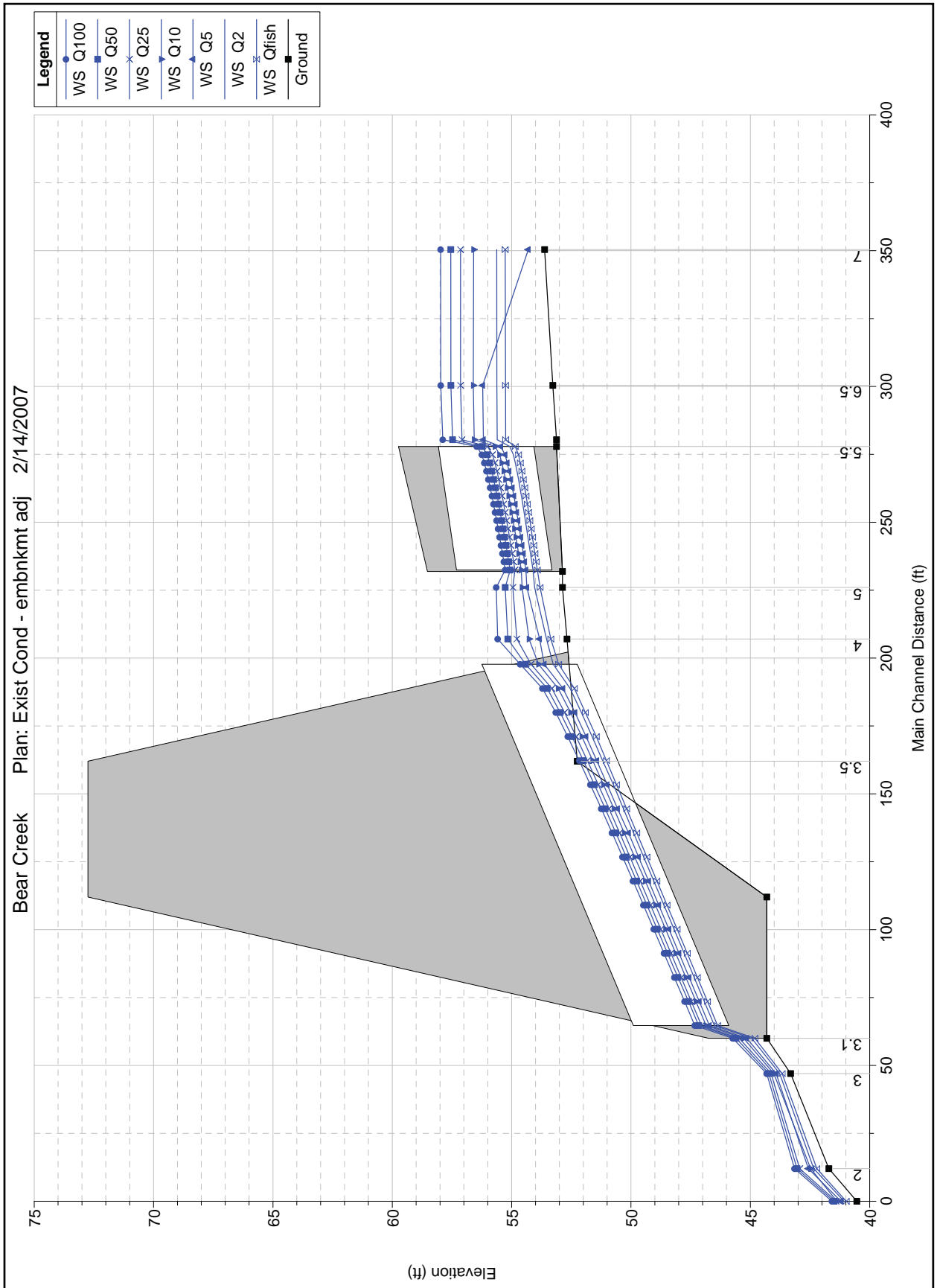
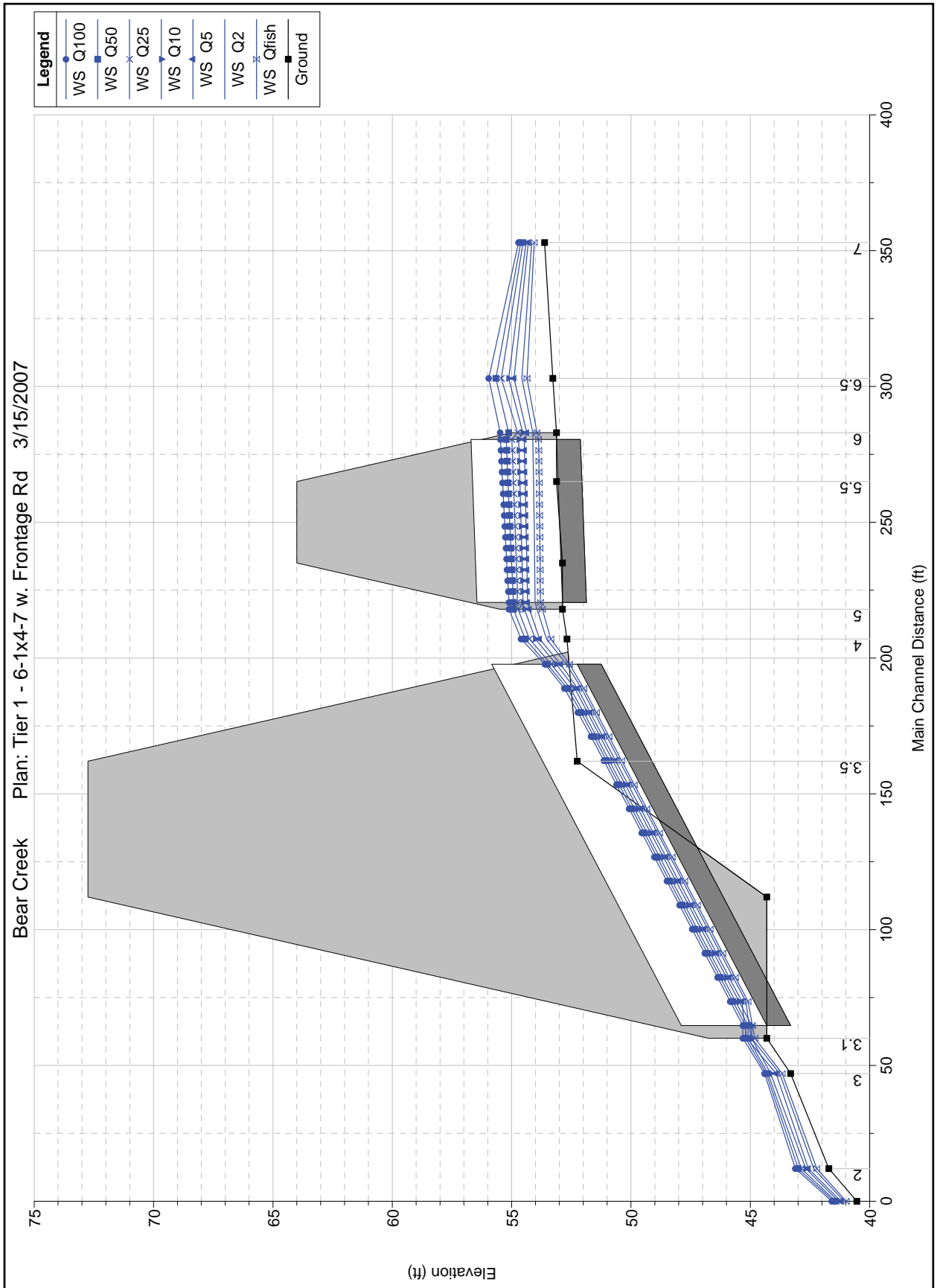


App 3.1 - Hydraulic analysis "Bear" Creek

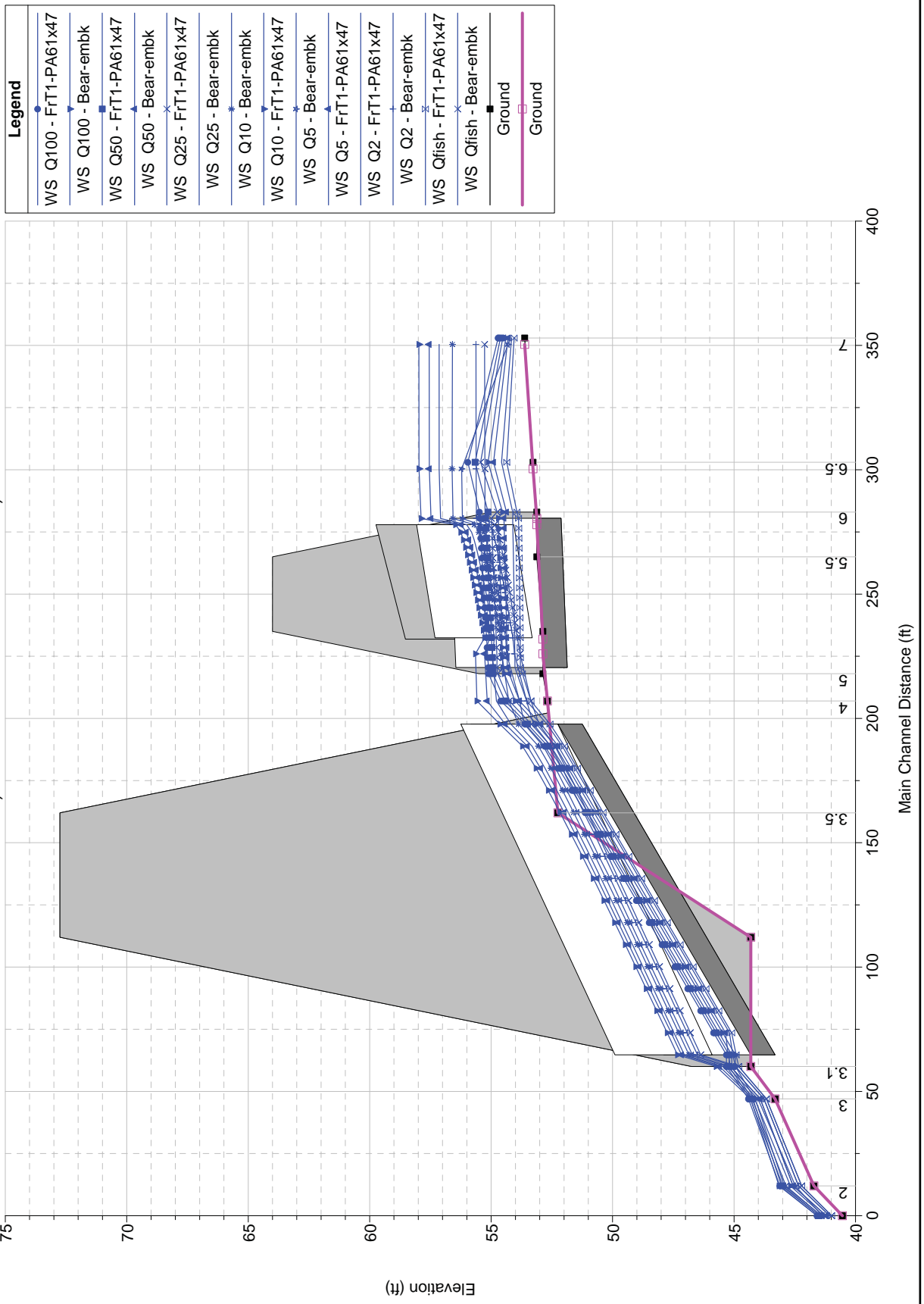
Bear Creek Plan: Exist Cond - embnkmnt adj 2/14/2007

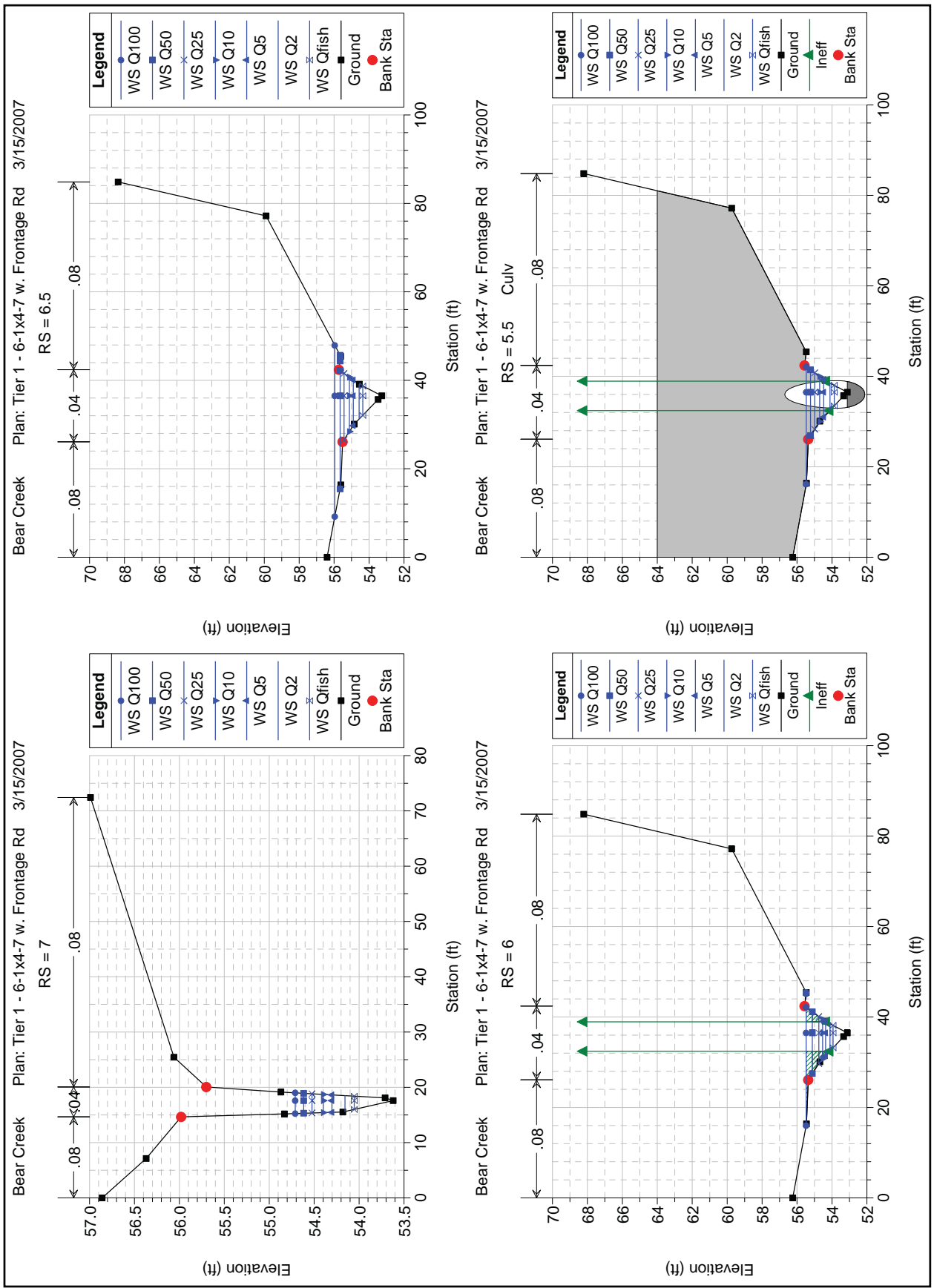


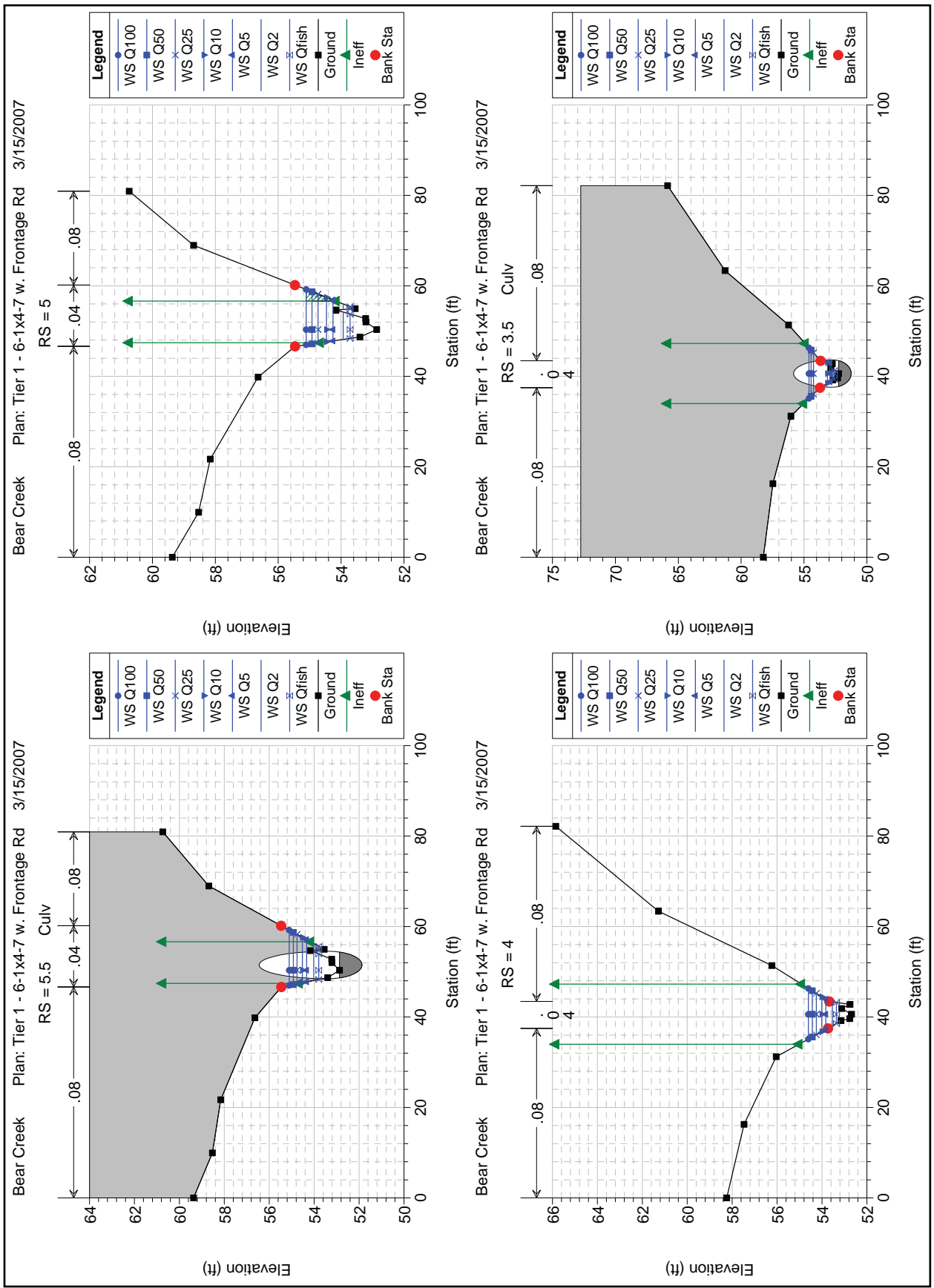
Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007



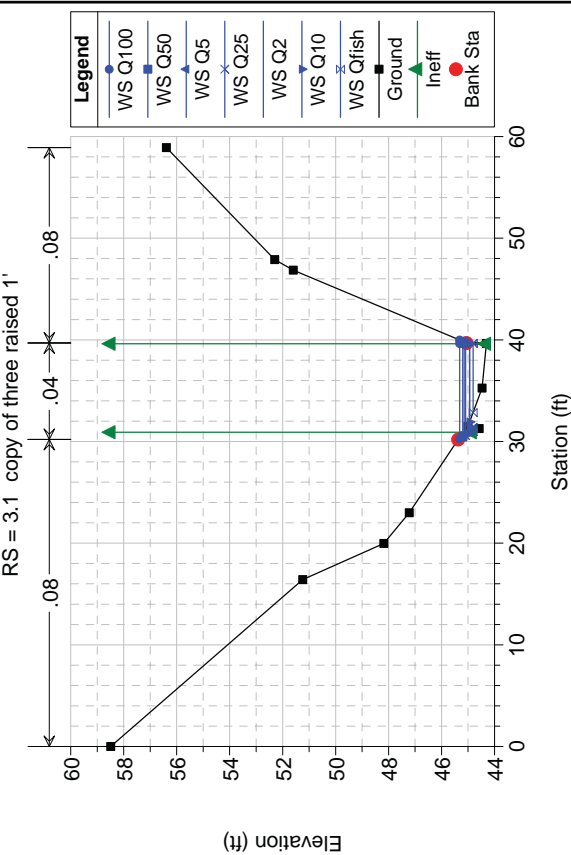
Bear Creek Plan: 1) FtT1-PA61x47 3/15/2007 2) Bear-embk 2/14/2007



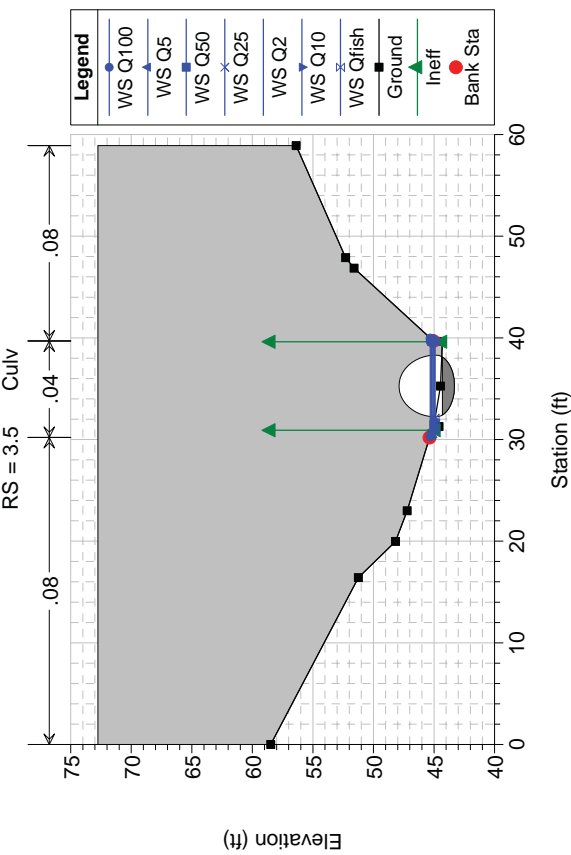




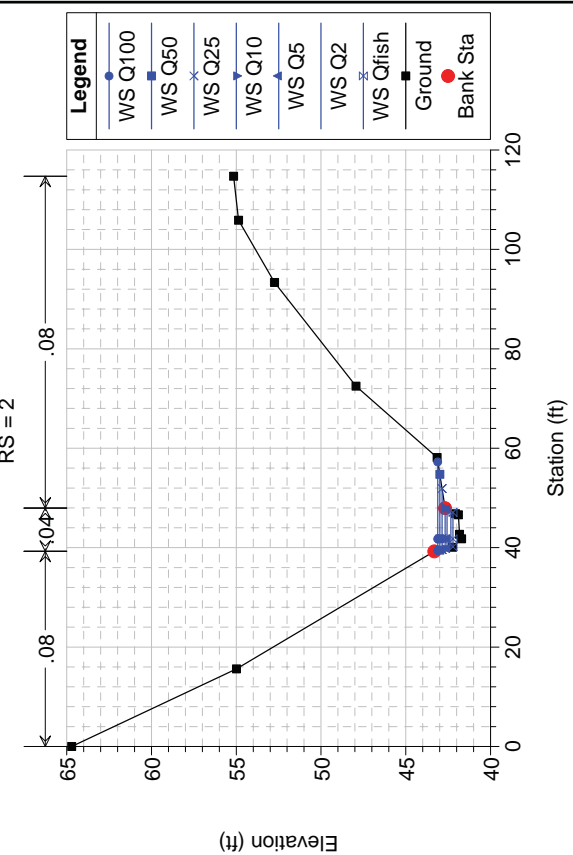
Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007
RS = 3.1 copy of three raised 1'



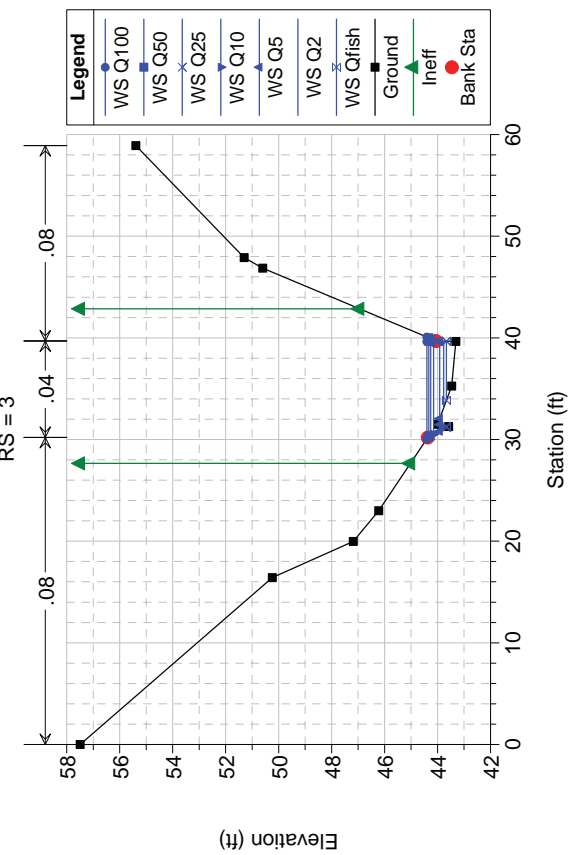
Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007
RS = 3.5 Culv



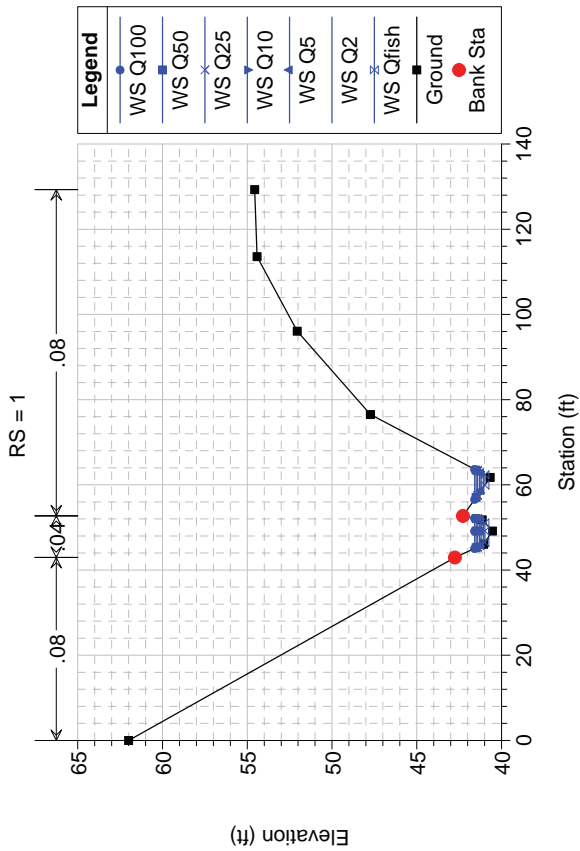
Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007
RS = 2



Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007
RS = 3



Bear Creek Plan: Tier 1 - 6-1x4-7 w. Frontage Rd 3/15/2007

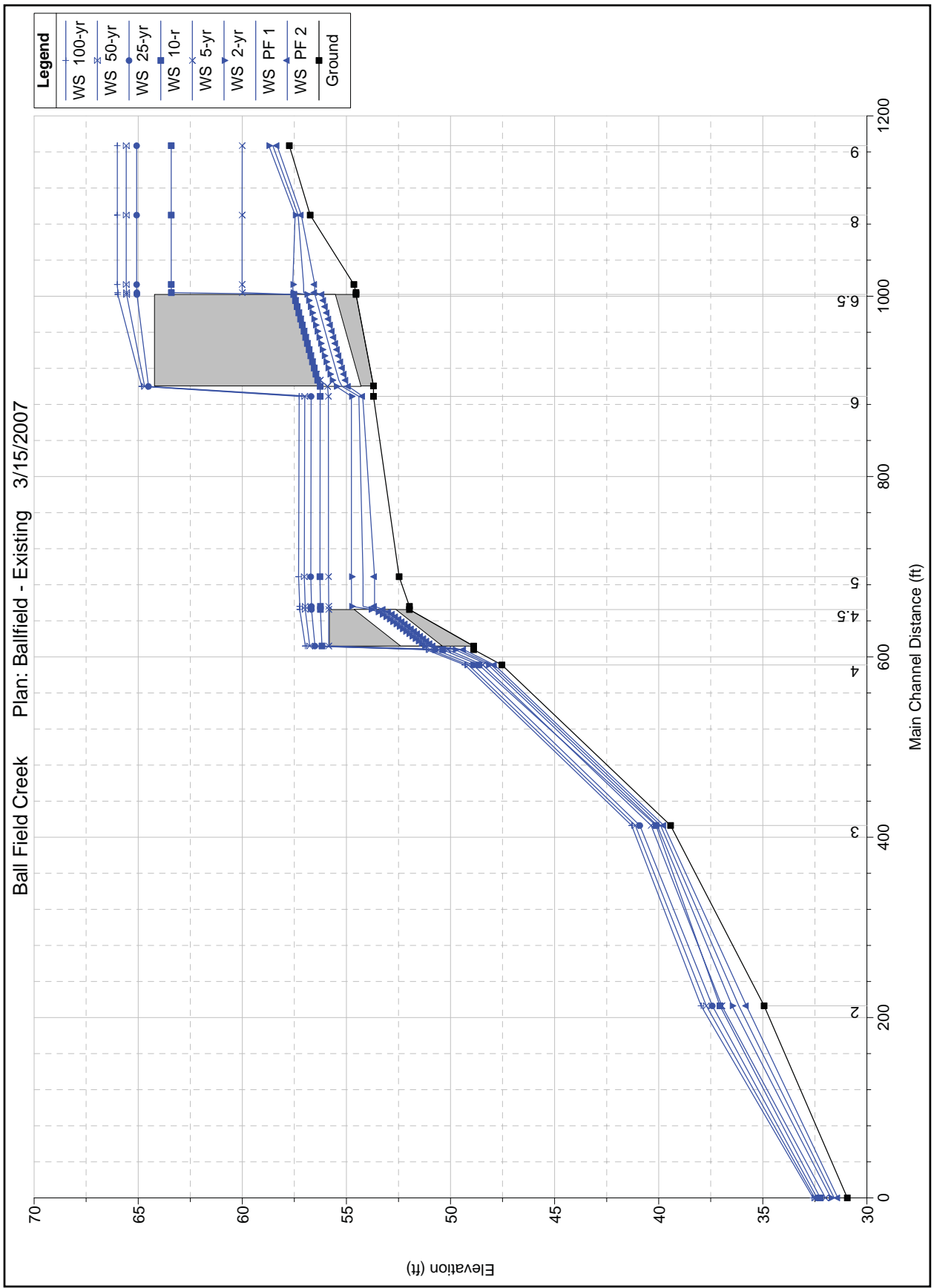


Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
1	1	Q2	12.00		40.54	41.07	41.26	41.72	0.201064	6.87	2.12	8.63	2.33	3.33
1	1	Q5	22.00		40.54	41.21	41.46	42.09	0.187122	8.14	3.37	10.22	2.35	4.21
1	1	Q10	30.00		40.54	41.31	41.60	42.28	0.161598	8.59	4.44	11.25	2.25	4.40
1	1	Q25	42.00		40.54	41.42	41.76	42.58	0.157270	9.47	5.74	12.39	2.27	5.06
1	1	Q50	52.00		40.54	41.50	41.89	42.79	0.153218	10.02	6.79	13.24	2.27	5.47
1	1	Q100	63.00		40.54	41.59	42.00	42.98	0.146676	10.46	7.98	14.14	2.25	5.77
1	1	Qfish	7.20		40.54	40.99	41.13	41.50	0.204321	6.09	1.41	7.07	2.28	2.79
1	2	Q2	12.00	12.00	41.71	42.34	42.34	42.57	0.033025	3.77	3.18	7.34	1.01	0.86
1	2	Q5	22.00	12.00	41.71	42.57	42.72	42.88	0.029957	4.50	4.89	7.92	1.01	1.09
1	2	Q10	30.00	12.00	41.71	42.68	42.72	43.10	0.033678	5.18	5.79	8.23	1.09	1.39
1	2	Q25	42.00	12.00	41.71	42.86	42.94	43.37	0.031275	5.73	7.65	12.29	1.08	1.59
1	2	Q50	52.00	12.00	41.71	42.99	43.12	43.56	0.029745	6.07	9.48	15.26	1.07	1.71
1	2	Q100	63.00	12.00	41.71	43.11	43.26	43.74	0.029716	6.46	11.40	17.86	1.09	1.88
1	2	Qfish	7.20	12.00	41.71	42.21	42.21	42.37	0.034892	3.22	2.24	6.90	1.00	0.69
1	3	Q2	12.00	47.00	43.31	43.77	43.94	44.31	0.143723	5.88	2.04	6.92	1.91	2.42
1	3	Q5	22.00	47.00	43.31	43.92	44.15	44.67	0.144954	6.95	3.16	8.26	1.98	3.12
1	3	Q10	30.00	47.00	43.31	44.15	44.28	44.66	0.060279	5.76	5.21	9.30	1.35	1.89
1	3	Q25	42.00	47.00	43.31	44.26	44.45	44.96	0.066141	6.73	6.26	9.57	1.45	2.44
1	3	Q50	52.00	47.00	43.31	44.33	44.59	45.21	0.072895	7.51	6.96	9.75	1.55	2.95
1	3	Q100	63.00	47.00	43.31	44.40	44.72	45.47	0.078939	8.29	7.66	10.01	1.63	3.49
1	3	Qfish	7.20	47.00	43.31	43.67	43.80	44.10	0.156920	5.26	1.37	5.98	1.94	2.09
1	3.1	Q2	12.00	60.00	44.31	44.94	44.94	45.15	0.033685	3.61	3.32	8.48	1.00	0.81
1	3.1	Q5	22.00	60.00	44.31	45.15	45.15	45.44	0.029079	4.31	5.10	9.30	0.99	1.02
1	3.1	Q10	30.00	60.00	44.31	44.94	45.28	46.22	0.214105	9.08	3.30	8.46	0.97	5.13
1	3.1	Q25	42.00	60.00	44.31	45.09	45.47	46.38	0.147785	9.10	4.62	9.16	0.94	4.69
1	3.1	Q50	52.00	60.00	44.31	45.20	45.60	46.56	0.121008	9.33	5.57	9.43	0.93	4.63
1	3.1	Q100	63.00	60.00	44.31	45.31	45.74	46.76	0.104800	9.65	6.53	9.70	0.92	4.70
1	3.1	Qfish	7.20	60.00	44.31	44.81	44.81	44.96	0.034764	3.15	2.28	7.27	0.99	0.67
1	3.5	Culvert												
1	4	Q2	12.00	207.00	52.68	53.54	53.54	53.81	0.035099	4.21	2.85	5.28	1.01	1.03
1	4	Q5	22.00	207.00	52.68	53.83	53.83	54.19	0.029819	4.87	4.56	6.69	0.99	1.23
1	4	Q10	30.00	207.00	52.68	54.01	54.01	54.45	0.026957	5.34	5.85	7.73	0.97	1.38
1	4	Q25	42.00	207.00	52.68	54.25	54.25	54.77	0.023633	5.83	7.91	9.15	0.94	1.52
1	4	Q50	52.00	207.00	52.68	54.43	54.43	55.00	0.021735	6.15	9.67	10.21	0.93	1.62
1	4	Q100	63.00	207.00	52.68	54.61	54.61	55.23	0.020658	6.50	11.53	11.21	0.92	1.73
1	4	Qfish	7.20	207.00	52.68	53.36	53.36	53.57	0.036437	3.67	1.96	4.64	0.99	0.85
1	5	Q2	12.00	218.00	52.87	53.93	53.93	54.06	0.013717	2.83	4.24	7.28	0.65	0.45
1	5	Q5	22.00	218.00	52.87	54.26	54.26	54.41	0.012023	3.19	6.90	9.06	0.63	0.52
1	5	Q10	30.00	218.00	52.87	54.46	54.46	54.65	0.010528	3.43	8.75	9.83	0.61	0.56

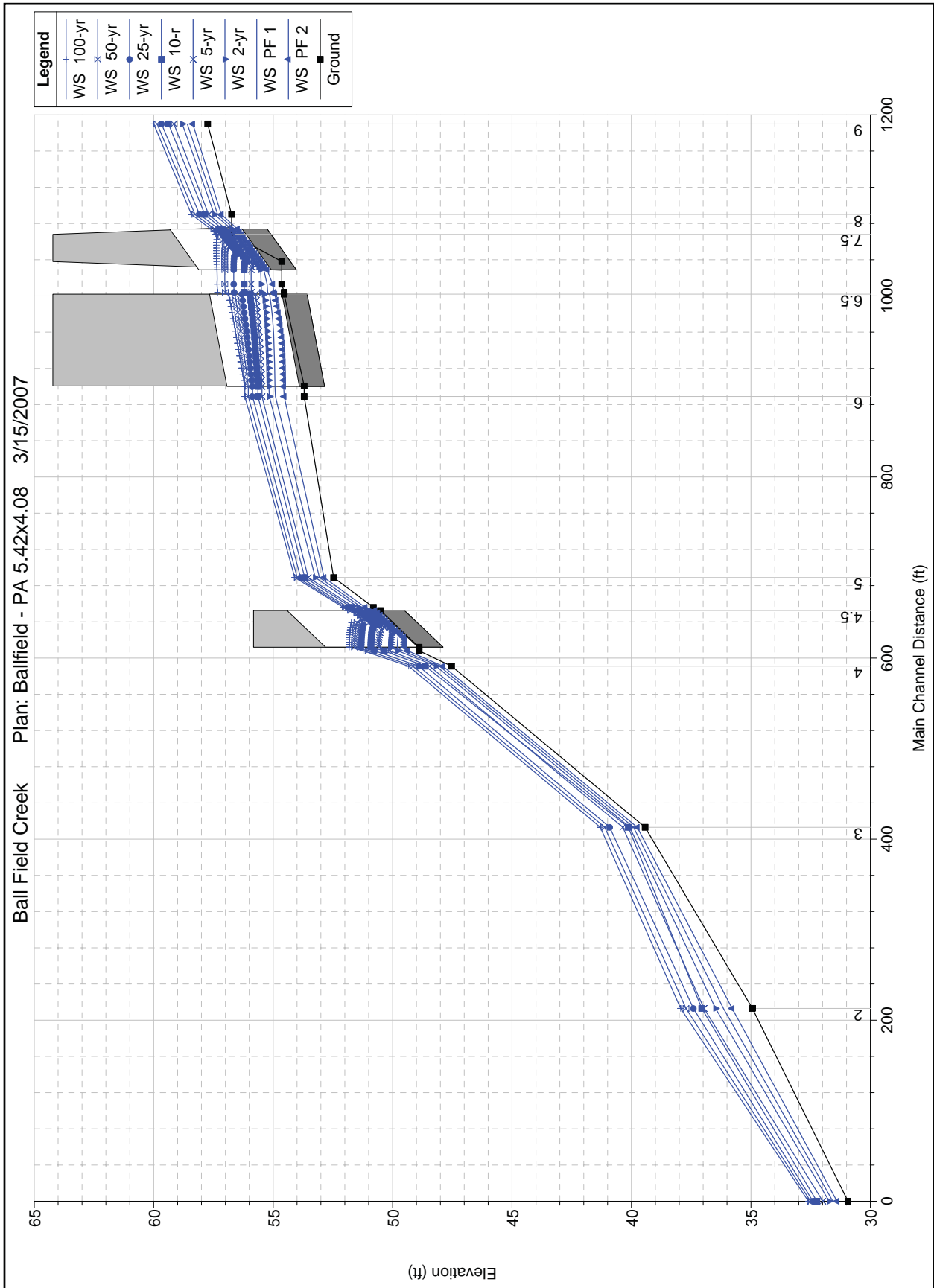
Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
1	5	Q25	42.00	218.00	52.87	54.73	54.11	54.95	0.009362	3.75	11.21	10.84	0.60	0.62
1	5	Q50	52.00	218.00	52.87	54.93	54.37	55.17	0.008811	4.01	12.98	11.55	0.59	0.68
1	5	Q100	63.00	218.00	52.87	55.11	54.53	55.40	0.008645	4.29	14.70	12.25	0.60	0.74
1	5	Qfish	7.20	218.00	52.87	53.71	53.94	53.82	0.014499	2.58	2.80	5.91	0.66	0.40
1	5.5	Culvert												
1	6	Q2	12.00	283.00	53.12	54.11	54.11	54.36	0.032087	4.01	3.00	6.06	1.00	0.94
1	6	Q5	22.00	283.00	53.12	54.37	54.37	54.72	0.028492	4.78	4.60	7.62	1.00	1.19
1	6	Q10	30.00	283.00	53.12	54.53	54.53	54.97	0.026278	5.29	5.68	8.74	1.00	1.35
1	6	Q25	42.00	283.00	53.12	54.75	54.75	55.30	0.024415	5.92	7.10	10.37	1.00	1.57
1	6	Q50	52.00	283.00	53.12	55.13	54.91	55.59	0.013998	5.45	9.54	13.67	0.79	1.21
1	6	Q100	63.00	283.00	53.12	55.48	55.09	55.92	0.010016	5.33	11.83	26.54	0.70	1.07
1	6	Qfish	7.20	283.00	53.12	53.94	53.94	54.13	0.033188	3.57	2.02	4.97	0.99	0.79
1	6.5	Q2	12.00	303.00	53.27	54.57	54.26	54.66	0.007726	2.35	5.11	7.94	0.52	0.29
1	6.5	Q5	22.00	303.00	53.27	54.90	54.53	55.02	0.007834	2.70	8.13	10.35	0.54	0.36
1	6.5	Q10	30.00	303.00	53.27	55.13	54.70	55.25	0.007390	2.81	10.67	12.32	0.53	0.38
1	6.5	Q25	42.00	303.00	53.27	55.43	54.91	55.56	0.006247	2.83	14.84	15.00	0.50	0.37
1	6.5	Q50	52.00	303.00	53.27	55.66	55.06	55.78	0.005101	2.81	19.36	28.07	0.46	0.35
1	6.5	Q100	63.00	303.00	53.27	55.96	55.20	56.06	0.003181	2.58	29.66	38.68	0.38	0.27
1	6.5	Qfish	7.20	303.00	53.27	54.36	54.08	54.42	0.007282	2.02	3.56	6.61	0.49	0.23
1	7	Q2	12.00	353.00	53.62	54.16	54.66	57.17	0.791311	13.94	0.86	2.87	4.48	13.53
1	7	Q5	22.00	353.00	53.62	54.30	55.03	58.73	0.790102	16.88	1.30	3.15	4.62	18.02
1	7	Q10	30.00	353.00	53.62	54.40	55.27	59.78	0.790347	18.62	1.61	3.29	4.69	20.89
1	7	Q25	42.00	353.00	53.62	54.52	55.57	61.14	0.790551	20.64	2.03	3.47	4.75	24.39
1	7	Q50	52.00	353.00	53.62	54.62	55.80	62.13	0.790784	22.00	2.36	3.60	4.79	26.83
1	7	Q100	63.00	353.00	53.62	54.71	56.08	63.11	0.790097	23.26	2.71	3.74	4.82	29.16
1	7	Qfish	7.20	353.00	53.62	54.05	54.44	56.38	0.790720	12.24	0.59	2.39	4.35	11.13

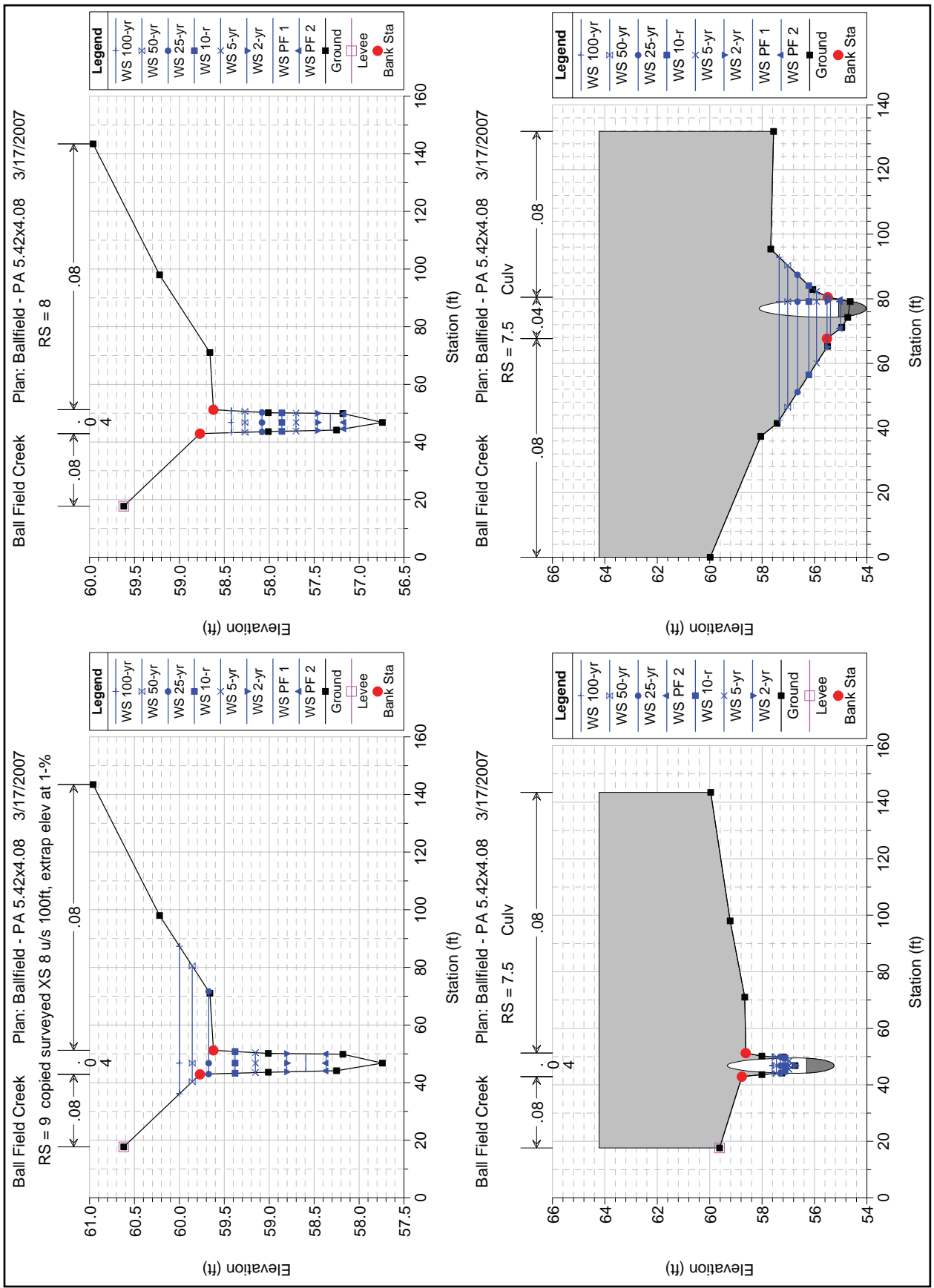
App 3.2 - Hydraulic analysis “Ball Field” Creek

Ball Field Creek Plan: Ballfield - Existing 3/15/2007

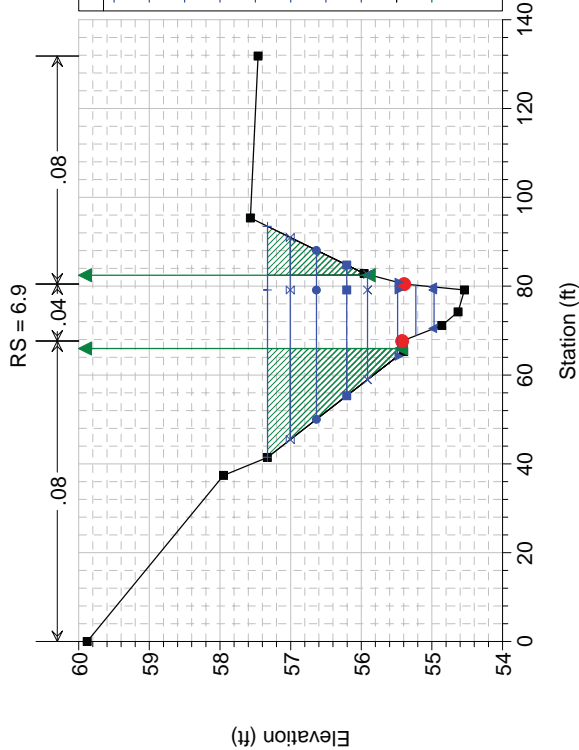


Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/15/2007

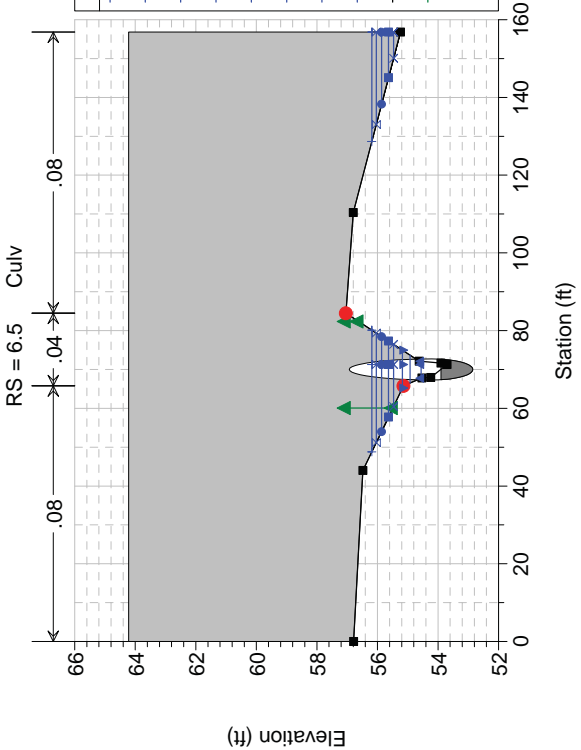




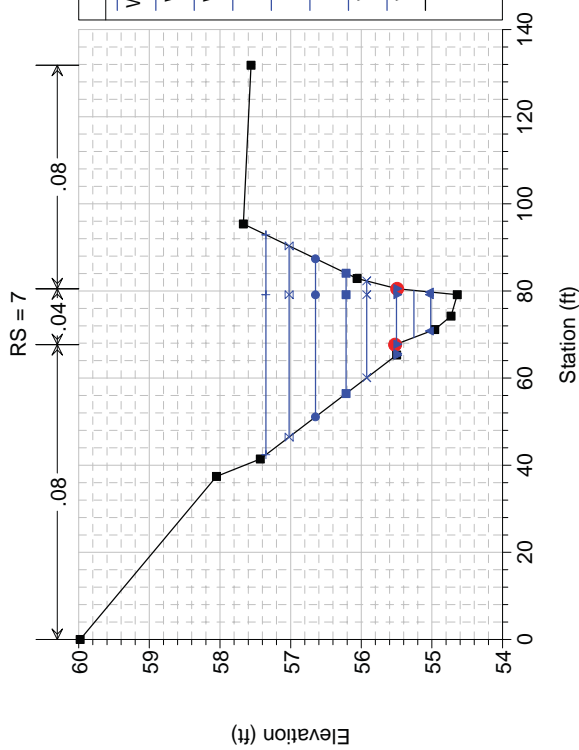
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



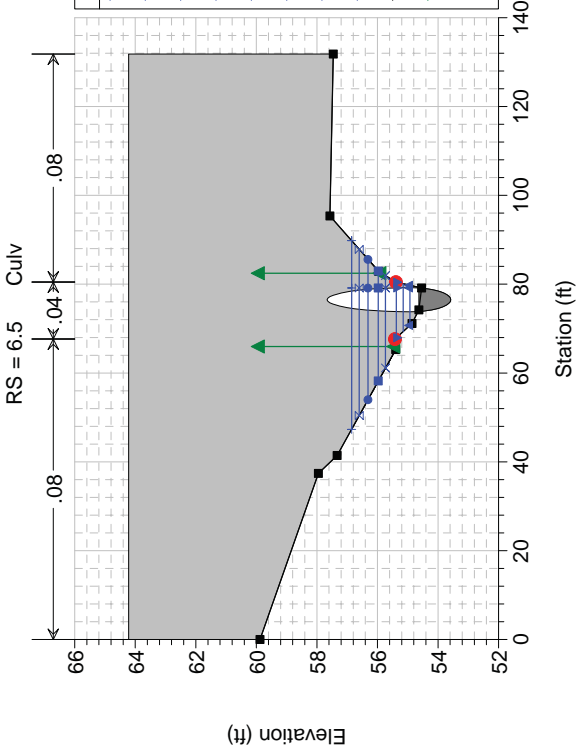
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



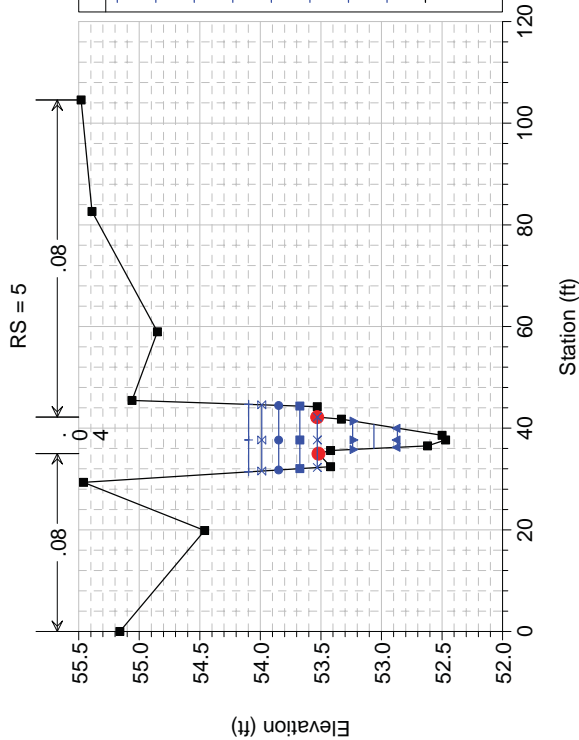
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007

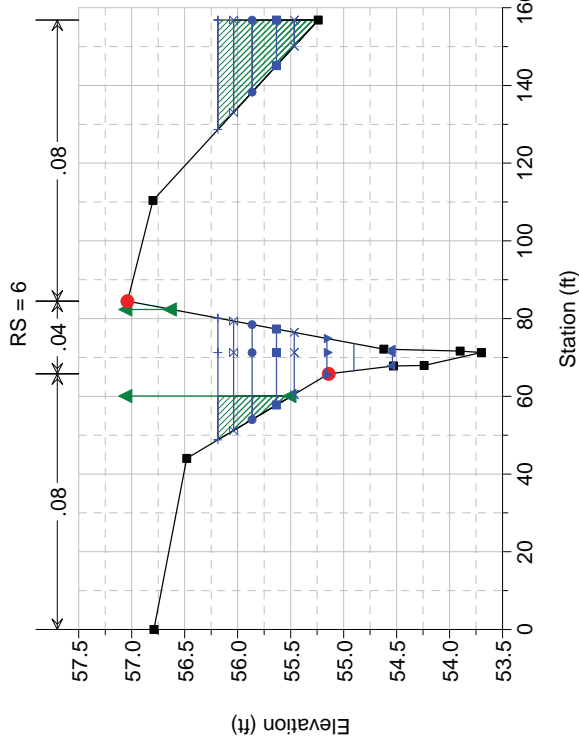


Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



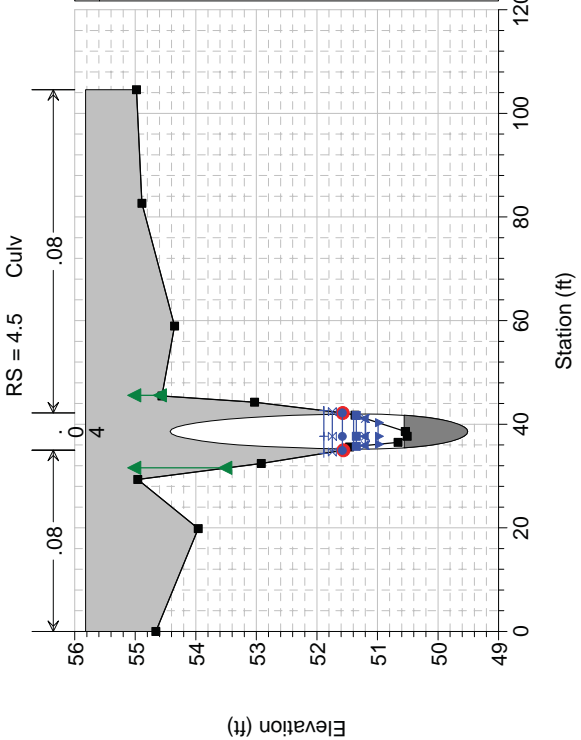
Legend	
+	WS 100-yr
x	WS 50-yr
•	WS 25-yr
■	WS 10-r
▲	WS 5-yr
▼	WS 2-yr
▲	WS PF 1
▼	WS PF 2
■	Ground
●	Bank Sta

Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



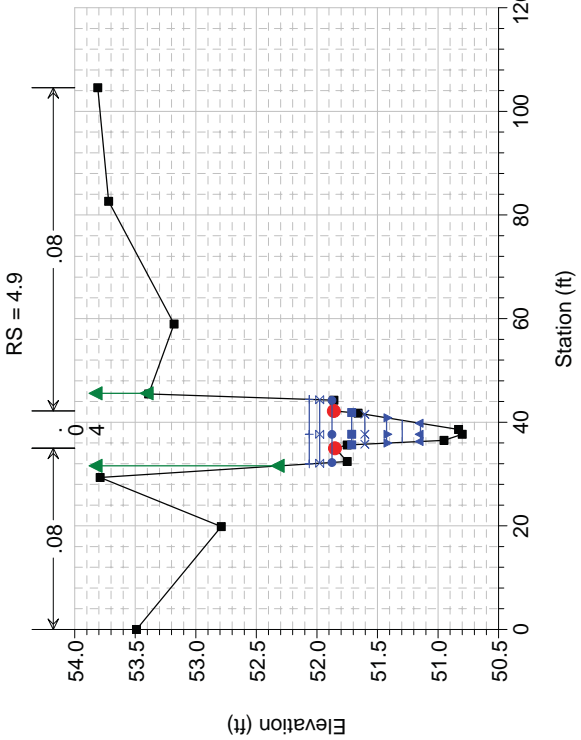
Legend	
+	WS 100-yr
x	WS 50-yr
•	WS 25-yr
■	WS 10-r
▲	WS 5-yr
▼	WS 2-yr
▲	WS PF 1
▼	WS PF 2
■	Ground
▲	Ineff
●	Bank Sta

Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



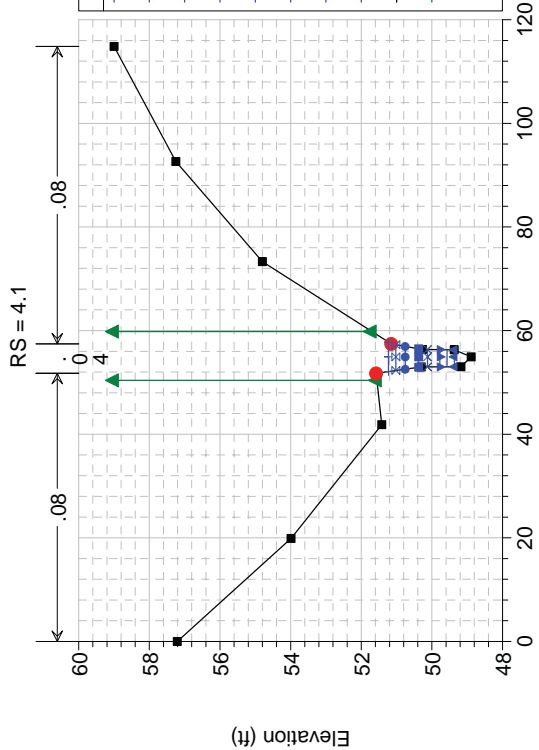
Legend	
+	WS 100-yr
x	WS 50-yr
•	WS 25-yr
■	WS PF 1
▲	WS 10-r
▼	WS 5-yr
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▼	WS 2-yr
■	Ground
▲	Ineff
●	Bank Sta

Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007

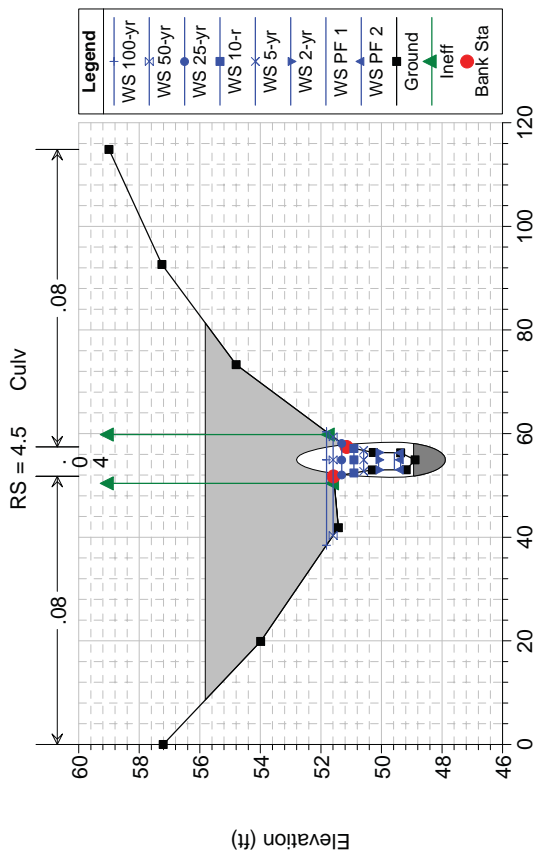


Legend	
+	WS 100-yr
x	WS 50-yr
•	WS 25-yr
■	WS 10-r
▲	WS 5-yr
▼	WS 2-yr
▲	WS PF 1
▼	WS PF 2
■	Ground
▲	Ineff
●	Bank Sta

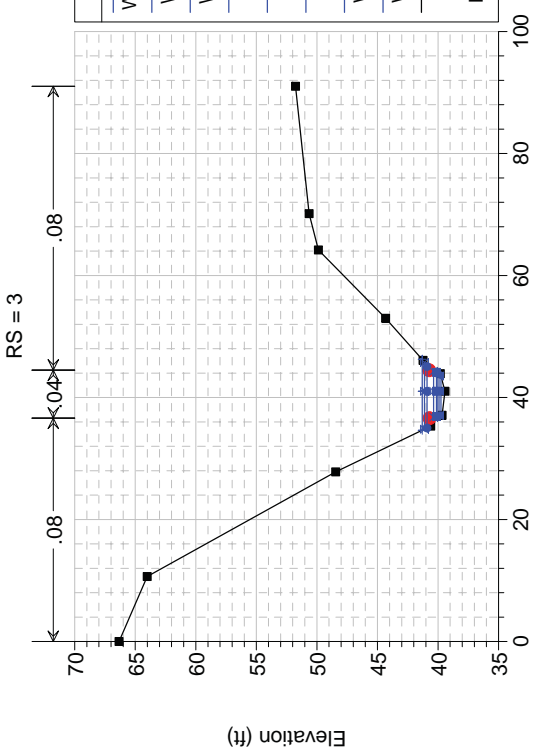
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



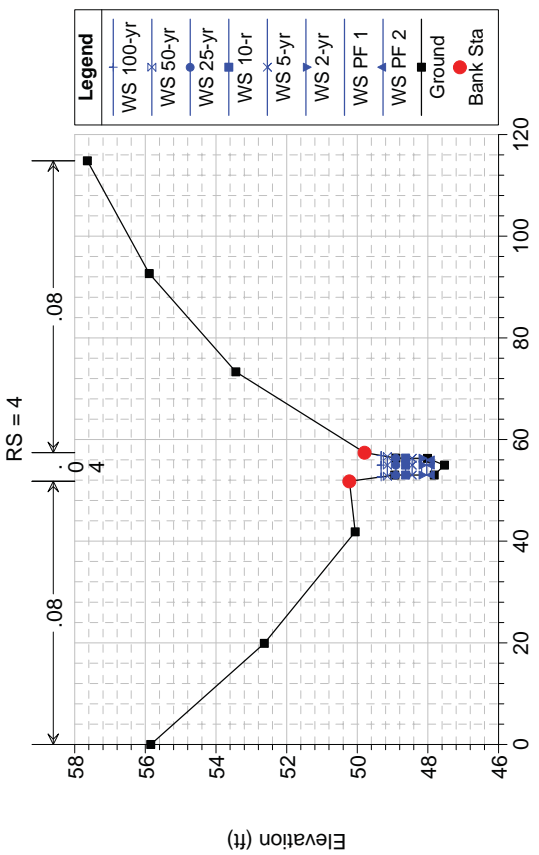
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



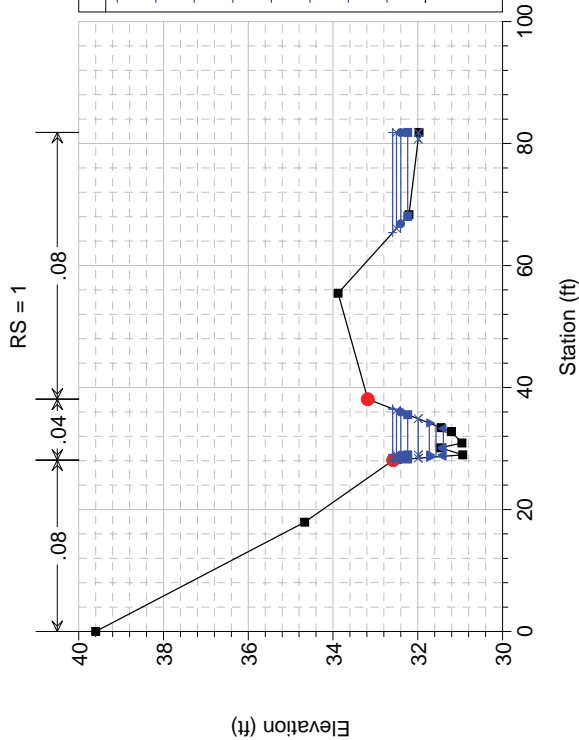
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



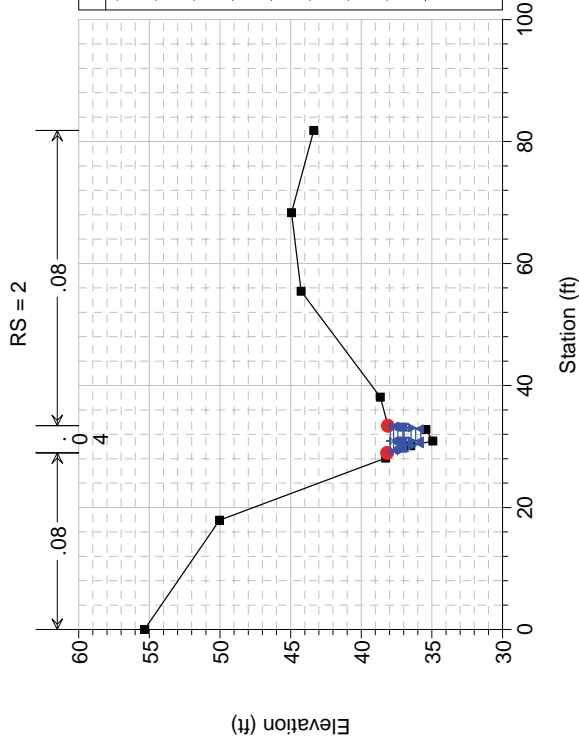
Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



Ball Field Creek Plan: Ballfield - PA 5.42x4.08 3/17/2007



Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
1	1	PF 1	6.60		30.94	31.57	31.57	31.76	0.038788	3.46	1.91	5.12	1.00	0.79
1	1	PF 2	3.00		30.94	31.40	31.40	31.52	0.043235	2.81	1.07	4.29	1.00	0.59
1	1	2-yr	11.00		30.94	31.73	31.73	31.98	0.036615	4.01	2.74	5.63	1.01	0.97
1	1	5-yr	20.00		30.94	31.99	31.99	32.32	0.032436	4.62	4.33	7.56	1.00	1.16
1	1	10-r	27.00		30.94	32.24	32.24	32.50	0.020458	4.22	8.06	20.97	0.82	0.91
1	1	25-yr	38.00		30.94	32.40	32.40	32.68	0.020416	4.54	11.62	22.75	1.01	1.01
1	1	50-yr	48.00		30.94	32.50	32.50	32.82	0.021978	4.91	13.99	23.86	0.87	1.16
1	1	100-yr	57.00		30.94	32.59	32.59	32.93	0.022507	5.15	16.15	24.88	0.89	1.25
1	2	PF 1	6.60	213.00	34.94	36.15	35.84	36.28	0.013340	2.91	2.27	2.68	0.56	0.47
1	2	PF 2	3.00	213.00	34.94	35.79		35.87	0.011802	2.23	1.35	2.42	0.53	0.30
1	2	2-yr	11.00	213.00	34.94	36.48		36.66	0.014672	3.44	3.19	2.93	0.58	0.61
1	2	5-yr	20.00	213.00	34.94	36.97		37.24	0.017278	4.23	4.73	3.37	0.63	0.87
1	2	10-r	27.00	213.00	34.94	37.06		37.50	0.026614	5.36	5.04	3.45	0.78	1.38
1	2	25-yr	38.00	213.00	34.94	37.41		37.97	0.029507	6.04	6.30	3.77	0.82	1.69
1	2	50-yr	48.00	213.00	34.94	37.72		38.35	0.029675	6.39	7.52	4.06	0.83	1.85
1	2	100-yr	57.00	213.00	34.94	37.94		38.65	0.030891	6.75	8.45	4.26	0.84	2.03
1	3	PF 1	6.60	413.00	39.43	39.91	39.88	40.04	0.028467	2.90	2.28	7.00	0.90	0.56
1	3	PF 2	3.00	413.00	39.43	39.76	39.76	39.85	0.040445	2.44	1.23	6.47	0.99	0.47
1	3	2-yr	11.00	413.00	39.43	40.07	40.01	40.23	0.022072	3.23	3.41	7.18	0.83	0.62
1	3	5-yr	20.00	413.00	39.43	40.36	40.22	40.56	0.015940	3.60	5.56	7.50	0.74	0.67
1	3	10-r	27.00	413.00	39.43	40.13	40.36	40.90	0.091602	7.04	3.84	7.24	1.70	2.83
1	3	25-yr	38.00	413.00	39.43	40.91	40.55	41.14	0.009707	3.85	10.24	10.08	0.61	0.65
1	3	50-yr	48.00	413.00	39.43	41.12	40.72	41.38	0.008988	4.12	12.46	10.95	0.60	0.71
1	3	100-yr	57.00	413.00	39.43	41.30	40.86	41.58	0.008364	4.30	14.54	11.63	0.59	0.74
1	4	PF 1	6.60	591.00	47.53	48.04	48.21	48.64	0.146864	6.25	1.06	3.28	1.94	2.67
1	4	PF 2	3.00	591.00	47.53	47.89	48.01	48.27	0.157327	4.95	0.61	2.95	1.93	1.91
1	4	2-yr	11.00	591.00	47.53	48.18	48.41	48.98	0.131651	7.20	1.53	3.30	1.86	3.21
1	4	5-yr	20.00	591.00	47.53	48.45	48.76	49.51	0.112727	8.29	2.41	3.32	1.71	3.82
1	4	10-r	27.00	591.00	47.53	48.63	49.01	49.86	0.106368	8.90	3.04	3.34	1.64	4.18
1	4	25-yr	38.00	591.00	47.53	48.91	49.38	50.34	0.100933	9.62	3.95	3.36	1.56	4.63
1	4	50-yr	48.00	591.00	47.53	49.15	49.66	50.69	0.098092	9.97	4.81	3.85	1.57	4.86
1	4	100-yr	57.00	591.00	47.53	49.33	49.85	50.97	0.097042	10.29	5.54	4.24	1.59	5.08
1	4.1	PF 1	6.60	608.00	48.89	49.57	49.57	49.82	0.038030	4.01	1.64	3.30	1.00	0.98
1	4.1	PF 2	3.00	608.00	48.89	49.37	49.37	49.52	0.040813	3.13	0.96	3.28	1.02	0.69
1	4.1	2-yr	11.00	608.00	48.89	49.78	49.78	50.13	0.038164	4.74	2.32	3.32	1.00	1.26
1	4.1	5-yr	20.00	608.00	48.89	50.12	50.12	50.64	0.040036	5.76	3.47	3.35	1.00	1.71
1	4.1	10-r	27.00	608.00	48.89	50.38	50.38	50.98	0.040577	6.24	4.33	3.56	1.00	1.93
1	4.1	25-yr	38.00	608.00	48.89	50.75	50.75	51.41	0.037810	6.52	5.83	4.38	1.00	2.02
1	4.1	50-yr	48.00	608.00	48.89	51.02	51.02	51.73	0.036661	6.79	7.07	4.96	1.00	2.13
1	4.1	100-yr	57.00	608.00	48.89	51.23	51.23	51.99	0.034789	6.98	8.18	5.68	0.99	2.19

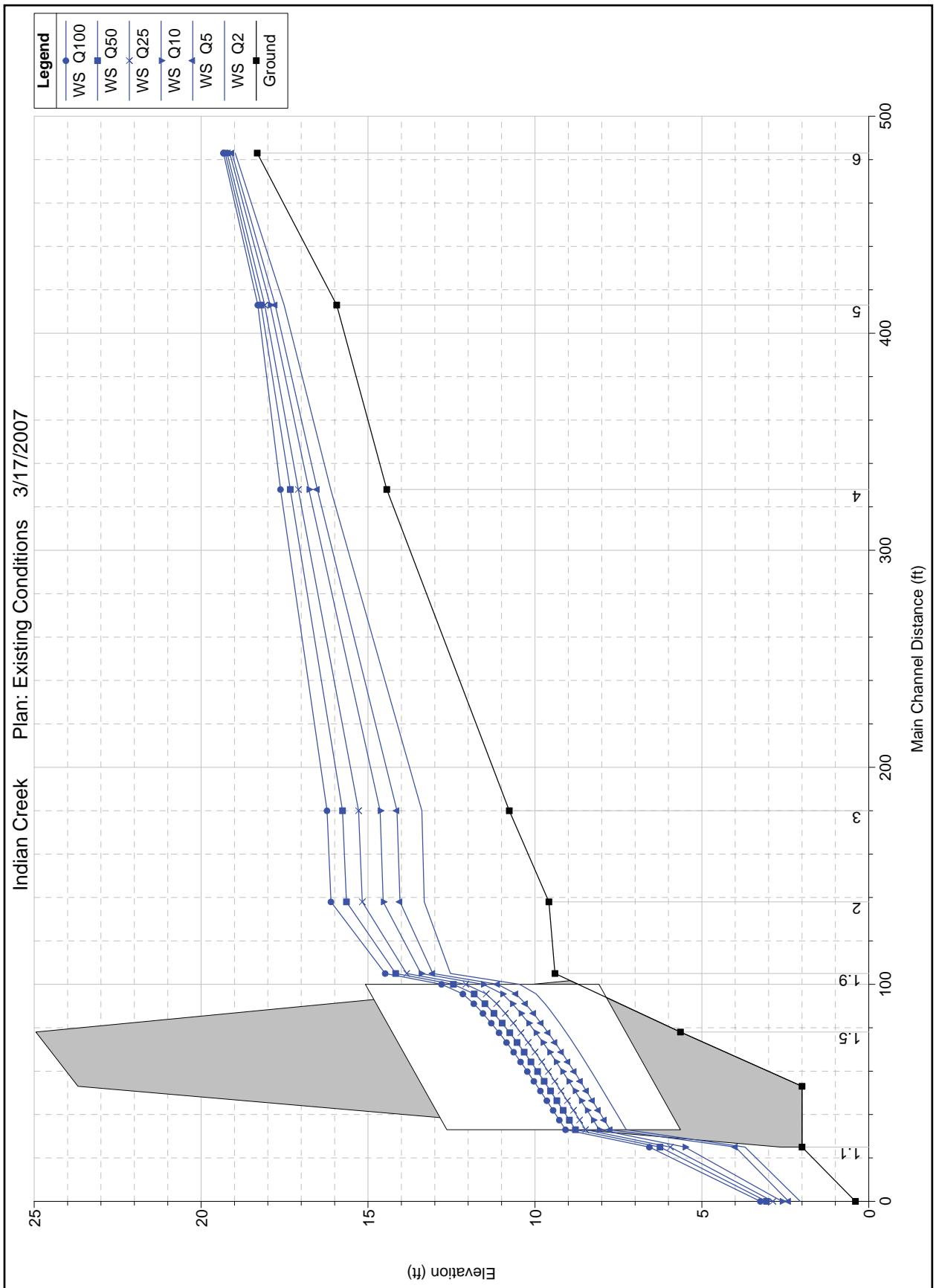
HEC-RAS Plan: BF-PA5x4 River: Ball Field Creek Reach: 1 (Continued)

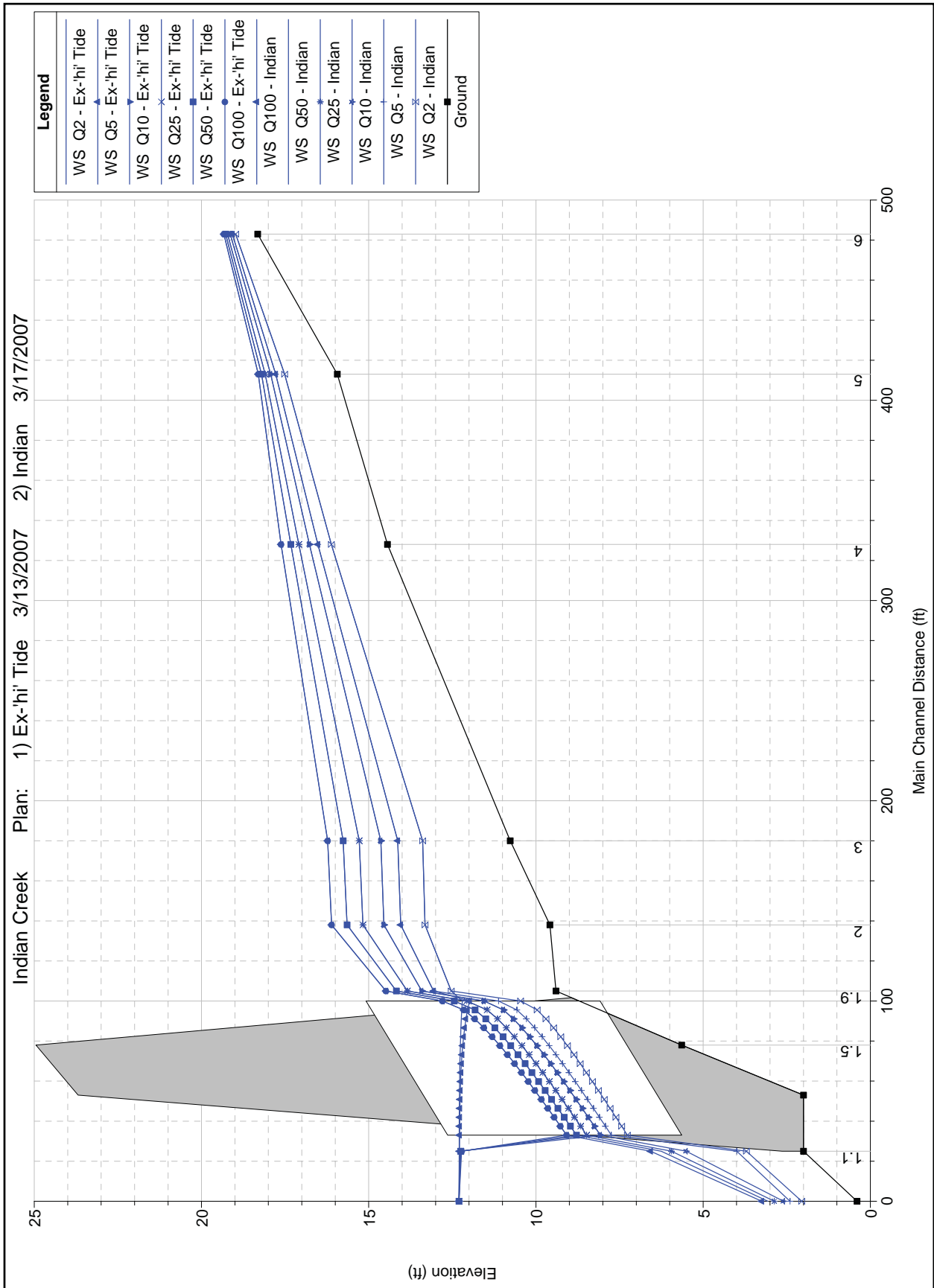
Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sqft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
1	4.5		Culvert											
1	4.9	PF 1	6.60	656.00	50.80	51.30	51.40	51.64	0.073362	4.68	1.41	4.25	1.43	1.45
1	4.9	PF 2	3.00	656.00	50.80	51.14	51.20	51.35	0.068734	3.63	0.83	3.50	1.32	0.98
1	4.9	2-yr	11.00	656.00	50.80	51.42	51.57	51.89	0.077278	5.50	2.00	4.89	1.51	1.87
1	4.9	5-yr	20.00	656.00	50.80	51.60	51.86	52.31	0.087566	6.76	2.96	5.78	1.66	2.64
1	4.9	10-r	27.00	656.00	50.80	51.71	52.01	52.58	0.090971	7.47	3.62	6.23	1.73	3.09
1	4.9	25-yr	38.00	656.00	50.80	51.88	52.18	52.87	0.089672	8.03	4.94	12.01	1.75	3.43
1	4.9	50-yr	48.00	656.00	50.80	51.98	52.33	53.10	0.084935	8.61	6.18	12.25	1.75	3.76
1	4.9	100-yr	57.00	656.00	50.80	52.06	52.43	53.28	0.080906	9.03	7.24	12.44	1.73	3.99
1	5	PF 1	6.60	689.00	52.47	53.06	53.06	53.26	0.034805	3.58	1.85	4.73	1.01	0.81
1	5	PF 2	3.00	689.00	52.47	52.87	52.87	53.00	0.037841	2.94	1.02	3.77	1.00	0.61
1	5	2-yr	11.00	689.00	52.47	53.24	53.24	53.49	0.032128	3.99	2.76	5.60	1.00	0.93
1	5	5-yr	20.00	689.00	52.47	53.53	53.53	53.82	0.026972	4.34	4.76	9.93	0.96	1.01
1	5	10-r	27.00	689.00	52.47	53.67	53.67	54.00	0.023693	4.66	6.51	12.31	0.93	1.09
1	5	25-yr	38.00	689.00	52.47	53.85	53.85	54.24	0.022424	5.18	8.69	12.71	0.93	1.26
1	5	50-yr	48.00	689.00	52.47	53.99	53.99	54.43	0.021687	5.58	10.49	13.03	0.94	1.39
1	5	100-yr	57.00	689.00	52.47	54.10	54.10	54.59	0.021642	5.93	11.91	13.28	0.95	1.53
1	6	PF 1	6.60	889.00	53.70	54.90	54.90	54.94	0.003637	1.52	4.34	7.02	0.34	0.13
1	6	PF 2	3.00	889.00	53.70	54.54	54.54	54.56	0.003252	1.29	2.33	4.29	0.31	0.10
1	6	2-yr	11.00	889.00	53.70	55.16	55.16	55.20	0.003843	1.72	6.40	9.39	0.36	0.15
1	6	5-yr	20.00	889.00	53.70	55.47	55.47	55.53	0.004094	2.08	10.32	22.72	0.39	0.21
1	6	10-r	27.00	889.00	53.70	55.63	55.63	55.71	0.004305	2.29	13.13	31.31	0.41	0.25
1	6	25-yr	38.00	889.00	53.70	55.86	55.86	55.96	0.004365	2.52	17.21	43.00	0.42	0.28
1	6	50-yr	48.00	889.00	53.70	56.04	56.04	56.14	0.004406	2.68	20.52	51.99	0.43	0.31
1	6	100-yr	57.00	889.00	53.70	56.19	56.19	56.30	0.004368	2.79	23.41	59.53	0.43	0.33
1	6.5		Culvert											
1	6.9	PF 1	6.60	1004.00	54.54	55.23	54.92	55.25	0.002922	1.21	5.44	11.37	0.31	0.09
1	6.9	PF 2	3.00	1004.00	54.54	54.97	54.80	54.99	0.004375	1.08	2.78	9.37	0.35	0.08
1	6.9	2-yr	11.00	1004.00	54.54	55.49	55.03	55.51	0.002064	1.27	8.76	16.65	0.27	0.08
1	6.9	5-yr	20.00	1004.00	54.54	55.91	55.20	55.94	0.001261	1.38	15.51	23.71	0.23	0.08
1	6.9	10-r	27.00	1004.00	54.54	56.21	55.32	56.24	0.001010	1.45	20.34	29.43	0.22	0.09
1	6.9	25-yr	38.00	1004.00	54.54	56.63	55.46	56.67	0.000787	1.53	27.42	38.07	0.20	0.09
1	6.9	50-yr	48.00	1004.00	54.54	57.00	55.58	57.04	0.000663	1.59	33.53	45.52	0.19	0.09
1	6.9	100-yr	57.00	1004.00	54.54	57.33	55.68	57.37	0.000583	1.63	38.86	52.02	0.18	0.09
1	7	PF 1	6.60	1013.00	54.64	55.25	55.25	55.29	0.004668	1.42	4.63	10.80	0.38	0.12
1	7	PF 2	3.00	1013.00	54.64	55.02	55.02	55.04	0.007927	1.32	2.28	8.94	0.46	0.12
1	7	2-yr	11.00	1013.00	54.64	55.50	55.50	55.54	0.003172	1.46	7.56	13.13	0.33	0.11
1	7	5-yr	20.00	1013.00	54.64	55.92	55.92	55.96	0.001634	1.49	15.41	22.22	0.26	0.10
1	7	10-r	27.00	1013.00	54.64	56.21	56.21	56.25	0.001174	1.49	22.65	27.61	0.23	0.09

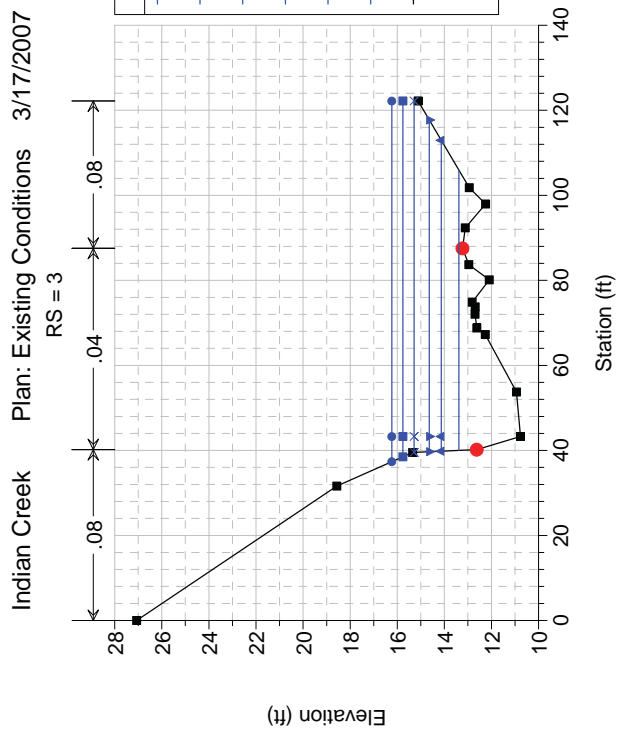
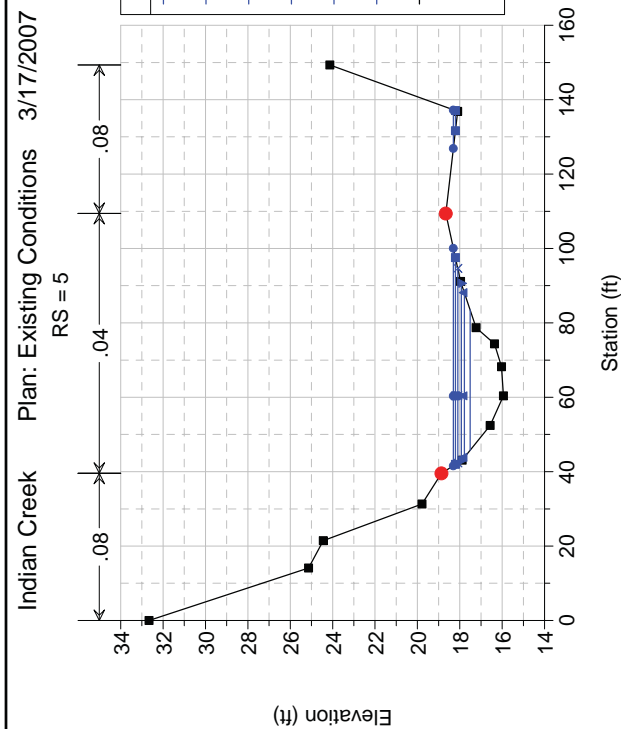
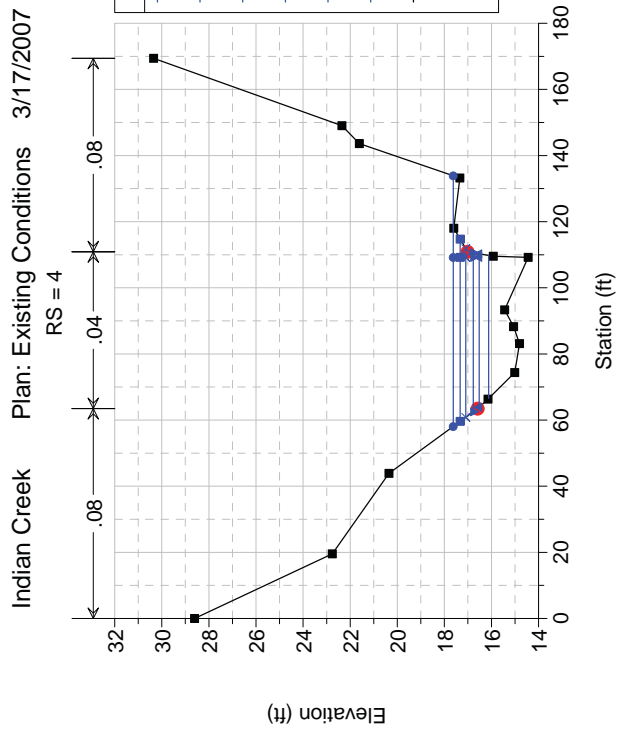
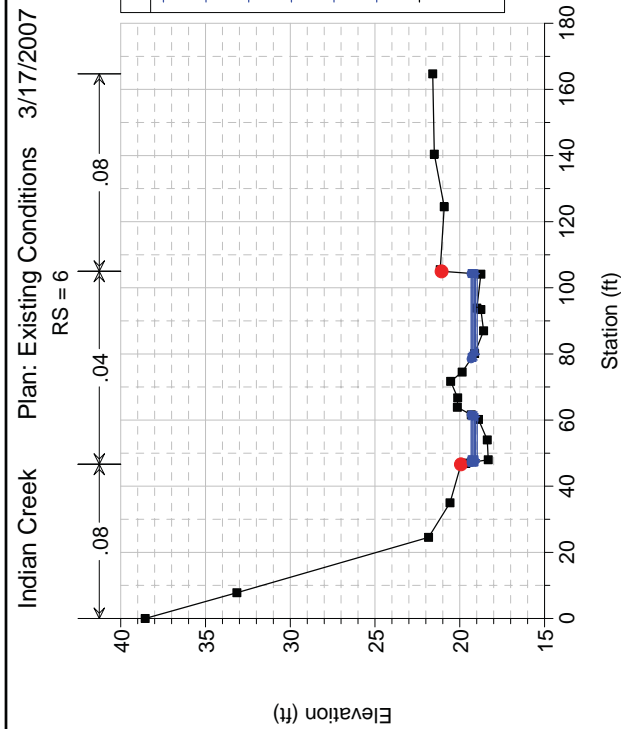
HEC-RAS Plan: BF-PA5x4 River: Ball Field Creek Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
1	7	25-yr	38.00	1013.00	54.64	56.65	57.32	56.68	0.000776	1.47	36.48	36.32	0.20	0.08
1	7	50-yr	48.00	1013.00	54.64	57.02	57.46	57.05	0.000568	1.43	51.50	43.86	0.17	0.07
1	7	100-yr	57.00	1013.00	54.64	57.35	57.70	57.37	0.000443	1.39	66.92	50.44	0.16	0.07
1	7.5													
		Culvert												
1	8	PF 1	6.60	1090.00	56.74	57.32	57.32	57.49	0.035983	3.34	1.97	5.82	1.01	0.73
1	8	PF 2	3.00	1090.00	56.74	57.17	57.17	57.28	0.041634	2.69	1.12	5.21	1.02	0.55
1	8	2-yr	11.00	1090.00	56.74	57.46	57.46	57.70	0.032670	3.90	2.82	5.98	1.00	0.90
1	8	5-yr	20.00	1090.00	56.74	57.70	57.70	58.04	0.030055	4.68	4.28	6.24	0.99	1.16
1	8	10-r	27.00	1090.00	56.74	57.86	57.86	58.27	0.029268	5.13	5.27	6.41	1.00	1.32
1	8	25-yr	38.00	1090.00	56.74	58.08	58.08	58.58	0.028613	5.66	6.72	6.76	1.00	1.53
1	8	50-yr	48.00	1090.00	56.74	58.27	58.27	58.82	0.027716	5.96	8.05	7.26	1.00	1.64
1	8	100-yr	57.00	1090.00	56.74	58.42	58.42	59.02	0.027301	6.21	9.17	7.66	1.00	1.74
1	9	PF 1	6.60	1190.00	57.74	58.59	58.32	58.64	0.005551	1.84	3.60	6.12	0.42	0.19
1	9	PF 2	3.00	1190.00	57.74	58.37	58.17	58.39	0.004967	1.34	2.24	5.87	0.38	0.11
1	9	2-yr	11.00	1190.00	57.74	58.81	58.46	58.88	0.005915	2.23	4.93	6.35	0.45	0.25
1	9	5-yr	20.00	1190.00	57.74	59.15	58.70	59.27	0.006490	2.77	7.22	6.95	0.48	0.36
1	9	10-r	27.00	1190.00	57.74	59.38	58.86	59.52	0.006742	3.05	8.86	7.55	0.50	0.42
1	9	25-yr	38.00	1190.00	57.74	59.67	59.08	59.85	0.006911	3.39	11.87	28.71	0.51	0.50
1	9	50-yr	48.00	1190.00	57.74	59.86	59.27	60.05	0.006622	3.58	18.06	40.20	0.51	0.53
1	9	100-yr	57.00	1190.00	57.74	60.00	59.42	60.18	0.006133	3.65	24.51	51.19	0.50	0.54

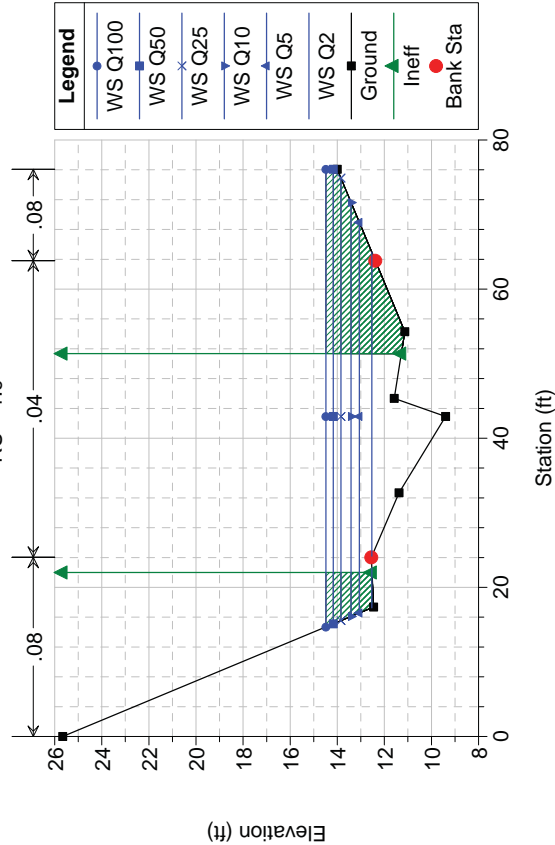
App 3.3 - Hydraulic analysis Indian Creek



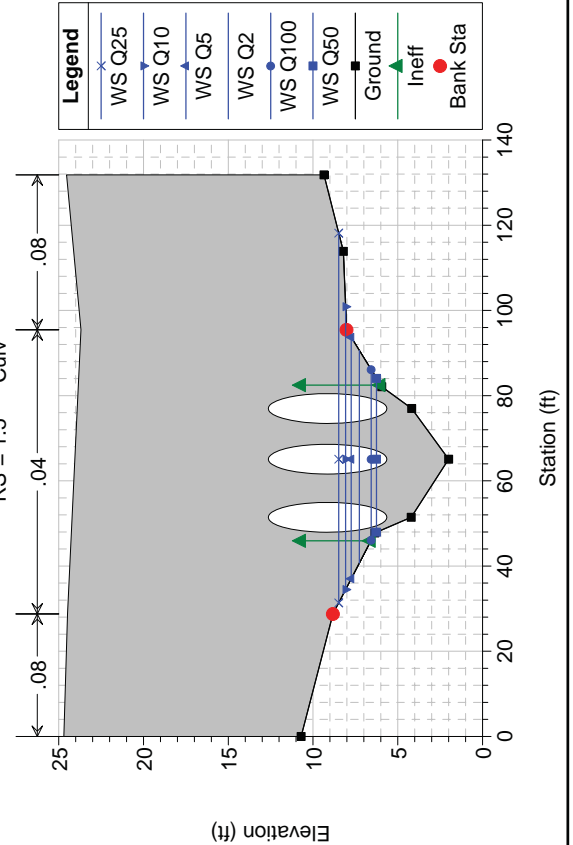




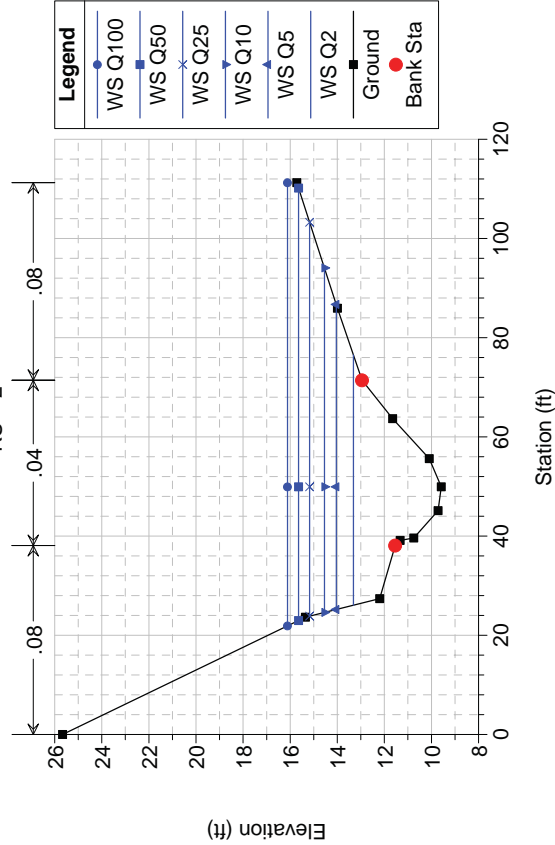
Indian Creek Plan: Existing Conditions 3/17/2007
RS = 1.9



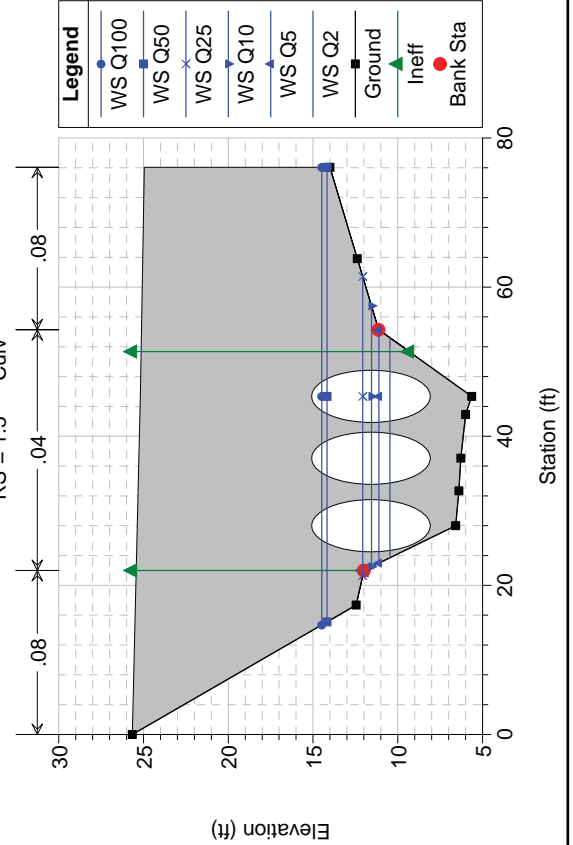
Indian Creek Plan: Existing Conditions 3/17/2007
RS = 1.5 Culv



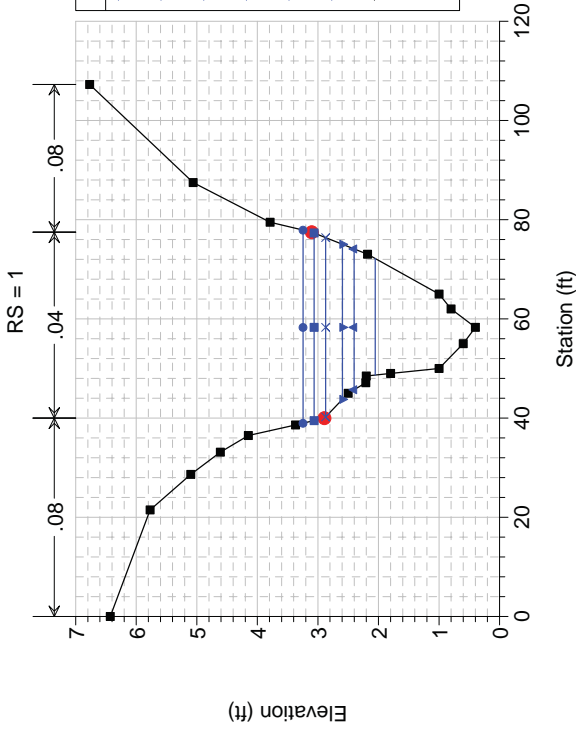
Indian Creek Plan: Existing Conditions 3/17/2007
RS = 2



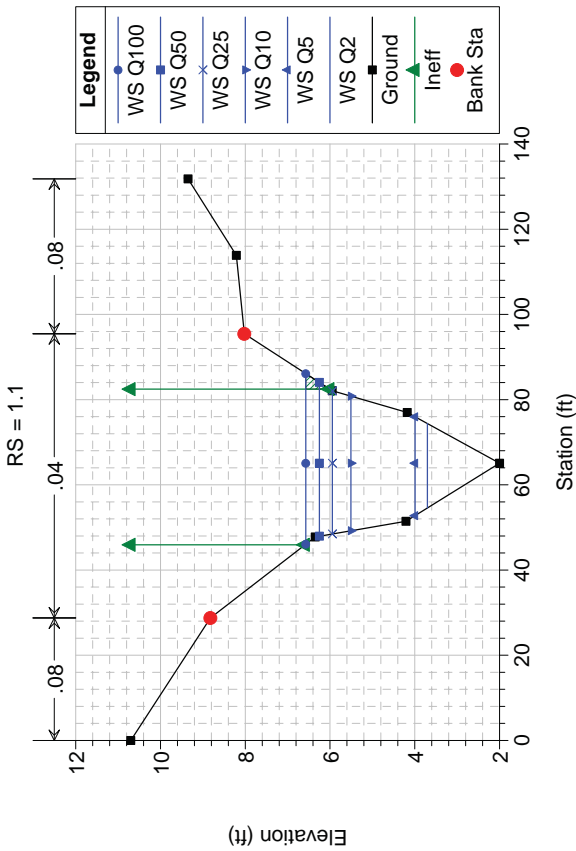
Indian Creek Plan: Existing Conditions 3/17/2007
RS = 1.5 Culv



Indian Creek Plan: Existing Conditions 3/17/2007



Indian Creek Plan: Existing Conditions 3/17/2007



HEC-RAS Plan: Indian River: Indian Creek Reach: Indian Creek

Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W. S. Elev (ft)	Crit W. S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
Indian Creek	1	Q2	259.00		0.40	2.05	2.62	3.76	0.076707	10.49	24.68	23.47	1.80	4.93
Indian Creek	1	Q5	414.00		0.40	2.40	3.12	4.75	0.089386	12.28	33.70	28.38	1.99	6.49
Indian Creek	1	Q10	534.00		0.40	2.60	3.42	5.44	0.099889	13.53	39.47	31.27	2.12	7.72
Indian Creek	1	Q25	697.00		0.40	2.87	3.79	6.04	0.101519	14.28	48.81	36.17	2.17	8.40
Indian Creek	1	Q50	828.00		0.40	3.06	4.05	6.48	0.095668	14.84	55.84	37.81	2.14	8.76
Indian Creek	1	Q100	962.00		0.40	3.24	4.32	6.91	0.088387	15.36	62.82	38.94	2.09	9.05
Indian Creek	1.1	Q2	259.00	25.00	2.00	3.70	4.59	7.36	0.215319	15.34	16.88	19.81	1.00	11.29
Indian Creek	1.1	Q5	414.00	25.00	2.00	3.99	5.14	8.98	0.238084	17.91	23.11	23.18	0.99	14.60
Indian Creek	1.1	Q10	534.00	25.00	2.00	5.51	5.51	6.54	0.018982	8.16	65.46	31.58	1.00	2.38
Indian Creek	1.1	Q25	697.00	25.00	2.00	5.94	5.94	7.13	0.018291	8.74	79.73	33.59	1.00	2.62
Indian Creek	1.1	Q50	828.00	25.00	2.00	6.25	6.25	7.56	0.017731	9.17	90.28	36.09	1.00	2.79
Indian Creek	1.1	Q100	962.00	25.00	2.00	6.57	6.57	7.97	0.017336	9.47	101.55	40.03	1.00	2.92
Indian Creek	1.5													
			Culvert											
Indian Creek	1.9	Q2	259.00	105.00	9.40	12.53	12.53	13.24	0.022003	6.75	38.36	46.07	1.00	1.86
Indian Creek	1.9	Q5	414.00	105.00	9.40	13.06	13.06	14.00	0.019317	7.80	53.89	52.38	0.99	2.24
Indian Creek	1.9	Q10	534.00	105.00	9.40	13.41	13.41	14.52	0.018264	8.49	64.24	55.52	0.99	2.51
Indian Creek	1.9	Q25	697.00	105.00	9.40	13.84	13.84	15.17	0.017378	9.29	76.88	59.35	0.99	2.83
Indian Creek	1.9	Q50	828.00	105.00	9.40	14.17	14.17	15.65	0.016677	9.82	86.54	60.97	0.99	3.05
Indian Creek	1.9	Q100	962.00	105.00	9.40	14.49	14.49	16.12	0.016201	10.33	95.71	61.38	0.99	3.26
Indian Creek	2	Q2	259.00	138.00	9.58	13.31		13.44	0.001758	2.87	102.12	50.45	0.32	0.27
Indian Creek	2	Q5	414.00	138.00	9.58	14.04		14.22	0.001837	3.47	142.96	61.52	0.34	0.37
Indian Creek	2	Q10	534.00	138.00	9.58	14.55		14.75	0.001825	3.80	175.77	69.45	0.34	0.42
Indian Creek	2	Q25	697.00	138.00	9.58	15.17		15.41	0.001759	4.13	222.56	79.40	0.35	0.47
Indian Creek	2	Q50	828.00	138.00	9.58	15.65		15.90	0.001695	4.34	261.79	87.18	0.35	0.51
Indian Creek	2	Q100	962.00	138.00	9.58	16.11		16.38	0.001603	4.49	303.06	89.34	0.34	0.52
Indian Creek	3	Q2	259.00	180.00	10.77	13.39	12.82	13.58	0.005497	3.56	79.71	65.98	0.51	0.50
Indian Creek	3	Q5	414.00	180.00	10.77	14.13	13.24	14.33	0.003379	3.65	131.48	73.13	0.43	0.46
Indian Creek	3	Q10	534.00	180.00	10.77	14.64	13.47	14.84	0.002722	3.76	169.89	78.01	0.40	0.46
Indian Creek	3	Q25	697.00	180.00	10.77	15.28	13.75	15.49	0.002179	3.87	222.00	82.66	0.37	0.45
Indian Creek	3	Q50	828.00	180.00	10.77	15.76	13.98	15.98	0.001896	3.94	261.96	83.70	0.35	0.45
Indian Creek	3	Q100	962.00	180.00	10.77	16.23	14.17	16.45	0.001698	4.03	301.09	84.84	0.34	0.45
Indian Creek	4	Q2	259.00	328.00	14.44	16.12	16.12	16.65	0.024758	5.83	44.43	43.23	1.01	1.54
Indian Creek	4	Q5	414.00	328.00	14.44	16.52	16.52	17.20	0.022519	6.64	62.34	46.38	1.01	1.83
Indian Creek	4	Q10	534.00	328.00	14.44	16.77	16.77	17.57	0.021398	7.19	74.34	48.11	1.01	2.03
Indian Creek	4	Q25	697.00	328.00	14.44	17.09	17.09	18.03	0.019846	7.79	90.05	51.04	1.00	2.25
Indian Creek	4	Q50	828.00	328.00	14.44	17.33	17.33	18.37	0.018772	8.21	102.69	55.14	0.99	2.40
Indian Creek	4	Q100	962.00	328.00	14.44	17.62	17.61	18.69	0.016316	8.34	121.88	75.82	0.95	2.37
Indian Creek	5	Q2	259.00	413.00	15.94	17.51	17.69	18.27	0.036733	7.00	37.00	37.75	1.25	2.24
Indian Creek	5	Q5	414.00	413.00	15.94	17.78	18.14	18.94	0.048606	8.62	48.02	44.23	1.46	3.28

HEC-RAS Plan: Indian River: Indian Creek Reach: Indian Creek (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
Indian Creek	5	Q10	534.00	413.00	15.94	17.93	18.44	19.40	0.057531	9.75	54.79	47.65	1.60	4.11
Indian Creek	5	Q25	697.00	413.00	15.94	18.09	18.74	19.99	0.069494	11.05	63.05	52.30	1.77	5.20
Indian Creek	5	Q50	828.00	413.00	15.94	18.21	18.93	20.44	0.078644	11.99	69.31	60.99	1.90	6.06
Indian Creek	5	Q100	962.00	413.00	15.94	18.30	19.09	20.88	0.087708	12.89	75.58	68.80	2.01	6.94
Indian Creek	6	Q2	259.00	483.00	18.32	18.98	19.84	29.40	2.601606	25.90	10.00	34.60	8.49	46.17
Indian Creek	6	Q5	414.00	483.00	18.32	19.08	20.26	33.43	2.602426	30.40	13.62	36.97	8.83	58.70
Indian Creek	6	Q10	534.00	483.00	18.32	19.14	20.52	36.32	2.601072	33.26	16.05	38.00	9.02	67.18
Indian Creek	6	Q25	697.00	483.00	18.32	19.22	20.79	40.05	2.603978	36.62	19.03	38.94	9.23	77.64
Indian Creek	6	Q50	828.00	483.00	18.32	19.28	20.98	42.80	2.600175	38.92	21.27	39.63	9.36	85.01
Indian Creek	6	Q100	962.00	483.00	18.32	19.33	21.23	45.48	2.600551	41.04	23.44	40.28	9.48	92.05

Seward Highway; Indian Creek - Pebble Count

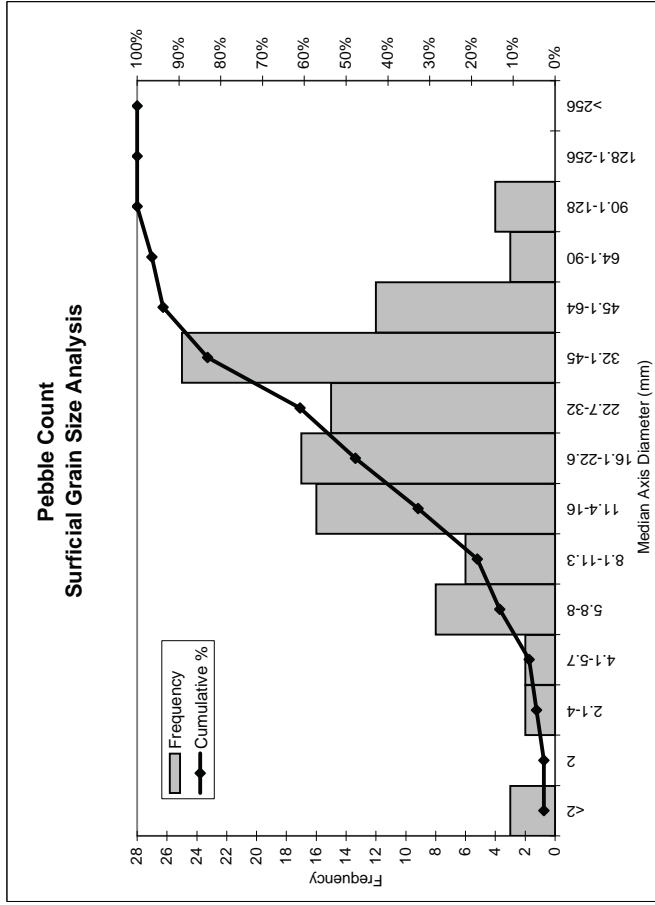


Sediment Grain Size Analysis

gravel bar at bridge	Identifier	8/3/06	Date
	Personnel	GK, MS	
	Stream	Indian Creek	
		n/a	Approximate Depth of Flow at Thalweg (ft)
gravel bar above water			Longitudinal Description (Pool, Riffle, Bend, Crossing)
surficial material			Sample Type: Armor Layer or Subarmor



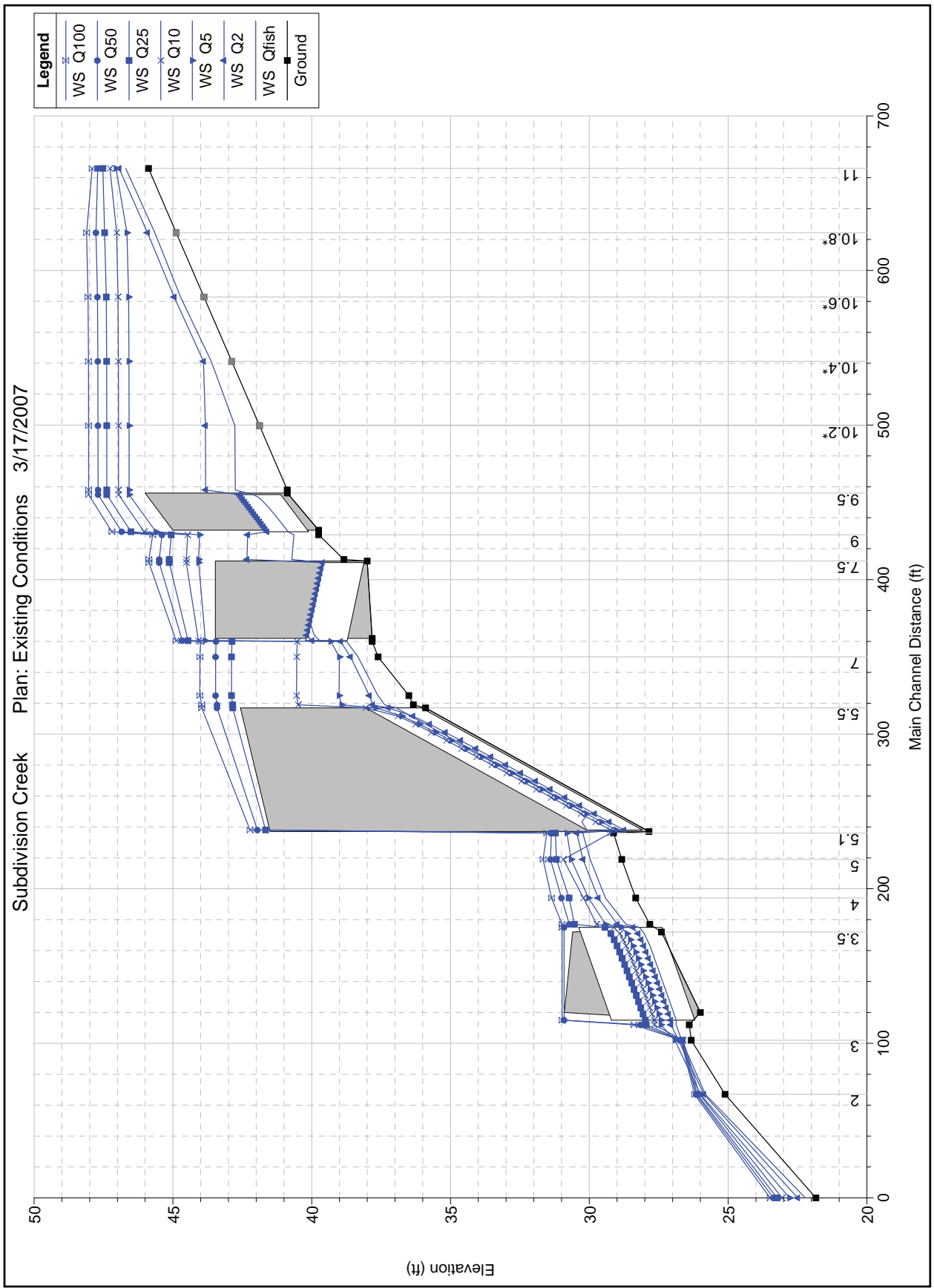
Notes:
 gravel bar at hwy bridge
 View Looking downstream



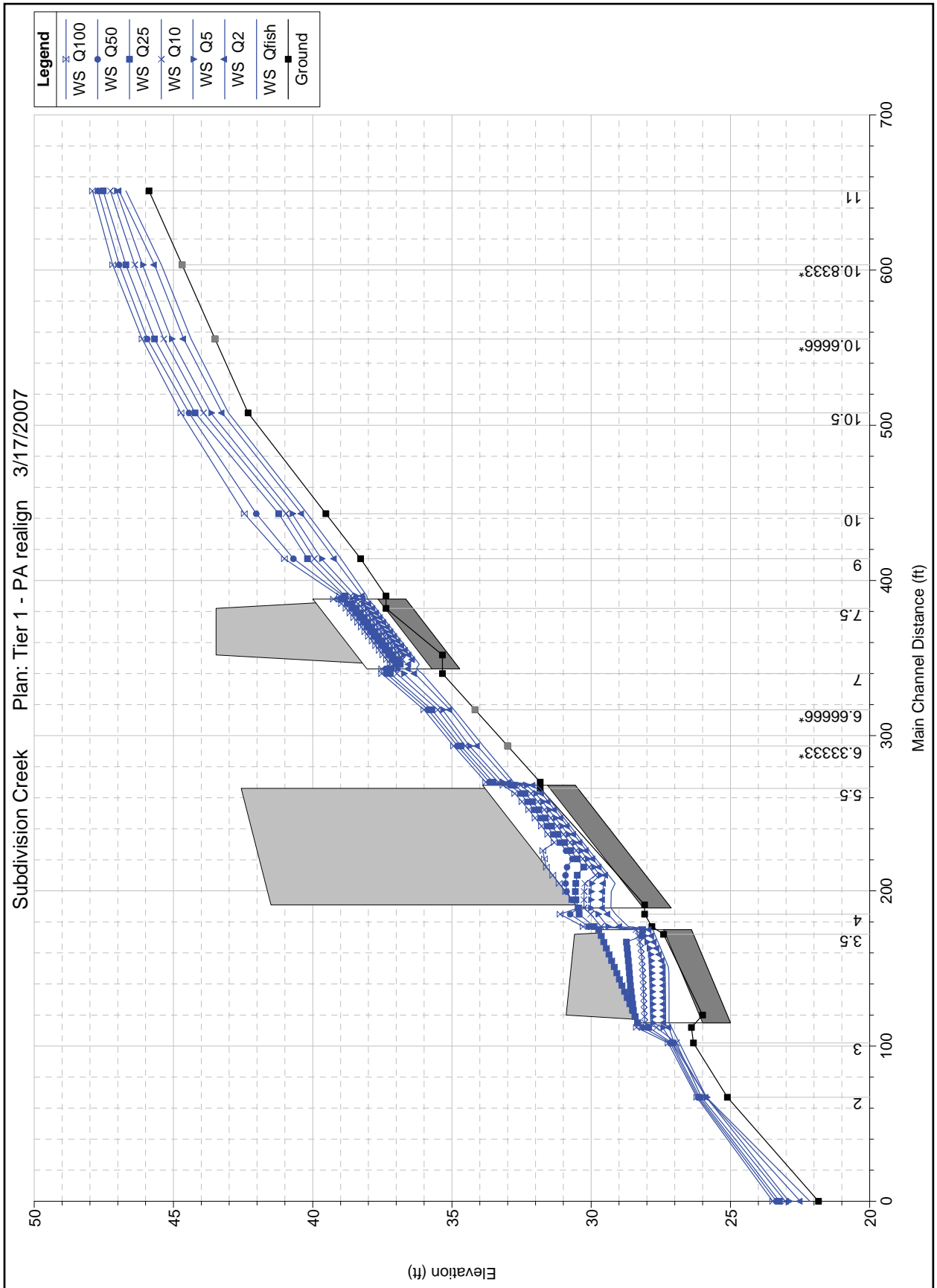
Pebble Count Data

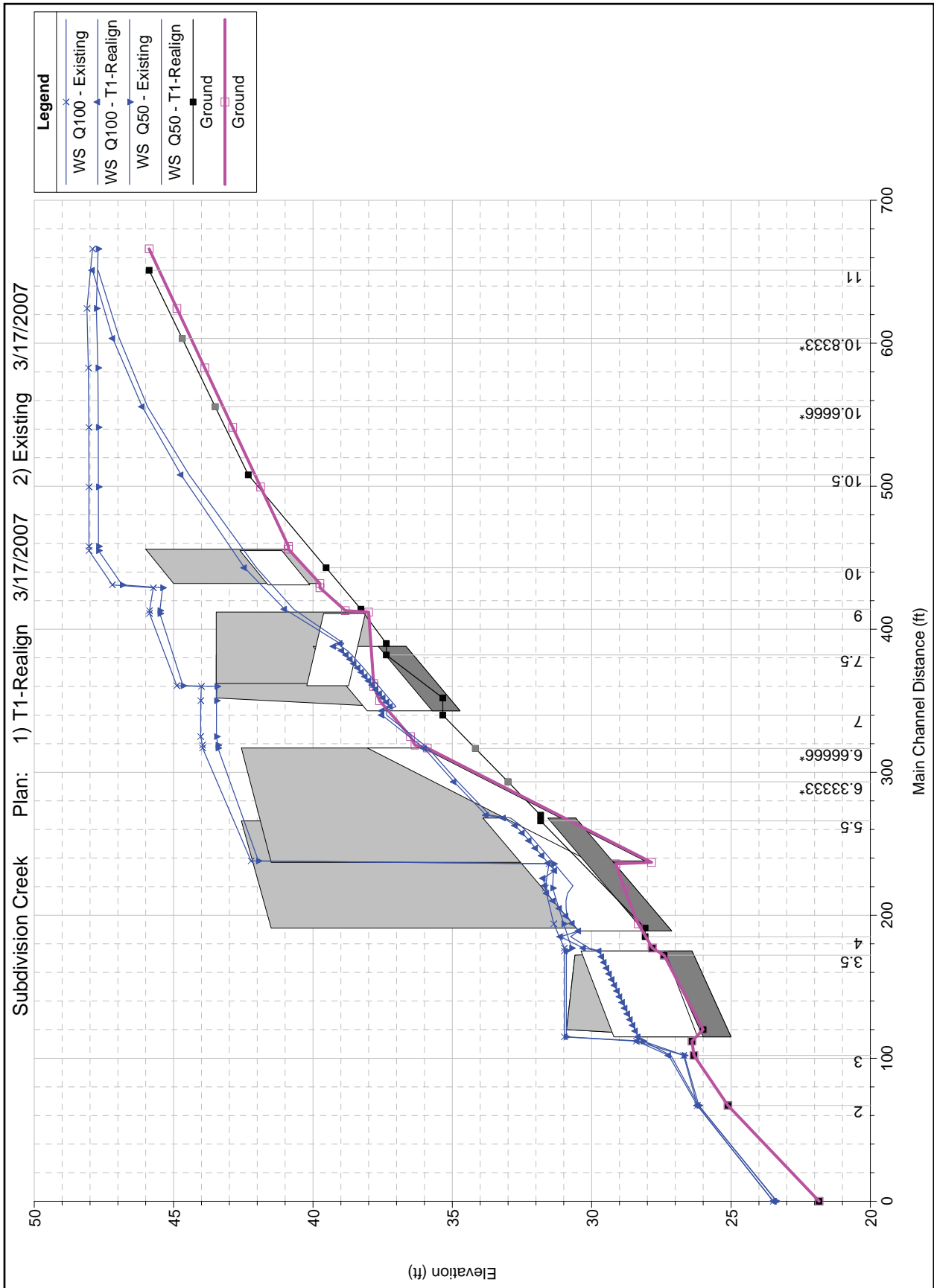
Class (Wentworth)	Size Class mm	Frequency	Cumulative %
Sand	<2	3	2.7%
Sand	2	0	2.7%
Very Fine Gravel	2.1-4	2	4.4%
Fine Gravel	4.1-5.7	2	6.2%
Fine Gravel	5.8-8	8	13.3%
Medium Gravel	8.1-11.3	6	18.6%
Medium Gravel	11.4-16	16	32.7%
Coarse Gravel	16.1-22.6	17	47.8%
Coarse Gravel	22.7-32	15	61.1%
Very Course Gravel	32.1-45	25	83.2%
Very Course Gravel	45.1-64	12	93.8%
Small Cobble	64.1-90	3	96.5%
Small Cobble	90.1-128	4	100.0%
Large Cobble	128.1-256	0	100.0%
Small Boulders	>256	0	100.0%
Total		113	

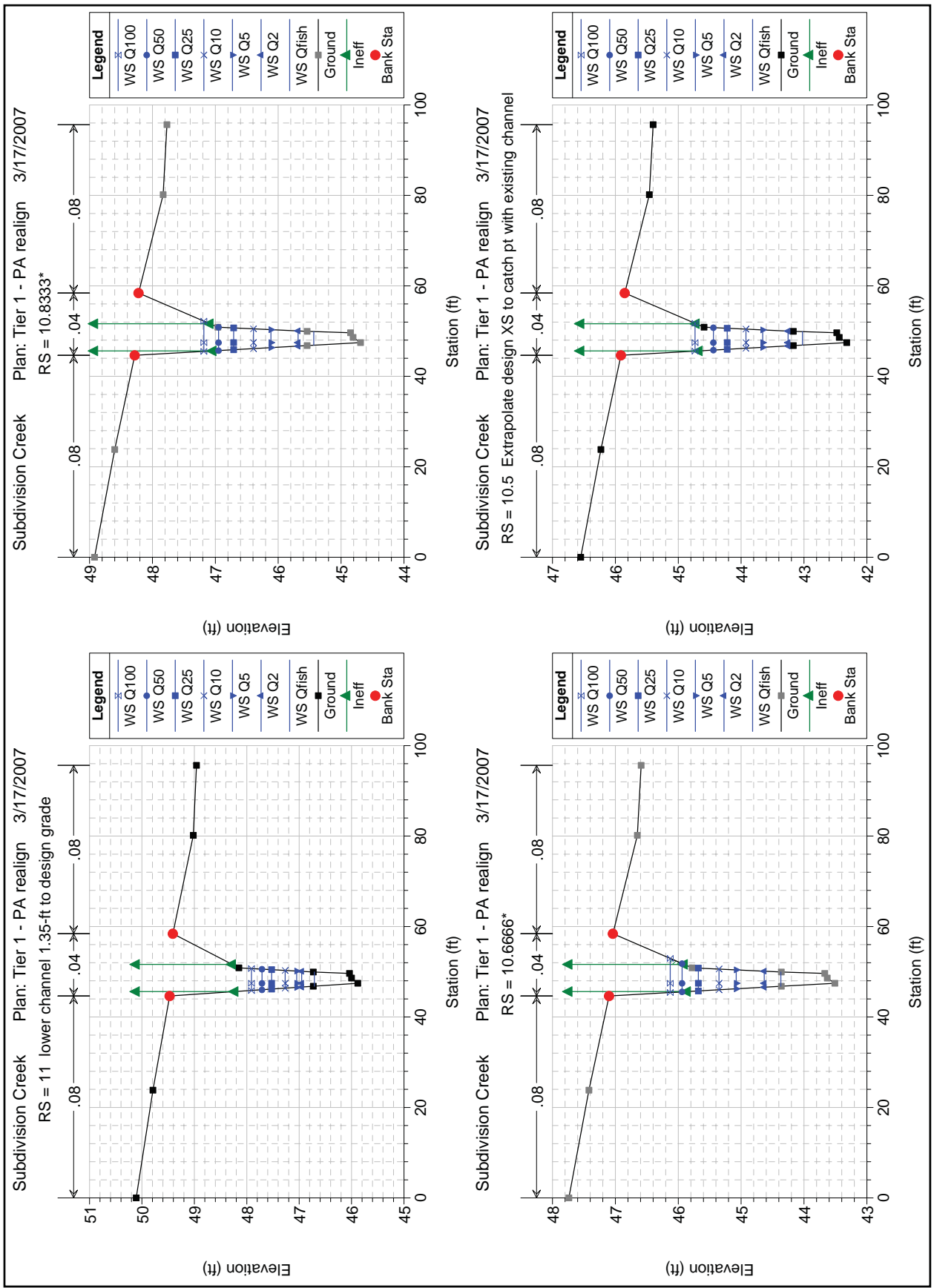
App 3.4 - Hydraulic analysis "Subdivision" Creek

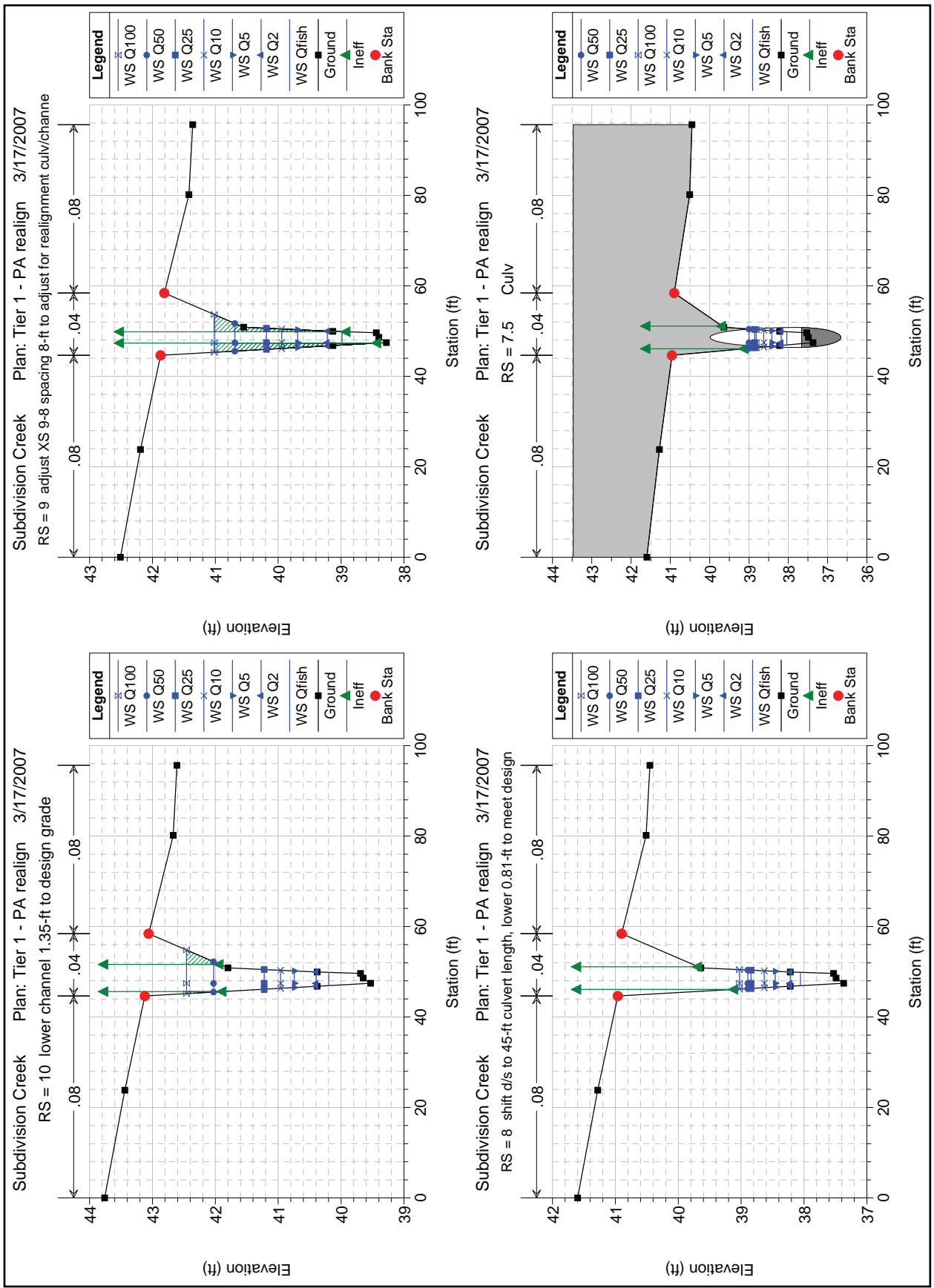


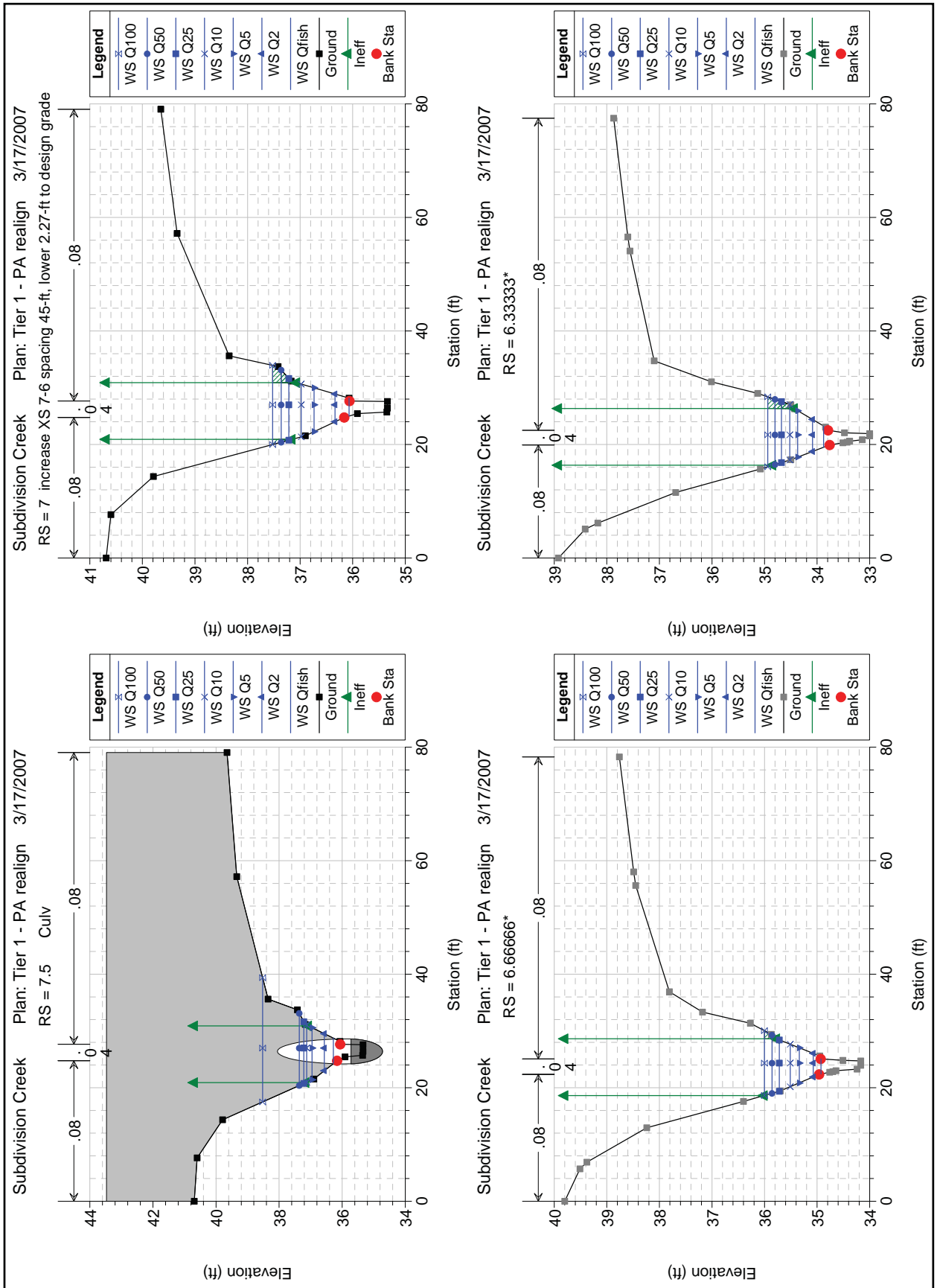
Subdivision Creek Plan: Tier 1 - PA realign 3/17/2007

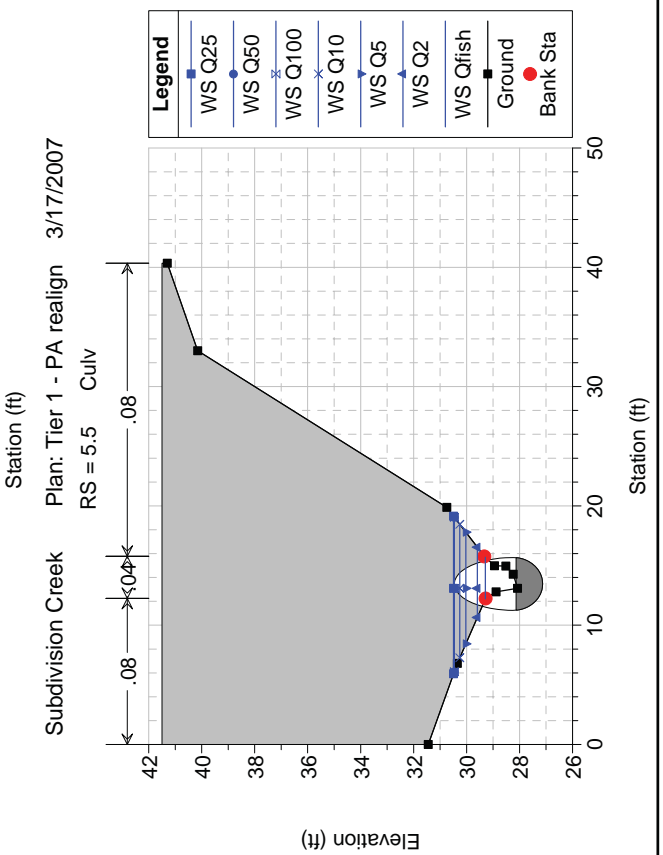
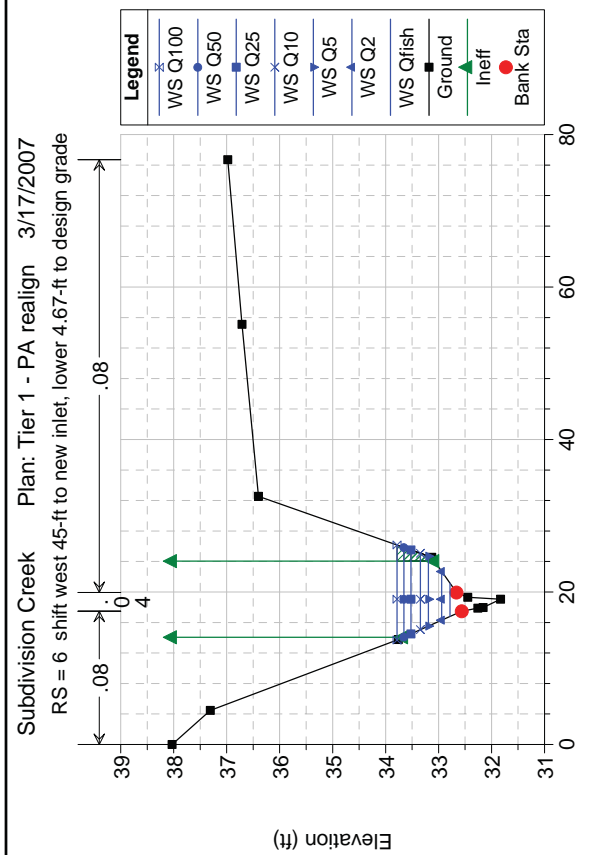
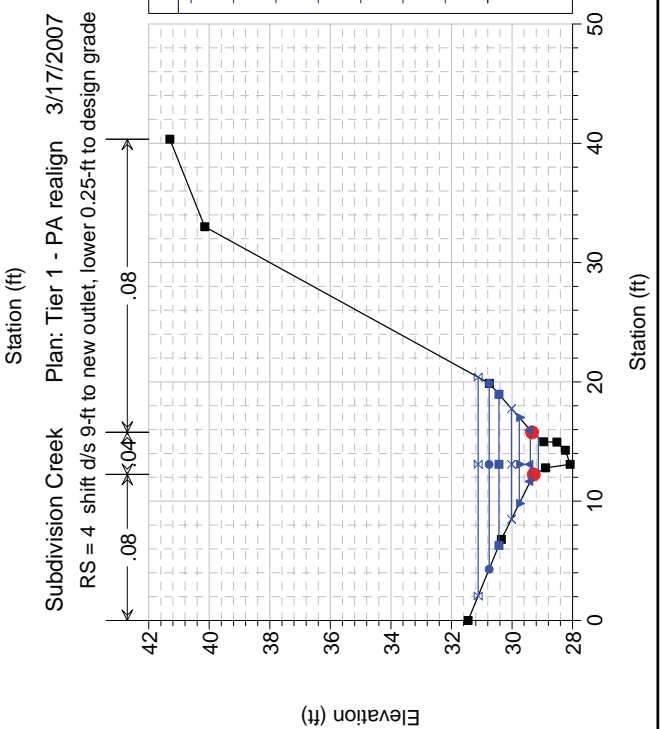
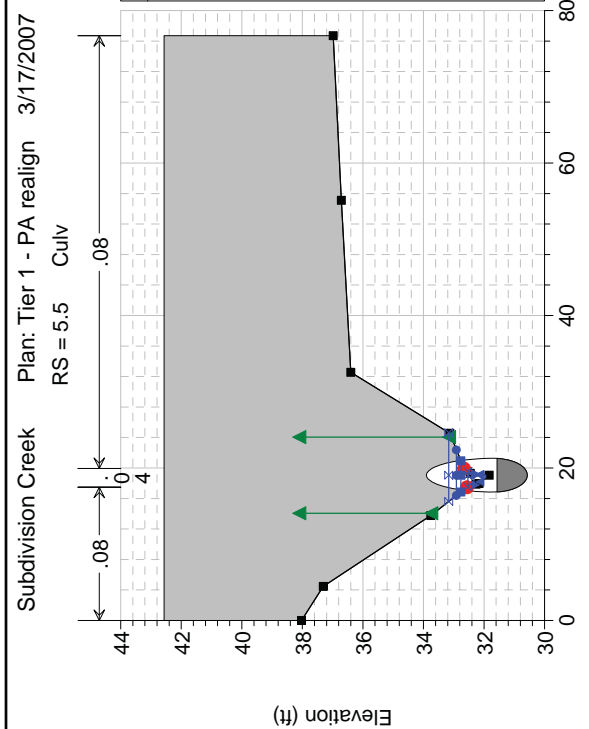




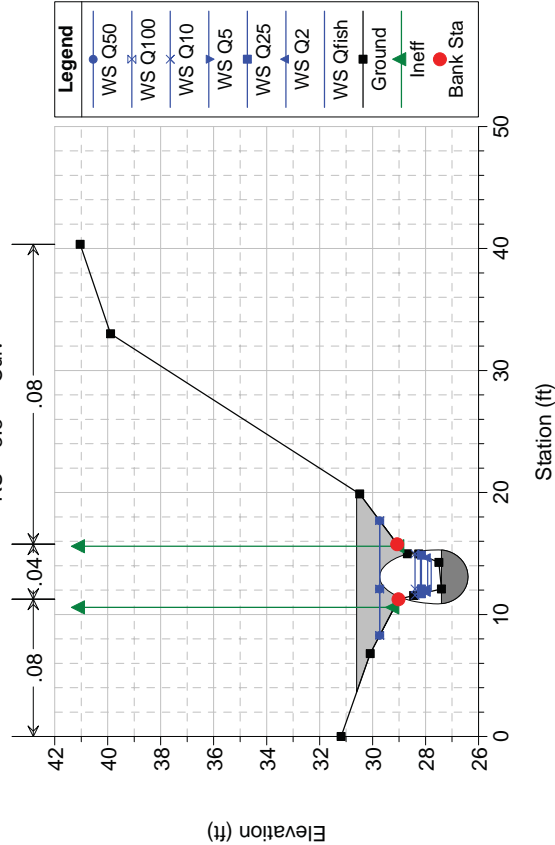




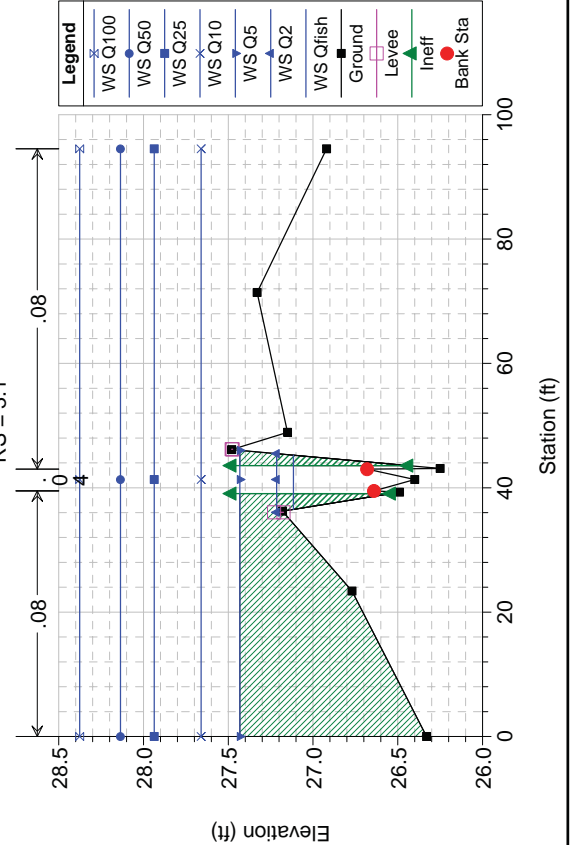




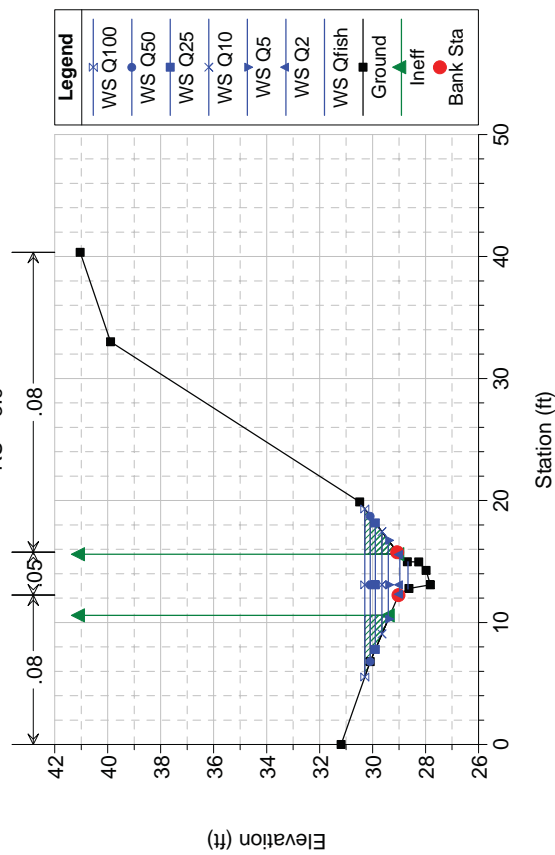
Subdivision Creek Plan: Tier 1 - PA realign 3/17/2007
RS = 3.5 Culiv



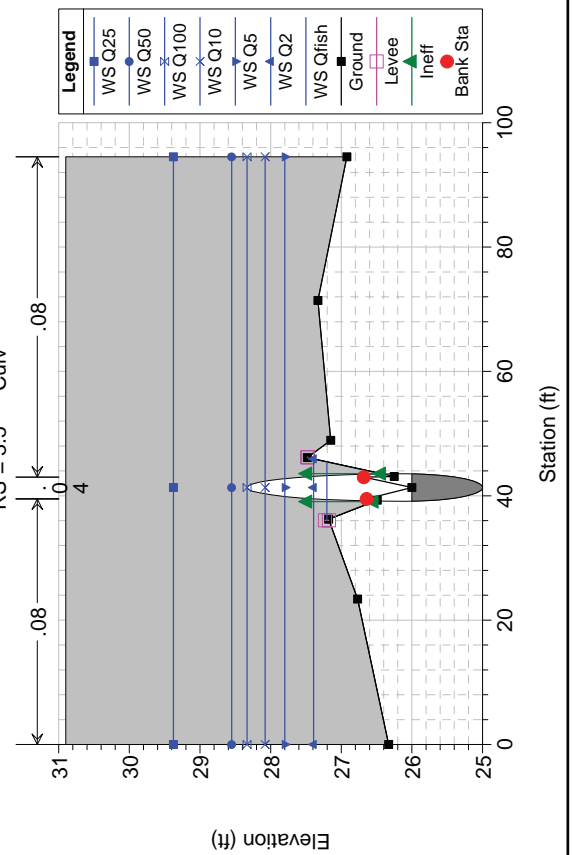
Subdivision Creek Plan: Tier 1 - PA realign 3/17/2007
RS = 3.1

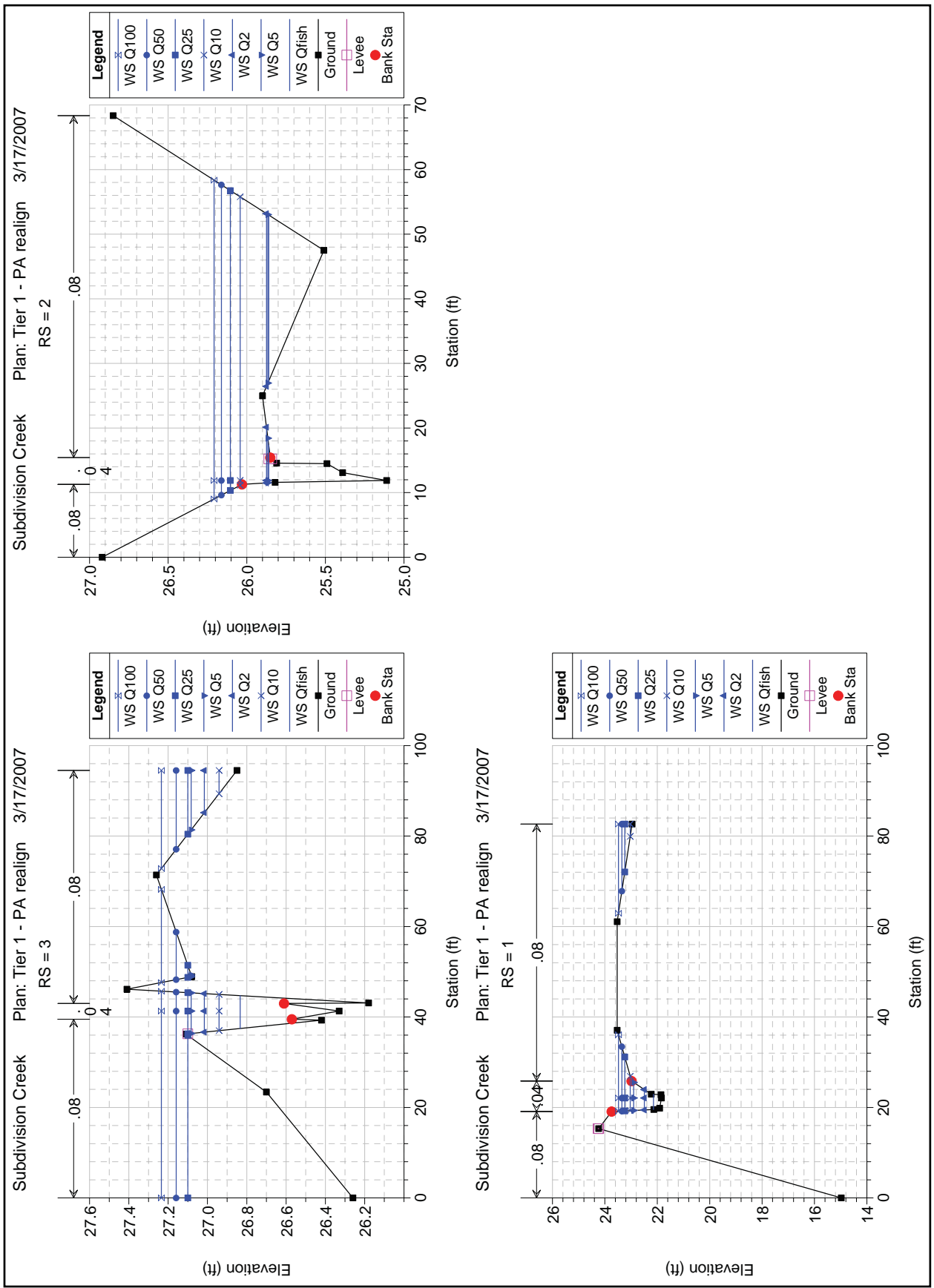


Subdivision Creek Plan: Tier 1 - PA realign 3/17/2007
RS = 3.9



Subdivision Creek Plan: Tier 1 - PA realign 3/17/2007
RS = 3.5 Culiv





HEC-RAS Plan: T1-Realign River: Subdivision Reach: Subdivision

Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
Subdivision	1	Qfish	6.60		21.84	22.15	22.39	23.02	0.272062	7.48	0.88	3.36	2.58	4.08
Subdivision	1	Q2	11.00		21.84	22.49	22.58	22.88	0.056010	4.98	2.21	4.51	1.25	1.49
Subdivision	1	Q5	21.00		21.84	22.90	22.90	23.26	0.032265	4.78	4.39	6.20	1.00	1.22
Subdivision	1	Q10	29.00		21.84	23.03	23.15	23.51	0.037157	5.54	5.35	10.31	1.09	1.58
Subdivision	1	Q25	40.00		21.84	23.24	23.39	23.74	0.030802	5.78	8.77	22.52	1.02	1.61
Subdivision	1	Q50	49.00		21.84	23.35	23.58	23.87	0.029937	6.06	11.65	29.05	1.02	1.71
Subdivision	1	Q100	60.00		21.84	23.48	23.68	23.98	0.027387	6.17	15.89	36.61	0.98	1.72
Subdivision	2	Qfish	6.60	67.00	25.11	25.86	25.86	25.90	0.016225	2.20	6.00	31.54	0.63	0.32
Subdivision	2	Q2	11.00	67.00	25.11	25.87	25.87	25.97	0.038093	3.44	6.48	35.35	0.97	0.78
Subdivision	2	Q5	21.00	67.00	25.11	25.87	25.99	26.26	0.154155	6.82	6.17	32.98	1.94	3.08
Subdivision	2	Q10	29.00	67.00	25.11	26.04	26.04	26.17	0.041566	4.41	13.61	44.65	1.06	1.15
Subdivision	2	Q25	40.00	67.00	25.11	26.10	26.10	26.27	0.046111	5.00	16.45	46.41	1.14	1.43
Subdivision	2	Q50	49.00	67.00	25.11	26.16	26.16	26.33	0.044734	5.23	19.14	48.02	1.14	1.52
Subdivision	2	Q100	60.00	67.00	25.11	26.21	26.21	26.41	0.048427	5.70	21.42	49.34	1.20	1.76
Subdivision	3	Qfish	6.60	102.00	26.33	26.83	26.84	27.02	0.040912	3.87	2.33	7.26	1.12	0.94
Subdivision	3	Q2	11.00	102.00	26.33	27.02	27.03	27.21	0.026461	4.06	4.54	17.85	0.96	0.91
Subdivision	3	Q5	21.00	102.00	26.33	27.08	27.10	27.55	0.059299	6.55	5.89	22.54	1.46	2.28
Subdivision	3	Q10	29.00	102.00	26.33	26.94	27.10	28.94	0.323937	12.89	3.38	13.12	3.27	9.63
Subdivision	3	Q25	40.00	102.00	26.33	27.10	27.10	27.31	0.017921	3.67	23.31	61.78	0.81	0.71
Subdivision	3	Q50	49.00	102.00	26.33	27.16	27.10	27.24	0.018553	3.96	27.31	73.46	0.83	0.80
Subdivision	3	Q100	60.00	102.00	26.33	27.23	27.10	27.32	0.017688	4.14	33.39	87.94	0.83	0.85
Subdivision	3.1	Qfish	6.60	112.00	26.40	27.12	26.94	27.22	0.011481	2.77	2.73	8.72	0.64	0.42
Subdivision	3.1	Q2	11.00	112.00	26.40	27.21	27.11	27.43	0.019122	3.96	3.17	9.43	0.84	0.81
Subdivision	3.1	Q5	21.00	112.00	26.40	27.43	27.43	27.90	0.028208	5.78	4.15	46.02	1.07	1.57
Subdivision	3.1	Q10	29.00	112.00	26.40	27.66	27.66	28.23	0.025630	6.40	5.17	94.51	1.06	1.79
Subdivision	3.1	Q25	40.00	112.00	26.40	27.94	27.94	28.65	0.023630	7.12	6.42	94.51	1.06	2.05
Subdivision	3.1	Q50	49.00	112.00	26.40	28.14	28.14	28.96	0.022912	7.65	7.31	94.51	1.06	2.27
Subdivision	3.1	Q100	60.00	112.00	26.40	28.38	28.38	29.31	0.021613	8.16	8.40	94.51	1.06	2.46
Subdivision	3.5	Culvert												
Subdivision	3.9	Qfish	6.60	177.00	27.82	28.67	28.68	29.00	0.074902	4.66	1.42	2.24	1.03	2.03
Subdivision	3.9	Q2	11.00	177.00	27.82	28.97	28.99	29.34	0.067092	4.88	2.25	3.25	1.03	2.11
Subdivision	3.9	Q5	21.00	177.00	27.82	29.41	29.42	29.87	0.046093	5.54	4.07	6.45	0.93	2.33
Subdivision	3.9	Q10	29.00	177.00	27.82	29.65	29.65	30.19	0.042365	6.05	5.27	8.38	0.92	2.60
Subdivision	3.9	Q25	40.00	177.00	27.82	29.90	29.92	30.57	0.042885	6.82	6.52	10.38	0.95	3.12
Subdivision	3.9	Q50	49.00	177.00	27.82	30.09	30.11	30.85	0.042244	7.31	7.49	11.92	0.96	3.45
Subdivision	3.9	Q100	60.00	177.00	27.82	30.29	30.32	31.17	0.042576	7.88	8.51	13.77	0.98	3.87
Subdivision	4	Qfish	6.60	185.00	28.08	29.13	28.94	29.31	0.022591	3.41	1.93	2.89	0.74	0.67
Subdivision	4	Q2	11.00	185.00	28.08	29.40	29.25	29.63	0.022162	3.89	2.86	4.31	0.77	0.82
Subdivision	4	Q5	21.00	185.00	28.08	29.76	29.67	30.12	0.021446	4.91	4.95	7.21	0.80	1.15
Subdivision	4	Q10	29.00	185.00	28.08	30.02	29.93	30.41	0.018930	5.27	7.07	9.26	0.78	1.24
Subdivision	4	Q25	40.00	185.00	28.08	30.43	30.41	30.76	0.012328	5.05	11.62	12.68	0.66	1.04
Subdivision	4	Q50	49.00	185.00	28.08	30.75	30.75	31.03	0.008879	4.77	16.16	15.59	0.57	0.88

HEC-RAS Plan: T1--Realign River: Subdivision Reach: Subdivision (Continued)

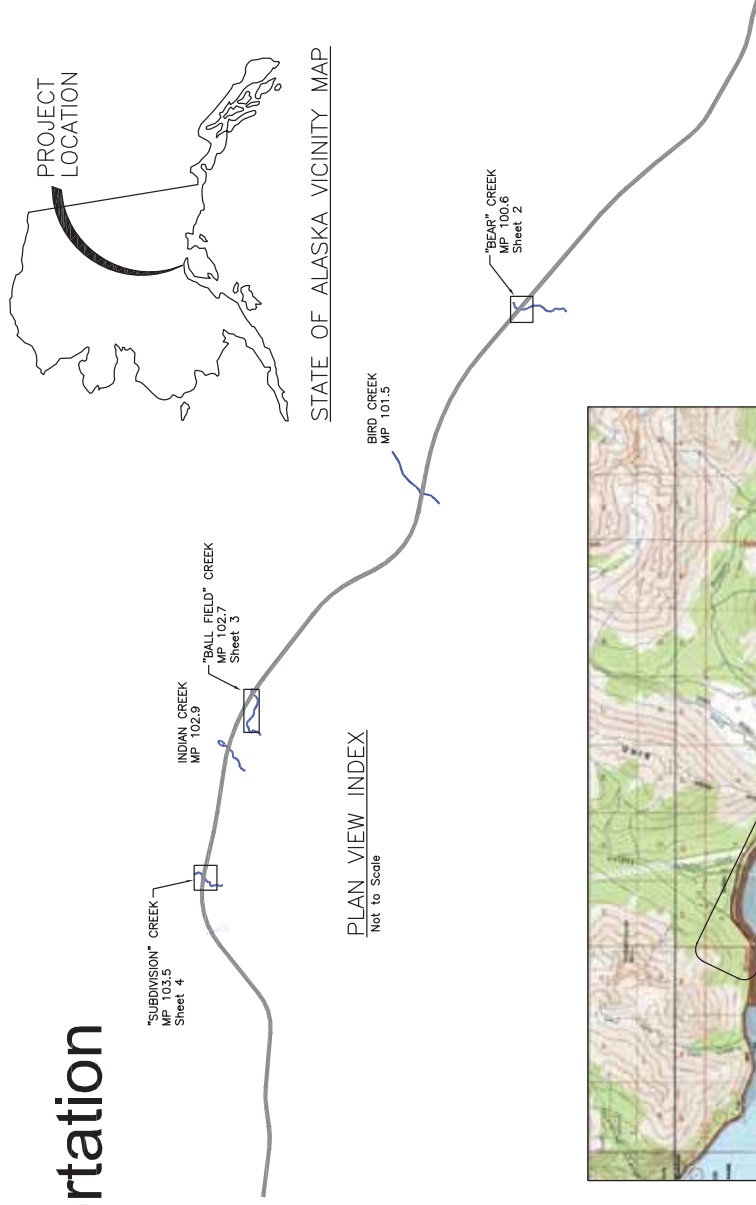
Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
Subdivision	4	Q100	60.00	185.00	28.08	31.12		31.33	0.006292	4.46	22.34	18.35		0.49
Subdivision	5.5	Culvert												
Subdivision	6	Qfish	6.60	270.00	31.83	32.79	32.87	33.13	0.048807	4.75	1.52	4.37		1.34
Subdivision	6	Q2	11.00	270.00	31.83	32.94	33.12	33.44	0.053882	5.88	2.35	6.38		1.89
Subdivision	6	Q5	21.00	270.00	31.83	33.19	33.40	33.87	0.054937	7.25	4.30	9.18		2.61
Subdivision	6	Q10	29.00	270.00	31.83	33.34	33.58	34.11	0.054803	7.98	5.62	10.01		3.01
Subdivision	6	Q25	40.00	270.00	31.83	33.52	33.79	34.38	0.053636	8.73	7.30	11.02		3.42
Subdivision	6	Q50	49.00	270.00	31.83	33.65	33.93	34.58	0.052881	9.24	8.57	11.74		3.71
Subdivision	6	Q100	60.00	270.00	31.83	33.78	34.08	34.81	0.053479	9.85	9.88	12.45		4.10
Subdivision	6.33333*	Qfish	6.60	293.33	33.00	33.88	33.91	34.18	0.041147	4.45	1.54	3.75		1.17
Subdivision	6.33333*	Q2	11.00	293.33	33.00	34.09	34.17	34.48	0.036579	5.18	2.52	5.63		1.42
Subdivision	6.33333*	Q5	21.00	293.33	33.00	34.37	34.55	34.95	0.038938	6.56	4.48	8.17		2.06
Subdivision	6.33333*	Q10	29.00	293.33	33.00	34.52	34.73	35.23	0.041975	7.44	5.79	9.79		2.53
Subdivision	6.33333*	Q25	40.00	293.33	33.00	34.68	34.93	35.53	0.045816	8.44	7.27	10.75		3.13
Subdivision	6.33333*	Q50	49.00	293.33	33.00	34.80	35.07	35.75	0.047039	9.05	8.44	11.48		3.49
Subdivision	6.33333*	Q100	60.00	293.33	33.00	34.94	35.24	35.98	0.047404	9.63	9.83	12.31		3.85
Subdivision	6.66666*	Qfish	6.60	316.66	34.17	34.93	34.98	35.27	0.051741	4.66	1.41	2.67		1.32
Subdivision	6.66666*	Q2	11.00	316.66	34.17	35.07	35.24	35.62	0.062763	5.98	1.94	4.18		2.02
Subdivision	6.66666*	Q5	21.00	316.66	34.17	35.34	35.63	36.20	0.066307	7.70	3.32	6.19		2.99
Subdivision	6.66666*	Q10	29.00	316.66	34.17	35.51	35.87	36.52	0.065146	8.54	4.48	7.48		3.47
Subdivision	6.66666*	Q25	40.00	316.66	34.17	35.72	36.08	36.84	0.060624	9.25	6.21	9.04		3.85
Subdivision	6.66666*	Q50	49.00	316.66	34.17	35.86	36.22	37.03	0.058340	9.70	7.51	10.27		4.09
Subdivision	6.66666*	Q100	60.00	316.66	34.17	36.00	36.38	37.25	0.056886	10.21	8.93	11.42		4.39
Subdivision	7	Qfish	6.60	339.99	35.34	36.07	36.07	36.35	0.042122	4.28	1.54	3.16		1.11
Subdivision	7	Q2	11.00	339.99	35.34	36.34	36.34	36.66	0.031900	4.65	2.60	4.90		1.17
Subdivision	7	Q5	21.00	339.99	35.34	36.73	36.73	37.13	0.024809	5.37	5.12	7.72		1.36
Subdivision	7	Q10	29.00	339.99	35.34	36.98	36.98	37.40	0.021955	5.72	7.20	9.30		1.45
Subdivision	7	Q25	40.00	339.99	35.34	37.22	37.22	37.69	0.021316	6.24	9.52	10.88		1.64
Subdivision	7	Q50	49.00	339.99	35.34	37.36	37.36	37.89	0.022083	6.71	10.97	12.72		1.85
Subdivision	7	Q100	60.00	339.99	35.34	37.52	37.52	38.11	0.022736	7.21	12.60	13.94		2.07
Subdivision	7.5	Culvert												
Subdivision	8	Qfish	6.60	389.99	37.37	38.06	38.07	38.35	0.042715	4.31	1.53	2.96		1.12
Subdivision	8	Q2	11.00	389.99	37.37	38.22	38.30	38.68	0.053258	5.43	2.03	3.16		1.68
Subdivision	8	Q5	21.00	389.99	37.37	38.46	38.71	39.32	0.077335	7.45	2.82	3.50		2.95
Subdivision	8	Q10	29.00	389.99	37.37	38.63	38.97	39.73	0.084234	8.39	3.46	3.75		3.61
Subdivision	8	Q25	40.00	389.99	37.37	38.84	39.26	40.20	0.090267	9.37	4.27	4.05		4.33
Subdivision	8	Q50	49.00	389.99	37.37	38.89	39.46	40.75	0.118911	10.93	4.48	4.12		5.85
Subdivision	8	Q100	60.00	389.99	37.37	39.03	39.72	41.22	0.129384	11.89	5.05	4.31		6.78
Subdivision	9	Qfish	6.60	413.99	38.28	38.98	39.00	39.30	0.036770	4.53	1.46	2.98		1.16
Subdivision	9	Q2	11.00	413.99	38.28	39.22	39.25	39.67	0.033098	5.38	2.04	3.29		1.47

HEC-RAS Plan: T1--Realign River: Subdivision Reach: Subdivision (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Cum Ch Len (ft)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)
Subdivision	9	Q5	21.00	413.99	38.28	39.69	39.70	40.35	0.026475	6.52	3.22	3.96	1.01	1.85
Subdivision	9	Q10	29.00	413.99	38.28	39.94	40.02	40.82	0.027752	7.52	3.86	4.32	1.07	2.32
Subdivision	9	Q25	40.00	413.99	38.28	40.19	40.40	41.43	0.032413	8.96	4.46	4.67	1.18	3.14
Subdivision	9	Q50	49.00	413.99	38.28	40.69	40.69	41.83	0.021272	8.57	5.72	6.13	1.00	2.64
Subdivision	9	Q100	60.00	413.99	38.28	41.02	41.02	42.32	0.020441	9.18	6.54	8.34	1.00	2.90
Subdivision	10	Qfish	6.60	442.99	39.53	40.20	40.23	40.51	0.047759	4.48	1.47	2.93	1.11	1.22
Subdivision	10	Q2	11.00	442.99	39.53	40.40	40.46	40.83	0.049162	5.28	2.08	3.18	1.15	1.57
Subdivision	10	Q5	21.00	442.99	39.53	40.74	40.87	41.38	0.051169	6.41	3.28	3.68	1.20	2.13
Subdivision	10	Q10	29.00	442.99	39.53	40.96	41.13	41.73	0.052413	7.05	4.12	3.99	1.22	2.47
Subdivision	10	Q25	40.00	442.99	39.53	41.22	41.43	42.14	0.052877	7.68	5.21	4.37	1.24	2.82
Subdivision	10	Q50	49.00	442.99	39.53	42.03	41.65	42.46	0.017663	5.28	9.27	6.73	0.75	1.22
Subdivision	10	Q100	60.00	442.99	39.53	42.46	41.94	42.86	0.011682	5.06	11.86	9.64	0.63	1.03
Subdivision	10.5	Qfish	6.60	507.99	42.32	43.02	43.02	43.29	0.038546	4.16	1.59	2.98	1.01	1.04
Subdivision	10.5	Q2	11.00	507.99	42.32	43.25	43.25	43.61	0.037356	4.78	2.30	3.28	1.01	1.27
Subdivision	10.5	Q5	21.00	507.99	42.32	43.66	43.66	44.15	0.035583	5.61	3.74	3.86	1.00	1.59
Subdivision	10.5	Q10	29.00	507.99	42.32	43.92	43.92	44.49	0.034265	6.02	4.82	4.24	1.00	1.75
Subdivision	10.5	Q25	40.00	507.99	42.32	44.22	44.22	44.88	0.033858	6.51	6.15	4.66	1.00	1.96
Subdivision	10.5	Q50	49.00	507.99	42.32	44.44	44.44	45.16	0.033288	6.81	7.20	4.97	1.00	2.09
Subdivision	10.5	Q100	60.00	507.99	42.32	44.73	44.73	45.46	0.031981	6.85	8.76	6.15	1.00	2.09
Subdivision	10.6666*	Qfish	6.60	555.66	43.51	44.37	44.21	44.53	0.018369	3.21	2.06	3.17	0.70	0.58
Subdivision	10.6666*	Q2	11.00	555.66	43.51	44.63	44.44	44.85	0.018769	3.73	2.95	3.55	0.72	0.74
Subdivision	10.6666*	Q5	21.00	555.66	43.51	45.08	45.08	45.39	0.019526	4.50	4.67	4.19	0.75	0.98
Subdivision	10.6666*	Q10	29.00	555.66	43.51	45.35	45.35	45.73	0.020097	4.94	5.87	4.58	0.77	1.14
Subdivision	10.6666*	Q25	40.00	555.66	43.51	45.68	45.68	46.13	0.020240	5.37	7.45	5.05	0.78	1.29
Subdivision	10.6666*	Q50	49.00	555.66	43.51	45.94	45.63	46.41	0.020564	5.53	8.86	6.26	0.80	1.36
Subdivision	10.6666*	Q100	60.00	555.66	43.51	46.13	45.92	46.69	0.020651	6.00	9.99	7.54	0.82	1.54
Subdivision	10.8333*	Qfish	6.60	603.33	44.69	45.44	45.39	45.67	0.031147	3.86	1.71	3.03	0.91	0.88
Subdivision	10.8333*	Q2	11.00	603.33	44.69	45.68	45.62	45.98	0.029627	4.40	2.50	3.36	0.90	1.06
Subdivision	10.8333*	Q5	21.00	603.33	44.69	46.12	46.03	46.53	0.028033	5.14	4.09	3.98	0.89	1.31
Subdivision	10.8333*	Q10	29.00	603.33	44.69	46.39	46.29	46.87	0.027185	5.53	5.25	4.38	0.89	1.45
Subdivision	10.8333*	Q25	40.00	603.33	44.69	46.71	46.59	47.26	0.026856	5.97	6.70	4.83	0.89	1.63
Subdivision	10.8333*	Q50	49.00	603.33	44.69	46.95	46.81	47.55	0.025970	6.20	7.90	5.17	0.88	1.71
Subdivision	10.8333*	Q100	60.00	603.33	44.69	47.18	47.10	47.84	0.026810	6.49	9.24	6.69	0.92	1.85
Subdivision	11	Qfish	6.60	651.00	45.88	46.71	46.58	46.88	0.020877	3.36	1.97	3.13	0.75	0.64
Subdivision	11	Q2	11.00	651.00	45.88	46.95	46.81	47.20	0.022232	3.97	2.77	3.48	0.78	0.84
Subdivision	11	Q5	21.00	651.00	45.88	47.05	47.22	47.76	0.059008	6.75	3.11	3.62	1.28	2.38
Subdivision	11	Q10	29.00	651.00	45.88	47.27	47.48	48.11	0.059010	7.36	3.94	3.93	1.30	2.71
Subdivision	11	Q25	40.00	651.00	45.88	47.53	47.78	48.52	0.059012	8.00	5.00	4.30	1.31	3.08
Subdivision	11	Q50	49.00	651.00	45.88	47.71	48.00	48.81	0.059014	8.43	5.81	4.56	1.32	3.33
Subdivision	11	Q100	60.00	651.00	45.88	47.91	48.29	49.13	0.058989	8.87	6.76	4.85	1.32	3.59

State of Alaska Department of Transportation and Public Facilities

Seward Highway, Bird to Indian
MP 99 to MP 105
ADOT&PF State Project #53577



PLAN VIEW INDEX
Not to Scale

SHEET INDEX

- 1 Cover Sheet
- 2 Stream Habitat Inventory, "Bear" Creek Plan View
- 3 Stream Habitat Inventory, "Ball Field" Creek Plan View
- 4 Stream Habitat Inventory, "Subdivision" Creek Plan View

Note:
Base Imagery provided by DOWL Engineers 2006



USGS VICINITY MAP
Not to Scale

PRELIMINARY

NO.	BY	DATE	REVISION DESCRIPTION

RP & NS.	DM.GK.MS.	DM.GK.MS.	DM.GK.MS.
DRAWN	DESIGNED	CHECKED	PROJECT
DM.GK.MS.	DM.GK.MS.	DM.GK.MS.	DM.GK.MS.
APPROVED	DATE	DATE	DATE
	08/10/07		

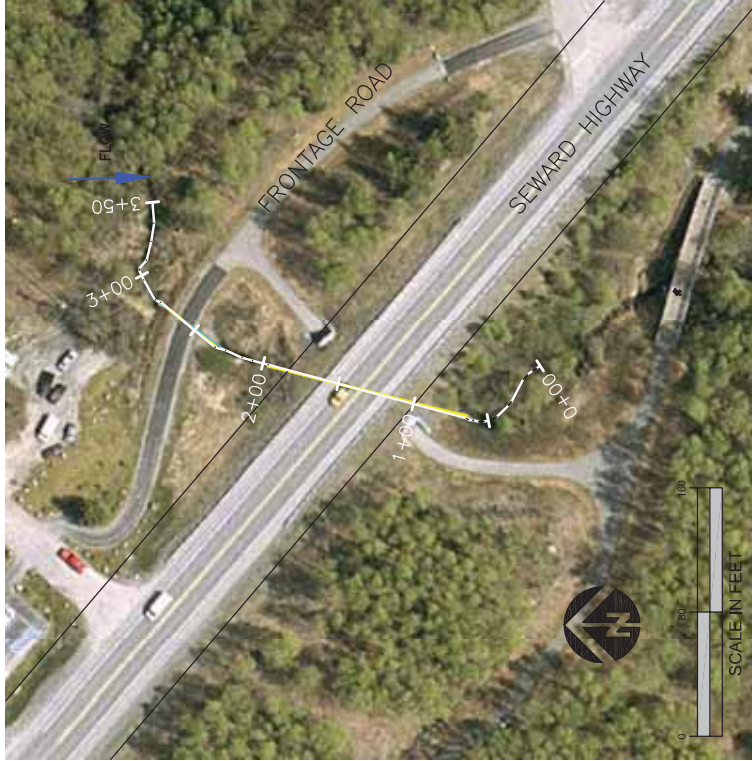
State of Alaska Department of Transportation
and Public Facilities, Seward Highway
Bird to Indian MP 99 to MP 105
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Prepared By
Interflume, Inc.

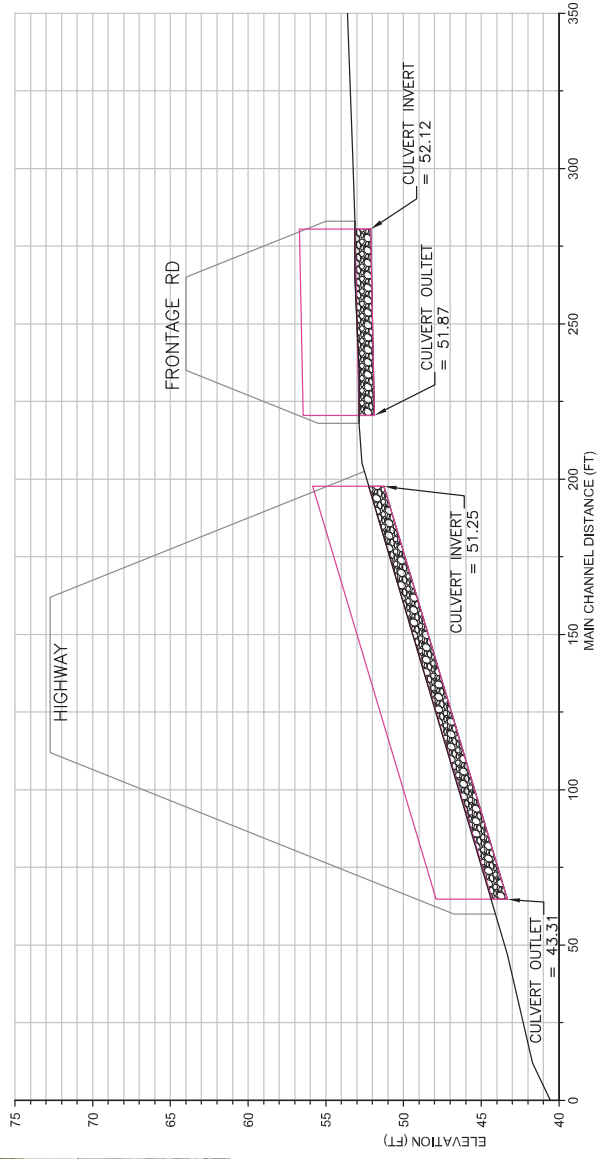
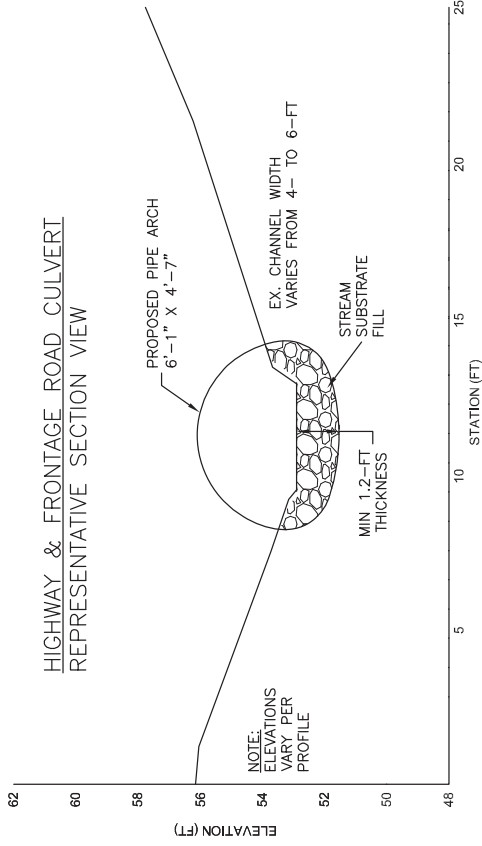
1020 Wasco Street, Suite 1
Hood River, OR 97031
www.interflume.com

Hydraulics and Hydrology
Cover Sheet

SHEET
1 of 4



HIGHWAY & FRONTAGE ROAD CULVERT REPRESENTATIVE SECTION VIEW



HYDRAULIC SUMMARY

Table 1. "Bear" Creek crossing Seward Highway - H&H Summary
 Drainage Area = 0.66-square miles

Exceedance probability	10%	2%	1%
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)
Design discharge (cfs)	30	52	63
Flow depth at inlet (ft)	1.76	2.18	2.36
Hw/D	0.89	0.61	0.66

Table 2. "Bear" Creek crossing Frontage Road - H&H Summary
 Drainage Area = 0.66-square miles

Exceedance probability	10%	2%	1%
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)
Design discharge (cfs)	30	52	63
Flow depth at inlet (ft)	1.88	2.11	2.35
Hw/D	0.54	0.59	0.66



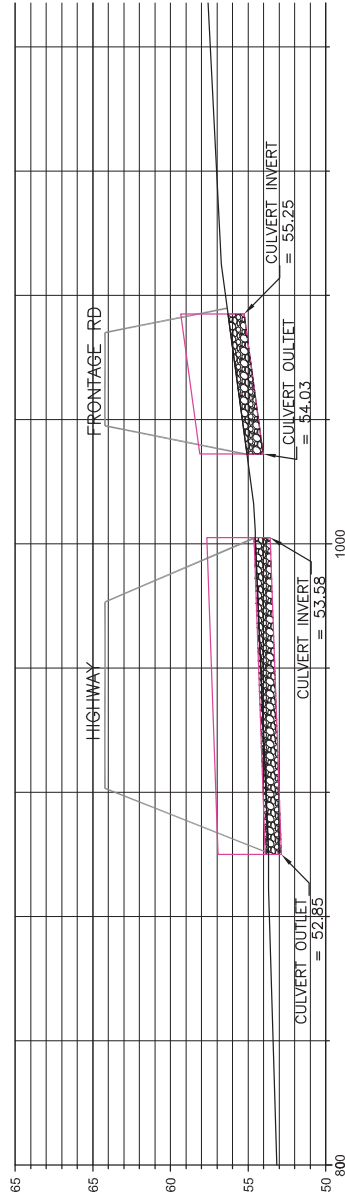
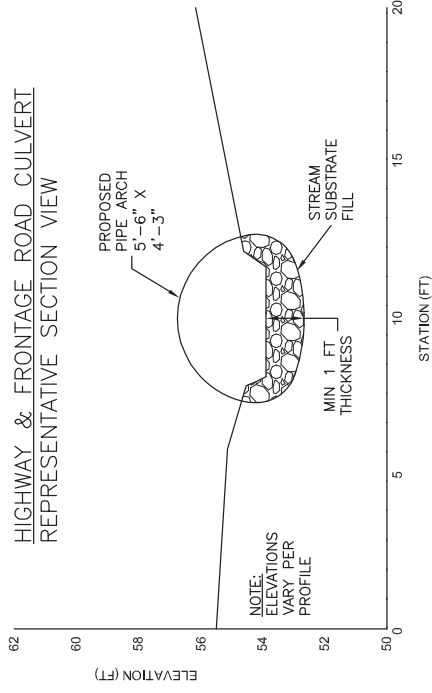
HYDRAULIC SUMMARY

Table 1. "Ball Field" Creek crossing Seward Highway – H&H Summary

Drainage Area = 0.6-square miles				
Exceedance probability	10%	2%	1%	
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)	
Design discharge (cfs)	29	49	60	
Flow depth at inlet (ft)	1.58	2.37	2.7	
Flow/D	0.52	0.78	0.89	

Table 2. "Ball Field" Creek crossing Frontage Road – H&H Summary

Drainage Area = 0.6-square miles				
Exceedance probability	10%	2%	1%	
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)	
Design discharge (cfs)	29	49	60	
Flow depth at inlet (ft)	1.56	1.97	2.12	
Flow/D	0.51	0.65	0.70	



CHANNEL PROFILE
vertical exaggeration 5:1

NO.	BY	DATE	REVISION DESCRIPTION	DESIGNED		CHECKED		PROJECT
				DATE	DATE	DATE	DATE	
				DM.GK.MS.	DM.GK.MS.			
				APPROVED				

State of Alaska Department of Transportation
and Public Facilities – Seward Highway
Bird to Indianapolis - 880490405

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Hydraulics and Hydrology
"Ball Field" Creek Plan View
SHEET
3 of 4

HYDRAULIC SUMMARY

Table 1. "Subdivision" Creek crossing Seward Highway – H&H Summary
 Drainage Area = 0.6-square miles

Exceedance probability	10%	2%	1%
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)
Design discharge (cfs)	29	49	60
Flow depth at inlet (ft)	1.77	2.08	2.21
Hw/D	0.76	0.89	0.95

Table 2. "Subdivision" Creek crossing Frontage Road – H&H Summary
 Drainage Area = 0.6-square miles

Exceedance probability	10%	2%	1%
Return period	10-year (Q10)	50-year (Q50)	100-year (Q100)
Design discharge (cfs)	29	49	60
Flow depth at inlet (ft)	0.96	1.34	1.59
Hw/D	0.41	0.58	0.68

