAS SECTION: 301

E: 555254 m

SPECIFICATIONS:

MATERIAL: Wood/Concrete

SPAN: 4.8 m

WIDTH: 4.0 m

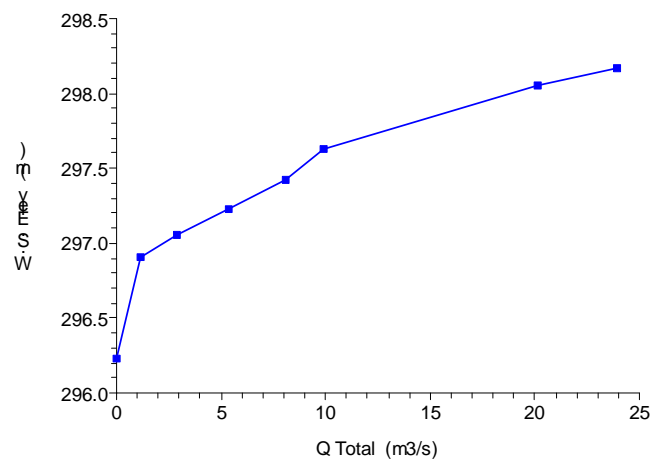
UPSTREAM INVERT ELEVATION: 296.15 m

DOWNSTREAM INVERT ELEVATION: 295.90 m

TOP OF ROAD ELEVATION: 297.51 m

EFFECTIVE FLOW AREA: 3.50 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek Main Branch

STRUCTURE TYPE: Box Culvert

LOCATION: Private Road

U.T.M. GRID REFERENCE (NAD 83):

N: 4809753 m

HEC-RAS SECTION: 18.5

E: 555952 m

SPECIFICATIONS:

MATERIAL: Concrete

RISE: 1.00 m

SPAN: 2.00 m

LENGTH: 4.3 m

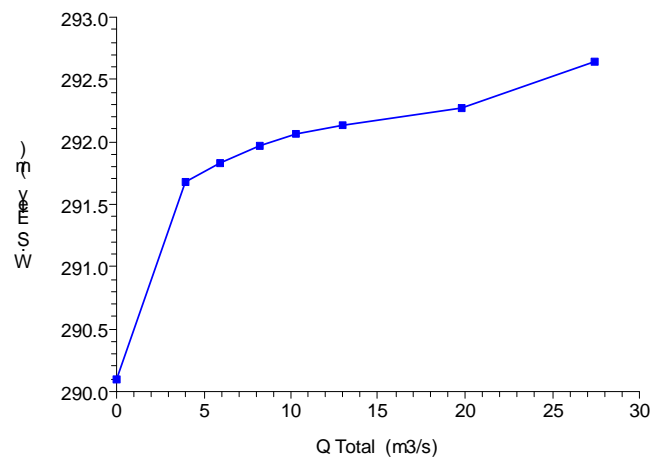
SLOPE: 0.0117 m/m

UPSTREAM INVERT ELEVATION: 290.15 m

TOP OF ROAD ELEVATION: 291.52 m

EFFECTIVE FLOW AREA: 2.00 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:



HYDRAULIC STRUCTURE DATA

WATERCOURSE: Forbes Creek Main Branch

STRUCTURE TYPE: Box Culvert

LOCATION: CN Rail Line

U.T.M. GRID REFERENCE (NAD 83):

N: 4809742 m

HEC-RAS SECTION: 9.5

E: 555963 m

SPECIFICATIONS:

MATERIAL: Concrete

RISE: 1.50 m

SPAN: 2.70 m

LENGTH: 5.6 m

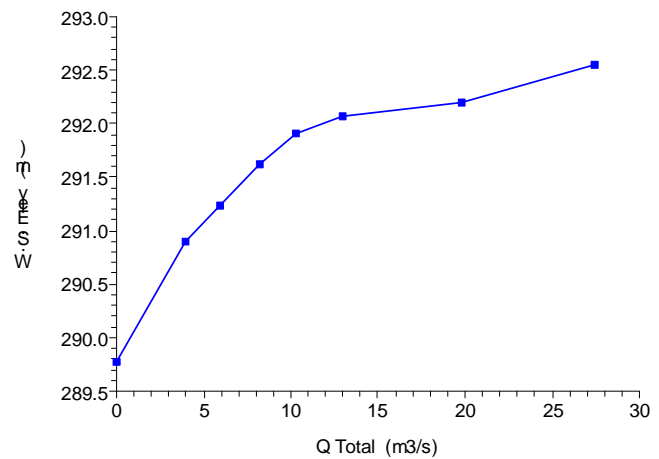
SLOPE: 0.0411 m/m

UPSTREAM INVERT ELEVATION: 289.77 m

TOP OF RAIL ELEVATION: 291.54 m

EFFECTIVE FLOW AREA: 4.05 m²

STRUCTURE RATING CURVE:



PHOTOGRAPHIC PRESENTATION:

