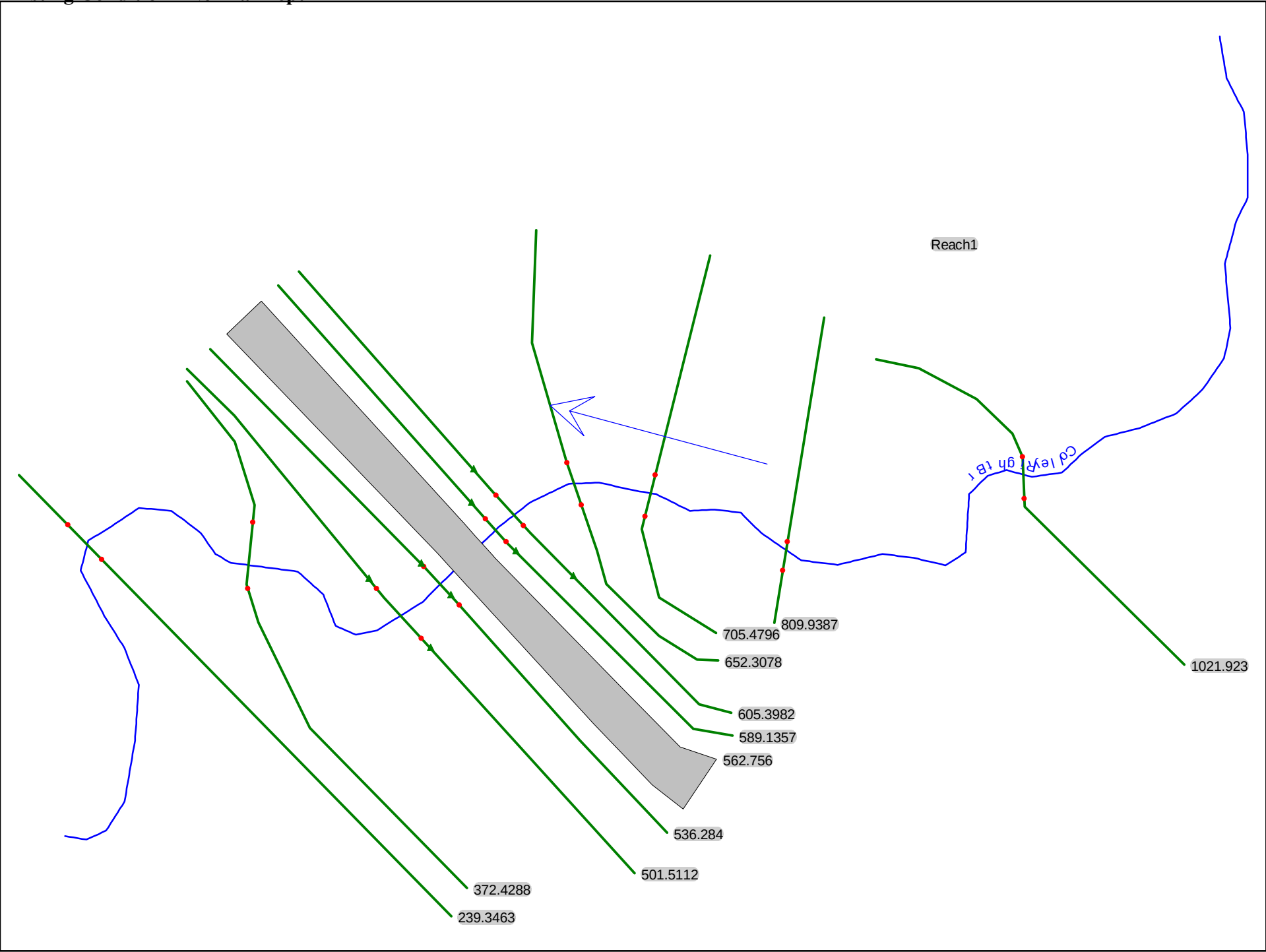


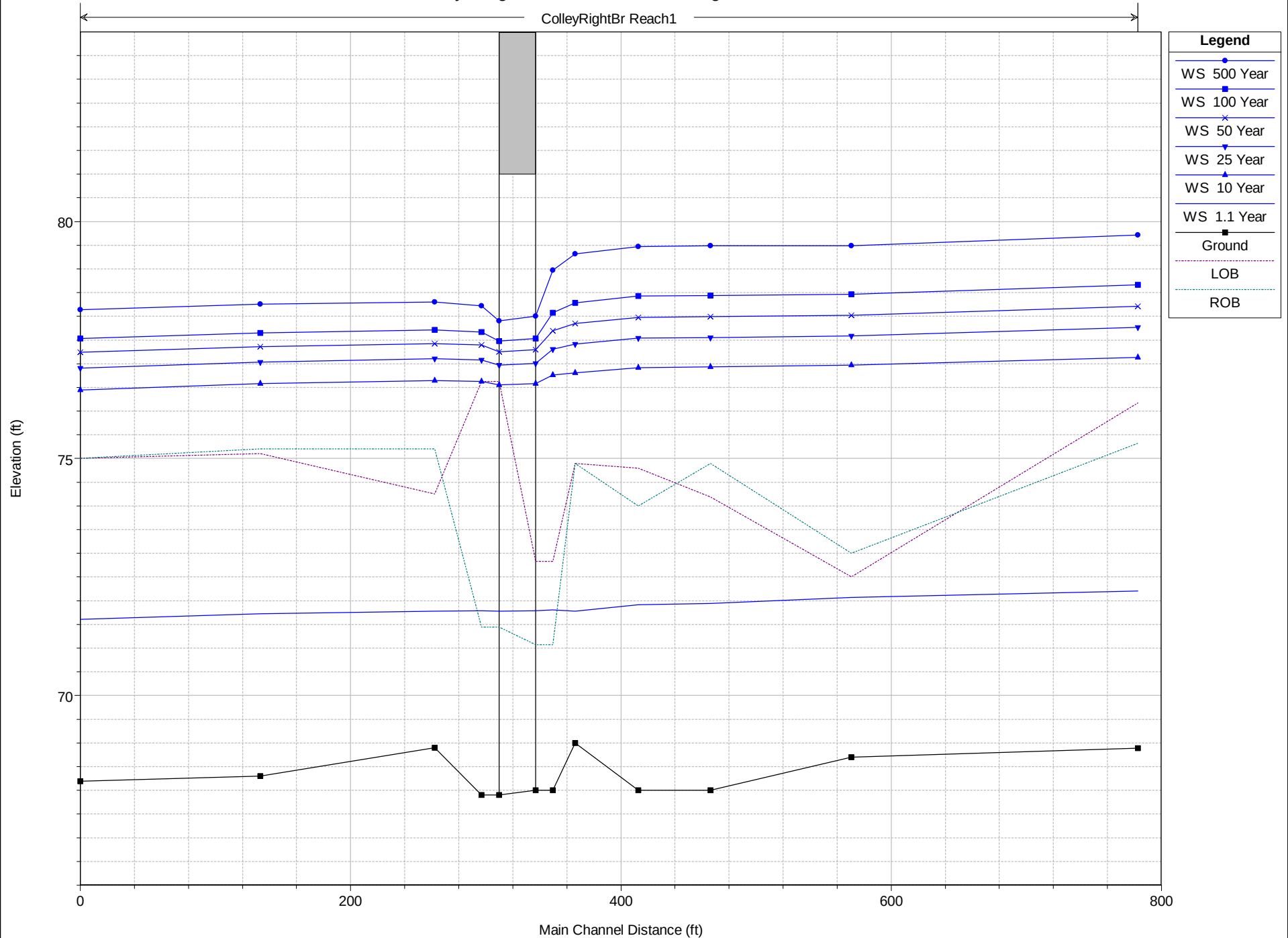
Hydraulics

Existing Condition - Normal Depth



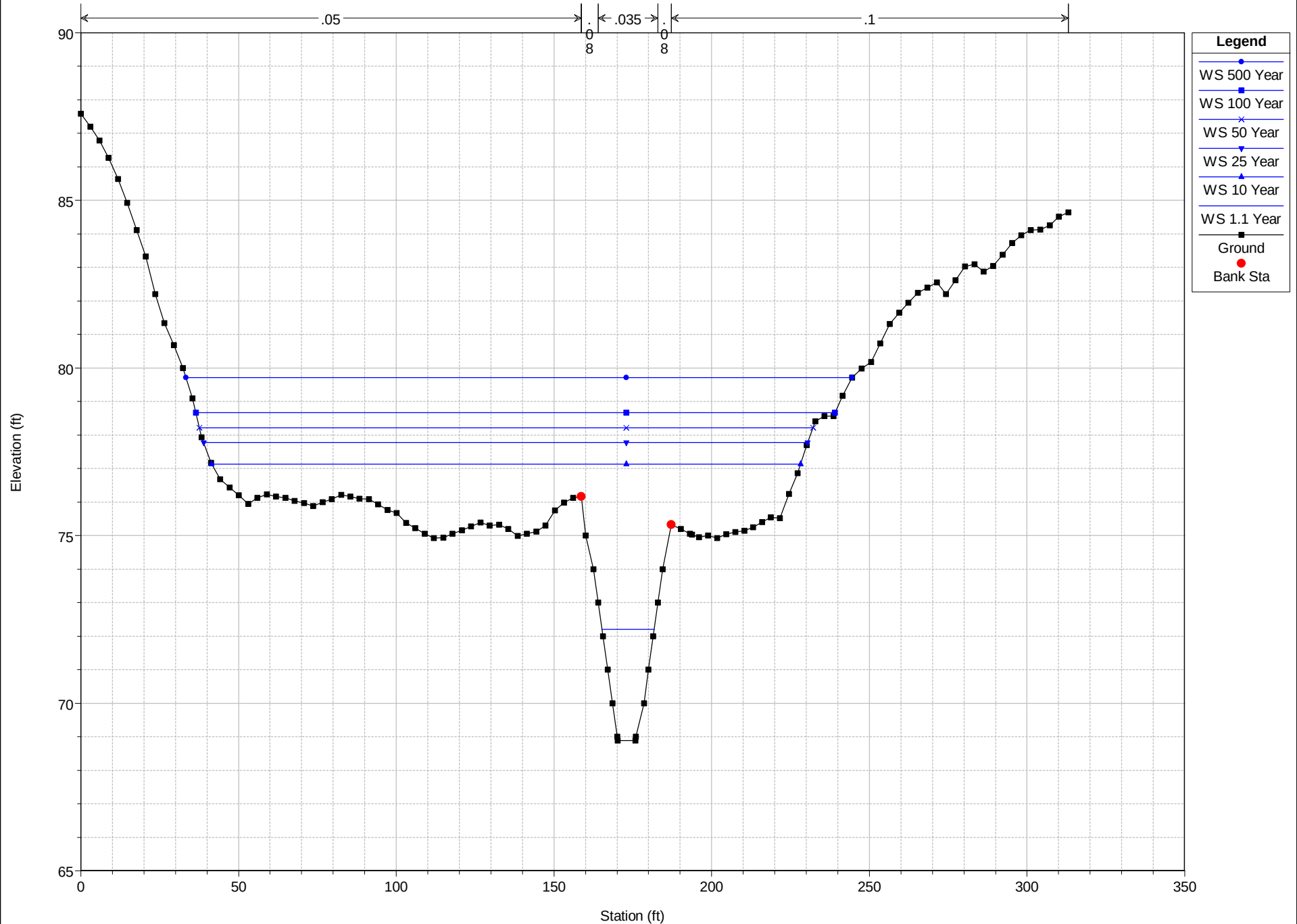
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019

ColleyRightBr Reach1



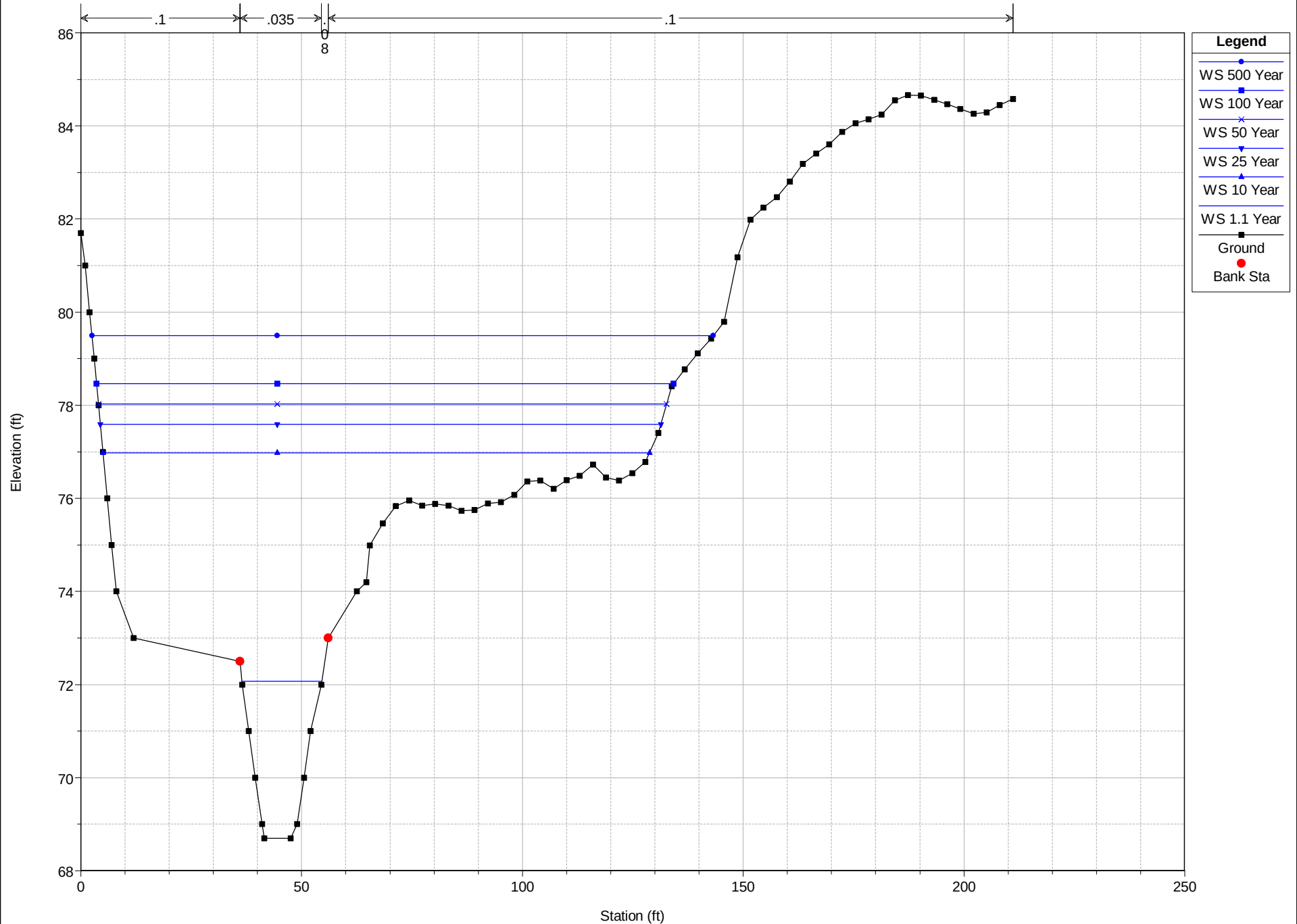
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Cross Section STA 1021.923



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019

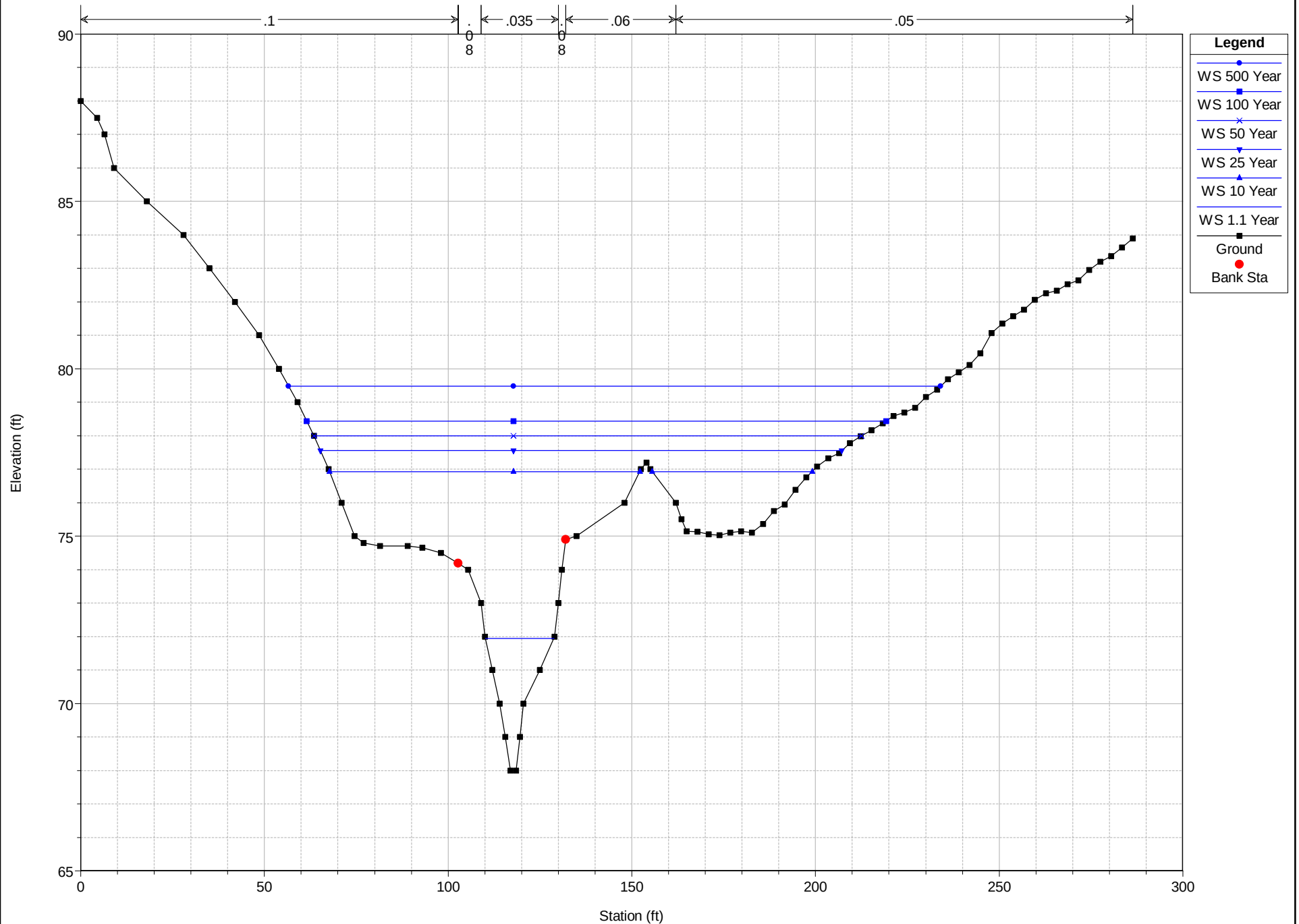
Cross Section STA 809.94



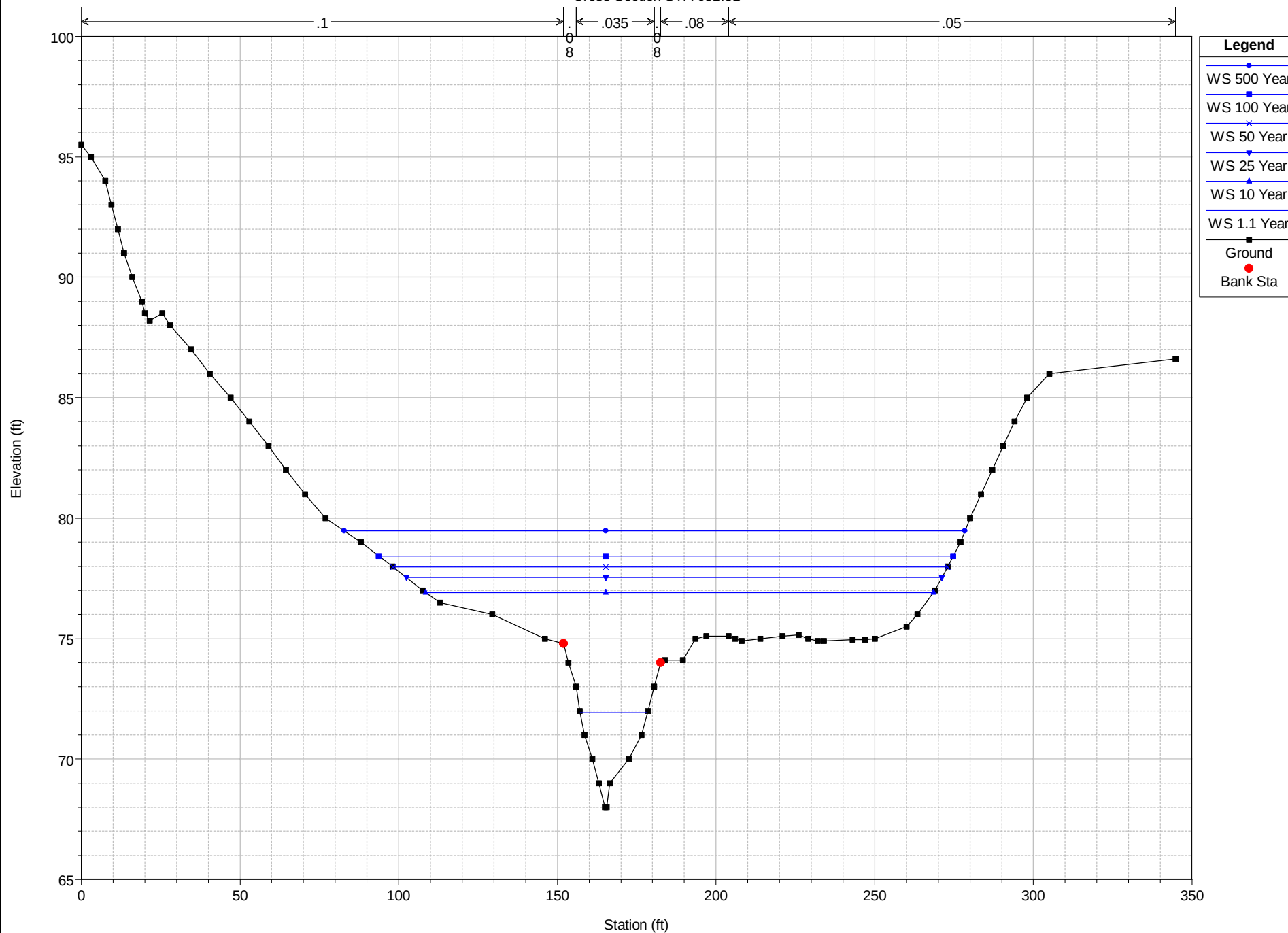
River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS ND 3/6/2019

Cross Section STA 705.48



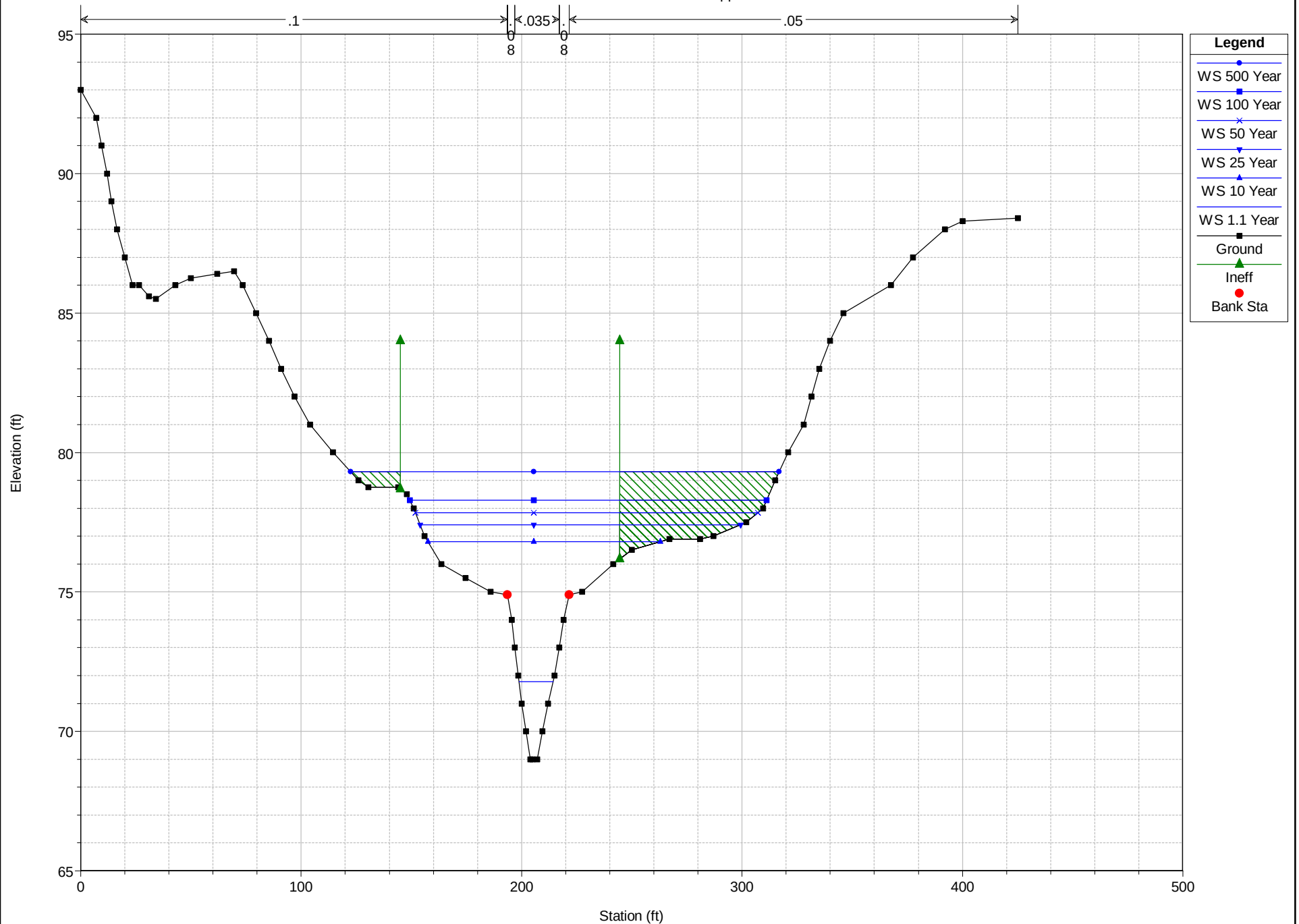
Cross Section STA 652.31



River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS ND 3/6/2019

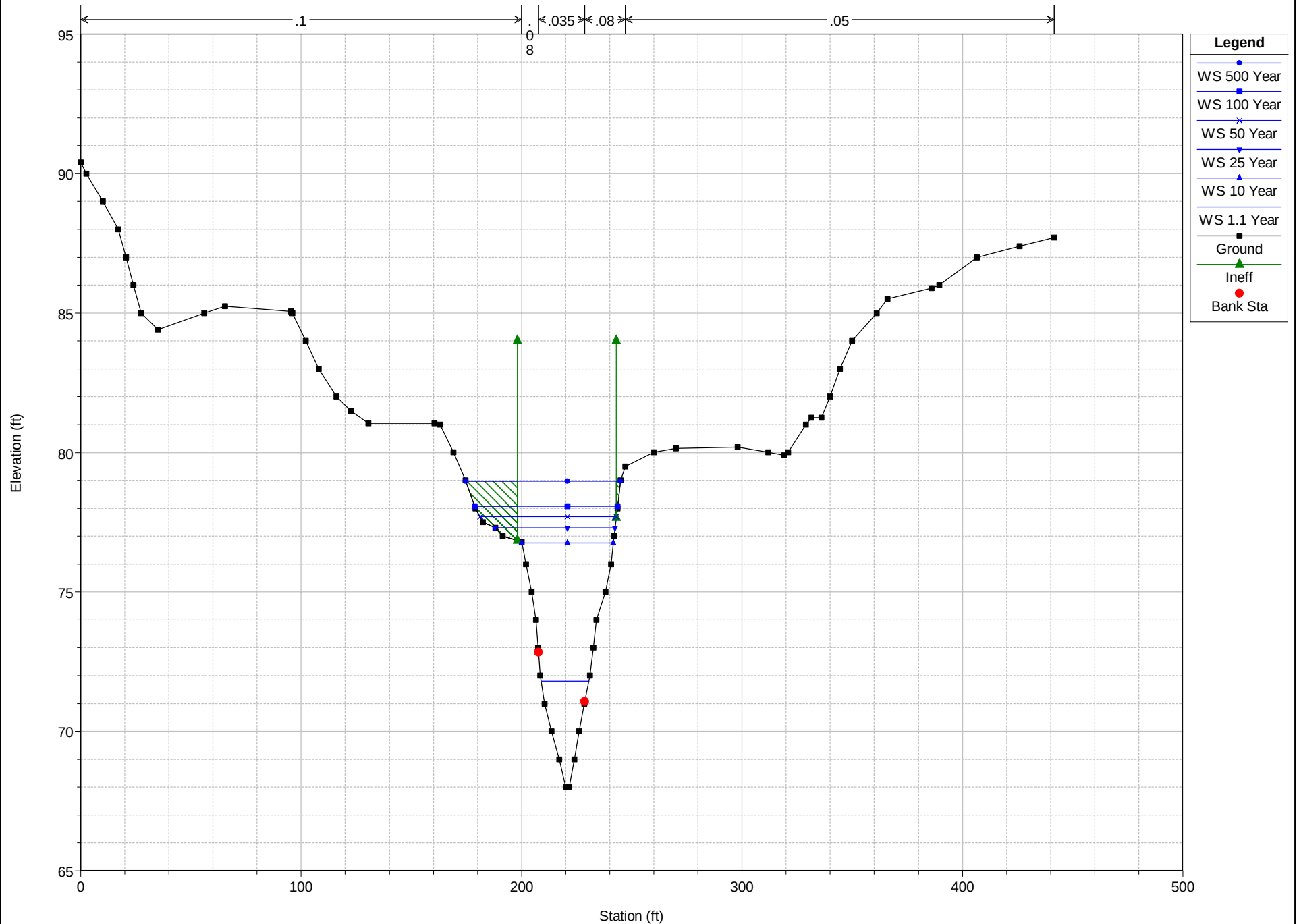
Cross Section STA 605.40 - Approach



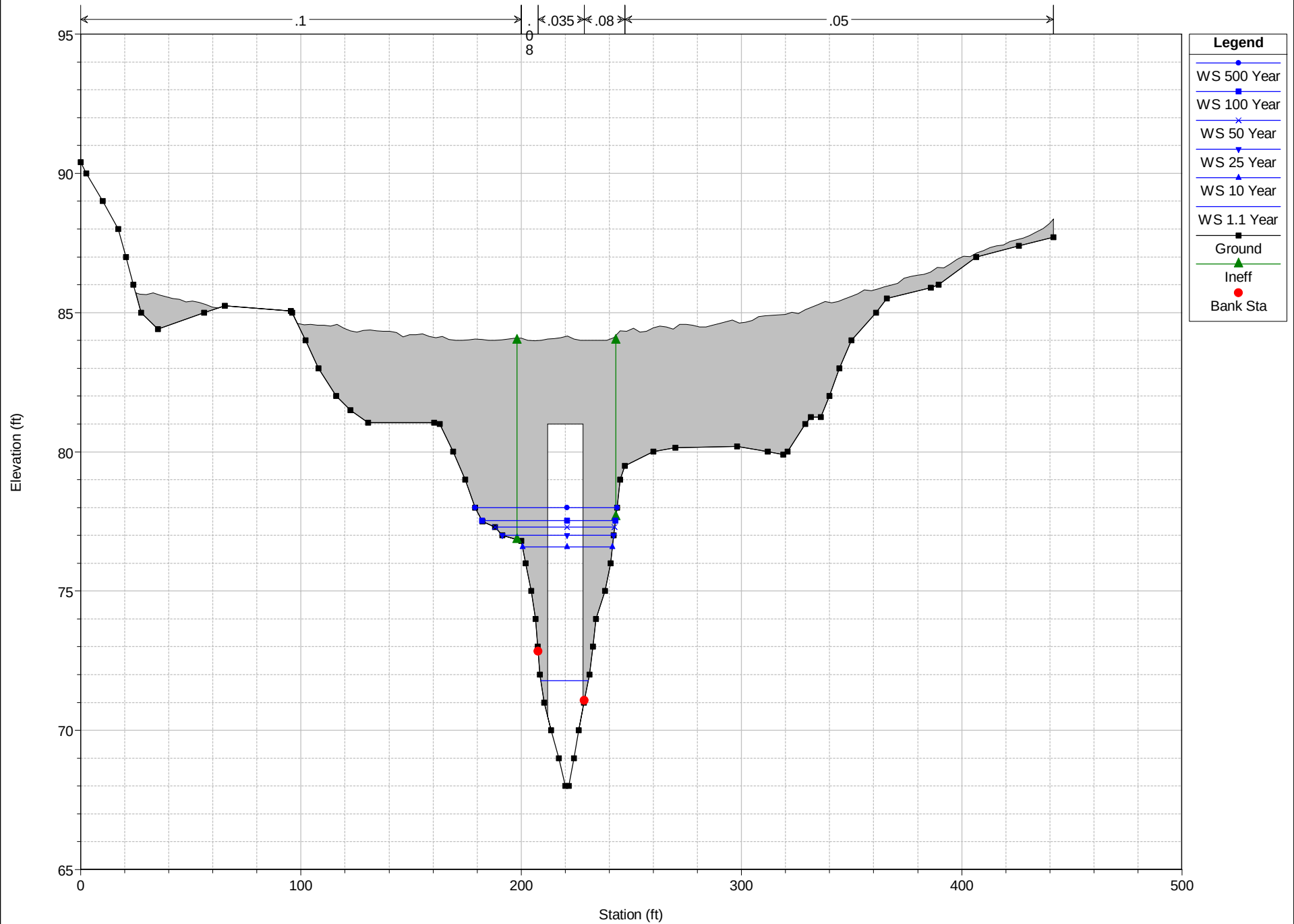
River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS ND 3/6/2019

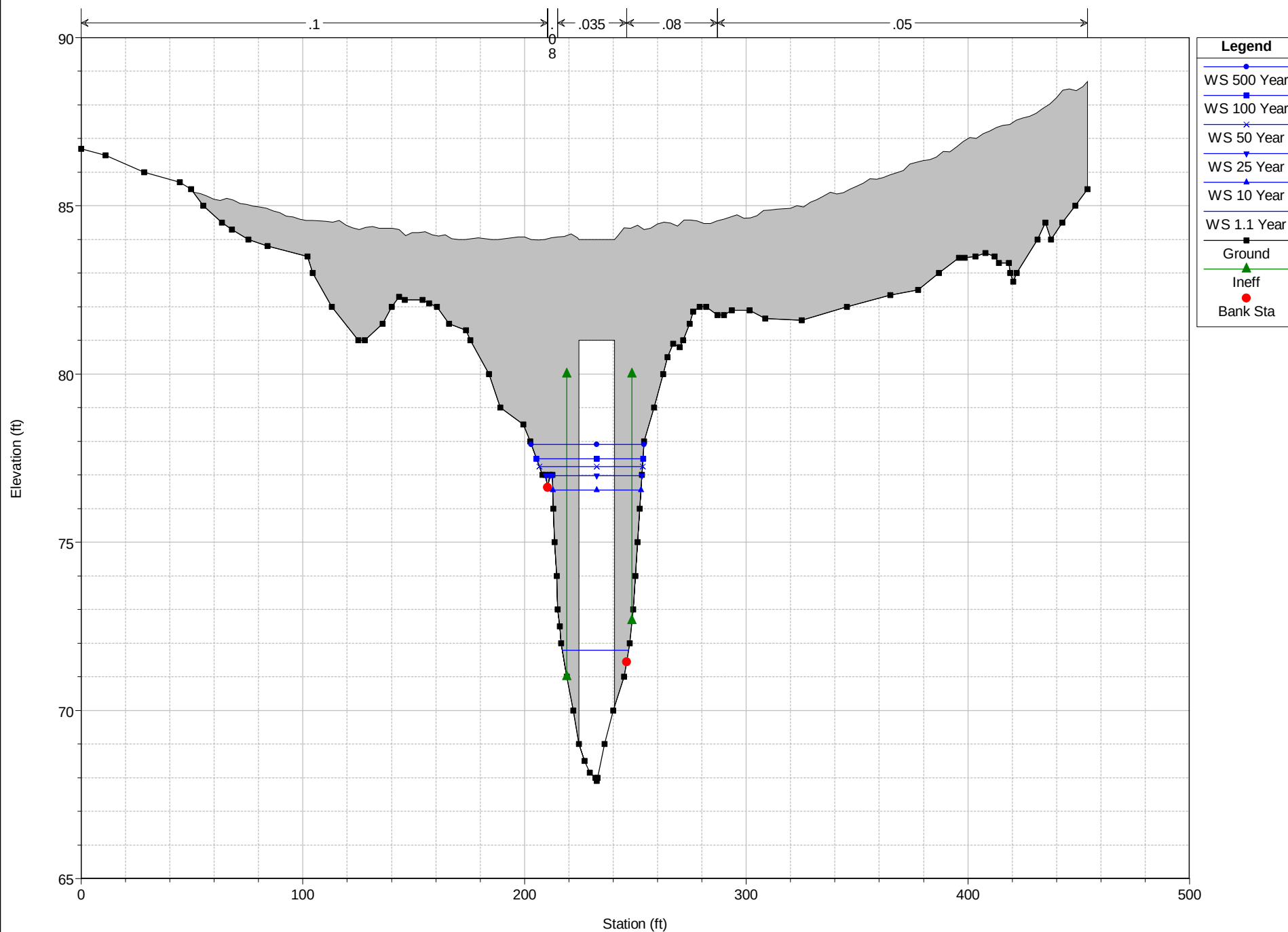
Cross Section STA 589.14 - US Fascia



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019

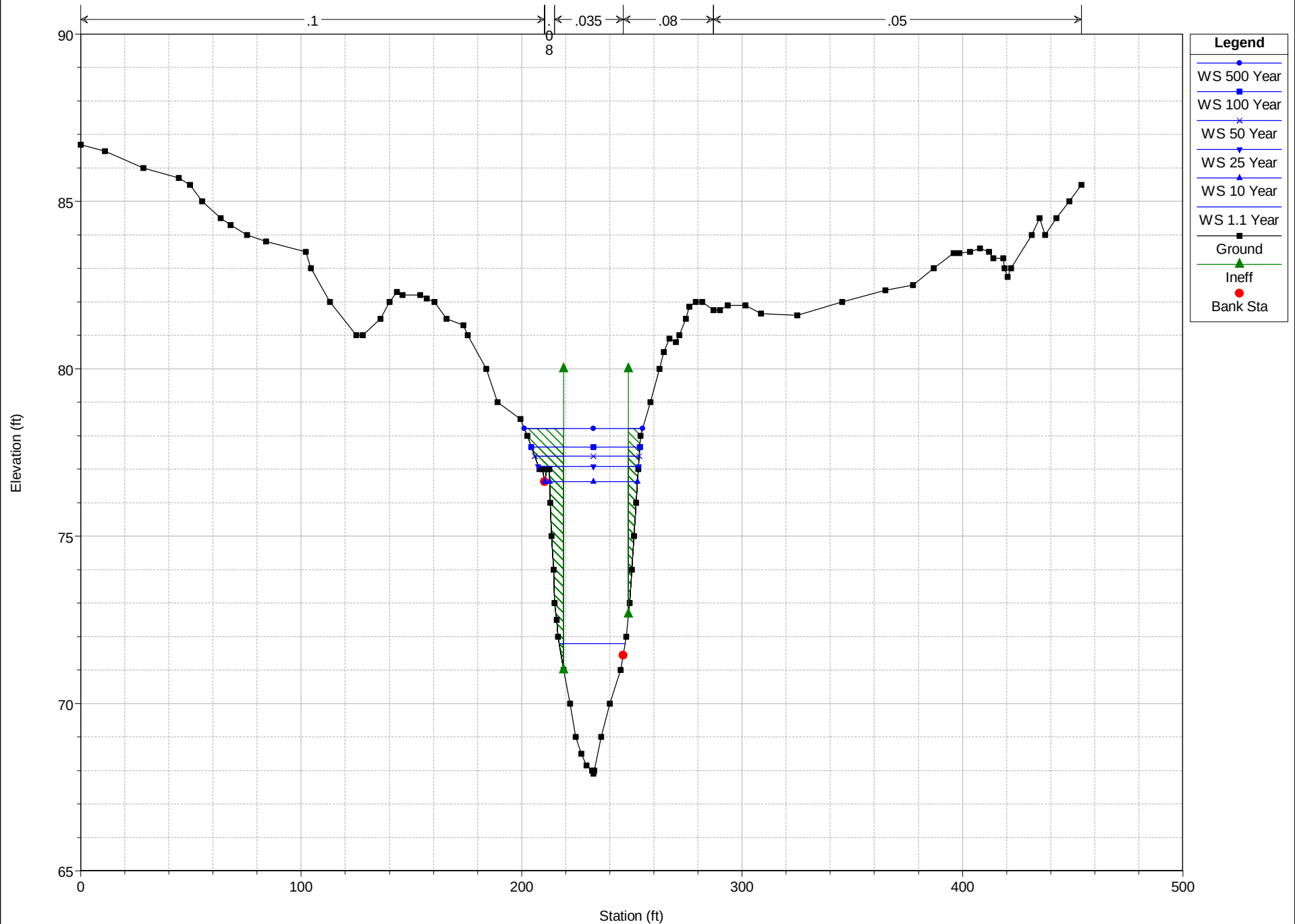


River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019



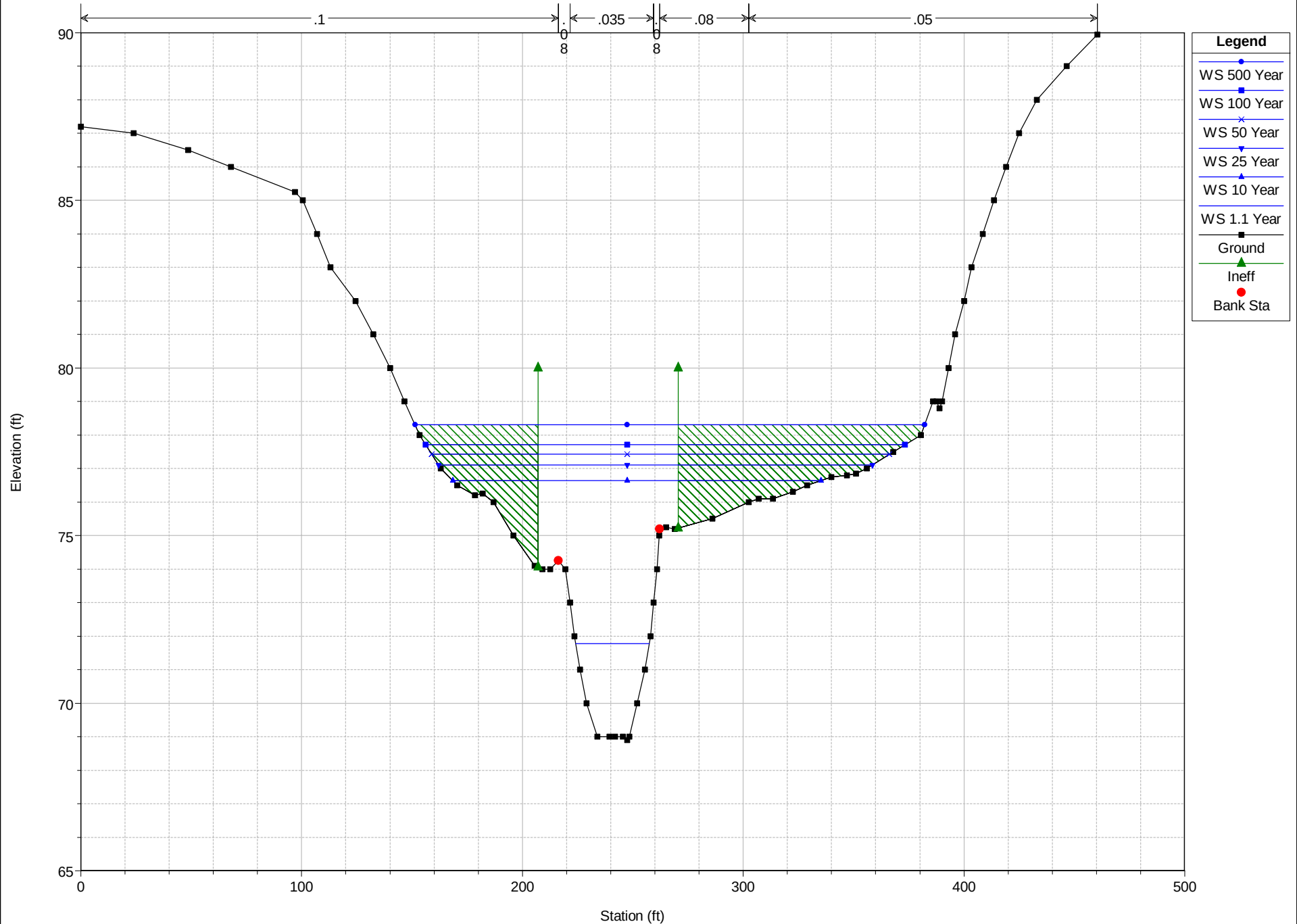
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019

Cross Section STA 536.28 - DS Fascia



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019

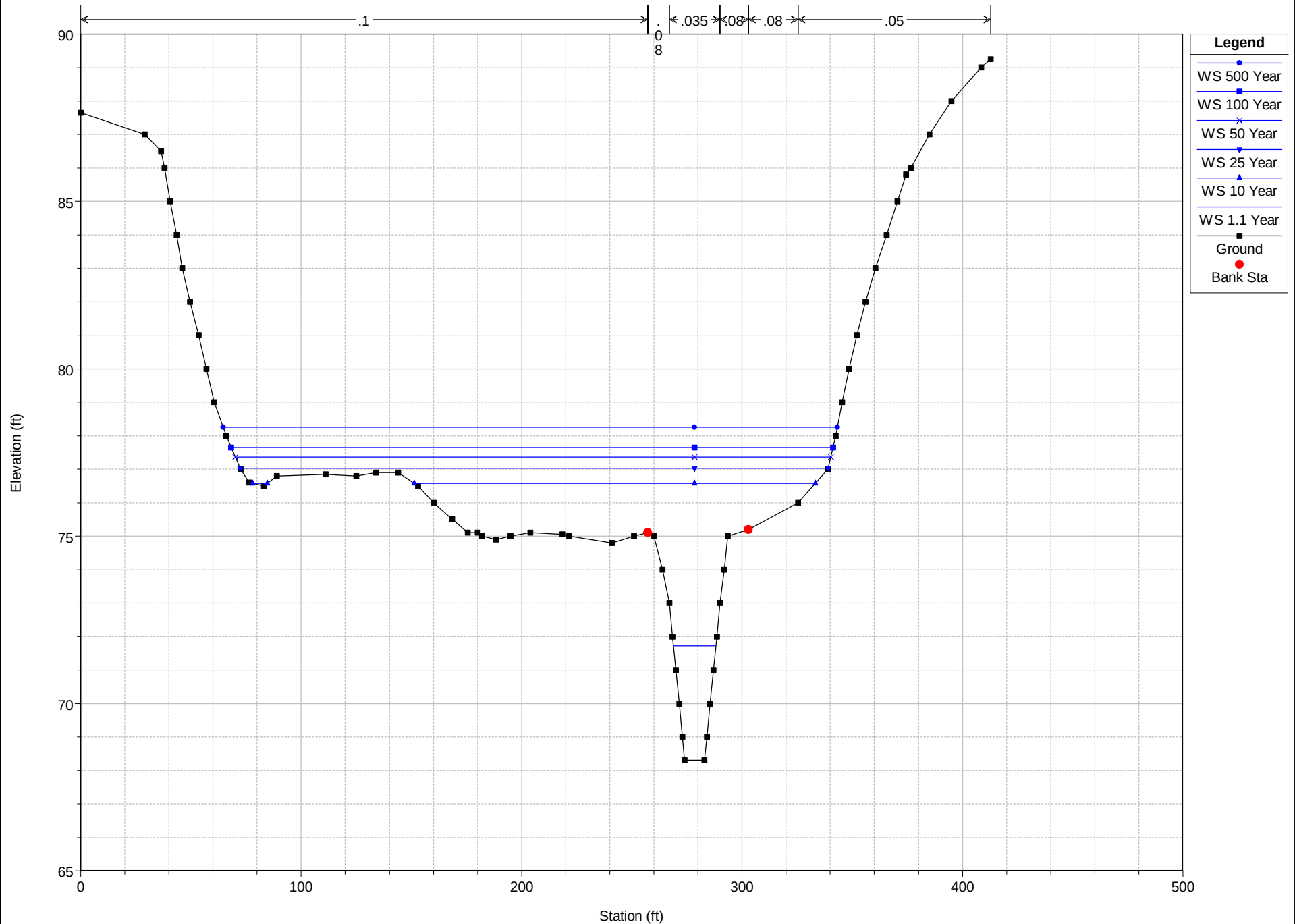
Cross Section STA 501.51 - Exit Section



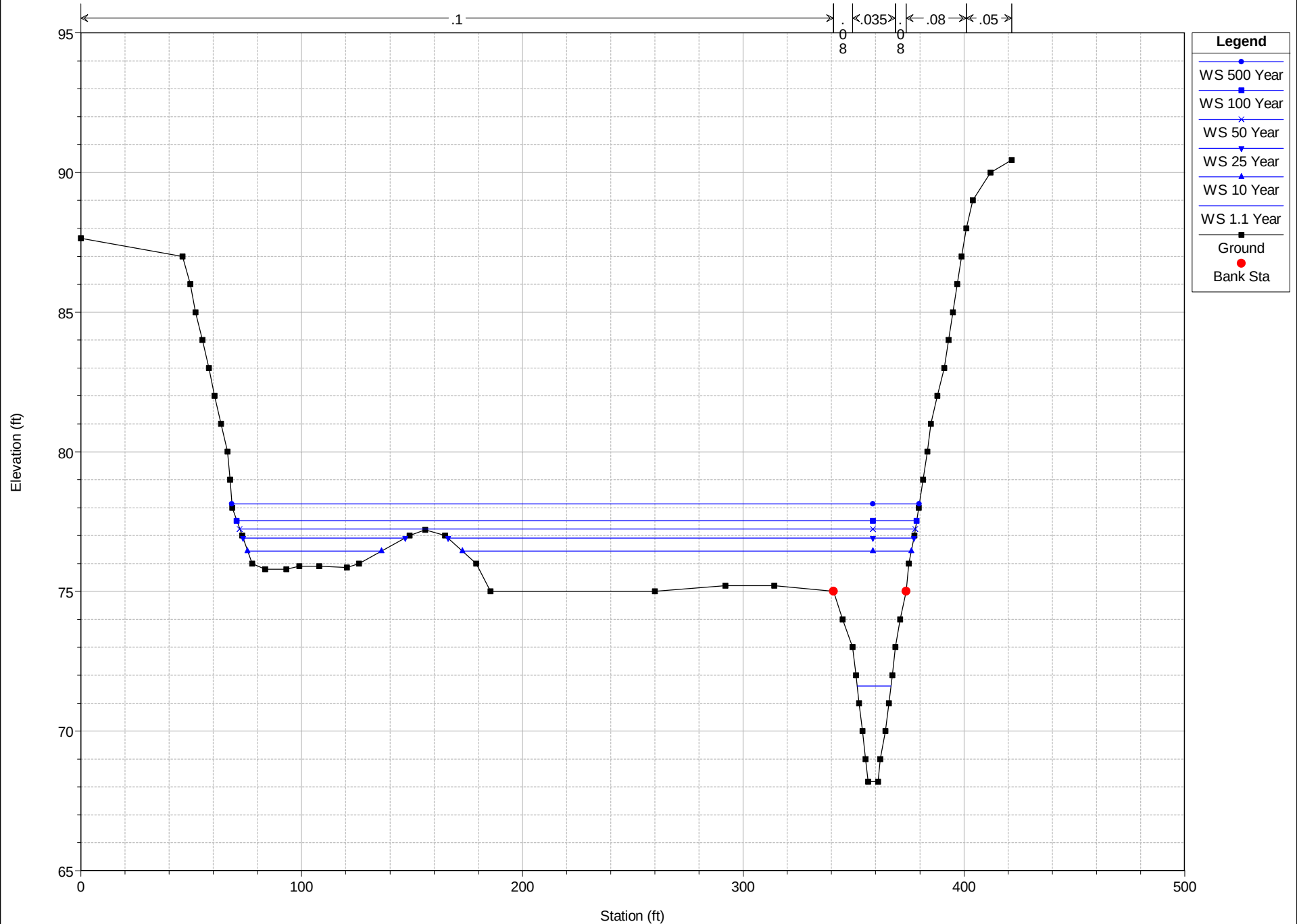
River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS ND 3/6/2019

Cross Section STA 372.43



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS ND 3/6/2019
Cross Section STA 239.35



HEC-RAS Plan: EXIST 2015 SS ND River: ColleyRightBr Reach: Reach1

Reach	River Sta	Profile	Q Total (cfs)	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
Reach1	1021.923	1.1 Year	70.40	68.89	72.21		72.26	0.000729	1.85	38.00	16.62	0.22
Reach1	1021.923	10 Year	496.00	68.89	77.13		77.17	0.000589	1.96	395.02	186.71	0.15
Reach1	1021.923	25 Year	652.00	68.89	77.77		77.81	0.000498	1.94	515.92	191.47	0.14
Reach1	1021.923	50 Year	764.00	68.89	78.21		78.25	0.000443	1.92	601.54	194.57	0.13
Reach1	1021.923	100 Year	896.00	68.89	78.67		78.71	0.000413	1.94	691.26	202.63	0.13
Reach1	1021.923	500 Year	1210.00	68.89	79.71		79.75	0.000342	1.93	907.06	211.21	0.12
Reach1	809.9387	1.1 Year	70.40	68.70	72.07		72.11	0.000624	1.70	41.35	18.16	0.20
Reach1	809.9387	10 Year	496.00	68.70	76.97		77.06	0.000455	2.71	343.98	123.75	0.18
Reach1	809.9387	25 Year	652.00	68.70	77.59		77.70	0.000526	3.08	421.19	126.97	0.20
Reach1	809.9387	50 Year	764.00	68.70	78.02		78.14	0.000553	3.28	476.74	128.68	0.20
Reach1	809.9387	100 Year	896.00	68.70	78.47		78.60	0.000590	3.51	533.98	130.72	0.21
Reach1	809.9387	500 Year	1210.00	68.70	79.49		79.65	0.000634	3.93	673.21	140.72	0.23
Reach1	705.4796	1.1 Year	70.40	68.00	71.95		72.02	0.001402	2.15	32.73	18.68	0.29
Reach1	705.4796	10 Year	496.00	68.00	76.93		77.00	0.000719	2.32	315.29	128.09	0.17
Reach1	705.4796	25 Year	652.00	68.00	77.55		77.62	0.000726	2.50	399.34	141.83	0.18
Reach1	705.4796	50 Year	764.00	68.00	77.99		78.07	0.000693	2.56	463.40	149.02	0.18
Reach1	705.4796	100 Year	896.00	68.00	78.44		78.52	0.000677	2.64	532.14	157.71	0.18
Reach1	705.4796	500 Year	1210.00	68.00	79.49		79.56	0.000597	2.72	708.21	177.51	0.17
Reach1	652.3078	1.1 Year	70.40	68.00	71.92		71.96	0.000687	1.67	42.19	21.20	0.21
Reach1	652.3078	10 Year	496.00	68.00	76.92		76.96	0.000382	1.97	389.64	160.12	0.14
Reach1	652.3078	25 Year	652.00	68.00	77.54		77.59	0.000384	2.11	491.87	168.76	0.14
Reach1	652.3078	50 Year	764.00	68.00	77.98		78.03	0.000372	2.17	567.72	174.72	0.14
Reach1	652.3078	100 Year	896.00	68.00	78.43		78.48	0.000369	2.25	647.40	180.98	0.14
Reach1	652.3078	500 Year	1210.00	68.00	79.47		79.53	0.000342	2.36	844.21	195.62	0.14
Reach1	605.3982	1.1 Year	70.40	69.00	71.78	70.72	71.90	0.002337	2.74	25.74	15.51	0.37
Reach1	605.3982	10 Year	496.00	69.00	76.81	73.35	76.92	0.001226	2.93	223.16	105.51	0.23
Reach1	605.3982	25 Year	652.00	69.00	77.41	73.92	77.54	0.001274	3.22	276.95	145.34	0.24
Reach1	605.3982	50 Year	764.00	69.00	77.84	74.31	77.99	0.001253	3.35	316.82	155.40	0.24
Reach1	605.3982	100 Year	896.00	69.00	78.28	74.74	78.44	0.001263	3.52	357.92	161.75	0.24
Reach1	605.3982	500 Year	1210.00	69.00	79.31	75.85	79.48	0.001194	3.76	459.55	194.51	0.24
Reach1	589.1357	1.1 Year	70.40	68.00	71.80	69.84	71.84	0.000510	1.58	45.18	21.62	0.19
Reach1	589.1357	10 Year	496.00	68.00	76.76	72.29	76.90	0.000446	3.13	196.40	41.54	0.21
Reach1	589.1357	25 Year	652.00	68.00	77.30	72.83	77.51	0.000586	3.77	220.26	54.57	0.24
Reach1	589.1357	50 Year	764.00	68.00	77.69	73.17	77.94	0.000668	4.16	237.62	61.89	0.26
Reach1	589.1357	100 Year	896.00	68.00	78.07	73.55	78.38	0.000770	4.61	254.84	64.95	0.28
Reach1	589.1357	500 Year	1210.00	68.00	78.97	74.39	79.39	0.000954	5.49	295.27	70.34	0.32
Reach1	562.756		Bridge									
Reach1	536.284	1.1 Year	70.40	67.90	71.79	69.46	71.81	0.000212	1.08	65.17	29.94	0.12
Reach1	536.284	10 Year	496.00	67.90	76.63	71.58	76.72	0.000256	2.49	207.30	40.07	0.16
Reach1	536.284	25 Year	652.00	67.90	77.08	72.01	77.23	0.000360	3.07	220.74	45.53	0.20
Reach1	536.284	50 Year	764.00	67.90	77.39	72.31	77.58	0.000433	3.46	229.94	47.55	0.22
Reach1	536.284	100 Year	896.00	67.90	77.66	72.64	77.90	0.000532	3.92	237.94	49.32	0.24
Reach1	536.284	500 Year	1210.00	67.90	78.22	73.36	78.60	0.000779	4.95	254.36	53.82	0.29
Reach1	501.5112	1.1 Year	70.40	68.90	71.78	69.82	71.80	0.000219	1.01	69.70	33.40	0.12
Reach1	501.5112	10 Year	496.00	68.90	76.64	71.57	76.69	0.000280	1.76	308.98	166.75	0.13
Reach1	501.5112	25 Year	652.00	68.90	77.11	71.99	77.17	0.000371	2.13	338.60	196.56	0.15
Reach1	501.5112	50 Year	764.00	68.90	77.43	72.26	77.51	0.000429	2.36	358.99	207.32	0.16
Reach1	501.5112	100 Year	896.00	68.90	77.71	72.56	77.82	0.000510	2.65	376.99	217.02	0.18
Reach1	501.5112	500 Year	1210.00	68.90	78.30	73.19	78.46	0.000699	3.27	414.60	230.79	0.21
Reach1	372.4288	1.1 Year	70.40	68.30	71.72		71.76	0.000400	1.46	48.10	19.17	0.16
Reach1	372.4288	10 Year	496.00	68.30	76.58		76.63	0.000925	1.97	375.13	188.58	0.17
Reach1	372.4288	25 Year	652.00	68.30	77.04		77.10	0.001071	2.27	478.78	266.85	0.18
Reach1	372.4288	50 Year	764.00	68.30	77.36		77.42	0.001017	2.31	566.91	270.13	0.18
Reach1	372.4288	100 Year	896.00	68.30	77.65		77.71	0.001034	2.41	644.96	273.01	0.18
Reach1	372.4288	500 Year	1210.00	68.30	78.26		78.33	0.001055	2.61	812.95	278.71	0.19
Reach1	239.3463	1.1 Year	70.40	68.19	71.61	69.85	71.67	0.001001	2.09	33.68	15.32	0.25
Reach1	239.3463	10 Year	496.00	68.19	76.45	72.67	76.51	0.001000	2.29	411.59	264.11	0.18
Reach1	239.3463	25 Year	652.00	68.19	76.91	73.39	76.97	0.001001	2.44	538.74	284.50	0.19
Reach1	239.3463	50 Year	764.00	68.19	77.24	73.83	77.30	0.001000	2.54	636.15	306.05	0.19
Reach1	239.3463	100 Year	896.00	68.19	77.53	74.29	77.59	0.001001	2.62	725.17	307.94	0.19
Reach1	239.3463	500 Year	1210.00	68.19	78.14	75.77	78.21	0.001001	2.80	914.88	311.42	0.19

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 1.1 Year

E.G. US. (ft)	71.84	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	71.80	E.G. Elev (ft)	71.83	71.82
Q Total (cfs)	70.40	W.S. Elev (ft)	71.79	71.78
Q Bridge (cfs)	70.40	Crit W.S. (ft)	69.84	69.45
Q Weir (cfs)		Max Chl Dpth (ft)	3.79	3.88
Weir Sta Lft (ft)		Vel Total (ft/s)	1.70	1.43
Weir Sta Rgt (ft)		Flow Area (sq ft)	41.46	49.19
Weir Submerg		Froude # Chl	0.15	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	62.89	81.82
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	2.59	3.07
Min El Prs (ft)	81.00	W.P. Total (ft)	19.24	20.86
Delta EG (ft)	0.04	Conv. Total (cfs)	2935.5	3699.6
Delta WS (ft)	0.02	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	1.70	C & E Loss (ft)	0.01	0.01
BR Sluice Coef		Shear Total (lb/sq ft)	0.08	0.05
BR Sel Method	Energy only	Power Total (lb/ft s)	0.13	0.08

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 10 Year

E.G. US. (ft)	76.90	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	76.76	E.G. Elev (ft)	76.85	76.80
Q Total (cfs)	496.00	W.S. Elev (ft)	76.58	76.56
Q Bridge (cfs)	496.00	Crit W.S. (ft)	72.30	71.81
Q Weir (cfs)		Max Chl Dpth (ft)	8.58	8.66
Weir Sta Lft (ft)		Vel Total (ft/s)	4.20	3.95
Weir Sta Rgt (ft)		Flow Area (sq ft)	118.10	125.57
Weir Submerg		Froude # Chl	0.25	0.24
Weir Max Depth (ft)		Specif Force (cu ft)	506.06	556.74
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	7.38	7.85
Min El Prs (ft)	81.00	W.P. Total (ft)	28.83	30.41
Delta EG (ft)	0.18	Conv. Total (cfs)	12837.6	13722.2
Delta WS (ft)	0.13	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.04	0.01
BR Open Vel (ft/s)	4.20	C & E Loss (ft)	0.02	0.07
BR Sluice Coef		Shear Total (lb/sq ft)	0.38	0.34
BR Sel Method	Energy only	Power Total (lb/ft s)	1.60	1.33

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 25 Year

E.G. US. (ft)	77.51	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	77.30	E.G. Elev (ft)	77.43	77.35
Q Total (cfs)	652.00	W.S. Elev (ft)	77.01	76.97
Q Bridge (cfs)	652.00	Crit W.S. (ft)	72.92	72.44
Q Weir (cfs)		Max Chl Dpth (ft)	9.01	9.07
Weir Sta Lft (ft)		Vel Total (ft/s)	5.22	4.93
Weir Sta Rgt (ft)		Flow Area (sq ft)	124.94	132.22
Weir Submerg		Froude # Chl	0.31	0.29
Weir Max Depth (ft)		Specif Force (cu ft)	599.01	649.33
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	7.81	8.26
Min El Prs (ft)	81.00	W.P. Total (ft)	29.68	31.24
Delta EG (ft)	0.28	Conv. Total (cfs)	13828.1	14687.7
Delta WS (ft)	0.22	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.06	0.01
BR Open Vel (ft/s)	5.22	C & E Loss (ft)	0.02	0.12

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 25 Year (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)	0.58	0.52
BR Sel Method	Energy only	Power Total (lb/ft s)	3.05	2.57

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 50 Year

E.G. US. (ft)	77.94	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	77.69	E.G. Elev (ft)	77.84	77.74
Q Total (cfs)	764.00	W.S. Elev (ft)	77.30	77.25
Q Bridge (cfs)	764.00	Crit W.S. (ft)	73.34	72.85
Q Weir (cfs)		Max Chl Dpth (ft)	9.30	9.35
Weir Sta Lft (ft)		Vel Total (ft/s)	5.90	5.59
Weir Sta Rgt (ft)		Flow Area (sq ft)	129.56	136.69
Weir Submerg		Froude # Chl	0.34	0.32
Weir Max Depth (ft)		Specif Force (cu ft)	670.04	719.68
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	8.10	8.54
Min El Prs (ft)	81.00	W.P. Total (ft)	30.26	31.80
Delta EG (ft)	0.36	Conv. Total (cfs)	14503.7	15342.1
Delta WS (ft)	0.30	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.07	0.01
BR Open Vel (ft/s)	5.90	C & E Loss (ft)	0.03	0.15
BR Sluice Coef		Shear Total (lb/sq ft)	0.74	0.67
BR Sel Method	Energy only	Power Total (lb/ft s)	4.37	3.72

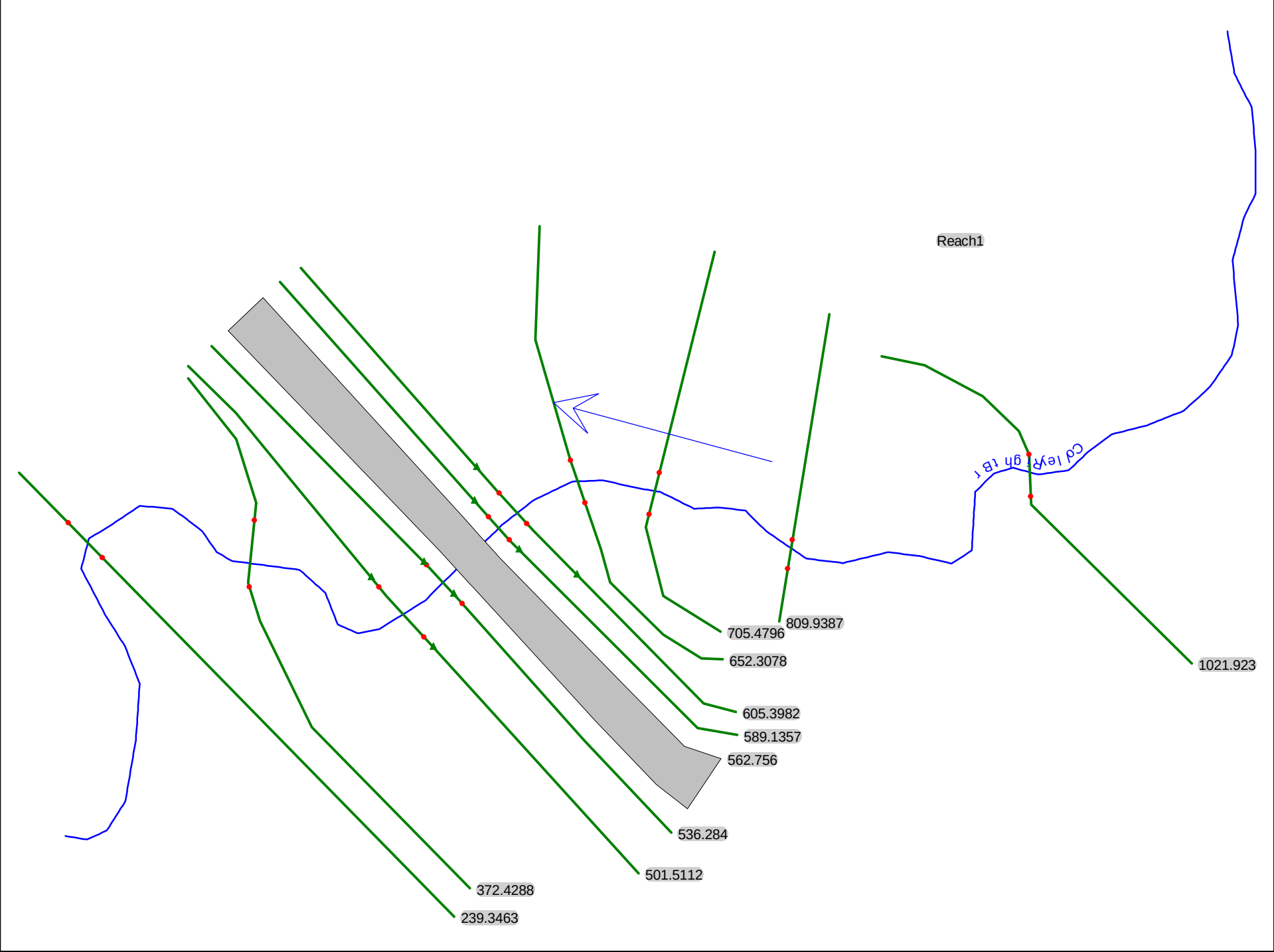
Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 100 Year

E.G. US. (ft)	78.38	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	78.07	E.G. Elev (ft)	78.24	78.11
Q Total (cfs)	896.00	W.S. Elev (ft)	77.53	77.48
Q Bridge (cfs)	896.00	Crit W.S. (ft)	73.80	73.31
Q Weir (cfs)		Max Chl Dpth (ft)	9.53	9.58
Weir Sta Lft (ft)		Vel Total (ft/s)	6.72	6.39
Weir Sta Rgt (ft)		Flow Area (sq ft)	133.38	140.30
Weir Submerg		Froude # Chl	0.38	0.36
Weir Max Depth (ft)		Specif Force (cu ft)	748.52	796.05
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	8.34	8.77
Min El Prs (ft)	81.00	W.P. Total (ft)	30.74	32.25
Delta EG (ft)	0.48	Conv. Total (cfs)	15066.2	15873.5
Delta WS (ft)	0.41	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.09	0.01
BR Open Vel (ft/s)	6.72	C & E Loss (ft)	0.03	0.20
BR Sluice Coef		Shear Total (lb/sq ft)	0.96	0.87
BR Sel Method	Energy only	Power Total (lb/ft s)	6.44	5.53

Plan: EXIST 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 500 Year

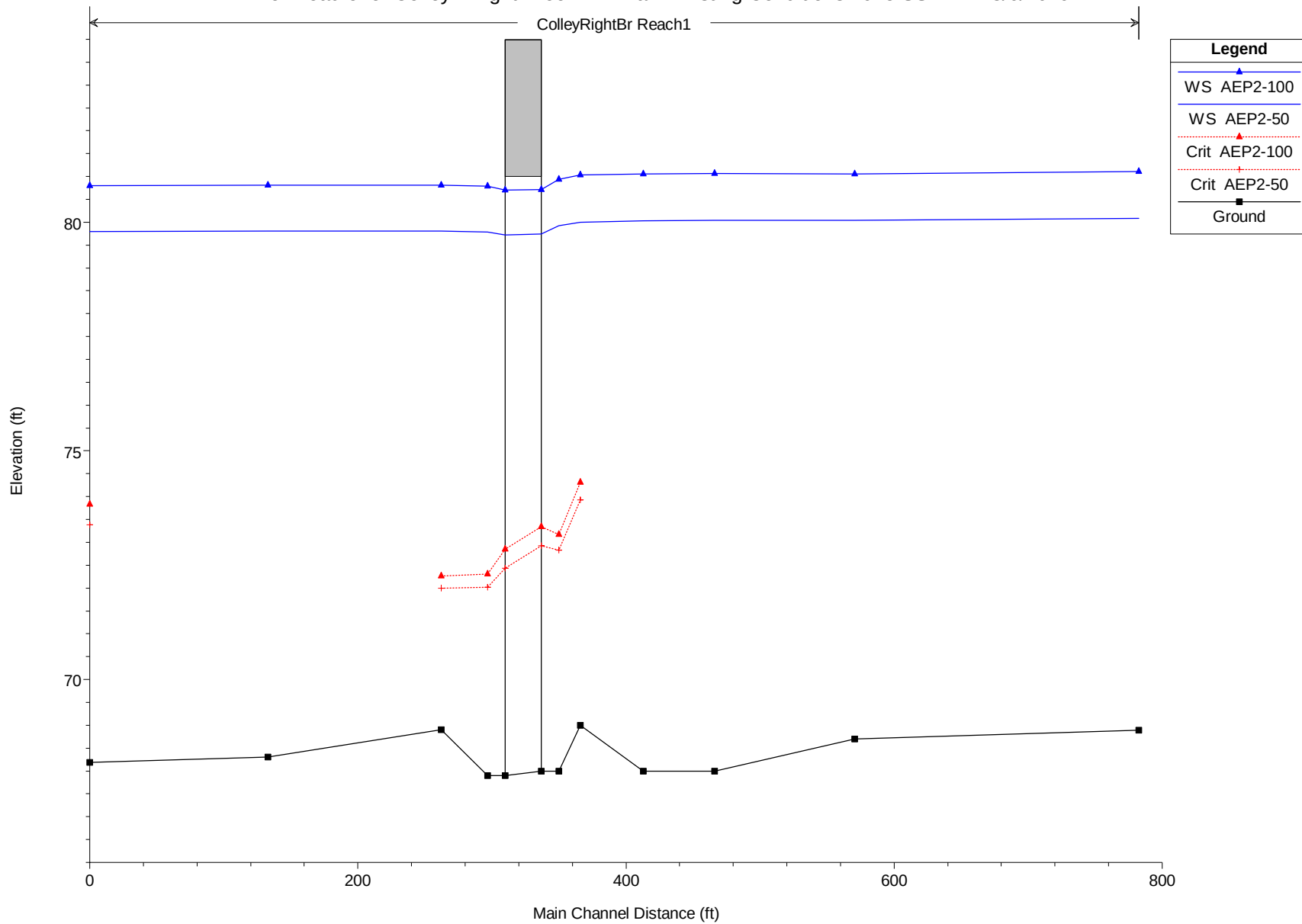
E.G. US. (ft)	79.39	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	78.97	E.G. Elev (ft)	79.15	78.95
Q Total (cfs)	1210.00	W.S. Elev (ft)	78.00	77.90
Q Bridge (cfs)	1210.00	Crit W.S. (ft)	74.82	74.33
Q Weir (cfs)		Max Chl Dpth (ft)	10.00	10.00
Weir Sta Lft (ft)		Vel Total (ft/s)	8.59	8.23
Weir Sta Rgt (ft)		Flow Area (sq ft)	140.83	147.10
Weir Submerg		Froude # Chl	0.48	0.46
Weir Max Depth (ft)		Specif Force (cu ft)	948.38	988.63
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	8.80	9.19
Min El Prs (ft)	81.00	W.P. Total (ft)	31.67	33.10
Delta EG (ft)	0.80	Conv. Total (cfs)	16169.1	16881.1
Delta WS (ft)	0.75	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.14	0.02
BR Open Vel (ft/s)	8.59	C & E Loss (ft)	0.05	0.34
BR Sluice Coef		Shear Total (lb/sq ft)	1.55	1.43
BR Sel Method	Energy only	Power Total (lb/ft s)	13.36	11.73

Existing Condition - Tailwater (AEP2 - Presumpscot R. Control)



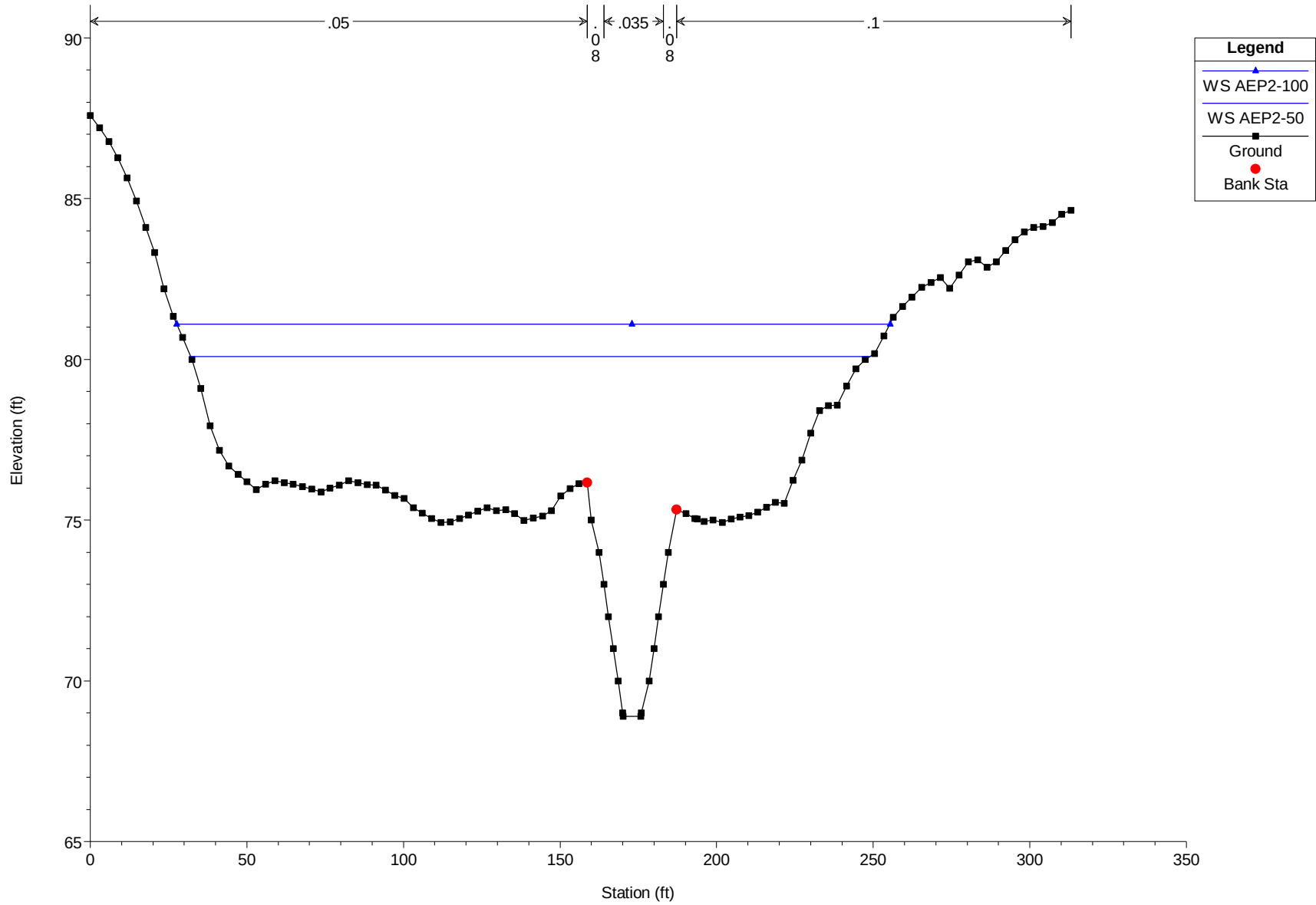
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

ColleyRightBr Reach1



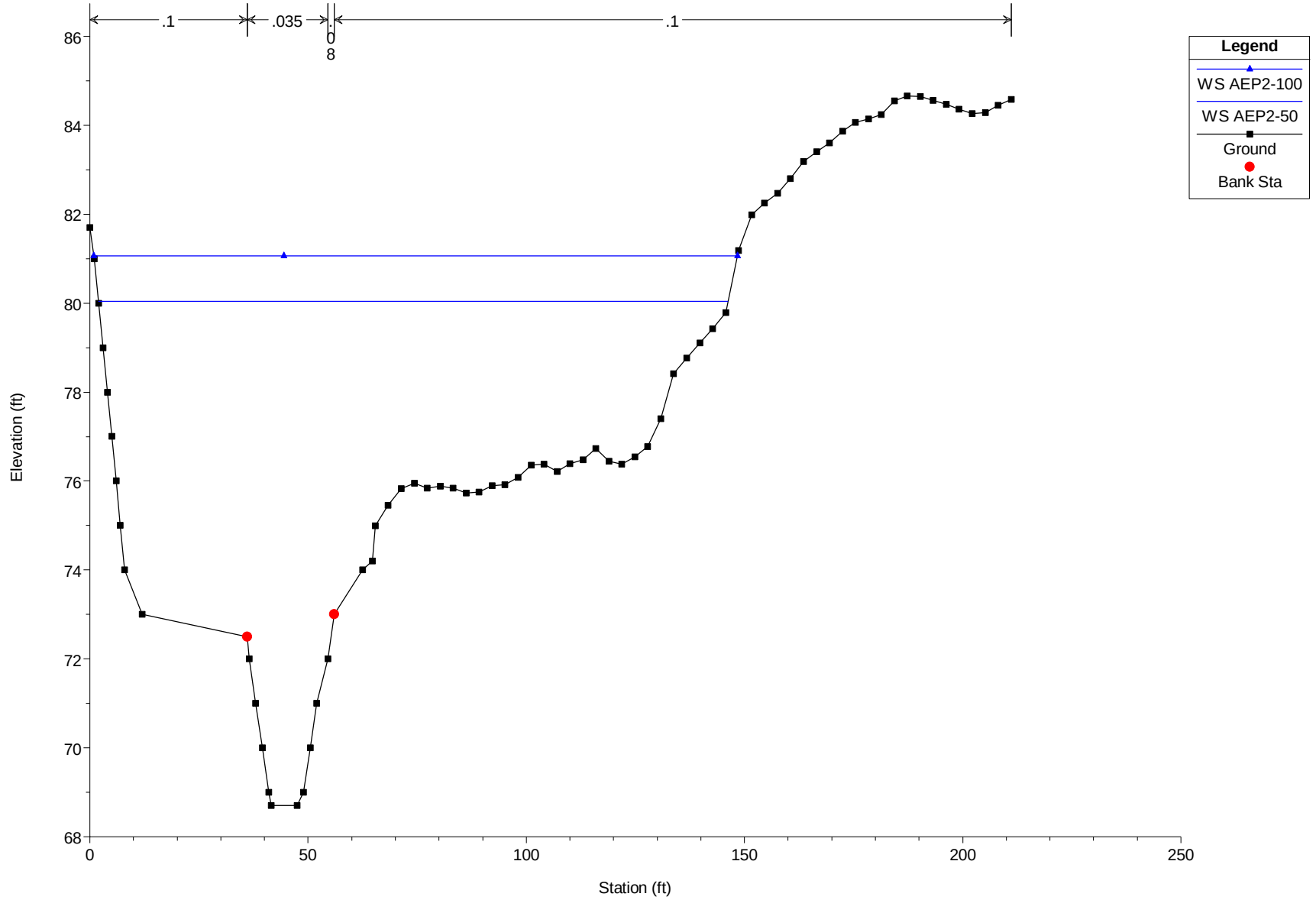
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 1021.923



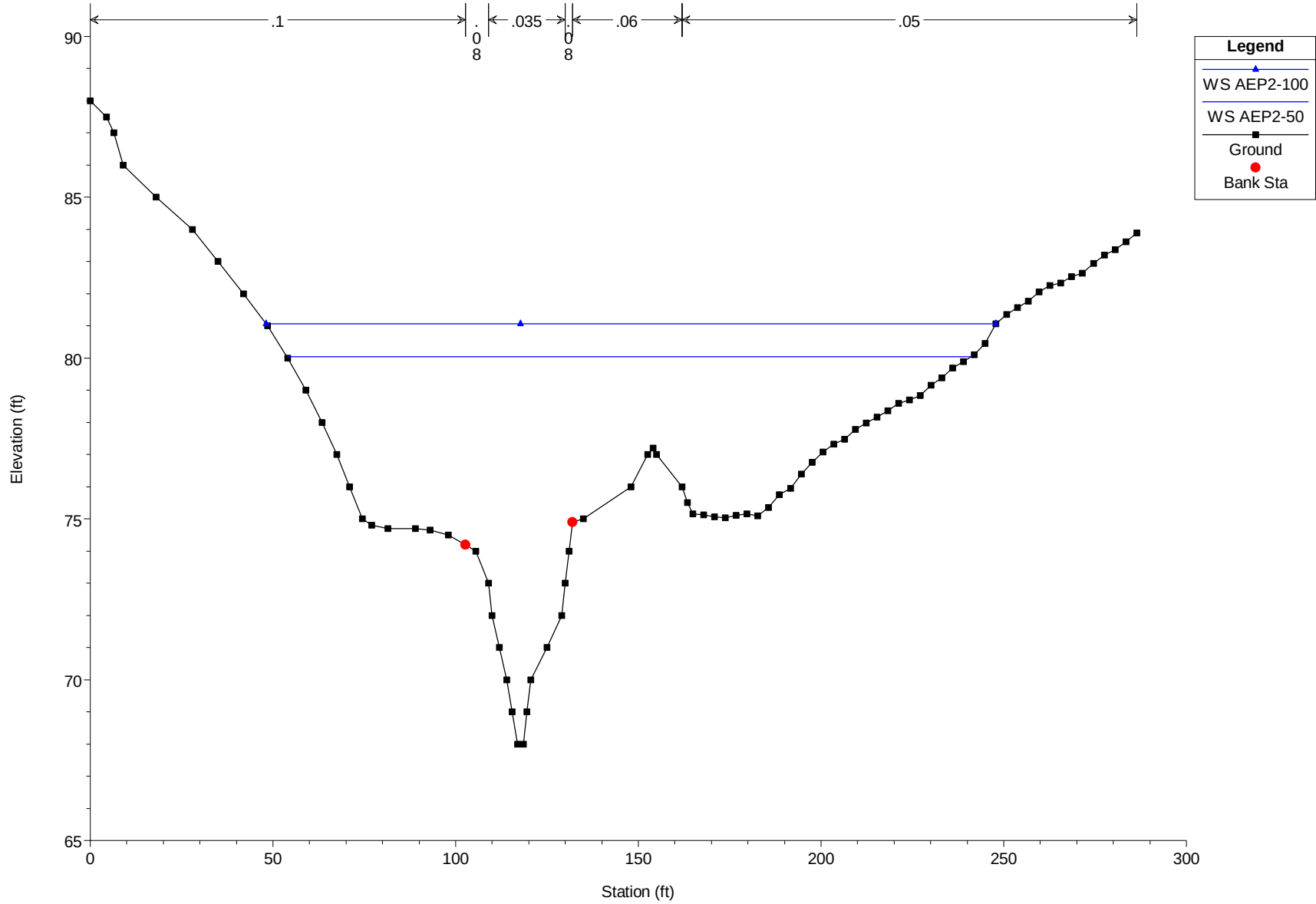
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 809.94



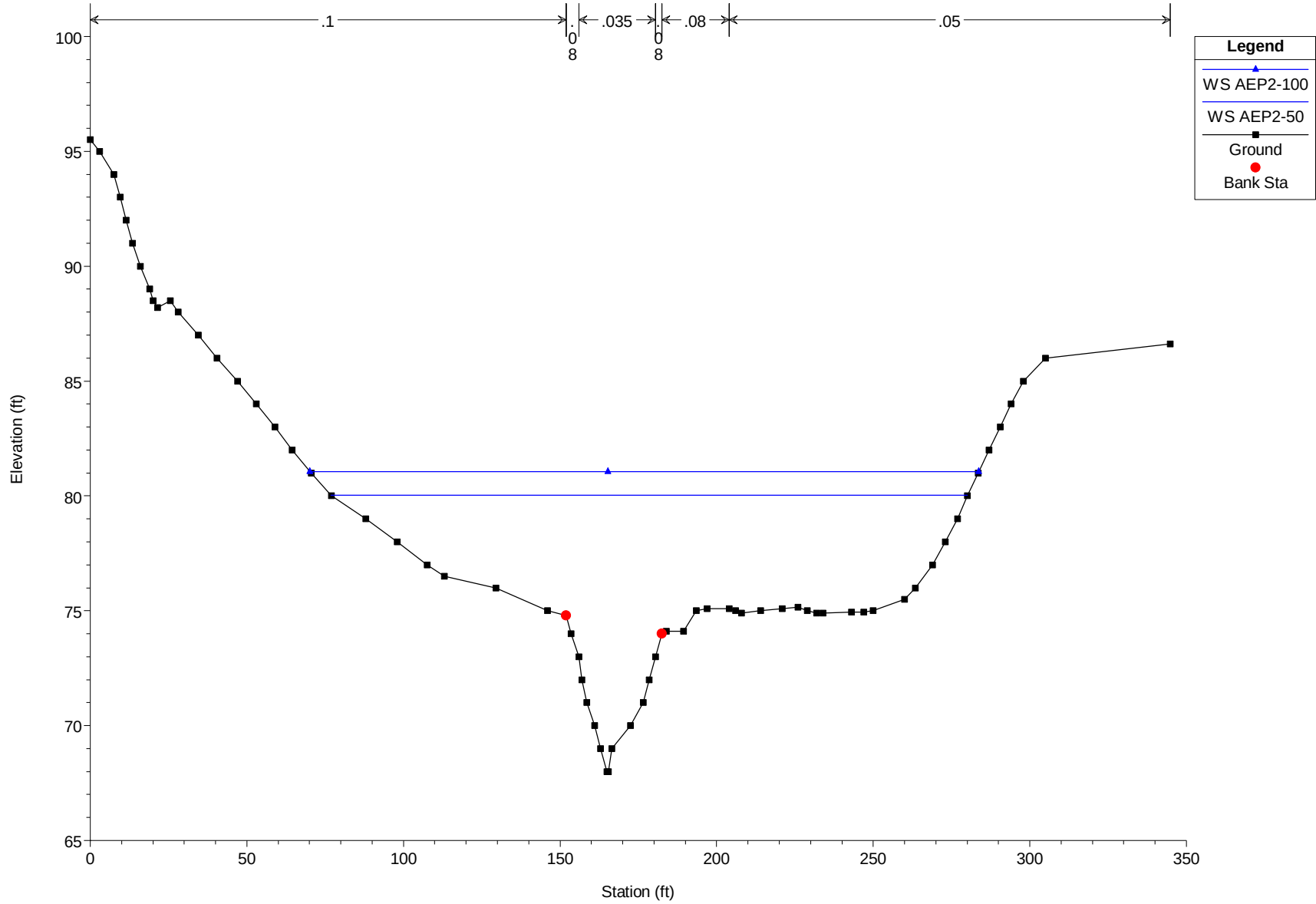
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 705.48



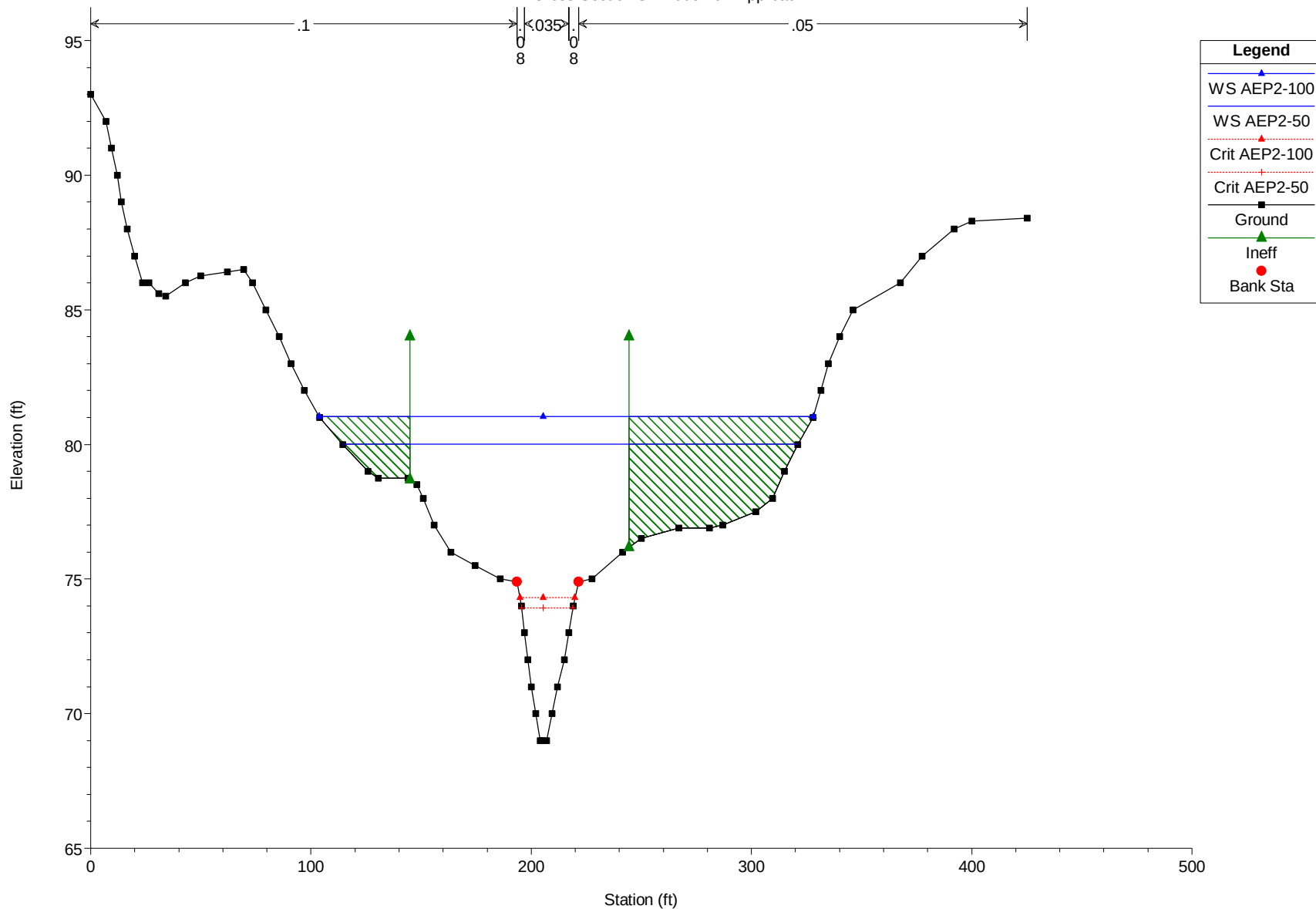
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 652.31



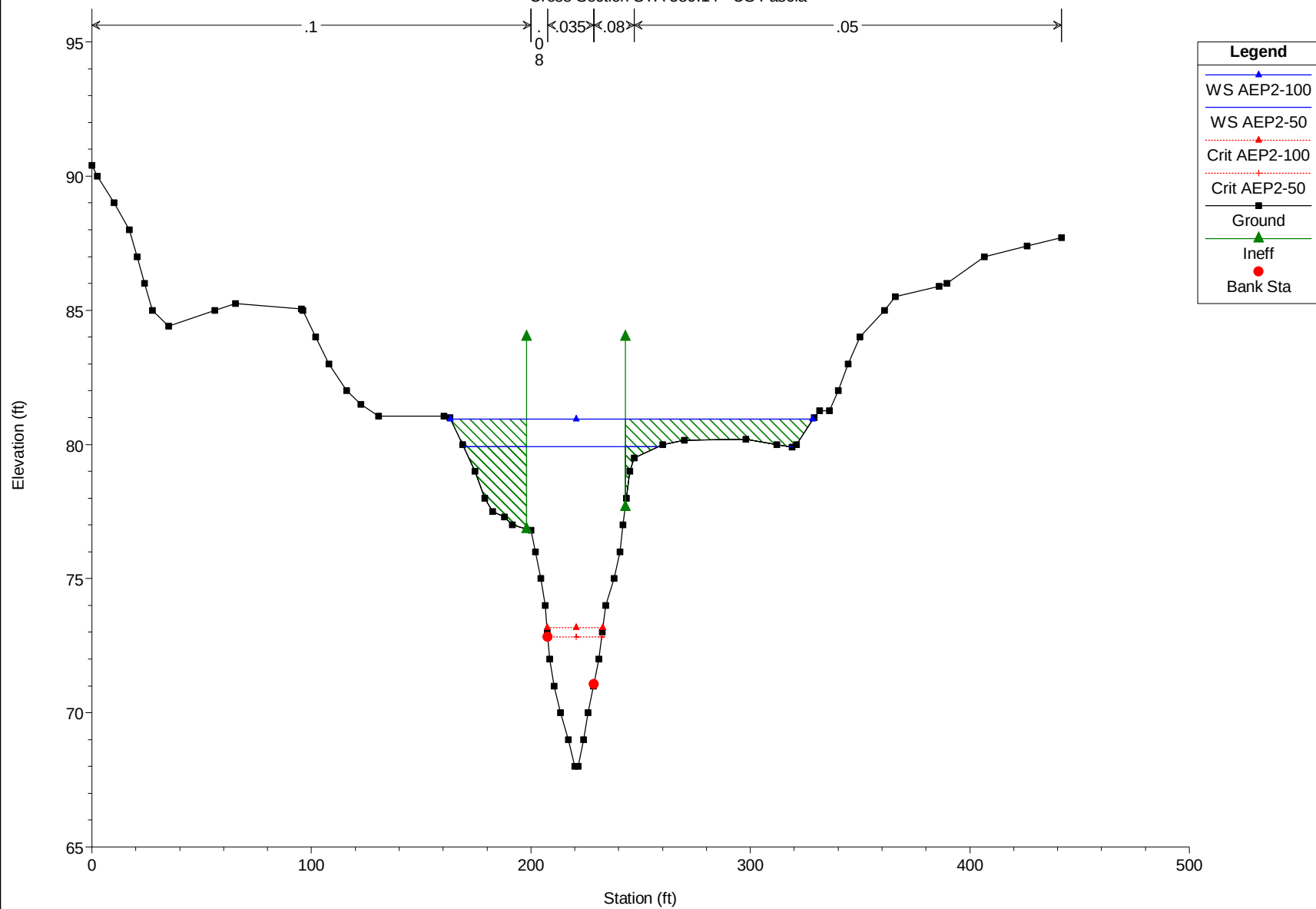
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 605.40 - Approach

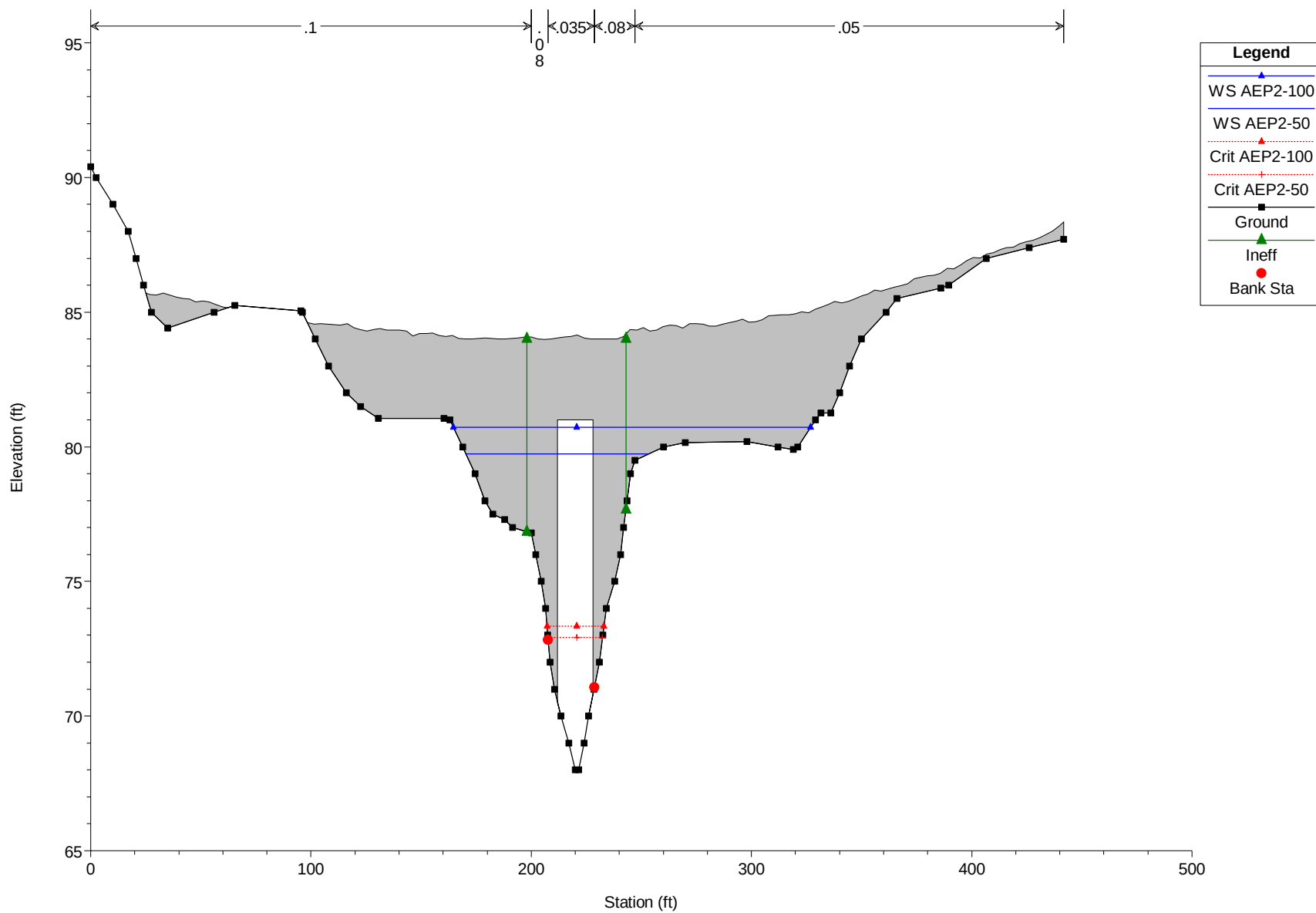


River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

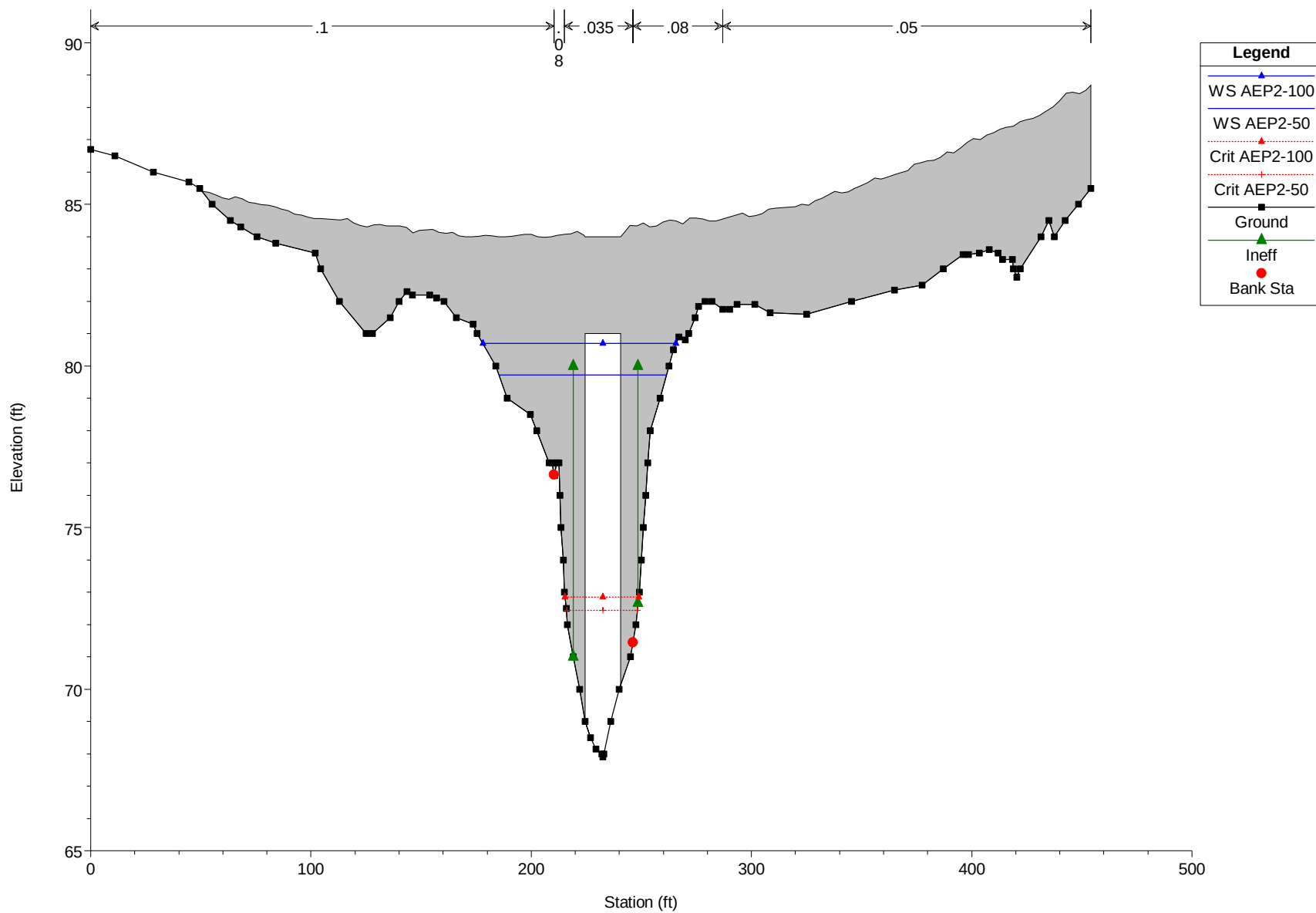
Cross Section STA 589.14 - US Fascia



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

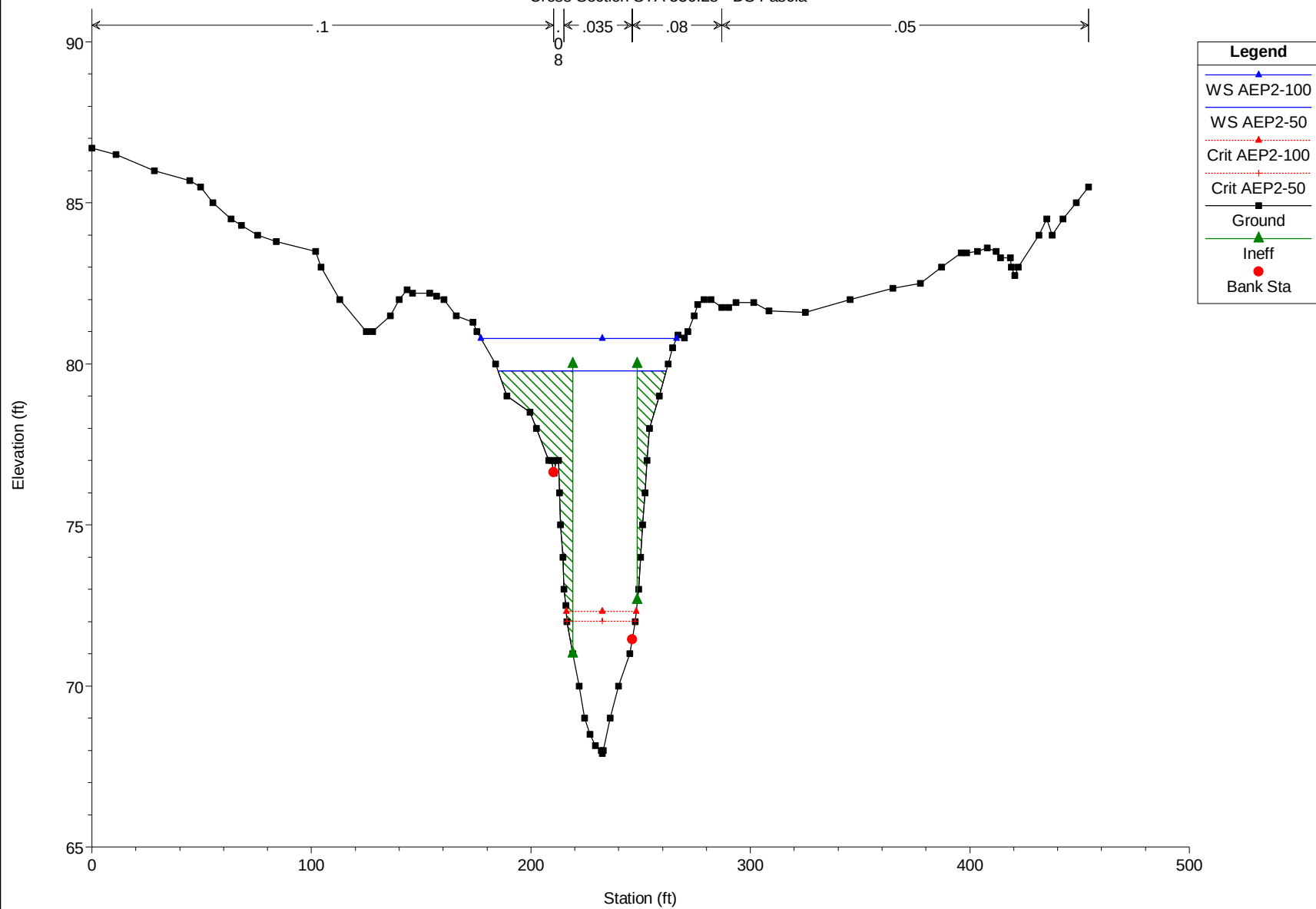


River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019



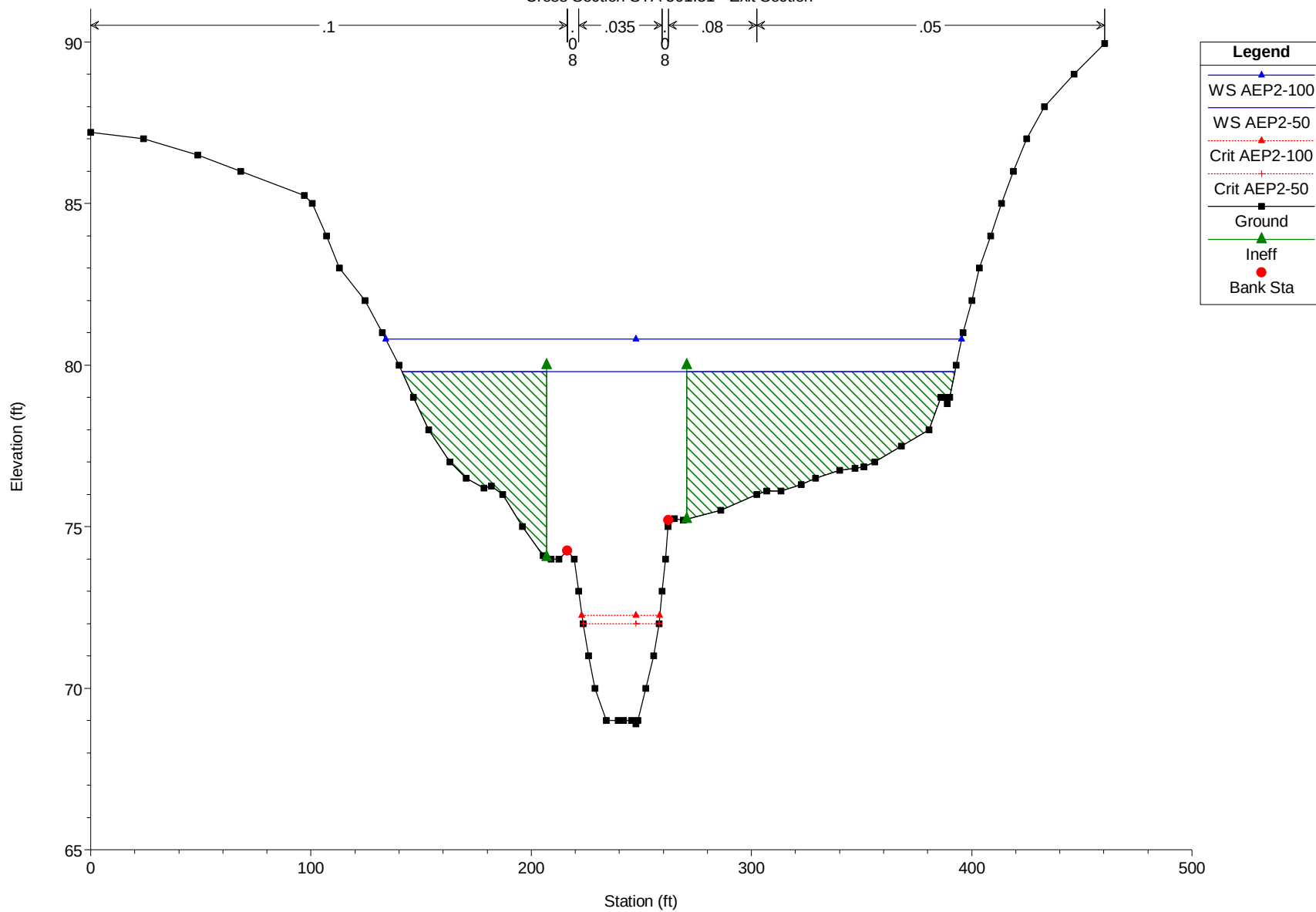
River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 536.28 - DS Fascia



River Road over Colley Wright Brook Plan: Existing Conditions 2015 SS TW 3/6/2019

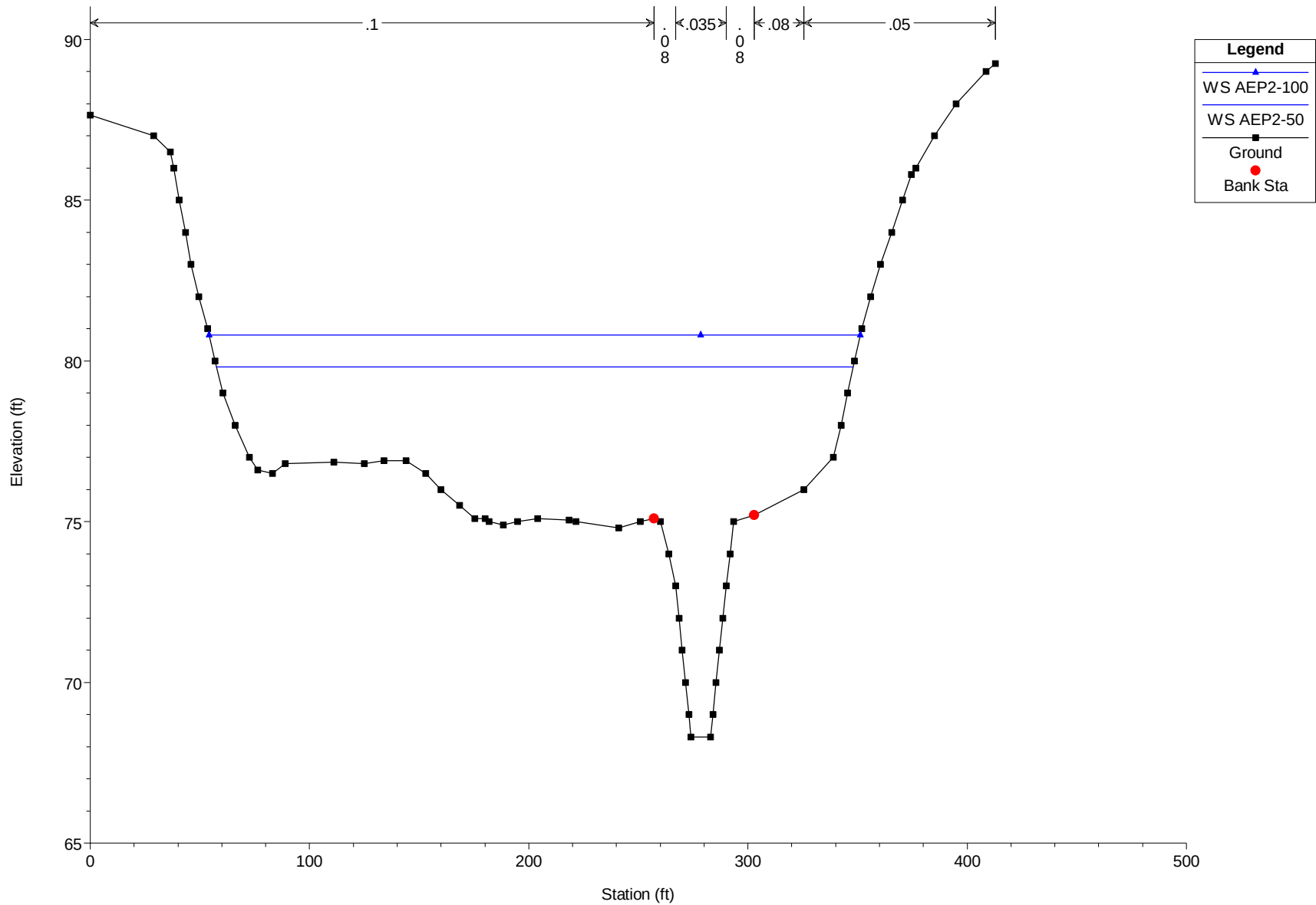
Cross Section STA 501.51 - Exit Section



River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS TW 3/6/2019

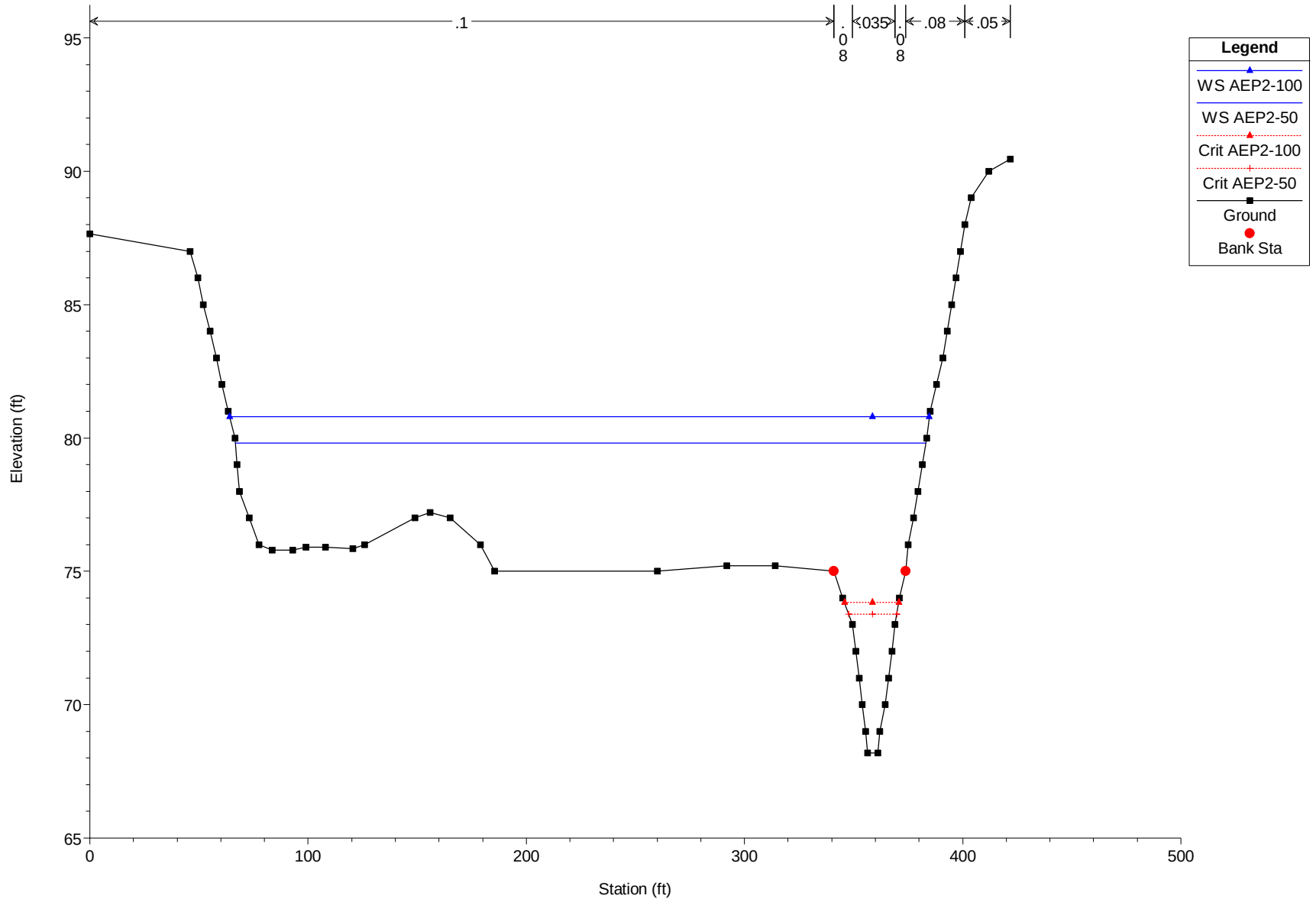
Cross Section STA 372.43



River Road over Colley Wright Brook

Plan: Existing Conditions 2015 SS TW 3/6/2019

Cross Section STA 239.35



HEC-RAS Plan: EX 2015 SS TW River: ColleyRightBr Reach: Reach1

Reach	River Sta	Profile	Q Total (cfs)	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
Reach1	1021.923	AEP2-50	652.00	68.89	80.09		80.10	0.000078	0.95	987.22	217.01	0.06
Reach1	1021.923	AEP2-100	764.00	68.89	81.10		81.11	0.000059	0.89	1213.71	227.83	0.05
Reach1	809.9387	AEP2-50	652.00	68.70	80.04		80.07	0.000142	1.93	751.07	144.25	0.11
Reach1	809.9387	AEP2-100	764.00	68.70	81.06		81.09	0.000123	1.92	900.12	147.48	0.10
Reach1	705.4796	AEP2-50	652.00	68.00	80.04		80.05	0.000123	1.29	808.53	187.19	0.08
Reach1	705.4796	AEP2-100	764.00	68.00	81.06		81.08	0.000092	1.20	1007.37	199.74	0.07
Reach1	652.3078	AEP2-50	652.00	68.00	80.03		80.05	0.000072	1.13	956.38	203.35	0.07
Reach1	652.3078	AEP2-100	764.00	68.00	81.06		81.07	0.000058	1.09	1170.06	213.57	0.06
Reach1	605.3982	AEP2-50	652.00	69.00	80.00	73.92	80.04	0.000235	1.77	527.87	206.52	0.11
Reach1	605.3982	AEP2-100	764.00	69.00	81.03	74.31	81.06	0.000193	1.73	630.07	224.30	0.10
Reach1	589.1357	AEP2-50	652.00	68.00	79.92	72.83	80.02	0.000192	2.63	338.02	90.69	0.14
Reach1	589.1357	AEP2-100	764.00	68.00	80.94	73.17	81.04	0.000184	2.75	383.73	165.15	0.14
Reach1	562.756		Bridge									
Reach1	536.284	AEP2-50	652.00	67.90	79.79	72.01	79.86	0.000131	2.26	300.52	76.57	0.12
Reach1	536.284	AEP2-100	764.00	67.90	80.79	72.31	80.85	0.000170	1.93	501.43	89.04	0.11
Reach1	501.5112	AEP2-50	652.00	68.90	79.81	71.99	79.84	0.000108	1.45	509.98	251.15	0.08
Reach1	501.5112	AEP2-100	764.00	68.90	80.81	72.26	80.82	0.000042	0.96	1361.28	261.51	0.05
Reach1	372.4288	AEP2-50	652.00	68.30	79.81		79.82	0.000093	0.90	1254.40	290.26	0.06
Reach1	372.4288	AEP2-100	764.00	68.30	80.81		80.81	0.000070	0.85	1547.37	297.15	0.05
Reach1	239.3463	AEP2-50	652.00	68.19	79.80	73.39	79.81	0.000081	0.93	1435.59	316.40	0.06
Reach1	239.3463	AEP2-100	764.00	68.19	80.80	73.83	80.81	0.000062	0.87	1753.97	320.60	0.05

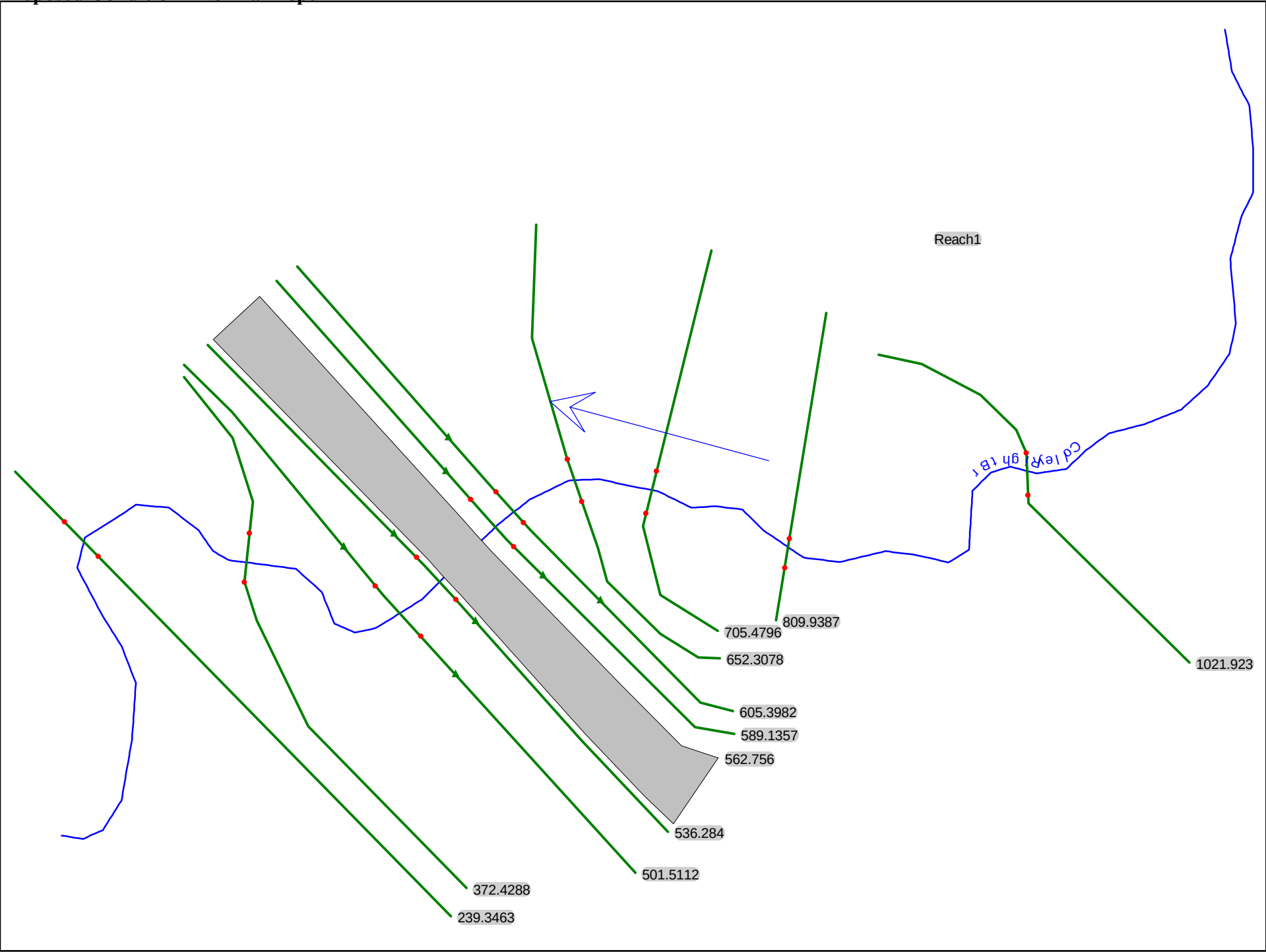
Plan: EX 2015 SS TW ColleyRightBr Reach1 RS: 562.756 Profile: AEP2-50

E.G. US. (ft)	80.02	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	79.92	E.G. Elev (ft)	79.97	79.93
Q Total (cfs)	652.00	W.S. Elev (ft)	79.74	79.72
Q Bridge (cfs)	652.00	Crit W.S. (ft)	72.92	72.44
Q Weir (cfs)		Max Chl Dpth (ft)	11.74	11.82
Weir Sta Lft (ft)		Vel Total (ft/s)	3.87	3.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	168.64	176.20
Weir Submerg		Froude # Chl	0.20	0.19
Weir Max Depth (ft)		Specif Force (cu ft)	972.57	1048.26
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	10.54	11.01
Min El Prs (ft)	81.00	W.P. Total (ft)	35.14	36.74
Delta EG (ft)	0.15	Conv. Total (cfs)	20369.2	21274.7
Delta WS (ft)	0.14	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	3.87	C & E Loss (ft)	0.01	0.07
BR Sluice Coef		Shear Total (lb/sq ft)	0.31	0.28
BR Sel Method	Energy only	Power Total (lb/ft s)	1.19	1.04

Plan: EX 2015 SS TW ColleyRightBr Reach1 RS: 562.756 Profile: AEP2-100

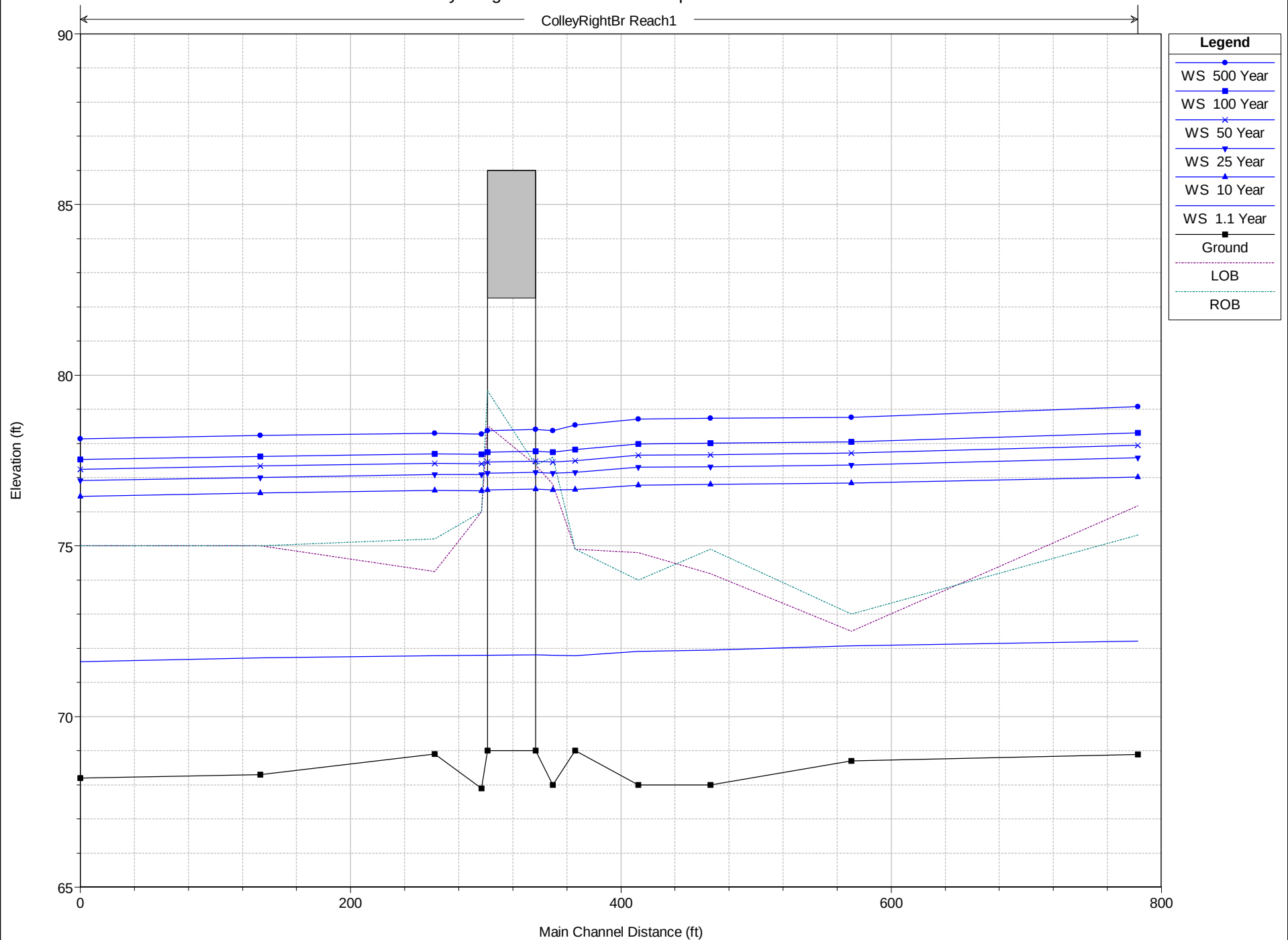
E.G. US. (ft)	81.04	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	80.94	E.G. Elev (ft)	80.99	80.95
Q Total (cfs)	764.00	W.S. Elev (ft)	80.72	80.70
Q Bridge (cfs)	764.00	Crit W.S. (ft)	73.34	72.85
Q Weir (cfs)		Max Chl Dpth (ft)	12.72	12.80
Weir Sta Lft (ft)		Vel Total (ft/s)	4.15	3.98
Weir Sta Rgt (ft)		Flow Area (sq ft)	184.32	191.84
Weir Submerg		Froude # Chl	0.20	0.20
Weir Max Depth (ft)		Specif Force (cu ft)	1165.53	1247.70
Min El Weir Flow (ft)	84.00	Hydr Depth (ft)	11.52	11.99
Min El Prs (ft)	81.00	W.P. Total (ft)	37.10	38.69
Delta EG (ft)	0.19	Conv. Total (cfs)	22782.2	23681.2
Delta WS (ft)	0.15	Top Width (ft)	16.00	16.00
BR Open Area (sq ft)	188.83	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	4.15	C & E Loss (ft)	0.01	0.10
BR Sluice Coef		Shear Total (lb/sq ft)	0.35	0.32
BR Sel Method	Energy only	Power Total (lb/ft s)	1.45	1.28

Proposed Condition - Normal Depth



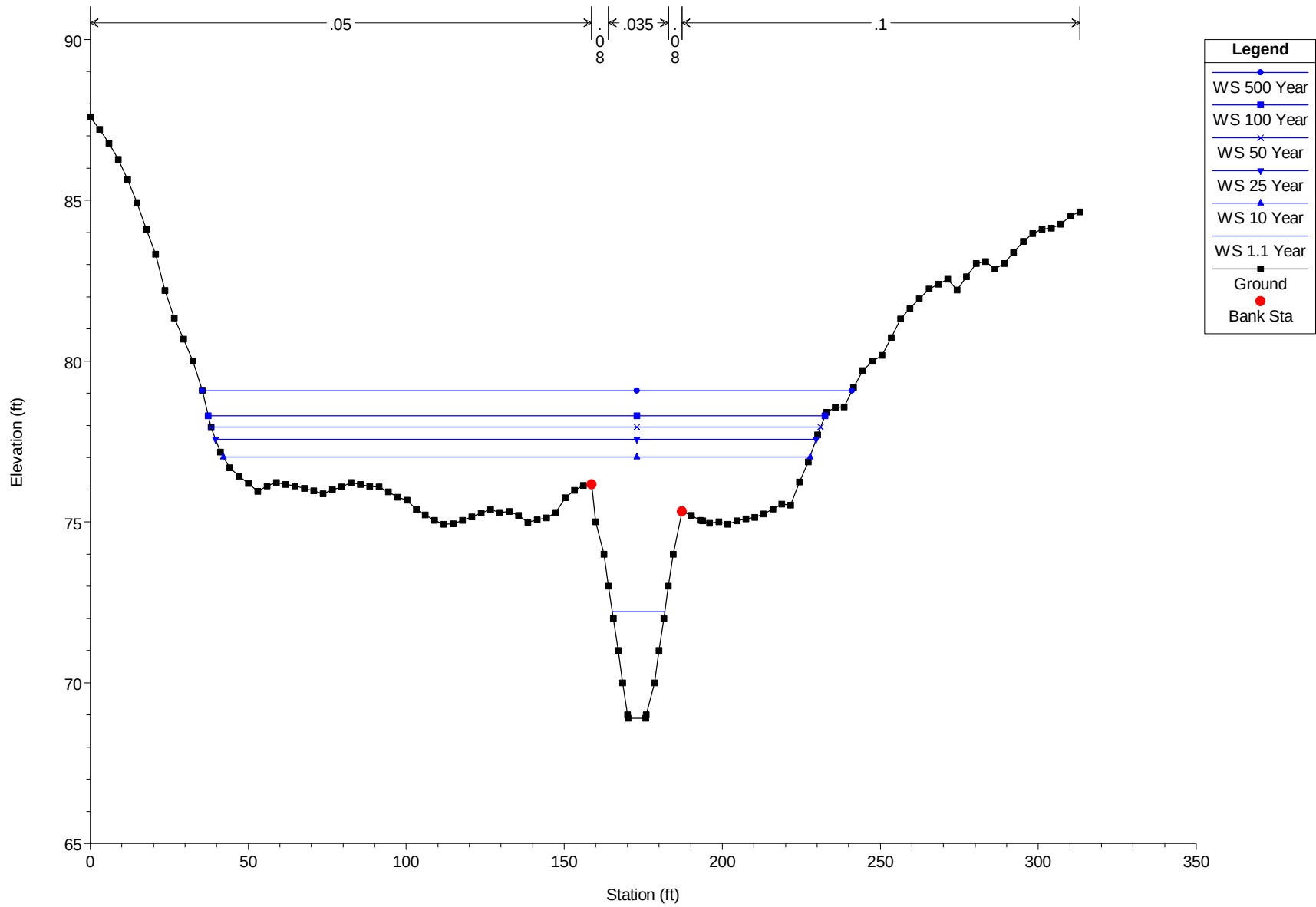
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

ColleyRightBr Reach1



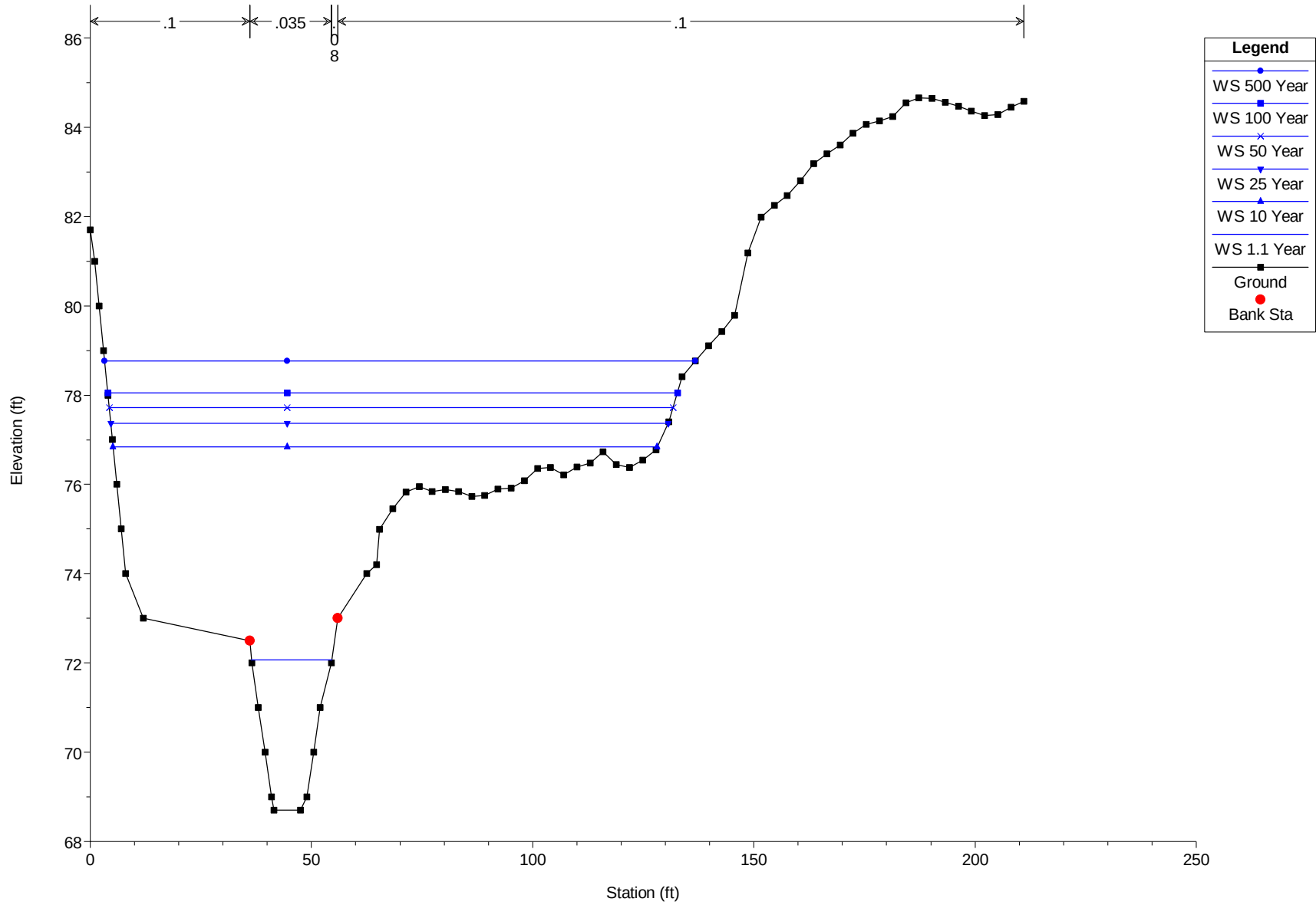
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

Cross Section STA 1021.923



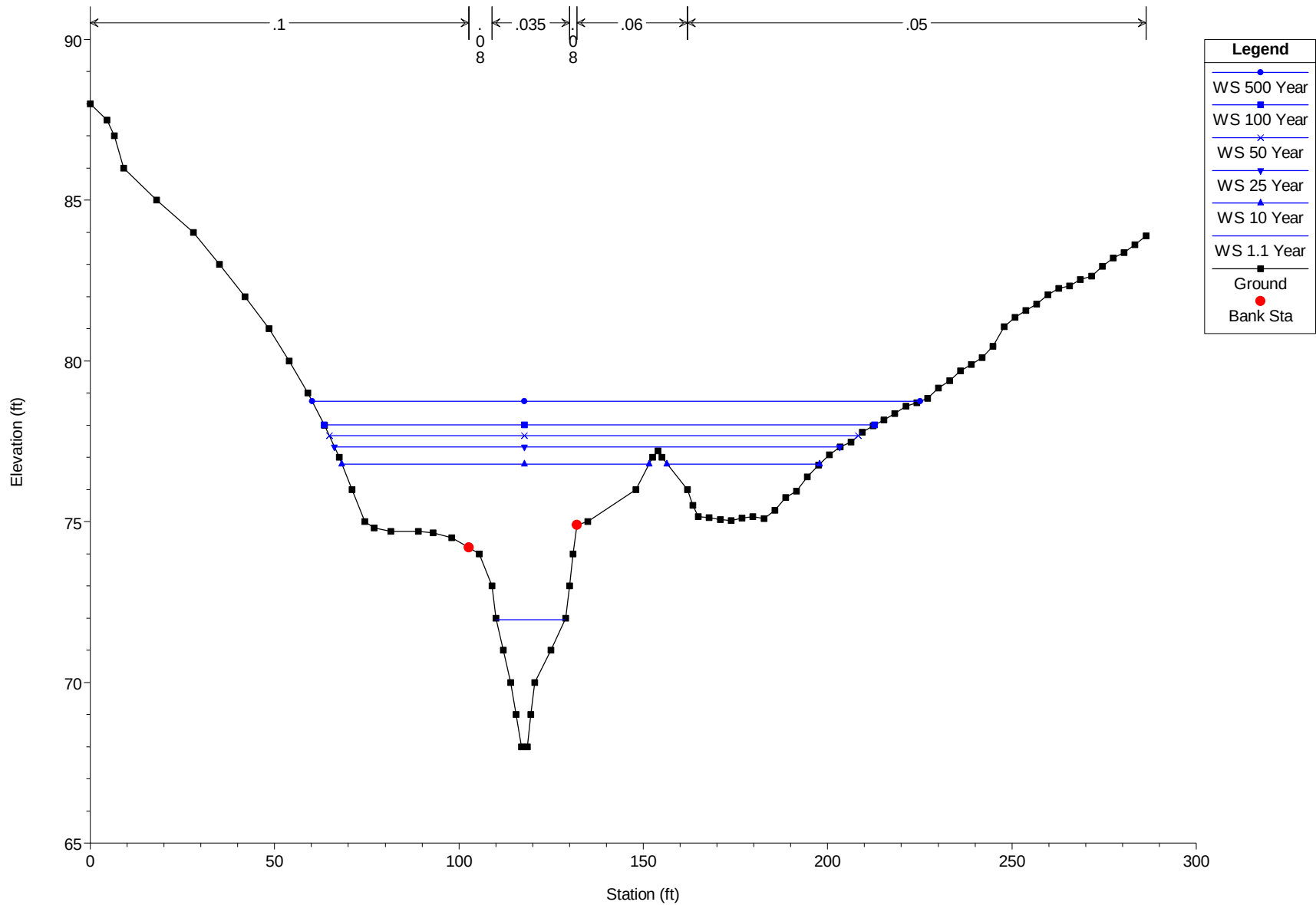
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

Cross Section STA 809.94



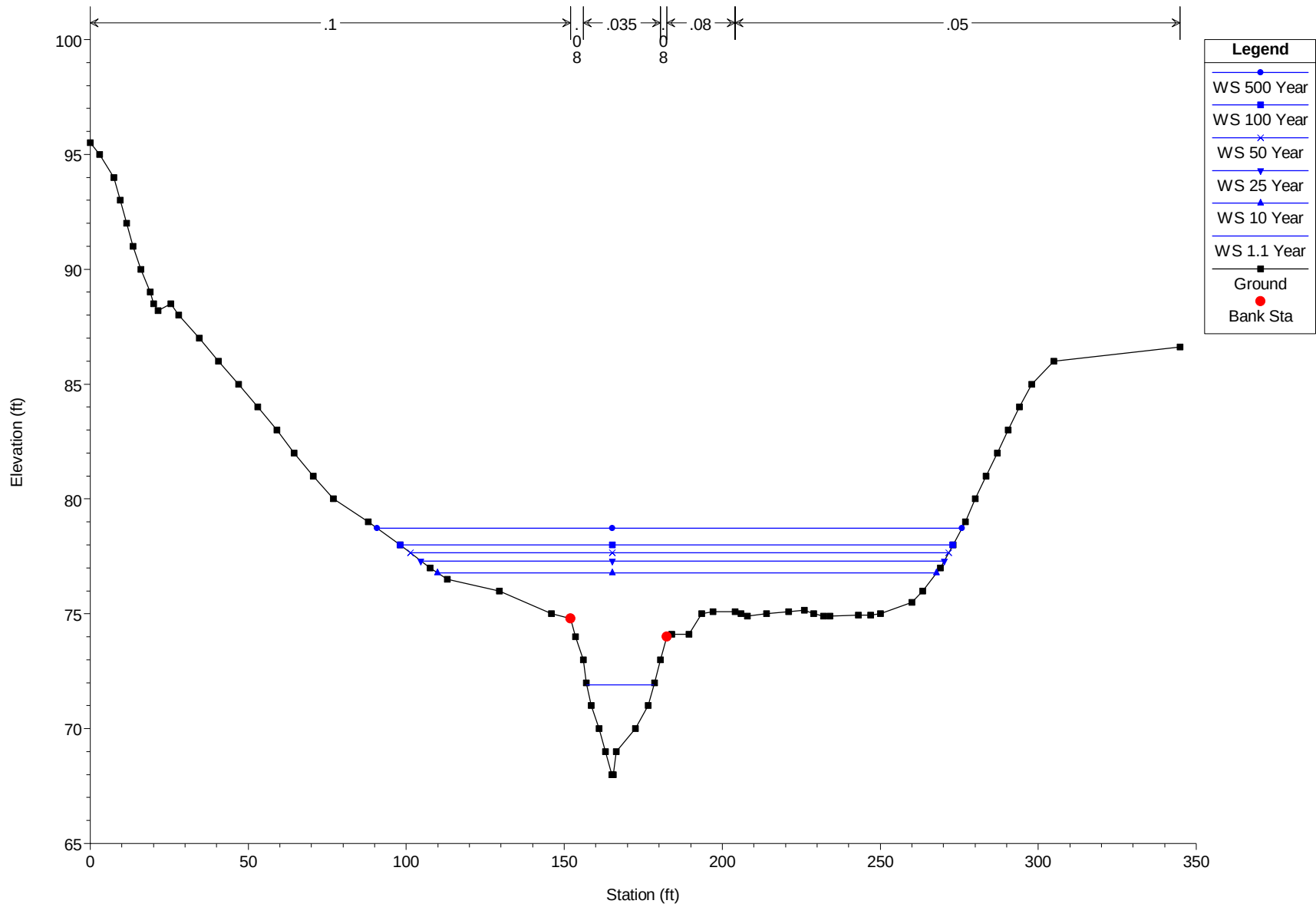
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

Cross Section STA 705.48

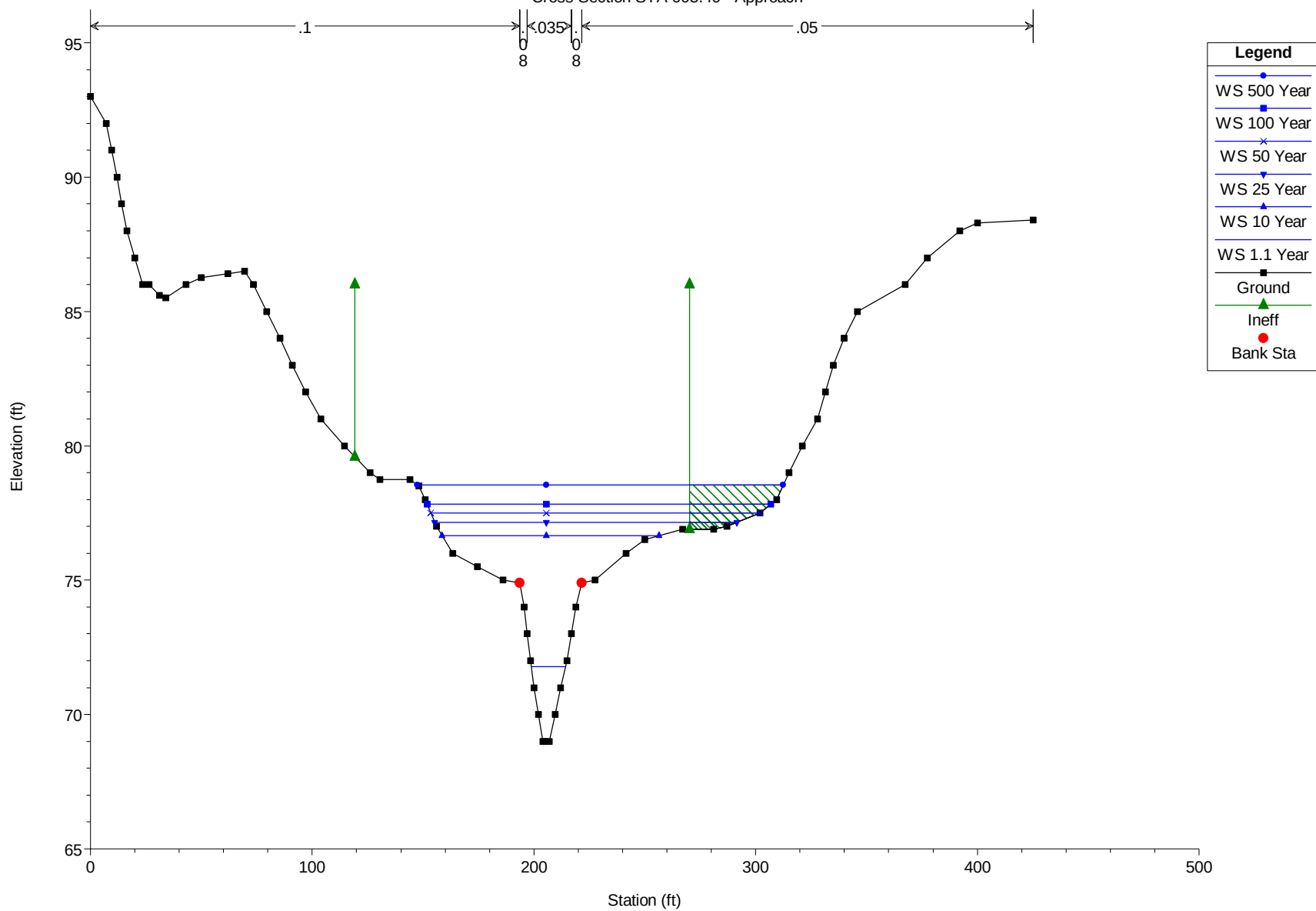


River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

Cross Section STA 652.31

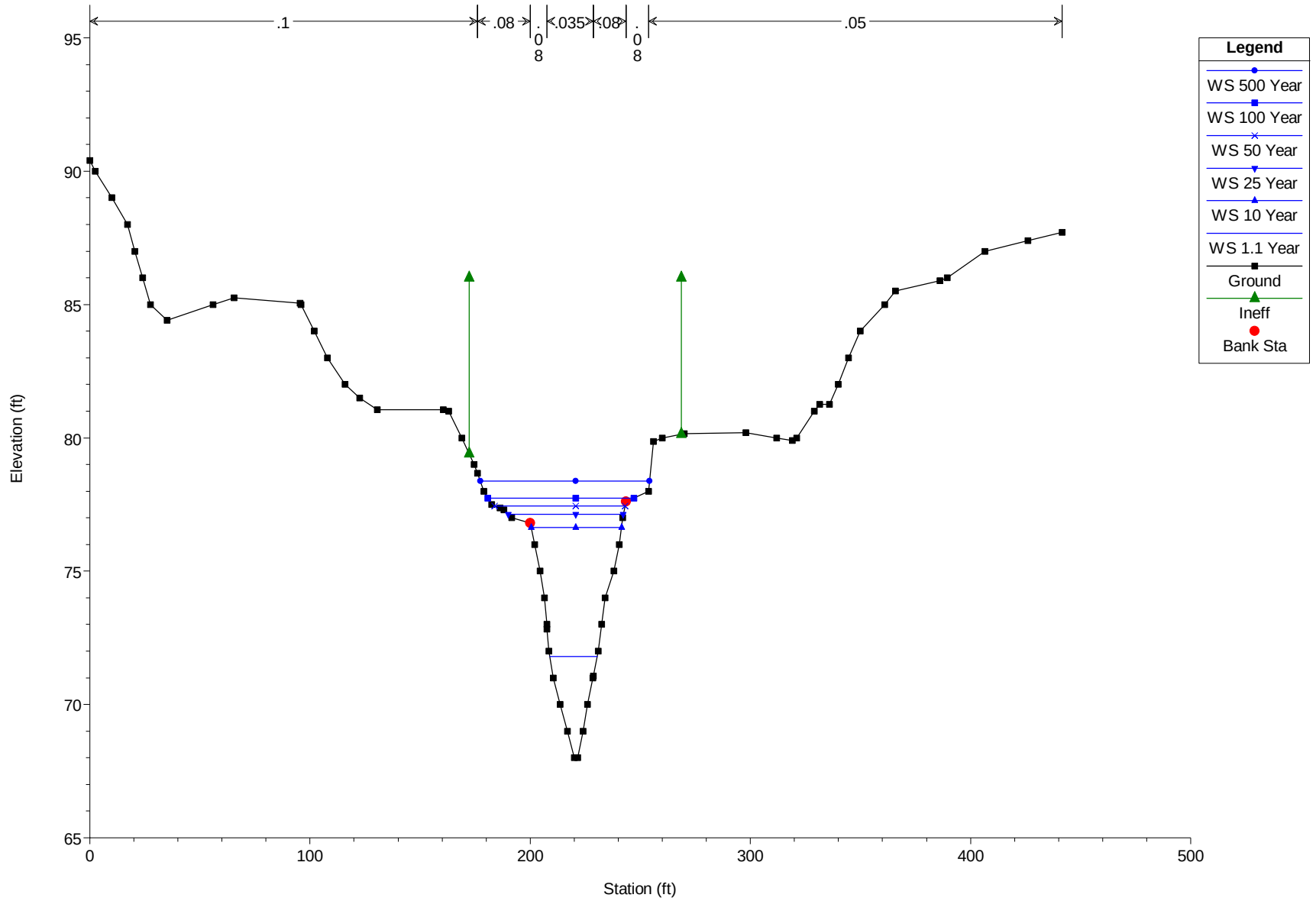


Cross Section STA 605.40 - Approach

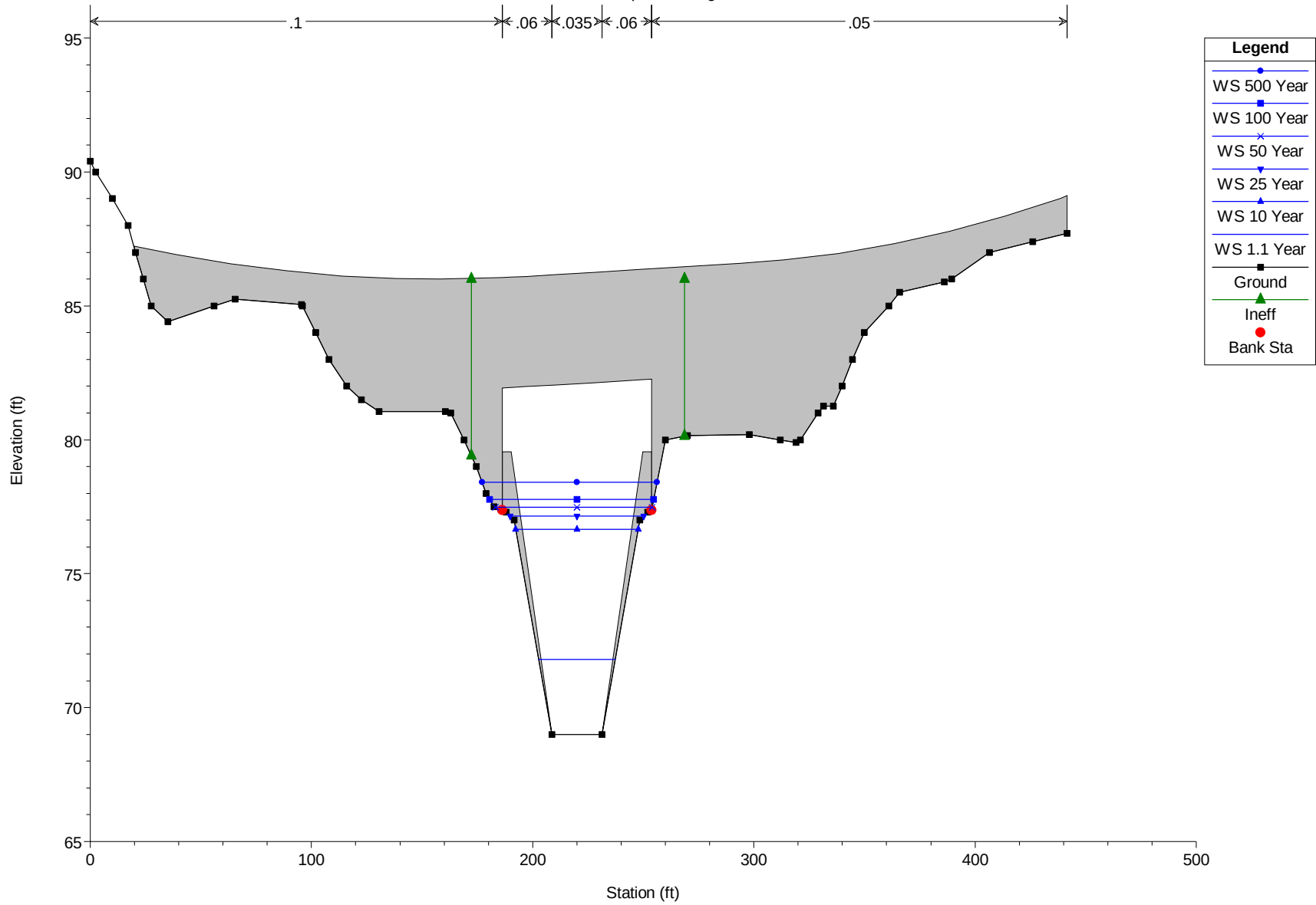


River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

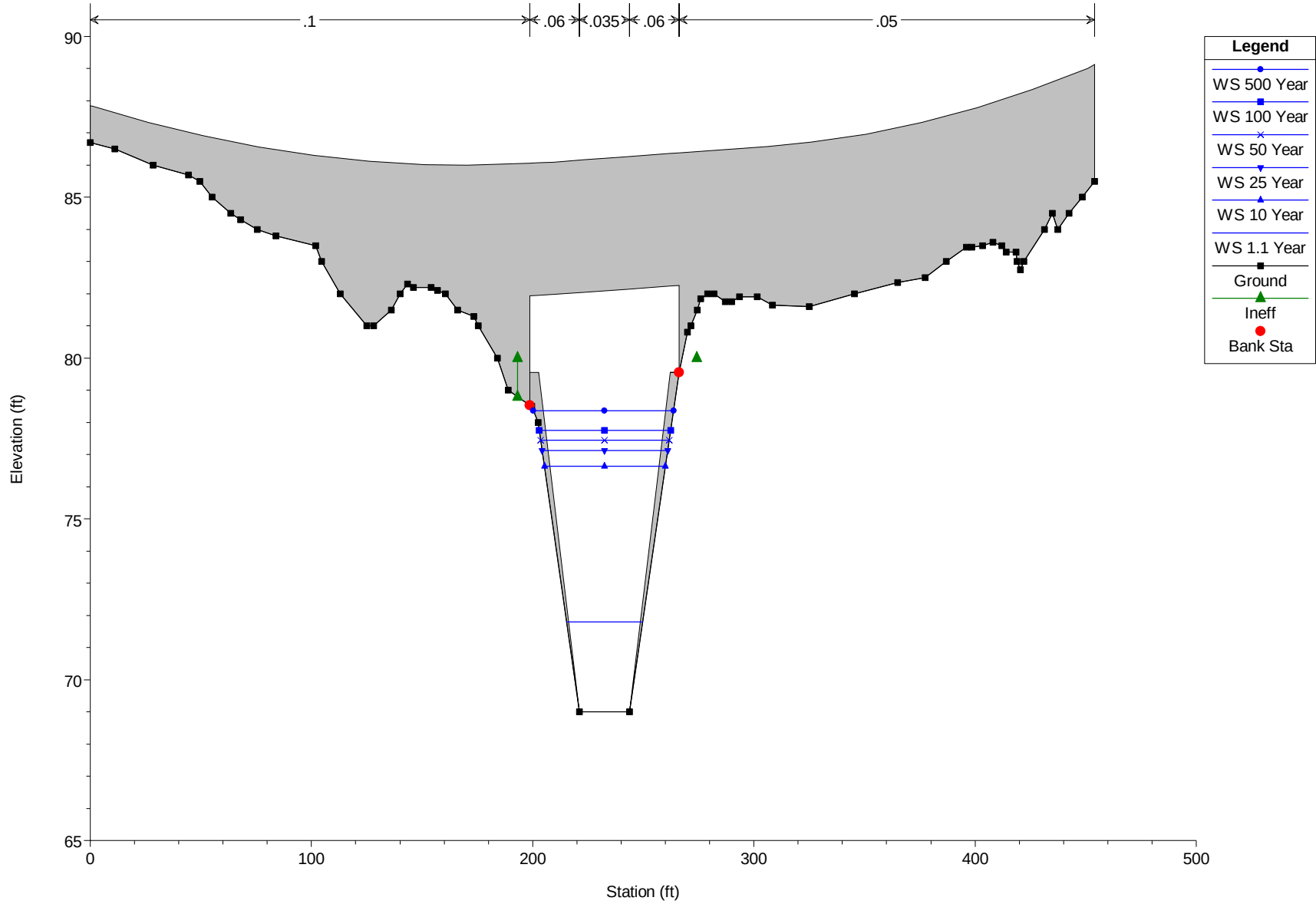
Cross Section STA 589.14 - US Fascia



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019
 Proposed Bridge

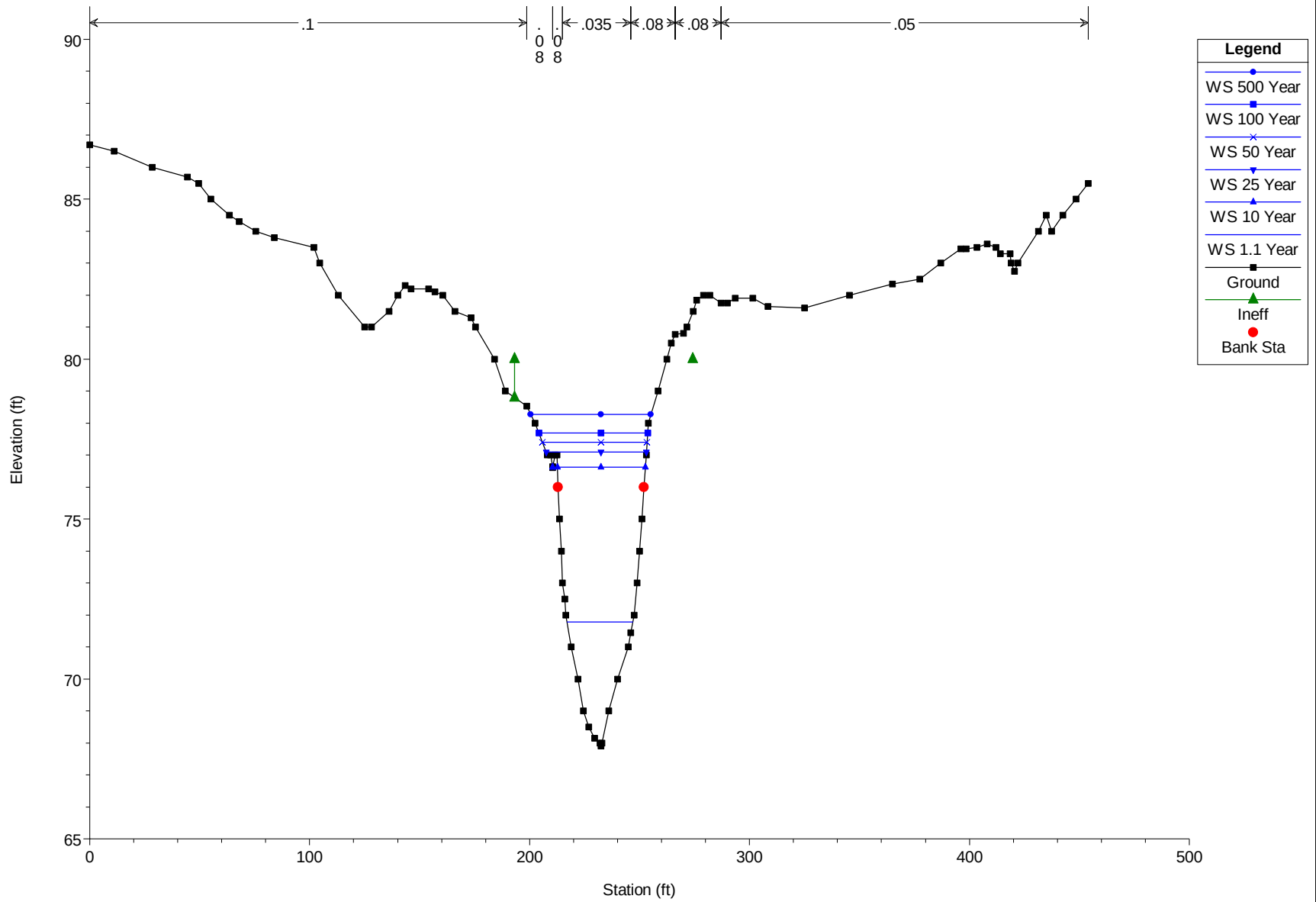


River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019
 Proposed Bridge



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

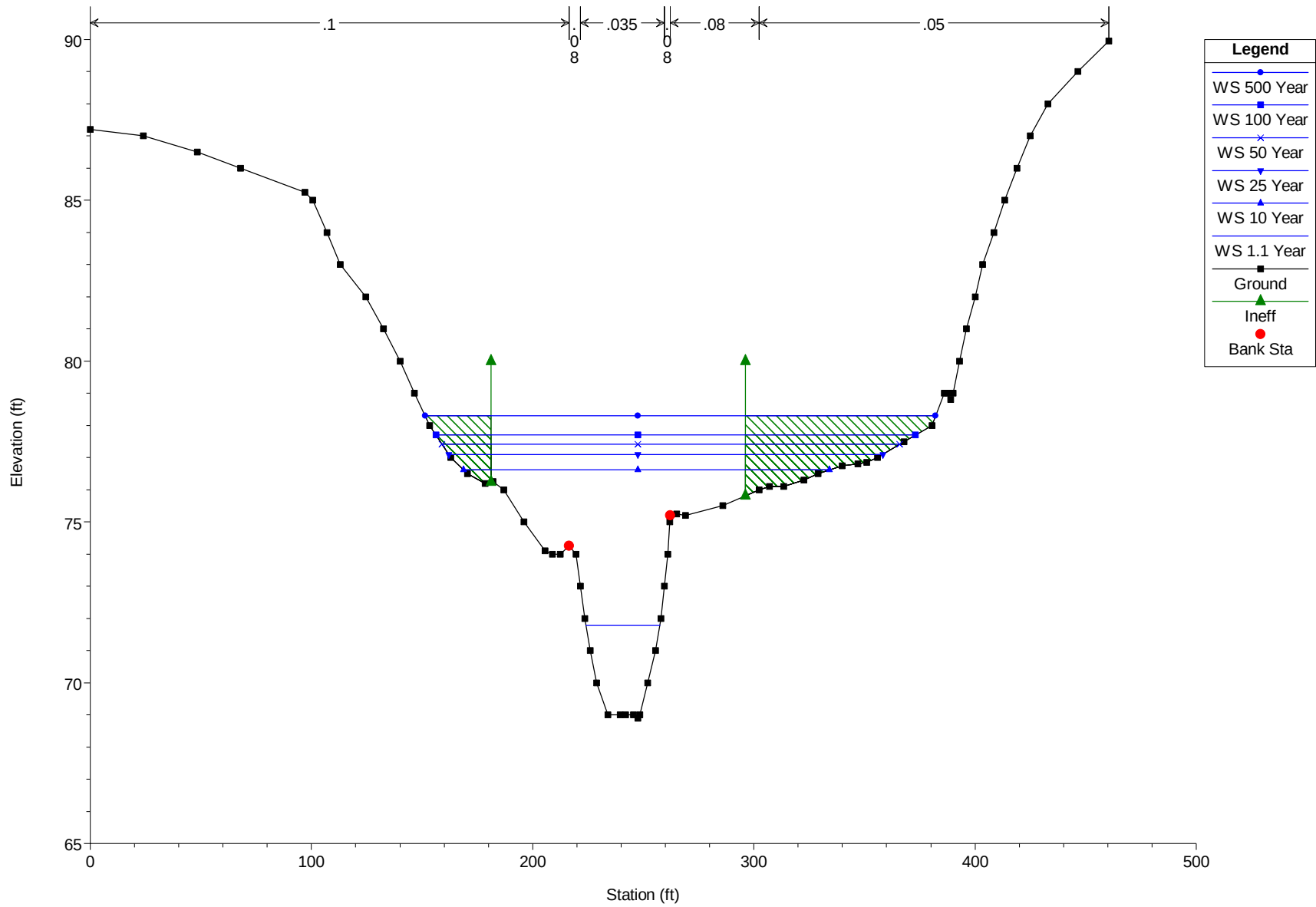
Cross Section STA 536.28 - DS Fascia



River Road over Colley Wright Brook

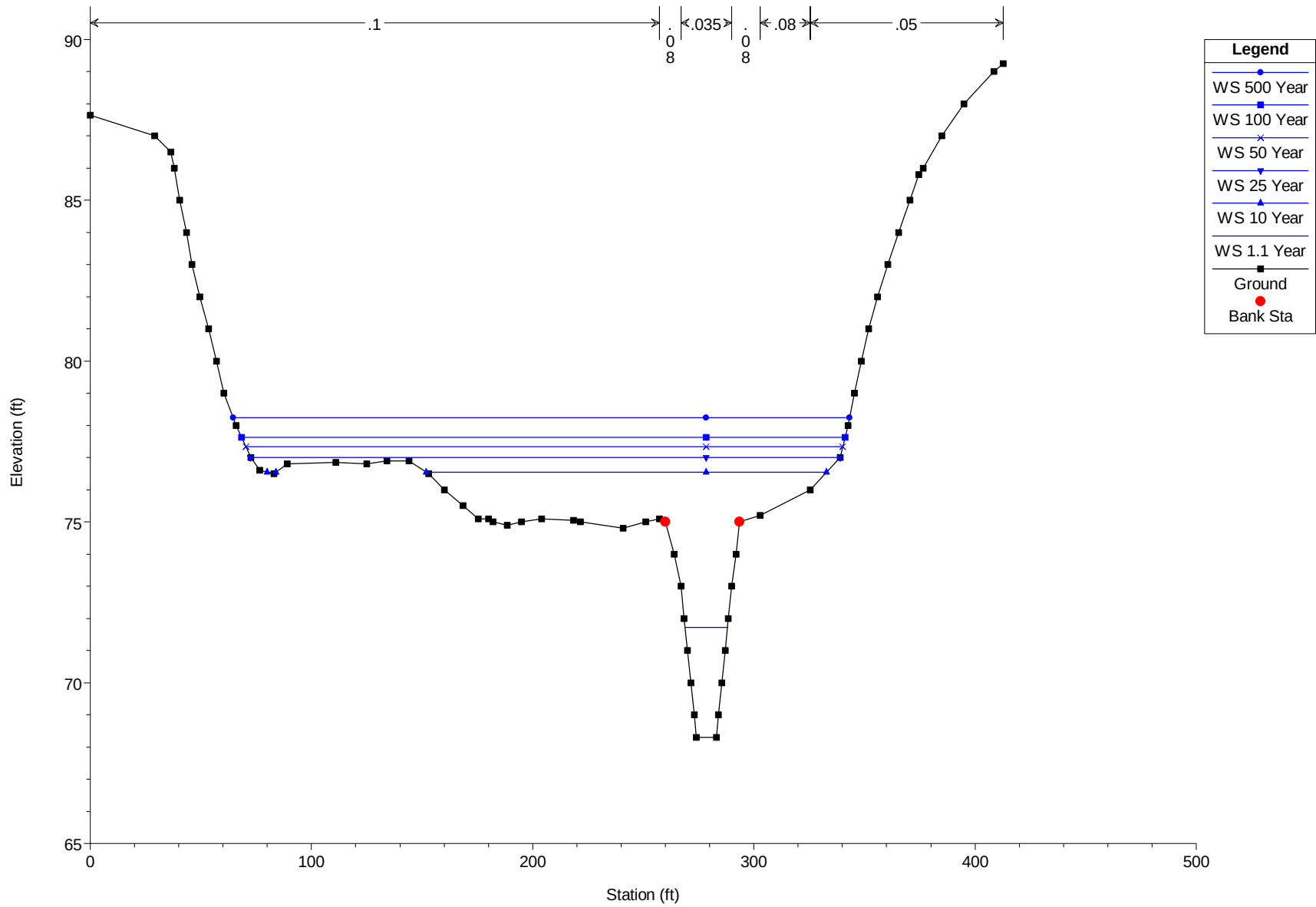
Plan: Proposed Conditions 2015 SS ND 3/6/2019

Cross Section STA 501.51 - Exit Section



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS ND 3/6/2019

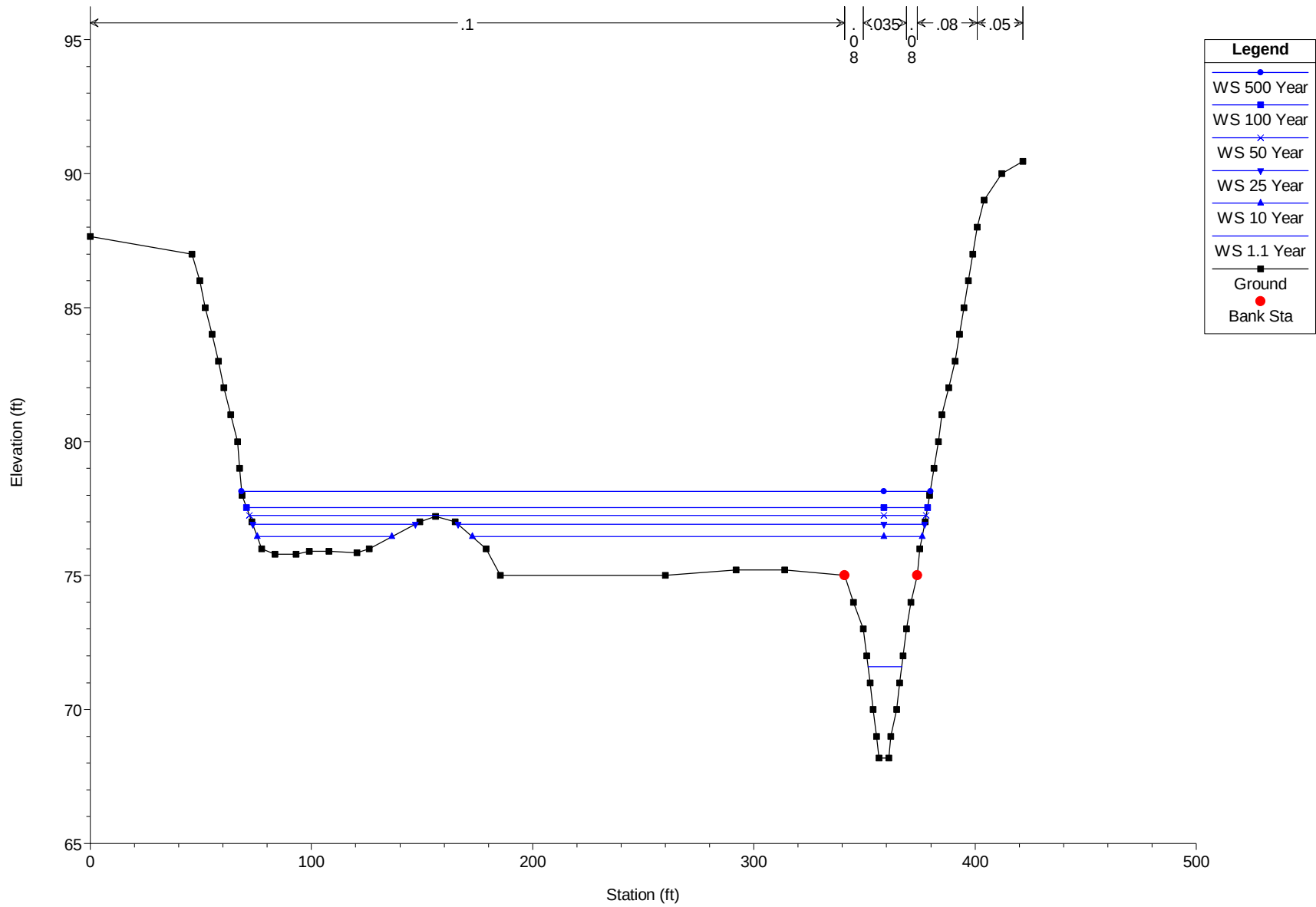
Cross Section STA 372.43



River Road over Colley Wright Brook

Plan: Proposed Conditions 2015 SS ND
Cross Section STA 239.35

3/6/2019



Reach	River Sta	Profile	Q Total (cfs)	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
Reach1	1021.923	1.1 Year	70.40	68.89	72.20		72.26	0.000731	1.85	37.96	16.61	0.22
Reach1	1021.923	10 Year	496.00	68.89	77.02		77.06	0.000678	2.07	373.65	185.63	0.16
Reach1	1021.923	25 Year	652.00	68.89	77.58		77.62	0.000612	2.10	478.74	190.01	0.15
Reach1	1021.923	50 Year	764.00	68.89	77.94		77.99	0.000574	2.12	549.25	192.81	0.15
Reach1	1021.923	100 Year	896.00	68.89	78.31		78.35	0.000560	2.18	619.66	195.17	0.15
Reach1	1021.923	500 Year	1210.00	68.89	79.08		79.13	0.000540	2.30	775.47	205.73	0.15
Reach1	809.9387	1.1 Year	70.40	68.70	72.07		72.11	0.000626	1.70	41.30	18.16	0.20
Reach1	809.9387	10 Year	496.00	68.70	76.85		76.94	0.000496	2.80	328.08	123.01	0.19
Reach1	809.9387	25 Year	652.00	68.70	77.37		77.49	0.000606	3.25	392.99	126.03	0.21
Reach1	809.9387	50 Year	764.00	68.70	77.71		77.85	0.000667	3.51	437.17	127.46	0.22
Reach1	809.9387	100 Year	896.00	68.70	78.05		78.21	0.000748	3.83	480.26	128.79	0.24
Reach1	809.9387	500 Year	1210.00	68.70	78.77		78.98	0.000913	4.48	574.11	133.53	0.27
Reach1	705.4796	1.1 Year	70.40	68.00	71.94		72.01	0.001408	2.15	32.67	18.66	0.29
Reach1	705.4796	10 Year	496.00	68.00	76.80		76.87	0.000815	2.43	298.12	124.80	0.18
Reach1	705.4796	25 Year	652.00	68.00	77.32		77.40	0.000886	2.69	366.66	137.08	0.20
Reach1	705.4796	50 Year	764.00	68.00	77.67		77.76	0.000901	2.82	416.20	143.47	0.20
Reach1	705.4796	100 Year	896.00	68.00	78.01		78.11	0.000941	2.99	465.86	149.35	0.20
Reach1	705.4796	500 Year	1210.00	68.00	78.74		78.85	0.001001	3.30	580.08	164.91	0.21
Reach1	652.3078	1.1 Year	70.40	68.00	71.91		71.96	0.000691	1.67	42.12	21.19	0.21
Reach1	652.3078	10 Year	496.00	68.00	76.78		76.83	0.000434	2.06	367.66	157.84	0.15
Reach1	652.3078	25 Year	652.00	68.00	77.30		77.36	0.000469	2.27	452.14	165.55	0.16
Reach1	652.3078	50 Year	764.00	68.00	77.65		77.71	0.000481	2.38	511.23	170.30	0.16
Reach1	652.3078	100 Year	896.00	68.00	77.99		78.06	0.000508	2.53	569.65	174.87	0.17
Reach1	652.3078	500 Year	1210.00	68.00	78.72		78.80	0.000551	2.82	700.60	185.05	0.18
Reach1	605.3982	1.1 Year	70.40	69.00	71.78	70.72	71.89	0.002353	2.74	25.68	15.49	0.38
Reach1	605.3982	10 Year	496.00	69.00	76.65	73.35	76.78	0.001437	3.11	211.89	97.73	0.24
Reach1	605.3982	25 Year	652.00	69.00	77.15	73.92	77.31	0.001587	3.48	266.31	136.19	0.26
Reach1	605.3982	50 Year	764.00	69.00	77.50	74.31	77.66	0.001578	3.62	306.75	148.40	0.26
Reach1	605.3982	100 Year	896.00	69.00	77.83	74.74	78.00	0.001628	3.81	345.50	155.04	0.27
Reach1	605.3982	500 Year	1210.00	69.00	78.54	75.85	78.74	0.001691	4.17	431.02	165.05	0.28
Reach1	589.1357	1.1 Year	70.40	68.00	71.80	69.85	71.83	0.000715	1.56	45.01	21.58	0.19
Reach1	589.1357	10 Year	496.00	68.00	76.64	72.29	76.74	0.001567	2.59	191.47	41.06	0.21
Reach1	589.1357	25 Year	652.00	68.00	77.12	72.81	77.27	0.002061	3.08	213.68	52.26	0.24
Reach1	589.1357	50 Year	764.00	68.00	77.45	73.16	77.63	0.002364	3.37	231.65	59.20	0.26
Reach1	589.1357	100 Year	896.00	68.00	77.74	73.53	77.96	0.002727	3.73	249.93	66.38	0.28
Reach1	589.1357	500 Year	1210.00	68.00	78.37	74.39	78.67	0.003337	4.43	296.29	76.87	0.32
Reach1	562.756		Bridge									
Reach1	536.284	1.1 Year	70.40	67.90	71.79	69.45	71.81	0.000255	1.07	65.97	29.94	0.13
Reach1	536.284	10 Year	496.00	67.90	76.62	71.60	76.69	0.000479	2.08	238.73	40.03	0.15
Reach1	536.284	25 Year	652.00	67.90	77.09	72.06	77.19	0.000646	2.54	258.54	45.59	0.17
Reach1	536.284	50 Year	764.00	67.90	77.41	72.35	77.53	0.000757	2.83	273.26	47.64	0.19
Reach1	536.284	100 Year	896.00	67.90	77.68	72.66	77.84	0.000911	3.19	286.75	49.45	0.21
Reach1	536.284	500 Year	1210.00	67.90	78.27	73.34	78.51	0.001269	3.97	316.97	54.61	0.25
Reach1	501.5112	1.1 Year	70.40	68.90	71.78	69.82	71.80	0.000219	1.01	69.70	33.40	0.12
Reach1	501.5112	10 Year	496.00	68.90	76.62	71.57	76.66	0.000262	1.70	373.35	165.55	0.12
Reach1	501.5112	25 Year	652.00	68.90	77.10	71.99	77.15	0.000331	2.01	428.11	196.21	0.14
Reach1	501.5112	50 Year	764.00	68.90	77.42	72.26	77.48	0.000372	2.20	464.98	206.95	0.15
Reach1	501.5112	100 Year	896.00	68.90	77.70	72.56	77.78	0.000433	2.44	497.67	216.67	0.16
Reach1	501.5112	500 Year	1210.00	68.90	78.30	73.19	78.42	0.000564	2.94	567.02	230.80	0.19
Reach1	372.4288	1.1 Year	70.40	68.30	71.72		71.76	0.000400	1.46	48.10	19.17	0.16
Reach1	372.4288	10 Year	496.00	68.30	76.55		76.61	0.000682	2.21	369.32	184.82	0.17
Reach1	372.4288	25 Year	652.00	68.30	77.01		77.09	0.000825	2.57	471.32	266.57	0.19
Reach1	372.4288	50 Year	764.00	68.30	77.34		77.42	0.000812	2.64	559.68	269.87	0.19
Reach1	372.4288	100 Year	896.00	68.30	77.63		77.71	0.000846	2.78	638.02	272.75	0.19
Reach1	372.4288	500 Year	1210.00	68.30	78.24		78.33	0.000899	3.04	806.17	278.50	0.20
Reach1	239.3463	1.1 Year	70.40	68.19	71.61	69.85	71.67	0.001001	2.09	33.68	15.32	0.25
Reach1	239.3463	10 Year	496.00	68.19	76.45	72.67	76.51	0.001000	2.29	411.59	264.11	0.18
Reach1	239.3463	25 Year	652.00	68.19	76.91	73.39	76.97	0.001001	2.44	538.74	284.50	0.19
Reach1	239.3463	50 Year	764.00	68.19	77.24	73.83	77.30	0.001000	2.54	636.15	306.05	0.19
Reach1	239.3463	100 Year	896.00	68.19	77.53	74.29	77.59	0.001001	2.62	725.17	307.94	0.19
Reach1	239.3463	500 Year	1210.00	68.19	78.14	75.77	78.21	0.001001	2.80	914.88	311.42	0.19

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 1.1 Year

E.G. US. (ft)	71.83	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	71.80	E.G. Elev (ft)	71.82	71.81
Q Total (cfs)	70.40	W.S. Elev (ft)	71.80	71.80
Q Bridge (cfs)	70.40	Crit W.S. (ft)	69.66	69.66
Q Weir (cfs)		Max Chl Dpth (ft)	2.80	2.80
Weir Sta Lft (ft)		Vel Total (ft/s)	0.91	0.92
Weir Sta Rgt (ft)		Flow Area (sq ft)	77.07	76.78
Weir Submerg		Froude # Chl	0.10	0.10
Weir Max Depth (ft)		Specif Force (cu ft)	103.62	102.95
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	2.38	2.37
Min El Prs (ft)	82.26	W.P. Total (ft)	33.88	33.85
Delta EG (ft)	0.03	Conv. Total (cfs)	4489.9	4467.0
Delta WS (ft)	0.01	Top Width (ft)	32.39	32.36
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	0.92	C & E Loss (ft)	0.00	0.00
BR Sluice Coef		Shear Total (lb/sq ft)	0.03	0.04
BR Sel Method	Energy only	Power Total (lb/ft s)	0.03	0.03

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 10 Year

E.G. US. (ft)	76.74	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	76.64	E.G. Elev (ft)	76.71	76.69
Q Total (cfs)	496.00	W.S. Elev (ft)	76.66	76.64
Q Bridge (cfs)	496.00	Crit W.S. (ft)	71.31	71.32
Q Weir (cfs)		Max Chl Dpth (ft)	7.66	7.64
Weir Sta Lft (ft)		Vel Total (ft/s)	1.80	1.81
Weir Sta Rgt (ft)		Flow Area (sq ft)	275.51	274.76
Weir Submerg		Froude # Chl	0.13	0.13
Weir Max Depth (ft)		Specif Force (cu ft)	951.69	947.59
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	5.58	5.57
Min El Prs (ft)	82.26	W.P. Total (ft)	53.45	53.38
Delta EG (ft)	0.06	Conv. Total (cfs)	24326.7	24240.7
Delta WS (ft)	0.02	Top Width (ft)	49.38	49.32
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	1.81	C & E Loss (ft)	0.00	0.00
BR Sluice Coef		Shear Total (lb/sq ft)	0.13	0.13
BR Sel Method	Energy only	Power Total (lb/ft s)	0.24	0.24

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 25 Year

E.G. US. (ft)	77.27	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	77.12	E.G. Elev (ft)	77.22	77.20
Q Total (cfs)	652.00	W.S. Elev (ft)	77.15	77.13
Q Bridge (cfs)	652.00	Crit W.S. (ft)	71.75	71.75
Q Weir (cfs)		Max Chl Dpth (ft)	8.15	8.13
Weir Sta Lft (ft)		Vel Total (ft/s)	2.17	2.18
Weir Sta Rgt (ft)		Flow Area (sq ft)	300.15	299.06
Weir Submerg		Froude # Chl	0.16	0.16
Weir Max Depth (ft)		Specif Force (cu ft)	1109.06	1102.87
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	5.87	5.86
Min El Prs (ft)	82.26	W.P. Total (ft)	55.42	55.34
Delta EG (ft)	0.08	Conv. Total (cfs)	27190.3	27063.0
Delta WS (ft)	0.03	Top Width (ft)	51.09	51.02
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	2.18	C & E Loss (ft)	0.00	0.01

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 25 Year (Continued)

BR Sluice Coef		Shear Total (lb/sq ft)	0.19	0.20
BR Sel Method	Energy only	Power Total (lb/ft s)	0.42	0.43

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 50 Year

E.G. US. (ft)	77.63	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	77.45	E.G. Elev (ft)	77.57	77.54
Q Total (cfs)	764.00	W.S. Elev (ft)	77.48	77.45
Q Bridge (cfs)	764.00	Crit W.S. (ft)	72.03	72.02
Q Weir (cfs)		Max Chl Dpth (ft)	8.48	8.45
Weir Sta Lft (ft)		Vel Total (ft/s)	2.41	2.42
Weir Sta Rgt (ft)		Flow Area (sq ft)	317.22	315.90
Weir Submerg		Froude # Chl	0.17	0.17
Weir Max Depth (ft)		Specif Force (cu ft)	1224.24	1216.44
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	6.07	6.06
Min El Prs (ft)	82.26	W.P. Total (ft)	56.75	56.65
Delta EG (ft)	0.10	Conv. Total (cfs)	29215.6	29057.2
Delta WS (ft)	0.04	Top Width (ft)	52.25	52.16
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.02	0.00
BR Open Vel (ft/s)	2.42	C & E Loss (ft)	0.00	0.01
BR Sluice Coef		Shear Total (lb/sq ft)	0.24	0.24
BR Sel Method	Energy only	Power Total (lb/ft s)	0.57	0.58

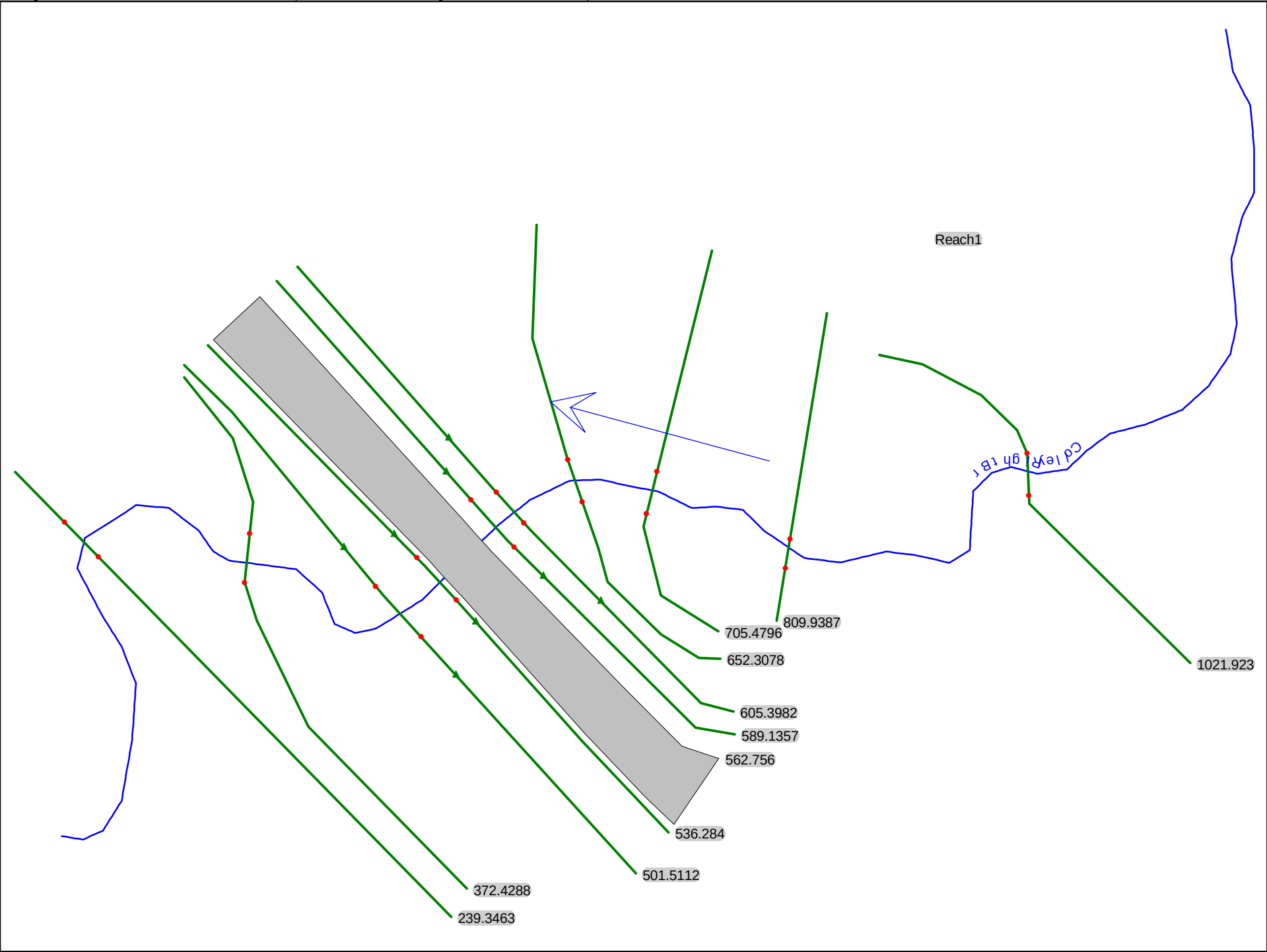
Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 100 Year

E.G. US. (ft)	77.96	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	77.74	E.G. Elev (ft)	77.89	77.86
Q Total (cfs)	896.00	W.S. Elev (ft)	77.78	77.75
Q Bridge (cfs)	896.00	Crit W.S. (ft)	72.34	72.34
Q Weir (cfs)		Max Chl Dpth (ft)	8.78	8.75
Weir Sta Lft (ft)		Vel Total (ft/s)	2.69	2.70
Weir Sta Rgt (ft)		Flow Area (sq ft)	332.94	331.28
Weir Submerg		Froude # Chl	0.19	0.19
Weir Max Depth (ft)		Specif Force (cu ft)	1338.79	1328.83
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	6.25	6.23
Min El Prs (ft)	82.26	W.P. Total (ft)	57.95	57.83
Delta EG (ft)	0.12	Conv. Total (cfs)	31107.0	30906.5
Delta WS (ft)	0.06	Top Width (ft)	53.29	53.18
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.03	0.00
BR Open Vel (ft/s)	2.70	C & E Loss (ft)	0.00	0.01
BR Sluice Coef		Shear Total (lb/sq ft)	0.30	0.30
BR Sel Method	Energy only	Power Total (lb/ft s)	0.80	0.81

Plan: PRP 2015 SS ND ColleyRightBr Reach1 RS: 562.756 Profile: 500 Year

E.G. US. (ft)	78.67	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	78.37	E.G. Elev (ft)	78.58	78.54
Q Total (cfs)	1210.00	W.S. Elev (ft)	78.41	78.37
Q Bridge (cfs)	1210.00	Crit W.S. (ft)	73.01	73.00
Q Weir (cfs)		Max Chl Dpth (ft)	9.41	9.37
Weir Sta Lft (ft)		Vel Total (ft/s)	3.29	3.31
Weir Sta Rgt (ft)		Flow Area (sq ft)	367.60	365.12
Weir Submerg		Froude # Chl	0.23	0.23
Weir Max Depth (ft)		Specif Force (cu ft)	1610.73	1595.15
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	6.62	6.59
Min El Prs (ft)	82.26	W.P. Total (ft)	60.52	60.34
Delta EG (ft)	0.16	Conv. Total (cfs)	35369.8	35060.1
Delta WS (ft)	0.10	Top Width (ft)	55.52	55.37
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.04	0.01
BR Open Vel (ft/s)	3.31	C & E Loss (ft)	0.00	0.02
BR Sluice Coef		Shear Total (lb/sq ft)	0.44	0.45
BR Sel Method	Energy only	Power Total (lb/ft s)	1.46	1.49

Proposed Condition - Tailwater (AEP2 - Presumpscot R. Control)



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

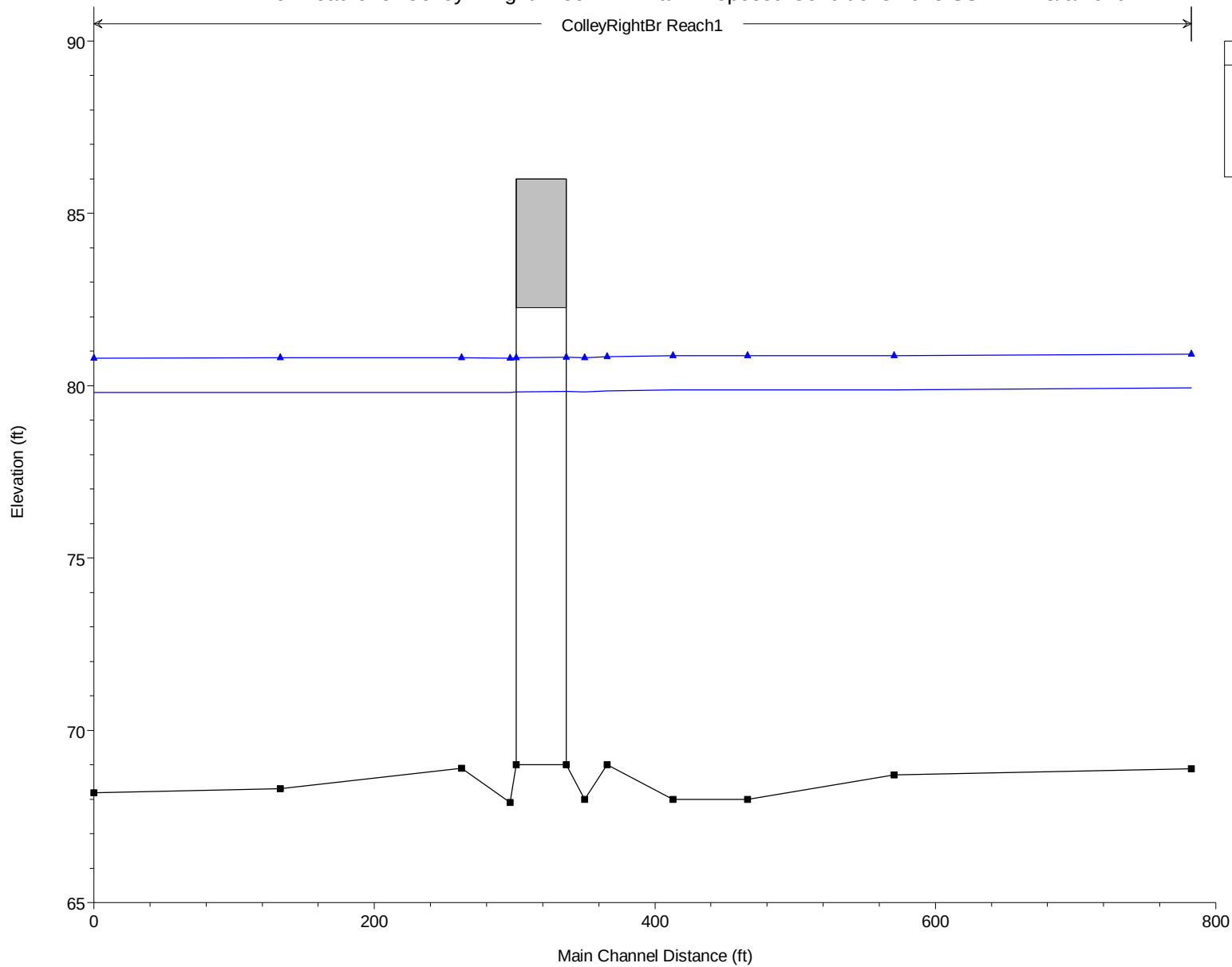
ColleyRightBr Reach1

Legend

WS AEP2-100

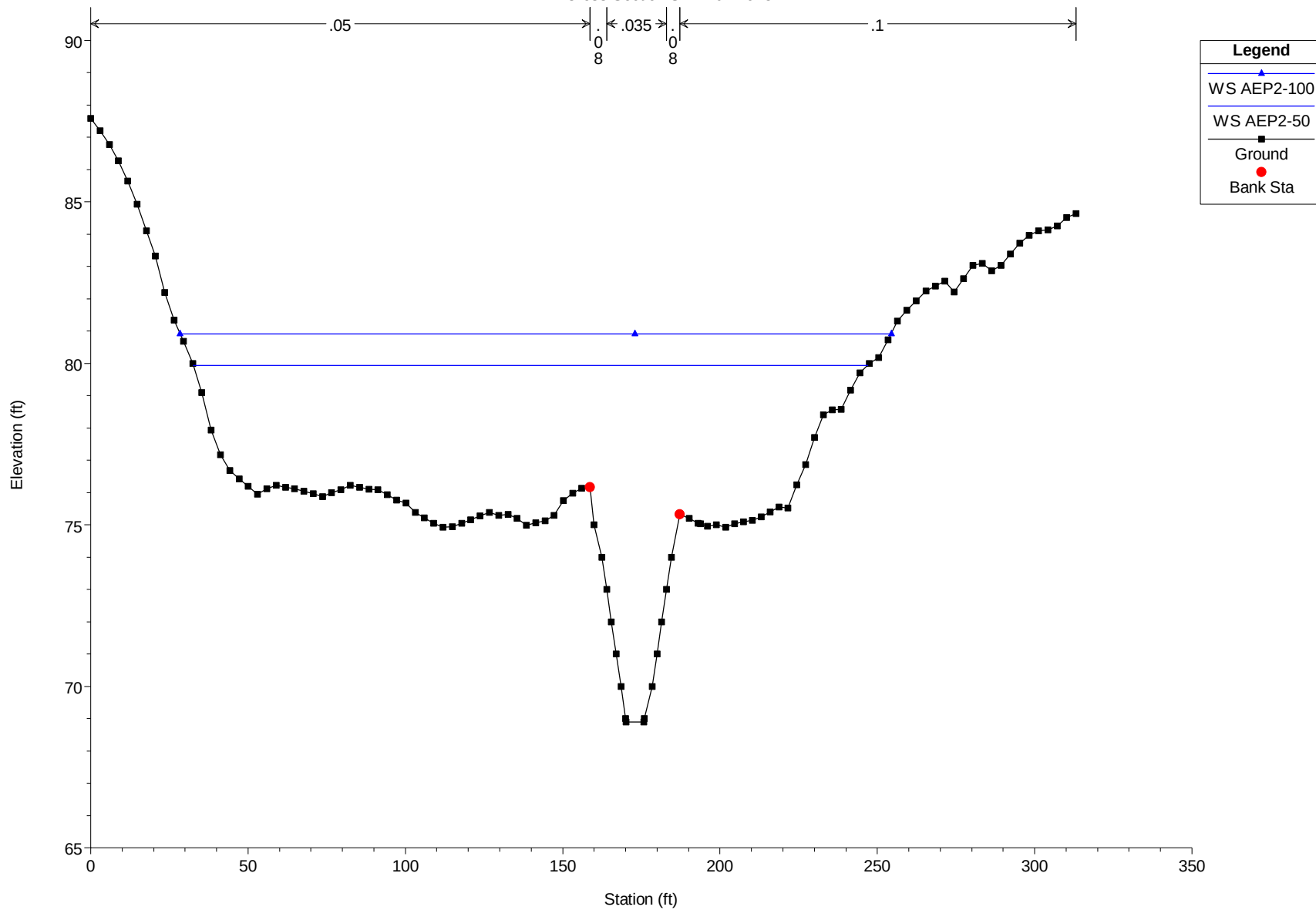
WS AEP2-50

Ground



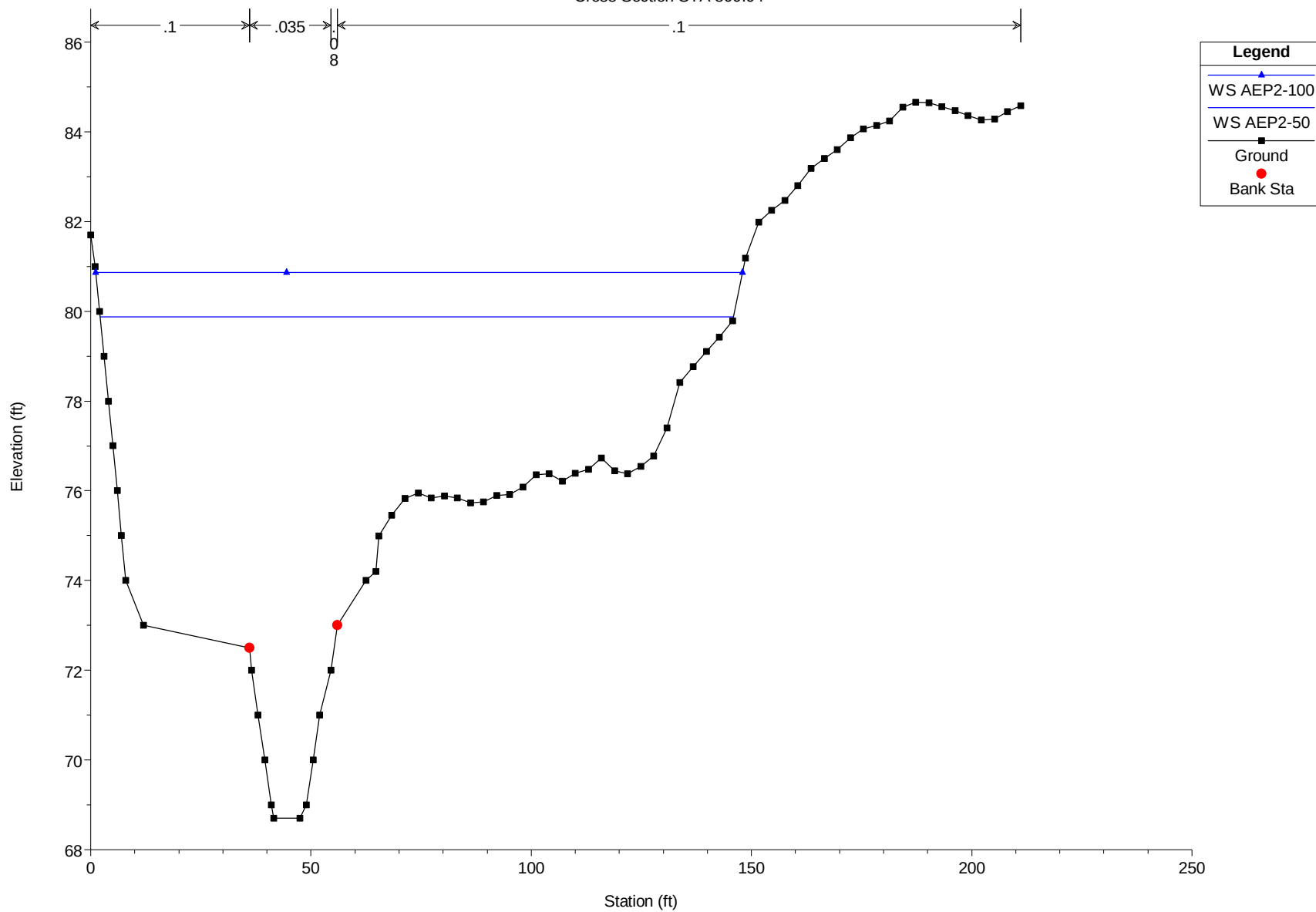
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 1021.923



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

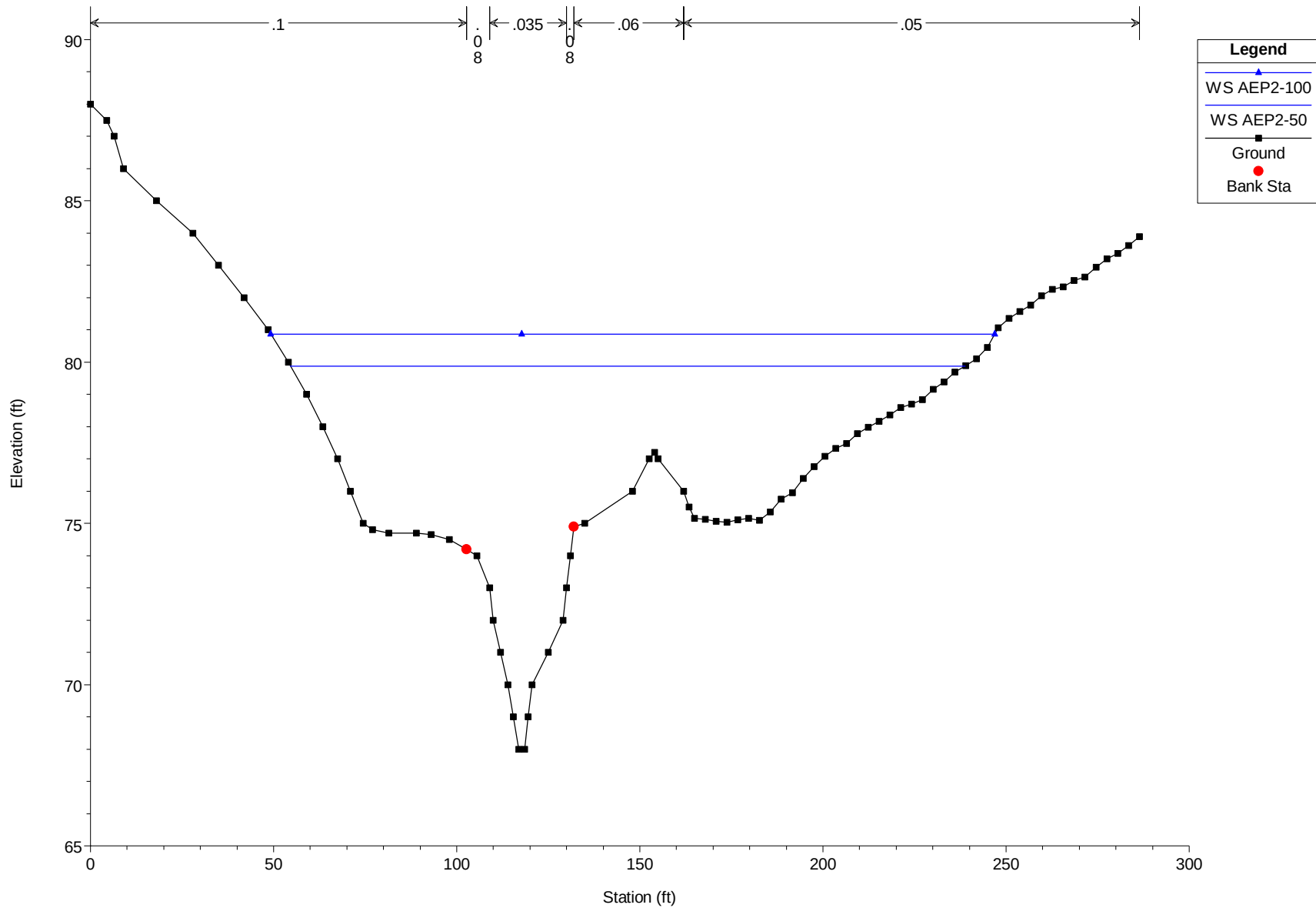
Cross Section STA 809.94



River Road over Colley Wright Brook

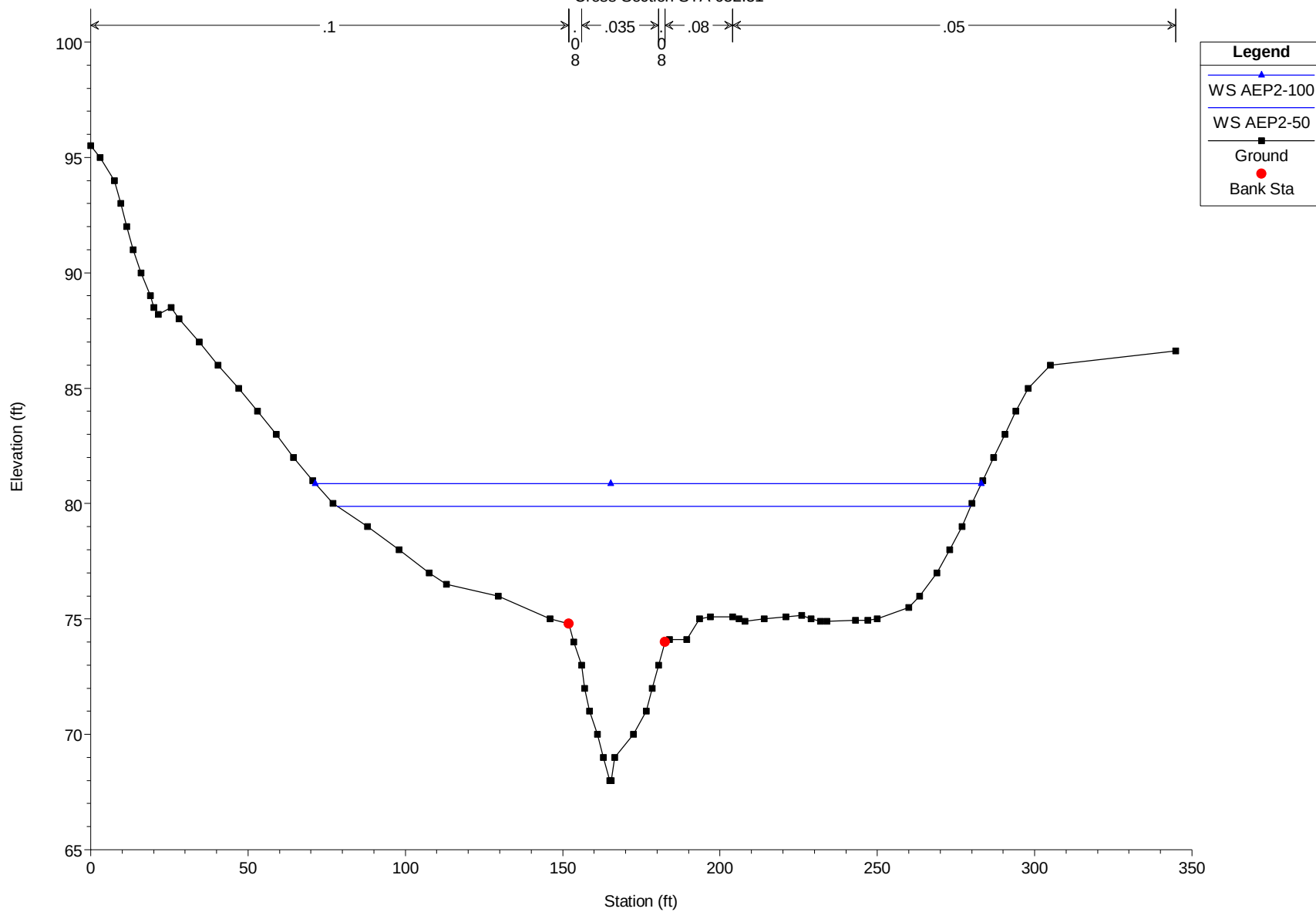
Plan: Proposed Conditions 2015 SS TW 3/6/2019

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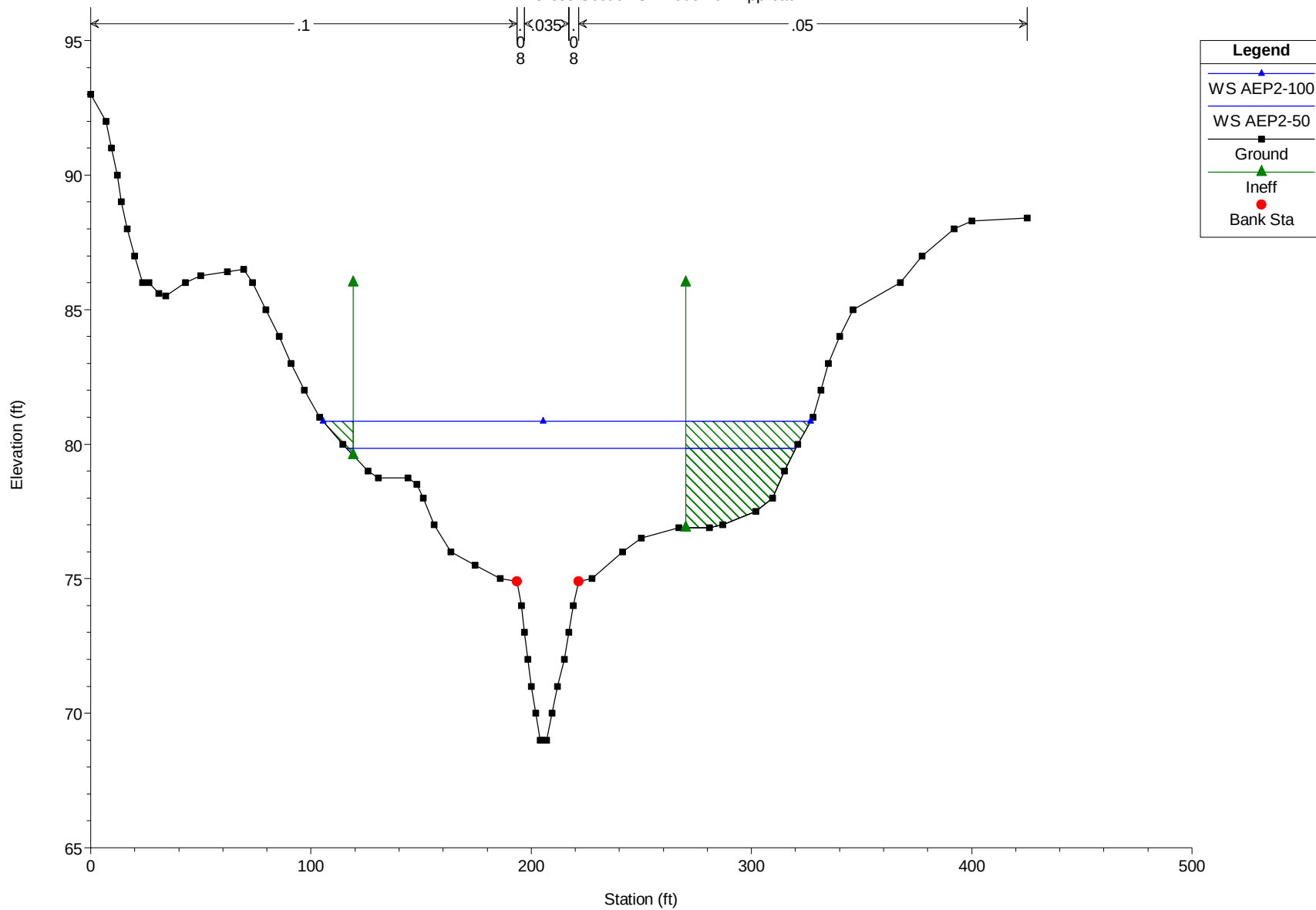
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 652.31



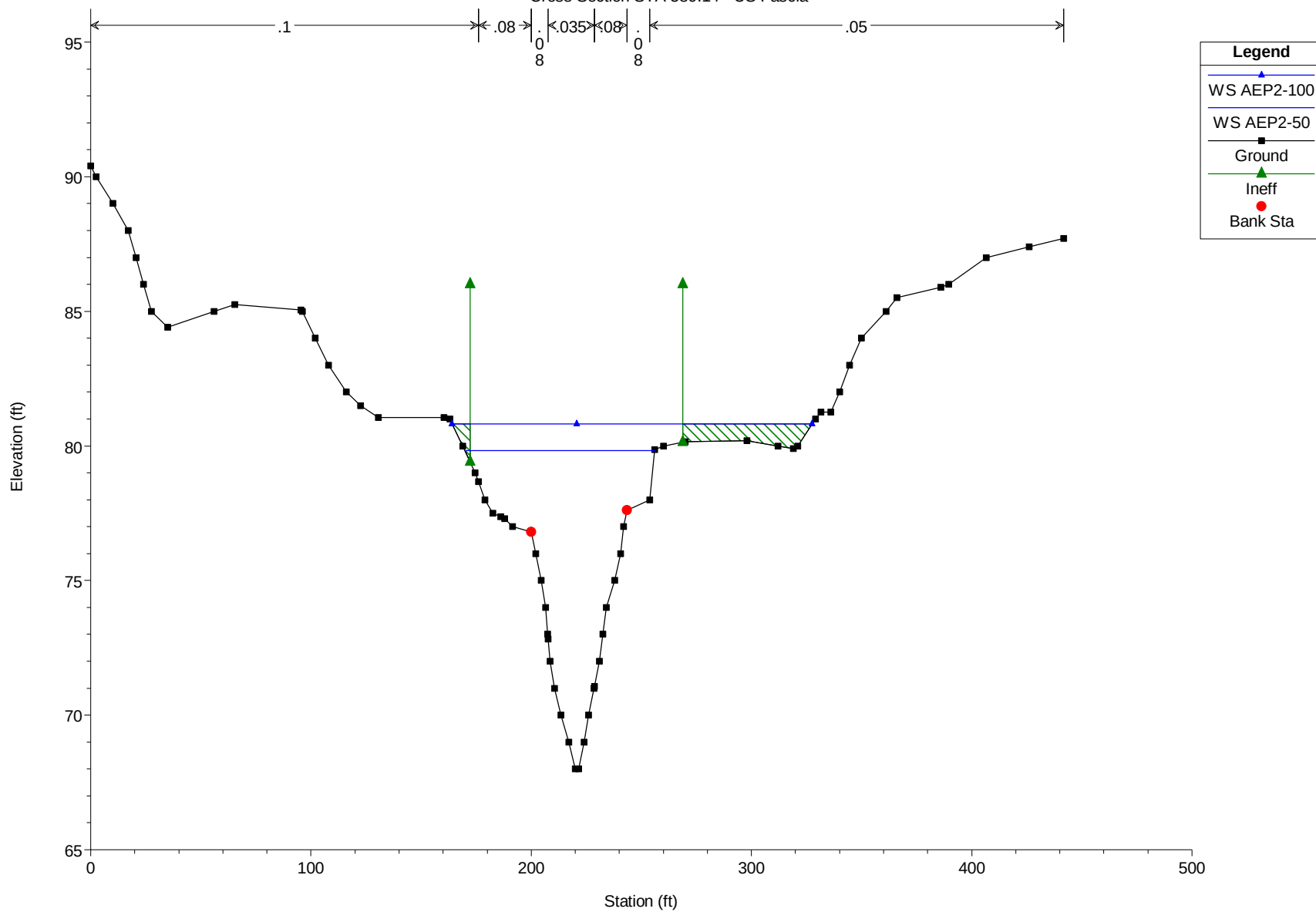
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 605.40 - Approach



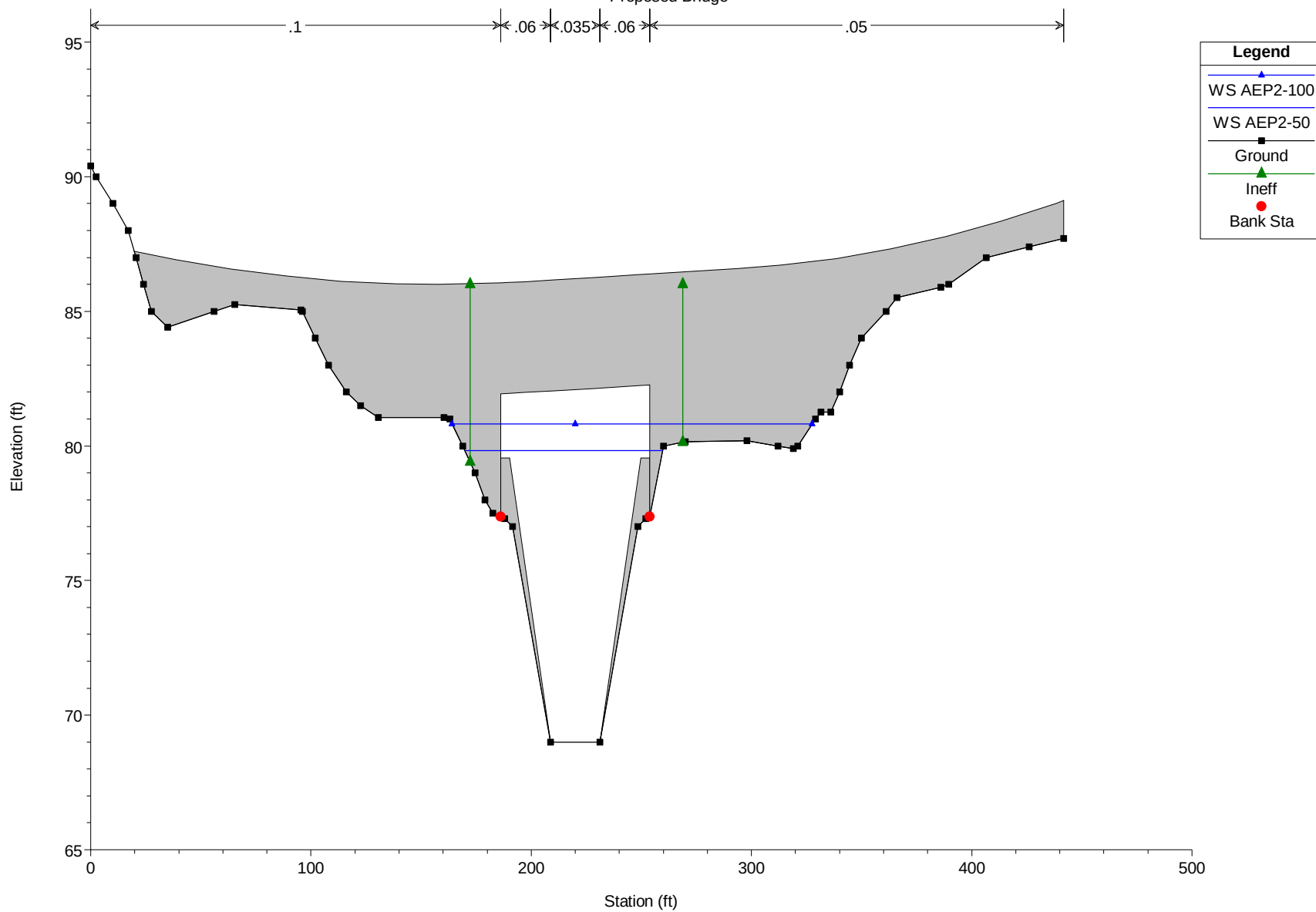
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 589.14 - US Fascia



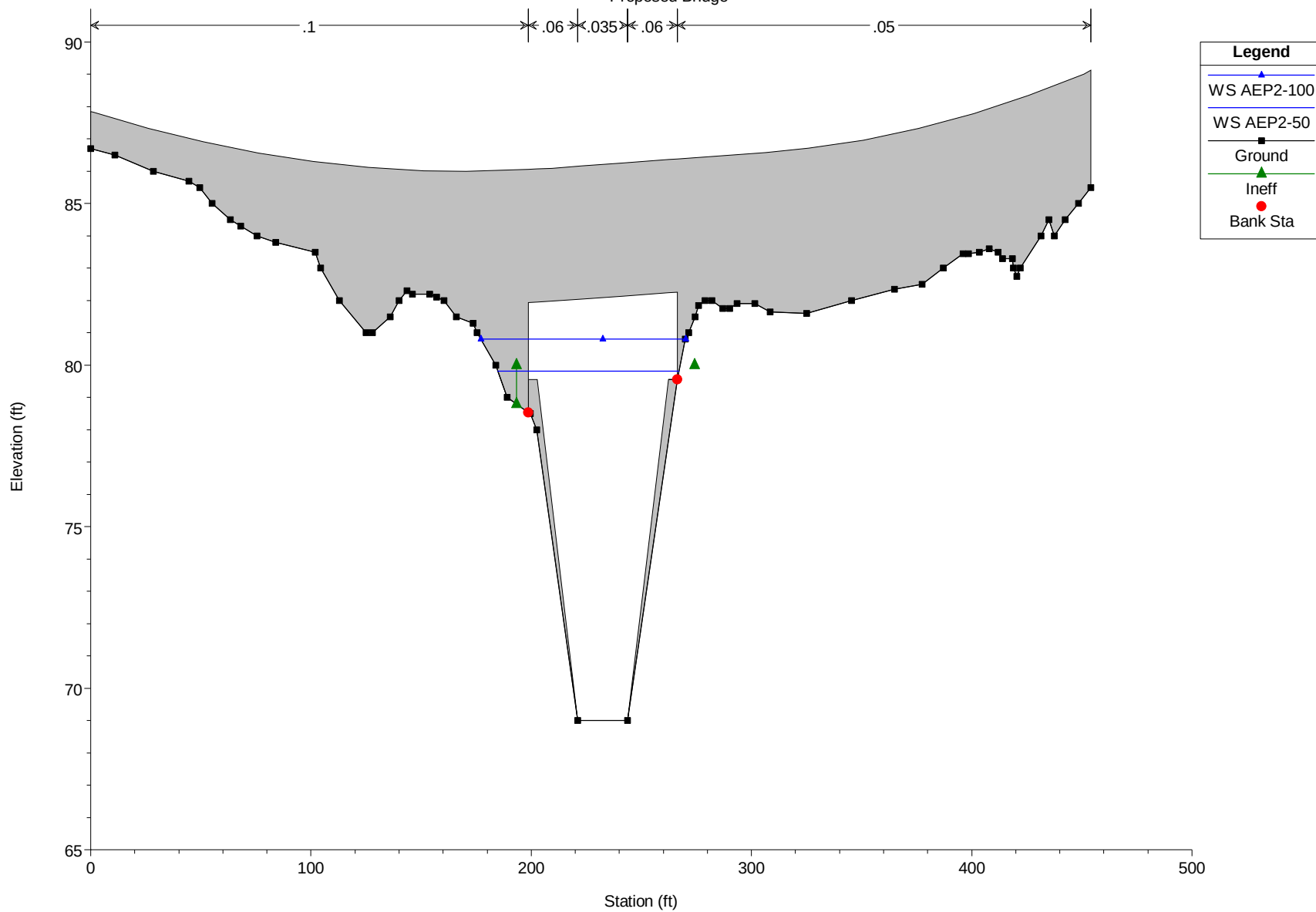
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Proposed Bridge



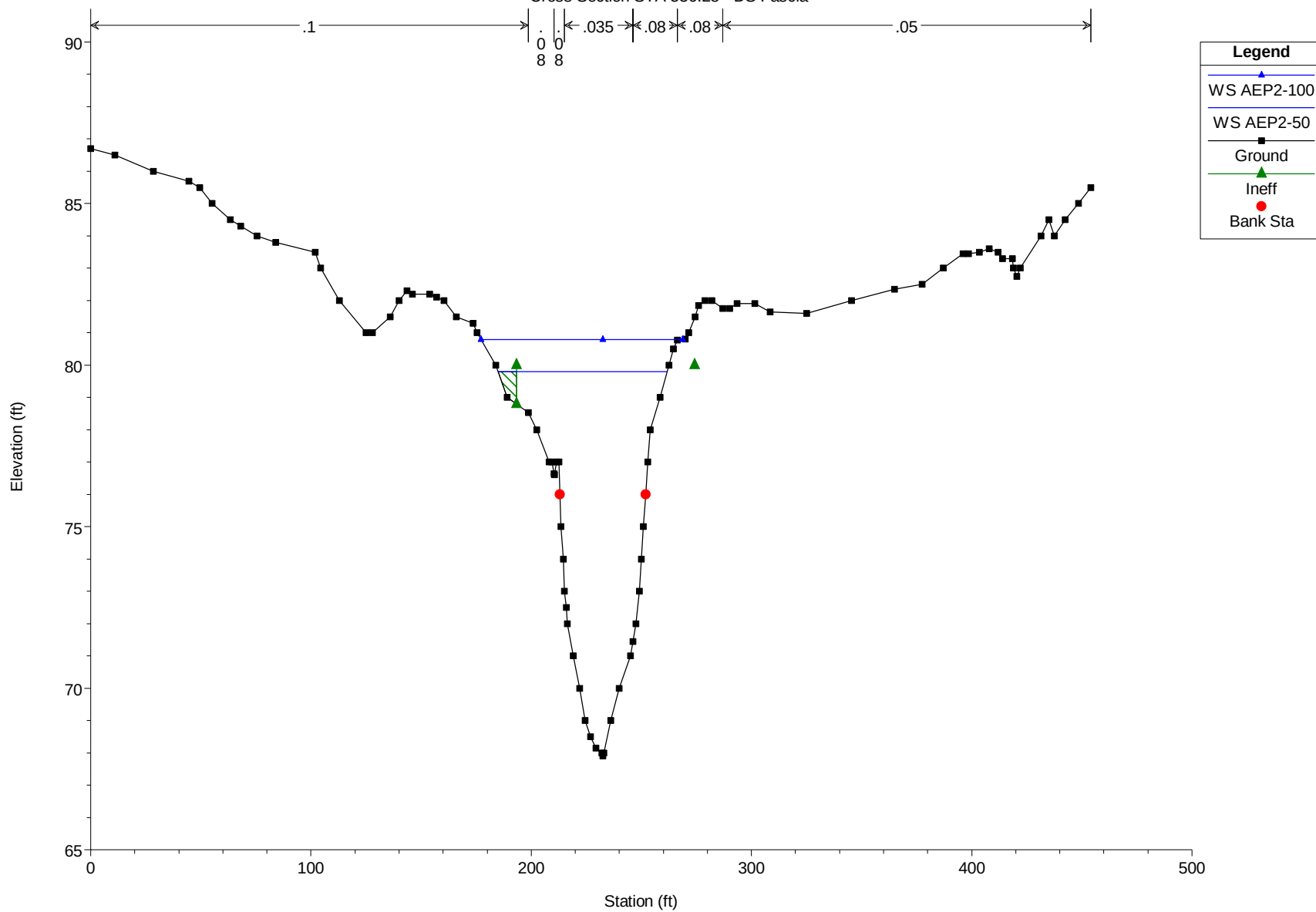
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Proposed Bridge



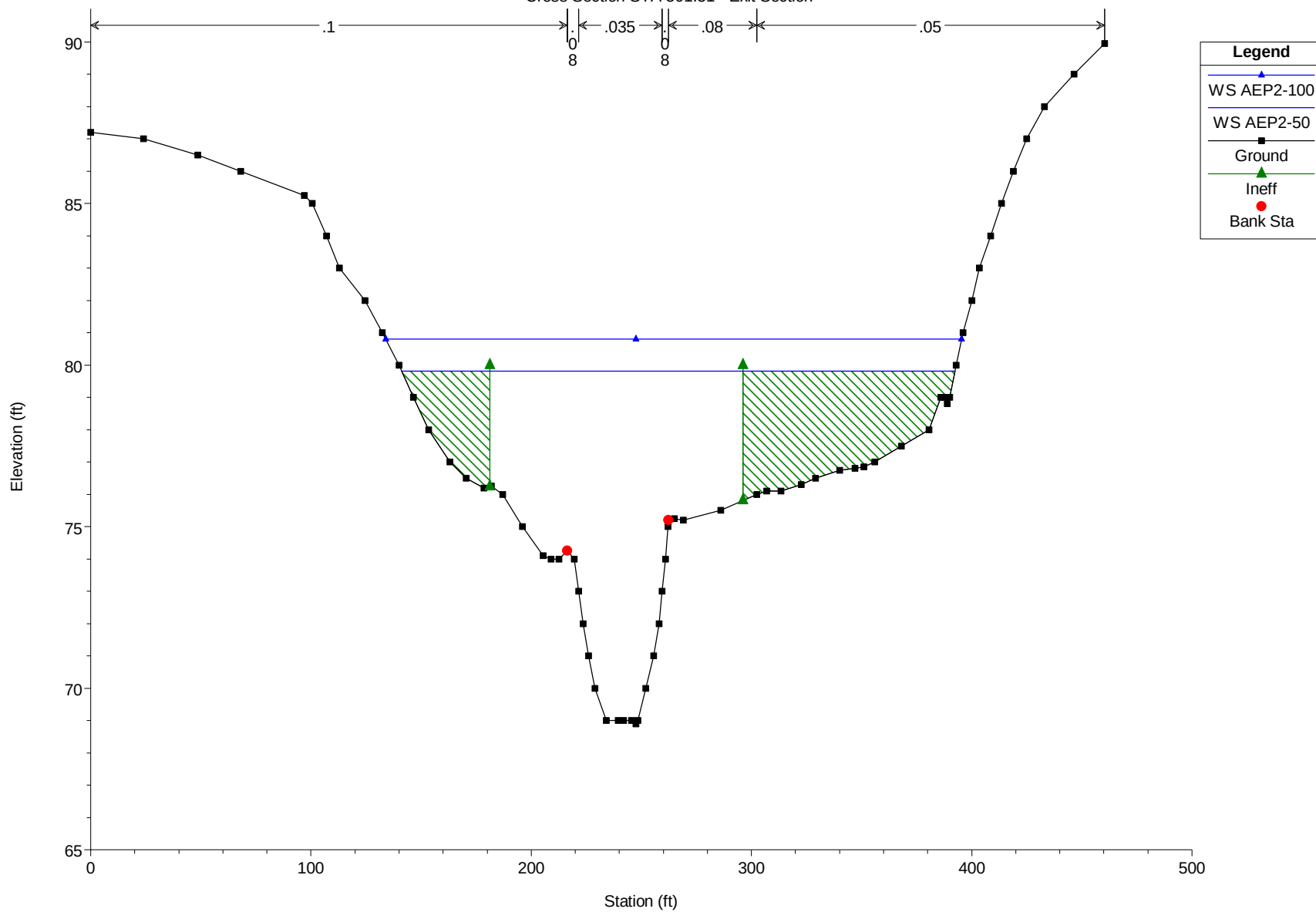
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 536.28 - DS Fascia



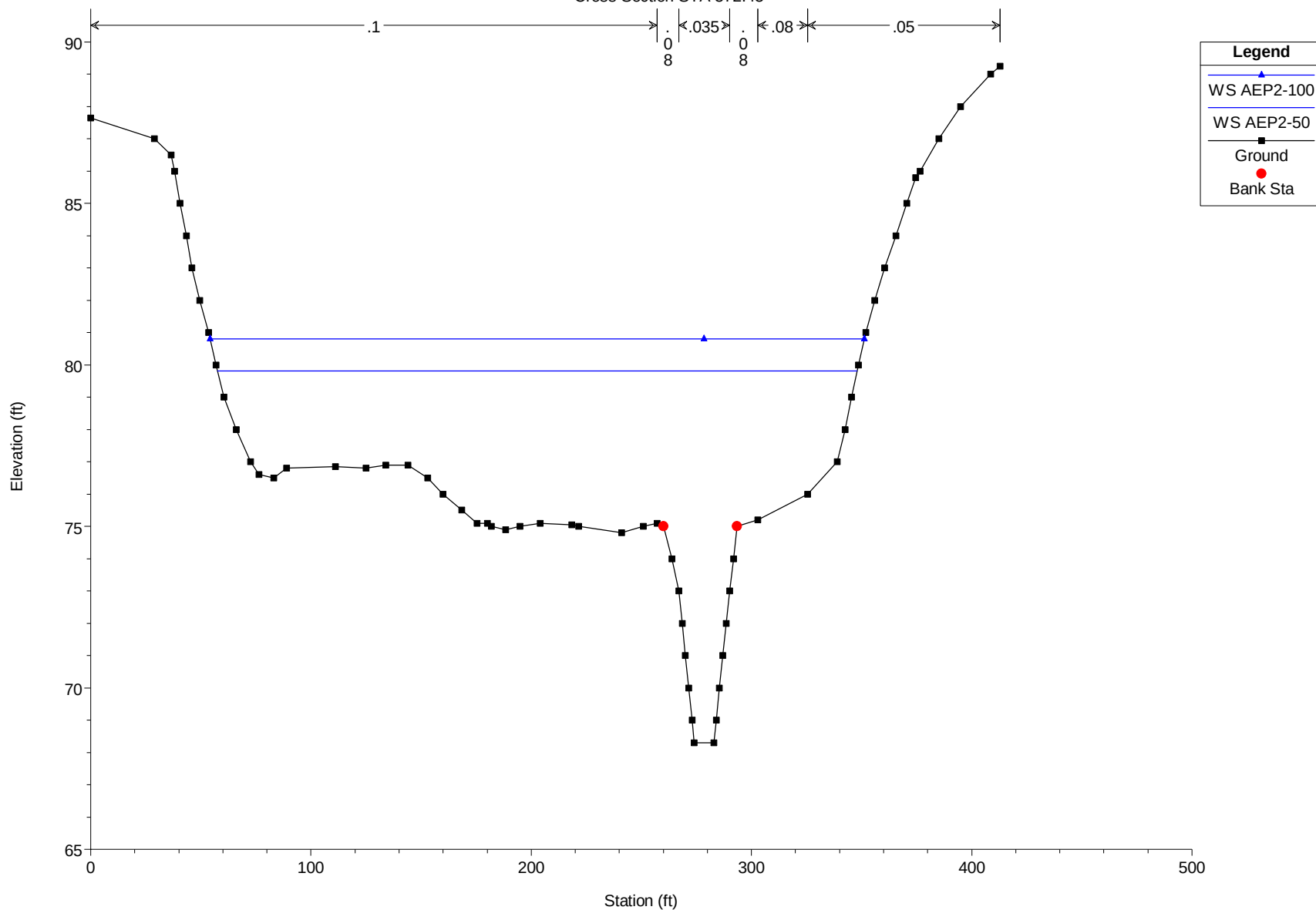
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 501.51 - Exit Section



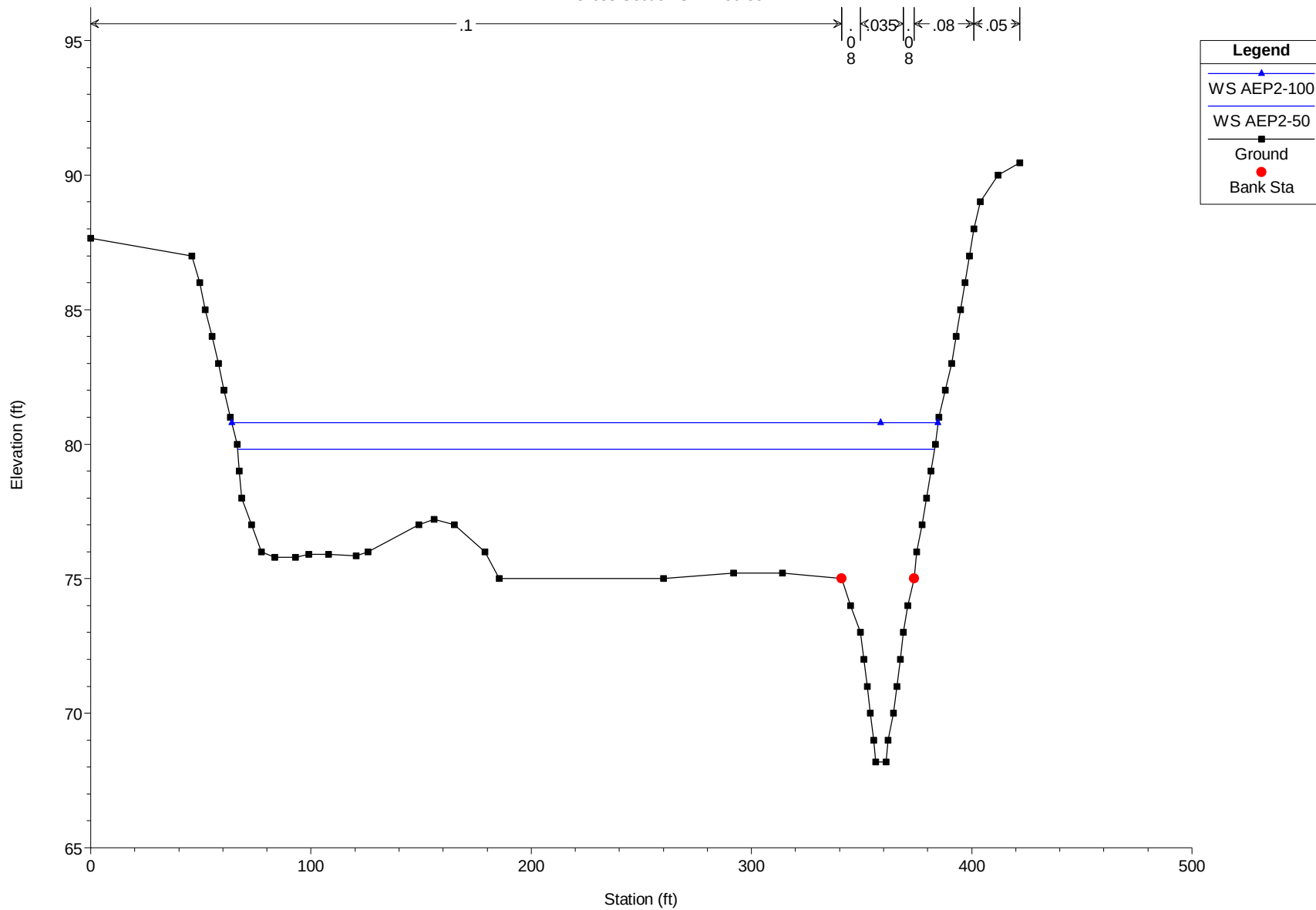
River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 372.43



River Road over Colley Wright Brook Plan: Proposed Conditions 2015 SS TW 3/6/2019

Cross Section STA 239.35



HEC-RAS Plan: PRP 2015 SS TW River: ColleyRightBr Reach: Reach1

Reach	River Sta	Profile	Q Total (cfs)	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
Reach1	1021.923	AEP2-50	652.00	68.89	79.93		79.94	0.000086	0.99	954.24	214.29	0.06
Reach1	1021.923	AEP2-100	764.00	68.89	80.92		80.92	0.000066	0.93	1171.03	226.02	0.05
Reach1	809.9387	AEP2-50	652.00	68.70	79.88		79.92	0.000153	1.98	728.49	143.75	0.11
Reach1	809.9387	AEP2-100	764.00	68.70	80.87		80.90	0.000134	1.98	871.91	146.86	0.11
Reach1	705.4796	AEP2-50	652.00	68.00	79.88		79.90	0.000135	1.34	779.32	184.25	0.08
Reach1	705.4796	AEP2-100	764.00	68.00	80.87		80.89	0.000103	1.25	969.23	197.69	0.07
Reach1	652.3078	AEP2-50	652.00	68.00	79.88		79.89	0.000078	1.17	924.50	201.28	0.07
Reach1	652.3078	AEP2-100	764.00	68.00	80.87		80.88	0.000063	1.12	1129.21	211.68	0.06
Reach1	605.3982	AEP2-50	652.00	69.00	79.85	73.92	79.88	0.000205	1.63	619.82	203.93	0.10
Reach1	605.3982	AEP2-100	764.00	69.00	80.85	74.31	80.87	0.000155	1.53	770.07	221.34	0.09
Reach1	589.1357	AEP2-50	652.00	68.00	79.82	72.81	79.87	0.000421	1.81	413.74	85.97	0.12
Reach1	589.1357	AEP2-100	764.00	68.00	80.82	73.16	80.86	0.000347	1.79	507.15	163.46	0.11
Reach1	562.756		Bridge									
Reach1	536.284	AEP2-50	652.00	67.90	79.80	72.06	79.85	0.000193	1.74	414.60	76.71	0.10
Reach1	536.284	AEP2-100	764.00	67.90	80.79	72.35	80.84	0.000180	1.80	501.84	91.51	0.10
Reach1	501.5112	AEP2-50	652.00	68.90	79.81	71.99	79.83	0.000079	1.24	740.21	251.19	0.07
Reach1	501.5112	AEP2-100	764.00	68.90	80.81	72.26	80.82	0.000042	0.96	1361.12	261.50	0.05
Reach1	372.4288	AEP2-50	652.00	68.30	79.81		79.82	0.000083	1.05	1253.85	290.25	0.06
Reach1	372.4288	AEP2-100	764.00	68.30	80.81		80.81	0.000063	0.99	1546.96	297.14	0.06
Reach1	239.3463	AEP2-50	652.00	68.19	79.80	73.39	79.81	0.000081	0.93	1435.59	316.40	0.06
Reach1	239.3463	AEP2-100	764.00	68.19	80.80	73.83	80.81	0.000062	0.87	1753.97	320.60	0.05

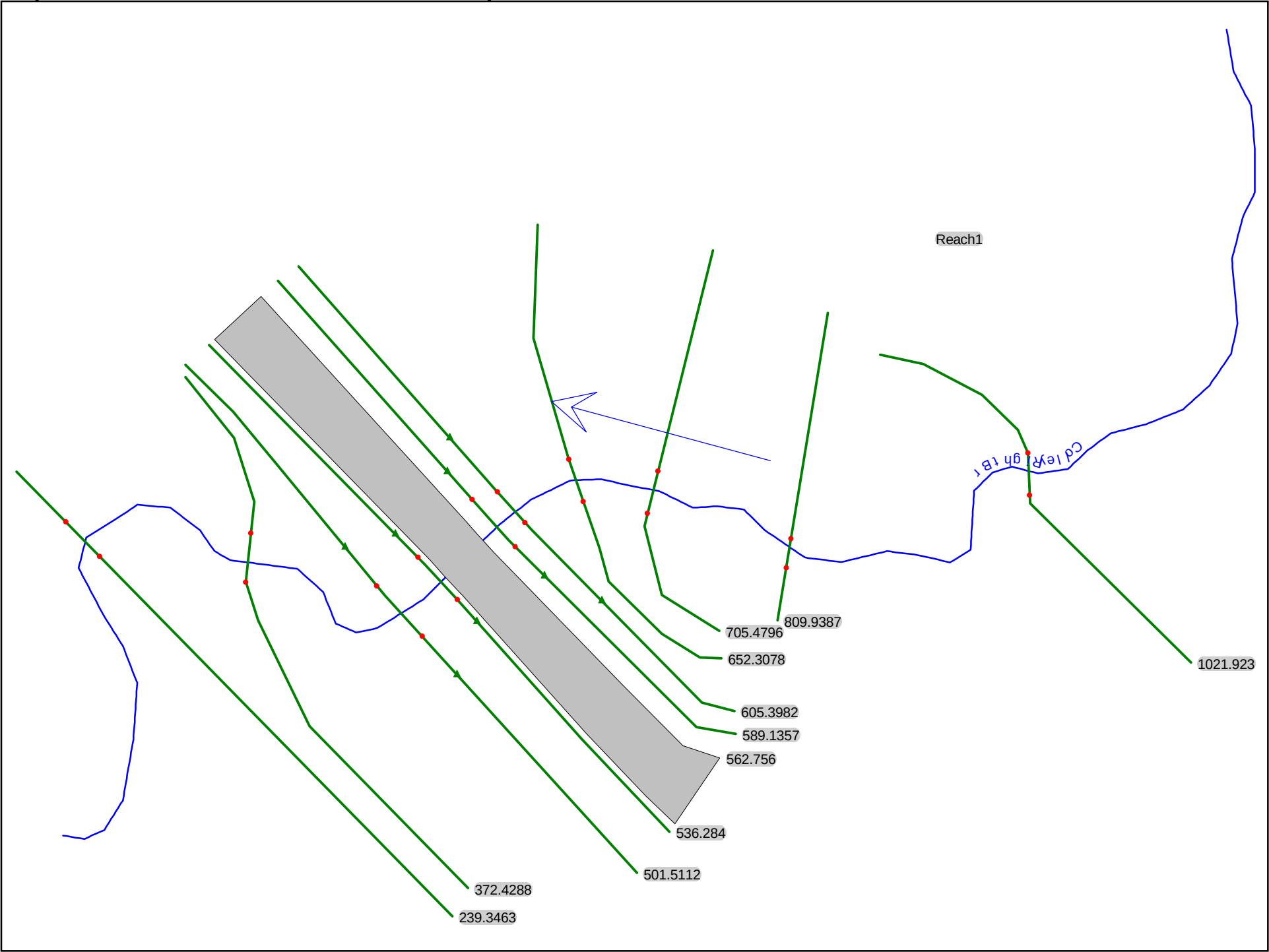
Plan: PRP 2015 SS TW ColleyRightBr Reach1 RS: 562.756 Profile: AEP2-50

E.G. US. (ft)	79.87	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	79.82	E.G. Elev (ft)	79.86	79.85
Q Total (cfs)	652.00	W.S. Elev (ft)	79.83	79.82
Q Bridge (cfs)	652.00	Crit W.S. (ft)	71.75	71.75
Q Weir (cfs)		Max Chl Dpth (ft)	10.83	10.82
Weir Sta Lft (ft)		Vel Total (ft/s)	1.44	1.45
Weir Sta Rgt (ft)		Flow Area (sq ft)	451.72	451.14
Weir Submerg		Froude # Chl	0.10	0.08
Weir Max Depth (ft)		Specif Force (cu ft)	2093.57	2089.78
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	6.69	6.68
Min El Prs (ft)	82.26	W.P. Total (ft)	73.66	73.64
Delta EG (ft)	0.02	Conv. Total (cfs)	42436.4	42375.9
Delta WS (ft)	0.02	Top Width (ft)	67.50	67.50
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	1.45	C & E Loss (ft)	0.00	0.00
BR Sluice Coef		Shear Total (lb/sq ft)	0.09	0.09
BR Sel Method	Energy only	Power Total (lb/ft s)	0.13	0.13

Plan: PRP 2015 SS TW ColleyRightBr Reach1 RS: 562.756 Profile: AEP2-100

E.G. US. (ft)	80.86	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	80.82	E.G. Elev (ft)	80.85	80.85
Q Total (cfs)	764.00	W.S. Elev (ft)	80.82	80.81
Q Bridge (cfs)	764.00	Crit W.S. (ft)	72.03	72.02
Q Weir (cfs)		Max Chl Dpth (ft)	11.82	11.81
Weir Sta Lft (ft)		Vel Total (ft/s)	1.47	1.47
Weir Sta Rgt (ft)		Flow Area (sq ft)	518.72	518.21
Weir Submerg		Froude # Chl	0.09	0.08
Weir Max Depth (ft)		Specif Force (cu ft)	2580.98	2577.05
Min El Weir Flow (ft)	86.01	Hydr Depth (ft)	7.68	7.68
Min El Prs (ft)	82.26	W.P. Total (ft)	75.64	75.63
Delta EG (ft)	0.02	Conv. Total (cfs)	52312.4	52351.8
Delta WS (ft)	0.03	Top Width (ft)	67.50	67.50
BR Open Area (sq ft)	604.72	Frctn Loss (ft)	0.01	0.00
BR Open Vel (ft/s)	1.47	C & E Loss (ft)	0.00	0.00
BR Sluice Coef		Shear Total (lb/sq ft)	0.09	0.09
BR Sel Method	Energy only	Power Total (lb/ft s)	0.13	0.13

Proposed Condition - Scour Calculations - Normal Depth Scenario



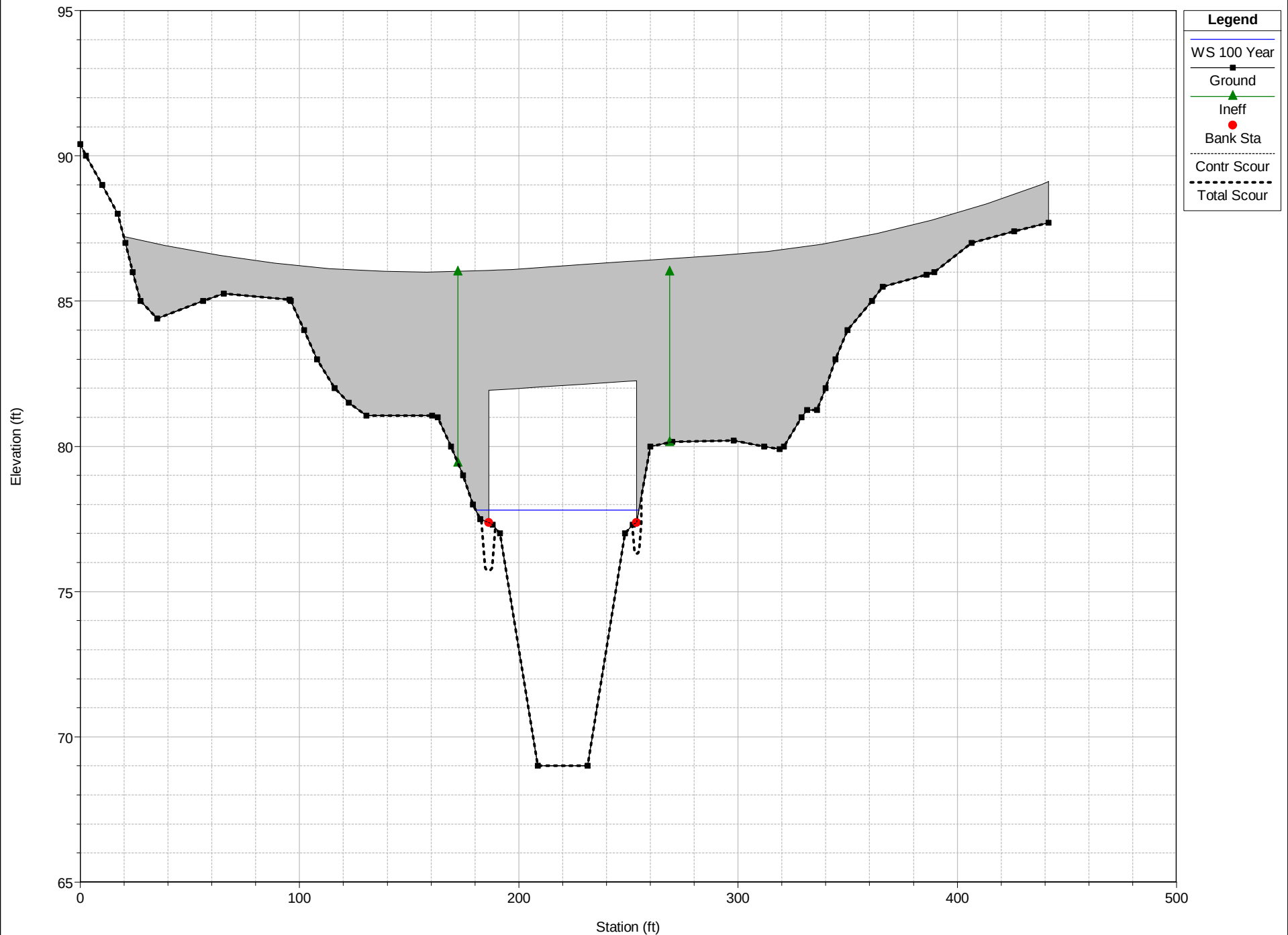
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	2.07	6.25	1.77
Approach Velocity (ft/s):	0.96	3.78	1.74
Br Average Depth (ft):		5.49	
BR Opening Flow (cfs):		896.00	
BR Top WD (ft):		67.50	
Grain Size D50 (mm):	0.20	0.20	0.20
Approach Flow (cfs):	83.47	662.15	150.38
Approach Top WD (ft):	41.74	28.00	48.75
K1 Coefficient:	0.690	0.690	0.690
Results			
Scour Depth Ys (ft):		0.00	
Critical Velocity (ft/s):		1.32	
Equation:		Live	

Abutment Scour

	Left	Right
Input Data		
Station at Toe (ft):	186.25	253.75
Toe Sta at appr (ft):	193.50	221.50
Abutment Length (ft):	41.74	48.75
Depth at Toe (ft):	0.39	0.39
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	90.00	90.00
K2 Skew Coef:	1.00	1.00
Projected Length L' (ft):	41.74	48.75
Avg Depth Obstructed Ya (ft):	2.07	1.77
Flow Obstructed Qe (cfs):	83.47	150.38
Area Obstructed Ae (sq ft):	86.59	86.43
Results		
Scour Depth Ys (ft):	1.65	1.06
Froude #:	0.19	0.05
Equation:	HIRE	HIRE

Bridge Scour RS = 562.756



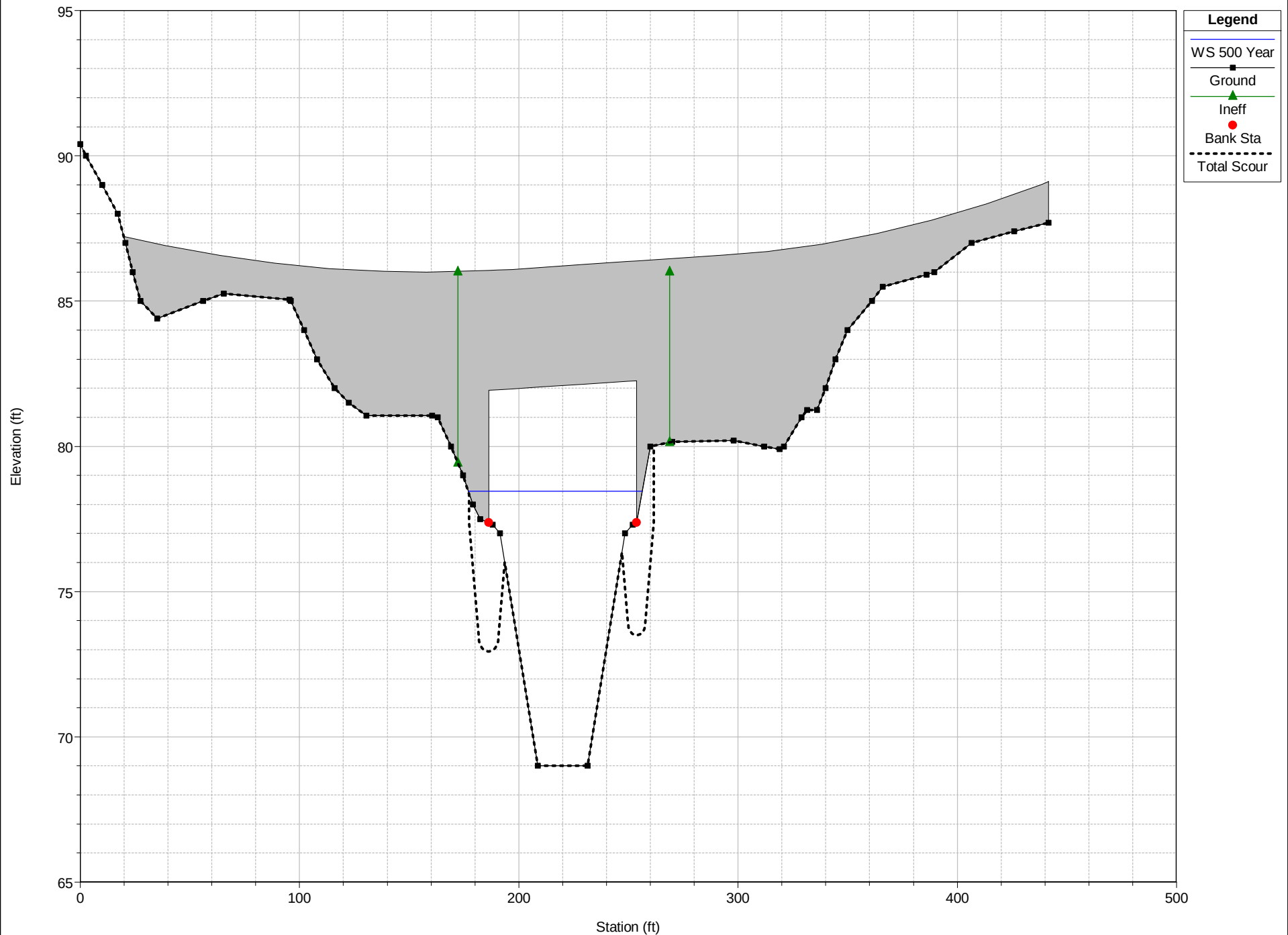
Contraction Scour

	Left	Channel	Right
Input Data			
Average Depth (ft):	2.54	6.97	2.49
Approach Velocity (ft/s):	1.12	4.14	2.22
Br Average Depth (ft):		6.14	
BR Opening Flow (cfs):		1210.00	
BR Top WD (ft):		67.50	
Grain Size D50 (mm):	0.20	0.20	0.20
Approach Flow (cfs):	132.32	807.80	269.87
Approach Top WD (ft):	46.58	28.00	48.75
K1 Coefficient:	0.690	0.690	0.690
Results			
Scour Depth Ys (ft):		0.00	
Critical Velocity (ft/s):		1.35	
Equation:		Live	

Abutment Scour

	Left	Right
Input Data		
Station at Toe (ft):	186.25	253.75
Toe Sta at appr (ft):	193.50	221.50
Abutment Length (ft):	46.41	48.75
Depth at Toe (ft):	1.04	1.04
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	90.00	90.00
K2 Skew Coef:	1.00	1.00
Projected Length L' (ft):	46.41	48.75
Avg Depth Obstructed Ya (ft):	2.54	2.49
Flow Obstructed Qe (cfs):	132.32	269.87
Area Obstructed Ae (sq ft):	118.10	121.50
Results		
Scour Depth Ys (ft):	4.42	3.87
Froude #:	0.20	0.13
Equation:	HIRE	HIRE

Bridge Scour RS = 562.756

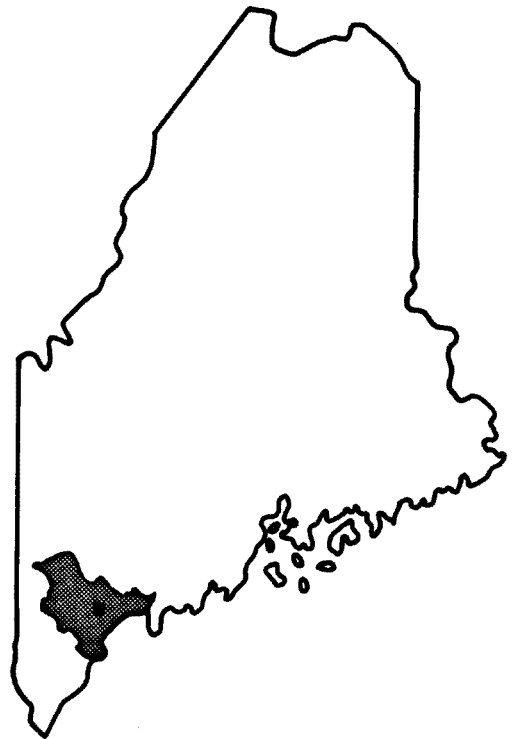


Supporting Information

FLOOD INSURANCE STUDY



**TOWN OF
WINDHAM,
MAINE
CUMBERLAND COUNTY**



MARCH 2, 1981



**federal emergency management agency
federal insurance administration**

COMMUNITY NUMBER - 230189

TABLE 1 - SUMMARY OF DISCHARGES

<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA</u> <u>(sq. miles)</u>	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10-YEAR</u>	<u>50-YEAR</u>	<u>100-YEAR</u>	<u>500-YEAR</u>
PRESUMPCOT RIVER					
At the Windham-City of Westbrook boundary	574	8,500	11,800	13,300	17,000
Above mouth of the Little River	516	6,500	9,200	10,800	15,200
At Newhall Dam	502	5,870	8,020	9,780	13,700
Above mouth of the Pleasant River	452	2,740	4,940	6,210	10,200
At the Windham-Standish boundary	437	1,980	4,130	5,380	9,290
DITCH BROOK					
At crossing of Varney's Mill Road	20.3	535	821	988	1,380
At outlet of Little Sebago Lake	18.9	535	821	988	1,380

For the analysis of Sebago Lake, values of the 10-, 50-, 100-, and 500-year peak stages were obtained from a graphical solution. Using the Weibull formula for plotting, position values of peak stage were plotted against exceedence probability and a curve was fitted to the data. The peak stages with desired exceedence probability were taken from the curve. The principal source of data for Sebago Lake was the record of lake elevations from 1872 to 1977.

For the analysis of elevations of Little Sebago Lake, values of the 10-, 50-, 100-, and 500-year peak stages were obtained from a stage-discharge relationship. The rating was developed by passing the desired theoretical flows through and over the outlet dam and computing the head on the dam.

A summary of peak elevation-frequency relationships is shown in Table 2, "Summary of Elevations."

All computed elevations were substantiated by interviews with residents of the area, visual checks for washouts and ice scratch lines, and historic news releases. The analysis reflects the still water elevation but does not include the contributions from wave action such as wave run-up and wave-crest height.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH ² (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Presumpscot River								
A	13.08	220	3,750	3.6	77.4	77.4	77.8	0.4
B	13.38	220	4,180	3.2	77.7	77.7	78.1	0.4
C	13.66	180	3,130	4.2	78.0	78.0	78.4	0.4
D	13.91	180	3,430	3.9	78.4	78.4	78.8	0.4
E	14.19	160	2,910	4.6	78.7	78.7	79.2	0.5
F	14.64	150	2,740	4.9	79.7	79.7	80.3	0.6
G	14.73	140	2,830	4.7	79.9	79.9	80.5	0.6
H	14.88	130	3,120	4.3	80.3	80.3	80.8	0.5
I	15.08	160	3,080	4.3	80.5	80.5	81.1	0.6
J	15.41	160	2,860	3.8	81.0	81.0	81.6	0.6
K	15.70	180	3,490	3.1	81.3	81.3	82.0	0.7
L	15.98	300	4,890	2.2	81.6	81.6	82.2	0.6
M	16.20	170	2,960	3.6	81.6	81.6	82.3	0.7
N	16.30	190	2,790	3.9	81.8	81.8	82.5	0.7
O	16.33	130	1,610	6.7	81.8	81.8	82.4	0.6
P	16.39	200	1,740	5.7	95.0	95.0	95.0	0.0
Q	16.42	200	2,140	4.7	95.4	95.4	95.4	0.0
R	16.63	170	1,850	5.4	96.2	96.2	96.2	0.0

¹Miles above mouth

²This width extends beyond corporate limits

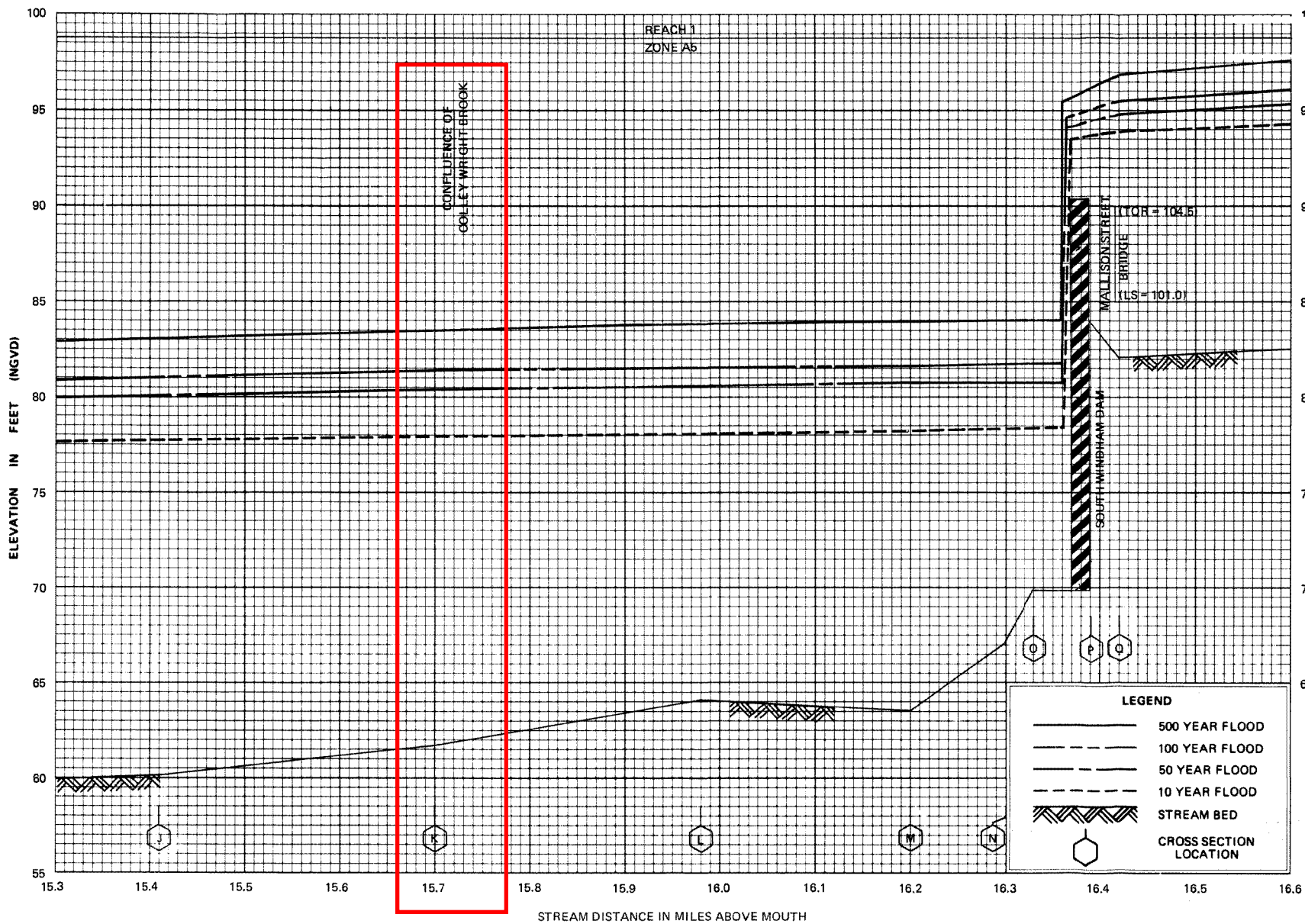
TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

TOWN OF WINDHAM, ME
(CUMBERLAND CO.)

FLOODWAY DATA

PRESUMPSCOT RIVER



FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

FLOOD PROFILES

TOWN OF WINDHAM, ME
(CUMBERLAND CO.)

PRESUMPCOT RIVER

03P

Questions concerning the VERTCON process may be mailed to [_NGS](#)

Latitude: 43.726

Longitude: 070.406

NGVD 29 height: 0000.00 FT

Datum shift(NAVD 88 minus NGVD 29): -0.673 feet

Converted to NAVD 88 height: -0.673 feet

Table 6-6. Joint Probability Analysis

Area Ratio $A_R = A_M/A_T$	Frequencies for Coincidental Occurrence							
	10% AEP Design		4% AEP Design		2% AEP Design		1% AEP Design	
	Main Stream	Tributary	Main Stream	Tributary	Main Stream	Tributary	Main Stream	Tributary
$A_R \geq 10,000$	50%	10%	50%	4%	50%	2%	50%	1%
	10%	50%	4%	50%	2%	50%	1%	50%
$1,000 \leq A_R < 10,000$	50%	10%	50%	4%	20%	2%	10%	1%
	10%	50%	4%	50%	2%	20%	1%	10%
$100 \leq A_R < 1,000$	20%	10%	20%	4%	10%	2%	4%	1%
	10%	20%	4%	20%	2%	10%	1%	4%
$10 \leq A_R < 100$	10%	10%	10%	4%	4%	2%	2%	1%
	10%	10%	4%	10%	2%	4%	1%	2%
$1 \leq A_R < 10$	10%	10%	4%	4%	2%	2%	1%	1%
	10%	10%	4%	4%	2%	2%	1%	1%

Note: Shaded values denote design combination for coincidental frequency occurrence. Non-shaded values denote check combination for coincidental frequency occurrence.

6.6.5 HEC-RAS Parameters

When evaluating VTrans structures, use the following HEC-RAS parameters for steady-state modeling:

- **Flow regime:** Use “Subcritical” for evaluating vertical clearance. Use “Mixed Flow” for evaluating peak velocities, scour, and stone sizing.
- **Expansion/contraction coefficients:** Use 0.3 (expansion) and 0.1 (contraction) for all model cross sections with the exception of the two cross sections immediately upstream and the one cross section immediately downstream of the bridge structure. For these cross sections, use 0.4 (expansion) and 0.2 (contraction) for most structures unless the contraction is significant. In the case of a significant contraction, use 0.5 (expansion) and 0.3 (contraction).

6.6.6 Extracting HEC-RAS Results

When evaluating VTrans structures, use the following HEC-RAS results for design:

- **Determining Structure Freeboard:** Use the predicted WSE two model cross sections upstream of the structure to determine structure freeboard.
- **Determining Peak Velocity:** Use the highest predicted average channel velocity from the six bridge cross sections, or “Six XS Bridge” (includes the two cross sections upstream of the crossing, the

two cross sections downstream of the crossing, and the two internal cross sections) for stone sizing or scour protection calculations.

- **Model Alterations to Accurately Calculate Scour:** Be sure to adjust the bank stations at internal and external bridge cross sections to represent channel flows through the opening during scour events. If the subject reach is typically affected by a confluence downstream, be sure to assume a low tailwater condition to arrive at a conservative estimate of scour. Refer to Chapter 7 “Channel Stability and Scour at Bridges” for more information.

6.6.7 Two-Dimensional Models

One-dimensional methods, such as the standard step method found in HEC-RAS, are typically used to predict the water surface profile and velocities in a river reach. While one-dimensional methods are adequate for most applications, these methods cannot provide a detailed determination of the cross-stream WSEs, flow velocities, or flow distribution.

Two-dimensional models are more complex and require more time to set up and calibrate. They require essentially the same field data as a one-dimensional model and, depending on complexity, may require more computer time. Obtain approval in writing from the VTrans Hydraulics Engineer before performing two-dimensional modeling.

Table 4.1 of [HDS-7](#), “Hydraulic Design of Safe Bridges” provides a useful visual for helping designers to determine when to select a two-dimensional model over a one-dimensional