

COTTONWOOD CREEK & SOUTH PINE CREEK DRAINAGE BASIN PLANNING STUDY

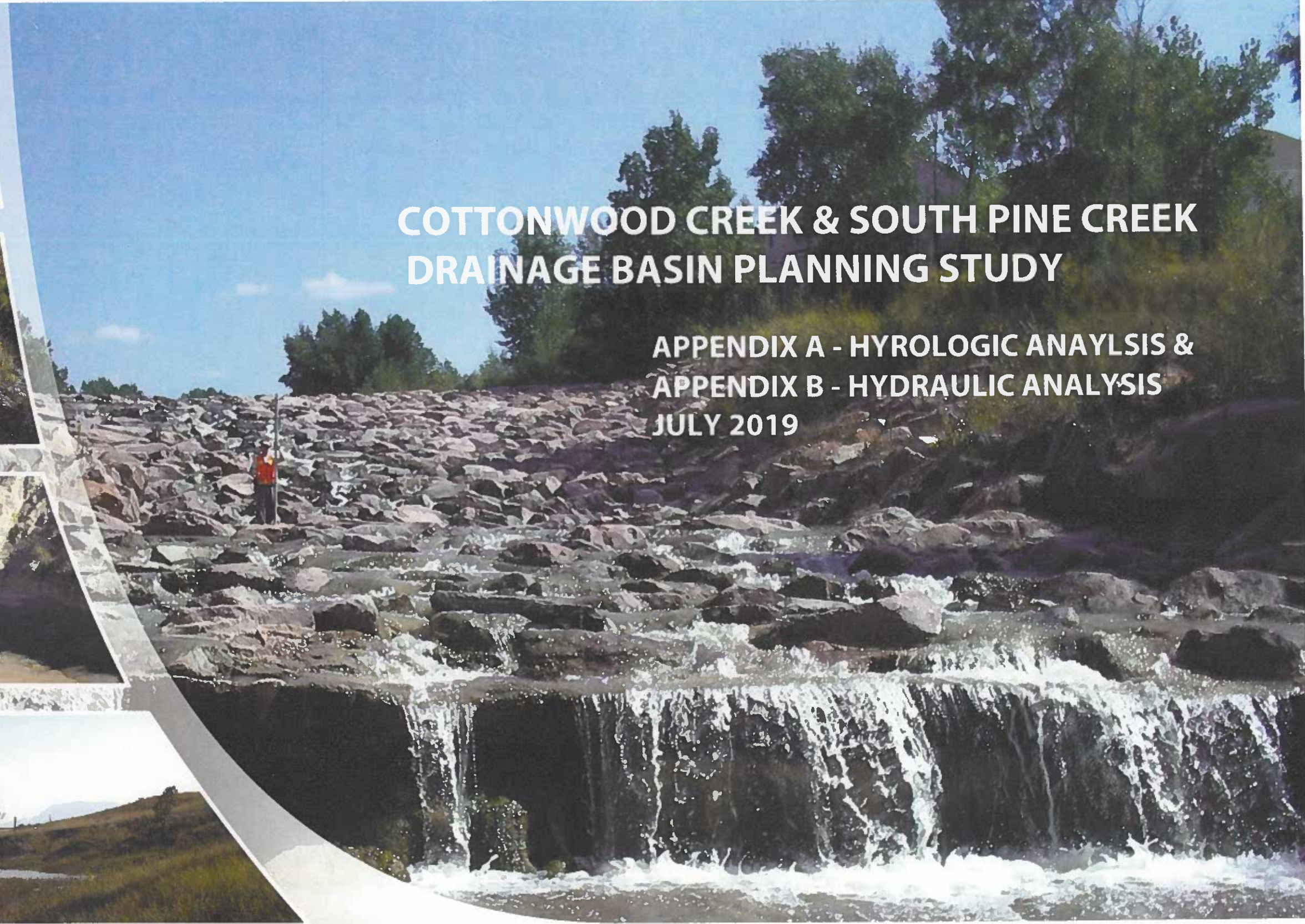
APPENDIX A - HYROLOGIC ANAYLSIS &
APPENDIX B - HYDRAULIC ANALYSIS
JULY 2019

Prepared for:



Department of Public Works
Water Resources Engineering
City of Colorado Springs
30 S. Nevada Ave
Colorado Springs, CO 80903

Prepared by:



Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach-1	20164 Existing - 2yr	950	6593.23	6591.94	6593.23	6593.77	0.011613	5.9	950	5.9	1.01	0.75	156.02	162.05
Reach-1	20164 Existing - 5yr	2000	6593.92	6591.94	6593.92	6594.76	0.009729	7.3	2000	7.3	1	1.01	164.66	273
Reach-1	20164 Existing - 10yr	2800	6594.34	6591.94	6594.34	6595.38	0.009115	8.2	2800	8.2	1.01	1.16	167.81	341.87
Reach-1	20164 Existing - 25yr	4800	6595.23	6591.94	6595.23	6596.72	0.008056	9.7	4796	9.8	1.02	1.43	172.97	494.12
Reach-1	20164 Existing - 50yr	6000	6595.7	6591.94	6595.7	6597.43	0.007649	10.4	5992	10.5	1.03	1.56	175.88	576.98
Reach-1	20164 Existing - 100yr	7200	6596.15	6591.94	6596.15	6598.09	0.007307	11	7185	11.2	1.03	1.67	178.56	656.35
Reach-1	20261	Culvert												
Reach-1	20354 Existing - 2yr	920	6597.94	6594.91	6596.78	6598.01	0.0005	2.2	920	2.2	0.28	0.06	219.25	416.05
Reach-1	20354 Existing - 5yr	1900	6599.87	6594.91	6597.34	6599.94	0.000199	2.1	1899	2.1	0.2	0.04	258.08	895.27
Reach-1	20354 Existing - 10yr	2700	6601.23	6594.91	6597.69	6601.31	0.000137	2.1	2694	2.2	0.18	0.04	274.51	1260.97
Reach-1	20354 Existing - 25yr	4600	6604.02	6594.91	6598.46	6604.1	0.000089	2.2	4554	2.4	0.16	0.04	331.28	2118.02
Reach-1	20354 Existing - 50yr	5700	6605.38	6594.91	6598.8	6605.47	0.000079	2.2	5614	2.5	0.16	0.04	344.55	2578.3
Reach-1	20354 Existing - 100yr	7000	6607.28	6594.91	6599.19	6607.38	0.000062	2.2	6845	2.5	0.15	0.03	357.68	3246.57
Reach-1	20471 Existing - 2yr	380	6597.68	6596	6597.68	6598.41	0.007162	6.8	380	6.8	1.01	0.62	39.61	55.75
Reach-1	20471 Existing - 5yr	840	6599.59	6596	6598.72	6600.11	0.001909	5.1	833	5.8	0.86	0.16	120.12	166.21
Reach-1	20471 Existing - 10yr	1200	6601.06	6596		6601.42	0.000851	2.8	1086	5	0.59	0.11	204.71	427.04
Reach-1	20471 Existing - 25yr	2100	6603.92	6596		6604.17	0.000358	2	1615	4.6	0.33	0.1	222.61	1043.44
Reach-1	20471 Existing - 50yr	2900	6605.25	6596		6605.55	0.000355	2.2	2128	5.1	0.32	0.13	227.74	1343.52
Reach-1	20471 Existing - 100yr	3800	6607.15	6596		6607.45	0.000285	2.1	2659	5.2	0.28	0.13	236.33	1784.15
Reach-1	20729 Existing - 2yr	380	6599.44	6598		6599.88	0.004521	5.3	380	5.3	0.8	0.38	52.89	71.93
Reach-1	20729 Existing - 5yr	840	6600.28	6598	6600.23	6600.99	0.00637	6.7	840	6.7	0.97	0.59	82.28	124.49
Reach-1	20729 Existing - 10yr	1200	6601.31	6598		6601.8	0.002358	5.5	1199	5.6	0.65	0.33	94.55	216.79
Reach-1	20729 Existing - 25yr	2100	6603.99	6598		6604.3	0.000562	3.5	2042	4.5	0.46	0.1	208.34	598.61
Reach-1	20729 Existing - 50yr	2900	6605.33	6598		6605.66	0.000456	3.2	2718	4.7	0.41	0.11	235.6	907.55
Reach-1	20729 Existing - 100yr	3800	6607.23	6598		6607.52	0.000301	2.8	3401	4.6	0.32	0.1	245.8	1366.03
Reach-1	21053 Existing - 2yr	380	6602.97	6602	6602.97	6603.44	0.008025	5.5	380	5.5	1	0.46	74.85	69.3
Reach-1	21053 Existing - 5yr	840	6603.62	6602	6603.62	6604.4	0.006813	7	840	7.1	1.02	0.64	79.19	119.2
Reach-1	21053 Existing - 10yr	1200	6604.04	6602	6604.04	6605.01	0.006273	7.8	1199	7.9	1.02	0.73	81.83	152.95
Reach-1	21053 Existing - 25yr	2100	6604.91	6602	6604.91	6606.32	0.005518	9.3	2094	9.5	1.03	0.9	85.99	226.4
Reach-1	21053 Existing - 50yr	2900	6605.59	6602	6605.59	6607.32	0.00513	10.2	2885	10.6	1.04	1.01	89.25	285.31
Reach-1	21053 Existing - 100yr	3800	6606.27	6602	6606.27	6608.34	0.004841	10.9	3773	11.6	1.06	1.1	93.63	347.34
Reach-1	21520 Existing - 2yr	380	6609.24	6608	6609.24	6609.84	0.007577	6.2	380	6.2	1.01	0.55	51.62	60.97
Reach-1	21520 Existing - 5yr	840	6610.08	6608	6610.08	6611.06	0.006393	7.9	840	8	1.01	0.75	54.9	105.68
Reach-1	21520 Existing - 10yr	1200	6610.6	6608	6610.6	6611.85	0.005866	8.9	1200	8.9	1.02	0.86	56.41	134.98
Reach-1	21520 Existing - 25yr	2100	6611.72	6608	6611.72	6613.51	0.005166	10.5	2096	10.8	1.03	1.05	59.28	199.53
Reach-1	21520 Existing - 50yr	2900	6612.59	6608	6612.59	6614.79	0.004749	11.5	2889	11.9	1.04	1.15	62.4	252.48
Reach-1	21520 Existing - 100yr	3800	6613.51	6608	6613.51	6616.09	0.004364	12.2	3777	12.9	1.05	1.22	66.52	311.27

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	22003	Existing - 2yr	380	6615.52	6614	6615.52	6616.2	0.007204	6.6	380	6.6	1.01	0.6	42.54	57.29
Reach-1	22003	Existing - 5yr	840	6616.46	6614	6616.46	6617.59	0.005984	8.4	839	8.5	1.04	0.76	48.1	100.32
Reach-1	22003	Existing - 10yr	1200	6617.07	6614	6617.07	6618.48	0.005474	9.2	1196	9.5	1.05	0.85	51.38	130.53
Reach-1	22003	Existing - 25yr	2100	6618.36	6614	6618.36	6620.36	0.004782	10.4	2077	11.4	1.08	1	58.32	201.05
Reach-1	22003	Existing - 50yr	2900	6619.34	6614	6619.34	6621.79	0.004433	11.1	2849	12.7	1.09	1.1	63.41	260.67
Reach-1	22003	Existing - 100yr	3800	6620.3	6614	6620.3	6623.23	0.004244	11.7	3711	13.9	1.13	1.18	70.69	324.13
Reach-1	22503	Existing - 2yr	380	6623.85	6622	6623.85	6624.42	0.007574	6.1	380	6.1	1.01	0.53	55.12	62.37
Reach-1	22503	Existing - 5yr	840	6624.63	6622	6624.63	6625.58	0.006382	7.7	839	7.8	1.04	0.69	62.51	109.55
Reach-1	22503	Existing - 10yr	1200	6625.14	6622	6625.14	6626.32	0.005817	8.5	1196	8.7	1.04	0.78	65.15	141.92
Reach-1	22503	Existing - 25yr	2100	6626.22	6622	6626.22	6627.9	0.005025	9.7	2080	10.4	1.05	0.93	71.53	216.17
Reach-1	22503	Existing - 50yr	2900	6627.03	6622	6627.03	6629.11	0.004725	10.5	2859	11.6	1.06	1.06	74.94	275.08
Reach-1	22503	Existing - 100yr	3800	6627.85	6622	6627.85	6630.32	0.00445	11.2	3728	12.7	1.07	1.17	78.38	338.45
Reach-1	22796	Existing - 2yr	380	6630.44	6628	6630.44	6631.26	0.006471	7	379	7.3	1.11	0.53	40.7	54.24
Reach-1	22796	Existing - 5yr	840	6631.62	6628	6631.62	6632.89	0.00506	7.2	814	9.2	1.19	0.56	65.78	116.86
Reach-1	22796	Existing - 10yr	1200	6632.38	6628	6632.38	6633.85	0.004412	7	1129	10	1.14	0.62	75.62	172.04
Reach-1	22796	Existing - 25yr	2100	6633.74	6628	6633.74	6635.81	0.004229	7.5	1884	12.2	1.1	0.89	81.29	278.81
Reach-1	22796	Existing - 50yr	2900	6634.73	6628	6634.73	6637.29	0.004224	8	2544	13.7	1.12	1.06	88.36	361.89
Reach-1	22796	Existing - 100yr	3800	6635.83	6628	6635.83	6638.77	0.003938	8.2	3263	14.8	1.11	1.15	97.55	464.71
Reach-1	22879	Existing - 2yr	380	6636.42	6634.79	6636.42	6636.82	0.00893	5	380	5	1.02	0.42	100.58	75.48
Reach-1	22879	Existing - 5yr	840	6636.97	6634.79	6636.97	6637.6	0.007187	6.4	840	6.4	1	0.56	104.38	131.67
Reach-1	22879	Existing - 10yr	1200	6637.31	6634.79	6637.31	6638.11	0.006743	7.2	1200	7.2	1.01	0.66	106.75	167.39
Reach-1	22879	Existing - 25yr	2100	6638.03	6634.79	6638.03	6639.17	0.005896	8.5	2099	8.6	1.02	0.81	111.68	246.74
Reach-1	22879	Existing - 50yr	2900	6638.57	6634.79	6638.57	6639.99	0.005525	9.4	2896	9.6	1.03	0.92	114.55	307.82
Reach-1	22879	Existing - 100yr	3800	6639.13	6634.79	6639.13	6640.82	0.005186	10.2	3791	10.4	1.03	1.02	117.51	372.52
Reach-1	23003	Existing - 2yr	380	6637.45	6636	6637.45	6637.93	0.007923	5.6	380	5.6	1	0.47	71.3	68.21
Reach-1	23003	Existing - 5yr	840	6638.12	6636	6638.12	6638.84	0.006986	6.8	840	6.8	1.03	0.6	90.12	123.8
Reach-1	23003	Existing - 10yr	1200	6638.51	6636	6638.51	6639.42	0.00635	7.5	1198	7.6	1.03	0.68	93.14	159.5
Reach-1	23003	Existing - 25yr	2100	6639.34	6636	6639.34	6640.63	0.005548	8.8	2090	9.2	1.04	0.82	100.08	238.88
Reach-1	23003	Existing - 50yr	2900	6639.96	6636	6639.96	6641.56	0.005163	9.6	2876	10.2	1.06	0.92	105.76	303.35
Reach-1	23003	Existing - 100yr	3800	6640.6	6636	6640.6	6642.5	0.004854	10.2	3753	11.1	1.05	1.03	108.39	371.54
Reach-1	23503	Existing - 2yr	380	6640.04	6638	6640.04	6640.55	0.003666	5.7	380	5.7	0.76	0.39	37.91	66.41
Reach-1	23503	Existing - 5yr	840	6640.83	6638	6640.77	6642.03	0.005342	8.5	838	8.8	1.03	0.74	43.23	98.36
Reach-1	23503	Existing - 10yr	1200	6641.47	6638	6641.47	6643.03	0.005191	9.4	1192	10.1	1.09	0.83	48.72	127.64
Reach-1	23503	Existing - 25yr	2100	6642.9	6638	6642.9	6645.1	0.004525	10.3	2055	12	1.1	0.99	56.26	204.42
Reach-1	23503	Existing - 50yr	2900	6643.98	6638	6643.98	6646.65	0.004242	10.9	2806	13.3	1.09	1.13	59.49	266.41
Reach-1	23503	Existing - 100yr	3800	6645.04	6638	6645.04	6648.22	0.004043	11.5	3641	14.6	1.09	1.28	62.02	331.38

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	24003	Existing - 2yr	380	6648.55	6646	6648.55	6649.35	0.006903	7.2	380	7.2	1.01	0.67	33.39	52.85
Reach-1	24003	Existing - 5yr	840	6649.68	6646	6649.68	6650.96	0.006032	9.1	840	9.1	1.01	0.91	36.71	92.65
Reach-1	24003	Existing - 10yr	1200	6650.37	6646	6650.37	6651.97	0.005598	10.1	1200	10.1	1.03	1.01	39.33	118.8
Reach-1	24003	Existing - 25yr	2100	6651.82	6646	6651.82	6654.1	0.00486	11.7	2093	12.1	1.07	1.14	45.45	180.03
Reach-1	24003	Existing - 50yr	2900	6652.96	6646	6652.96	6655.72	0.004392	12.3	2876	13.4	1.1	1.18	51.96	235.47
Reach-1	24003	Existing - 100yr	3800	6654.08	6646	6654.08	6657.33	0.0041	12.8	3743	14.6	1.12	1.25	57.65	297.29
Reach-1	24438	Existing - 2yr	380	6656.19	6654	6656.19	6657.09	0.006713	7.6	380	7.6	1.03	0.69	29.94	50.29
Reach-1	24438	Existing - 5yr	840	6657.44	6654	6657.44	6658.9	0.005413	9.1	834	9.7	1.1	0.79	38.51	92.71
Reach-1	24438	Existing - 10yr	1200	6658.23	6654	6658.23	6660.05	0.004953	9.6	1182	10.9	1.14	0.83	45.05	125.64
Reach-1	24438	Existing - 25yr	2100	6659.95	6654	6659.95	6662.39	0.00414	9.6	2016	12.8	1.18	0.87	62.71	218.78
Reach-1	24438	Existing - 50yr	2900	6661.26	6654	6661.26	6664.1	0.003722	9.3	2721	14	1.21	0.87	80.92	312.05
Reach-1	24438	Existing - 100yr	3800	6662.6	6654	6662.6	6665.7	0.003294	8.8	3456	14.8	1.17	0.9	96.03	432.08
Reach-1	24912	Existing - 2yr	380	6665.91	6664	6665.91	6666.59	0.008388	6.6	380	6.6	1	0.7	42.44	57.54
Reach-1	24912	Existing - 5yr	840	6666.86	6664	6666.86	6667.94	0.007413	8.3	840	8.3	1.01	0.96	47.54	100.88
Reach-1	24912	Existing - 10yr	1200	6667.45	6664	6667.45	6668.79	0.006925	9.3	1200	9.3	1.02	1.09	49.94	129.51
Reach-1	24912	Existing - 25yr	2100	6668.66	6664	6668.66	6670.56	0.006058	10.8	2097	11.1	1.06	1.23	57.89	194.16
Reach-1	24912	Existing - 50yr	2900	6669.61	6664	6669.61	6671.91	0.005464	11.4	2883	12.2	1.13	1.18	71.51	254.77
Reach-1	24912	Existing - 100yr	3800	6670.61	6664	6670.61	6673.23	0.004891	11.3	3745	13.1	1.17	1.14	87.38	335.25
Reach-1	25102	Existing - 2yr	380	6667.93	6666	6667.93	6668.74	0.008129	7.2	380	7.2	1	0.79	32.82	52.67
Reach-1	25102	Existing - 5yr	840	6669.09	6666	6669.09	6670.33	0.007269	8.9	840	8.9	1.01	1.06	38.34	93.92
Reach-1	25102	Existing - 10yr	1200	6669.79	6666	6669.79	6671.3	0.00675	9.8	1200	9.9	1.02	1.17	41.67	121.93
Reach-1	25102	Existing - 25yr	2100	6671.19	6666	6671.19	6673.32	0.005746	11.1	2091	11.7	1.11	1.18	54.05	188.48
Reach-1	25102	Existing - 50yr	2900	6672.26	6666	6672.26	6674.83	0.005249	11.5	2863	12.9	1.14	1.21	63.9	251.43
Reach-1	25102	Existing - 100yr	3800	6673.32	6666	6673.32	6676.31	0.004875	11.7	3708	14	1.16	1.28	72.45	324.11
Reach-1	25454	Existing - 2yr	380	6675.67	6673.78	6675.67	6676.29	0.008656	6.3	380	6.3	1.01	0.66	48.91	60.06
Reach-1	25454	Existing - 5yr	840	6676.52	6673.78	6676.52	6677.52	0.007407	7.9	838	8	1.05	0.83	58.88	106.57
Reach-1	25454	Existing - 10yr	1200	6677.07	6673.78	6677.07	6678.31	0.006674	8.6	1194	9	1.07	0.91	63.81	140.03
Reach-1	25454	Existing - 25yr	2100	6678.22	6673.78	6678.22	6679.96	0.005709	9.6	2067	10.7	1.08	1.05	73.7	219.55
Reach-1	25454	Existing - 50yr	2900	6679.07	6673.78	6679.07	6681.21	0.005372	10.2	2830	11.9	1.1	1.18	79.84	284.41
Reach-1	25454	Existing - 100yr	3800	6679.95	6673.78	6679.95	6682.45	0.004994	10.6	3674	12.9	1.1	1.27	86.27	357.85
Reach-1	25534	Existing - 2yr	380	6677.55	6676	6677.55	6678.27	0.007054	6.7	380	6.8	1.02	0.6	41.02	56.36
Reach-1	25534	Existing - 5yr	840	6678.55	6676	6678.55	6679.72	0.005851	8.4	837	8.7	1.04	0.77	46.34	99.79
Reach-1	25534	Existing - 10yr	1200	6679.18	6676	6679.18	6680.66	0.005381	9.2	1192	9.8	1.06	0.86	49.61	130.27
Reach-1	25534	Existing - 25yr	2100	6680.53	6676	6680.53	6682.63	0.004732	10.4	2066	11.7	1.09	1.01	57.31	201.83
Reach-1	25534	Existing - 50yr	2900	6681.57	6676	6681.57	6684.11	0.004337	10.9	2830	12.9	1.11	1.08	64.37	265.22
Reach-1	25534	Existing - 100yr	3800	6682.61	6676	6682.61	6685.59	0.004069	11.3	3675	14.1	1.13	1.15	72.12	335.93

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	25573	Existing - 2yr	380	6680.17	6678	6680.17	6680.93	0.007055	7	380	7	1.01	0.64	36.87	54.55
Reach-1	25573	Existing - 5yr	840	6681.27	6678	6681.27	6682.36	0.006106	8.4	840	8.4	1.01	0.8	46.65	100.26
Reach-1	25573	Existing - 10yr	1200	6681.85	6678	6681.85	6683.22	0.005743	9.3	1199	9.4	1.05	0.88	51.7	129.08
Reach-1	25573	Existing - 25yr	2100	6683.1	6678	6683.1	6685.04	0.004939	10.6	2088	11.2	1.08	1	59.75	198.54
Reach-1	25573	Existing - 50yr	2900	6684.05	6678	6684.05	6686.41	0.004534	11.2	2866	12.4	1.1	1.09	65.6	258.2
Reach-1	25573	Existing - 100yr	3800	6685.02	6678	6685.02	6687.79	0.0042	11.7	3729	13.5	1.1	1.16	71.29	324.77
Reach-1	25654	Existing - 2yr	380	6680.81	6678		6681.35	0.003633	5.9	380	5.9	0.75	0.43	33.53	64.17
Reach-1	25654	Existing - 5yr	840	6681.66	6678	6681.62	6682.88	0.005679	8.8	840	8.8	0.99	0.85	38.71	95.12
Reach-1	25654	Existing - 10yr	1200	6682.3	6678	6682.3	6683.86	0.005543	9.9	1199	10	1.05	0.95	43.01	121.17
Reach-1	25654	Existing - 25yr	2100	6683.76	6678	6683.76	6685.9	0.004575	10.6	2077	11.8	1.15	0.9	61.25	198.99
Reach-1	25654	Existing - 50yr	2900	6684.85	6678	6684.85	6687.4	0.004161	10.7	2831	13	1.16	0.96	71.05	270.93
Reach-1	25654	Existing - 100yr	3800	6685.92	6678	6685.92	6688.87	0.003862	10.8	3654	14	1.14	1.06	77.62	351.21
Reach-1	25784	Bridge													
Reach-1	25919	Existing - 2yr	380	6684.63	6682	6683.6	6684.79	0.001037	3.2	380	3.2	0.41	0.12	62.43	119.45
Reach-1	25919	Existing - 5yr	840	6685.82	6682	6684.48	6686.09	0.001122	4.2	840	4.2	0.45	0.19	73.23	200.22
Reach-1	25919	Existing - 10yr	1200	6686.51	6682	6685	6686.86	0.001089	4.8	1200	4.8	0.47	0.22	77.32	252.19
Reach-1	25919	Existing - 25yr	2100	6687.94	6682	6686.03	6688.48	0.001032	5.7	2094	5.9	0.5	0.27	84.59	368.33
Reach-1	25919	Existing - 50yr	2900	6689.02	6682	6686.73	6689.7	0.000999	6.3	2882	6.6	0.51	0.31	89.87	462.85
Reach-1	25919	Existing - 100yr	3800	6690.11	6682	6687.46	6690.94	0.000972	6.7	3763	7.3	0.53	0.35	95.33	563.7
Reach-1	26035	Existing - 2yr	380	6685.44	6684	6685.44	6686.09	0.007297	6.5	380	6.5	1.01	0.58	45.68	58.73
Reach-1	26035	Existing - 5yr	840	6686.35	6684	6686.35	6687.39	0.006242	8.2	840	8.2	1.03	0.75	52.3	103.05
Reach-1	26035	Existing - 10yr	1200	6686.91	6684	6686.91	6688.22	0.005672	9	1198	9.2	1.05	0.82	56.81	133.82
Reach-1	26035	Existing - 25yr	2100	6688.1	6684	6688.1	6689.96	0.004952	10.2	2082	11	1.09	0.95	65.83	206.81
Reach-1	26035	Existing - 50yr	2900	6689.02	6684	6689.02	6691.27	0.004538	10.7	2855	12.1	1.11	1	74.69	271.32
Reach-1	26035	Existing - 100yr	3800	6689.96	6684	6689.96	6692.58	0.004185	11	3708	13.2	1.13	1.05	83.48	345.87
Reach-1	26233	Existing - 2yr	150	6687.06	6686		6687.3	0.003721	3.9	150	3.9	0.69	0.23	38.43	38.42
Reach-1	26233	Existing - 5yr	420	6687.96	6686		6688.45	0.003599	5.6	420	5.6	0.75	0.39	42.1	74.53
Reach-1	26233	Existing - 10yr	770	6688.35	6686	6688.35	6689.47	0.006204	8.4	770	8.5	1.02	0.8	43.01	91.5
Reach-1	26233	Existing - 25yr	1800	6690.04	6686	6690.04	6691.94	0.004994	10.8	1789	11.1	1.03	1.05	46.75	166.97
Reach-1	26233	Existing - 50yr	2400	6690.86	6686	6690.86	6693.14	0.004642	11.6	2375	12.2	1.04	1.14	48.92	206.19
Reach-1	26233	Existing - 100yr	3100	6691.72	6686	6691.72	6694.39	0.004365	12.4	3053	13.2	1.05	1.23	51.15	249.44
Reach-1	26289	Bridge													

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	26361	Existing - 2yr	150	6689.6	6688	6689.09	6689.82	0.002153	3.7	150	3.7	0.55	0.19	27.91	40.1
Reach-1	26361	Existing - 5yr	420	6690.67	6688	6690.09	6691.21	0.002682	5.8	419	5.9	0.69	0.36	31.75	71.85
Reach-1	26361	Existing - 10yr	770	6691.68	6688	6691.04	6692.56	0.002753	7.3	760	7.6	0.77	0.49	35.6	106.02
Reach-1	26361	Existing - 25yr	1800	6693.95	6688	6693.38	6695.39	0.002453	7.8	1666	10	1.01	0.42	82.44	231.7
Reach-1	26361	Existing - 50yr	2400	6694.91	6688	6694.52	6696.46	0.002257	7.5	2074	10.6	0.97	0.45	97.81	319.91
Reach-1	26361	Existing - 100yr	3100	6695.7	6688	6695.33	6697.45	0.002317	7.7	2529	11.6	0.98	0.52	109.9	401.26
Reach-1	26480	Existing - 2yr	150	6691.2	6690	6691.2	6691.75	0.007809	5.9	150	5.9	1	0.52	23.1	25.25
Reach-1	26480	Existing - 5yr	420	6692.29	6690	6692.29	6693.28	0.00663	8	420	8	1.01	0.78	26.78	52.56
Reach-1	26480	Existing - 10yr	770	6693.29	6690	6693.29	6694.72	0.005821	9.5	770	9.6	1.04	0.9	30.82	81.02
Reach-1	26480	Existing - 25yr	1800	6695.8	6690	6695.8	6697.51	0.003268	7	1647	10.9	1.18	0.48	105.49	256.48
Reach-1	26480	Existing - 50yr	2400	6696.61	6690	6696.61	6698.55	0.003259	7	2075	12	1.12	0.61	111.83	344.26
Reach-1	26480	Existing - 100yr	3100	6697.41	6690	6697.41	6699.59	0.003257	7.1	2545	13	1.08	0.74	116.95	436.64
Reach-1	26791	Existing - 2yr	150	6695.63	6694	6695.63	6696.18	0.007674	6	150	6	1	0.52	22.82	25.11
Reach-1	26791	Existing - 5yr	420	6696.72	6694	6696.72	6697.58	0.006363	7.4	419	7.4	1.03	0.64	34.74	56.8
Reach-1	26791	Existing - 10yr	770	6697.61	6694	6697.61	6698.81	0.005248	8.5	752	8.9	1.04	0.71	41.07	90.71
Reach-1	26791	Existing - 25yr	1800	6699.55	6694	6699.55	6701.34	0.003987	9.6	1633	11.1	1.06	0.76	59.47	187.33
Reach-1	26791	Existing - 50yr	2400	6700.44	6694	6700.44	6702.41	0.003616	9.8	2082	11.9	1.05	0.79	68.13	243.77
Reach-1	26791	Existing - 100yr	3100	6701.26	6694	6701.26	6703.48	0.003456	10.2	2572	12.8	1.05	0.85	75.28	303.15
Reach-1	27232	Existing - 2yr	150	6701.58	6700	6701.58	6702.2	0.007498	6.3	150	6.3	1	0.56	19.48	23.86
Reach-1	27232	Existing - 5yr	420	6702.79	6700	6702.79	6703.86	0.006459	8.3	420	8.3	1	0.81	23.8	50.62
Reach-1	27232	Existing - 10yr	770	6703.89	6700	6703.89	6705.42	0.005742	9.7	768	9.9	1.04	0.95	28.09	79.29
Reach-1	27232	Existing - 25yr	1800	6706.43	6700	6706.43	6708.58	0.003824	8.2	1708	12.1	1.24	0.65	78.3	219.29
Reach-1	27232	Existing - 50yr	2400	6707.43	6700	6707.43	6709.89	0.00364	8	2195	13.1	1.18	0.78	84.63	301.16
Reach-1	27232	Existing - 100yr	3100	6708.41	6700	6708.41	6711.23	0.003587	8	2742	14.3	1.15	0.93	90.02	386.7
Reach-1	27595	Existing - 2yr	150	6705.28	6704	6705.28	6705.77	0.008122	5.6	150	5.6	1.01	0.48	27.87	26.74
Reach-1	27595	Existing - 5yr	420	6706.25	6704	6706.25	6707.07	0.006926	7.3	420	7.3	1.01	0.68	35.97	57.76
Reach-1	27595	Existing - 10yr	770	6707.07	6704	6707.07	6708.23	0.006185	8.6	770	8.6	1.02	0.83	40.44	89.42
Reach-1	27595	Existing - 25yr	1800	6708.84	6704	6708.84	6710.81	0.004956	10.9	1793	11.3	1.05	1.07	45.89	165.61
Reach-1	27595	Existing - 50yr	2400	6709.68	6704	6709.68	6712.06	0.004652	11.7	2383	12.4	1.06	1.17	48.03	205.24
Reach-1	27595	Existing - 100yr	3100	6710.59	6704	6710.59	6713.39	0.004351	12.3	3070	13.5	1.13	1.13	57.49	252.42
Reach-1	28003	Existing - 2yr	150	6709.97	6708	6709.97	6710.42	0.007565	5.4	150	5.4	0.96	0.44	29.21	28
Reach-1	28003	Existing - 5yr	420	6710.76	6708	6710.76	6711.47	0.007398	6.8	420	6.8	1.01	0.62	44.72	62.06
Reach-1	28003	Existing - 10yr	770	6711.47	6708	6711.47	6712.5	0.006593	8.2	770	8.2	1.01	0.8	46.75	94.44
Reach-1	28003	Existing - 25yr	1800	6713.03	6708	6713.03	6714.79	0.005357	10.5	1799	10.6	1.03	1.04	52.07	171.53
Reach-1	28003	Existing - 50yr	2400	6713.77	6708	6713.77	6715.89	0.005061	11.4	2395	11.7	1.05	1.14	54.83	210.64
Reach-1	28003	Existing - 100yr	3100	6714.58	6708	6714.58	6717.06	0.004699	12.1	3086	12.7	1.06	1.22	57.41	256.19

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	28503	Existing - 2yr	150	6717.65	6716	6717.65	6718.32	0.00756	6.6	150	6.6	1.01	0.6	17.27	22.83
Reach-1	28503	Existing - 5yr	420	6718.93	6716	6718.93	6720.07	0.006394	8.5	420	8.6	1.04	0.8	23.38	49.35
Reach-1	28503	Existing - 10yr	770	6720.09	6716	6720.09	6721.74	0.00535	9.7	766	10.3	1.1	0.86	28.81	79.16
Reach-1	28503	Existing - 25yr	1800	6722.65	6716	6722.65	6725.38	0.004285	10.8	1748	13.4	1.14	1.03	39.81	166.12
Reach-1	28503	Existing - 50yr	2400	6723.86	6716	6723.86	6727.08	0.004016	11.1	2298	14.7	1.15	1.12	44.46	216.84
Reach-1	28503	Existing - 100yr	3100	6725.08	6716	6725.08	6728.88	0.003885	11.2	2938	16.1	1.22	1.14	54.12	275.74
Reach-1	28969	Existing - 2yr	150	6723.35	6722	6723.35	6723.95	0.007756	6.2	150	6.2	1.01	0.56	20.2	24.07
Reach-1	28969	Existing - 5yr	420	6724.54	6722	6724.54	6725.61	0.006588	8.3	420	8.3	1	0.82	23.96	50.69
Reach-1	28969	Existing - 10yr	770	6725.62	6722	6725.62	6727.15	0.006	9.9	770	9.9	1.02	1.01	26.57	77.98
Reach-1	28969	Existing - 25yr	1800	6727.96	6722	6727.96	6730.53	0.004836	12.2	1789	12.9	1.08	1.2	33.25	148.02
Reach-1	28969	Existing - 50yr	2400	6729.06	6722	6729.06	6732.16	0.004546	12.9	2374	14.2	1.1	1.29	36.55	186.43
Reach-1	28969	Existing - 100yr	3100	6730.15	6722	6730.15	6733.87	0.00445	13.6	3051	15.6	1.15	1.38	40.84	228.1
Reach-1	29390	Existing - 2yr	150	6728.83	6728	6728.83	6729.25	0.008782	5.2	150	5.2	1.02	0.43	36.21	29
Reach-1	29390	Existing - 5yr	420	6729.64	6728	6729.64	6730.42	0.007004	7.1	420	7.1	1.01	0.65	38.66	59.36
Reach-1	29390	Existing - 10yr	770	6730.42	6728	6730.42	6731.55	0.006147	8.5	770	8.6	1.03	0.8	42.23	90.45
Reach-1	29390	Existing - 25yr	1800	6732.16	6728	6732.16	6734.1	0.004915	10.4	1785	11.2	1.08	0.98	52.05	173.11
Reach-1	29390	Existing - 50yr	2400	6732.99	6728	6732.99	6735.31	0.004611	11	2366	12.3	1.08	1.08	54.93	217.5
Reach-1	29390	Existing - 100yr	3100	6733.87	6728	6733.87	6736.59	0.004361	11.6	3038	13.4	1.09	1.18	57.98	267.04
Reach-1	29669	Existing - 2yr	150	6733.47	6732	6733.47	6734.07	0.007689	6.2	150	6.2	1.01	0.55	20.54	24.21
Reach-1	29669	Existing - 5yr	420	6734.68	6732	6734.68	6735.65	0.006682	7.9	420	7.9	1.01	0.76	28.02	53.29
Reach-1	29669	Existing - 10yr	770	6735.66	6732	6735.66	6736.99	0.00601	9.1	770	9.2	1.05	0.86	35.2	84.35
Reach-1	29669	Existing - 25yr	1800	6737.77	6732	6737.77	6739.84	0.004406	9.3	1754	11.7	1.24	0.71	72.61	194.59
Reach-1	29669	Existing - 50yr	2400	6738.76	6732	6738.76	6741.08	0.003958	8.8	2275	12.5	1.17	0.8	80.66	271.48
Reach-1	29669	Existing - 100yr	3100	6739.69	6732	6739.69	6742.34	0.003777	8.9	2862	13.6	1.12	0.94	83.43	348.63
Reach-1	30071	Existing - 2yr	150	6735.92	6735.1		6736.08	0.003385	3.2	150	3.2	0.64	0.17	58.9	46.52
Reach-1	30071	Existing - 5yr	420	6736.82	6735.1		6737.1	0.002119	4.1	419	4.2	0.59	0.21	63.22	101.8
Reach-1	30071	Existing - 10yr	770	6737.8	6735.1		6738.17	0.001551	4.6	764	4.9	0.55	0.23	67.91	166.15
Reach-1	30071	Existing - 25yr	1800	6740.18	6735.1		6740.73	0.001	5.3	1764	6	0.5	0.26	78.13	339.91
Reach-1	30071	Existing - 50yr	2400	6741.27	6735.1		6741.92	0.000921	5.6	2339	6.6	0.5	0.29	82.01	426.78
Reach-1	30071	Existing - 100yr	3100	6742.4	6735.1		6743.16	0.000865	5.9	3005	7.1	0.5	0.32	86.03	521.99
Reach-1	30095	Existing - 2yr	150	6739.76	6739.19	6739.76	6740.04	0.009571	4.3	150	4.3	1.01	0.33	63.22	35.17
Reach-1	30095	Existing - 5yr	420	6740.32	6739.19	6740.32	6740.86	0.007614	5.9	420	5.9	1	0.51	65.76	71.07
Reach-1	30095	Existing - 10yr	770	6740.86	6739.19	6740.86	6741.66	0.006671	7.2	770	7.2	1.01	0.65	67.81	107.36
Reach-1	30095	Existing - 25yr	1800	6742.07	6739.19	6742.07	6743.48	0.005545	9.4	1797	9.5	1.03	0.9	72.42	192.39
Reach-1	30095	Existing - 50yr	2400	6742.67	6739.19	6742.67	6744.37	0.005165	10.1	2392	10.5	1.04	1	74.72	236.47
Reach-1	30095	Existing - 100yr	3100	6743.31	6739.19	6743.31	6745.31	0.004857	10.9	3084	11.4	1.04	1.09	77.17	284.79

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	30206	Existing - 2yr	150	6740.33	6739.19		6740.47	0.00193	3	150	3	0.51	0.13	46.16	50.02
Reach-1	30206	Existing - 5yr	420	6740.96	6739.19		6741.4	0.003337	5.3	419	5.4	0.74	0.34	48.47	79.94
Reach-1	30206	Existing - 10yr	770	6741.41	6739.19	6741.3	6742.35	0.005162	7.5	767	7.8	0.96	0.64	50.13	102.28
Reach-1	30206	Existing - 25yr	1800	6742.88	6739.19	6742.88	6744.68	0.005039	10	1781	10.8	1.05	0.99	55.51	179.78
Reach-1	30206	Existing - 50yr	2400	6743.65	6739.19	6743.65	6745.81	0.004699	10.7	2366	11.9	1.06	1.08	58.33	223.66
Reach-1	30206	Existing - 100yr	3100	6744.46	6739.19	6744.46	6747	0.004434	11.4	3044	12.9	1.07	1.18	61.31	272.29
Reach-1	30230	Existing - 2yr	150	6745.74	6745.19	6745.74	6746.01	0.009455	4.2	150	4.2	1	0.32	66.32	35.98
Reach-1	30230	Existing - 5yr	420	6746.27	6745.19	6746.27	6746.81	0.007606	5.8	420	5.9	1.01	0.49	68.56	71.88
Reach-1	30230	Existing - 10yr	770	6746.8	6745.19	6746.8	6747.6	0.006713	7.1	769	7.2	1.02	0.64	70.76	108.51
Reach-1	30230	Existing - 25yr	1800	6748.02	6745.19	6748.02	6749.41	0.005504	9.1	1790	9.5	1.04	0.88	75.87	197.58
Reach-1	30230	Existing - 50yr	2400	6748.61	6745.19	6748.61	6750.29	0.005146	9.9	2381	10.4	1.04	0.98	78.36	243.29
Reach-1	30230	Existing - 100yr	3100	6749.24	6745.19	6749.24	6751.22	0.004851	10.6	3068	11.4	1.05	1.07	81	293.44
Reach-1	30296	Existing - 2yr	150	6746.17	6745.19		6746.32	0.002486	3.1	150	3.1	0.57	0.14	53.96	49.04
Reach-1	30296	Existing - 5yr	420	6746.73	6745.19		6747.18	0.004027	5.2	419	5.4	0.8	0.35	57.8	80.53
Reach-1	30296	Existing - 10yr	770	6747.15	6745.19	6747.12	6748.06	0.005975	7.3	766	7.7	1.03	0.64	60.57	105.01
Reach-1	30296	Existing - 25yr	1800	6748.55	6745.19	6748.55	6750.15	0.005076	9.1	1770	10.2	1.08	0.86	72.27	198.3
Reach-1	30296	Existing - 50yr	2400	6749.24	6745.19	6749.24	6751.15	0.004766	9.6	2343	11.2	1.08	0.96	76.38	249.15
Reach-1	30296	Existing - 100yr	3100	6749.98	6745.19	6749.98	6752.2	0.004452	10.1	3005	12.1	1.08	1.04	80.65	307.33
Reach-1	30320	Existing - 2yr	150	6751.83	6751.19	6751.83	6752.14	0.009281	4.4	150	4.4	1.01	0.35	55.86	33.78
Reach-1	30320	Existing - 5yr	420	6752.43	6751.19	6752.43	6753.01	0.007406	6.1	420	6.1	1.02	0.52	61.44	68.91
Reach-1	30320	Existing - 10yr	770	6753	6751.19	6753	6753.87	0.00648	7.3	768	7.5	1.05	0.64	66.61	105.73
Reach-1	30320	Existing - 25yr	1800	6754.33	6751.19	6754.33	6755.81	0.005216	8.9	1776	9.8	1.07	0.83	78.47	202.19
Reach-1	30320	Existing - 50yr	2400	6754.97	6751.19	6754.97	6756.74	0.00486	9.4	2355	10.8	1.08	0.91	84.09	254.41
Reach-1	30320	Existing - 100yr	3100	6755.63	6751.19	6755.63	6757.72	0.004665	10	3023	11.7	1.1	0.99	89.78	311.17
Reach-1	30520	Existing - 2yr	150	6754.81	6753.63	6754.81	6755.23	0.008452	5.2	150	5.2	1.01	0.43	34.79	28.85
Reach-1	30520	Existing - 5yr	420	6755.63	6753.63	6755.63	6756.42	0.006992	7.1	420	7.1	1.01	0.66	38.32	58.98
Reach-1	30520	Existing - 10yr	770	6756.42	6753.63	6756.42	6757.57	0.00606	8.5	769	8.6	1.03	0.8	41.17	90.06
Reach-1	30520	Existing - 25yr	1800	6758.27	6753.63	6758.27	6760.17	0.004568	10.1	1788	11.1	1.23	0.7	70.28	178.09
Reach-1	30520	Existing - 50yr	2400	6759.14	6753.63	6759.14	6761.35	0.00418	9.8	2350	12.1	1.23	0.74	83.37	244.25
Reach-1	30520	Existing - 100yr	3100	6760.09	6753.63	6760.09	6762.55	0.003745	9.4	2973	12.8	1.19	0.79	94.85	329.94
Reach-1	31003	Existing - 2yr	150	6760.14	6758.66	6760.14	6760.63	0.008003	5.6	150	5.6	1.01	0.48	27.26	26.59
Reach-1	31003	Existing - 5yr	420	6761.13	6758.66	6761.13	6761.98	0.006831	7.4	420	7.4	1.01	0.7	33.76	56.68
Reach-1	31003	Existing - 10yr	770	6762.02	6758.66	6762.02	6763.2	0.005649	8.3	768	8.7	1.37	0.43	73.81	92.48
Reach-1	31003	Existing - 25yr	1800	6763.85	6758.66	6763.85	6765.51	0.004138	6.6	1651	10.8	1.18	0.6	114.16	272.08
Reach-1	31003	Existing - 50yr	2400	6764.63	6758.66	6764.63	6766.52	0.003936	6.6	2119	11.7	1.12	0.72	121.46	363.84
Reach-1	31003	Existing - 100yr	3100	6765.38	6758.66	6765.38	6767.55	0.003881	6.8	2647	12.8	1.09	0.86	125.51	456.7

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	31503	Existing - 2yr	150	6768.13	6766.51	6768.13	6768.5	0.009114	4.9	150	4.9	1.02	0.4	42.82	30.56
Reach-1	31503	Existing - 5yr	420	6768.86	6766.51	6768.86	6769.54	0.007071	6.6	420	6.6	1	0.59	46.59	63.42
Reach-1	31503	Existing - 10yr	770	6769.55	6766.51	6769.55	6770.54	0.006271	7.9	770	8	1.01	0.75	50.13	96.95
Reach-1	31503	Existing - 25yr	1800	6771.07	6766.51	6771.07	6772.73	0.005055	9.6	1788	10.4	1.14	0.79	73.47	187.25
Reach-1	31503	Existing - 50yr	2400	6771.79	6766.51	6771.79	6773.76	0.004706	9.8	2363	11.4	1.19	0.81	87.4	244.93
Reach-1	31503	Existing - 100yr	3100	6772.64	6766.51	6772.64	6774.81	0.004092	9.4	3006	12	1.17	0.8	103.24	328.23
Reach-1	31817	Existing - 2yr	65	6772.52	6772	6772.52	6772.78	0.010101	4.1	65	4.1	1.02	0.31	31.86	15.95
Reach-1	31817	Existing - 5yr	260	6773.3	6772	6773.3	6773.85	0.007581	6	260	6	1	0.52	39.32	43.55
Reach-1	31817	Existing - 10yr	510	6773.95	6772	6773.95	6774.74	0.006835	7.1	510	7.1	1	0.66	45.94	71.72
Reach-1	31817	Existing - 25yr	1300	6775.3	6772	6775.3	6776.69	0.005412	8.5	1278	9.5	1.08	0.79	63.62	152.83
Reach-1	31817	Existing - 50yr	1800	6775.95	6772	6775.95	6777.68	0.005157	9.2	1756	10.7	1.08	0.92	66.33	195.55
Reach-1	31817	Existing - 100yr	2400	6776.71	6772	6776.71	6778.77	0.004782	9.6	2331	11.7	1.14	0.93	78.36	249.88
Reach-1	32075	Existing - 2yr	65	6774.67	6774	6774.6	6774.9	0.006771	3.9	65	3.9	0.86	0.27	26.09	16.67
Reach-1	32075	Existing - 5yr	260	6775.49	6774	6775.49	6776.17	0.007281	6.7	260	6.7	1	0.6	28.4	39.07
Reach-1	32075	Existing - 10yr	510	6776.27	6774	6776.27	6777.32	0.006531	8.2	510	8.2	1.02	0.79	30.45	62
Reach-1	32075	Existing - 25yr	1300	6778.08	6774	6778.08	6780.01	0.005188	10.7	1295	11.2	1.05	1.03	34.98	121.43
Reach-1	32075	Existing - 50yr	1800	6779.03	6774	6779.03	6781.4	0.004783	11.5	1787	12.4	1.07	1.12	37.67	155.85
Reach-1	32075	Existing - 100yr	2400	6779.94	6774	6779.94	6782.89	0.004739	12.5	2373	13.8	1.11	1.27	40.09	191.41
Reach-1	32509	Existing - 2yr	65	6782.61	6782	6782.61	6782.89	0.00923	4.3	65	4.3	0.99	0.33	26.09	15.16
Reach-1	32509	Existing - 5yr	260	6783.47	6782	6783.47	6784.16	0.007338	6.6	260	6.7	1.02	0.59	29.47	39.14
Reach-1	32509	Existing - 10yr	510	6784.25	6782	6784.25	6785.31	0.006215	8.1	509	8.3	1.05	0.72	32.77	63.26
Reach-1	32509	Existing - 25yr	1300	6786.05	6782	6786.05	6788	0.005105	10.2	1282	11.3	1.08	1	38.31	127.58
Reach-1	32509	Existing - 50yr	1800	6787.05	6782	6787.05	6789.39	0.004552	10.6	1766	12.4	1.13	0.99	45.89	169.58
Reach-1	32509	Existing - 100yr	2400	6788.02	6782	6788.02	6790.85	0.004344	11	2333	13.7	1.18	1.04	53.52	218.14
Reach-1	33003	Existing - 2yr	65	6790.96	6790	6790.96	6791.4	0.008736	5.3	65	5.3	1.01	0.45	14.12	12.21
Reach-1	33003	Existing - 5yr	260	6792.29	6790	6792.29	6793.21	0.007022	7.7	260	7.7	1	0.75	18.29	33.64
Reach-1	33003	Existing - 10yr	510	6793.36	6790	6793.36	6794.69	0.006361	9.2	510	9.3	1.04	0.91	22.23	55.35
Reach-1	33003	Existing - 25yr	1300	6795.76	6790	6795.76	6797.96	0.004629	9.9	1274	12	1.22	0.79	44.58	131.09
Reach-1	33003	Existing - 50yr	1800	6797.14	6790	6797.14	6799.36	0.003547	7.3	1677	12.4	1.34	0.52	100.48	247.17
Reach-1	33003	Existing - 100yr	2400	6798.39	6790	6798.39	6800.63	0.00302	6.2	2086	12.9	1.19	0.57	123.09	389.82
Reach-1	33325	Existing - 2yr	65	6796.11	6794.27	6796.11	6796.41	0.009721	4.4	65	4.4	1.01	0.35	25.25	14.81
Reach-1	33325	Existing - 5yr	260	6797.02	6794.27	6797.02	6797.67	0.007368	6.5	260	6.5	1	0.59	30.33	39.92
Reach-1	33325	Existing - 10yr	510	6797.77	6794.27	6797.77	6798.76	0.006611	8	510	8	1.03	0.75	34.09	64.13
Reach-1	33325	Existing - 25yr	1300	6799.47	6794.27	6799.47	6801.25	0.005146	9.9	1289	10.7	1.11	0.88	45.67	131.75
Reach-1	33325	Existing - 50yr	1800	6800.36	6794.27	6800.36	6802.51	0.004714	10.3	1770	11.9	1.14	0.92	53.18	175.07
Reach-1	33325	Existing - 100yr	2400	6801.34	6794.27	6801.34	6803.84	0.004249	10.3	2334	12.9	1.17	0.93	63.48	232.52

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	33742	Existing - 2yr	65	6802.51	6802	6802.51	6802.75	0.010054	3.9	65	3.9	1.01	0.3	34.86	16.54
Reach-1	33742	Existing - 5yr	260	6803.22	6802	6803.22	6803.77	0.007675	5.9	260	5.9	1.01	0.51	40.53	43.8
Reach-1	33742	Existing - 10yr	510	6803.85	6802	6803.85	6804.69	0.006646	7.3	510	7.4	1.02	0.66	43.46	69.95
Reach-1	33742	Existing - 25yr	1300	6805.28	6802	6805.28	6806.83	0.005403	9.6	1293	10	1.04	0.93	47.95	135.81
Reach-1	33742	Existing - 50yr	1800	6806.04	6802	6806.04	6807.94	0.004993	10.4	1785	11.1	1.05	1.03	50.28	172.71
Reach-1	33742	Existing - 100yr	2400	6806.85	6802	6806.85	6809.13	0.00465	11.2	2372	12.2	1.06	1.12	53.05	214.79
Reach-1	34211	Existing - 2yr	65	6810.61	6810	6810.61	6810.9	0.009298	4.3	65	4.3	1	0.33	26.21	15.14
Reach-1	34211	Existing - 5yr	260	6811.48	6810	6811.48	6812.15	0.007259	6.5	260	6.5	1.01	0.58	30.45	39.78
Reach-1	34211	Existing - 10yr	510	6812.24	6810	6812.24	6813.25	0.006331	7.9	509	8.1	1.05	0.71	34.83	64.29
Reach-1	34211	Existing - 25yr	1300	6813.98	6810	6813.98	6815.79	0.004998	9.7	1281	10.9	1.1	0.9	45.24	134.25
Reach-1	34211	Existing - 50yr	1800	6814.92	6810	6814.92	6817.08	0.004474	9.8	1757	11.9	1.18	0.84	58.89	182.81
Reach-1	34211	Existing - 100yr	2400	6816.03	6810	6816.03	6818.41	0.003769	9.2	2302	12.6	1.24	0.71	84.88	262.15
Reach-1	34267	Existing - 2yr	58	6811.05	6810		6811.19	0.002978	3	58	3	0.59	0.15	23.91	19.26
Reach-1	34267	Existing - 5yr	240	6811.96	6810		6812.47	0.004088	5.6	240	5.7	0.8	0.39	27.22	42.7
Reach-1	34267	Existing - 10yr	470	6812.55	6810	6812.5	6813.6	0.005657	8	469	8.2	1	0.7	28.33	59.08
Reach-1	34267	Existing - 25yr	1200	6814.39	6810	6814.39	6816.4	0.004944	10.5	1188	11.4	1.06	1	32.01	114.25
Reach-1	34267	Existing - 50yr	1700	6815.46	6810	6815.46	6817.96	0.004531	11.3	1675	12.8	1.08	1.09	35.14	150.13
Reach-1	34267	Existing - 100yr	2200	6816.42	6810	6816.42	6819.36	0.004272	11.8	2159	13.9	1.14	1.09	40.99	185.71
Reach-1	34299	Existing - 2yr	58	6814.85	6814	6814.85	6815.17	0.009053	4.6	58	4.6	1	0.36	19.76	12.74
Reach-1	34299	Existing - 5yr	240	6815.84	6814	6815.84	6816.47	0.007466	6.4	240	6.4	1.01	0.57	30.52	37.72
Reach-1	34299	Existing - 10yr	470	6816.55	6814	6816.55	6817.49	0.006439	7.6	469	7.8	1.06	0.66	37.02	61.53
Reach-1	34299	Existing - 25yr	1200	6818.21	6814	6818.21	6819.84	0.004863	8.8	1177	10.3	1.13	0.76	53.06	135.88
Reach-1	34299	Existing - 50yr	1700	6819.09	6814	6819.09	6821.1	0.004516	9.2	1643	11.6	1.14	0.85	60.29	185.74
Reach-1	34299	Existing - 100yr	2200	6819.89	6814	6819.89	6822.2	0.00422	9.3	2097	12.5	1.14	0.92	66.6	236.57
Reach-1	34439	Existing - 2yr	58	6819.26	6817.38	6819.26	6819.76	0.008762	5.7	58	5.7	1.01	0.5	10.35	10.18
Reach-1	34439	Existing - 5yr	240	6820.78	6817.38	6820.78	6821.56	0.0074	7.1	240	7.1	1.01	0.67	22.04	33.8
Reach-1	34439	Existing - 10yr	470	6821.7	6817.38	6821.7	6822.7	0.006533	8	470	8	1.05	0.71	32.17	58.95
Reach-1	34439	Existing - 25yr	1200	6823.54	6817.38	6823.54	6825.02	0.004306	6.6	1129	10.1	1.24	0.51	94.99	182.38
Reach-1	34439	Existing - 50yr	1700	6824.41	6817.38	6824.41	6826.11	0.003958	6.3	1521	11.1	1.16	0.62	107.13	271.41
Reach-1	34439	Existing - 100yr	2200	6825.1	6817.38	6825.1	6827.04	0.003917	6.3	1897	12	1.13	0.74	113	346.97
Reach-1	34524	Bridge													

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	34614	Existing - 2yr	58	6819.93	6818	6818.62	6819.96	0.000193	1.2	58	1.2	0.17	0.02	29.28	47.56
Reach-1	34614	Existing - 5yr	240	6821.74	6818	6819.54	6821.81	0.000312	2.2	240	2.2	0.23	0.05	40.25	110.03
Reach-1	34614	Existing - 10yr	470	6822.86	6818	6820.34	6822.99	0.000418	2.9	470	2.9	0.3	0.07	57.38	163.49
Reach-1	34614	Existing - 25yr	1200	6825.03	6818	6822.11	6825.33	0.000501	3.6	1172	4.4	0.42	0.1	99.86	333.45
Reach-1	34614	Existing - 50yr	1700	6826.03	6818	6822.88	6826.44	0.000558	3.8	1630	5.2	0.47	0.13	118.68	443.27
Reach-1	34614	Existing - 100yr	2200	6826.89	6818	6823.56	6827.4	0.000597	4	2071	5.9	0.49	0.16	128.87	549.65
Reach-1	34800	Existing - 2yr	58	6821.35	6820	6821.35	6821.79	0.008593	5.3	58	5.3	1.01	0.45	12.36	10.85
Reach-1	34800	Existing - 5yr	240	6822.64	6820	6822.64	6823.28	0.007507	6.4	240	6.4	1	0.58	29.12	37.29
Reach-1	34800	Existing - 10yr	470	6823.39	6820	6823.39	6824.32	0.006694	7.7	470	7.7	1.02	0.72	33.9	60.9
Reach-1	34800	Existing - 25yr	1200	6825.01	6820	6825.01	6826.68	0.005239	9.7	1189	10.4	1.09	0.87	44.09	124.31
Reach-1	34800	Existing - 50yr	1700	6825.87	6820	6825.87	6827.97	0.004944	10.3	1670	11.7	1.12	0.97	49.35	164.52
Reach-1	34800	Existing - 100yr	2200	6826.83	6820	6826.83	6829.1	0.004135	9.6	2133	12.3	1.23	0.74	76.32	229.39
Reach-1	35126	Existing - 2yr	58	6826.03	6824.68	6826.03	6826.48	0.008859	5.4	58	5.4	1.01	0.46	12.25	10.78
Reach-1	35126	Existing - 5yr	240	6827.4	6824.68	6827.4	6828.36	0.007232	7.9	240	7.9	1.01	0.77	16.17	30.53
Reach-1	35126	Existing - 10yr	470	6828.49	6824.68	6828.49	6829.91	0.006431	9.5	470	9.5	1.03	0.94	18.51	49.45
Reach-1	35126	Existing - 25yr	1200	6831.03	6824.68	6831.03	6833.5	0.004794	11	1187	12.7	1.3	0.78	37.65	109.35
Reach-1	35126	Existing - 50yr	1700	6832.61	6824.68	6832.61	6835.23	0.003745	8.9	1617	13.3	1.28	0.69	59.75	190.39
Reach-1	35126	Existing - 100yr	2200	6833.76	6824.68	6833.76	6836.65	0.003501	8.4	2015	14.2	1.22	0.79	67.61	263.04
Reach-1	35692	Existing - 2yr	58	6834.78	6834	6834.78	6835.12	0.009171	4.7	58	4.7	1.01	0.38	18.28	12.31
Reach-1	35692	Existing - 5yr	240	6835.83	6834	6835.83	6836.52	0.007223	6.6	240	6.6	1.01	0.6	26.56	36.1
Reach-1	35692	Existing - 10yr	470	6836.6	6834	6836.6	6837.64	0.006238	8	469	8.2	1.04	0.72	30.84	58.47
Reach-1	35692	Existing - 25yr	1200	6838.4	6834	6838.4	6840.27	0.004949	10	1185	11	1.09	0.93	38.33	120.48
Reach-1	35692	Existing - 50yr	1700	6839.38	6834	6839.38	6841.71	0.004593	10.6	1666	12.4	1.11	1.02	42.62	160.22
Reach-1	35692	Existing - 100yr	2200	6839.95	6834	6839.95	6843.02	0.005255	11.9	2145	14.2	1.23	1.27	45.42	185.41
Reach-1	36156	Existing - 2yr	58	6842.81	6842	6842.81	6843.16	0.008795	4.7	58	4.7	1	0.38	17.77	12.33
Reach-1	36156	Existing - 5yr	240	6843.89	6842	6843.89	6844.64	0.007214	7	240	7	1.01	0.64	23.43	34.45
Reach-1	36156	Existing - 10yr	470	6844.76	6842	6844.76	6845.83	0.005716	7.5	464	8.4	1.12	0.59	37.01	63.07
Reach-1	36156	Existing - 25yr	1200	6846.65	6842	6846.65	6848.5	0.004621	8.2	1133	11.2	1.11	0.83	48.76	146.02
Reach-1	36156	Existing - 50yr	1700	6847.67	6842	6847.67	6849.93	0.004311	8.6	1571	12.5	1.09	0.97	52.44	197.56
Reach-1	36156	Existing - 100yr	2200	6848.52	6842	6848.52	6851.22	0.004272	9	2008	13.8	1.13	1.07	58.16	243.9
Reach-1	36365	Existing - 2yr	58	6846.75	6846	6846.75	6847.09	0.009103	4.7	58	4.7	1.01	0.38	18.07	12.31
Reach-1	36365	Existing - 5yr	240	6847.82	6846	6847.82	6848.62	0.007056	7.1	240	7.1	1.01	0.66	21.52	33.62
Reach-1	36365	Existing - 10yr	470	6848.72	6846	6848.72	6849.94	0.00602	8.6	469	8.8	1.07	0.76	25.74	54.76
Reach-1	36365	Existing - 25yr	1200	6850.84	6846	6850.84	6852.99	0.004734	10	1174	11.9	1.13	0.93	35.69	119.8
Reach-1	36365	Existing - 50yr	1700	6851.91	6846	6851.91	6854.64	0.004602	10.6	1642	13.5	1.18	1.04	41.2	160.89
Reach-1	36365	Existing - 100yr	2200	6853.53	6846	6853.53	6855.82	0.002941	6.7	1998	12.7	1.27	0.5	115.77	328.34

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	36776	Existing - 2yr	58	6851.45	6850	6851.45	6851.96	0.00874	5.7	58	5.7	1	0.5	10.09	10.16
Reach-1	36776	Existing - 5yr	240	6852.98	6850	6852.98	6853.91	0.007047	7.5	240	7.7	1.12	0.6	21.56	31.91
Reach-1	36776	Existing - 10yr	470	6854.05	6850	6854.05	6855.4	0.006206	8	459	9.4	1.11	0.77	26.75	58.93
Reach-1	36776	Existing - 25yr	1200	6856.37	6850	6856.37	6858.78	0.005247	9.5	1131	12.8	1.1	1.14	31.68	126.56
Reach-1	36776	Existing - 50yr	1700	6857.68	6850	6857.68	6860.64	0.004837	10	1580	14.3	1.1	1.27	34.68	170.02
Reach-1	36776	Existing - 100yr	2200	6858.81	6850	6858.81	6862.36	0.004703	10.3	2036	15.7	1.2	1.27	42.97	213.07
Reach-1	37236	Existing - 2yr	58	6861.29	6860	6861.29	6861.78	0.00877	5.6	58	5.6	1	0.49	10.74	10.36
Reach-1	37236	Existing - 5yr	240	6862.78	6860	6862.78	6863.96	0.006429	8.2	238	8.8	1.07	0.72	14.13	29.35
Reach-1	37236	Existing - 10yr	470	6864.11	6860	6864.11	6865.91	0.005505	9.5	460	10.9	1.09	0.86	16.23	49.54
Reach-1	37236	Existing - 25yr	1200	6867.38	6860	6867.38	6870.36	0.004091	10.2	1130	14.3	1.22	0.86	29.25	117.88
Reach-1	37236	Existing - 50yr	1700	6869.71	6860	6869.71	6872.28	0.00263	6.8	1463	13.9	1.24	0.51	74.9	250.03
Reach-1	37236	Existing - 100yr	2200	6870.88	6860	6870.88	6873.64	0.00258	6.4	1763	14.9	1.15	0.62	81.77	341.8
Reach-1	37421	Existing - 2yr	58	6867.04	6866	6867.04	6867.52	0.008845	5.5	58	5.5	1.01	0.48	11.22	10.46
Reach-1	37421	Existing - 5yr	240	6868.55	6866	6868.55	6869.53	0.007212	7.9	240	7.9	1	0.78	15.58	30.23
Reach-1	37421	Existing - 10yr	470	6869.69	6866	6869.69	6871.08	0.00638	9.3	469	9.5	1.05	0.9	19.99	50.5
Reach-1	37421	Existing - 25yr	1200	6872.24	6866	6872.24	6874.4	0.004366	9	1147	12.1	1.25	0.71	47.98	132.75
Reach-1	37421	Existing - 50yr	1700	6873.6	6866	6873.6	6875.97	0.003712	8	1546	12.9	1.23	0.69	67.65	211.39
Reach-1	37421	Existing - 100yr	2200	6874.67	6866	6874.67	6877.23	0.003434	7.5	1906	13.8	1.2	0.73	81.99	292.08
Reach-1	37525	Bridge													
Reach-1	37590	Existing - 2yr	58	6873.28	6872	6872.58	6873.32	0.000619	1.6	58	1.6	0.28	0.04	34.25	35.45
Reach-1	37590	Existing - 5yr	240	6874.59	6872	6873.4	6874.71	0.000719	2.7	240	2.7	0.34	0.09	44.29	87.65
Reach-1	37590	Existing - 10yr	470	6875.63	6872	6874.07	6875.82	0.000696	3.4	468	3.5	0.38	0.11	52.15	137.42
Reach-1	37590	Existing - 25yr	1200	6877.82	6872	6875.46	6878.22	0.000712	4.5	1173	5.1	0.44	0.18	65.11	267
Reach-1	37590	Existing - 50yr	1700	6878.87	6872	6876.21	6879.41	0.000761	5	1644	6	0.47	0.22	70.46	338.03
Reach-1	37590	Existing - 100yr	2200	6879.65	6872	6876.9	6880.35	0.000849	5.6	2111	6.8	0.51	0.27	74.31	394.57
Reach-1	37714	Existing - 2yr	58	6873.36	6872		6873.41	0.000883	1.8	58	1.8	0.33	0.05	34.42	31.9
Reach-1	37714	Existing - 5yr	240	6874.69	6872		6874.8	0.000782	2.7	240	2.7	0.36	0.08	51.06	89.31
Reach-1	37714	Existing - 10yr	470	6875.74	6872		6875.91	0.000657	3.1	467	3.3	0.38	0.1	63.39	149.41
Reach-1	37714	Existing - 25yr	1200	6877.99	6872		6878.31	0.000588	3.8	1155	4.6	0.41	0.14	82.69	314.73
Reach-1	37714	Existing - 50yr	1700	6879.09	6872		6879.5	0.000598	4.2	1608	5.3	0.42	0.17	87.64	408.24
Reach-1	37714	Existing - 100yr	2200	6879.93	6872		6880.46	0.00064	4.5	2058	6	0.44	0.21	91.53	483.98

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	38160	Existing - 2yr	58	6880.66	6880	6880.66	6880.94	0.009491	4.3	58	4.3	1	0.33	24.23	13.6
Reach-1	38160	Existing - 5yr	240	6881.54	6880	6881.54	6882.12	0.00747	6.1	240	6.1	1	0.53	34.01	39.29
Reach-1	38160	Existing - 10yr	470	6882.21	6880	6882.21	6883.04	0.006709	7.3	470	7.3	1.03	0.65	41.26	64.47
Reach-1	38160	Existing - 25yr	1200	6883.66	6880	6883.66	6885.13	0.005152	8.9	1183	9.8	1.1	0.77	55.89	135.17
Reach-1	38160	Existing - 50yr	1700	6884.45	6880	6884.45	6886.25	0.004751	9.4	1655	10.9	1.11	0.85	62.62	181.73
Reach-1	38160	Existing - 100yr	2200	6885.17	6880	6885.17	6887.24	0.0044	9.6	2116	11.8	1.12	0.9	68.99	229.2
Reach-1	38627	Existing - 2yr	37	6886.16	6885.36	6886.16	6886.36	0.010646	3.6	37	3.6	1.01	0.26	25.76	10.27
Reach-1	38627	Existing - 5yr	140	6886.73	6885.36	6886.73	6887.16	0.008288	5.3	140	5.3	1.01	0.44	30.89	26.5
Reach-1	38627	Existing - 10yr	260	6887.19	6885.36	6887.19	6887.79	0.007515	6.2	260	6.2	1.01	0.55	35.03	41.64
Reach-1	38627	Existing - 25yr	610	6888.11	6885.36	6888.11	6889.08	0.006379	7.9	610	7.9	1.03	0.71	42.71	77.65
Reach-1	38627	Existing - 50yr	840	6888.58	6885.36	6888.58	6889.76	0.005769	8.5	838	8.7	1.04	0.77	45.47	98.57
Reach-1	38627	Existing - 100yr	1100	6889.05	6885.36	6889.05	6890.45	0.005465	9.2	1095	9.5	1.06	0.83	48.18	120.18
Reach-1	39086	Existing - 2yr	37	6894.69	6894	6894.69	6894.98	0.009605	4.3	37	4.3	1	0.33	15.08	8.64
Reach-1	39086	Existing - 5yr	140	6895.46	6894	6895.46	6896.03	0.007921	5.9	140	6	1.07	0.46	24.11	23.6
Reach-1	39086	Existing - 10yr	260	6896.04	6894	6896.04	6896.86	0.006764	6.6	256	7.3	1.12	0.53	30.1	39.23
Reach-1	39086	Existing - 25yr	610	6897.37	6894	6897.37	6898.57	0.004868	6.4	569	9.1	1.16	0.52	53.44	94.81
Reach-1	39086	Existing - 50yr	840	6897.94	6894	6897.94	6899.4	0.004856	6.6	758	10.2	1.18	0.61	60.26	127.21
Reach-1	39086	Existing - 100yr	1100	6898.64	6894	6898.64	6900.2	0.004251	6.3	954	10.7	1.13	0.63	70.54	173.95
Reach-1	39599	Existing - 2yr	37	6906.33	6906	6906.33	6906.49	0.012175	3.2	37	3.2	1.03	0.23	37.42	11.44
Reach-1	39599	Existing - 5yr	140	6906.79	6906	6906.79	6907.12	0.008791	4.7	140	4.7	1	0.37	44.31	30.01
Reach-1	39599	Existing - 10yr	260	6907.14	6906	6907.14	6907.63	0.007852	5.6	260	5.6	1	0.47	48.42	46.64
Reach-1	39599	Existing - 25yr	610	6907.89	6906	6907.89	6908.7	0.00653	7.1	609	7.3	1.04	0.62	56.32	85.5
Reach-1	39599	Existing - 50yr	840	6908.27	6906	6908.27	6909.28	0.00612	7.8	836	8.1	1.06	0.69	59.58	107.78
Reach-1	39599	Existing - 100yr	1100	6908.67	6906	6908.67	6909.86	0.005698	8.3	1091	8.8	1.06	0.75	62.69	132.38
Reach-1	40099	Existing - 2yr	37	6912.26	6912	6912.25	6912.38	0.011358	2.7	37	2.7	0.96	0.18	53.75	13.5
Reach-1	40099	Existing - 5yr	140	6912.61	6912	6912.61	6912.89	0.009427	4.3	140	4.3	1	0.33	58.73	32.89
Reach-1	40099	Existing - 10yr	260	6912.89	6912	6912.89	6913.31	0.008365	5.2	260	5.2	1.03	0.42	62.98	50.17
Reach-1	40099	Existing - 25yr	610	6913.54	6912	6913.54	6914.25	0.006634	6.5	605	6.8	1.05	0.53	72.83	94.24
Reach-1	40099	Existing - 50yr	840	6913.89	6912	6913.89	6914.76	0.006084	7	829	7.5	1.06	0.59	77.68	120.82
Reach-1	40099	Existing - 100yr	1100	6914.24	6912	6914.24	6915.27	0.005728	7.3	1079	8.2	1.1	0.6	88.52	150.21

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	40503	Existing - 2yr	37	6918.29	6918	6918.29	6918.43	0.011646	3	37	3	0.99	0.2	43.84	12.36
Reach-1	40503	Existing - 5yr	140	6918.69	6918	6918.69	6919.02	0.008926	4.6	140	4.6	1	0.36	47.05	30.62
Reach-1	40503	Existing - 10yr	260	6919.03	6918	6919.03	6919.51	0.007808	5.5	260	5.5	1	0.46	49.79	47.12
Reach-1	40503	Existing - 25yr	610	6919.76	6918	6919.76	6920.57	0.006552	7.1	609	7.2	1.03	0.62	55.75	85.72
Reach-1	40503	Existing - 50yr	840	6920.15	6918	6920.15	6921.15	0.006092	7.8	837	8	1.05	0.69	59.17	107.93
Reach-1	40503	Existing - 100yr	1100	6920.55	6918	6920.55	6921.73	0.00572	8.3	1092	8.8	1.06	0.74	62.83	132.06
Reach-1	41003	Existing - 2yr	37	6926.4	6926	6926.4	6926.58	0.01146	3.4	37	3.4	1.02	0.25	31.18	10.85
Reach-1	41003	Existing - 5yr	140	6926.9	6926	6926.9	6927.26	0.008977	4.8	140	4.8	1.01	0.39	41.43	29.11
Reach-1	41003	Existing - 10yr	260	6927.29	6926	6927.29	6927.77	0.008042	5.6	260	5.6	1.01	0.47	49.38	46.82
Reach-1	41003	Existing - 25yr	610	6928.05	6926	6928.05	6928.83	0.006184	6.5	604	7.1	1.14	0.46	78.54	93.88
Reach-1	41003	Existing - 50yr	840	6928.44	6926	6928.44	6929.37	0.005676	6.6	819	7.8	1.14	0.5	88.85	126.47
Reach-1	41003	Existing - 100yr	1100	6928.83	6926	6928.83	6929.9	0.005222	6.7	1053	8.5	1.12	0.54	96.71	163.58
Reach-1	41503	Existing - 2yr	37	6934.41	6934	6934.41	6934.6	0.010898	3.5	37	3.5	1.01	0.25	28.29	10.58
Reach-1	41503	Existing - 5yr	140	6934.95	6934	6934.95	6935.35	0.008496	5.1	140	5.1	1.01	0.41	35.29	27.7
Reach-1	41503	Existing - 10yr	260	6935.37	6934	6935.37	6935.93	0.007568	6	260	6	1.03	0.5	40.68	43.41
Reach-1	41503	Existing - 25yr	610	6936.25	6934	6936.25	6937.15	0.005922	7	604	7.6	1.14	0.51	62.49	86.88
Reach-1	41503	Existing - 50yr	840	6936.71	6934	6936.71	6937.77	0.00535	7.1	820	8.4	1.14	0.54	72.6	117.79
Reach-1	41503	Existing - 100yr	1100	6937.14	6934	6937.14	6938.38	0.00507	7.3	1058	9.1	1.15	0.59	80.68	150.96
Reach-1	42003	Existing - 2yr	37	6938.85	6938	6938.8	6939.13	0.007549	4.3	37	4.3	0.91	0.31	12.85	8.7
Reach-1	42003	Existing - 5yr	140	6939.72	6938	6939.72	6940.35	0.007615	6.4	140	6.4	1.01	0.56	17.89	22.03
Reach-1	42003	Existing - 10yr	260	6940.36	6938	6940.36	6941.26	0.006669	7.5	260	7.6	1.06	0.64	21.67	34.75
Reach-1	42003	Existing - 25yr	610	6941.76	6938	6941.76	6943.25	0.005189	8.6	597	9.9	1.13	0.72	30.4	71.2
Reach-1	42003	Existing - 50yr	840	6942.51	6938	6942.51	6944.28	0.004749	8.8	810	10.9	1.14	0.76	35.45	95.71
Reach-1	42003	Existing - 100yr	1100	6943.25	6938	6943.25	6945.29	0.004418	8.9	1042	11.8	1.15	0.8	40.61	124.1
Reach-1	42458	Existing - 2yr	37	6946.47	6946	6946.47	6946.69	0.010361	3.8	37	3.8	1.01	0.28	21.82	9.72
Reach-1	42458	Existing - 5yr	140	6947.11	6946	6947.11	6947.61	0.007967	5.7	140	5.7	1	0.49	24.53	24.61
Reach-1	42458	Existing - 10yr	260	6947.64	6946	6947.64	6948.36	0.007312	6.8	260	6.8	1.01	0.62	27.04	38.2
Reach-1	42458	Existing - 25yr	610	6948.72	6946	6948.72	6949.93	0.006077	8.6	609	8.8	1.05	0.79	32.47	70.88
Reach-1	42458	Existing - 50yr	840	6949.3	6946	6949.3	6950.77	0.005563	9.3	836	9.7	1.05	0.87	34.06	90.23
Reach-1	42458	Existing - 100yr	1100	6949.88	6946	6949.88	6951.63	0.005241	10	1091	10.6	1.06	0.95	35.82	110.49

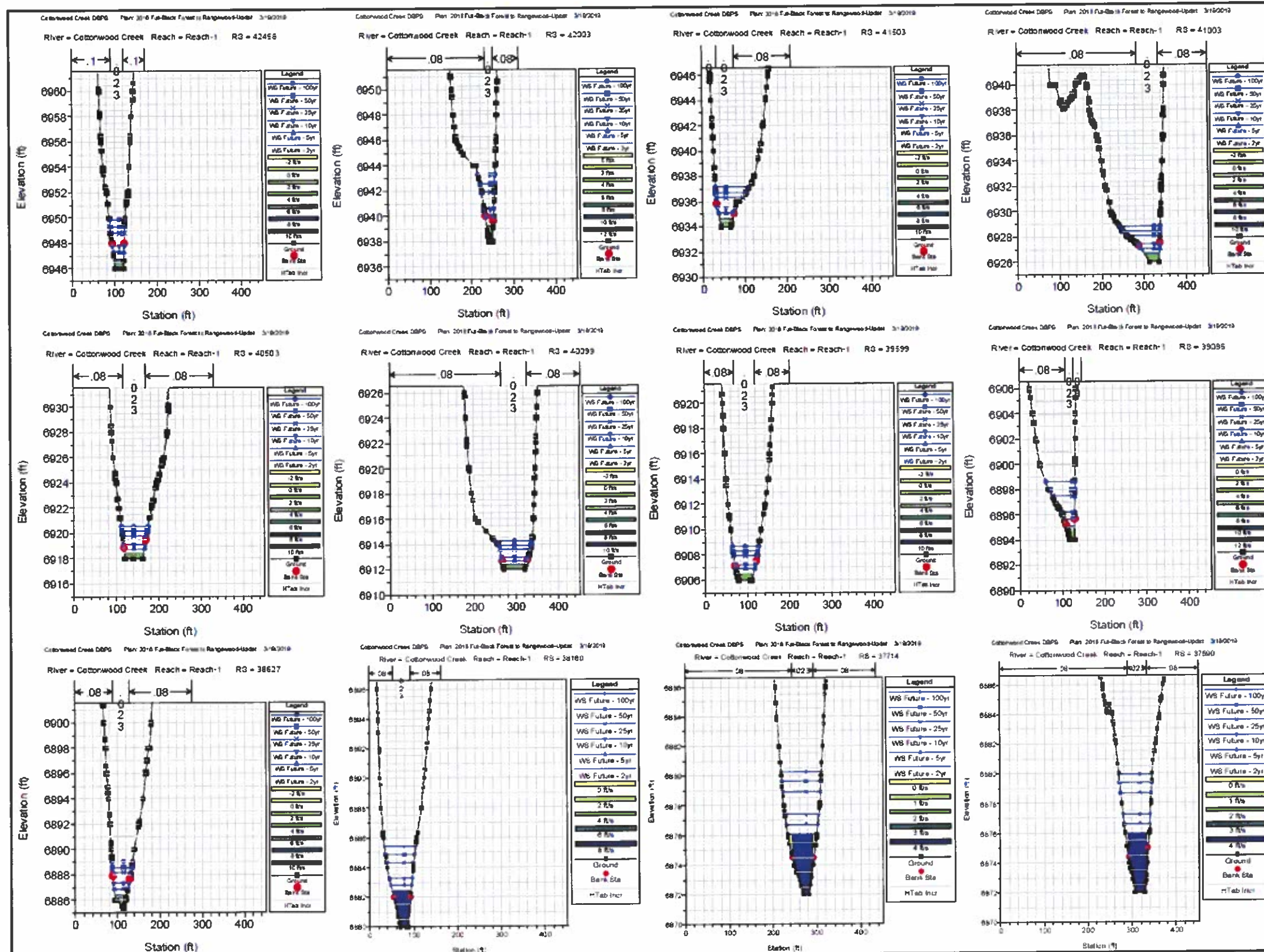
Cottonwood Creek Culvert Results – Black Forest Road to Rangewood Drive - Existing Conditions

Reach	River Sta	Profile	Q Total	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS	
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)	
Reach-1	20261	Culvert #1	Existing - 2yr	920	6598.01	6597.94	6597.21	6598	6615.61	237.37		4.7	7.43	8.93
Reach-1	20261	Culvert #2	Existing - 2yr	920	6598.01	6597.94	6597.19	6598.03	6615.61	257.63		4.7	7.63	9.43
Reach-1	20261	Culvert #3	Existing - 2yr	920	6598.01	6597.94	6597.2	6598.01	6615.61	232.87		4.7	7.38	9.43
Reach-1	20261	Culvert #4	Existing - 2yr	920	6598.01	6597.94	6597.29	6598.01	6615.61	192.12		4.7	6.92	8.5
Reach-1	20261	Culvert #1	Existing - 5yr	1900	6599.94	6599.87	6598.88	6599.94	6615.61	487.2		5.94	9.19	11.56
Reach-1	20261	Culvert #2	Existing - 5yr	1900	6599.94	6599.87	6598.85	6599.94	6615.61	510.51		5.94	9.34	12.13
Reach-1	20261	Culvert #3	Existing - 5yr	1900	6599.94	6599.87	6598.86	6599.93	6615.61	479.24		5.94	9.14	12.37
Reach-1	20261	Culvert #4	Existing - 5yr	1900	6599.94	6599.87	6598.93	6599.93	6615.61	423.05		5.94	8.77	11.38
Reach-1	20261	Culvert #1	Existing - 10yr	2700	6601.31	6601.23	6600.05	6601.31	6615.61	687.53		6.9	10.47	12.89
Reach-1	20261	Culvert #2	Existing - 10yr	2700	6601.31	6601.23	6599.99	6601.31	6615.61	706.95		6.9	10.69	13.29
Reach-1	20261	Culvert #3	Existing - 10yr	2700	6601.31	6601.23	6600.04	6601.3	6615.61	681.6		6.9	10.38	13.62
Reach-1	20261	Culvert #4	Existing - 10yr	2700	6601.31	6601.23	6600.13	6601.31	6615.61	623.92		6.9	9.98	12.83
Reach-1	20261	Culvert #1	Existing - 25yr	4600	6604.1	6604.02	6602.71	6604.12	6615.61	1172.72		8.79	12.32	15.3
Reach-1	20261	Culvert #2	Existing - 25yr	4600	6604.1	6604.02	6602.7	6604.12	6615.61	1204.89		8.79	12.43	15.74
Reach-1	20261	Culvert #3	Existing - 25yr	4600	6604.1	6604.02	6602.71	6604.14	6615.61	1167.73		8.79	12.3	16.13
Reach-1	20261	Culvert #4	Existing - 25yr	4600	6604.1	6604.02	6602.54	6604.04	6615.61	1054.66		8.79	12.21	15.19
Reach-1	20261	Culvert #1	Existing - 50yr	5700	6605.47	6605.38	6604.05	6605.47	6615.61	1441.34		9.67	13.19	16.22
Reach-1	20261	Culvert #2	Existing - 50yr	5700	6605.47	6605.38	6604.04	6605.47	6615.61	1474.51		9.67	13.29	16.66
Reach-1	20261	Culvert #3	Existing - 50yr	5700	6605.47	6605.38	6604.03	6605.48	6615.61	1432.57		9.67	13.17	17.09
Reach-1	20261	Culvert #4	Existing - 50yr	5700	6605.47	6605.38	6604.05	6605.48	6615.61	1351.59		9.67	12.91	16.34
Reach-1	20261	Culvert #1	Existing - 100yr	7000	6607.38	6607.28	6605.66	6607.37	6615.61	1763.73		11.13	14.92	17.16
Reach-1	20261	Culvert #2	Existing - 100yr	7000	6607.38	6607.28	6605.66	6607.38	6615.61	1796.03		11.13	15.01	17.6
Reach-1	20261	Culvert #3	Existing - 100yr	7000	6607.38	6607.28	6605.65	6607.38	6615.61	1755.27		11.13	14.9	18.04
Reach-1	20261	Culvert #4	Existing - 100yr	7000	6607.38	6607.28	6605.69	6607.38	6615.61	1684.98		11.13	14.6	17.32

Cottonwood Creek Bridge Results – Black Forest Road to Rangewood Drive - Existing Conditions

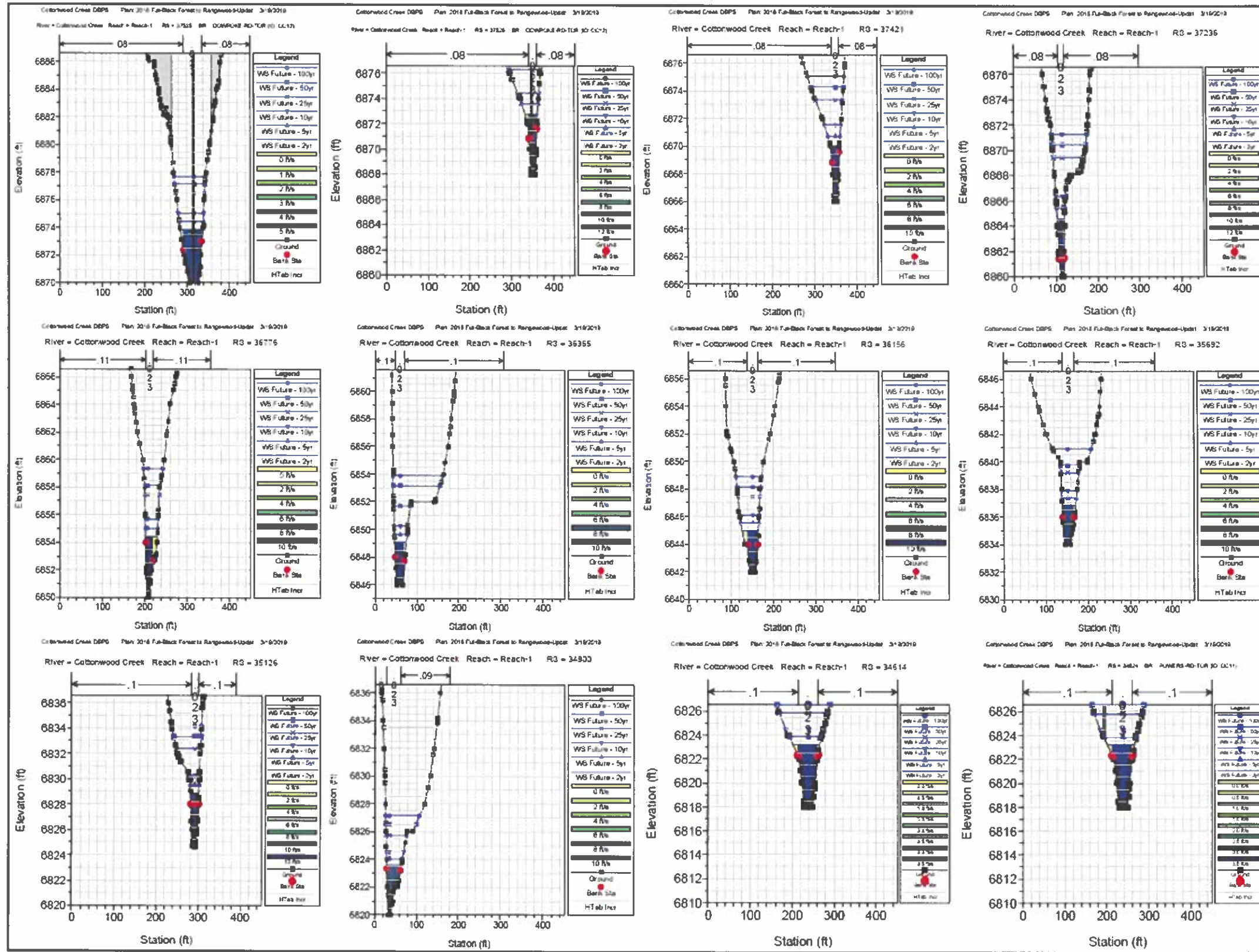
Reach	River Sta	Profile	Q Total (cfs)	W.S. U.S. (ft)	BR Open Area (sq ft)	R Open Ve (ft/s)	Q Weir (cfs)	Delta EG (ft)
Reach-1	25784	Existing - 2yr	380	6684.63	2067.82	7.3		3.44
Reach-1	25784	Existing - 5yr	840	6685.82	2067.82	8.89		3.21
Reach-1	25784	Existing - 10yr	1200	6686.51	2067.82	9.86		3
Reach-1	25784	Existing - 25yr	2100	6687.94	2067.82	10.4		2.58
Reach-1	25784	Existing - 50yr	2900	6689.02	2067.82	10.6		2.31
Reach-1	25784	Existing - 100yr	3800	6690.11	2067.82	10.74		2.07
Reach-1	26289	Existing - 2yr	150	6689.6	1713.63	4.98		2.52
Reach-1	26289	Existing - 5yr	420	6690.67	1713.63	7.29		2.76
Reach-1	26289	Existing - 10yr	770	6691.68	1713.63	9.09		3.09
Reach-1	26289	Existing - 25yr	1800	6693.95	1713.63	10.65		3.45
Reach-1	26289	Existing - 50yr	2400	6694.91	1713.63	11.55		3.32
Reach-1	26289	Existing - 100yr	3100	6695.7	1713.63	12.3		3.06
Reach-1	34524	Existing - 2yr	58	6819.93	7240.8	4.22		0.2
Reach-1	34524	Existing - 5yr	240	6821.74	7240.8	5.44		0.25
Reach-1	34524	Existing - 10yr	470	6822.86	7240.8	6.36		0.29
Reach-1	34524	Existing - 25yr	1200	6825.03	7240.8	5.23		0.31
Reach-1	34524	Existing - 50yr	1700	6826.03	7240.8	5.24		0.33
Reach-1	34524	Existing - 100yr	2200	6826.89	7240.8	5.4		0.35
Reach-1	37525	Existing - 2yr	58	6873.28	1725.67	4.5		5.8
Reach-1	37525	Existing - 5yr	240	6874.59	1725.67	8.13		5.18
Reach-1	37525	Existing - 10yr	470	6875.63	1725.67	9.21		4.75
Reach-1	37525	Existing - 25yr	1200	6877.82	1725.67	7.45		3.82
Reach-1	37525	Existing - 50yr	1700	6878.87	1725.67	6.93		3.44
Reach-1	37525	Existing - 100yr	2200	6879.65	1725.67	7.35		3.12

Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions

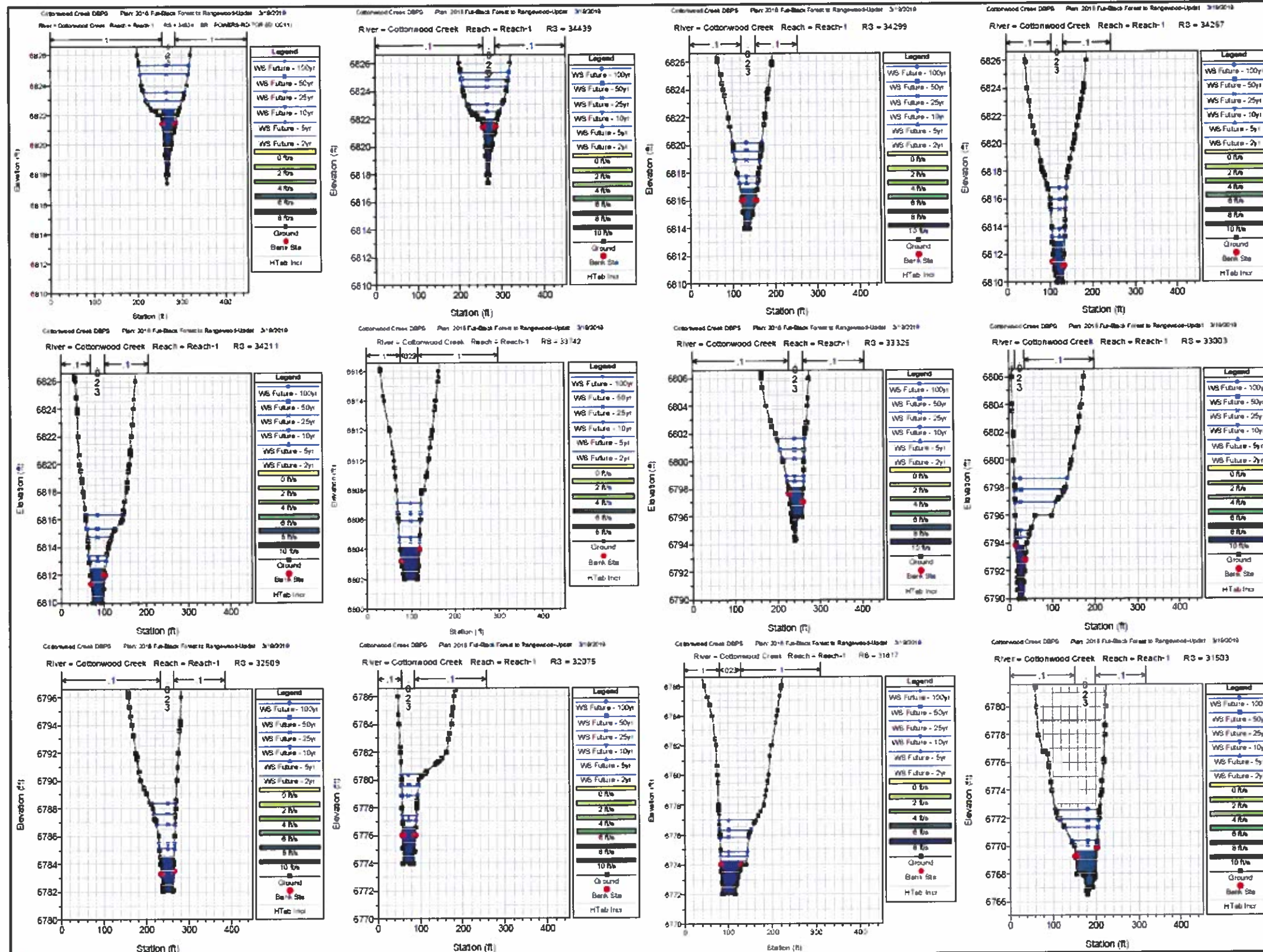


1 in Horiz. = 300 ft 1 in Vert. = 10 ft

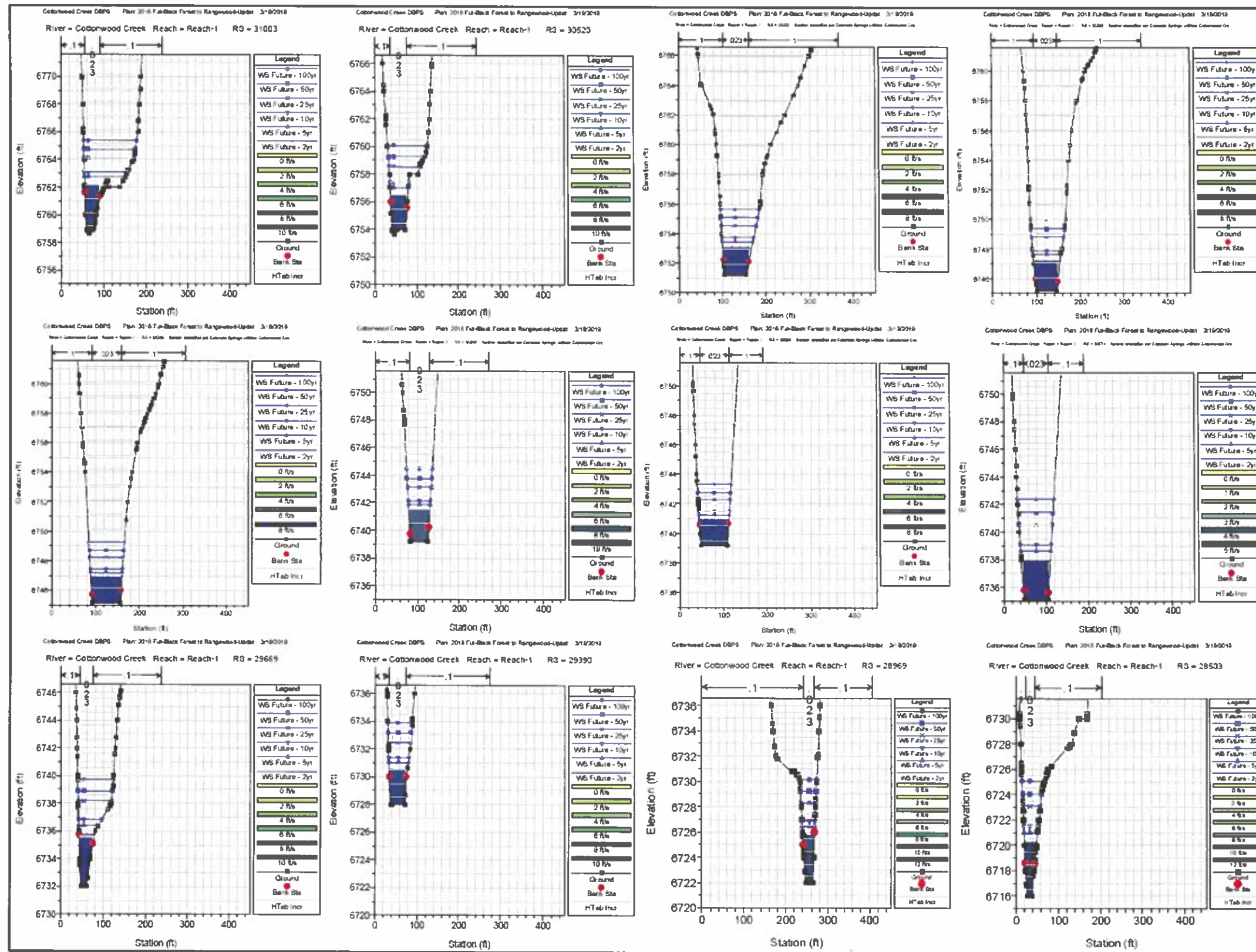
Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions



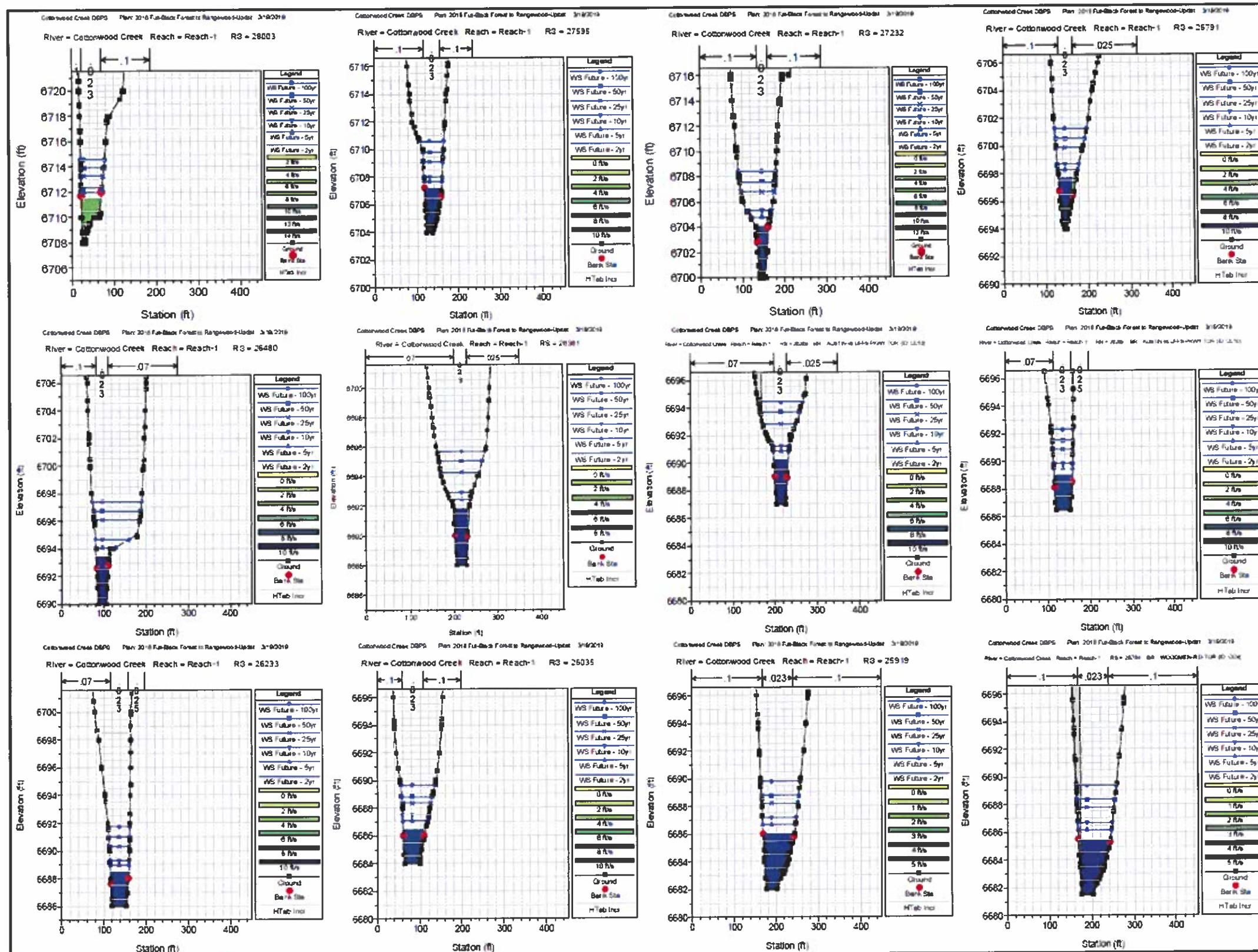
Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions



Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions

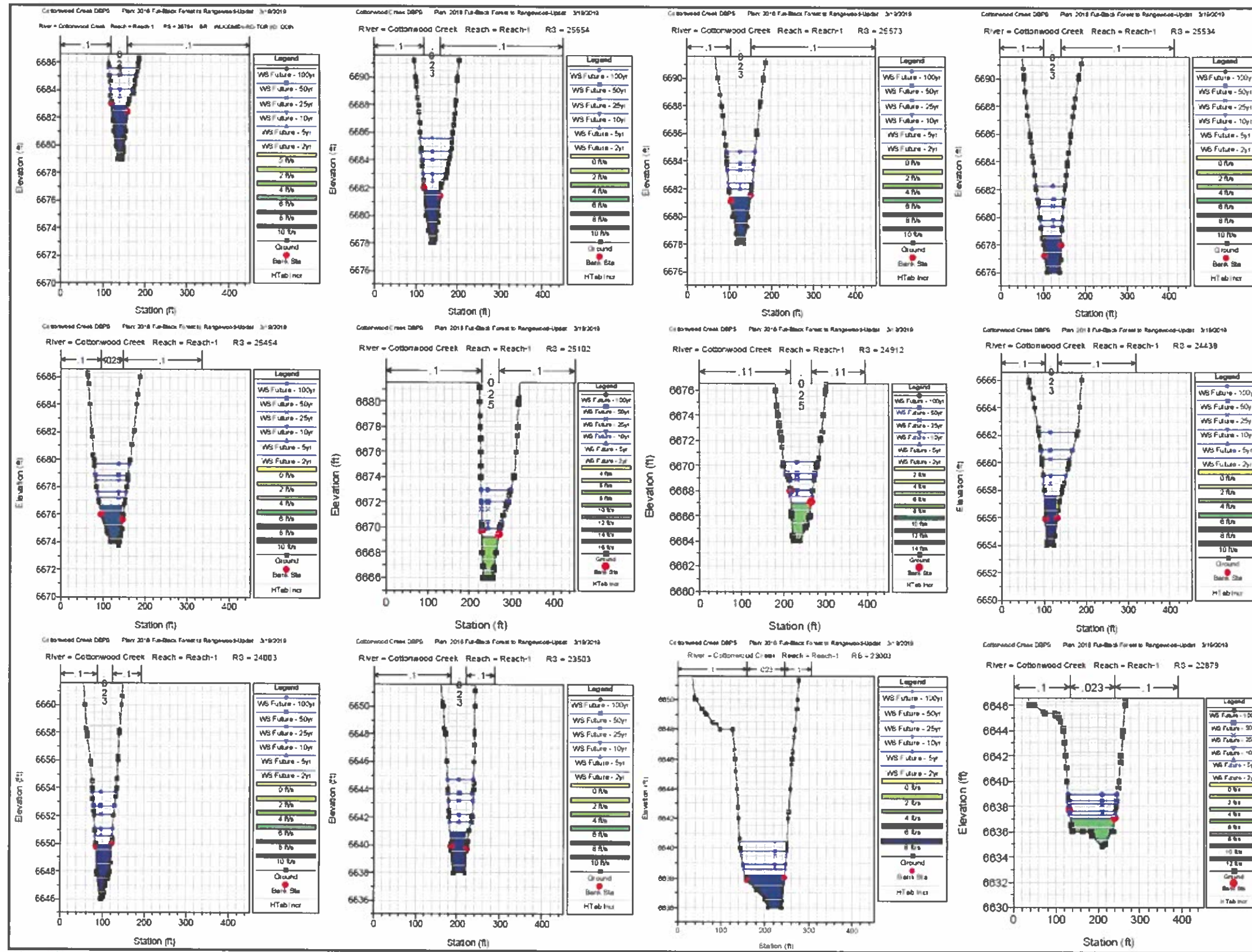


Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions

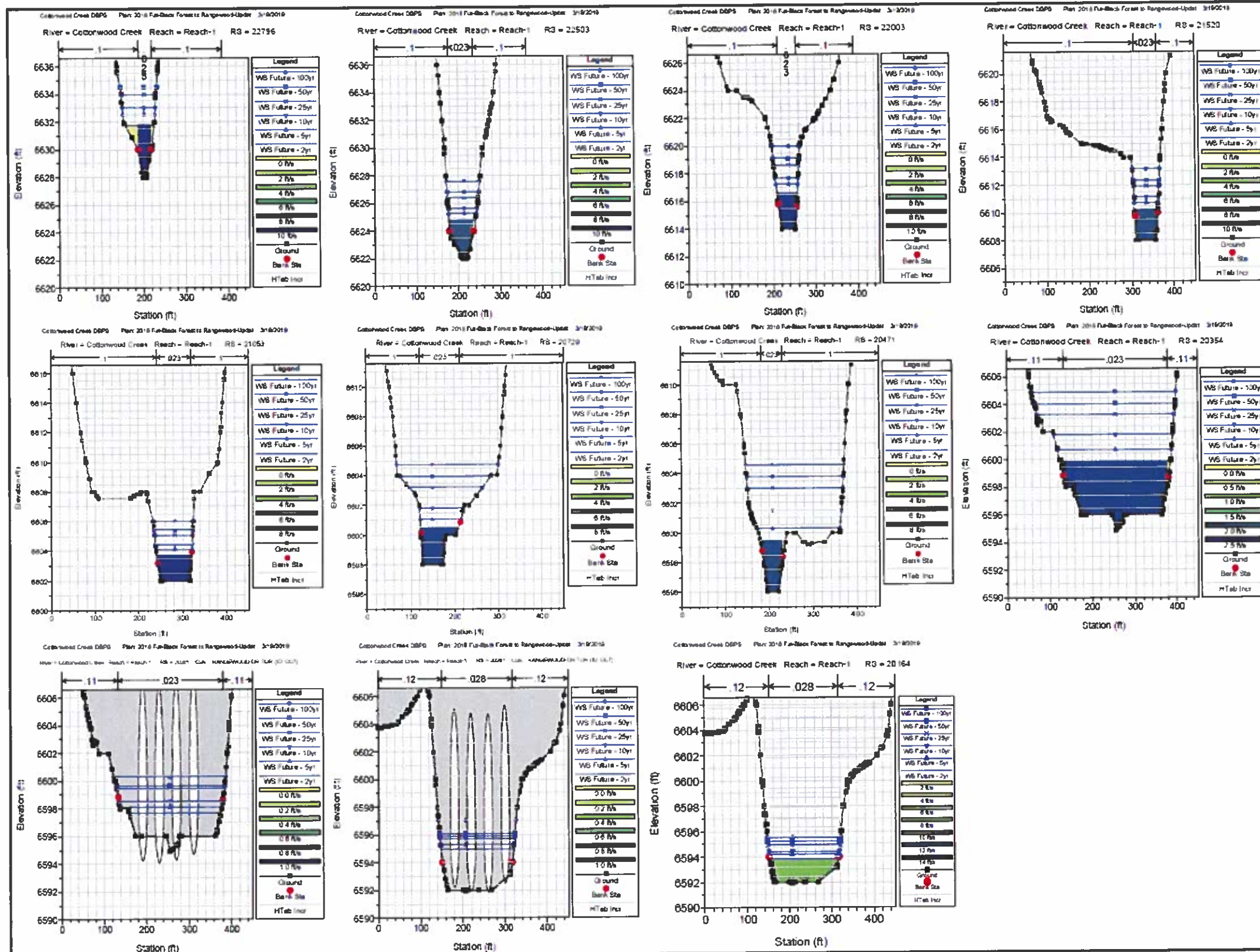


1 in Horiz. = 300 ft 1 in Vert. = 10 ft

Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions



Cottonwood Creek HEC – RAS Cross Sections – Black Forest Road to Rangewood Drive – Future Conditions



Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	20164	Future - 2yr	1900	6593.86	6591.94	6593.86	6594.67	0.009916	7.2	1900	7.2	1.01	0.99	163.9	262.73
Reach-1	20164	Future - 5yr	2500	6594.19	6591.94	6594.19	6595.15	0.009306	7.9	2500	7.9	1.01	1.1	166.96	317.18
Reach-1	20164	Future - 10yr	3000	6594.44	6591.94	6594.44	6595.53	0.008913	8.4	3000	8.4	1.01	1.18	168.39	358.94
Reach-1	20164	Future - 25yr	4100	6594.93	6591.94	6594.93	6596.28	0.008406	9.3	4098	9.3	1.02	1.35	171.23	442.44
Reach-1	20164	Future - 50yr	4800	6595.23	6591.94	6595.23	6596.72	0.00802	9.7	4796	9.8	1.02	1.43	172.99	494.79
Reach-1	20164	Future - 100yr	5500	6595.51	6591.94	6595.51	6597.14	0.007775	10.1	5494	10.2	1.02	1.5	174.71	543.69
Reach-1	20261	Culvert													
Reach-1	20354	Future - 2yr	1900	6599.87	6594.91	6597.32	6599.94	0.000199	2.1	1899	2.1	0.2	0.04	258.08	895.27
Reach-1	20354	Future - 5yr	2400	6600.71	6594.91	6597.57	6600.78	0.000157	2.1	2397	2.2	0.19	0.04	269.23	1118.94
Reach-1	20354	Future - 10yr	3000	6601.75	6594.91	6597.82	6601.83	0.000121	2.1	2990	2.2	0.17	0.04	279.83	1405.1
Reach-1	20354	Future - 25yr	4000	6603.26	6594.91	6598.25	6603.34	0.000095	2.1	3972	2.3	0.17	0.03	324.48	1868.76
Reach-1	20354	Future - 50yr	4600	6604.02	6594.91	6598.46	6604.1	0.000089	2.2	4554	2.4	0.16	0.04	331.28	2118.02
Reach-1	20354	Future - 100yr	5300	6604.89	6594.91	6598.68	6604.98	0.000082	2.2	5230	2.5	0.16	0.04	340.43	2409.68
Reach-1	20471	Future - 2yr	920	6599.49	6596	6598.85	6600.16	0.002593	6	915	6.6	0.99	0.22	113.51	154.12
Reach-1	20471	Future - 5yr	1300	6600.28	6596	6599.52	6601.02	0.002154	4.8	1250	7	1.02	0.19	190.42	272.36
Reach-1	20471	Future - 10yr	1600	6601.49	6596		6601.97	0.00104	3.1	1403	5.9	0.62	0.16	209.35	516.93
Reach-1	20471	Future - 25yr	2300	6603.03	6596		6603.46	0.000718	2.7	1841	5.9	0.48	0.17	218.81	846.33
Reach-1	20471	Future - 50yr	2700	6603.79	6596		6604.23	0.000633	2.7	2087	6	0.44	0.18	222.07	1015.32
Reach-1	20471	Future - 100yr	3500	6604.59	6596		6605.13	0.000705	2.9	2624	6.8	0.45	0.23	225.22	1193.56
Reach-1	20729	Future - 2yr	920	6600.42	6598	6600.33	6601.13	0.005808	6.7	920	6.7	0.94	0.58	84.44	136.46
Reach-1	20729	Future - 5yr	1300	6601.05	6598		6601.77	0.004079	6.8	1300	6.8	0.83	0.52	92.4	192.19
Reach-1	20729	Future - 10yr	1600	6601.79	6598		6602.39	0.002276	6.1	1597	6.2	0.67	0.37	98.95	263.34
Reach-1	20729	Future - 25yr	2300	6603.19	6598		6603.73	0.001229	5.1	2270	5.9	0.63	0.2	166.69	448
Reach-1	20729	Future - 50yr	2700	6603.93	6598		6604.45	0.000969	4.6	2629	5.8	0.6	0.17	205.31	586.09
Reach-1	20729	Future - 100yr	3500	6604.75	6598		6605.36	0.000941	4.5	3335	6.4	0.6	0.19	231.26	772.27
Reach-1	21053	Future - 2yr	920	6603.71	6602	6603.71	6604.54	0.006739	7.3	920	7.3	1.02	0.66	79.8	126.62
Reach-1	21053	Future - 5yr	1300	6604.14	6602	6604.14	6605.17	0.006172	8	1299	8.1	1.02	0.75	82.28	161.56
Reach-1	21053	Future - 10yr	1600	6604.45	6602	6604.45	6605.62	0.005866	8.6	1597	8.7	1.03	0.81	83.68	186.92
Reach-1	21053	Future - 25yr	2300	6605.09	6602	6605.09	6606.58	0.005409	9.5	2292	9.8	1.04	0.93	86.85	241.5
Reach-1	21053	Future - 50yr	2700	6605.42	6602	6605.42	6607.08	0.005212	10	2688	10.3	1.04	0.98	88.47	271
Reach-1	21053	Future - 100yr	3500	6606.04	6602	6606.04	6608.01	0.004945	10.7	3477	11.3	1.05	1.08	91.66	326.53

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	21520	Future - 2yr	920	6610.2	6608	6610.2	6611.24	0.006225	8.2	920	8.2	1.01	0.78	55.28	112.59
Reach-1	21520	Future - 5yr	1300	6610.74	6608	6610.74	6612.05	0.005791	9.1	1299	9.2	1.02	0.88	56.75	142.41
Reach-1	21520	Future - 10yr	1600	6611.13	6608	6611.13	6612.63	0.005491	9.7	1598	9.8	1.03	0.95	57.74	164.83
Reach-1	21520	Future - 25yr	2300	6611.94	6608	6611.94	6613.85	0.00507	10.8	2294	11.1	1.04	1.08	59.87	212.74
Reach-1	21520	Future - 50yr	2700	6612.37	6608	6612.37	6614.49	0.004879	11.3	2691	11.7	1.04	1.14	61.41	238.85
Reach-1	21520	Future - 100yr	3500	6613.18	6608	6613.18	6615.67	0.004567	12.1	3482	12.7	1.06	1.22	65.04	289.88
Reach-1	22003	Future - 2yr	920	6616.61	6614	6616.61	6617.79	0.005834	8.6	919	8.7	1.04	0.78	48.87	107.28
Reach-1	22003	Future - 5yr	1300	6617.22	6614	6617.22	6618.71	0.005403	9.4	1295	9.8	1.06	0.87	52.19	138.34
Reach-1	22003	Future - 10yr	1600	6617.67	6614	6617.67	6619.36	0.005139	9.9	1589	10.5	1.07	0.93	54.6	162.12
Reach-1	22003	Future - 25yr	2300	6618.61	6614	6618.61	6620.74	0.00469	10.6	2271	11.8	1.08	1.03	59.65	216
Reach-1	22003	Future - 50yr	2700	6619.1	6614	6619.1	6621.45	0.004517	11	2657	12.4	1.09	1.08	62.18	245.77
Reach-1	22003	Future - 100yr	3500	6619.97	6614	6619.97	6622.76	0.004339	11.6	3423	13.5	1.11	1.19	66.61	301.81
Reach-1	22503	Future - 2yr	920	6624.75	6622	6624.75	6625.75	0.006212	7.9	918	8	1.04	0.71	63.12	117.09
Reach-1	22503	Future - 5yr	1300	6625.27	6622	6625.27	6626.52	0.005705	8.6	1294	9	1.05	0.8	65.97	150.46
Reach-1	22503	Future - 10yr	1600	6625.64	6622	6625.64	6627.07	0.005441	9.1	1590	9.6	1.05	0.86	68.29	175.27
Reach-1	22503	Future - 25yr	2300	6626.42	6622	6626.42	6628.22	0.004977	10	2275	10.8	1.06	0.97	72.42	230.69
Reach-1	22503	Future - 50yr	2700	6626.83	6622	6626.83	6628.82	0.004801	10.4	2665	11.4	1.06	1.03	74.12	260.53
Reach-1	22503	Future - 100yr	3500	6627.6	6622	6627.6	6629.93	0.004482	11	3438	12.3	1.06	1.13	77.33	318.88
Reach-1	22796	Future - 2yr	920	6631.79	6628	6631.79	6633.12	0.004937	7.2	887	9.4	1.2	0.57	69.45	128.48
Reach-1	22796	Future - 5yr	1300	6632.55	6628	6632.55	6634.1	0.004381	7	1215	10.3	1.13	0.65	76.33	184.95
Reach-1	22796	Future - 10yr	1600	6633.01	6628	6633.01	6634.78	0.004371	7.3	1469	11.1	1.12	0.76	78.25	220.5
Reach-1	22796	Future - 25yr	2300	6633.97	6628	6633.97	6636.19	0.004307	7.7	2050	12.6	1.11	0.96	82.18	297.61
Reach-1	22796	Future - 50yr	2700	6634.47	6628	6634.47	6636.94	0.004272	7.9	2381	13.4	1.12	1.03	86.26	339.89
Reach-1	22796	Future - 100yr	3500	6635.47	6628	6635.47	6638.3	0.004044	8.1	3026	14.5	1.12	1.12	94.54	429.63
Reach-1	22879	Future - 2yr	920	6637.04	6634.79	6637.04	6637.72	0.007197	6.6	920	6.6	1.01	0.59	104.88	139.29
Reach-1	22879	Future - 5yr	1300	6637.39	6634.79	6637.39	6638.24	0.006728	7.4	1300	7.4	1.02	0.69	107.32	176.02
Reach-1	22879	Future - 10yr	1600	6637.64	6634.79	6637.64	6638.61	0.006415	7.9	1600	7.9	1.02	0.74	109.09	203.28
Reach-1	22879	Future - 25yr	2300	6638.17	6634.79	6638.17	6639.39	0.00583	8.8	2298	8.9	1.02	0.84	112.4	261.94
Reach-1	22879	Future - 50yr	2700	6638.44	6634.79	6638.44	6639.79	0.005641	9.2	2697	9.3	1.03	0.9	113.83	292.43
Reach-1	22879	Future - 100yr	3500	6638.95	6634.79	6638.95	6640.55	0.005286	10	3493	10.2	1.03	0.99	116.56	351.44
Reach-1	23003	Future - 2yr	920	6638.21	6636	6638.21	6638.98	0.00686	7	920	7	1.03	0.62	90.8	131.75
Reach-1	23003	Future - 5yr	1300	6638.6	6636	6638.6	6639.57	0.006322	7.7	1298	7.9	1.04	0.7	93.85	168.04
Reach-1	23003	Future - 10yr	1600	6638.89	6636	6638.89	6639.99	0.005997	8.2	1596	8.4	1.04	0.76	96.09	195.16
Reach-1	23003	Future - 25yr	2300	6639.49	6636	6639.49	6640.88	0.0055	9	2287	9.5	1.05	0.85	101.47	254.38
Reach-1	23003	Future - 50yr	2700	6639.8	6636	6639.8	6641.34	0.005317	9.4	2681	10	1.06	0.9	104.29	286.28
Reach-1	23003	Future - 100yr	3500	6640.4	6636	6640.4	6642.19	0.004893	10	3461	10.8	1.05	0.99	107.66	350.6

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	23503	Future - 2yr	920	6640.93	6638	6640.93	6642.26	0.005626	8.9	917	9.3	1.07	0.8	43.92	102.82
Reach-1	23503	Future - 5yr	1300	6641.65	6638	6641.65	6643.28	0.005058	9.5	1290	10.3	1.1	0.84	50.36	136.69
Reach-1	23503	Future - 10yr	1600	6642.15	6638	6642.15	6644.01	0.004785	9.8	1579	11	1.11	0.88	54.05	163.11
Reach-1	23503	Future - 25yr	2300	6643.2	6638	6643.2	6645.5	0.004396	10.4	2243	12.3	1.09	1.02	57.14	221.17
Reach-1	23503	Future - 50yr	2700	6643.72	6638	6643.72	6646.28	0.004309	10.8	2619	13	1.09	1.1	58.69	251.11
Reach-1	23503	Future - 100yr	3500	6644.7	6638	6644.7	6647.71	0.004103	11.3	3363	14.2	1.09	1.23	61.21	310.11
Reach-1	24003	Future - 2yr	920	6649.85	6646	6649.85	6651.2	0.005922	9.3	920	9.3	1.01	0.94	37.22	98.93
Reach-1	24003	Future - 5yr	1300	6650.55	6646	6650.55	6652.23	0.0055	10.3	1300	10.4	1.04	1.03	40.06	125.66
Reach-1	24003	Future - 10yr	1600	6651.05	6646	6651.05	6652.97	0.005202	10.9	1598	11.1	1.05	1.07	42.19	146.4
Reach-1	24003	Future - 25yr	2300	6652.11	6646	6652.11	6654.52	0.004753	11.9	2290	12.5	1.08	1.16	46.89	193.31
Reach-1	24003	Future - 50yr	2700	6652.69	6646	6652.69	6655.33	0.00448	12.2	2682	13.1	1.1	1.17	50.36	221.68
Reach-1	24003	Future - 100yr	3500	6653.71	6646	6653.71	6656.81	0.004211	12.7	3456	14.2	1.12	1.23	55.94	276.06
Reach-1	24438	Future - 2yr	920	6657.64	6654	6657.64	6659.17	0.005197	9.1	912	10	1.1	0.79	39.82	100.67
Reach-1	24438	Future - 5yr	1300	6658.46	6654	6658.46	6660.34	0.004783	9.6	1278	11.1	1.15	0.82	47.69	135.97
Reach-1	24438	Future - 10yr	1600	6659.06	6654	6659.06	6661.17	0.004461	9.6	1559	11.8	1.17	0.83	53.81	166.71
Reach-1	24438	Future - 25yr	2300	6660.27	6654	6660.27	6662.85	0.004093	9.6	2198	13.2	1.2	0.88	66.87	238.96
Reach-1	24438	Future - 50yr	2700	6660.93	6654	6660.93	6663.7	0.00384	9.4	2550	13.7	1.21	0.87	76.42	286.68
Reach-1	24438	Future - 100yr	3500	6662.21	6654	6662.21	6665.2	0.003352	8.8	3217	14.5	1.19	0.86	93.19	395.67
Reach-1	24912	Future - 2yr	920	6667	6664	6667	6668.14	0.007324	8.6	920	8.6	1.01	1	48.1	107.49
Reach-1	24912	Future - 5yr	1300	6667.6	6664	6667.6	6669	0.00681	9.5	1300	9.5	1.02	1.12	50.55	136.97
Reach-1	24912	Future - 10yr	1600	6668.02	6664	6668.02	6669.62	0.006495	10.1	1599	10.1	1.03	1.19	52.63	158.9
Reach-1	24912	Future - 25yr	2300	6668.91	6664	6668.91	6670.92	0.005902	11	2295	11.4	1.08	1.23	60.49	208.53
Reach-1	24912	Future - 50yr	2700	6669.38	6664	6669.38	6671.59	0.005615	11.3	2688	11.9	1.12	1.21	67.36	238.56
Reach-1	24912	Future - 100yr	3500	6670.28	6664	6670.28	6672.81	0.005082	11.4	3462	12.8	1.18	1.13	84.12	307.13
Reach-1	25102	Future - 2yr	920	6669.26	6666	6669.26	6670.56	0.007124	9.1	920	9.1	1	1.09	39.17	100.74
Reach-1	25102	Future - 5yr	1300	6669.94	6666	6669.94	6671.55	0.006719	10.1	1300	10.2	1.03	1.2	42.41	128.35
Reach-1	25102	Future - 10yr	1600	6670.43	6666	6670.43	6672.25	0.006308	10.7	1598	10.8	1.07	1.2	46.71	150.05
Reach-1	25102	Future - 25yr	2300	6671.46	6666	6671.46	6673.72	0.005659	11.3	2286	12.1	1.12	1.2	56.58	203.12
Reach-1	25102	Future - 50yr	2700	6672.01	6666	6672.01	6674.47	0.00532	11.4	2671	12.6	1.14	1.19	61.94	236.07
Reach-1	25102	Future - 100yr	3500	6672.99	6666	6672.99	6675.84	0.004968	11.7	3428	13.7	1.15	1.25	69.7	300.17
Reach-1	25454	Future - 2yr	920	6676.66	6673.78	6676.66	6677.71	0.007113	8	918	8.2	1.05	0.84	60.11	114.64
Reach-1	25454	Future - 5yr	1300	6677.22	6673.78	6677.22	6678.51	0.006452	8.7	1292	9.2	1.06	0.92	65.13	149.66
Reach-1	25454	Future - 10yr	1600	6677.61	6673.78	6677.61	6679.09	0.006164	9.1	1585	9.8	1.08	0.98	68.6	175.78
Reach-1	25454	Future - 25yr	2300	6678.44	6673.78	6678.44	6680.29	0.005612	9.7	2259	11	1.09	1.09	75.31	236.03
Reach-1	25454	Future - 50yr	2700	6678.86	6673.78	6678.86	6680.91	0.005469	10.1	2640	11.6	1.09	1.15	78.34	267.99
Reach-1	25454	Future - 100yr	3500	6679.67	6673.78	6679.67	6682.05	0.005082	10.5	3394	12.6	1.1	1.24	84.24	334.12

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	25534	Future - 2yr	920	6678.69	6676	6678.69	6679.94	0.005764	8.6	916	9	1.05	0.8	47.08	106.49
Reach-1	25534	Future - 5yr	1300	6679.34	6676	6679.34	6680.9	0.005314	9.4	1290	10	1.07	0.89	50.43	138.18
Reach-1	25534	Future - 10yr	1600	6679.81	6676	6679.81	6681.58	0.005047	9.8	1582	10.7	1.07	0.94	52.93	162.46
Reach-1	25534	Future - 25yr	2300	6680.81	6676	6680.81	6683.01	0.004571	10.5	2258	12	1.09	1.02	59.14	218.49
Reach-1	25534	Future - 50yr	2700	6681.31	6676	6681.31	6683.76	0.004436	10.8	2641	12.7	1.11	1.07	62.56	249.04
Reach-1	25534	Future - 100yr	3500	6682.27	6676	6682.27	6685.12	0.004151	11.2	3395	13.7	1.13	1.13	69.49	312.18
Reach-1	25573	Future - 2yr	920	6681.41	6678	6681.41	6682.56	0.006072	8.6	920	8.6	1.02	0.83	47.85	106.72
Reach-1	25573	Future - 5yr	1300	6682	6678	6682	6683.45	0.005628	9.5	1299	9.6	1.06	0.89	52.96	136.93
Reach-1	25573	Future - 10yr	1600	6682.44	6678	6682.44	6684.08	0.00527	9.9	1596	10.3	1.06	0.93	55.7	160.86
Reach-1	25573	Future - 25yr	2300	6683.36	6678	6683.36	6685.4	0.004759	10.7	2283	11.5	1.08	1.01	61.38	214.57
Reach-1	25573	Future - 50yr	2700	6683.84	6678	6683.84	6686.08	0.004573	11.1	2672	12.1	1.09	1.06	64.3	244.31
Reach-1	25573	Future - 100yr	3500	6684.69	6678	6684.69	6687.34	0.004336	11.6	3443	13.2	1.1	1.15	69.37	301.7
Reach-1	25654	Future - 2yr	920	6681.79	6678	6681.79	6683.11	0.005864	9.2	920	9.2	1.02	0.9	39.46	99.99
Reach-1	25654	Future - 5yr	1300	6682.49	6678	6682.49	6684.11	0.005331	10	1299	10.2	1.07	0.93	45.34	129.5
Reach-1	25654	Future - 10yr	1600	6682.99	6678	6682.99	6684.83	0.005007	10.4	1595	10.9	1.14	0.86	54.88	154.2
Reach-1	25654	Future - 25yr	2300	6684.03	6678	6684.03	6686.29	0.004515	10.7	2268	12.2	1.16	0.93	63.56	215.53
Reach-1	25654	Future - 50yr	2700	6684.59	6678	6684.59	6687.04	0.004231	10.7	2645	12.7	1.15	0.94	68.96	253.26
Reach-1	25654	Future - 100yr	3500	6685.57	6678	6685.57	6688.4	0.003971	10.8	3383	13.7	1.15	1.03	75.55	323.88
Reach-1	25784	Bridge													
Reach-1	25919	Future - 2yr	920	6685.98	6682	6684.6	6686.27	0.001118	4.3	920	4.3	0.45	0.2	74.58	212.12
Reach-1	25919	Future - 5yr	1300	6686.68	6682	6685.14	6687.06	0.001083	4.9	1299	4.9	0.47	0.23	78.2	265.71
Reach-1	25919	Future - 10yr	1600	6687.18	6682	6685.49	6687.62	0.001059	5.2	1598	5.3	0.48	0.24	80.75	305.6
Reach-1	25919	Future - 25yr	2300	6688.22	6682	6686.22	6688.8	0.001024	5.9	2291	6.1	0.5	0.28	85.97	392.36
Reach-1	25919	Future - 50yr	2700	6688.76	6682	6686.55	6689.41	0.001008	6.1	2686	6.5	0.51	0.3	88.6	439.62
Reach-1	25919	Future - 100yr	3500	6689.77	6682	6687.23	6690.54	0.000978	6.6	3470	7.1	0.52	0.34	93.6	530.95
Reach-1	26035	Future - 2yr	920	6686.48	6684	6686.48	6687.58	0.006084	8.4	920	8.4	1.03	0.77	53.3	110.04
Reach-1	26035	Future - 5yr	1300	6687.05	6684	6687.05	6688.43	0.005592	9.2	1297	9.4	1.06	0.84	58.01	141.87
Reach-1	26035	Future - 10yr	1600	6687.48	6684	6687.48	6689.03	0.005228	9.6	1593	10	1.07	0.87	61.55	167.42
Reach-1	26035	Future - 25yr	2300	6688.34	6684	6688.34	6690.3	0.004824	10.3	2276	11.3	1.09	0.96	68.15	223
Reach-1	26035	Future - 50yr	2700	6688.8	6684	6688.8	6690.96	0.004627	10.6	2663	11.9	1.11	0.99	72.54	255.12
Reach-1	26035	Future - 100yr	3500	6689.65	6684	6689.65	6692.16	0.004289	10.9	3426	12.8	1.12	1.04	80.82	320.9

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	26233	Future - 2yr	810	6688.43	6686	6688.43	6689.58	0.006088	8.5	809	8.6	1.02	0.81	43.18	94.95
Reach-1	26233	Future - 5yr	1100	6688.96	6686	6688.96	6690.34	0.005602	9.3	1098	9.5	1.02	0.9	44.26	117.84
Reach-1	26233	Future - 10yr	1300	6689.28	6686	6689.28	6690.83	0.005411	9.8	1296	10	1.03	0.95	44.96	132.3
Reach-1	26233	Future - 25yr	2000	6690.32	6686	6690.32	6692.35	0.004861	11.1	1985	11.5	1.04	1.09	47.56	180.3
Reach-1	26233	Future - 50yr	2500	6690.99	6686	6690.99	6693.32	0.004594	11.8	2473	12.3	1.04	1.16	49.25	212.54
Reach-1	26233	Future - 100yr	3100	6691.72	6686	6691.72	6694.39	0.004365	12.4	3053	13.2	1.05	1.23	51.15	249.44
Reach-1	26289	Bridge													
Reach-1	26361	Future - 2yr	810	6691.78	6688	6691.13	6692.69	0.002756	7.4	798	7.7	0.77	0.5	35.99	109.67
Reach-1	26361	Future - 5yr	1100	6692.46	6688	6691.81	6693.61	0.002795	8.1	1075	8.7	0.88	0.5	45.15	136.05
Reach-1	26361	Future - 10yr	1300	6692.91	6688	6692.19	6694.19	0.002725	8.2	1256	9.2	0.94	0.47	55.31	159.01
Reach-1	26361	Future - 25yr	2000	6694.29	6688	6693.73	6695.78	0.002386	7.6	1812	10.2	1.01	0.42	89.66	261.65
Reach-1	26361	Future - 50yr	2500	6695.03	6688	6694.65	6696.61	0.002268	7.5	2141	10.8	0.97	0.46	99.42	331.66
Reach-1	26361	Future - 100yr	3100	6695.7	6688	6695.33	6697.45	0.002317	7.7	2529	11.6	0.98	0.52	109.9	401.26
Reach-1	26480	Future - 2yr	810	6693.38	6690	6693.38	6694.86	0.005777	9.6	809	9.8	1.05	0.92	31.21	83.95
Reach-1	26480	Future - 5yr	1100	6694.11	6690	6694.11	6695.86	0.00511	10.1	1096	10.6	1.24	0.7	47.64	108.77
Reach-1	26480	Future - 10yr	1300	6694.69	6690	6694.69	6696.44	0.004248	8.9	1277	10.7	1.39	0.47	80.68	146.24
Reach-1	26480	Future - 25yr	2000	6696.09	6690	6696.09	6697.88	0.003252	7	1793	11.3	1.16	0.52	108.53	287.5
Reach-1	26480	Future - 50yr	2500	6696.72	6690	6696.72	6698.71	0.003273	7	2144	12.2	1.12	0.63	112.56	357.24
Reach-1	26480	Future - 100yr	3100	6697.41	6690	6697.41	6699.59	0.003257	7.1	2545	13	1.08	0.74	116.95	436.64
Reach-1	26791	Future - 2yr	810	6697.71	6694	6697.71	6698.94	0.005143	8.6	789	9	1.04	0.71	41.64	94.58
Reach-1	26791	Future - 5yr	1100	6698.3	6694	6698.3	6699.75	0.004757	9.1	1051	9.9	1.06	0.75	46.83	120.76
Reach-1	26791	Future - 10yr	1300	6698.69	6694	6698.69	6700.26	0.004505	9.3	1225	10.3	1.07	0.75	50.72	139.45
Reach-1	26791	Future - 25yr	2000	6699.86	6694	6699.86	6701.72	0.003872	9.7	1789	11.5	1.07	0.77	62.68	205.78
Reach-1	26791	Future - 50yr	2500	6700.55	6694	6700.55	6702.58	0.003616	9.9	2155	12.1	1.05	0.8	69.15	251.68
Reach-1	26791	Future - 100yr	3100	6701.26	6694	6701.26	6703.48	0.003456	10.2	2572	12.8	1.05	0.85	75.28	303.15
Reach-1	27232	Future - 2yr	810	6703.99	6700	6703.99	6705.57	0.00572	9.8	808	10.1	1.04	0.97	28.39	82.26
Reach-1	27232	Future - 5yr	1100	6704.79	6700	6704.79	6706.62	0.004953	9.8	1091	10.9	1.24	0.71	47.19	112.23
Reach-1	27232	Future - 10yr	1300	6705.29	6700	6705.29	6707.25	0.004567	9.4	1278	11.3	1.29	0.65	58.86	138.79
Reach-1	27232	Future - 25yr	2000	6706.77	6700	6706.77	6709.04	0.003764	8.1	1873	12.5	1.21	0.7	80.49	246.81
Reach-1	27232	Future - 50yr	2500	6707.58	6700	6707.58	6710.09	0.003623	8	2274	13.3	1.17	0.81	85.57	314.04
Reach-1	27232	Future - 100yr	3100	6708.41	6700	6708.41	6711.23	0.003587	8	2742	14.3	1.15	0.93	90.02	386.7

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	27595	Future - 2yr	810	6707.16	6704	6707.16	6708.35	0.006066	8.7	810	8.8	1.02	0.84	40.71	92.96
Reach-1	27595	Future - 5yr	1100	6707.71	6704	6707.71	6709.15	0.005574	9.5	1099	9.6	1.03	0.92	42.36	115.8
Reach-1	27595	Future - 10yr	1300	6708.03	6704	6708.03	6709.65	0.005441	10	1298	10.2	1.04	0.98	43.34	129.84
Reach-1	27595	Future - 25yr	2000	6709.11	6704	6709.11	6711.25	0.004909	11.2	1990	11.8	1.06	1.11	46.72	178.25
Reach-1	27595	Future - 50yr	2500	6709.8	6704	6709.8	6712.26	0.00463	11.8	2482	12.6	1.06	1.19	48.3	211.33
Reach-1	27595	Future - 100yr	3100	6710.59	6704	6710.59	6713.39	0.004351	12.3	3070	13.5	1.13	1.13	57.49	252.42
Reach-1	28003	Future - 2yr	810	6711.54	6708	6711.54	6712.61	0.006549	8.3	810	8.3	1.01	0.82	46.95	97.75
Reach-1	28003	Future - 5yr	1100	6712.03	6708	6712.03	6713.31	0.006142	9.1	1100	9.1	1.01	0.91	48.37	121.04
Reach-1	28003	Future - 10yr	1300	6712.33	6708	6712.33	6713.76	0.005898	9.6	1300	9.6	1.02	0.96	49.46	135.69
Reach-1	28003	Future - 25yr	2000	6713.28	6708	6713.28	6715.17	0.005297	10.9	1998	11	1.04	1.08	52.97	184.22
Reach-1	28003	Future - 50yr	2500	6713.9	6708	6713.9	6716.07	0.004946	11.5	2493	11.8	1.05	1.14	55.34	218.07
Reach-1	28003	Future - 100yr	3100	6714.58	6708	6714.58	6717.06	0.004699	12.1	3086	12.7	1.06	1.22	57.41	256.19
Reach-1	28503	Future - 2yr	810	6720.2	6716	6720.2	6721.91	0.005293	9.8	805	10.5	1.1	0.87	29.15	82.47
Reach-1	28503	Future - 5yr	1100	6720.97	6716	6720.97	6723.05	0.004978	10.4	1086	11.6	1.11	0.97	31.5	105.84
Reach-1	28503	Future - 10yr	1300	6721.51	6716	6721.51	6723.77	0.004666	10.5	1278	12.2	1.13	0.96	34.66	123.5
Reach-1	28503	Future - 25yr	2000	6723.07	6716	6723.07	6725.97	0.004193	10.9	1933	13.9	1.15	1.06	41.46	182.89
Reach-1	28503	Future - 50yr	2500	6724.04	6716	6724.04	6727.34	0.003996	11.1	2389	14.9	1.15	1.14	45.2	224.91
Reach-1	28503	Future - 100yr	3100	6725.08	6716	6725.08	6728.88	0.003885	11.2	2938	16.1	1.22	1.14	54.12	275.74
Reach-1	28969	Future - 2yr	810	6725.73	6722	6725.73	6727.3	0.005916	10	810	10	1.02	1.02	26.88	80.99
Reach-1	28969	Future - 5yr	1100	6726.45	6722	6726.45	6728.35	0.005534	10.9	1099	11.1	1.05	1.09	29.06	101.05
Reach-1	28969	Future - 10yr	1300	6726.9	6722	6726.9	6729.02	0.005304	11.4	1297	11.7	1.06	1.13	30.41	114.51
Reach-1	28969	Future - 25yr	2000	6728.33	6722	6728.33	6731.09	0.004755	12.5	1985	13.4	1.09	1.24	34.36	160.53
Reach-1	28969	Future - 50yr	2500	6729.25	6722	6729.25	6732.41	0.00446	12.9	2471	14.3	1.1	1.29	37.13	193.54
Reach-1	28969	Future - 100yr	3100	6730.15	6722	6730.15	6733.87	0.00445	13.6	3051	15.6	1.15	1.38	40.84	228.1
Reach-1	29390	Future - 2yr	810	6730.5	6728	6730.5	6731.67	0.006019	8.6	810	8.7	1.03	0.8	42.74	94.04
Reach-1	29390	Future - 5yr	1100	6731.03	6728	6731.03	6732.46	0.005583	9.3	1098	9.6	1.05	0.86	45.88	117.74
Reach-1	29390	Future - 10yr	1300	6731.37	6728	6731.37	6732.96	0.005409	9.8	1295	10.1	1.07	0.9	47.81	133.27
Reach-1	29390	Future - 25yr	2000	6732.44	6728	6732.44	6734.52	0.004813	10.6	1980	11.6	1.08	1.02	53.02	187.98
Reach-1	29390	Future - 50yr	2500	6733.12	6728	6733.12	6735.5	0.004564	11.1	2462	12.5	1.08	1.1	55.39	224.8
Reach-1	29390	Future - 100yr	3100	6733.87	6728	6733.87	6736.59	0.004361	11.6	3038	13.4	1.09	1.18	57.98	267.04
Reach-1	29669	Future - 2yr	810	6735.76	6732	6735.76	6737.12	0.005924	9.2	809	9.4	1.06	0.86	35.9	87.79
Reach-1	29669	Future - 5yr	1100	6736.4	6732	6736.4	6738.03	0.005394	9.7	1096	10.3	1.15	0.8	45.71	113.26
Reach-1	29669	Future - 10yr	1300	6736.82	6732	6736.82	6738.6	0.005028	9.7	1289	10.7	1.19	0.75	53.89	134.34
Reach-1	29669	Future - 25yr	2000	6738.17	6732	6738.17	6740.28	0.004078	8.9	1930	11.9	1.21	0.7	78.59	224.94
Reach-1	29669	Future - 50yr	2500	6738.89	6732	6738.89	6741.27	0.00395	8.9	2361	12.7	1.17	0.82	81.13	282.15
Reach-1	29669	Future - 100yr	3100	6739.69	6732	6739.69	6742.34	0.003777	8.9	2862	13.6	1.12	0.94	83.43	348.63

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	30071	Future - 2yr	810	6737.91	6735.1		6738.29	0.001508	4.7	803	5	0.55	0.23	68.42	173.34
Reach-1	30071	Future - 5yr	1100	6738.64	6735.1		6739.08	0.001268	4.9	1087	5.3	0.53	0.24	71.64	224.75
Reach-1	30071	Future - 10yr	1300	6739.11	6735.1		6739.58	0.001161	5	1281	5.5	0.52	0.25	73.67	258.92
Reach-1	30071	Future - 25yr	2000	6740.55	6735.1		6741.14	0.000972	5.4	1957	6.2	0.5	0.27	79.44	369.07
Reach-1	30071	Future - 50yr	2500	6741.44	6735.1		6742.1	0.00091	5.7	2435	6.6	0.5	0.29	82.63	440.93
Reach-1	30071	Future - 100yr	3100	6742.4	6735.1		6743.16	0.000865	5.9	3005	7.1	0.5	0.32	86.03	521.99
Reach-1	30095	Future - 2yr	810	6740.91	6739.19	6740.91	6741.74	0.006698	7.3	810	7.3	1.01	0.67	67.99	110.58
Reach-1	30095	Future - 5yr	1100	6741.28	6739.19	6741.28	6742.3	0.006234	8.1	1100	8.1	1.02	0.75	69.4	136.34
Reach-1	30095	Future - 10yr	1300	6741.52	6739.19	6741.52	6742.66	0.005983	8.5	1299	8.6	1.02	0.8	70.31	153.16
Reach-1	30095	Future - 25yr	2000	6742.28	6739.19	6742.28	6743.79	0.005378	9.6	1996	9.8	1.03	0.93	73.23	207.72
Reach-1	30095	Future - 50yr	2500	6742.77	6739.19	6742.77	6744.51	0.005116	10.3	2491	10.6	1.04	1.01	75.09	243.53
Reach-1	30095	Future - 100yr	3100	6743.31	6739.19	6743.31	6745.31	0.004857	10.9	3084	11.4	1.04	1.09	77.17	284.79
Reach-1	30206	Future - 2yr	810	6741.45	6739.19	6741.37	6742.45	0.005344	7.8	807	8	0.98	0.68	50.29	104.48
Reach-1	30206	Future - 5yr	1100	6741.86	6739.19	6741.86	6743.17	0.005611	8.8	1094	9.2	1.04	0.83	51.79	125.34
Reach-1	30206	Future - 10yr	1300	6742.17	6739.19	6742.17	6743.63	0.005429	9.2	1291	9.7	1.05	0.88	52.91	141.32
Reach-1	30206	Future - 25yr	2000	6743.14	6739.19	6743.14	6745.07	0.004924	10.3	1977	11.2	1.06	1.02	56.47	194.48
Reach-1	30206	Future - 50yr	2500	6743.77	6739.19	6743.77	6745.99	0.004652	10.8	2463	12	1.06	1.1	58.78	230.81
Reach-1	30206	Future - 100yr	3100	6744.46	6739.19	6744.46	6747	0.004434	11.4	3044	12.9	1.07	1.18	61.31	272.29
Reach-1	30230	Future - 2yr	810	6746.86	6745.19	6746.86	6747.69	0.006571	7.2	809	7.3	1.02	0.64	71.01	112.73
Reach-1	30230	Future - 5yr	1100	6747.23	6745.19	6747.23	6748.25	0.006146	7.9	1097	8.1	1.03	0.73	72.58	139.45
Reach-1	30230	Future - 10yr	1300	6747.47	6745.19	6747.47	6748.6	0.005916	8.3	1295	8.5	1.03	0.78	73.58	156.86
Reach-1	30230	Future - 25yr	2000	6748.22	6745.19	6748.22	6749.72	0.005356	9.4	1987	9.8	1.04	0.91	76.73	213.34
Reach-1	30230	Future - 50yr	2500	6748.7	6745.19	6748.7	6750.43	0.005098	10	2480	10.6	1.04	0.99	78.75	250.61
Reach-1	30230	Future - 100yr	3100	6749.24	6745.19	6749.24	6751.22	0.004851	10.6	3068	11.4	1.05	1.07	81	293.44
Reach-1	30296	Future - 2yr	810	6747.2	6745.19	6747.19	6748.15	0.006055	7.5	805	7.9	1.04	0.66	60.91	108.1
Reach-1	30296	Future - 5yr	1100	6747.62	6745.19	6747.62	6748.8	0.005775	8.2	1090	8.8	1.06	0.75	63.65	134.56
Reach-1	30296	Future - 10yr	1300	6747.89	6745.19	6747.89	6749.21	0.005615	8.5	1286	9.3	1.07	0.8	65.79	152.08
Reach-1	30296	Future - 25yr	2000	6748.79	6745.19	6748.79	6750.5	0.004945	9.3	1962	10.6	1.08	0.89	73.71	215.77
Reach-1	30296	Future - 50yr	2500	6749.35	6745.19	6749.35	6751.31	0.004721	9.7	2439	11.4	1.08	0.97	77.03	257.46
Reach-1	30296	Future - 100yr	3100	6749.98	6745.19	6749.98	6752.2	0.004452	10.1	3005	12.1	1.08	1.04	80.65	307.33
Reach-1	30320	Future - 2yr	810	6753.07	6751.19	6753.07	6753.96	0.006288	7.3	807	7.6	1.04	0.64	67.23	110.37
Reach-1	30320	Future - 5yr	1100	6753.47	6751.19	6753.47	6754.56	0.005947	8	1093	8.4	1.06	0.72	70.8	137.77
Reach-1	30320	Future - 10yr	1300	6753.73	6751.19	6753.73	6754.94	0.00566	8.3	1290	8.8	1.06	0.75	73.19	156.89
Reach-1	30320	Future - 25yr	2000	6754.54	6751.19	6754.54	6756.13	0.005126	9.1	1970	10.2	1.08	0.86	80.33	219.13
Reach-1	30320	Future - 50yr	2500	6755.06	6751.19	6755.06	6756.88	0.004859	9.5	2451	10.9	1.09	0.92	84.88	262.05
Reach-1	30320	Future - 100yr	3100	6755.63	6751.19	6755.63	6757.72	0.004665	10	3023	11.7	1.1	0.99	89.78	311.17

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	30520	Future - 2yr	810	6756.5	6753.63	6756.5	6757.69	0.005969	8.7	809	8.8	1.03	0.82	41.45	93.43
Reach-1	30520	Future - 5yr	1100	6757.04	6753.63	6757.04	6758.49	0.005566	9.5	1098	9.7	1.04	0.9	43.31	116.23
Reach-1	30520	Future - 10yr	1300	6757.38	6753.63	6757.38	6759	0.005352	9.9	1296	10.2	1.05	0.95	44.47	131.32
Reach-1	30520	Future - 25yr	2000	6758.56	6753.63	6758.56	6760.58	0.004446	10	1978	11.5	1.22	0.74	72.89	199.16
Reach-1	30520	Future - 50yr	2500	6759.28	6753.63	6759.28	6761.54	0.004105	9.8	2441	12.2	1.23	0.75	85.43	256.37
Reach-1	30520	Future - 100yr	3100	6760.09	6753.63	6760.09	6762.55	0.003745	9.4	2973	12.8	1.19	0.79	94.85	329.94
Reach-1	31003	Future - 2yr	810	6762.13	6758.66	6762.13	6763.32	0.005358	8	806	8.7	1.35	0.43	77.54	101.09
Reach-1	31003	Future - 5yr	1100	6762.77	6758.66	6762.77	6764.07	0.004537	7	1067	9.3	1.27	0.45	97.61	157.26
Reach-1	31003	Future - 10yr	1300	6763.1	6758.66	6763.1	6764.52	0.004404	6.8	1239	9.8	1.24	0.5	102.58	190.74
Reach-1	31003	Future - 25yr	2000	6764.15	6758.66	6764.15	6765.87	0.003993	6.5	1809	11.1	1.15	0.63	118.6	306.19
Reach-1	31003	Future - 50yr	2500	6764.74	6758.66	6764.74	6766.67	0.003917	6.6	2195	11.9	1.12	0.74	122.08	377.99
Reach-1	31003	Future - 100yr	3100	6765.38	6758.66	6765.38	6767.55	0.003881	6.8	2647	12.8	1.09	0.86	125.51	456.7
Reach-1	31503	Future - 2yr	810	6769.61	6766.51	6769.61	6770.64	0.006349	8.1	810	8.1	1.02	0.77	50.41	99.72
Reach-1	31503	Future - 5yr	1100	6770.08	6766.51	6770.08	6771.32	0.005885	8.9	1099	8.9	1.04	0.83	54.06	124.04
Reach-1	31503	Future - 10yr	1300	6770.38	6766.51	6770.38	6771.76	0.005616	9.2	1298	9.4	1.08	0.81	60.11	141.01
Reach-1	31503	Future - 25yr	2000	6771.34	6766.51	6771.34	6773.09	0.004814	9.6	1981	10.7	1.15	0.78	78.74	208.02
Reach-1	31503	Future - 50yr	2500	6771.88	6766.51	6771.88	6773.92	0.004723	9.9	2458	11.6	1.2	0.82	89.27	253.34
Reach-1	31503	Future - 100yr	3100	6772.64	6766.51	6772.64	6774.81	0.004092	9.4	3006	12	1.17	0.8	103.24	328.23
Reach-1	31817	Future - 2yr	630	6774.2	6772	6774.2	6775.09	0.006407	7.4	629	7.6	1.1	0.57	58.96	85.68
Reach-1	31817	Future - 5yr	840	6774.58	6772	6774.58	6775.64	0.005928	7.7	834	8.3	1.09	0.65	60.61	108.5
Reach-1	31817	Future - 10yr	1000	6774.84	6772	6774.84	6776.02	0.005727	8	989	8.8	1.08	0.71	61.73	124.39
Reach-1	31817	Future - 25yr	1700	6775.85	6772	6775.85	6777.49	0.005101	9	1660	10.4	1.07	0.89	65.86	188.55
Reach-1	31817	Future - 50yr	2100	6776.33	6772	6776.33	6778.25	0.005023	9.5	2045	11.3	1.12	0.94	71.95	221.11
Reach-1	31817	Future - 100yr	2600	6776.97	6772	6776.97	6779.11	0.004599	9.6	2519	11.9	1.15	0.91	83.07	270.72
Reach-1	32075	Future - 2yr	630	6776.59	6774	6776.59	6777.79	0.006166	8.8	630	8.8	1.02	0.83	31.25	71.92
Reach-1	32075	Future - 5yr	840	6777.1	6774	6777.1	6778.55	0.005772	9.5	839	9.7	1.04	0.91	32.51	88.12
Reach-1	32075	Future - 10yr	1000	6777.46	6774	6777.46	6779.09	0.00553	10	998	10.3	1.04	0.96	33.4	100.01
Reach-1	32075	Future - 25yr	1700	6778.84	6774	6778.84	6781.13	0.004871	11.4	1689	12.2	1.07	1.11	37.17	148.87
Reach-1	32075	Future - 50yr	2100	6779.58	6774	6779.58	6782.16	0.004517	11.9	2080	12.9	1.07	1.15	39.14	177.12
Reach-1	32075	Future - 100yr	2600	6780.36	6774	6780.36	6783.37	0.004408	12.3	2573	14	1.22	1.01	52.42	210.58
Reach-1	32509	Future - 2yr	630	6784.57	6782	6784.57	6785.79	0.005873	8.5	627	8.8	1.06	0.77	34.06	74.16
Reach-1	32509	Future - 5yr	840	6785.09	6782	6785.09	6786.55	0.005485	9.1	834	9.7	1.06	0.84	35.75	92.2
Reach-1	32509	Future - 10yr	1000	6785.46	6782	6785.46	6787.08	0.005256	9.5	990	10.3	1.06	0.9	36.63	105.4
Reach-1	32509	Future - 25yr	1700	6786.86	6782	6786.86	6789.13	0.004634	10.6	1670	12.2	1.12	0.98	44.47	161.11
Reach-1	32509	Future - 50yr	2100	6787.6	6782	6787.6	6790.14	0.004308	10.7	2050	12.9	1.14	0.99	50.1	196.04
Reach-1	32509	Future - 100yr	2600	6788.38	6782	6788.38	6791.31	0.004164	10.9	2521	13.9	1.2	0.99	59.11	238.39

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	33003	Future - 2yr	630	6793.79	6790	6793.79	6795.29	0.006047	9.7	629	9.8	1.04	0.95	23.46	65.17
Reach-1	33003	Future - 5yr	840	6794.44	6790	6794.44	6796.23	0.005598	10.3	837	10.8	1.13	0.89	29.38	81.89
Reach-1	33003	Future - 10yr	1000	6794.92	6790	6794.92	6796.88	0.005191	10.2	992	11.3	1.19	0.83	35.27	97.59
Reach-1	33003	Future - 25yr	1700	6796.94	6790	6796.94	6799.12	0.00358	7.5	1600	12.2	1.35	0.51	96.06	227.93
Reach-1	33003	Future - 50yr	2100	6797.85	6790	6797.85	6800.04	0.003154	6.5	1886	12.5	1.26	0.53	117.14	324.81
Reach-1	33003	Future - 100yr	2600	6798.67	6790	6798.67	6800.99	0.003026	6.1	2220	13.2	1.17	0.62	125.38	425.37
Reach-1	33325	Future - 2yr	630	6798.08	6794.27	6798.08	6799.2	0.006133	8.4	630	8.5	1.03	0.77	35.73	74.99
Reach-1	33325	Future - 5yr	840	6798.56	6794.27	6798.56	6799.9	0.005702	9	838	9.3	1.06	0.81	39.09	92.95
Reach-1	33325	Future - 10yr	1000	6798.9	6794.27	6798.9	6800.4	0.005431	9.4	996	9.8	1.08	0.83	41.55	106.75
Reach-1	33325	Future - 25yr	1700	6800.2	6794.27	6800.2	6802.27	0.004727	10.2	1674	11.6	1.13	0.91	51.6	167.09
Reach-1	33325	Future - 50yr	2100	6800.85	6794.27	6800.85	6803.2	0.004492	10.4	2054	12.4	1.16	0.93	58.31	202.66
Reach-1	33325	Future - 100yr	2600	6801.63	6794.27	6801.63	6804.25	0.004181	10.4	2518	13.2	1.18	0.94	66.57	251.12
Reach-1	33742	Future - 2yr	630	6804.11	6802	6804.11	6805.06	0.006287	7.7	629	7.8	1.02	0.71	44.5	81.45
Reach-1	33742	Future - 5yr	840	6804.51	6802	6804.51	6805.67	0.005927	8.4	838	8.6	1.03	0.79	45.66	99.52
Reach-1	33742	Future - 10yr	1000	6804.79	6802	6804.79	6806.09	0.005695	8.9	996	9.2	1.03	0.84	46.49	112.69
Reach-1	33742	Future - 25yr	1700	6805.89	6802	6805.89	6807.73	0.005049	10.3	1687	10.9	1.05	1.01	49.81	165.65
Reach-1	33742	Future - 50yr	2100	6806.45	6802	6806.45	6808.55	0.00481	10.8	2079	11.7	1.06	1.08	51.7	193.92
Reach-1	33742	Future - 100yr	2600	6807.1	6802	6807.1	6809.5	0.004567	11.4	2567	12.5	1.07	1.15	53.91	228.29
Reach-1	34211	Future - 2yr	630	6812.55	6810	6812.55	6813.7	0.005925	8.3	628	8.6	1.06	0.74	36.81	75.59
Reach-1	34211	Future - 5yr	840	6813.04	6810	6813.04	6814.42	0.005544	8.9	835	9.5	1.08	0.8	39.81	94.31
Reach-1	34211	Future - 10yr	1000	6813.39	6810	6813.39	6814.92	0.005275	9.2	991	10	1.09	0.83	41.83	108.66
Reach-1	34211	Future - 25yr	1700	6814.73	6810	6814.73	6816.84	0.004575	9.9	1664	11.8	1.17	0.85	56.04	172.35
Reach-1	34211	Future - 50yr	2100	6815.38	6810	6815.38	6817.77	0.004384	9.9	2037	12.6	1.23	0.84	67.48	212.13
Reach-1	34211	Future - 100yr	2600	6816.34	6810	6816.34	6818.8	0.003669	9	2474	12.9	1.22	0.74	87.52	288.45
Reach-1	34267	Future - 2yr	560	6812.9	6810	6812.77	6814.01	0.004973	8.1	558	8.5	0.96	0.7	28.96	68.97
Reach-1	34267	Future - 5yr	750	6813.29	6810	6813.29	6814.78	0.005528	9.3	746	9.8	1.05	0.87	29.62	80.6
Reach-1	34267	Future - 10yr	970	6813.86	6810	6813.86	6815.61	0.00516	9.9	962	10.6	1.05	0.94	30.58	97.66
Reach-1	34267	Future - 25yr	1600	6815.26	6810	6815.26	6817.67	0.004597	11.2	1578	12.5	1.08	1.07	34.56	143.07
Reach-1	34267	Future - 50yr	2000	6815.98	6810	6815.98	6818.81	0.004518	11.8	1966	13.6	1.11	1.17	36.72	168.92
Reach-1	34267	Future - 100yr	2400	6816.81	6810	6816.81	6819.88	0.00412	11.9	2351	14.2	1.17	1.06	44.7	202.39
Reach-1	34299	Future - 2yr	560	6816.79	6814	6816.79	6817.83	0.006096	7.9	558	8.2	1.08	0.67	39.22	70.67
Reach-1	34299	Future - 5yr	750	6817.24	6814	6817.24	6818.5	0.005647	8.4	745	9	1.1	0.71	43.4	89.51
Reach-1	34299	Future - 10yr	970	6817.73	6814	6817.73	6819.18	0.005223	8.7	957	9.7	1.11	0.75	47.84	111.79
Reach-1	34299	Future - 25yr	1600	6818.92	6814	6818.92	6820.86	0.004597	9.1	1550	11.4	1.14	0.84	58.9	175.44
Reach-1	34299	Future - 50yr	2000	6819.58	6814	6819.58	6821.77	0.004336	9.3	1916	12.1	1.14	0.89	64.18	216.04
Reach-1	34299	Future - 100yr	2400	6820.17	6814	6820.17	6822.61	0.004194	9.4	2277	12.9	1.15	0.95	69.09	255.22

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	34439	Future - 2yr	560	6821.94	6817.38	6821.94	6823.07	0.006362	8.4	559	8.5	1.08	0.74	34.19	66.89
Reach-1	34439	Future - 5yr	750	6822.51	6817.38	6822.51	6823.76	0.005224	7.7	741	9	1.32	0.46	67.92	97.52
Reach-1	34439	Future - 10yr	970	6823.06	6817.38	6823.06	6824.42	0.004623	7	936	9.5	1.29	0.46	84.71	139.17
Reach-1	34439	Future - 25yr	1600	6824.27	6817.38	6824.27	6825.91	0.003952	6.2	1443	10.8	1.17	0.59	105.9	256.12
Reach-1	34439	Future - 50yr	2000	6824.82	6817.38	6824.82	6826.68	0.003962	6.3	1749	11.7	1.14	0.69	110.65	316.23
Reach-1	34439	Future - 100yr	2400	6825.34	6817.38	6825.34	6827.39	0.003926	6.4	2046	12.4	1.12	0.78	115.1	374.93
Reach-1	34524		Bridge												
Reach-1	34614	Future - 2yr	560	6823.21	6818	6820.6	6823.36	0.000426	3	559	3.1	0.33	0.07	63.89	184.8
Reach-1	34614	Future - 5yr	750	6823.86	6818	6821.09	6824.05	0.000445	3.3	744	3.6	0.36	0.08	76.13	229.9
Reach-1	34614	Future - 10yr	970	6824.47	6818	6821.6	6824.72	0.000472	3.5	955	4	0.4	0.09	89.4	281.16
Reach-1	34614	Future - 25yr	1600	6825.84	6818	6822.75	6826.23	0.000548	3.8	1540	5.1	0.46	0.12	115.39	421.43
Reach-1	34614	Future - 50yr	2000	6826.56	6818	6823.31	6827.03	0.000583	3.9	1896	5.6	0.48	0.15	124.86	507.66
Reach-1	34614	Future - 100yr	2400	6827.21	6818	6823.8	6827.75	0.00061	4.1	2244	6.1	0.49	0.17	132.86	591.12
Reach-1	34800	Future - 2yr	560	6823.62	6820	6823.62	6824.66	0.006401	8.1	560	8.2	1.03	0.74	35.39	68.95
Reach-1	34800	Future - 5yr	750	6824.06	6820	6824.06	6825.32	0.006048	8.8	748	9	1.06	0.8	38.13	85.09
Reach-1	34800	Future - 10yr	970	6824.54	6820	6824.54	6826.02	0.005634	9.3	965	9.8	1.08	0.84	41.12	104.05
Reach-1	34800	Future - 25yr	1600	6825.73	6820	6825.73	6827.73	0.004897	10.1	1574	11.4	1.11	0.94	48.51	157.71
Reach-1	34800	Future - 50yr	2000	6826.51	6820	6826.51	6828.68	0.00428	9.7	1954	11.9	1.23	0.73	71.53	205.46
Reach-1	34800	Future - 100yr	2400	6827.14	6820	6827.14	6829.49	0.004026	9.5	2310	12.5	1.23	0.75	80.82	253.29
Reach-1	35126	Future - 2yr	560	6828.84	6824.68	6828.84	6830.43	0.006195	10	560	10.1	1.05	0.98	19.2	55.97
Reach-1	35126	Future - 5yr	750	6829.54	6824.68	6829.54	6831.44	0.005684	10.7	748	11.1	1.06	1.03	20.68	69.89
Reach-1	35126	Future - 10yr	970	6830.28	6824.68	6830.28	6832.5	0.005233	11.2	965	12	1.15	0.96	25.72	86.76
Reach-1	35126	Future - 25yr	1600	6832.37	6824.68	6832.37	6834.92	0.003799	9.1	1533	13.1	1.3	0.67	57.85	175.98
Reach-1	35126	Future - 50yr	2000	6833.33	6824.68	6833.33	6836.11	0.00357	8.5	1858	13.9	1.24	0.75	64.66	234.68
Reach-1	35126	Future - 100yr	2400	6834.16	6824.68	6834.16	6837.16	0.003439	8.2	2168	14.6	1.2	0.83	70.16	291.25
Reach-1	35692	Future - 2yr	560	6836.87	6834	6836.87	6838.02	0.0059	8.4	559	8.6	1.05	0.75	31.91	66.82
Reach-1	35692	Future - 5yr	750	6837.36	6834	6837.36	6838.76	0.00554	9	746	9.5	1.07	0.82	33.96	83.13
Reach-1	35692	Future - 10yr	970	6837.89	6834	6837.89	6839.53	0.005193	9.5	962	10.3	1.08	0.87	36.22	101.7
Reach-1	35692	Future - 25yr	1600	6839.2	6834	6839.2	6841.43	0.004618	10.5	1570	12.1	1.11	1	41.87	152.77
Reach-1	35692	Future - 50yr	2000	6839.75	6834	6839.75	6842.5	0.004939	11.3	1954	13.5	1.18	1.15	44.6	176.44
Reach-1	35692	Future - 100yr	2400	6840.92	6834	6840.92	6843.47	0.003538	9.3	2316	13	1.34	0.61	90.82	258.53

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	36156	Future - 2yr	560	6845.03	6842	6845.03	6846.23	0.005551	7.6	550	8.9	1.13	0.63	39.08	73.31
Reach-1	36156	Future - 5yr	750	6845.57	6842	6845.57	6846.99	0.005166	7.9	727	9.7	1.13	0.69	43.2	95.43
Reach-1	36156	Future - 10yr	970	6846.14	6842	6846.14	6847.77	0.004781	8	928	10.5	1.12	0.75	46.99	121.48
Reach-1	36156	Future - 25yr	1600	6847.45	6842	6847.45	6849.66	0.004449	8.6	1485	12.4	1.11	0.96	51.64	186.05
Reach-1	36156	Future - 50yr	2000	6848.15	6842	6848.15	6850.72	0.0044	9	1836	13.4	1.13	1.06	55.22	222.97
Reach-1	36156	Future - 100yr	2400	6848.88	6842	6848.88	6851.69	0.004145	9	2179	14.1	1.14	1.08	60.92	265.45
Reach-1	36365	Future - 2yr	560	6849.03	6846	6849.03	6850.38	0.005736	8.9	558	9.3	1.08	0.78	27.27	62.94
Reach-1	36365	Future - 5yr	750	6849.63	6846	6849.63	6851.24	0.005293	9.4	743	10.2	1.1	0.83	30.15	80.15
Reach-1	36365	Future - 10yr	970	6850.24	6846	6850.24	6852.14	0.005002	9.8	955	11.1	1.12	0.89	32.64	99.35
Reach-1	36365	Future - 25yr	1600	6851.73	6846	6851.73	6854.32	0.004547	10.4	1549	13.1	1.17	1	40.32	153.76
Reach-1	36365	Future - 50yr	2000	6853.16	6846	6853.16	6855.39	0.003005	7	1853	12.4	1.32	0.46	111.8	286.81
Reach-1	36365	Future - 100yr	2400	6853.87	6846	6853.87	6856.22	0.002887	6.5	2138	13	1.23	0.54	118.92	368.74
Reach-1	36776	Future - 2yr	560	6854.4	6850	6854.4	6855.89	0.005923	8.2	543	9.9	1.09	0.83	27.56	68.43
Reach-1	36776	Future - 5yr	750	6855.04	6850	6855.04	6856.84	0.005684	8.7	720	11	1.1	0.95	28.9	86.5
Reach-1	36776	Future - 10yr	970	6855.72	6850	6855.72	6857.83	0.005412	9.1	921	11.9	1.09	1.05	30.19	106.69
Reach-1	36776	Future - 25yr	1600	6857.45	6850	6857.45	6860.29	0.004846	9.9	1491	14	1.09	1.23	34.17	162.2
Reach-1	36776	Future - 50yr	2000	6858.12	6850	6858.12	6861.69	0.005348	10.8	1854	15.7	1.19	1.45	36.52	185.58
Reach-1	36776	Future - 100yr	2400	6859.34	6850	6859.34	6862.98	0.004418	10.1	2209	15.9	1.2	1.23	46.93	237.13
Reach-1	37236	Future - 2yr	560	6864.57	6860	6864.57	6866.57	0.005251	9.8	545	11.5	1.1	0.88	17.3	57.28
Reach-1	37236	Future - 5yr	750	6865.47	6860	6865.47	6867.83	0.00484	10.2	723	12.6	1.11	0.93	19.37	73.74
Reach-1	37236	Future - 10yr	970	6866.38	6860	6866.38	6869.14	0.004573	10.5	926	13.6	1.15	0.96	22.38	92.6
Reach-1	37236	Future - 25yr	1600	6869.41	6860	6869.41	6871.98	0.002686	7	1401	13.7	1.28	0.48	72.69	228.23
Reach-1	37236	Future - 50yr	2000	6870.45	6860	6870.45	6873.12	0.002573	6.5	1645	14.4	1.17	0.57	79.52	307.78
Reach-1	37236	Future - 100yr	2400	6871.28	6860	6871.28	6874.12	0.002578	6.4	1879	15.2	1.13	0.66	84.17	375.71
Reach-1	37421	Future - 2yr	560	6870.04	6866	6870.04	6871.59	0.006051	9.7	558	10	1.07	0.91	21.57	57.83
Reach-1	37421	Future - 5yr	750	6870.76	6866	6870.76	6872.56	0.005376	9.8	743	10.8	1.18	0.79	29.79	76.31
Reach-1	37421	Future - 10yr	970	6871.54	6866	6871.54	6873.52	0.00472	9.4	945	11.4	1.22	0.73	38.65	102.92
Reach-1	37421	Future - 25yr	1600	6873.34	6866	6873.34	6875.69	0.003838	8.2	1471	12.8	1.24	0.69	63.83	194.19
Reach-1	37421	Future - 50yr	2000	6874.28	6866	6874.28	6876.75	0.003498	7.7	1765	13.4	1.21	0.71	77.07	260.94
Reach-1	37421	Future - 100yr	2400	6875.04	6866	6875.04	6877.67	0.003379	7.4	2043	14.1	1.19	0.75	86.65	323.33
Reach-1	37525	Bridge													

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	37590	Future - 2yr	560	6875.97	6872	6874.28	6876.19	0.000691	3.6	557	3.8	0.39	0.12	55.01	155.58
Reach-1	37590	Future - 5yr	750	6876.6	6872	6874.67	6876.88	0.00069	3.9	742	4.2	0.41	0.14	58.58	191.63
Reach-1	37590	Future - 10yr	970	6877.24	6872	6875.07	6877.58	0.000698	4.2	954	4.7	0.43	0.16	61.99	230.01
Reach-1	37590	Future - 25yr	1600	6878.71	6872	6876.07	6879.21	0.000739	4.9	1550	5.8	0.46	0.21	69.64	326.5
Reach-1	37590	Future - 50yr	2000	6879.36	6872	6876.63	6880	0.00081	5.4	1925	6.5	0.5	0.25	72.94	373.46
Reach-1	37590	Future - 100yr	2400	6879.93	6872	6877.14	6880.69	0.000881	5.8	2297	7.1	0.53	0.29	75.61	415.8
Reach-1	37714	Future - 2yr	560	6876.08	6872		6876.27	0.000635	3.3	554	3.5	0.39	0.1	67.12	171.95
Reach-1	37714	Future - 5yr	750	6876.73	6872		6876.96	0.000608	3.5	735	3.9	0.39	0.11	72.38	217.14
Reach-1	37714	Future - 10yr	970	6877.38	6872		6877.66	0.000594	3.6	942	4.3	0.4	0.13	77.82	266.2
Reach-1	37714	Future - 25yr	1600	6878.91	6872		6879.3	0.000586	4.1	1518	5.2	0.42	0.16	86.77	392.79
Reach-1	37714	Future - 50yr	2000	6879.62	6872		6880.1	0.000621	4.4	1878	5.7	0.44	0.19	90.11	455.51
Reach-1	37714	Future - 100yr	2400	6880.24	6872		6880.81	0.000655	4.7	2236	6.2	0.45	0.22	92.82	512.56
Reach-1	38160	Future - 2yr	560	6882.42	6880	6882.42	6883.35	0.006365	7.6	560	7.7	1.05	0.66	43.42	73.38
Reach-1	38160	Future - 5yr	750	6882.83	6880	6882.83	6883.93	0.005874	8.2	747	8.5	1.07	0.7	47.58	91.82
Reach-1	38160	Future - 10yr	970	6883.25	6880	6883.25	6884.55	0.005481	8.6	962	9.2	1.09	0.73	51.93	112.96
Reach-1	38160	Future - 25yr	1600	6884.32	6880	6884.32	6886.04	0.004733	9.2	1561	10.6	1.1	0.82	61.56	173.7
Reach-1	38160	Future - 50yr	2000	6884.89	6880	6884.89	6886.86	0.004516	9.5	1933	11.4	1.12	0.88	66.66	210.42
Reach-1	38160	Future - 100yr	2400	6885.42	6880	6885.42	6887.6	0.004339	9.7	2298	12.1	1.12	0.92	71.12	246.99
Reach-1	38627	Future - 2yr	78	6886.42	6885.36	6886.42	6886.73	0.009357	4.5	78	4.5	1.01	0.36	28.1	17.31
Reach-1	38627	Future - 5yr	180	6886.9	6885.36	6886.9	6887.39	0.007995	5.7	180	5.7	1.01	0.49	32.38	31.75
Reach-1	38627	Future - 10yr	300	6887.32	6885.36	6887.32	6887.97	0.007347	6.5	300	6.5	1.01	0.58	36.21	46.3
Reach-1	38627	Future - 25yr	640	6888.17	6885.36	6888.17	6889.17	0.006319	8	640	8	1.04	0.73	43.06	80.29
Reach-1	38627	Future - 50yr	850	6888.59	6885.36	6888.59	6889.79	0.005831	8.6	848	8.8	1.05	0.78	45.52	98.99
Reach-1	38627	Future - 100yr	1100	6889.05	6885.36	6889.05	6890.45	0.005465	9.2	1095	9.5	1.06	0.83	48.18	120.18
Reach-1	39086	Future - 2yr	78	6895.08	6894	6895.08	6895.48	0.008691	5.1	78	5.1	1	0.42	19.36	15.44
Reach-1	39086	Future - 5yr	180	6895.68	6894	6895.68	6896.33	0.007274	6.2	179	6.5	1.08	0.48	26.39	29.15
Reach-1	39086	Future - 10yr	300	6896.22	6894	6896.22	6897.1	0.006419	6.7	294	7.6	1.14	0.52	33.07	44.8
Reach-1	39086	Future - 25yr	640	6897.46	6894	6897.46	6898.68	0.004789	6.4	594	9.2	1.16	0.52	54.55	99.85
Reach-1	39086	Future - 50yr	850	6897.95	6894	6897.95	6899.43	0.004912	6.6	766	10.3	1.18	0.62	60.4	127.91
Reach-1	39086	Future - 100yr	1100	6898.64	6894	6898.64	6900.2	0.004251	6.3	954	10.7	1.13	0.63	70.54	173.95
Reach-1	39599	Future - 2yr	78	6906.55	6906	6906.55	6906.79	0.009617	3.9	78	3.9	0.99	0.29	40.44	19.83
Reach-1	39599	Future - 5yr	180	6906.92	6906	6906.92	6907.31	0.008441	5	180	5	1	0.41	45.91	35.84
Reach-1	39599	Future - 10yr	300	6907.24	6906	6907.24	6907.77	0.007841	5.9	300	5.9	1.02	0.5	49.45	51.13
Reach-1	39599	Future - 25yr	640	6907.94	6906	6907.94	6908.78	0.006411	7.2	639	7.4	1.04	0.62	56.89	88.74
Reach-1	39599	Future - 50yr	850	6908.29	6906	6908.29	6909.3	0.006028	7.8	846	8.1	1.05	0.68	59.76	109.18
Reach-1	39599	Future - 100yr	1100	6908.67	6906	6908.67	6909.86	0.005698	8.3	1091	8.8	1.06	0.75	62.69	132.38

Cottonwood Creek Channel Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	40099	Future - 2yr	78	6912.41	6912	6912.41	6912.61	0.010609	3.6	78	3.6	1	0.26	55.94	21.91
Reach-1	40099	Future - 5yr	180	6912.71	6912	6912.71	6913.04	0.009074	4.6	180	4.6	1.01	0.37	60.23	38.98
Reach-1	40099	Future - 10yr	300	6912.98	6912	6912.98	6913.44	0.00798	5.4	300	5.4	1.03	0.43	64.35	55.7
Reach-1	40099	Future - 25yr	640	6913.58	6912	6913.58	6914.32	0.006671	6.6	635	7	1.06	0.55	73.39	97.17
Reach-1	40099	Future - 50yr	850	6913.91	6912	6913.91	6914.78	0.006052	7	838	7.6	1.06	0.59	77.88	122.04
Reach-1	40099	Future - 100yr	1100	6914.24	6912	6914.24	6915.27	0.005728	7.3	1079	8.2	1.1	0.6	88.52	150.21
Reach-1	40503	Future - 2yr	78	6918.47	6918	6918.47	6918.7	0.010059	3.8	78	3.8	1	0.28	45.29	20.47
Reach-1	40503	Future - 5yr	180	6918.81	6918	6918.81	6919.19	0.00865	5	180	5	1.01	0.41	48	36.24
Reach-1	40503	Future - 10yr	300	6919.12	6918	6919.12	6919.65	0.007798	5.8	300	5.8	1.02	0.49	50.51	51.6
Reach-1	40503	Future - 25yr	640	6919.81	6918	6919.81	6920.65	0.006541	7.2	639	7.4	1.03	0.64	56.17	88.43
Reach-1	40503	Future - 50yr	850	6920.16	6918	6920.16	6921.17	0.006132	7.8	846	8.1	1.05	0.69	59.26	108.54
Reach-1	40503	Future - 100yr	1100	6920.55	6918	6920.55	6921.73	0.00572	8.3	1092	8.8	1.06	0.74	62.83	132.06
Reach-1	41003	Future - 2yr	78	6926.64	6926	6926.64	6926.9	0.009758	4.1	78	4.1	1.01	0.32	36.06	18.89
Reach-1	41003	Future - 5yr	180	6927.05	6926	6927.05	6927.45	0.008537	5.1	180	5.1	1.01	0.42	44.39	35.33
Reach-1	41003	Future - 10yr	300	6927.39	6926	6927.39	6927.91	0.007828	5.8	300	5.8	1.02	0.49	51.61	51.9
Reach-1	41003	Future - 25yr	640	6928.1	6926	6928.1	6928.9	0.006129	6.5	632	7.2	1.14	0.46	79.97	97.99
Reach-1	41003	Future - 50yr	850	6928.46	6926	6928.46	6929.39	0.005605	6.6	828	7.8	1.14	0.5	89.41	128.39
Reach-1	41003	Future - 100yr	1100	6928.83	6926	6928.83	6929.9	0.005222	6.7	1053	8.5	1.12	0.54	96.71	163.58
Reach-1	41503	Future - 2yr	78	6934.67	6934	6934.67	6934.95	0.00934	4.3	78	4.3	1	0.33	31.56	18.12
Reach-1	41503	Future - 5yr	180	6935.1	6934	6935.1	6935.56	0.008247	5.4	180	5.4	1.01	0.46	37.24	33.16
Reach-1	41503	Future - 10yr	300	6935.49	6934	6935.49	6936.1	0.00725	6.2	300	6.3	1.03	0.52	42.29	48.54
Reach-1	41503	Future - 25yr	640	6936.32	6934	6936.32	6937.24	0.005821	7	633	7.7	1.14	0.51	64.03	90.92
Reach-1	41503	Future - 50yr	850	6936.73	6934	6936.73	6937.8	0.005341	7.1	830	8.4	1.14	0.54	72.88	119.04
Reach-1	41503	Future - 100yr	1100	6937.14	6934	6937.14	6938.38	0.00507	7.3	1058	9.1	1.15	0.59	80.68	150.96
Reach-1	42003	Future - 2yr	78	6939.24	6938	6939.24	6939.71	0.008316	5.5	78	5.5	1.01	0.47	15.04	14.12
Reach-1	42003	Future - 5yr	180	6939.97	6938	6939.97	6940.68	0.007246	6.8	180	6.8	1.02	0.6	19.27	26.65
Reach-1	42003	Future - 10yr	300	6940.55	6938	6940.55	6941.53	0.00637	7.7	299	8	1.07	0.65	22.82	38.91
Reach-1	42003	Future - 25yr	640	6941.88	6938	6941.88	6943.39	0.005062	8.6	625	10	1.12	0.72	31.12	74.7
Reach-1	42003	Future - 50yr	850	6942.54	6938	6942.54	6944.32	0.004724	8.8	819	10.9	1.14	0.76	35.68	96.87
Reach-1	42003	Future - 100yr	1100	6943.25	6938	6943.25	6945.29	0.004418	8.9	1042	11.8	1.15	0.8	40.61	124.1
Reach-1	42458	Future - 2yr	78	6946.76	6946	6946.76	6947.12	0.009079	4.8	78	4.8	1.01	0.39	23.06	16.21
Reach-1	42458	Future - 5yr	180	6947.3	6946	6947.3	6947.88	0.007683	6.1	180	6.1	1	0.54	25.44	29.4
Reach-1	42458	Future - 10yr	300	6947.8	6946	6947.8	6948.57	0.00707	7.1	300	7.1	1	0.65	27.8	42.55
Reach-1	42458	Future - 25yr	640	6948.81	6946	6948.81	6950.04	0.005957	8.7	638	8.9	1.05	0.8	32.71	73.64
Reach-1	42458	Future - 50yr	850	6949.33	6946	6949.33	6950.81	0.005542	9.3	846	9.8	1.05	0.87	34.13	91.06
Reach-1	42458	Future - 100yr	1100	6949.88	6946	6949.88	6951.63	0.005241	10	1091	10.6	1.06	0.95	35.82	110.49

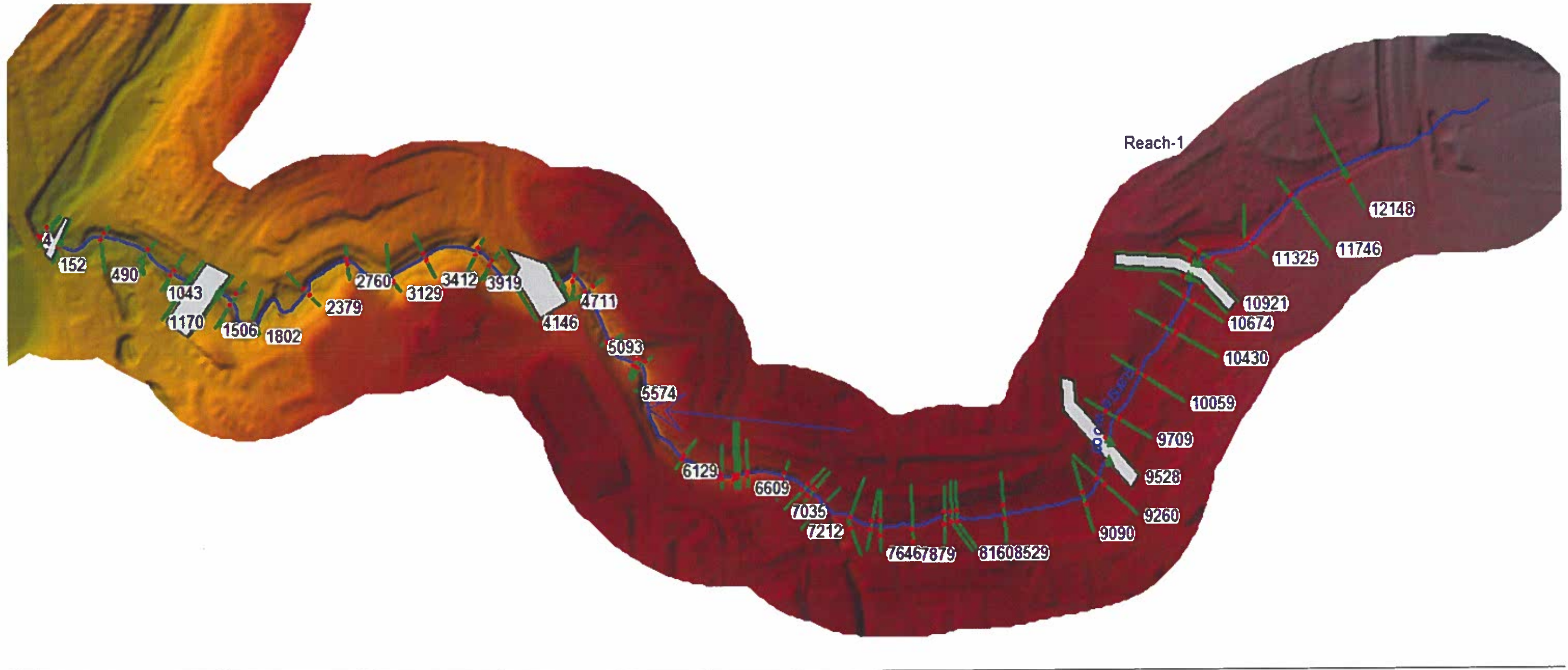
Cottonwood Creek Culvert Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Reach-1	20261	Culvert #1	Future - 2yr	1900	6599.94	6599.87	6598.88	6599.94	6615.61	487.2	6.01	9.19	11.56
Reach-1	20261	Culvert #2	Future - 2yr	1900	6599.94	6599.87	6598.85	6599.94	6615.61	510.51	6.01	9.34	12.13
Reach-1	20261	Culvert #3	Future - 2yr	1900	6599.94	6599.87	6598.86	6599.93	6615.61	479.24	6.01	9.14	12.37
Reach-1	20261	Culvert #4	Future - 2yr	1900	6599.94	6599.87	6598.93	6599.93	6615.61	423.05	6.01	8.77	11.38
Reach-1	20261	Culvert #1	Future - 5yr	2400	6600.79	6600.71	6599.62	6600.78	6615.61	612.39	6.52	9.92	12.43
Reach-1	20261	Culvert #2	Future - 5yr	2400	6600.79	6600.71	6599.58	6600.77	6615.61	635.08	6.52	10.04	12.84
Reach-1	20261	Culvert #3	Future - 5yr	2400	6600.79	6600.71	6599.61	6600.79	6615.61	606.32	6.52	9.89	13.15
Reach-1	20261	Culvert #4	Future - 5yr	2400	6600.79	6600.71	6599.67	6600.8	6615.61	546.2	6.52	9.55	12.44
Reach-1	20261	Culvert #1	Future - 10yr	3000	6601.83	6601.75	6600.48	6601.83	6615.61	762.1	7.32	10.96	13.49
Reach-1	20261	Culvert #2	Future - 10yr	3000	6601.83	6601.75	6600.46	6601.83	6615.61	788.04	7.32	11.08	13.78
Reach-1	20261	Culvert #3	Future - 10yr	3000	6601.83	6601.75	6600.46	6601.83	6615.61	754.44	7.32	10.92	14.06
Reach-1	20261	Culvert #4	Future - 10yr	3000	6601.83	6601.75	6600.53	6601.83	6615.61	695.42	7.32	10.58	13.29
Reach-1	20261	Culvert #1	Future - 25yr	4000	6603.34	6603.26	6601.71	6603.17	6615.61	983.21	8.33	11.93	14.5
Reach-1	20261	Culvert #2	Future - 25yr	4000	6603.34	6603.26	6601.69	6603.17	6615.61	1010.74	8.33	12.04	14.94
Reach-1	20261	Culvert #3	Future - 25yr	4000	6603.34	6603.26	6602.36	6603.77	6615.61	1098.7	8.33	12.05	15.85
Reach-1	20261	Culvert #4	Future - 25yr	4000	6603.34	6603.26	6601.74	6603.17	6615.61	907.35	8.33	11.61	14.49
Reach-1	20261	Culvert #1	Future - 50yr	4600	6604.1	6604.02	6602.71	6604.12	6615.61	1172.72	8.78	12.32	15.3
Reach-1	20261	Culvert #2	Future - 50yr	4600	6604.1	6604.02	6602.7	6604.12	6615.61	1204.89	8.78	12.43	15.74
Reach-1	20261	Culvert #3	Future - 50yr	4600	6604.1	6604.02	6602.71	6604.14	6615.61	1167.73	8.78	12.3	16.13
Reach-1	20261	Culvert #4	Future - 50yr	4600	6604.1	6604.02	6602.54	6604.04	6615.61	1054.66	8.78	12.21	15.19
Reach-1	20261	Culvert #1	Future - 100yr	5300	6604.98	6604.89	6603.55	6604.98	6615.61	1341.31	9.37	12.88	15.92
Reach-1	20261	Culvert #2	Future - 100yr	5300	6604.98	6604.89	6603.55	6604.98	6615.61	1374.15	9.37	12.99	16.35
Reach-1	20261	Culvert #3	Future - 100yr	5300	6604.98	6604.89	6603.54	6604.98	6615.61	1331.91	9.37	12.85	16.75
Reach-1	20261	Culvert #4	Future - 100yr	5300	6604.98	6604.89	6603.55	6604.98	6615.61	1252.64	9.37	12.59	15.99

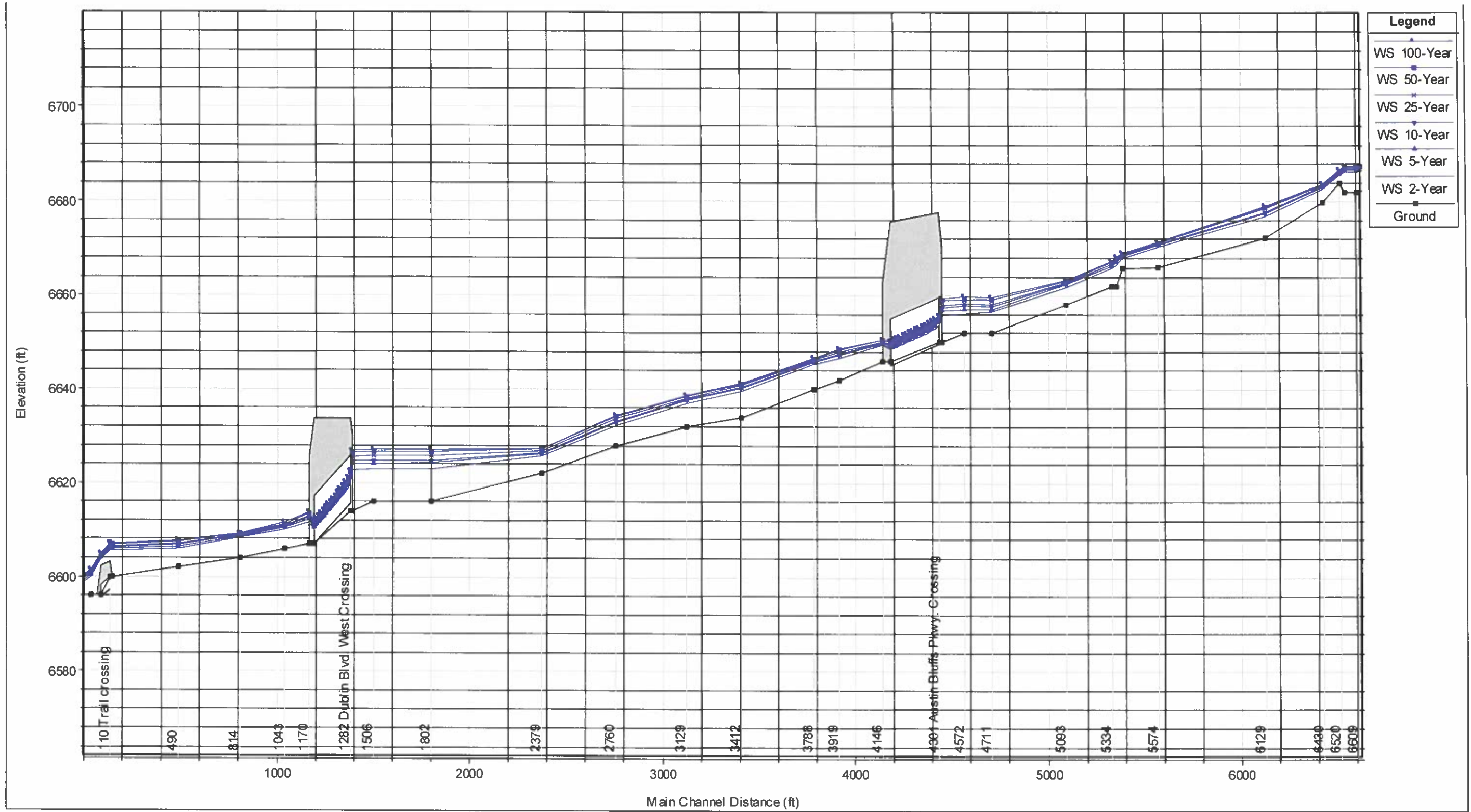
Cottonwood Creek Bridge Results – Black Forest Road to Rangewood Drive - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. US. (ft)	BR Open Area (sq ft)	BR Open Vel (ft/s)	Q Weir (cfs)	Delta EG (ft)
Reach-1	25784	Future - 2yr	920	6685.98	2067.82	9.06		3.16
Reach-1	25784	Future - 5yr	1300	6686.68	2067.82	9.95		2.94
Reach-1	25784	Future - 10yr	1600	6687.18	2067.82	10.29		2.79
Reach-1	25784	Future - 25yr	2300	6688.22	2067.82	10.59		2.51
Reach-1	25784	Future - 50yr	2700	6688.76	2067.82	10.61		2.37
Reach-1	25784	Future - 100yr	3500	6689.77	2067.82	10.64		2.14
Reach-1	26289	Future - 2yr	810	6691.78	1713.63	9.2		3.12
Reach-1	26289	Future - 5yr	1100	6692.46	1713.63	9.91		3.27
Reach-1	26289	Future - 10yr	1300	6692.91	1713.63	10.28		3.35
Reach-1	26289	Future - 25yr	2000	6694.29	1713.63	10.99		3.43
Reach-1	26289	Future - 50yr	2500	6695.03	1713.63	11.68		3.28
Reach-1	26289	Future - 100yr	3100	6695.7	1713.63	12.3		3.06
Reach-1	34524	Future - 2yr	560	6823.21	7240.8	6.25		0.29
Reach-1	34524	Future - 5yr	750	6823.86	7240.8	5.68		0.29
Reach-1	34524	Future - 10yr	970	6824.47	7240.8	5.35		0.3
Reach-1	34524	Future - 25yr	1600	6825.84	7240.8	5.22		0.32
Reach-1	34524	Future - 50yr	2000	6826.56	7240.8	5.33		0.34
Reach-1	34524	Future - 100yr	2400	6827.21	7240.8	5.47		0.36
Reach-1	37525	Future - 2yr	560	6875.97	1725.67	9.09		4.6
Reach-1	37525	Future - 5yr	750	6876.6	1725.67	8.49		4.32
Reach-1	37525	Future - 10yr	970	6877.24	1725.67	7.93		4.06
Reach-1	37525	Future - 25yr	1600	6878.71	1725.67	6.81		3.53
Reach-1	37525	Future - 50yr	2000	6879.36	1725.67	7.13		3.24
Reach-1	37525	Future - 100yr	2400	6879.93	1725.67	7.52		3.02

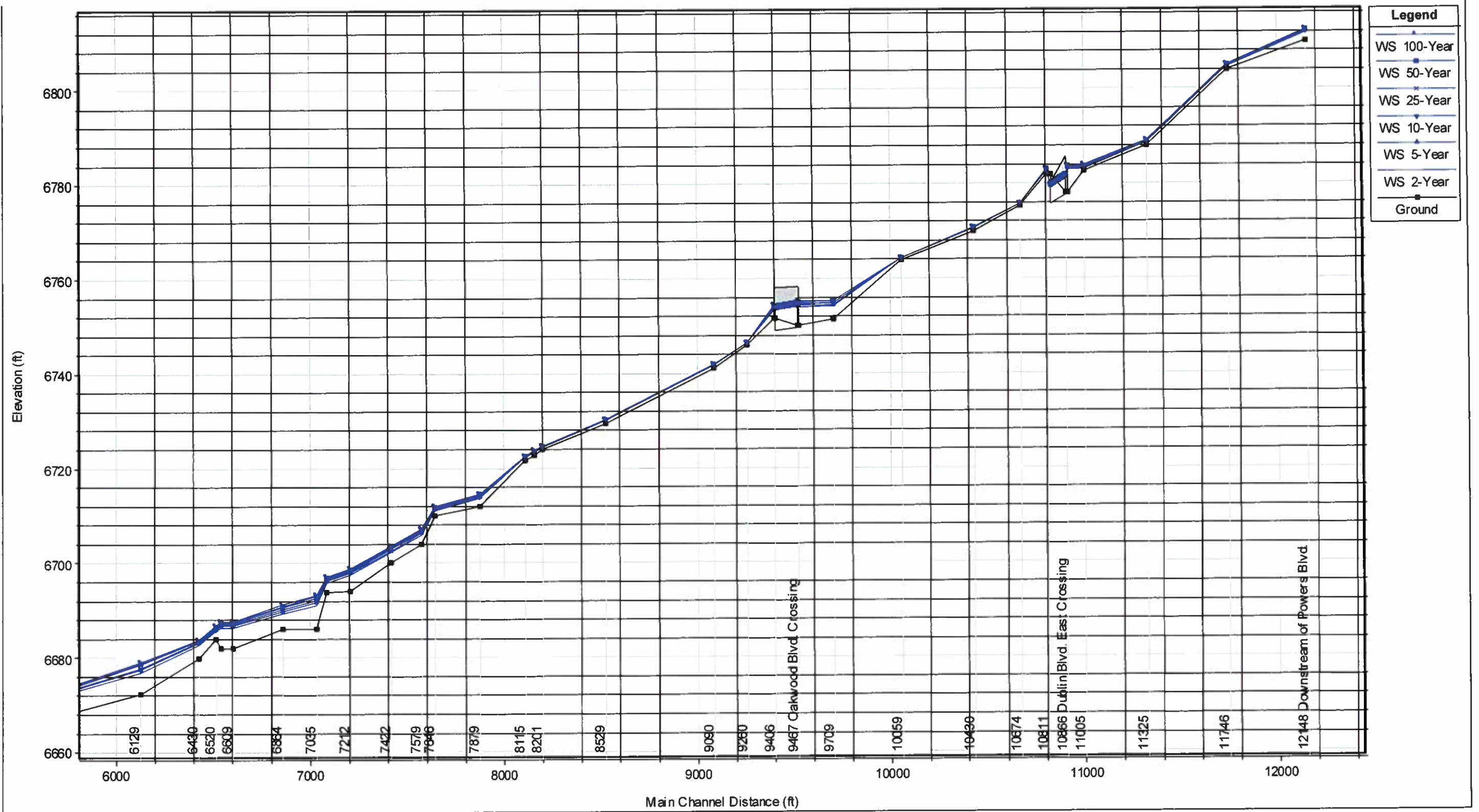
Cottonwood Creek – Rangewood Tributary – HEC – RAS Cross Section Locations



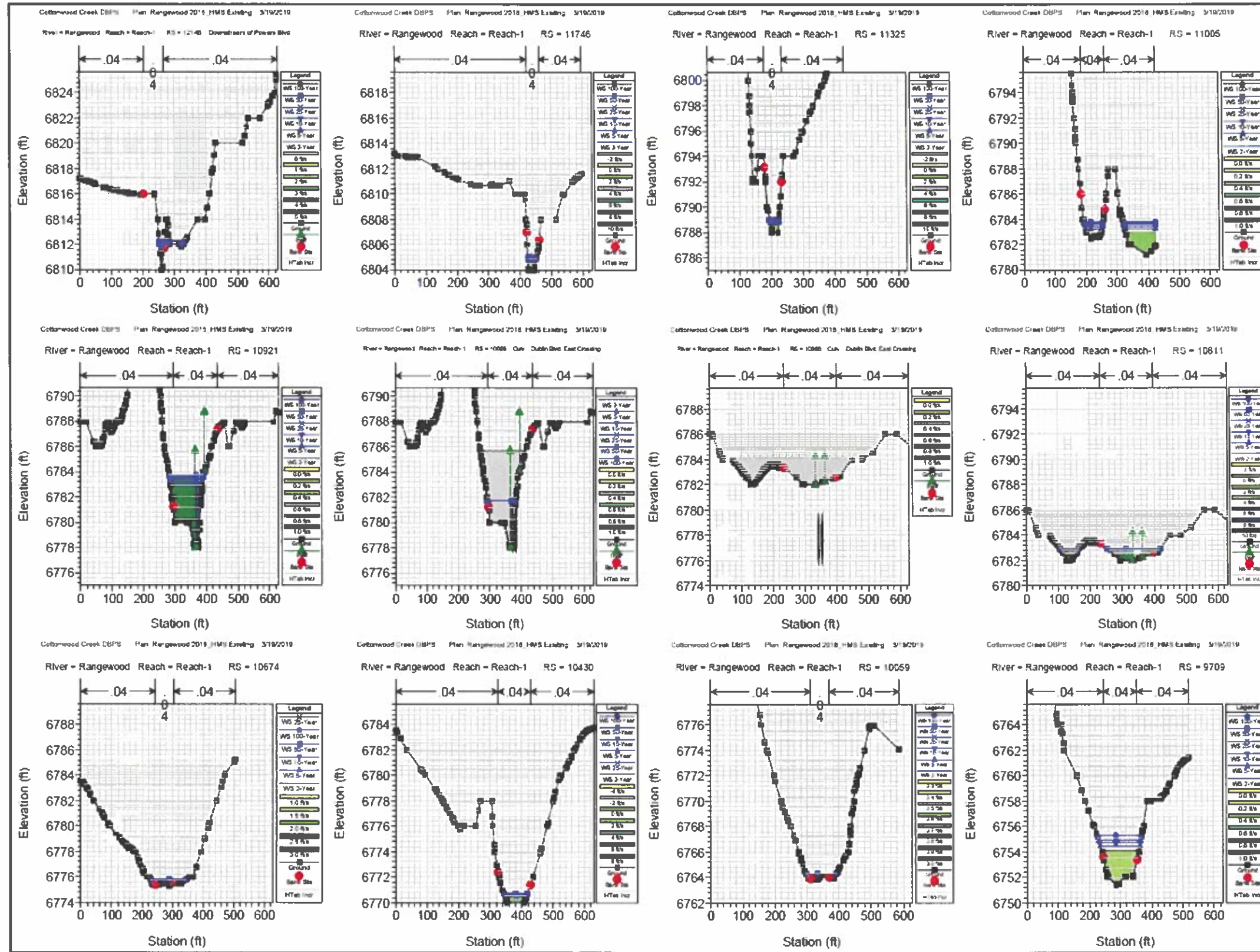
Rangewood Tributary Water Surface Profiles - Existing and Future Conditions



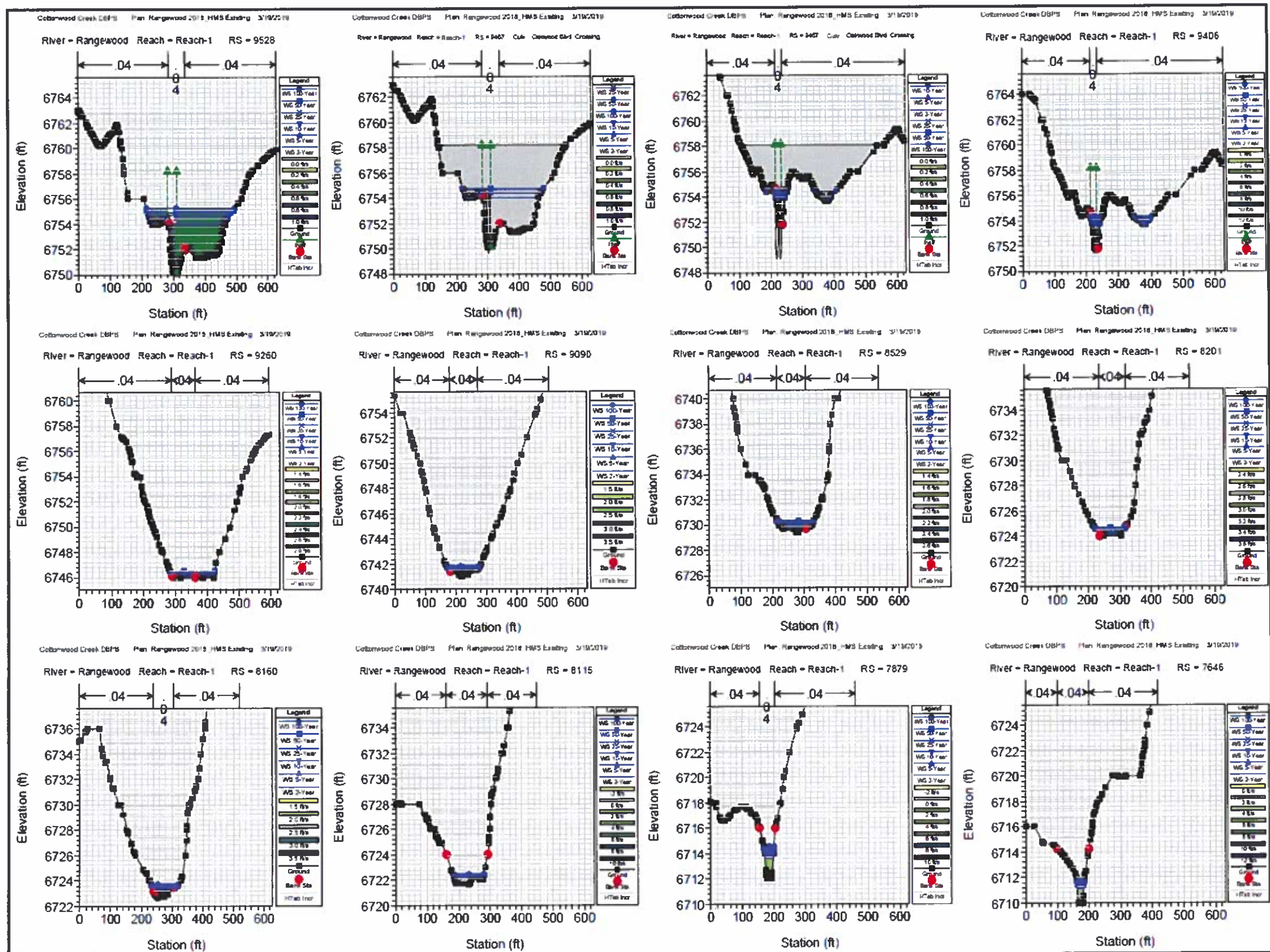
Rangewood Tributary Water Surface Profiles - Existing and Future Conditions



Rangewood Tributary HEC - RAS Cross Sections - Existing and Future Conditions

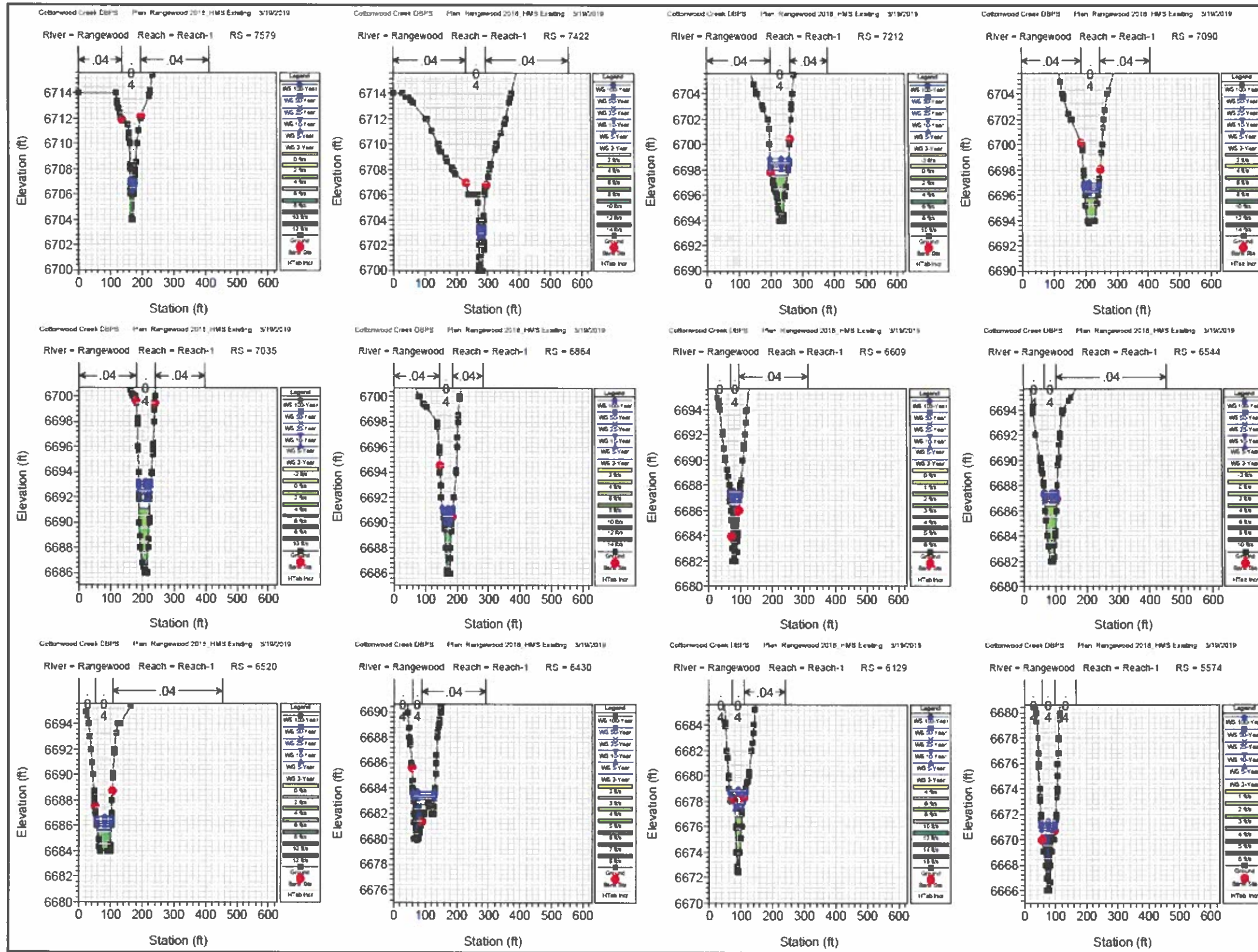


Rangewood Tributary HEC – RAS Cross Sections – Existing and Future Conditions

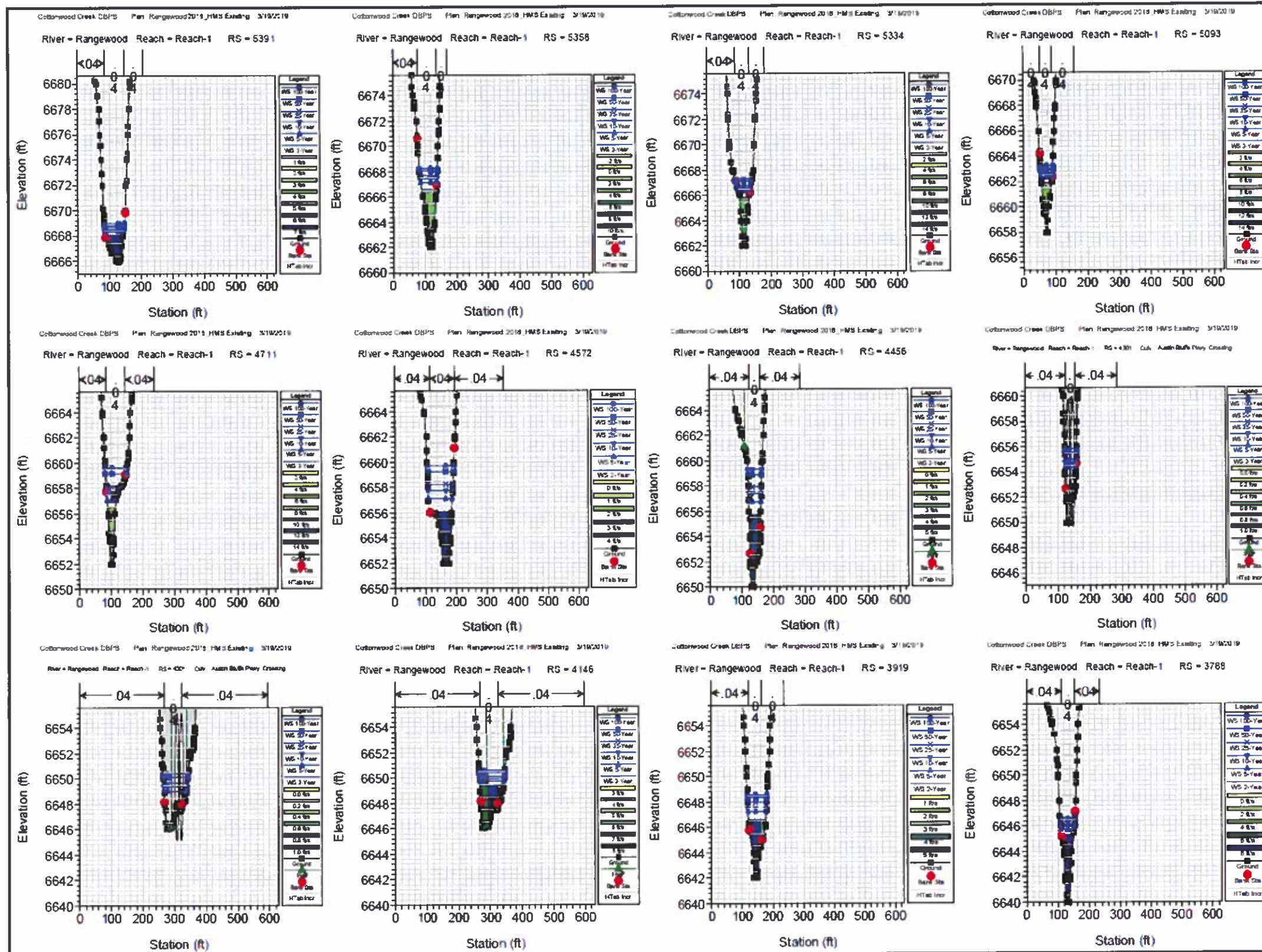


1 in Horiz. = 400 ft 1 in Vert. = 10 ft

Rangewood Tributary HEC – RAS Cross Sections – Existing and Future Conditions

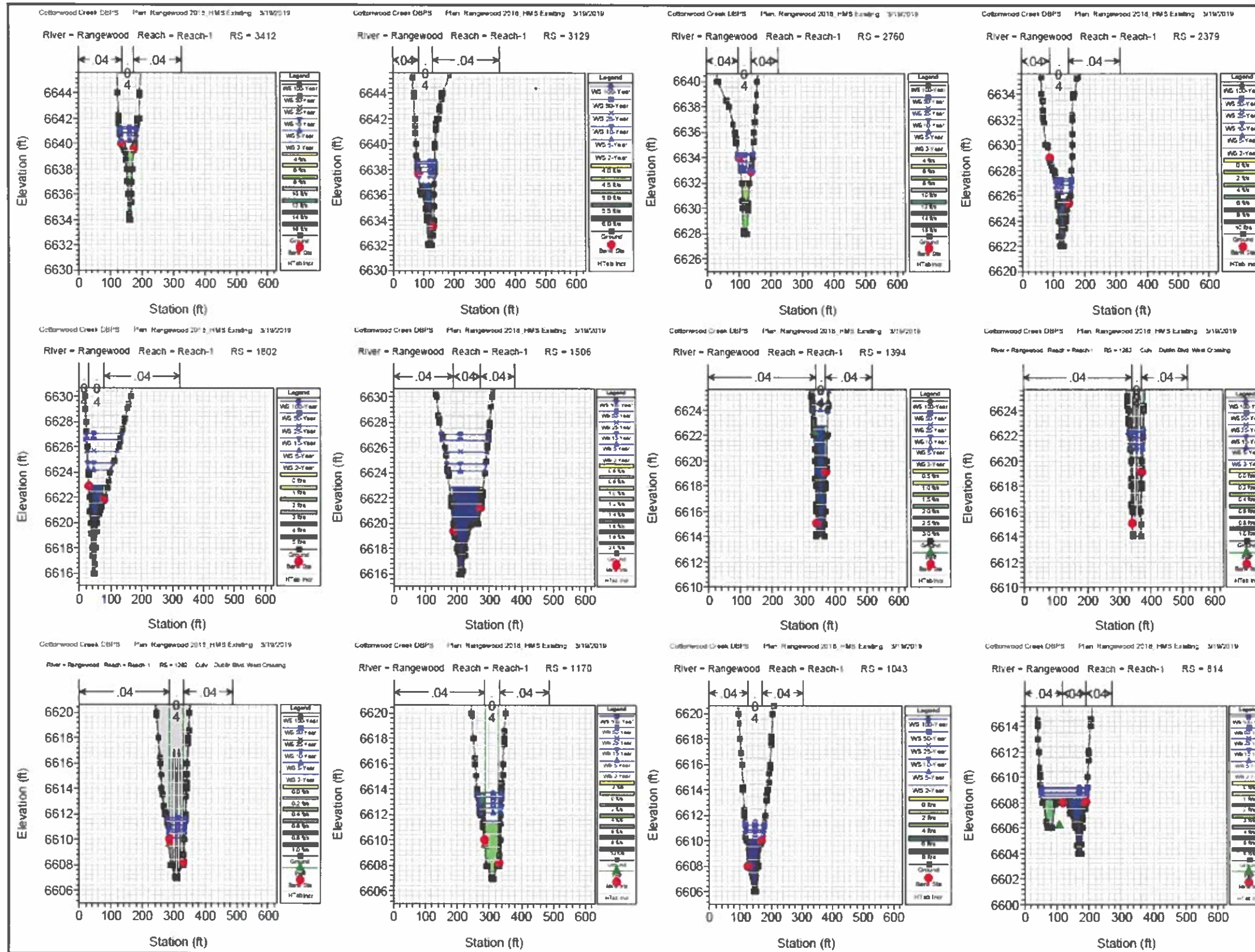


Rangewood Tributary HEC - RAS Cross Sections - Existing and Future Conditions

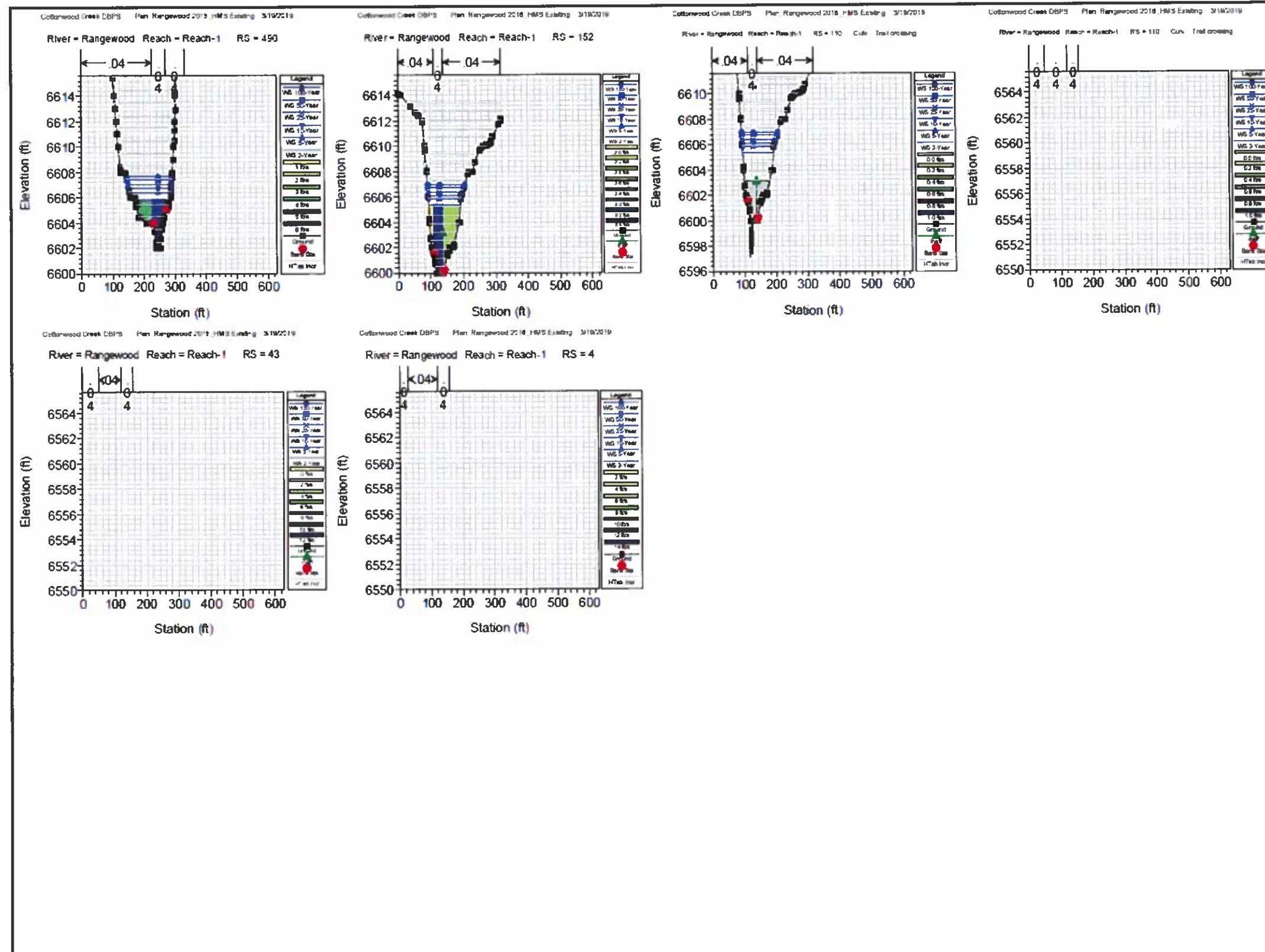


1 in Horiz. = 400 ft 1 in Vert. = 10 ft

Rangewood Tributary HEC - RAS Cross Sections - Existing and Future Conditions



Rangewood Tributary HEC - RAS Cross Sections - Existing and Future Conditions



1 in Horiz. = 400 ft 1 in Vert. = 10 ft

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	4	2-Year	990	6598.89	6596	6598.89	6599.91	0.018867	8.1	990	8.1	1.01	2.35	60.78	122.37
Reach-1	4	5-Year	1300	6599.32	6596	6599.32	6600.5	0.0181	8.7	1300	8.7	1.01	2.59	64.57	149.55
Reach-1	4	10-Year	1500	6599.59	6596	6599.59	6600.84	0.017497	9	1500	9	1	2.7	66.9	167.01
Reach-1	4	25-Year	1700	6599.82	6596	6599.82	6601.17	0.017322	9.3	1700	9.3	1.01	2.84	68.93	182.79
Reach-1	4	50-Year	2000	6600.15	6596	6600.15	6601.62	0.016893	9.7	2000	9.7	1.01	3	71.61	206.23
Reach-1	4	100-Year	2200	6600.36	6596	6600.36	6601.9	0.01667	10	2200	10	1.01	3.11	72.9	220.87
Reach-1	43	2-Year	990	6599.84	6596	6598.9	6600.33	0.005724	5.6	990	5.6	0.59	1.01	69.13	184.38
Reach-1	43	5-Year	1300	6600.32	6596	6599.37	6600.94	0.006085	6.3	1300	6.3	0.62	1.21	72.68	218.38
Reach-1	43	10-Year	1500	6600.59	6596	6599.63	6601.29	0.006317	6.7	1500	6.7	0.64	1.35	74.38	238.02
Reach-1	43	25-Year	1700	6600.84	6596	6599.85	6601.62	0.006519	7.1	1700	7.1	0.65	1.47	75.95	256.85
Reach-1	43	50-Year	2000	6601.17	6596	6600.21	6602.07	0.006838	7.6	2000	7.6	0.68	1.66	77.97	281.84
Reach-1	43	100-Year	2200	6601.36	6596	6600.45	6602.36	0.007021	8	2200	8	0.7	1.77	79.22	297.53
Reach-1	110	Culvert													
Reach-1	152	2-Year	990	6605.42	6600	6603.14	6605.55	0.000892	2.7	538	3.3	0.27	0.2	98.76	362.21
Reach-1	152	5-Year	1300	6605.86	6600	6603.42	6606.03	0.001097	3.2	682	3.9	0.3	0.27	100.87	405.44
Reach-1	152	10-Year	1500	6606.15	6600	6603.65	6606.35	0.001197	3.5	774	4.2	0.31	0.31	103.35	434.78
Reach-1	152	25-Year	1700	6606.39	6600	6603.85	6606.63	0.001319	3.7	870	4.5	0.33	0.35	106.68	460.56
Reach-1	152	50-Year	2000	6606.74	6600	6604.16	6607.02	0.001482	4	1011	5	0.35	0.41	111.67	498.46
Reach-1	152	100-Year	2200	6606.97	6600	6604.35	6607.28	0.001561	4.2	1101	5.2	0.37	0.44	114.95	525.3
Reach-1	490	2-Year	990	6605.88	6602		6606.27	0.006419	4.8	634	5.5	0.65	0.73	113.17	207.96
Reach-1	490	5-Year	1300	6606.41	6602		6606.81	0.005453	4.7	801	5.7	0.62	0.69	135.97	275.89
Reach-1	490	10-Year	1500	6606.73	6602		6607.12	0.004671	4.7	876	5.7	0.58	0.67	138.98	320.24
Reach-1	490	25-Year	1700	6607.02	6602		6607.4	0.004211	4.7	953	5.7	0.55	0.67	141.3	360.33
Reach-1	490	50-Year	2000	6607.41	6602		6607.81	0.003755	4.8	1068	5.7	0.52	0.67	144.55	416.93
Reach-1	490	100-Year	2200	6607.67	6602		6608.07	0.003516	4.8	1143	5.8	0.51	0.67	146.78	454.06
Reach-1	814	2-Year	990	6608.32	6604	6607.79	6608.69	0.008816	4.8	732	5.3	0.71	0.82	138	208.37
Reach-1	814	5-Year	1300	6608.59	6604	6608.28	6609.05	0.008958	5.3	923	5.9	0.72	0.98	139.61	246.46
Reach-1	814	10-Year	1500	6608.72	6604	6608.4	6609.25	0.0095	5.7	1047	6.3	0.75	1.11	140.38	264.85
Reach-1	814	25-Year	1700	6608.86	6604	6608.55	6609.45	0.009719	6	1168	6.6	0.76	1.21	141.2	284.58
Reach-1	814	50-Year	2000	6609.08	6604	6608.73	6609.73	0.009711	6.3	1345	7	0.77	1.33	142.47	315.39
Reach-1	814	100-Year	2200	6609.23	6604	6608.85	6609.92	0.009566	6.5	1461	7.2	0.77	1.38	143.32	336.54

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	1043	2-Year	990	6610.13	6606		6610.99	0.01007	7.3	964	7.5	0.83	1.54	54.54	135.88
Reach-1	1043	5-Year	1300	6610.45	6606	6610.24	6611.62	0.012013	8.5	1255	8.8	0.93	1.99	56.78	153.79
Reach-1	1043	10-Year	1500	6610.66	6606	6610.54	6612.01	0.012833	9.1	1440	9.5	0.97	2.23	58.22	165.69
Reach-1	1043	25-Year	1700	6610.82	6606	6610.81	6612.38	0.013978	9.7	1624	10.2	1.03	2.52	59.34	175.25
Reach-1	1043	50-Year	2000	6611.21	6606	6611.21	6612.91	0.013435	10.1	1887	10.7	1.03	2.63	61.96	198.57
Reach-1	1043	100-Year	2200	6611.47	6606	6611.47	6613.23	0.012925	10.2	2057	10.9	1.02	2.67	63.57	214.87
Reach-1	1170	2-Year	740	6611.46	6606.95	6609.75	6611.78	0.002509	4.5	740	4.5	0.41	0.59	57.02	183.4
Reach-1	1170	5-Year	980	6612.13	6606.95	6610.19	6612.53	0.002569	5.1	980	5.1	0.42	0.71	65.95	223.57
Reach-1	1170	10-Year	1100	6612.54	6606.95	6610.38	6612.97	0.002414	5.2	1100	5.2	0.42	0.73	69.32	251.47
Reach-1	1170	25-Year	1300	6612.91	6606.95	6610.71	6613.43	0.002645	5.7	1300	5.7	0.44	0.86	72.03	277.64
Reach-1	1170	50-Year	1500	6613.4	6606.95	6610.99	6613.97	0.002627	6.1	1500	6.1	0.45	0.93	75.46	313.29
Reach-1	1170	100-Year	1600	6613.7	6606.95	6611.17	6614.29	0.002512	6.1	1600	6.1	0.44	0.94	77.41	336.85
Reach-1	1282	Culvert													
Reach-1	1394	2-Year	740	6622.76	6614	6616.94	6622.87	0.000355	2.5	695	2.7	0.18	0.13	44.01	292.44
Reach-1	1394	5-Year	980	6623.99	6614	6617.51	6624.13	0.000377	2.8	902	3.1	0.19	0.16	48.93	349.37
Reach-1	1394	10-Year	1100	6624.58	6614	6617.79	6624.73	0.000381	3	1001	3.2	0.19	0.17	52.17	378.86
Reach-1	1394	25-Year	1300	6625.52	6614	6618.22	6625.69	0.000382	3.1	1164	3.4	0.19	0.19	57.12	430.48
Reach-1	1394	50-Year	1500	6626.44	6614	6618.64	6626.63	0.000378	3.3	1324	3.6	0.19	0.21	61.52	485.29
Reach-1	1394	100-Year	1600	6626.9	6614	6618.75	6627.09	0.000375	3.4	1403	3.7	0.19	0.21	63.67	513.99
Reach-1	1506	2-Year	740	6622.86	6616		6622.92	0.000403	1.9	712	2	0.18	0.09	105.89	393.83
Reach-1	1506	5-Year	980	6624.12	6616		6624.18	0.000284	1.8	918	1.9	0.16	0.08	116.07	533.38
Reach-1	1506	10-Year	1100	6624.72	6616		6624.77	0.000249	1.8	1018	1.9	0.15	0.08	121.25	603.96
Reach-1	1506	25-Year	1300	6625.68	6616		6625.73	0.000205	1.8	1178	1.9	0.14	0.07	130.13	724.63
Reach-1	1506	50-Year	1500	6626.61	6616		6626.67	0.000173	1.8	1333	1.9	0.13	0.06	141.7	852
Reach-1	1506	100-Year	1600	6627.08	6616		6627.13	0.00016	1.7	1406	1.9	0.13	0.06	147.34	919.4
Reach-1	1802	2-Year	740	6622.95	6616		6623.25	0.002985	4.3	730	4.4	0.46	0.51	60.2	172.74
Reach-1	1802	5-Year	980	6624.15	6616		6624.41	0.001771	3.9	932	4.1	0.39	0.36	73.55	252.62
Reach-1	1802	10-Year	1100	6624.73	6616		6624.97	0.001436	3.7	1023	4	0.37	0.31	82.88	298.11
Reach-1	1802	25-Year	1300	6625.68	6616		6625.89	0.001041	3.4	1155	3.9	0.33	0.25	97.29	383.81
Reach-1	1802	50-Year	1500	6626.62	6616		6626.8	0.000774	3.1	1261	3.7	0.29	0.21	108.96	480.74
Reach-1	1802	100-Year	1600	6627.08	6616		6627.25	0.000674	3	1309	3.6	0.27	0.19	114.35	532.69

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	2379	2-Year	740	6625.78	6622	6625.69	6626.86	0.016309	8.3	739	8.3	0.98	2.21	39.73	89.21
Reach-1	2379	5-Year	980	6626.26	6622	6626.26	6627.54	0.016151	8.9	971	9.1	1.03	2.36	45.25	109.64
Reach-1	2379	10-Year	1100	6626.5	6622	6626.5	6627.84	0.015678	9.1	1083	9.4	1.02	2.45	46.5	120.46
Reach-1	2379	25-Year	1300	6626.84	6622	6626.84	6628.31	0.015374	9.5	1267	9.8	1.02	2.62	48.32	136.75
Reach-1	2379	50-Year	1500	6627.18	6622	6627.18	6628.73	0.014828	9.8	1447	10.1	1.01	2.73	50.23	153.63
Reach-1	2379	100-Year	1600	6627.34	6622	6627.34	6628.93	0.014756	9.9	1536	10.3	1.01	2.79	51.45	161.8
Reach-1	2760	2-Year	740	6632.16	6628	6632.15	6633.6	0.018627	9.6	740	9.6	1	3.05	26.43	76.79
Reach-1	2760	5-Year	980	6632.89	6628	6632.89	6634.44	0.018462	10	980	10	1.01	3.19	32.43	98.37
Reach-1	2760	10-Year	1100	6633.17	6628	6633.17	6634.8	0.017874	10.2	1100	10.2	1.02	3.18	34.69	107.69
Reach-1	2760	25-Year	1300	6633.64	6628	6633.64	6635.35	0.016504	10.4	1296	10.5	1.02	3.11	38.14	124.81
Reach-1	2760	50-Year	1500	6634.16	6628	6634.16	6635.84	0.015971	10.3	1486	10.4	1.03	2.92	46.41	146.2
Reach-1	2760	100-Year	1600	6634.33	6628	6634.33	6636.06	0.015394	10.4	1580	10.6	1.03	2.9	47.71	154.49
Reach-1	3129	2-Year	740	6636.91	6632		6637.4	0.006241	5.6	693	5.7	0.6	1.01	49.33	132.88
Reach-1	3129	5-Year	980	6637.52	6632		6638.08	0.005886	6	915	6.1	0.6	1.1	51.99	163.63
Reach-1	3129	10-Year	1100	6637.77	6632		6638.38	0.005825	6.2	1026	6.4	0.61	1.15	53.1	177
Reach-1	3129	25-Year	1300	6638.14	6632		6638.83	0.005808	6.6	1211	6.8	0.63	1.22	55.77	196.78
Reach-1	3129	50-Year	1500	6638.48	6632		6639.25	0.005768	6.9	1394	7.2	0.64	1.29	57.18	216.25
Reach-1	3129	100-Year	1600	6638.63	6632		6639.44	0.00584	7.1	1486	7.4	0.65	1.34	57.79	224.58
Reach-1	3412	2-Year	740	6639.52	6634	6639.52	6640.82	0.019218	9.1	740	9.1	1.01	2.84	31.63	80.95
Reach-1	3412	5-Year	980	6640.25	6634	6640.25	6641.52	0.017084	8.9	976	9	1.05	2.33	47.43	109.79
Reach-1	3412	10-Year	1100	6640.48	6634	6640.48	6641.82	0.016319	9.1	1090	9.3	1.05	2.36	49.23	120.7
Reach-1	3412	25-Year	1300	6640.85	6634	6640.85	6642.28	0.015002	9.3	1274	9.7	1.03	2.37	52.15	139.47
Reach-1	3412	50-Year	1500	6641.14	6634	6641.14	6642.7	0.014771	9.7	1454	10.2	1.05	2.5	54.2	154.91
Reach-1	3412	100-Year	1600	6641.32	6634	6641.32	6642.9	0.01407	9.7	1540	10.2	1.03	2.47	55.48	164.85
Reach-1	3788	2-Year	740	6645.26	6640		6646.05	0.01041	7.1	740	7.1	0.77	1.67	38.39	103.55
Reach-1	3788	5-Year	980	6645.72	6640	6645.27	6646.72	0.0114	8	979	8.1	0.84	1.94	42.78	122.28
Reach-1	3788	10-Year	1100	6645.91	6640	6645.53	6647.03	0.011876	8.4	1097	8.5	0.87	2.08	44.52	130.85
Reach-1	3788	25-Year	1300	6646.18	6640	6645.92	6647.49	0.012882	9.1	1293	9.2	0.92	2.38	45.97	142.88
Reach-1	3788	50-Year	1500	6646.47	6640	6646.26	6647.94	0.013135	9.6	1486	9.7	0.94	2.6	47.1	156.56
Reach-1	3788	100-Year	1600	6646.56	6640	6646.42	6648.14	0.013852	10	1583	10.1	0.97	2.79	47.44	160.69
Reach-1	3919	2-Year	580	6646.61	6642		6646.92	0.003796	4.3	549	4.6	0.51	0.55	56.44	134.22
Reach-1	3919	5-Year	770	6647.23	6642		6647.57	0.003286	4.5	706	4.8	0.49	0.58	58.66	170.02
Reach-1	3919	10-Year	900	6647.51	6642		6647.9	0.003391	4.8	815	5.2	0.5	0.64	59.67	186.6
Reach-1	3919	25-Year	1000	6647.97	6642		6648.33	0.002769	4.7	889	5	0.46	0.58	61.31	214.04
Reach-1	3919	50-Year	1200	6648.37	6642		6648.79	0.002857	5	1050	5.4	0.47	0.65	62.73	239.15
Reach-1	3919	100-Year	1300	6648.57	6642		6649.02	0.002867	5.2	1129	5.6	0.48	0.68	63.45	251.97

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	4146	2-Year	580	6649.39	6646	6649.39	6650.22	0.015812	7	537	7.5	1	1.62	73.99	149.71
Reach-1	4146	5-Year	770	6649.76	6646	6649.76	6650.73	0.014994	7.6	688	8.2	0.98	1.87	76.54	177.45
Reach-1	4146	10-Year	900	6649.99	6646	6649.99	6651.05	0.014581	8	789	8.6	0.97	2.03	78.13	195.27
Reach-1	4146	25-Year	1000	6650.12	6646	6650.12	6651.28	0.015134	8.4	869	9	0.99	2.23	78.85	205.2
Reach-1	4146	50-Year	1200	6650.43	6646	6650.43	6651.73	0.014646	8.9	1022	9.5	0.98	2.44	80.5	230.26
Reach-1	4146	100-Year	1300	6650.59	6646	6650.59	6651.94	0.014333	9.1	1097	9.7	0.97	2.52	81.31	242.9
Reach-1	4301	Culvert													
Reach-1	4456	2-Year	580	6655.7	6650	6653.58	6655.96	0.002	4.1	573	4.2	0.37	0.44	36.11	142.48
Reach-1	4456	5-Year	770	6656.75	6650	6654.06	6657.04	0.001656	4.2	755	4.4	0.35	0.44	37.95	181.34
Reach-1	4456	10-Year	900	6657.41	6650	6654.36	6657.72	0.001501	4.3	877	4.5	0.34	0.43	39.14	207.15
Reach-1	4456	25-Year	1000	6657.91	6650	6654.58	6658.23	0.001405	4.4	970	4.6	0.34	0.43	40.02	226.8
Reach-1	4456	50-Year	1200	6658.87	6650	6654.97	6659.21	0.001249	4.5	1153	4.8	0.33	0.42	42.67	266.47
Reach-1	4456	100-Year	1300	6659.34	6650	6655.13	6659.69	0.001181	4.5	1242	4.8	0.33	0.41	44	286.83
Reach-1	4572	2-Year	490	6656.07	6652		6656.28	0.004085	3.6	490	3.7	0.48	0.45	74.5	134.5
Reach-1	4572	5-Year	650	6657.1	6652		6657.25	0.001731	3	640	3.1	0.33	0.29	78.09	213.16
Reach-1	4572	10-Year	760	6657.77	6652		6657.9	0.001189	2.9	740	2.9	0.28	0.24	80.33	266.06
Reach-1	4572	25-Year	870	6658.26	6652		6658.39	0.00101	2.8	842	2.9	0.26	0.23	81.98	306.13
Reach-1	4572	50-Year	990	6659.24	6652		6659.34	0.000633	2.6	947	2.6	0.21	0.17	85.03	387.52
Reach-1	4572	100-Year	1100	6659.7	6652		6659.81	0.000578	2.6	1047	2.6	0.21	0.17	86.55	427.69
Reach-1	4711	2-Year	490	6656.53	6652		6657.29	0.010115	7	490	7	0.74	1.63	24.95	69.76
Reach-1	4711	5-Year	650	6657.04	6652		6657.99	0.011307	7.8	650	7.8	0.79	1.96	27.68	83.27
Reach-1	4711	10-Year	760	6657.61	6652		6658.5	0.010744	7.6	760	7.6	0.78	1.84	34.16	100.61
Reach-1	4711	25-Year	870	6658.1	6652		6658.94	0.011256	7.3	870	7.3	0.8	1.75	45.2	118.99
Reach-1	4711	50-Year	990	6659.17	6652		6659.65	0.005649	5.5	986	5.6	0.59	0.94	64.21	179.23
Reach-1	4711	100-Year	1100	6659.65	6652		6660.08	0.004189	5.2	1090	5.3	0.53	0.77	68.43	210.91
Reach-1	5093	2-Year	490	6661.84	6658	6661.84	6662.81	0.020018	7.9	490	7.9	1.01	2.29	32.68	62.18
Reach-1	5093	5-Year	650	6662.33	6658	6662.27	6663.38	0.017915	8.3	650	8.3	0.98	2.39	35.45	78.77
Reach-1	5093	10-Year	760	6662.57	6658	6662.54	6663.74	0.017561	8.7	760	8.7	0.99	2.53	36.41	87.68
Reach-1	5093	25-Year	870	6662.89	6658	6662.78	6664.08	0.015698	8.8	870	8.8	0.95	2.48	37.62	99.25
Reach-1	5093	50-Year	990	6663.03	6658	6663.03	6664.43	0.017346	9.5	989	9.5	1.01	2.84	38.16	104.54
Reach-1	5093	100-Year	1100	6663.25	6658	6663.25	6664.73	0.016847	9.7	1098	9.8	1.01	2.91	39.03	113.15

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	5334	2-Year	490	6665.82	6662		6666.61	0.012595	7.1	490	7.1	0.82	1.75	29.62	69.06
Reach-1	5334	5-Year	650	6666.33	6662	6665.98	6667.23	0.014215	7.6	650	7.6	0.88	1.98	36.84	85.54
Reach-1	5334	10-Year	760	6666.62	6662	6666.36	6667.58	0.014335	7.8	759	7.9	0.91	2	41.9	97.12
Reach-1	5334	25-Year	870	6666.79	6662	6666.66	6667.88	0.015707	8.3	868	8.4	0.96	2.22	44.55	104.41
Reach-1	5334	50-Year	990	6667.15	6662	6666.94	6668.21	0.013963	8.2	984	8.3	0.93	2.05	50.02	121.45
Reach-1	5334	100-Year	1100	6667.33	6662	6667.17	6668.47	0.01404	8.4	1090	8.6	0.96	2.1	52.65	130.34
Reach-1	5358	2-Year	490	6666.55	6662		6666.8	0.003412	4	490	4	0.44	0.54	46.92	121.72
Reach-1	5358	5-Year	650	6667.14	6662		6667.43	0.003238	4.3	650	4.3	0.44	0.59	50.54	150.56
Reach-1	5358	10-Year	760	6667.47	6662		6667.79	0.003233	4.5	760	4.5	0.45	0.62	52.54	167.35
Reach-1	5358	25-Year	870	6667.75	6662		6668.11	0.003297	4.8	869	4.8	0.46	0.67	54.45	182.54
Reach-1	5358	50-Year	990	6668.03	6662		6668.42	0.003386	5	988	5	0.47	0.72	56.34	197.99
Reach-1	5358	100-Year	1100	6668.26	6662		6668.69	0.003453	5.2	1097	5.2	0.48	0.77	57.3	210.98
Reach-1	5391	2-Year	490	6668.02	6665.89	6668.02	6668.7	0.021558	6.6	490	6.6	1.02	1.73	57.76	74.51
Reach-1	5391	5-Year	650	6668.32	6665.89	6668.32	6669.1	0.019816	7.1	648	7.1	1.01	1.89	59.93	91.99
Reach-1	5391	10-Year	760	6668.49	6665.89	6668.49	6669.36	0.019411	7.4	756	7.5	1.02	2.02	61	102.45
Reach-1	5391	25-Year	870	6668.67	6665.89	6668.67	6669.6	0.018459	7.7	863	7.7	1	2.09	62.13	113.66
Reach-1	5391	50-Year	990	6668.84	6665.89	6668.84	6669.84	0.018219	8	980	8.1	1.01	2.22	63.15	124.15
Reach-1	5391	100-Year	1100	6668.99	6665.89	6668.99	6670.06	0.017941	8.2	1087	8.3	1.01	2.32	64.07	133.65
Reach-1	5574	2-Year	490	6670.41	6666	6669.58	6670.87	0.007286	5.4	490	5.4	0.63	0.99	40.02	90.62
Reach-1	5574	5-Year	650	6670.76	6666	6670.11	6671.36	0.00827	6.2	649	6.2	0.69	1.23	42.31	105.09
Reach-1	5574	10-Year	760	6670.96	6666	6670.35	6671.67	0.008772	6.7	757	6.7	0.73	1.37	43.62	113.79
Reach-1	5574	25-Year	870	6671.14	6666	6670.59	6671.95	0.009353	7.2	866	7.2	0.77	1.52	44.76	121.54
Reach-1	5574	50-Year	990	6671.33	6666	6670.84	6672.25	0.009831	7.6	983	7.7	0.81	1.67	45.99	130.05
Reach-1	5574	100-Year	1100	6671.48	6666	6671.04	6672.51	0.010295	8	1090	8.2	0.84	1.8	47.01	137.27
Reach-1	6129	2-Year	490	6676.77	6672.37	6676.77	6678.09	0.019607	9.2	490	9.2	1.01	2.88	20.46	53.2
Reach-1	6129	5-Year	650	6677.4	6672.37	6677.4	6678.87	0.018919	9.7	650	9.7	1.01	3.11	22.91	66.72
Reach-1	6129	10-Year	760	6677.77	6672.37	6677.77	6679.34	0.018696	10.1	760	10.1	1.01	3.26	24.4	75.45
Reach-1	6129	25-Year	870	6678.45	6672.37	6678.45	6679.69	0.017354	8.8	868	8.9	1.05	2.27	44.21	98.48
Reach-1	6129	50-Year	990	6678.7	6672.37	6678.7	6680.01	0.016422	9	981	9.2	1.07	2.22	47.79	110
Reach-1	6129	100-Year	1100	6678.94	6672.37	6678.94	6680.29	0.015188	9	1079	9.4	1.06	2.14	51.3	122.17
Reach-1	6430	2-Year	490	6682.73	6679.88	6682.73	6683.45	0.013099	6.2	446	7.1	1.08	1	63.14	79.39
Reach-1	6430	5-Year	650	6683.11	6679.88	6683.11	6683.85	0.011767	6.2	541	7.4	0.97	1.12	66.59	104.46
Reach-1	6430	10-Year	760	6683.28	6679.88	6683.28	6684.09	0.01209	6.5	607	7.8	0.96	1.27	67.16	116.22
Reach-1	6430	25-Year	870	6683.44	6679.88	6683.44	6684.31	0.012576	6.9	673	8.2	0.97	1.42	67.65	126.39
Reach-1	6430	50-Year	990	6683.6	6679.88	6683.6	6684.54	0.012794	7.2	741	8.5	0.96	1.56	68.19	137.73
Reach-1	6430	100-Year	1100	6683.74	6679.88	6683.74	6684.74	0.013089	7.5	803	8.8	0.97	1.69	68.63	147.12

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	6520	2-Year	430	6685.64	6684	6685.64	6686.36	0.020982	6.8	430	6.8	1	1.86	43.84	63.23
Reach-1	6520	5-Year	570	6685.94	6684	6685.94	6686.8	0.020546	7.4	570	7.4	1.01	2.11	45.87	76.79
Reach-1	6520	10-Year	670	6686.15	6684	6686.15	6687.08	0.019591	7.7	670	7.7	1	2.22	46.98	86.7
Reach-1	6520	25-Year	770	6686.34	6684	6686.34	6687.35	0.019266	8.1	770	8.1	1.01	2.35	47.81	95.45
Reach-1	6520	50-Year	870	6686.52	6684	6686.52	6687.6	0.018903	8.4	870	8.4	1.01	2.47	48.61	104.04
Reach-1	6520	100-Year	970	6686.69	6684	6686.69	6687.85	0.01845	8.6	970	8.6	1.01	2.57	49.4	112.65
Reach-1	6544	2-Year	430	6686.31	6682		6686.55	0.002542	3.9	430	3.9	0.39	0.47	36.07	111.59
Reach-1	6544	5-Year	570	6686.69	6682		6687.01	0.003169	4.5	570	4.5	0.44	0.63	37.22	125.48
Reach-1	6544	10-Year	670	6686.93	6682		6687.31	0.003602	5	670	5	0.47	0.75	37.93	134.19
Reach-1	6544	25-Year	770	6687.14	6682		6687.59	0.003977	5.4	770	5.4	0.5	0.86	38.65	142.38
Reach-1	6544	50-Year	870	6687.34	6682		6687.86	0.004327	5.8	870	5.8	0.52	0.97	39.34	150.05
Reach-1	6544	100-Year	970	6687.51	6682		6688.11	0.004642	6.2	970	6.2	0.55	1.07	39.95	156.96
Reach-1	6609	2-Year	430	6686.4	6682		6686.79	0.003725	4.9	421	5	0.5	0.67	28.54	87.86
Reach-1	6609	5-Year	570	6686.78	6682		6687.32	0.004576	5.8	554	6	0.58	0.87	30.29	99.02
Reach-1	6609	10-Year	670	6687.01	6682		6687.67	0.005163	6.3	648	6.6	0.62	1.01	31.33	106.11
Reach-1	6609	25-Year	770	6687.22	6682		6688	0.005726	6.8	741	7.2	0.67	1.16	32.27	112.7
Reach-1	6609	50-Year	870	6687.41	6682		6688.31	0.006281	7.3	834	7.7	0.71	1.3	33.12	118.84
Reach-1	6609	100-Year	970	6687.57	6682		6688.6	0.006874	7.8	926	8.3	0.75	1.46	33.86	124.28
Reach-1	6864	2-Year	430	6689.29	6686	6689.29	6690.48	0.019931	8.7	430	8.7	1.01	2.68	20.99	49.2
Reach-1	6864	5-Year	570	6689.84	6686	6689.84	6691.19	0.019346	9.3	570	9.3	1.01	2.92	23.2	61.25
Reach-1	6864	10-Year	670	6690.25	6686	6690.25	6691.62	0.018732	9.4	670	9.4	1	2.94	26.08	71.27
Reach-1	6864	25-Year	770	6690.58	6686	6690.58	6692.01	0.018654	9.6	770	9.6	1.02	2.99	28.93	80.29
Reach-1	6864	50-Year	870	6690.88	6686	6690.88	6692.36	0.017937	9.7	869	9.8	1.02	2.95	31.48	89.27
Reach-1	6864	100-Year	970	6691.17	6686	6691.17	6692.68	0.017124	9.8	968	9.9	1.02	2.9	33.97	98.77
Reach-1	7035	2-Year	430	6691.08	6686		6691.26	0.001642	3.4	430	3.4	0.31	0.36	32.94	124.7
Reach-1	7035	5-Year	570	6691.77	6686		6692	0.001742	3.8	570	3.8	0.33	0.43	34.19	148.06
Reach-1	7035	10-Year	670	6692.2	6686		6692.47	0.001837	4.1	670	4.1	0.34	0.48	35.22	162.91
Reach-1	7035	25-Year	770	6692.59	6686		6692.88	0.001943	4.4	770	4.4	0.35	0.53	36.38	176.7
Reach-1	7035	50-Year	870	6692.93	6686		6693.26	0.002053	4.6	870	4.6	0.36	0.58	37.42	189.42
Reach-1	7035	100-Year	970	6693.25	6686		6693.61	0.002173	4.8	970	4.8	0.37	0.63	38.6	201.42

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7090	2-Year	430	6695.84	6693.81	6695.84	6696.61	0.020983	7.1	430	7.1	1.01	1.97	40.02	60.88
Reach-1	7090	5-Year	570	6696.18	6693.81	6696.18	6697.08	0.01993	7.6	570	7.6	1.01	2.18	42.17	74.84
Reach-1	7090	10-Year	670	6696.41	6693.81	6696.41	6697.38	0.019254	7.9	670	7.9	1	2.29	43.71	84.57
Reach-1	7090	25-Year	770	6696.61	6693.81	6696.61	6697.66	0.018937	8.2	770	8.2	1.01	2.41	45.1	93.59
Reach-1	7090	50-Year	870	6696.81	6693.81	6696.81	6697.92	0.018471	8.5	870	8.5	1	2.51	46.45	102.71
Reach-1	7090	100-Year	970	6696.99	6693.81	6696.99	6698.17	0.018237	8.7	970	8.7	1.01	2.61	47.69	111.26
Reach-1	7212	2-Year	430	6697.6	6694	6696.75	6697.9	0.005995	4.4	430	4.4	0.56	0.7	51.61	98.45
Reach-1	7212	5-Year	570	6698	6694	6697.14	6698.35	0.006044	4.7	570	4.7	0.58	0.77	57.83	120.4
Reach-1	7212	10-Year	670	6698.24	6694	6697.37	6698.63	0.00593	5	669	5	0.58	0.83	58.58	134.26
Reach-1	7212	25-Year	770	6698.47	6694	6697.59	6698.9	0.00582	5.2	768	5.2	0.59	0.88	59.28	147.62
Reach-1	7212	50-Year	870	6698.68	6694	6697.78	6699.14	0.005767	5.4	867	5.5	0.59	0.94	59.93	160.07
Reach-1	7212	100-Year	970	6698.88	6694	6697.95	6699.38	0.005694	5.6	966	5.7	0.59	0.99	60.56	172.34
Reach-1	7422	2-Year	200	6702.19	6700	6702.19	6703.09	0.022333	7.6	200	7.6	1.01	2.25	14.62	26.2
Reach-1	7422	5-Year	260	6702.54	6700	6702.54	6703.6	0.02185	8.3	260	8.3	1.01	2.51	15.08	31.51
Reach-1	7422	10-Year	310	6702.82	6700	6702.82	6703.99	0.021491	8.7	310	8.7	1.01	2.7	15.44	35.73
Reach-1	7422	25-Year	350	6703.04	6700	6703.04	6704.28	0.02105	8.9	350	8.9	1	2.81	15.73	39.11
Reach-1	7422	50-Year	390	6703.23	6700	6703.23	6704.56	0.021069	9.3	390	9.3	1	2.96	15.99	42.15
Reach-1	7422	100-Year	440	6703.47	6700	6703.47	6704.89	0.020881	9.6	440	9.6	1	3.1	16.32	45.99
Reach-1	7579	2-Year	110	6705.94	6704	6705.88	6706.61	0.021835	6.6	110	6.6	0.95	1.79	11.25	16.73
Reach-1	7579	5-Year	150	6706.29	6704	6706.25	6707.1	0.022174	7.2	150	7.2	0.97	2.06	12.14	20.78
Reach-1	7579	10-Year	180	6706.54	6704	6706.49	6707.42	0.021596	7.5	180	7.5	0.97	2.18	12.79	23.93
Reach-1	7579	25-Year	200	6706.72	6704	6706.64	6707.62	0.020717	7.6	200	7.6	0.96	2.2	13.25	26.23
Reach-1	7579	50-Year	230	6706.92	6704	6706.85	6707.9	0.020717	7.9	230	7.9	0.96	2.33	13.78	29.04
Reach-1	7579	100-Year	250	6707.15	6704	6707	6708.09	0.018472	7.8	250	7.8	0.91	2.2	14.36	32.18
Reach-1	7646	2-Year	110	6711.12	6710	6711.12	6711.6	0.024594	5.5	110	5.5	1.01	1.42	21.1	19.87
Reach-1	7646	5-Year	150	6711.36	6710	6711.36	6711.92	0.023315	6	150	6	1	1.58	22.53	25
Reach-1	7646	10-Year	180	6711.51	6710	6711.51	6712.13	0.022953	6.3	180	6.3	1.01	1.7	23.46	28.49
Reach-1	7646	25-Year	200	6711.62	6710	6711.62	6712.26	0.022201	6.5	200	6.5	1	1.74	24.11	31
Reach-1	7646	50-Year	230	6711.76	6710	6711.76	6712.45	0.021628	6.7	230	6.7	1	1.82	24.97	34.47
Reach-1	7646	100-Year	250	6711.84	6710	6711.84	6712.57	0.021741	6.9	250	6.9	1.01	1.9	25.45	36.47

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7879	2-Year	110	6713.64	6712		6713.79	0.004798	3.1	110	3.1	0.47	0.39	26.57	35.63
Reach-1	7879	5-Year	150	6713.93	6712		6714.12	0.00496	3.4	150	3.4	0.49	0.47	28.31	43.62
Reach-1	7879	10-Year	180	6714.14	6712		6714.35	0.005028	3.6	180	3.6	0.5	0.51	30.04	49.64
Reach-1	7879	25-Year	200	6714.26	6712		6714.48	0.005124	3.7	200	3.7	0.5	0.53	31.21	53.4
Reach-1	7879	50-Year	230	6714.44	6712		6714.67	0.005215	3.9	230	3.9	0.51	0.57	32.83	58.95
Reach-1	7879	100-Year	250	6714.56	6712		6714.8	0.005185	4	250	4	0.51	0.59	33.94	62.91
Reach-1	8115	2-Year	110	6722.21	6721.63	6722.21	6722.39	0.033144	3.4	110	3.4	1	0.73	92.31	32.58
Reach-1	8115	5-Year	150	6722.29	6721.63	6722.29	6722.51	0.031643	3.7	150	3.7	1.01	0.84	94.01	40.08
Reach-1	8115	10-Year	180	6722.35	6721.63	6722.35	6722.59	0.030702	4	180	4	1.01	0.91	95.18	45.35
Reach-1	8115	25-Year	200	6722.38	6721.63	6722.38	6722.65	0.030275	4.1	200	4.1	1.02	0.96	95.92	48.66
Reach-1	8115	50-Year	230	6722.44	6721.63	6722.44	6722.72	0.028624	4.3	230	4.3	1	0.99	97.1	54.08
Reach-1	8115	100-Year	250	6722.47	6721.63	6722.47	6722.77	0.028647	4.4	250	4.4	1.01	1.04	97.69	56.98
Reach-1	8160	2-Year	110	6723.43	6722.67	6723.37	6723.61	0.021713	3.4	109	3.4	0.88	0.64	68.66	32.46
Reach-1	8160	5-Year	150	6723.51	6722.67	6723.49	6723.75	0.023739	3.9	148	3.9	0.96	0.77	74.97	38.81
Reach-1	8160	10-Year	180	6723.57	6722.67	6723.56	6723.85	0.024618	4.2	177	4.3	1.03	0.81	82.15	43.28
Reach-1	8160	25-Year	200	6723.61	6722.67	6723.61	6723.91	0.024292	4.3	195	4.4	1.04	0.83	85.23	46.75
Reach-1	8160	50-Year	230	6723.68	6722.67	6723.68	6724	0.022837	4.4	222	4.6	1.03	0.85	88.02	52.6
Reach-1	8160	100-Year	250	6723.72	6722.67	6723.72	6724.05	0.022565	4.5	240	4.7	1.03	0.88	89.52	55.94
Reach-1	8201	2-Year	110	6724.44	6724	6724.42	6724.61	0.027579	3.3	103	3.4	0.95	0.67	85.02	33.09
Reach-1	8201	5-Year	150	6724.54	6724	6724.52	6724.74	0.024639	3.6	139	3.7	0.93	0.72	89.18	41.98
Reach-1	8201	10-Year	180	6724.61	6724	6724.57	6724.83	0.022783	3.7	165	3.8	0.91	0.75	92.02	48.53
Reach-1	8201	25-Year	200	6724.65	6724	6724.61	6724.88	0.022606	3.8	183	4	0.92	0.79	93.57	52.16
Reach-1	8201	50-Year	230	6724.69	6724	6724.67	6724.96	0.024155	4.1	210	4.2	0.96	0.89	95.22	55.98
Reach-1	8201	100-Year	250	6724.72	6724	6724.7	6725.01	0.024115	4.2	227	4.4	0.96	0.92	96.6	59.21
Reach-1	8529	2-Year	110	6730.08	6729.39		6730.16	0.01138	2.3	103	2.4	0.64	0.31	108.19	47.02
Reach-1	8529	5-Year	150	6730.16	6729.39		6730.27	0.01227	2.7	138	2.8	0.67	0.39	110.91	56.12
Reach-1	8529	10-Year	180	6730.21	6729.39		6730.35	0.012884	2.9	164	3	0.7	0.44	112.69	62.18
Reach-1	8529	25-Year	200	6730.25	6729.39	6730.12	6730.4	0.012977	3	182	3.1	0.71	0.47	113.98	66.44
Reach-1	8529	50-Year	230	6730.31	6729.39	6730.17	6730.47	0.012348	3.1	207	3.2	0.7	0.49	116.12	73.8
Reach-1	8529	100-Year	250	6730.35	6729.39	6730.2	6730.51	0.012339	3.2	224	3.3	0.71	0.51	117.25	77.78

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	9090	2-Year	110	6741.6	6741.05	6741.6	6741.77	0.03216	3.4	109	3.4	1.01	0.71	92.62	32.58
Reach-1	9090	5-Year	150	6741.68	6741.05	6741.68	6741.9	0.030376	3.7	148	3.7	1.01	0.79	97.18	40.64
Reach-1	9090	10-Year	180	6741.74	6741.05	6741.74	6741.98	0.02822	3.8	177	3.9	1	0.82	100.79	46.88
Reach-1	9090	25-Year	200	6741.77	6741.05	6741.77	6742.03	0.028464	4	196	4.1	1.02	0.87	102.44	49.96
Reach-1	9090	50-Year	230	6741.82	6741.05	6741.82	6742.1	0.027777	4.2	225	4.3	1.03	0.91	105.09	55.03
Reach-1	9090	100-Year	250	6741.86	6741.05	6741.86	6742.15	0.026608	4.2	243	4.4	1.03	0.91	107	58.86
Reach-1	9260	2-Year	110	6746.32	6746	6746.29	6746.43	0.02348	2.6	61	2.7	0.84	0.46	133.5	41.7
Reach-1	9260	5-Year	150	6746.38	6746	6746.35	6746.53	0.024538	3	83	3.1	0.88	0.56	135.01	49.76
Reach-1	9260	10-Year	180	6746.42	6746	6746.4	6746.59	0.025945	3.3	100	3.3	0.92	0.65	135.93	54.72
Reach-1	9260	25-Year	200	6746.45	6746	6746.43	6746.63	0.025582	3.4	111	3.5	0.92	0.69	136.66	58.65
Reach-1	9260	50-Year	230	6746.48	6746	6746.47	6746.69	0.026019	3.6	127	3.7	0.94	0.75	137.57	63.6
Reach-1	9260	100-Year	250	6746.5	6746	6746.49	6746.73	0.027064	3.8	138	3.9	0.97	0.81	138.03	66.16
Reach-1	9406	2-Year	110	6753.41	6751.69	6753.41	6754.01	0.021328	6.2	110	6.2	0.98	1.63	23.89	29.26
Reach-1	9406	5-Year	150	6753.71	6751.69	6753.71	6754.42	0.021273	6.8	150	6.8	1	1.85	33.73	36.88
Reach-1	9406	10-Year	180	6753.91	6751.69	6753.91	6754.69	0.020846	7	180	7	1	1.96	50.19	45.7
Reach-1	9406	25-Year	200	6754.06	6751.69	6754.06	6754.85	0.019677	7.1	200	7.1	0.99	1.96	60.18	53.83
Reach-1	9406	50-Year	230	6754.21	6751.69	6754.21	6755.08	0.020346	7.5	230	7.5	1.01	2.14	74.49	63.74
Reach-1	9406	100-Year	250	6754.35	6751.69	6754.35	6755.23	0.01926	7.5	250	7.5	0.99	2.12	89.11	75.2
Reach-1	9467	Culvert													
Reach-1	9528	2-Year	61	6754.06	6750.11	6751.03	6754.07	0.000096	0.8	61	0.8	0.08	0.02	201.69	443.43
Reach-1	9528	5-Year	81	6754.44	6750.11	6751.19	6754.45	0.00012	0.9	81	0.9	0.09	0.02	233.79	525.67
Reach-1	9528	10-Year	95	6754.71	6750.11	6751.29	6754.72	0.000126	1	95	1	0.09	0.03	255.31	593.06
Reach-1	9528	25-Year	110	6754.88	6750.11	6751.37	6754.9	0.000144	1.1	110	1.1	0.1	0.03	263.45	638.2
Reach-1	9528	50-Year	120	6755.12	6750.11	6751.44	6755.14	0.000139	1.1	119	1.1	0.1	0.03	273.5	702.96
Reach-1	9528	100-Year	130	6755.28	6750.11	6751.49	6755.3	0.000143	1.1	129	1.1	0.1	0.03	279.93	745.66
Reach-1	9709	2-Year	61	6754.08	6751.42		6754.08	0.000021	0.3	61	0.3	0.03	0	119.82	226.55
Reach-1	9709	5-Year	81	6754.46	6751.42		6754.46	0.00002	0.3	80	0.3	0.04	0	127.43	273.21
Reach-1	9709	10-Year	95	6754.73	6751.42		6754.73	0.000019	0.3	93	0.3	0.04	0	132.96	308.94
Reach-1	9709	25-Year	110	6754.91	6751.42		6754.91	0.000021	0.3	107	0.3	0.04	0	136.53	332.83
Reach-1	9709	50-Year	120	6755.15	6751.42		6755.15	0.000019	0.3	116	0.3	0.04	0	141.39	366.34
Reach-1	9709	100-Year	130	6755.3	6751.42		6755.31	0.000018	0.3	125	0.4	0.04	0	144.54	388.68

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	10059	2-Year	61	6764.2	6763.84	6764.2	6764.32	0.035695	2.8	43	2.8	0.99	0.54	90.69	22.13
Reach-1	10059	5-Year	81	6764.25	6763.84	6764.25	6764.39	0.034587	3	57	3.1	1	0.62	92.47	26.69
Reach-1	10059	10-Year	95	6764.28	6763.84	6764.28	6764.44	0.033737	3.2	66	3.3	1.01	0.67	93.64	29.73
Reach-1	10059	25-Year	110	6764.31	6763.84	6764.31	6764.49	0.032205	3.3	76	3.5	1	0.7	94.91	33.09
Reach-1	10059	50-Year	120	6764.33	6763.84	6764.33	6764.52	0.031965	3.4	83	3.6	1	0.73	95.64	35.05
Reach-1	10059	100-Year	130	6764.36	6763.84	6764.36	6764.55	0.031315	3.5	90	3.7	1	0.75	96.4	37.11
Reach-1	10430	2-Year	61	6770.48	6770		6770.55	0.009701	2.1	61	2.1	0.56	0.26	67.23	29.13
Reach-1	10430	5-Year	81	6770.57	6770	6770.4	6770.65	0.009907	2.3	81	2.3	0.58	0.31	69.48	34.77
Reach-1	10430	10-Year	95	6770.62	6770	6770.43	6770.71	0.010081	2.5	95	2.5	0.59	0.34	70.89	38.37
Reach-1	10430	25-Year	110	6770.62	6770	6770.48	6770.71	0.031326	3.8	110	3.8	1.01	0.85	67.26	29.19
Reach-1	10430	50-Year	120	6770.7	6770	6770.51	6770.81	0.010431	2.7	120	2.7	0.61	0.39	73.13	44.24
Reach-1	10430	100-Year	130	6770.73	6770	6770.54	6770.85	0.010577	2.8	130	2.8	0.62	0.41	73.95	46.43
Reach-1	10674	2-Year	61	6775.63	6775.28	6775.63	6775.76	0.032833	2.7	52	2.9	1.05	0.47	98.13	22.35
Reach-1	10674	5-Year	81	6775.7	6775.28	6775.7	6775.83	0.027579	2.8	66	3.1	1.01	0.45	110.59	29.1
Reach-1	10674	10-Year	95	6775.73	6775.28	6775.73	6775.88	0.027582	2.9	76	3.3	1.01	0.5	112.62	32.48
Reach-1	10674	25-Year	110	6775.82	6775.28	6775.76	6775.93	0.015654	2.5	82	2.8	0.77	0.36	119.01	43.5
Reach-1	10674	50-Year	120	6775.78	6775.28	6775.78	6775.95	0.026018	3.1	92	3.5	0.99	0.54	116.36	38.85
Reach-1	10674	100-Year	130	6775.8	6775.28	6775.8	6775.98	0.025691	3.2	99	3.5	0.99	0.56	117.7	41.19
Reach-1	10811	2-Year	61	6782.66	6782	6782.66	6782.93	0.029681	4.1	61	4.1	1.01	0.95	308.65	265.58
Reach-1	10811	5-Year	81	6782.78	6782	6782.78	6783.09	0.026087	4.4	81	4.4	0.98	1.03	330.87	303.9
Reach-1	10811	10-Year	95	6782.85	6782	6782.85	6783.19	0.025601	4.7	95	4.7	0.99	1.12	340.49	326.51
Reach-1	10811	25-Year	110	6782.93	6782	6782.93	6783.3	0.024474	4.9	110	4.9	0.98	1.18	353.06	352.43
Reach-1	10811	50-Year	120	6782.95	6782	6782.95	6783.37	0.025996	5.2	120	5.2	1.02	1.3	356.75	361.96
Reach-1	10811	100-Year	130	6783.01	6782	6783.01	6783.43	0.024527	5.2	130	5.2	1	1.31	364.33	381.5
Reach-1	10866	Culvert													
Reach-1	10921	2-Year	61	6783	6778	6779.07	6783.01	0.000098	0.8	61	0.8	0.08	0.02	100.24	309.86
Reach-1	10921	5-Year	81	6783.21	6778	6779.28	6783.23	0.000147	1	81	1	0.1	0.03	101.92	331.83
Reach-1	10921	10-Year	95	6783.37	6778	6779.42	6783.39	0.000181	1.1	95	1.1	0.11	0.04	103.13	347.69
Reach-1	10921	25-Year	110	6783.54	6778	6779.53	6783.56	0.000216	1.3	110	1.3	0.12	0.05	104.76	365.41
Reach-1	10921	50-Year	120	6783.66	6778	6779.64	6783.68	0.000237	1.3	120	1.3	0.12	0.05	108.02	377.78
Reach-1	10921	100-Year	130	6783.78	6778	6779.71	6783.81	0.000257	1.4	130	1.4	0.13	0.06	111.06	390.79

Rangewood Tributary Channel Results-Existing and Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	11005	2-Year	61	6783.01	6782.53		6783.02	0.000102	0.4	3	0.2	0.08	0.01	145.58	145.36
Reach-1	11005	5-Year	81	6783.24	6782.53		6783.24	0.000101	0.5	7	0.2	0.08	0.01	151.1	178.68
Reach-1	11005	10-Year	95	6783.4	6782.53		6783.4	0.000097	0.5	11	0.3	0.08	0.01	155.05	203.2
Reach-1	11005	25-Year	110	6783.57	6782.53		6783.58	0.00009	0.5	15	0.3	0.07	0.01	159.45	230.76
Reach-1	11005	50-Year	120	6783.69	6782.53		6783.7	0.000086	0.5	18	0.3	0.07	0.01	162.47	250.02
Reach-1	11005	100-Year	130	6783.82	6782.53		6783.82	0.000081	0.5	21	0.3	0.07	0.01	165.57	269.96
Reach-1	11325	2-Year	61	6788.64	6788	6788.64	6788.92	0.028527	4.2	61	4.2	1	0.99	25.6	14.36
Reach-1	11325	5-Year	81	6788.77	6788	6788.77	6789.09	0.026825	4.6	81	4.6	1	1.09	26.83	17.67
Reach-1	11325	10-Year	95	6788.84	6788	6788.84	6789.2	0.026788	4.8	95	4.8	1.01	1.18	27.54	19.66
Reach-1	11325	25-Year	110	6788.93	6788	6788.93	6789.31	0.025422	5	110	5	1	1.22	28.39	22.08
Reach-1	11325	50-Year	120	6788.97	6788	6788.97	6789.38	0.025811	5.2	120	5.2	1.01	1.29	28.8	23.3
Reach-1	11325	100-Year	130	6789.02	6788	6789.02	6789.45	0.025049	5.2	130	5.2	1	1.31	29.32	24.84
Reach-1	11746	2-Year	61	6804.67	6804	6804.67	6804.96	0.028432	4.3	61	4.3	1	1.02	24.15	14.06
Reach-1	11746	5-Year	81	6804.8	6804	6804.8	6805.14	0.02701	4.7	81	4.7	1	1.14	25.39	17.27
Reach-1	11746	10-Year	95	6804.89	6804	6804.89	6805.26	0.026097	4.9	95	4.9	1	1.2	26.2	19.45
Reach-1	11746	25-Year	110	6804.97	6804	6804.97	6805.37	0.02579	5.1	110	5.1	1.01	1.27	26.96	21.57
Reach-1	11746	50-Year	120	6805.02	6804	6805.02	6805.44	0.025657	5.2	120	5.2	1.01	1.32	27.44	22.92
Reach-1	11746	100-Year	130	6805.07	6804	6805.07	6805.51	0.02488	5.3	130	5.3	1	1.34	27.97	24.47
Reach-1	12148	2-Year	61	6811.76	6810	6811.5	6812.02	0.011899	4.1	61	4.1	0.71	0.74	14.54	15
Reach-1	12148	5-Year	81	6811.95	6810	6811.72	6812.27	0.012525	4.5	81	4.6	0.88	0.63	21.69	18.03
Reach-1	12148	10-Year	95	6812.05	6810	6811.85	6812.4	0.012858	4.3	93	4.8	1.38	0.29	60.18	22.24
Reach-1	12148	25-Year	110	6812.17	6810	6812.17	6812.48	0.011172	3.7	99	4.7	1.16	0.32	63.82	29.63
Reach-1	12148	50-Year	120	6812.26	6810	6812.26	6812.53	0.009598	3.4	101	4.5	1.01	0.31	66.43	35.29
Reach-1	12148	100-Year	130	6812.29	6810	6812.29	6812.57	0.010104	3.5	107	4.7	1.02	0.35	67.31	37.25

Rangewood Tributary Culvert Results-Existing and Future Conditions

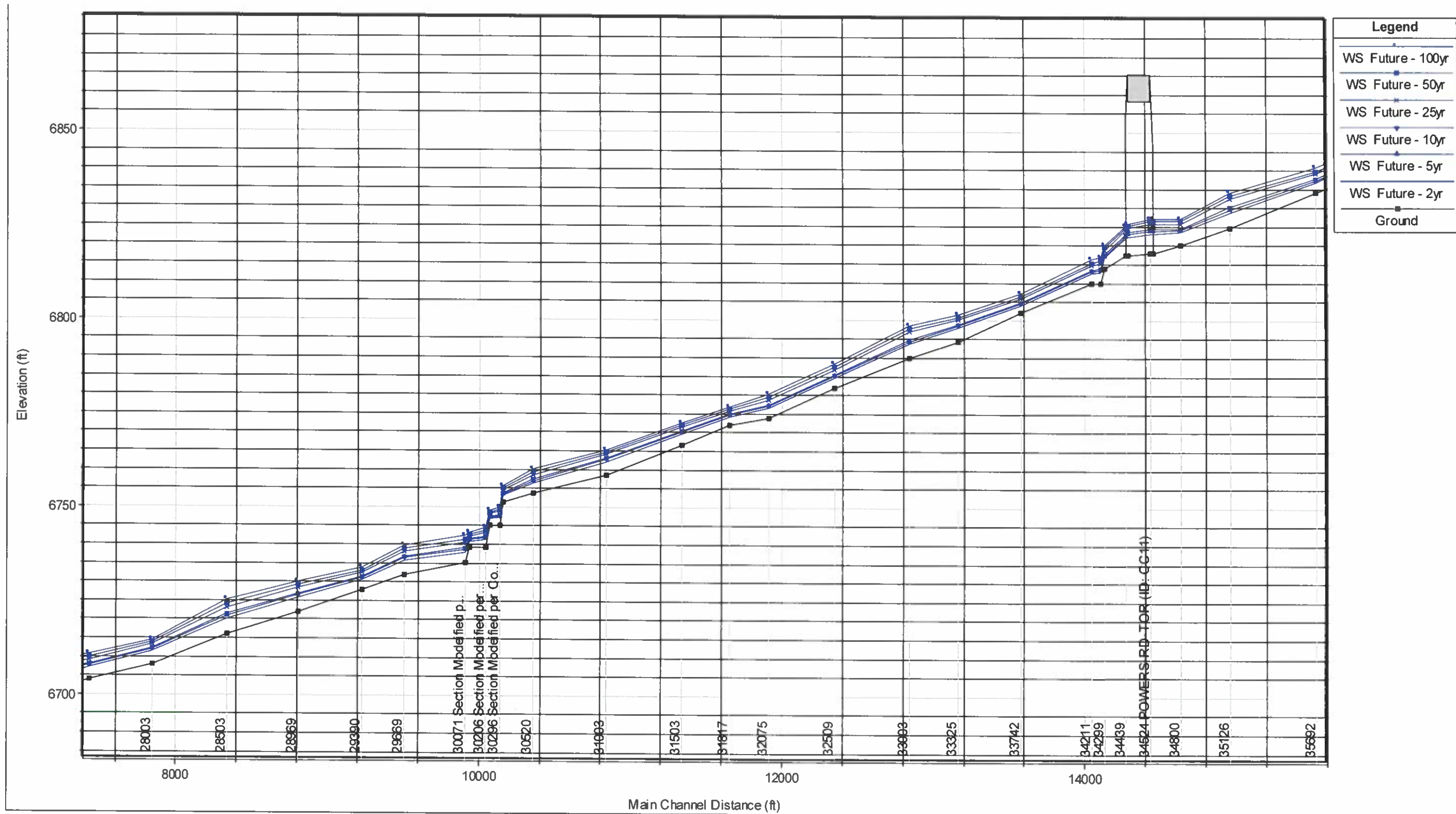
Reach	River Sta	Profile	Q Total	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS	
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)	
Reach-1	110	Culvert #1	2-Year	990	6605.56	6605.42	6605	6605.56	6603.14	99.93	868.72	5.58	14.02	14.02
Reach-1	110	Culvert #2	2-Year	990	6605.56	6605.42	6599.14	6605.55	6603.14	21.35	868.72	5.58	3	3
Reach-1	110	Culvert #1	5-Year	1300	6606.04	6605.87	6605.01	6606.05	6603.14	100.04	1179.93	5.54	14.04	14.04
Reach-1	110	Culvert #2	5-Year	1300	6606.04	6605.87	6599.13	6606.02	6603.14	21.06	1179.93	5.54	2.95	2.95
Reach-1	110	Culvert #1	10-Year	1500	6606.35	6606.15	6605.05	6606.35	6603.14	100.37	1378.63	5.56	14.08	14.08
Reach-1	110	Culvert #2	10-Year	1500	6606.35	6606.15	6599.12	6606.34	6603.14	21	1378.63	5.56	2.95	2.95
Reach-1	110	Culvert #1	25-Year	1700	6606.63	6606.39	6605.08	6606.63	6603.14	100.58	1579.42	5.55	14.11	14.11
Reach-1	110	Culvert #2	25-Year	1700	6606.63	6606.39	6599.12	6606.62	6603.14	20.9	1579.42	5.55	2.93	2.93
Reach-1	110	Culvert #1	50-Year	2000	6607.02	6606.74	6605.15	6607.02	6603.14	101.16	1876.99	5.57	14.19	14.19
Reach-1	110	Culvert #2	50-Year	2000	6607.02	6606.74	6599.11	6607.02	6603.14	20.79	1876.99	5.57	2.92	2.92
Reach-1	110	Culvert #1	100-Year	2200	6607.23	6606.92	6605.18	6607.23	6603.14	101.4	2077.97	5.57	14.23	14.23
Reach-1	110	Culvert #2	100-Year	2200	6607.23	6606.92	6599.11	6607.23	6603.14	20.63	2077.97	5.57	2.89	2.89
Reach-1	1282	Culvert #1	2-Year	740	6622.87	6622.76	6621.94	6622.87	6633.7	740		11.3	10.61	18.54
Reach-1	1282	Culvert #1	5-Year	980	6624.13	6623.99	6623.15	6624.13	6633.7	980		11.86	11.64	19.94
Reach-1	1282	Culvert #1	10-Year	1100	6624.73	6624.58	6623.74	6624.73	6633.7	1100		12.03	12.13	20.5
Reach-1	1282	Culvert #1	25-Year	1300	6625.69	6625.52	6624.7	6625.69	6633.7	1300		12.61	12.9	21.33
Reach-1	1282	Culvert #1	50-Year	1500	6626.63	6626.44	6625.66	6626.63	6633.7	1500		13.05	13.65	22.05
Reach-1	1282	Culvert #1	100-Year	1600	6627.1	6626.9	6626.14	6627.1	6633.7	1600		13.2	14.03	22.38
Reach-1	4301	Culvert #1	2-Year	580	6655.96	6655.7	6655.22	6655.96	6677.7	580		6.3	9.84	12.63
Reach-1	4301	Culvert #1	5-Year	770	6657.04	6656.75	6656.24	6657.04	6677.7	770		6.98	10.75	13.67
Reach-1	4301	Culvert #1	10-Year	900	6657.72	6657.41	6656.9	6657.72	6677.7	900		7.42	11.31	14.25
Reach-1	4301	Culvert #1	25-Year	1000	6658.23	6657.91	6657.39	6658.23	6677.7	1000		7.79	11.73	14.66
Reach-1	4301	Culvert #1	50-Year	1200	6659.21	6658.87	6658.36	6659.21	6677.7	1200		8.44	12.52	15.36
Reach-1	4301	Culvert #1	100-Year	1300	6659.69	6659.34	6658.84	6659.69	6677.7	1300		8.75	12.9	15.65

Rangewood Tributary Channel Results-Existing and Future Conditions

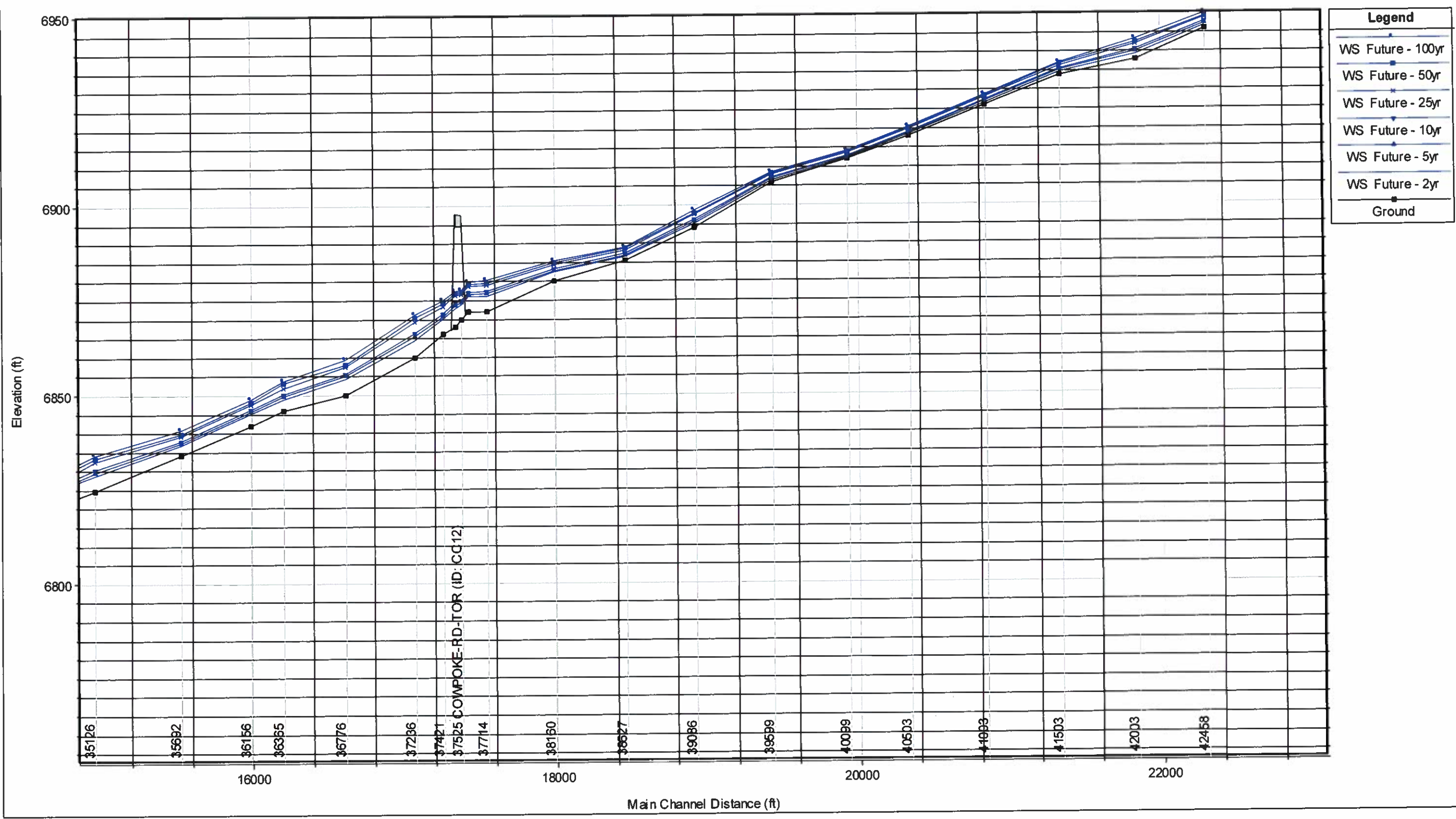
Reach	River Sta	Profile	Q Total (cfs)	E.G. US. (ft)	W.S. US. (ft)	E.G. IC (ft)	E.G. OC (ft)	Min El Weir Flow (ft)	Q Culv Group (cfs)	Q Weir (cfs)	Delta WS (ft)	Culv Vel US (ft/s)	Culv Vel DS (ft/s)
Reach-1	9467	Culvert #1	2-Year	61	6754.07	6754.06	6751.58	6754.07	6758.2	29.76	0.66	1.14	1.04
Reach-1	9467	Culvert #2	2-Year	61	6754.07	6754.06	6751.38	6754.07	6758.2	31.24	0.66	1.15	1.09
Reach-1	9467	Culvert #1	5-Year	81	6754.45	6754.44	6751.86	6754.45	6758.2	39.93	0.73	1.44	1.39
Reach-1	9467	Culvert #2	5-Year	81	6754.45	6754.44	6751.65	6754.45	6758.2	41.07	0.73	1.44	1.43
Reach-1	9467	Culvert #1	10-Year	95	6754.72	6754.71	6752.05	6754.72	6758.2	47.41	0.79	1.66	1.65
Reach-1	9467	Culvert #2	10-Year	95	6754.72	6754.71	6751.81	6754.72	6758.2	47.59	0.79	1.66	1.66
Reach-1	9467	Culvert #1	25-Year	110	6754.9	6754.88	6752.19	6754.9	6758.2	53.09	0.82	1.85	1.85
Reach-1	9467	Culvert #2	25-Year	110	6754.9	6754.88	6752.03	6754.9	6758.2	56.91	0.82	1.98	1.98
Reach-1	9467	Culvert #1	50-Year	120	6755.14	6755.12	6752.31	6755.14	6758.2	58.15	0.92	2.02	2.02
Reach-1	9467	Culvert #2	50-Year	120	6755.14	6755.12	6752.15	6755.15	6758.2	61.85	0.92	2.15	2.15
Reach-1	9467	Culvert #1	100-Year	130	6755.3	6755.28	6752.42	6755.29	6758.2	63.13	0.93	2.2	2.2
Reach-1	9467	Culvert #2	100-Year	130	6755.3	6755.28	6752.26	6755.3	6758.2	66.87	0.93	2.33	2.33
Reach-1	10866	Culvert #1	2-Year	61	6783.01	6783	6779.95	6783.01	6785.7	61	0.33	2.43	2.43
Reach-1	10866	Culvert #1	5-Year	81	6783.23	6783.21	6780.38	6783.23	6785.7	81	0.43	3.22	3.22
Reach-1	10866	Culvert #1	10-Year	95	6783.39	6783.37	6780.66	6783.39	6785.7	95	0.52	3.78	3.78
Reach-1	10866	Culvert #1	25-Year	110	6783.56	6783.54	6780.96	6783.56	6785.7	110	0.61	4.38	4.38
Reach-1	10866	Culvert #1	50-Year	120	6783.68	6783.66	6781.16	6783.68	6785.7	120	0.7	4.77	4.77
Reach-1	10866	Culvert #1	100-Year	130	6783.81	6783.78	6781.36	6783.81	6785.7	130	0.77	5.17	5.17

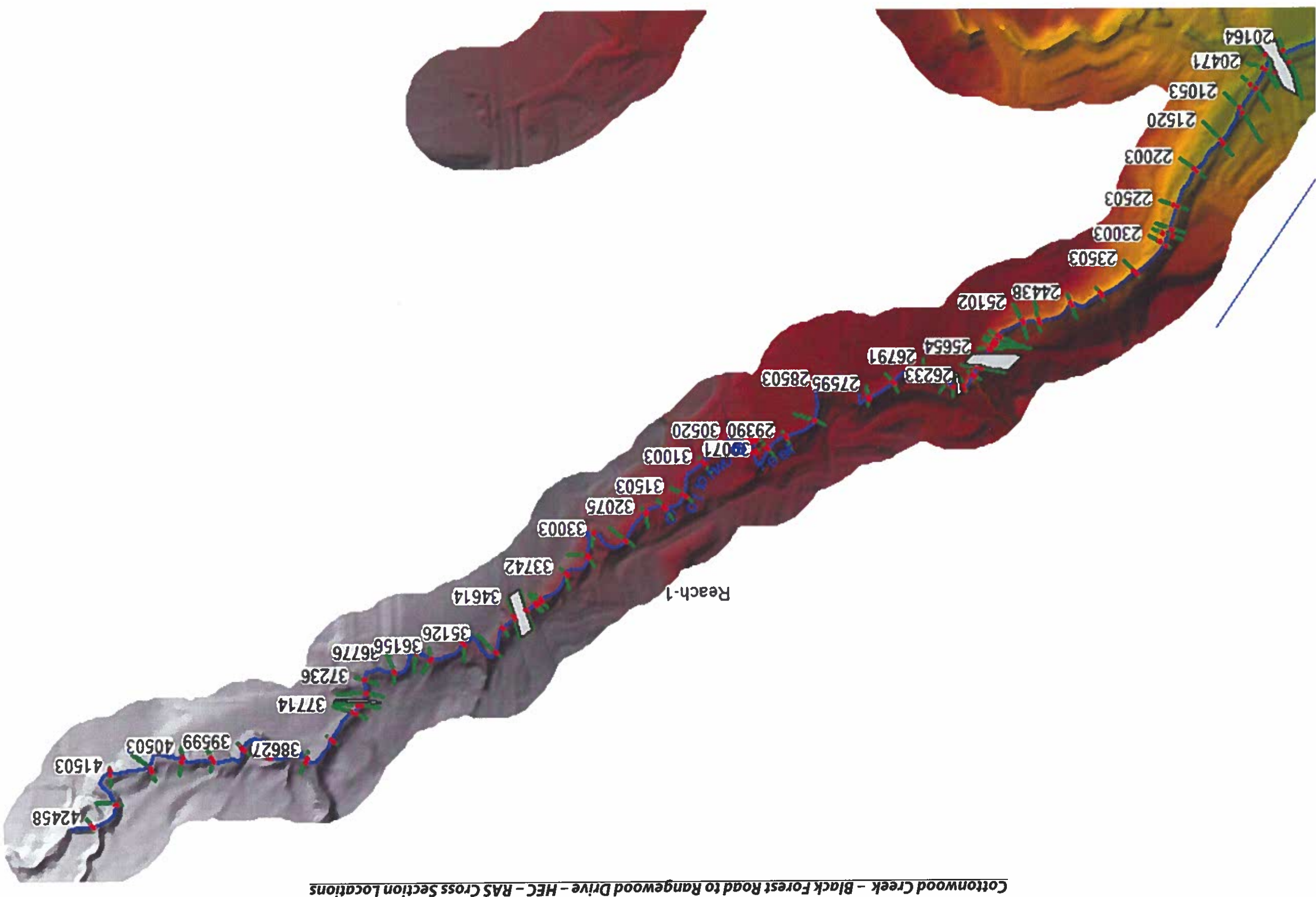
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Cottonwood Creek Water Surface Profiles - Black Forest Road to Rangewood Drive - Future Conditions



Cottonwood Creek Water Surface Profiles - Black Forest Road to Rangewood Drive - Future Conditions





Cottonwood Creek Bridge Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. US (ft)	Open Area (sq ft)	Open V (ft/s)	Q Weir (cfs)	Delta EG (ft)
Reach-1	7560.57	2-yr	2300	6373.16	1716.67	10.68		1.67
Reach-1	7560.57	5-yr	3100	6374.05	1716.67	9.78		1.45
Reach-1	7560.57	10-yr	3800	6374.69	1716.67	9.84		1.32
Reach-1	7560.57	25-yr	5100	6375.71	1716.67	10.2		1.16
Reach-1	7560.57	50-yr	5900	6376.27	1716.67	10.45		1.07
Reach-1	7560.57	100-yr	6800	6376.88	1716.67	10.8		0.98
Reach-1	8051.07	2-yr	2300	6381.04	1321.44	8.18		1.09
Reach-1	8051.07	5-yr	3100	6381.92	1321.44	9.08		1.17
Reach-1	8051.07	10-yr	3800	6382.59	1321.44	9.87		1.22
Reach-1	8051.07	25-yr	5100	6383.73	1321.44	11.19		1.38
Reach-1	8051.07	50-yr	5900	6384.39	1321.44	11.94		1.49
Reach-1	8051.07	100-yr	6800	6385.09	1321.44	12.73		1.6

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	13015	2-yr	2200	6479.78	6476	6479.74	6481.1	0.008023	9.2	3000	9.2	0.99	1.34	121.61	268.93
Reach-1	13015	5-yr	3000	6479.78	6476	6479.74	6481.1	0.008023	9.2	3000	9.2	0.99	1.34	121.61	326.23
Reach-1	13015	10-yr	3600	6480.12	6476	6480.11	6481.61	0.007814	9.8	3599	9.8	1.01	1.43	125.31	368.08
Reach-1	13015	25-yr	4800	6480.75	6476	6480.75	6482.56	0.007413	10.7	4790	10.8	1.03	1.59	129.87	447.82
Reach-1	13015	50-yr	5600	6481.16	6476	6481.16	6483.15	0.007053	11.2	5579	11.3	1.03	1.65	132.9	501.77
Reach-1	13015	100-yr	6400	6481.53	6476	6481.53	6483.7	0.006667	11.6	6365	11.8	1.03	1.73	135.58	551.45
Reach-1	13134	2-yr	2200	6480.57	6477.09	6480.57	6481.77	0.008475	8.5	2184	8.8	1.02	1.21	111.74	258.02
Reach-1	13134	5-yr	3000	6481.11	6477.09	6481.11	6482.59	0.00808	9.4	2970	9.8	1.03	1.39	113.67	318.66
Reach-1	13134	10-yr	3600	6481.49	6477.09	6481.49	6483.16	0.007747	9.9	3558	10.4	1.03	1.5	115.08	362.55
Reach-1	13134	25-yr	4800	6482.19	6477.09	6482.19	6484.21	0.007279	10.8	4730	11.5	1.04	1.68	118.31	444.6
Reach-1	13134	50-yr	5600	6482.65	6477.09	6482.65	6484.86	0.006907	11.2	5507	12	1.03	1.75	120.43	499.51
Reach-1	13134	100-yr	6400	6483.07	6477.09	6483.07	6485.47	0.006717	11.6	6282	12.6	1.03	1.85	122.33	549.77
Reach-1	13185	2-yr	2200	6484.44	6481.81	6484.44	6485.59	0.008876	8.6	2200	8.6	1.02	1.22	115.1	255.81
Reach-1	13185	5-yr	3000	6484.97	6481.81	6484.97	6486.38	0.008187	9.4	2997	9.5	1.02	1.36	118.27	317.8
Reach-1	13185	10-yr	3600	6485.33	6481.81	6485.33	6486.92	0.00782	10	3593	10.1	1.03	1.45	120.46	361.51
Reach-1	13185	25-yr	4800	6486.01	6486.01	6486.01	6487.91	0.007288	10.8	4782	11.1	1.03	1.61	124.67	444.09
Reach-1	13185	50-yr	5600	6486.42	6481.81	6486.42	6488.52	0.007048	11.3	5571	11.7	1.04	1.7	126.66	495.81
Reach-1	13185	100-yr	6400	6486.83	6481.81	6486.83	6489.11	0.006762	11.7	6358	12.2	1.03	1.78	128.62	547.98
Reach-1	13394	2-yr	2200	6486.8	6484	6486.8	6487.96	0.008843	8.6	2196	8.7	1.02	1.22	115.32	256.94
Reach-1	13394	5-yr	3000	6487.32	6484	6487.32	6488.75	0.008236	9.4	2991	9.6	1.02	1.38	117.25	318.32
Reach-1	13394	10-yr	3600	6487.69	6484	6487.69	6489.29	0.007871	10	3586	10.2	1.02	1.48	118.38	361.7
Reach-1	13394	25-yr	4800	6488.37	6484	6488.37	6490.3	0.007376	10.9	4774	11.2	1.03	1.66	120.72	442.08
Reach-1	13394	50-yr	5600	6488.78	6484	6488.78	6490.92	0.007111	11.4	5564	11.8	1.03	1.76	122.37	493
Reach-1	13394	100-yr	6400	6489.19	6484	6489.19	6491.51	0.006873	11.8	6352	12.3	1.03	1.84	123.95	542.55
Reach-1	13425	2-yr	2200	6489.54	6486.24	6489.54	6490.77	0.008407	8.8	2197	8.9	1.03	1.22	107.17	250.17
Reach-1	13425	5-yr	3000	6490.11	6486.24	6490.11	6491.61	0.007842	9.6	2989	9.9	1.04	1.36	111.99	312.29
Reach-1	13425	10-yr	3600	6490.51	6486.24	6490.51	6492.19	0.007445	10.1	3580	10.4	1.04	1.44	114.35	357.71
Reach-1	13425	25-yr	4800	6491.22	6486.24	6491.22	6493.25	0.007055	10.9	4755	11.5	1.05	1.62	118.52	440.03
Reach-1	13425	50-yr	5600	6491.66	6486.24	6491.66	6493.91	0.006799	11.3	5534	12.1	1.05	1.71	121.15	493.57
Reach-1	13425	100-yr	6400	6492.08	6486.24	6492.08	6494.53	0.006641	11.8	6310	12.6	1.06	1.8	123.74	544.06

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	13989	2-yr	2200	6503.84	6500	6502.64	6504.32	0.002218	5.6	2200	5.6	0.54	0.45	119.26	394.57
Reach-1	13989	5-yr	2900	6504.8	6500	6503.13	6505.31	0.001662	5.7	2898	5.7	0.5	0.42	125.1	512.24
Reach-1	13989	10-yr	3500	6505.58	6500	6503.51	6506.11	0.001386	5.7	3493	5.8	0.47	0.4	129.72	611.96
Reach-1	13989	25-yr	4800	6506.99	6500	6504.24	6507.6	0.001147	6	4774	6.2	0.46	0.41	138.09	801.11
Reach-1	13989	50-yr	5500	6506.86	6500	6504.59	6507.69	0.001614	7	5472	7.3	0.54	0.57	137.3	782.89
Reach-1	13989	100-yr	6300	6506.7	6500	6504.99	6507.84	0.002312	8.3	6271	8.6	0.64	0.79	136.32	760.31
Reach-1	14287	2-yr	2200	6504.55	6502	6504.42	6505.56	0.007091	8	2200	8.1	0.92	1.04	115.33	273.52
Reach-1	14287	5-yr	2900	6505.22	6502	6504.87	6506.3	0.00549	8.2	2897	8.3	0.86	1	119.84	352.12
Reach-1	14287	10-yr	3500	6505.87	6502	6505.27	6506.94	0.004249	8.1	3491	8.3	0.79	0.91	124.2	431
Reach-1	14287	25-yr	4800	6507.16	6502	6505.99	6508.27	0.002959	8	4770	8.5	0.7	0.82	132.93	597.24
Reach-1	14287	50-yr	5500	6507.12	6502	6506.37	6508.6	0.003977	9.3	5466	9.8	0.81	1.1	132.69	592.57
Reach-1	14287	100-yr	6300	6507.14	6502	6506.76	6509.06	0.005166	10.6	6261	11.2	0.93	1.43	132.79	594.58
Reach-1	14677	2-yr	2200	6506.97	6504	6506.42	6507.71	0.004279	6.8	2198	6.9	0.74	0.71	119.55	321.26
Reach-1	14677	5-yr	2900	6507.33	6504	6506.89	6508.34	0.004952	7.9	2896	8.1	0.82	0.92	121.93	365.29
Reach-1	14677	10-yr	3500	6507.62	6504	6507.28	6508.85	0.005418	8.7	3493	8.9	0.87	1.09	123.79	400.27
Reach-1	14677	25-yr	4800	6508.35	6504	6508.01	6509.93	0.005361	9.7	4781	10.1	0.91	1.27	128.46	492.73
Reach-1	14677	50-yr	5500	6508.72	6504	6508.39	6510.46	0.005314	10.2	5472	10.6	0.92	1.36	130.72	540.32
Reach-1	14677	100-yr	6300	6509.17	6504	6508.76	6511.06	0.005062	10.5	6259	11.1	0.92	1.41	133.33	600.59

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbs/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	13483	2-yr	2200	6490.53	6488	6490.53	6491.72	0.008703	8.7	2199	8.7	1.02	1.23	110.67	252.57
Reach-1	13483	5-yr	3000	6491.08	6488	6491.08	6492.53	0.008027	9.5	2996	9.7	1.03	1.37	114.6	314.5
Reach-1	13483	10-yr	3600	6491.45	6488	6491.45	6493.09	0.007762	10.1	3591	10.3	1.04	1.47	117.23	357.01
Reach-1	13483	25-yr	4800	6492.16	6488	6492.16	6494.11	0.007155	10.9	4776	11.2	1.05	1.58	123.77	441.92
Reach-1	13483	50-yr	5600	6492.58	6488	6492.58	6494.74	0.006896	11.3	5561	11.8	1.05	1.67	126.67	495.6
Reach-1	13483	100-yr	6400	6492.99	6488	6492.99	6495.34	0.006685	11.7	6342	12.3	1.05	1.75	129.64	547.72
Reach-1	13661	2-yr	2200	6491.88	6488	6491.75	6493.1	0.006846	7.8	2127	9	0.99	1.07	112.34	282.45
Reach-1	13661	5-yr	3000	6492.38	6488	6492.38	6494.01	0.007467	8.8	2879	10.5	1.05	1.36	115	339.2
Reach-1	13661	10-yr	3600	6492.8	6488	6492.8	6494.64	0.007222	9.3	3436	11.1	1.05	1.48	117.16	388.68
Reach-1	13661	25-yr	4800	6493.6	6488	6493.6	6495.79	0.00676	9.9	4540	12.2	1.05	1.67	120.97	484
Reach-1	13661	50-yr	5600	6494.06	6488	6494.06	6496.5	0.006691	10.4	5273	12.9	1.05	1.81	122.95	539.68
Reach-1	13661	100-yr	6400	6494.51	6488	6494.51	6497.17	0.006537	10.7	6003	13.5	1.06	1.92	125.02	596.1
Reach-1	13700	2-yr	2200	6497.28	6494.63	6497.28	6498.56	0.00248	9	2200	9.1	1.02	0.37	99.03	243.5
Reach-1	13700	5-yr	2900	6497.8	6494.63	6497.8	6499.33	0.002338	9.8	2898	9.9	1.05	0.4	106.72	297.15
Reach-1	13700	10-yr	3500	6498.21	6494.63	6498.21	6499.94	0.00224	10.2	3494	10.6	1.06	0.42	110.47	341.47
Reach-1	13700	25-yr	4800	6499.02	6494.63	6499.02	6501.14	0.002076	11.1	4781	11.7	1.06	0.48	115.08	433.2
Reach-1	13700	50-yr	5500	6499.43	6494.63	6499.43	6501.74	0.002009	11.5	5471	12.2	1.06	0.5	117.13	480.31
Reach-1	13700	100-yr	6300	6499.86	6494.63	6499.86	6502.39	0.00195	11.8	6259	12.8	1.06	0.53	119.28	532.2
Reach-1	13763	Culvert													
Reach-1	13826	2-yr	2200	6503.69	6498.7	6501.36	6503.97	0.000239	4	2193	4.3	0.37	0.06	132.25	543.39
Reach-1	13826	5-yr	2900	6504.71	6498.7	6501.78	6505.03	0.000214	4.3	2885	4.6	0.36	0.06	139.24	681.91
Reach-1	13826	10-yr	3500	6505.51	6498.7	6502.19	6505.88	0.000199	4.4	3476	4.8	0.36	0.07	145.05	796.27
Reach-1	13826	25-yr	4800	6506.94	6498.7	6502.93	6507.4	0.000192	4.7	4752	5.4	0.38	0.08	158.08	1012.99
Reach-1	13826	50-yr	5500	6507.78	6498.7	6503.32	6507.4	0.00027	5.6	5447	6.4	0.44	0.1	156.55	986.88
Reach-1	13826	100-yr	6300	6508.52	6498.7	6503.69	6507.4	0.000397	6.7	6243	7.5	0.53	0.15	154.22	947.35
Reach-1	13865	2-yr	2200	6503.57	6499.43	6502.33	6504.05	0.002075	5.4	2193	5.6	0.55	0.41	125.93	404.28
Reach-1	13865	5-yr	2900	6504.61	6499.43	6502.83	6505.1	0.001513	5.4	2879	5.7	0.5	0.38	133.78	539.76
Reach-1	13865	10-yr	3500	6505.42	6499.43	6503.2	6505.94	0.001267	5.4	3463	5.8	0.47	0.37	139.33	651.22
Reach-1	13865	25-yr	4800	6506.86	6499.43	6503.93	6507.46	0.001072	5.6	4721	6.2	0.46	0.38	150.89	859.12
Reach-1	13865	50-yr	5500	6508.65	6499.43	6504.3	6507.49	0.001563	6.6	5414	7.4	0.55	0.54	149.01	827.93
Reach-1	13865	100-yr	6300	6509.31	6499.43	6504.71	6507.53	0.002452	8.1	6210	8.9	0.68	0.81	145.92	777.67

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	12504	2-yr	2200	6469.28	6465.63	6469.54	6470.3	0.005554	8.1	2200	8.1	0.84	0.99	93.91	271.92
Reach-1	12504	5-yr	3000	6469.71	6465.63	6469.54	6471.15	0.006779	9.6	2998	9.7	0.95	1.34	97.64	312.47
Reach-1	12504	10-yr	3600	6470.04	6465.63	6470.03	6471.76	0.007235	10.4	3598	10.5	1.2	1.07	145.86	346.96
Reach-1	12504	25-yr	4800	6470.84	6465.63	6470.84	6472.81	0.008417	10.3	4736	11.3	1.12	1.24	147.98	464.47
Reach-1	12504	50-yr	5600	6471.31	6465.63	6471.31	6473.44	0.006109	10.5	5473	11.8	1.09	1.35	149.23	534.27
Reach-1	12504	100-yr	6400	6471.71	6465.63	6471.71	6474.03	0.006026	10.8	6205	12.4	1.08	1.47	150.29	594.53
Reach-1	12689	2-yr	2200	6470.28	6466	6471	6471	0.002566	6.5	2156	6.9	0.64	0.55	97.1	339.24
Reach-1	12689	5-yr	3000	6471.01	6466	6471.96	6471.96	0.002728	7.3	2916	7.9	0.7	0.66	105.76	412.82
Reach-1	12689	10-yr	3600	6471.5	6466	6472.61	6472.61	0.002817	7.7	3480	8.6	0.74	0.7	115.7	466.79
Reach-1	12689	25-yr	4800	6472.16	6466	6473.68	6473.68	0.003325	8.7	4598	10.1	0.86	0.85	132.52	549.69
Reach-1	12689	50-yr	5600	6472.53	6466	6474.33	6474.33	0.00367	9.4	5327	11	0.9	1.01	134.19	598.07
Reach-1	12689	100-yr	6400	6472.85	6466	6474.94	6474.94	0.004023	10	6051	11.9	0.94	1.17	135.66	641.09
Reach-1	12725	2-yr	2200	6472.47	6469.3	6472.47	6473.64	0.008641	8.6	2196	8.7	1.05	1.15	120.23	257.18
Reach-1	12725	5-yr	3000	6473.03	6469.3	6473.03	6474.42	0.007809	9.2	2978	9.5	1.04	1.25	126.73	326.04
Reach-1	12725	10-yr	3600	6473.4	6469.3	6473.4	6474.96	0.007437	9.6	3558	10.1	1.04	1.33	130.33	374.12
Reach-1	12725	25-yr	4800	6474.1	6469.3	6474.1	6475.93	0.006813	10.3	4698	11	1.03	1.45	136.36	467.24
Reach-1	12725	50-yr	5600	6474.49	6469.3	6474.49	6476.52	0.00667	10.7	5449	11.6	1.04	1.56	138.66	521.83
Reach-1	12725	100-yr	6400	6474.88	6469.3	6474.88	6477.08	0.006487	11.1	6192	12.1	1.04	1.64	140.92	576.03
Reach-1	12856	2-yr	2200	6473.43	6470	6473.24	6474.58	0.00608	8.1	2104	8.7	0.95	0.95	108.01	270.96
Reach-1	12856	5-yr	3000	6473.89	6470	6473.89	6475.45	0.006974	9.3	2834	10.2	1.06	1.22	114.51	321.32
Reach-1	12856	10-yr	3600	6474.31	6470	6474.31	6476.04	0.006714	9.7	3358	10.8	1.05	1.31	117.68	370.44
Reach-1	12856	25-yr	4800	6475.07	6470	6475.07	6477.12	0.00633	10.4	4385	11.8	1.04	1.49	121.76	462.22
Reach-1	12856	50-yr	5600	6475.52	6470	6475.52	6477.78	0.006249	10.8	5062	12.5	1.04	1.61	124.11	516.79
Reach-1	12856	100-yr	6400	6475.97	6470	6475.97	6478.4	0.006061	11.2	5729	13	1.04	1.7	126.48	572.95
Reach-1	12919	2-yr	2200	6478.39	6474.87	6478.39	6479.54	0.008708	8.6	2198	8.6	1.02	1.21	114.86	256.33
Reach-1	12919	5-yr	3000	6478.93	6474.87	6478.93	6480.32	0.007968	9.4	2990	9.5	1.02	1.34	118.34	319.41
Reach-1	12919	10-yr	3600	6479.28	6474.87	6479.28	6480.86	0.007717	9.9	3581	10.1	1.03	1.44	120.54	361.81
Reach-1	12919	25-yr	4800	6479.97	6474.87	6479.97	6481.84	0.007089	10.8	4753	11	1.02	1.57	124.72	446.3
Reach-1	12919	50-yr	5600	6480.37	6474.87	6480.37	6482.45	0.006912	11.3	5529	11.6	1.03	1.67	127.05	496.83
Reach-1	12919	100-yr	6400	6480.77	6474.87	6480.77	6483.02	0.006698	11.7	6300	12.1	1.03	1.75	129.38	547.23

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit W.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lbsq ft]	Top Width [ft]	Area [sq ft]
Reach-1	11912	2-yr	2200	6460.06	6456	6456	6460.49	0.001813	5.3	2200	5.3	0.5	0.39	119.64	417.96
Reach-1	11912	5-yr	3000	6460.67	6456	6456	6461.25	0.002004	6.1	2997	6.2	0.55	0.48	126.21	492.45
Reach-1	11912	10-yr	3600	6461.07	6456	6456	6461.77	0.002126	6.6	3593	6.7	0.58	0.55	130.53	543.85
Reach-1	11912	25-yr	4800	6461.78	6456	6456	6462.71	0.002326	7.5	4778	7.8	0.63	0.67	138.11	639.74
Reach-1	11912	50-yr	5600	6462.22	6456	6456	6463.29	0.002424	8	5562	8.3	0.66	0.74	141.4	700.83
Reach-1	11912	100-yr	6400	6462.63	6456	6456	6463.84	0.002504	8.4	6342	8.9	0.68	0.82	143.13	759.32
Reach-1	11998	2-yr	2200	6460.08	6456	6456	6460.8	0.003905	6.8	2200	6.8	0.7	0.7	111.55	324.32
Reach-1	11998	5-yr	3000	6460.66	6456	6456	6461.59	0.003987	7.7	2998	7.7	0.74	0.83	115.9	390.51
Reach-1	11998	10-yr	3600	6461.05	6456	6456	6462.13	0.004076	8.3	3595	8.4	0.78	0.91	120.5	435.67
Reach-1	11998	25-yr	4800	6461.72	6456	6456	6463.12	0.004256	9.3	4782	9.5	0.82	1.08	125.36	518.35
Reach-1	11998	50-yr	5600	6462.13	6456	6456	6463.73	0.004352	9.8	5570	10.2	0.85	1.19	128.47	569.96
Reach-1	11998	100-yr	6400	6462.51	6456	6456	6464.3	0.004437	10.3	6355	10.8	0.87	1.29	131.42	619.4
Reach-1	12125	2-yr	2200	6460.71	6458	6460.71	6462.01	0.008221	9	2194	9.2	1.05	1.19	104.55	245.66
Reach-1	12125	5-yr	3000	6461.32	6458	6461.32	6462.89	0.007586	9.6	2975	10.1	1.08	1.27	115.05	312.62
Reach-1	12125	10-yr	3600	6461.75	6458	6461.75	6463.49	0.007161	9.9	3551	10.7	1.08	1.31	121.83	363.49
Reach-1	12125	25-yr	4800	6462.52	6458	6462.52	6464.56	0.006598	10.4	4678	11.6	1.07	1.45	128.73	460.93
Reach-1	12125	50-yr	5600	6462.98	6458	6462.98	6465.22	0.006357	10.7	5418	12.2	1.06	1.55	131.27	521.49
Reach-1	12125	100-yr	6400	6463.41	6458	6463.41	6465.83	0.006238	11.1	6153	12.7	1.06	1.65	133.55	577.29
Reach-1	12170	2-yr	2200	6466.13	6463.12	6466.13	6467.22	0.008946	8.4	2199	8.4	1.02	1.17	125.26	263.11
Reach-1	12170	5-yr	3000	6466.64	6463.12	6466.64	6467.96	0.008209	9.1	2993	9.2	1.03	1.28	130.54	328.18
Reach-1	12170	10-yr	3600	6466.99	6463.12	6466.99	6468.47	0.007759	9.6	3583	9.8	1.03	1.35	134.23	375.3
Reach-1	12170	25-yr	4800	6467.65	6463.12	6467.65	6469.39	0.0071	10.3	4746	10.6	1.03	1.45	141.02	465.42
Reach-1	12170	50-yr	5600	6468.05	6463.12	6468.05	6469.95	0.006791	10.7	5511	11.2	1.03	1.52	145.02	522.65
Reach-1	12170	100-yr	6400	6468.41	6463.12	6468.41	6470.48	0.006628	11.1	6265	11.7	1.03	1.61	147.07	575.13
Reach-1	12351	2-yr	2200	6468	6464	6468	6469.26	0.008046	8.7	2192	9	1.1	1.03	121.14	251.44
Reach-1	12351	5-yr	3000	6468.64	6464	6468.64	6470.09	0.00701	8.9	2943	9.8	1.09	1.07	137.59	338.46
Reach-1	12351	10-yr	3600	6469.02	6464	6469.02	6470.65	0.00685	9.2	3493	10.4	1.08	1.18	140.78	391.67
Reach-1	12351	25-yr	4800	6469.76	6464	6469.76	6471.65	0.006368	9.7	4564	11.3	1.06	1.33	146.77	497.41
Reach-1	12351	50-yr	5600	6470.21	6464	6470.21	6472.26	0.006115	9.9	5260	11.8	1.04	1.42	149.57	564.29
Reach-1	12351	100-yr	6400	6470.58	6464	6470.58	6472.83	0.006113	10.3	5952	12.4	1.04	1.55	151.1	620.59

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	11464	2-yr	2200	6439.43	6434	6438.96	6441.15	0.004978	9.6	2152	10.6	0.92	1.2	56.51	229.31
Reach-1	11464	5-yr	3000	6440.03	6434	6439.98	6442.53	0.006245	11.4	2919	12.9	1.06	1.64	59.52	263.79
Reach-1	11464	10-yr	3600	6440.67	6434	6440.67	6443.5	0.006113	11.9	3481	13.7	1.08	1.76	62.38	303.28
Reach-1	11464	25-yr	4800	6441.91	6434	6441.91	6445.27	0.005739	12.5	4586	15	1.09	1.91	68.01	383.87
Reach-1	11464	50-yr	5600	6442.69	6434	6442.69	6446.34	0.005503	12.8	5309	15.7	1.09	1.98	71.86	438.2
Reach-1	11464	100-yr	6400	6443.42	6434	6443.42	6447.34	0.005314	13	6022	16.4	1.1	2.05	75.2	491.93
Reach-1	11657	2-yr	2200	6458.3	6455.2	6458.3	6459.36	0.009029	8.3	2200	8.3	1.01	1.16	128.96	266.38
Reach-1	11657	5-yr	3000	6458.78	6455.2	6458.78	6460.08	0.008421	9.1	2998	9.2	1.02	1.31	132.1	329.41
Reach-1	11657	10-yr	3600	6459.13	6455.2	6459.13	6460.58	0.007927	9.6	3594	9.7	1.02	1.38	134.37	376.12
Reach-1	11657	25-yr	4800	6459.73	6455.2	6459.73	6461.5	0.007529	10.5	4784	10.7	1.03	1.55	138.3	458.47
Reach-1	11657	50-yr	5600	6460.14	6455.2	6460.14	6462.07	0.007124	10.9	5573	11.2	1.03	1.62	140.72	514.97
Reach-1	11657	100-yr	6400	6460.49	6455.2	6460.49	6462.61	0.006985	11.3	6360	11.7	1.03	1.72	142.47	564.68
Reach-1	11703	2-yr	2200	6458.88	6456	6459.73	6459.73	0.006223	7.4	2200	7.4	0.85	0.91	127.66	298.75
Reach-1	11703	5-yr	3000	6459.4	6456	6459.14	6460.44	0.00616	8.2	3000	8.2	0.87	1.05	133.64	366.18
Reach-1	11703	10-yr	3600	6459.74	6456	6459.47	6460.93	0.006052	8.7	3599	8.7	0.89	1.13	137.15	412.54
Reach-1	11703	25-yr	4800	6460.41	6456	6460.07	6461.84	0.005592	9.5	4794	9.6	0.89	1.24	141.69	506.12
Reach-1	11703	50-yr	5600	6460.83	6456	6460.45	6462.4	0.005365	9.9	5588	10.1	0.89	1.31	143.73	565.21
Reach-1	11703	100-yr	6400	6461.23	6456	6460.8	6462.93	0.005126	10.3	6379	10.5	0.89	1.36	145.74	624.29
Reach-1	11834	2-yr	2200	6459.76	6456	6460.28	6460.28	0.002766	5.8	2200	5.8	0.59	0.51	127.71	379.86
Reach-1	11834	5-yr	3000	6460.34	6456	6461.02	6461.02	0.002901	6.6	2999	6.6	0.63	0.62	132	454.88
Reach-1	11834	10-yr	3600	6460.71	6456	6461.51	6461.51	0.002982	7.1	3598	7.2	0.65	0.7	133.83	504.78
Reach-1	11834	25-yr	4800	6461.38	6456	6462.41	6462.41	0.003128	8.1	4792	8.2	0.69	0.84	137.12	595.28
Reach-1	11834	50-yr	5600	6461.79	6456	6462.97	6462.97	0.003204	8.6	5586	8.7	0.71	0.93	139.11	651.25
Reach-1	11834	100-yr	6400	6462.17	6456	6463.5	6463.5	0.003271	9.1	6379	9.3	0.73	1.01	140.85	704.44
Reach-1	11864	2-yr	2200	6459.82	6456	6460.38	6460.38	0.002744	6	2199	6	0.6	0.52	119.98	369.11
Reach-1	11864	5-yr	3000	6460.38	6456	6461.12	6461.12	0.002961	6.8	2996	6.9	0.65	0.64	126.15	438.19
Reach-1	11864	10-yr	3600	6460.74	6456	6461.63	6461.63	0.003125	7.4	3592	7.6	0.69	0.72	129.89	484.57
Reach-1	11864	25-yr	4800	6461.38	6456	6462.55	6462.55	0.003405	8.4	4777	8.7	0.75	0.88	136.35	569.83
Reach-1	11864	50-yr	5600	6461.77	6456	6463.12	6463.12	0.003557	9	5563	9.4	0.78	0.99	139.26	622.92
Reach-1	11864	100-yr	6400	6462.13	6456	6463.66	6463.66	0.003689	9.5	6345	10	0.8	1.09	141.58	673.57

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	10767	2-yr	2200	6431.38	6427.69	6431.38	6432.95	0.008162	10	2200	10	1.01	1.54	70.81	219.12
Reach-1	10767	5-yr	3000	6432.12	6427.69	6432.12	6434	0.00774	11	3000	11	1.01	1.75	73.4	272.57
Reach-1	10767	10-yr	3600	6432.63	6427.69	6432.63	6434.72	0.007477	11.6	3600	11.6	1.01	1.87	75.19	310.59
Reach-1	10767	25-yr	4900	6433.63	6427.69	6433.63	6436.12	0.007093	12.6	4900	12.6	1	2.11	78.69	387.46
Reach-1	10767	50-yr	5600	6434.12	6427.69	6434.12	6436.8	0.006941	13.1	5600	13.1	1	2.22	80.41	426.61
Reach-1	10767	100-yr	6400	6434.65	6427.69	6434.65	6437.54	0.006802	13.6	6400	13.6	1.01	2.33	82.27	469.74
Reach-1	10982	2-yr	2200	6433.43	6427.69	6433.43	6435.4	0.00774	11.3	2200	11.3	1.01	1.81	50.31	195.46
Reach-1	10982	5-yr	3000	6434.43	6427.69	6434.43	6436.71	0.007403	12.1	3000	12.1	1.01	2	55.08	247.8
Reach-1	10982	10-yr	3600	6435.09	6427.69	6435.09	6437.56	0.007216	12.6	3600	12.6	1.01	2.11	58.25	285.12
Reach-1	10982	25-yr	4900	6436.34	6427.69	6436.34	6439.19	0.006927	13.5	4900	13.5	1.01	2.32	64.27	361.73
Reach-1	10982	50-yr	5600	6436.96	6427.69	6436.96	6439.96	0.006749	13.9	5600	13.9	1	2.4	67.25	402.45
Reach-1	10982	100-yr	6400	6437.59	6427.69	6437.59	6440.79	0.006645	14.3	6400	14.3	1	2.5	70.31	446.18
Reach-1	11004	2-yr	2200	6437.93	6433.69	6437.93	6439.54	0.008042	10.2	2200	10.2	1.01	1.57	68.01	216.16
Reach-1	11004	5-yr	3000	6438.72	6433.69	6438.72	6440.61	0.007629	11	3000	11	1.01	1.75	72.8	272.09
Reach-1	11004	10-yr	3600	6439.26	6433.69	6439.26	6441.33	0.007379	11.5	3600	11.5	1	1.85	76.05	312.18
Reach-1	11004	25-yr	4900	6440.27	6433.69	6440.27	6442.7	0.006799	12.3	4893	12.5	1.07	1.77	93.78	398.76
Reach-1	11004	50-yr	5600	6440.77	6433.69	6440.77	6443.37	0.006568	12.6	5579	13	1.07	1.84	97.47	445.97
Reach-1	11004	100-yr	6400	6441.31	6433.69	6441.31	6444.08	0.006324	12.8	6356	13.4	1.06	1.9	101.51	499.75
Reach-1	11360	2-yr	2200	6440.04	6433.69	6433.69	6440.51	0.001148	5.5	2200	5.5	0.41	0.38	70.74	399.41
Reach-1	11360	5-yr	3000	6441.63	6433.69	6433.69	6441.65	0.00127	6.4	2999	6.4	0.45	0.47	74.19	469.32
Reach-1	11360	10-yr	3600	6441.81	6433.69	6433.69	6442.4	0.001356	7	3596	7.1	0.48	0.53	76.44	516.39
Reach-1	11360	25-yr	4800	6442.81	6433.69	6433.69	6443.82	0.00146	7.9	4786	8.1	0.53	0.6	86.11	611.25
Reach-1	11360	50-yr	5600	6443.32	6433.69	6433.69	6444.54	0.001632	8.5	5575	8.9	0.58	0.68	91.66	656.51
Reach-1	11360	100-yr	6400	6443.87	6433.69	6433.69	6445.28	0.001738	9	6358	9.5	0.62	0.74	97.75	709.14
Reach-1	11395	2-yr	2200	6439.78	6433.69	6433.69	6440.7	0.002056	7.2	2171	7.7	0.61	0.61	61.19	306.24
Reach-1	11395	5-yr	3000	6440.61	6433.69	6433.69	6441.9	0.002449	8.4	2945	9.2	0.69	0.79	65.81	359.06
Reach-1	11395	10-yr	3600	6441.12	6433.69	6433.69	6442.71	0.002747	9.2	3521	10.2	0.74	0.94	67.99	393.2
Reach-1	11395	25-yr	4800	6442.07	6433.69	6433.69	6444.24	0.003198	10.4	4663	12	0.83	1.19	72.75	460.02
Reach-1	11395	50-yr	5600	6442.33	6433.69	6433.69	6445.09	0.003917	11.7	5429	13.5	0.92	1.49	73.82	478.63
Reach-1	11395	100-yr	6400	6442.61	6433.69	6433.69	6445.96	0.00457	12.8	6190	14.9	1	1.79	75.01	499.49

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit W.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lbsq ft]	Top Width [ft]	Area [sq ft]
Reach-1	10290	2-yr	2300	6419.89	6414.56	6419.89	6422.08	0.007297	11.7	2295	11.9	1.04	1.75	48.39	197.17
Reach-1	10290	5-yr	3100	6420.86	6414.56	6420.86	6423.52	0.006771	12.6	3086	13.1	1.05	1.91	50.75	245.48
Reach-1	10290	10-yr	3700	6421.54	6414.56	6421.54	6424.5	0.006466	13.2	3675	13.9	1.05	2	52.4	280.43
Reach-1	10290	25-yr	5000	6422.87	6414.56	6422.87	6426.46	0.006028	14.2	4944	15.3	1.07	2.17	56.07	352.6
Reach-1	10290	50-yr	5800	6423.63	6414.56	6423.63	6427.56	0.005829	14.7	5718	16	1.08	2.25	58.37	395.82
Reach-1	10290	100-yr	6600	6424.37	6414.56	6424.37	6428.61	0.005611	15	6487	16.7	1.09	2.3	61.04	440.09
Reach-1	10386	2-yr	2300	6422.19	6415.69	6422.19	6424	0.007711	10.8	2300	10.8	1	1.69	59	213.28
Reach-1	10386	5-yr	3100	6423.03	6415.69	6423.03	6425.16	0.007401	11.7	3100	11.7	1.01	1.85	64.37	265.4
Reach-1	10386	10-yr	3700	6423.57	6415.69	6423.57	6425.95	0.007073	12.3	3699	12.4	1.03	1.93	66.51	300.39
Reach-1	10386	25-yr	5000	6424.64	6415.69	6424.64	6427.52	0.006526	13.4	4991	13.6	1.04	2.08	70.8	374.03
Reach-1	10386	50-yr	5800	6425.25	6415.69	6425.25	6428.41	0.006284	13.9	5781	14.3	1.05	2.15	73.23	417.88
Reach-1	10386	100-yr	6600	6425.82	6415.69	6425.81	6429.25	0.006114	14.3	6568	14.9	1.06	2.23	75.51	460.19
Reach-1	10410	2-yr	2300	6425.48	6421.69	6425.48	6427.04	0.008132	10	2300	10	1.01	1.54	74.15	229.23
Reach-1	10410	5-yr	3100	6426.2	6421.69	6426.2	6428.06	0.007689	10.9	3100	10.9	1	1.73	77.03	283.53
Reach-1	10410	10-yr	3700	6426.7	6421.69	6426.7	6428.74	0.00739	11.5	3700	11.5	1	1.84	79.03	322.66
Reach-1	10410	25-yr	5000	6427.64	6421.69	6427.64	6430.08	0.007109	12.5	5000	12.5	1.01	2.08	82.81	399.11
Reach-1	10410	50-yr	5800	6428.19	6421.69	6428.19	6430.83	0.006925	13	5800	13	1.01	2.19	84.99	444.71
Reach-1	10410	100-yr	6600	6428.7	6421.69	6428.7	6431.53	0.00678	13.5	6600	13.5	1.01	2.29	87.46	488.55
Reach-1	10636	2-yr	2300	6426.74	6421.69	6426.5	6428.81	0.006317	11.4	2297	11.6	0.96	1.63	44.48	201.86
Reach-1	10636	5-yr	3100	6427.51	6421.69	6427.51	6430.29	0.006944	13.1	3093	13.4	1.03	2.03	45.54	236.83
Reach-1	10636	10-yr	3700	6428.22	6421.69	6428.22	6431.33	0.006646	13.7	3687	14.2	1.04	2.13	46.53	269.15
Reach-1	10636	25-yr	5000	6429.61	6421.69	6429.61	6433.38	0.006196	14.9	4970	15.6	1.05	2.32	48.64	335.35
Reach-1	10636	50-yr	5800	6430.39	6421.69	6430.39	6434.56	0.00601	15.5	5757	16.4	1.06	2.41	50.38	374.04
Reach-1	10636	100-yr	6600	6431.19	6421.69	6431.19	6435.67	0.005741	15.9	6539	17.1	1.07	2.43	52.78	415.19
Reach-1	10743	2-yr	2200	6428.56	6421.69	6428.56	6430.56	0.007714	11.4	2200	11.4	1	1.83	48.69	193.73
Reach-1	10743	5-yr	3000	6429.59	6421.69	6429.59	6431.88	0.007492	12.1	3000	12.1	1.01	2.01	54.83	246.93
Reach-1	10743	10-yr	3600	6430.27	6421.69	6430.27	6432.74	0.007313	12.6	3600	12.6	1.01	2.11	58.88	285.58
Reach-1	10743	25-yr	4900	6431.56	6421.69	6431.56	6434.34	0.006941	13.4	4900	13.4	1	2.28	66.61	366.8
Reach-1	10743	50-yr	5600	6433.28	6421.69	6432.15	6435.31	0.004187	11.4	5600	11.4	0.8	1.59	76.84	489.83
Reach-1	10743	100-yr	6400	6434.55	6421.69	6432.81	6436.38	0.00306	10.8	6399	10.8	0.72	1.29	83.5	592.16

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit W.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lbs/sq ft]	Top Width [ft]	Area [sq ft]
Reach-1	8692.2	2-yr	2300	6399.24	6394.92		6400.04	0.010142	7.1	2293	7.2	0.73	1.9	106.62	323.74
Reach-1	8692.2	5-yr	3100	6399.79	6394.92		6400.84	0.010855	8.1	3082	8.3	0.77	2.35	108.9	382.41
Reach-1	8692.2	10-yr	3700	6400.15	6394.92		6401.39	0.011353	8.8	3670	9	0.81	2.67	110.41	421.76
Reach-1	8692.2	25-yr	5000	6400.84	6394.92	6400.32	6402.48	0.012247	10	4938	10.3	0.86	3.31	113.3	498.93
Reach-1	8692.2	50-yr	5800	6401.21	6394.92	6400.76	6403.1	0.012749	10.7	5713	11.1	0.89	3.69	114.7	541.8
Reach-1	8692.2	100-yr	6600	6401.56	6394.92	6401.18	6403.69	0.013186	11.3	6486	11.8	0.92	4.05	115.94	582.46
Reach-1	8730.2	2-yr	2300	6399.63	6395.1		6400.4	0.00874	7	2291	7.1	0.68	1.78	99.48	329.5
Reach-1	8730.2	5-yr	3100	6400.2	6395.1		6401.23	0.009529	8	3080	8.2	0.74	2.22	101.93	387.04
Reach-1	8730.2	10-yr	3700	6400.57	6395.1		6401.79	0.010072	8.7	3668	8.9	0.77	2.54	103.5	425.56
Reach-1	8730.2	25-yr	5000	6401.28	6395.1		6402.92	0.011115	10	4935	10.3	0.83	3.2	106.43	500.13
Reach-1	8730.2	50-yr	5800	6401.67	6395.1	6401.08	6403.56	0.011711	10.7	5710	11.1	0.87	3.59	108.01	541.28
Reach-1	8730.2	100-yr	6600	6402.03	6395.1	6401.54	6404.17	0.012222	11.4	6482	11.8	0.9	3.95	109.49	580.57
Reach-1	9026	2-yr	2300	6404.34	6404.34	6405.69	6405.69	0.008513	9.3	2300	9.3	1.01	1.38	92.73	247.09
Reach-1	9026	5-yr	3100	6404.92	6404.92	6406.58	6406.58	0.00811	10.3	3099	10.3	1.02	1.56	94.68	301.03
Reach-1	9026	10-yr	3700	6405.35	6405.35	6407.19	6407.19	0.007635	10.8	3698	10.9	1.02	1.64	96.12	342.26
Reach-1	9026	25-yr	5000	6406.16	6406.16	6406.42	6406.42	0.007208	11.9	4992	12.1	1.03	1.85	98.81	421.02
Reach-1	9026	50-yr	5800	6406.62	6406.62	6409.12	6409.12	0.006979	12.4	5787	12.7	1.04	1.95	100.29	467.44
Reach-1	9026	100-yr	6600	6407.07	6407.07	6409.79	6409.79	0.006772	12.9	6581	13.2	1.04	2.04	101.74	512.67
Reach-1	9500	2-yr	2300	6408.72	6408.72	6410.49	6410.49	0.007529	10.2	2291	10.7	1.08	1.41	73.84	224.74
Reach-1	9500	5-yr	3100	6409.52	6409.52	6411.64	6411.64	0.006934	10.8	3073	11.7	1.09	1.52	80.05	286.01
Reach-1	9500	10-yr	3700	6410.06	6410.06	6412.42	6412.42	0.006639	11.2	3654	12.4	1.1	1.6	83.96	330.45
Reach-1	9500	25-yr	5000	6411.15	6411.15	6413.97	6413.97	0.006099	11.7	4898	13.6	1.1	1.72	91.97	426.79
Reach-1	9500	50-yr	5800	6411.74	6411.74	6414.85	6414.85	0.005976	12	5657	14.3	1.11	1.82	96.12	481.55
Reach-1	9500	100-yr	6600	6412.65	6412.65	6415.71	6415.71	0.004962	10.9	6408	14.2	1.25	1.19	154.41	607.26
Reach-1	10000	2-yr	2300	6415.83	6415.83	6418.37	6418.37	0.007634	12.7	2299	12.8	1.03	2.07	37.36	180.76
Reach-1	10000	5-yr	3100	6416.96	6416.96	6420.03	6420.03	0.007042	13.8	3094	14.1	1.04	2.2	39.76	224.55
Reach-1	10000	10-yr	3700	6417.74	6417.74	6417.74	6417.74	0.006722	14.4	3686	14.9	1.05	2.28	41.42	256.32
Reach-1	10000	25-yr	5000	6419.37	6419.37	6423.4	6423.4	0.006032	15.3	4947	16.2	1.07	2.33	46.11	327.42
Reach-1	10000	50-yr	5800	6420.23	6420.23	6424.65	6424.65	0.005852	15.8	5709	17	1.08	2.4	48.61	367.94
Reach-1	10000	100-yr	6600	6421.15	6421.15	6421.15	6421.15	0.005484	15.9	6455	17.5	1.09	2.35	52.5	414.67

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lbs/sq ft)	(ft)	(sq ft)
Reach-1	8555.2	2-yr	2300	6396.72	6393.95	6396.72	6397.85	0.081944	8.5	2276	8.5	1	11.36	121.29	271.22
Reach-1	8555.2	5-yr	3100	6397.22	6393.95	6397.22	6398.59	0.077361	9.3	3053	9.4	1.01	12.87	123.33	331.6
Reach-1	8555.2	10-yr	3700	6397.57	6393.95	6397.57	6399.1	0.073853	9.9	3630	10	1.01	13.72	124.78	375.16
Reach-1	8555.2	25-yr	5000	6398.26	6393.95	6398.26	6400.1	0.068677	10.8	4867	11	1.01	15.34	127.64	462.36
Reach-1	8555.2	50-yr	5800	6398.67	6393.95	6398.67	6400.67	0.065398	11.3	5619	11.5	1	16.03	129.33	514.87
Reach-1	8555.2	100-yr	6600	6399.02	6393.95	6399.02	6401.21	0.064241	11.8	6367	12	1.01	16.96	130.81	561.23
Reach-1	8563.2	2-yr	2300	6397.72	6392.88	6397.72	6398.25	0.023963	5.8	2257	5.9	0.58	4.65	125.42	397.14
Reach-1	8563.2	5-yr	3100	6398.32	6392.88	6397.19	6399	0.024712	6.5	3022	6.7	0.6	5.6	127.91	473.33
Reach-1	8563.2	10-yr	3700	6398.73	6392.88	6397.55	6399.51	0.025169	7	3590	7.2	0.62	6.24	129.58	525.45
Reach-1	8563.2	25-yr	5000	6399.52	6392.88	6398.23	6400.52	0.02575	7.9	4806	8.1	0.65	7.45	132.87	629.83
Reach-1	8563.2	50-yr	5800	6399.96	6392.88	6398.62	6401.09	0.026051	8.4	5546	8.6	0.66	8.12	134.7	688.88
Reach-1	8563.2	100-yr	6600	6400.39	6392.88	6399.02	6401.63	0.026118	8.8	6279	9.1	0.67	8.7	136.46	746.74
Reach-1	8591.2	2-yr	2300	6397.99	6394.27	6398.87	6398.87	0.014612	7.4	2286	7.5	0.84	2.27	123.13	309.46
Reach-1	8591.2	5-yr	3100	6398.55	6394.27	6399.62	6399.62	0.013796	8.2	3072	8.3	0.84	2.57	125.39	379.11
Reach-1	8591.2	10-yr	3700	6398.93	6394.27	6400.14	6400.14	0.013439	8.7	3660	8.9	0.85	2.78	126.92	426.85
Reach-1	8591.2	25-yr	5000	6399.67	6394.27	6401.16	6401.16	0.01291	9.6	4925	9.9	0.86	3.19	129.86	522.28
Reach-1	8591.2	50-yr	5800	6400.08	6394.27	6401.74	6401.74	0.012739	10.1	5699	10.4	0.87	3.42	131.45	576.05
Reach-1	8591.2	100-yr	6600	6400.47	6394.27	6402.29	6402.29	0.01259	10.5	6471	10.9	0.88	3.64	132.96	627.63
Reach-1	8622.2	2-yr	2300	6398.52	6394.45	6399.27	6399.27	0.010961	6.9	2297	6.9	0.73	1.9	118.45	332.76
Reach-1	8622.2	5-yr	3100	6399.06	6394.45	6400.02	6400.02	0.011275	7.8	3093	7.9	0.76	2.28	120.14	396.19
Reach-1	8622.2	10-yr	3700	6399.41	6394.45	6400.53	6400.53	0.011491	8.4	3688	8.5	0.79	2.55	121.28	439.34
Reach-1	8622.2	25-yr	5000	6400.1	6394.45	6401.56	6401.56	0.011916	9.5	4973	9.7	0.83	3.09	123.48	523.77
Reach-1	8622.2	50-yr	5800	6400.48	6394.45	6402.14	6402.14	0.012209	10.2	5761	10.4	0.85	3.41	124.85	570.39
Reach-1	8622.2	100-yr	6600	6400.84	6394.45	6402.69	6402.69	0.012391	10.7	6547	10.9	0.87	3.69	126.25	615.81
Reach-1	8656.2	2-yr	2300	6398.87	6394.73	6399.66	6399.66	0.010943	7.1	2295	7.1	0.74	1.94	113.21	325.2
Reach-1	8656.2	5-yr	3100	6399.4	6394.73	6400.43	6400.43	0.011476	8	3086	8.1	0.78	2.37	114.9	385.85
Reach-1	8656.2	10-yr	3700	6399.76	6394.73	6400.96	6400.96	0.011841	8.7	3677	8.8	0.81	2.67	116.03	426.78
Reach-1	8656.2	25-yr	5000	6400.44	6394.73	6399.94	6402.01	0.012522	9.9	4952	10.1	0.86	3.29	118.2	506.67
Reach-1	8656.2	50-yr	5800	6400.81	6394.73	6402.61	6402.61	0.01294	10.5	5734	10.8	0.88	3.65	119.38	550.69
Reach-1	8656.2	100-yr	6600	6401.16	6394.73	6403.18	6403.18	0.013278	11.1	6513	11.5	0.91	3.98	120.55	592.81

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Cir W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8454.2	2-yr	2300	6394.19	6389.48	6394.97	6394.97	0.013481	7.1	2298	7.1	0.79	2.08	128.87	325.27
Reach-1	8454.2	5-yr	3100	6394.77	6389.48	6395.71	6395.71	0.012411	7.7	3093	7.8	0.78	2.32	130.92	401.57
Reach-1	8454.2	10-yr	3700	6395.17	6389.48	6396.22	6396.22	0.011902	8.1	3688	8.2	0.78	2.49	132.32	454.27
Reach-1	8454.2	25-yr	5000	6395.96	6389.48	6397.22	6397.22	0.011213	8.9	4975	9	0.78	2.82	135.05	558.98
Reach-1	8454.2	50-yr	5800	6396.4	6389.48	6397.79	6397.79	0.010903	9.4	5765	9.5	0.78	3	136.6	619.26
Reach-1	8454.2	100-yr	6600	6396.82	6389.48	6398.33	6398.33	0.010666	9.8	6553	9.9	0.79	3.17	138.05	676.06
Reach-1	8483.2	2-yr	2300	6394.79	6389.73	6395.4	6395.4	0.015202	6.2	2287	6.3	0.65	2.67	128.72	368.98
Reach-1	8483.2	5-yr	3100	6395.34	6389.73	6396.13	6396.13	0.015573	7	3068	7.1	0.68	3.21	130.75	441.07
Reach-1	8483.2	10-yr	3700	6395.72	6389.73	6396.63	6396.63	0.015746	7.5	3651	7.7	0.7	3.57	132.16	490.94
Reach-1	8483.2	25-yr	5000	6396.46	6389.73	6397.62	6397.62	0.016027	8.5	4904	8.7	0.73	4.27	134.91	589.79
Reach-1	8483.2	50-yr	5800	6396.88	6389.73	6398.18	6398.18	0.016144	9	5670	9.2	0.74	4.65	136.46	646.17
Reach-1	8483.2	100-yr	6600	6397.28	6389.73	6398.71	6398.71	0.016127	9.4	6431	9.7	0.75	4.99	137.95	701.44
Reach-1	8511.2	2-yr	2300	6395.27	6390.84	6395.77	6395.77	0.010225	5.6	2279	5.7	0.56	2.02	129.7	412.52
Reach-1	8511.2	5-yr	3100	6395.87	6390.84	6396.52	6396.52	0.010706	6.3	3053	6.5	0.59	2.47	131.95	490.9
Reach-1	8511.2	10-yr	3700	6396.28	6390.84	6397.02	6397.02	0.010979	6.8	3628	7	0.6	2.77	133.48	544.69
Reach-1	8511.2	25-yr	5000	6397.07	6390.84	6398.03	6398.03	0.011409	7.7	4865	7.9	0.63	3.36	136.45	651.38
Reach-1	8511.2	50-yr	5800	6397.51	6390.84	6398.6	6398.6	0.011604	8.1	5620	8.5	0.65	3.68	138.11	712.11
Reach-1	8511.2	100-yr	6600	6397.93	6390.84	6399.14	6399.14	0.011733	8.6	6370	8.9	0.66	3.98	139.69	770.64
Reach-1	8515.2	2-yr	2300	6395.63	6389	6395.82	6395.82	0.001934	3.4	2264	3.5	0.27	0.62	129.72	675.9
Reach-1	8515.2	5-yr	3100	6396.3	6389	6396.57	6396.57	0.002406	4.1	3033	4.2	0.31	0.85	132.17	763.88
Reach-1	8515.2	10-yr	3700	6396.75	6389	6397.08	6397.08	0.002713	4.5	3605	4.7	0.33	1.02	134.08	824.17
Reach-1	8515.2	25-yr	5000	6397.63	6389	6398.1	6398.1	0.003271	5.3	4833	5.6	0.37	1.36	138.59	944.2
Reach-1	8515.2	50-yr	5800	6398.13	6389	6398.67	6398.67	0.003558	5.7	5581	6	0.39	1.56	141.11	1012.96
Reach-1	8515.2	100-yr	6600	6398.59	6389	6399.22	6399.22	0.003806	6.1	6322	6.5	0.41	1.76	142.88	1078.97
Reach-1	8535.2	2-yr	2300	6395.7	6389	6395.87	6395.87	0.00392	3.3	2300	3.3	0.25	1.35	123.02	689.86
Reach-1	8535.2	5-yr	3100	6396.39	6389	6396.64	6396.64	0.004947	4	3100	4	0.28	1.87	125	775.54
Reach-1	8535.2	10-yr	3700	6396.86	6389	6397.16	6397.16	0.005616	4.4	3700	4.4	0.3	2.26	126.48	834.21
Reach-1	8535.2	25-yr	5000	6397.76	6389	6398.19	6398.19	0.006797	5.3	4999	5.3	0.34	3.02	130.21	950.58
Reach-1	8535.2	50-yr	5800	6398.27	6389	6398.78	6398.78	0.007415	5.7	5797	5.7	0.36	3.46	132.29	1016.85
Reach-1	8535.2	100-yr	6600	6398.75	6389	6399.33	6399.33	0.007956	6.1	6593	6.1	0.38	3.88	134.26	1080.56

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit V.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lbs/sq ft]	Top Width [ft]	Area [sq ft]
Reach-1	8344.2	2-yr	2300	6390.59	6384	6390.75	0.003596	3.2	2295	2295	3.2	0.24	1.21	130.66	716.96
Reach-1	8344.2	5-yr	3100	6391.27	6384	6391.5	0.00449	3.8	3088	3088	3.9	0.28	1.67	133.43	806.57
Reach-1	8344.2	10-yr	3700	6391.73	6384	6392.01	0.005038	4.3	3680	3680	4.3	0.3	1.98	135.28	868.44
Reach-1	8344.2	25-yr	5000	6392.63	6384	6393.03	0.006014	5	4954	4954	5.1	0.34	2.63	138.88	991.79
Reach-1	8344.2	50-yr	5800	6393.13	6384	6393.6	0.006507	5.5	5732	5732	5.5	0.35	3	140.91	1062.36
Reach-1	8344.2	100-yr	6600	6393.61	6384	6394.15	0.006937	5.8	6505	6505	5.9	0.37	3.35	142.81	1129.82
Reach-1	8352.37	2-yr	2300	6392.29	6389.6	6393.4	0.086774	8.4	2300	2300	8.4	1.01	11.79	124.11	272.23
Reach-1	8352.37	5-yr	3100	6392.78	6389.6	6394.12	0.082014	9.3	3100	3100	9.3	1.01	13.4	126.24	333.66
Reach-1	8352.37	10-yr	3700	6393.12	6389.6	6394.62	0.079387	9.8	3700	3700	9.8	1.01	14.46	127.71	376.56
Reach-1	8352.37	25-yr	5000	6393.8	6389.6	6395.6	0.074005	10.7	5000	5000	10.7	1	16.25	130.7	465.39
Reach-1	8352.37	50-yr	5800	6394.18	6389.6	6396.15	0.0725	11.3	5800	5800	11.3	1.01	17.36	132.33	514.64
Reach-1	8352.37	100-yr	6600	6394.55	6389.6	6396.68	0.070565	11.7	6600	6600	11.7	1.01	18.27	133.93	563.59
Reach-1	8371.2	2-yr	2300	6393.69	6389.6	6394.1	0.017288	5.1	2300	2300	5.1	0.48	3.69	130.22	451.06
Reach-1	8371.2	5-yr	3100	6394.33	6389.6	6394.85	0.018439	5.8	3100	3100	5.8	0.51	4.56	132.96	534.01
Reach-1	8371.2	10-yr	3700	6394.75	6389.6	6395.36	0.019077	6.3	3700	3700	6.3	0.53	5.14	134.82	591.34
Reach-1	8371.2	25-yr	5000	6395.58	6389.6	6396.36	0.020138	7.1	5000	5000	7.1	0.56	6.29	138.37	703.94
Reach-1	8371.2	50-yr	5800	6396.04	6389.6	6396.93	0.020465	7.5	5799	5799	7.6	0.57	6.87	140.32	768.58
Reach-1	8371.2	100-yr	6600	6396.47	6389.6	6397.46	0.020793	8	6597	6597	8	0.58	7.43	142.14	829.61
Reach-1	8392.2	2-yr	2300	6393.86	6389.52	6394.29	0.005277	5.3	2300	2300	5.3	0.51	1.07	132.22	437.37
Reach-1	8392.2	5-yr	3100	6394.5	6389.52	6395.05	0.005435	5.9	3100	3100	5.9	0.53	1.29	134.76	522.89
Reach-1	8392.2	10-yr	3700	6394.94	6389.52	6395.56	0.005525	6.4	3700	3700	6.4	0.54	1.44	136.48	581.82
Reach-1	8392.2	25-yr	5000	6395.77	6389.52	6396.57	0.005714	7.2	5000	5000	7.2	0.57	1.74	139.79	697.29
Reach-1	8392.2	50-yr	5800	6396.24	6389.52	6397.14	0.005795	7.6	5800	5800	7.6	0.58	1.9	141.65	763.46
Reach-1	8392.2	100-yr	6600	6396.68	6389.52	6397.67	0.005876	8	6600	6600	8	0.59	2.06	143.39	825.95
Reach-1	8424.2	2-yr	2300	6393.94	6389.5	6394.58	0.010183	6.4	2300	2300	6.4	0.68	1.7	130.46	357.77
Reach-1	8424.2	5-yr	3100	6394.57	6389.5	6395.34	0.009475	7	3100	3100	7	0.68	1.91	132.87	440.83
Reach-1	8424.2	10-yr	3700	6395	6389.5	6395.85	0.009117	7.4	3700	3700	7.4	0.68	2.05	134.46	498.07
Reach-1	8424.2	25-yr	5000	6395.82	6389.5	6396.87	0.008658	8.2	4999	4999	8.2	0.69	2.33	137.35	609.69
Reach-1	8424.2	50-yr	5800	6396.28	6389.5	6397.44	0.008468	8.6	5797	5797	8.6	0.69	2.49	138.97	673.51
Reach-1	8424.2	100-yr	6600	6396.71	6389.5	6397.98	0.008353	9	6595	6595	9	0.7	2.64	140.49	733.55

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	V.S. Elev (ft)	Min Ch El (ft)	Crit V.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8222.57	2-yr	2300	6388.5	6382.8	6389.07	6389.07	0.007881	6.1	2300	6.1	0.61	146	125.5	379.97
Reach-1	8222.57	5-yr	3100	6389.1	6382.8	6389.82	6389.82	0.007994	6.8	3100	6.8	0.63	174	127.88	456.3
Reach-1	8222.57	10-yr	3700	6389.5	6382.8	6390.33	6390.33	0.008097	7.3	3700	7.3	0.65	194	129.47	508.2
Reach-1	8222.57	25-yr	5000	6390.32	6382.8	6391.35	6391.35	0.008077	8.1	5000	8.1	0.66	228	132.72	615.94
Reach-1	8222.57	50-yr	5800	6390.79	6382.8	6391.93	6391.93	0.008011	8.5	5800	8.5	0.67	246	134.55	678.39
Reach-1	8222.57	100-yr	6600	6391.23	6382.8	6392.48	6392.48	0.007906	8.9	6600	8.9	0.68	26	136.26	738.42
Reach-1	8256.57	2-yr	2300	6388.75	6382.84	6389.35	6389.35	0.008533	6.2	2300	6.2	0.64	156	124.29	369.15
Reach-1	8256.57	5-yr	3100	6389.35	6382.84	6390.11	6390.11	0.008566	7	3100	7	0.66	184	126.76	444.85
Reach-1	8256.57	10-yr	3700	6389.76	6382.84	6390.62	6390.62	0.008627	7.5	3700	7.5	0.67	204	128.41	496.43
Reach-1	8256.57	25-yr	5000	6390.57	6382.84	6391.64	6391.64	0.008572	8.3	5000	8.3	0.68	239	131.75	602.57
Reach-1	8256.57	50-yr	5800	6391.04	6382.84	6392.22	6392.22	0.00852	8.7	5800	8.7	0.69	258	133.64	663.99
Reach-1	8256.57	100-yr	6600	6391.48	6382.84	6392.77	6392.77	0.008467	9.1	6600	9.1	0.7	275	135.44	723.05
Reach-1	8285.57	2-yr	2300	6389.07	6382.92	6389.7	6389.7	0.016796	6.3	2300	6.3	0.66	291	127.8	363.03
Reach-1	8285.57	5-yr	3100	6389.68	6382.92	6390.45	6390.45	0.016385	7	3100	7	0.67	337	130.45	441.34
Reach-1	8285.57	10-yr	3700	6390.09	6382.92	6390.96	6390.96	0.016226	7.5	3700	7.5	0.68	369	132.23	495.08
Reach-1	8285.57	25-yr	5000	6390.91	6382.92	6391.97	6391.97	0.015743	8.3	5000	8.3	0.69	426	135.83	605.42
Reach-1	8285.57	50-yr	5800	6391.38	6382.92	6392.55	6392.55	0.015474	8.7	5800	8.7	0.69	456	137.87	669.5
Reach-1	8285.57	100-yr	6600	6391.83	6382.92	6393.09	6393.09	0.015218	9	6600	9	0.7	482	139.81	731.33
Reach-1	8320.57	2-yr	2300	6389.63	6385.66	6389.49	6390.59	0.031596	7.8	2292	7.9	0.92	439	131.33	295.38
Reach-1	8320.57	5-yr	3100	6390.17	6385.66	6389.96	6391.31	0.028874	8.5	3069	8.6	0.91	49	133.46	366.81
Reach-1	8320.57	10-yr	3700	6390.54	6385.66	6390.29	6391.81	0.027382	8.9	3645	9.1	0.9	49	134.94	416.94
Reach-1	8320.57	25-yr	5000	6391.29	6385.66	6390.98	6392.79	0.024874	9.6	4883	9.9	0.89	576	137.91	519.59
Reach-1	8320.57	50-yr	5800	6391.73	6385.66	6391.34	6393.35	0.023705	10	5638	10.3	0.89	604	139.8	579.52
Reach-1	8320.57	100-yr	6600	6392.14	6385.66	6391.71	6393.88	0.022747	10.4	6388	10.7	0.88	628	141.62	637.37
Reach-1	8324.57	2-yr	2300	6390.5	6384	6390.69	6390.69	0.002441	3.5	2300	3.5	0.28	0.74	133.39	655.2
Reach-1	8324.57	5-yr	3100	6391.15	6384	6391.42	6391.42	0.002992	4.2	3100	4.2	0.31	1.01	135.98	743.58
Reach-1	8324.57	10-yr	3700	6391.6	6384	6391.93	6391.93	0.003338	4.6	3700	4.6	0.34	1.2	137.74	804.73
Reach-1	8324.57	25-yr	5000	6392.48	6384	6392.93	6392.93	0.003947	5.4	5000	5.4	0.37	1.59	141.2	926.9
Reach-1	8324.57	50-yr	5800	6392.97	6384	6393.5	6393.5	0.004248	5.8	5800	5.8	0.39	1.81	143.15	997.16
Reach-1	8324.57	100-yr	6600	6393.44	6384	6394.03	6394.03	0.00451	6.2	6600	6.2	0.4	2.03	144.99	1064.41

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8139.07	2-yr	2300	6384.65	6381	6385.31	0.010194	6385.31	6.5	2300	6.5	0.65	1.98	113.14	355.02
Reach-1	8139.07	5-yr	3100	6385.25	6381	6386.09	0.010631	6386.09	7.3	3095	7.4	0.68	2.38	116.5	423.44
Reach-1	8139.07	10-yr	3700	6385.64	6381	6386.62	0.010933	6386.62	7.9	3690	7.9	0.7	2.68	117.95	469.81
Reach-1	8139.07	25-yr	5000	6386.4	6381	6387.66	0.01151	6387.66	8.9	4973	9	0.74	3.28	120.75	560.43
Reach-1	8139.07	50-yr	5800	6386.82	6381	6388.25	0.011843	6388.25	9.5	5760	9.6	0.76	3.63	122.28	610.98
Reach-1	8139.07	100-yr	6600	6387.21	6381	6388.8	0.012135	6388.8	10	6545	10.2	0.77	3.96	123.71	658.96
Reach-1	8143.07	2-yr	2300	6385.05	6380	6385.36	0.003191	6385.36	4.5	2300	4.5	0.38	0.84	120.9	515.94
Reach-1	8143.07	5-yr	3100	6385.73	6380	6386.15	0.003627	6386.15	5.2	3096	5.2	0.42	1.08	123.75	599.54
Reach-1	8143.07	10-yr	3700	6386.19	6380	6386.69	0.003895	6386.69	5.6	3691	5.7	0.44	1.25	125.43	656.61
Reach-1	8143.07	25-yr	5000	6387.08	6380	6387.75	0.004361	6387.75	6.5	4976	6.6	0.47	1.59	128.65	769.19
Reach-1	8143.07	50-yr	5800	6387.57	6380	6388.34	0.004589	6388.34	7	5764	7.1	0.49	1.79	130.44	833.27
Reach-1	8143.07	100-yr	6600	6388.04	6380	6388.91	0.004783	6388.91	7.4	6550	7.5	0.51	1.97	132.14	894.49
Reach-1	8155.07	2-yr	2300	6385.07	6380	6385.41	0.003689	6385.41	4.7	2300	4.7	0.4	0.96	115.04	487.32
Reach-1	8155.07	5-yr	3100	6385.75	6380	6386.21	0.004159	6386.21	5.5	3097	5.5	0.44	1.21	119.84	567.58
Reach-1	8155.07	10-yr	3700	6386.2	6380	6386.76	0.004446	6386.76	5.9	3693	6	0.47	1.4	121.47	622.6
Reach-1	8155.07	25-yr	5000	6387.08	6380	6387.82	0.004946	6387.82	6.8	4979	6.9	0.5	1.77	124.63	731.05
Reach-1	8155.07	50-yr	5800	6387.58	6380	6388.43	0.005191	6388.43	7.3	5768	7.4	0.52	1.99	126.39	792.7
Reach-1	8155.07	100-yr	6600	6388.04	6380	6388.99	0.005401	6388.99	7.8	6555	7.9	0.54	2.19	128.05	851.53
Reach-1	8175.07	2-yr	2300	6387.37	6385	6387.37	0.028373	6388.49	8.5	2299	8.5	1.01	3.88	123.01	270.93
Reach-1	8175.07	5-yr	3100	6387.87	6385	6387.87	0.026475	6389.22	9.3	3095	9.4	1.01	4.37	124.84	332.72
Reach-1	8175.07	10-yr	3700	6388.2	6385	6388.2	0.025602	6389.73	9.9	3692	9.9	1.01	4.71	126.08	375.17
Reach-1	8175.07	25-yr	5000	6388.89	6385	6388.89	0.023832	6390.73	10.8	4981	10.9	1.01	5.28	128.57	462.02
Reach-1	8175.07	50-yr	5800	6389.28	6385	6389.28	0.022292	6391.3	11.3	5772	11.4	1.01	5.56	129.99	512.34
Reach-1	8175.07	100-yr	6600	6389.64	6385	6389.64	0.022258	6391.84	11.8	6561	11.9	1.02	5.84	131.32	560.06
Reach-1	8193.07	2-yr	2300	6388.14	6384.98	6387.43	0.009183	6388.81	6.5	2293	6.6	0.68	1.64	122.87	353.9
Reach-1	8193.07	5-yr	3100	6388.67	6384.98	6387.94	0.009582	6389.54	7.4	3083	7.5	0.72	1.99	125.11	420.5
Reach-1	8193.07	10-yr	3700	6389.04	6384.98	6388.29	0.009803	6390.05	7.9	3674	8.1	0.74	2.23	126.63	466.41
Reach-1	8193.07	25-yr	5000	6389.75	6384.98	6389	0.010187	6391.05	9	4946	9.2	0.78	2.7	129.58	557.11
Reach-1	8193.07	50-yr	5800	6390.14	6384.98	6389.39	0.010385	6391.62	9.5	5725	9.8	0.8	2.96	131.22	608.43
Reach-1	8193.07	100-yr	6600	6390.51	6384.98	6389.78	0.010538	6392.17	10	6501	10.4	0.82	3.21	132.77	657.6

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lbsq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8079.87	2-yr	2300	6381.13	6376.78		6381.68	0.005421	5.9	2300	5.9	0.53	1.29	99.95	387.56
Reach-1	8079.87	5-yr	3100	6381.99	6376.78		6382.65	0.005289	6.5	3100	6.5	0.54	1.48	104.25	475.4
Reach-1	8079.87	10-yr	3700	6382.68	6376.78		6383.39	0.004894	6.7	3700	6.7	0.53	1.52	107.7	548.62
Reach-1	8079.87	25-yr	5000	6383.8	6376.78		6384.66	0.004872	7.4	5000	7.4	0.54	1.76	113.3	672.34
Reach-1	8079.87	50-yr	5800	6384.45	6376.78		6385.38	0.005452	7.7	5800	7.7	0.57	1.91	130.36	749.93
Reach-1	8079.87	100-yr	6600	6385.16	6376.78		6386.12	0.004794	7.8	6599	7.8	0.55	1.85	132.98	843.48
Reach-1	8086.83	2-yr	2300	6381.35	6375.78		6381.71	0.003397	4.8	2300	4.8	0.39	0.99	99.11	474.32
Reach-1	8086.83	5-yr	3100	6382.21	6375.78		6382.69	0.003718	5.5	3100	5.5	0.42	1.23	103.45	562.25
Reach-1	8086.83	10-yr	3700	6382.89	6375.78		6383.42	0.003722	5.8	3700	5.8	0.42	1.34	106.84	633.51
Reach-1	8086.83	25-yr	5000	6384.02	6375.78		6384.69	0.004036	6.6	5000	6.6	0.45	1.65	112.47	756.87
Reach-1	8086.83	50-yr	5800	6384.67	6375.78		6385.42	0.004738	7	5800	7	0.49	1.85	130.13	833.24
Reach-1	8086.83	100-yr	6600	6385.35	6375.78		6386.15	0.004371	7.1	6599	7.2	0.48	1.85	132.74	923.74
Reach-1	8098.87	2-yr	2300	6381.38	6375.78		6381.78	0.003739	5.1	2300	5.1	0.41	1.09	94.89	453.12
Reach-1	8098.87	5-yr	3100	6382.24	6375.78		6382.76	0.004098	5.8	3100	5.8	0.44	1.35	99.21	537.23
Reach-1	8098.87	10-yr	3700	6382.92	6375.78		6383.5	0.004112	6.1	3700	6.1	0.44	1.48	102.56	605.21
Reach-1	8098.87	25-yr	5000	6384.04	6375.78		6384.78	0.004464	6.9	5000	6.9	0.47	1.81	108.14	723.27
Reach-1	8098.87	50-yr	5800	6384.68	6375.78		6385.51	0.004581	7.3	5800	7.3	0.48	1.98	111.36	794.22
Reach-1	8098.87	100-yr	6600	6385.35	6375.78		6386.25	0.004487	7.6	6600	7.6	0.49	2.06	114.72	869.79
Reach-1	8114.07	2-yr	2300	6382.97	6380.1	6382.97	6384.31	0.026982	9.3	2300	9.3	1	4.43	92.73	247.21
Reach-1	8114.07	5-yr	3100	6383.58	6380.1	6383.58	6385.19	0.025491	10.2	3100	10.2	1	5	95.48	304.6
Reach-1	8114.07	10-yr	3700	6384	6380.1	6384	6385.78	0.024609	10.7	3700	10.7	1	5.35	97.38	345.24
Reach-1	8114.07	25-yr	5000	6384.82	6380.1	6384.82	6386.95	0.02335	11.7	5000	11.7	1	6.04	101.1	426.99
Reach-1	8114.07	50-yr	5800	6385.28	6380.1	6385.28	6387.61	0.022801	12.2	5800	12.2	1.01	6.39	103.27	473.77
Reach-1	8114.07	100-yr	6600	6385.72	6380.1	6385.72	6388.23	0.022054	12.7	6599	12.7	1.01	6.62	105.69	519.84
Reach-1	8117.07	2-yr	2300	6383.7	6381	6383.7	6384.9	0.028119	8.8	2300	8.8	1.01	4.12	110.67	261.53
Reach-1	8117.07	5-yr	3100	6384.25	6381	6384.25	6385.68	0.026329	9.6	3100	9.6	1.01	4.62	113.83	322.86
Reach-1	8117.07	10-yr	3700	6384.63	6381	6384.63	6386.21	0.025194	10.1	3700	10.1	1	4.92	116.03	366.74
Reach-1	8117.07	25-yr	5000	6385.36	6381	6385.36	6387.25	0.023343	11	4997	11	1.02	5.25	124.82	455.06
Reach-1	8117.07	50-yr	5800	6385.76	6381	6385.76	6387.84	0.022707	11.5	5789	11.5	1.02	5.59	126.34	505.22
Reach-1	8117.07	100-yr	6600	6386.16	6381	6386.16	6388.39	0.021902	11.9	6577	11.9	1.01	5.86	127.84	555.54

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7868.73	2-yr	2300	6378.69	6375.8	6378.64	6379.3	6380.91	9.3	2300	9.3	1	3.59	92.79	247.2
Reach-1	7868.73	5-yr	3100	6379.3	6375.8	6379.79	6381.6	0.02066	10.2	3100	10.2	1.01	4.04	95.9	304.88
Reach-1	7868.73	10-yr	3800	6379.79	6375.8	6379.79	6381.6	0.019892	10.8	3800	10.8	1.01	4.38	98.37	352.21
Reach-1	7868.73	25-yr	5100	6380.76	6375.8	6380.76	6382.73	0.019342	11.3	5100	11.3	1.01	4.64	115.74	452.45
Reach-1	7868.73	50-yr	5900	6381.17	6375.8	6381.17	6383.33	0.018832	11.8	5900	11.8	1.01	4.93	117.29	500.76
Reach-1	7868.73	100-yr	6800	6381.61	6375.8	6381.61	6383.96	0.018369	12.3	6800	12.3	1.01	5.23	118.93	552.83
Reach-1	7883.17	2-yr	2300	6379.47	6375.8	6378.64	6380.23	0.009152	7	2300	7	0.67	1.88	99.04	329.69
Reach-1	7883.17	5-yr	3100	6380.17	6375.8	6379.24	6381.1	0.009134	7.7	3100	7.7	0.69	2.19	102.66	400.61
Reach-1	7883.17	10-yr	3800	6380.81	6375.8	6379.72	6381.81	0.00937	8	3800	8	0.71	2.31	117.98	473.45
Reach-1	7883.17	25-yr	5100	6381.74	6375.8	6380.64	6382.93	0.008566	8.7	5096	8.7	0.7	2.51	122.63	586.18
Reach-1	7883.17	50-yr	5900	6382.21	6375.8	6381.06	6383.53	0.008477	9.2	5892	9.2	0.71	2.68	124.24	643.44
Reach-1	7883.17	100-yr	6800	6382.7	6375.8	6381.49	6384.17	0.008416	9.7	6784	9.7	0.73	2.87	125.9	704.45
Reach-1	7906.07	2-yr	2300	6379.88	6375.94	6380.45	6380.45	0.006207	6	2300	6	0.56	1.37	106.38	380.76
Reach-1	7906.07	5-yr	3100	6380.67	6375.94	6381.34	6381.34	0.006466	6.5	3099	6.6	0.59	1.53	123.02	473.79
Reach-1	7906.07	10-yr	3800	6381.29	6375.94	6382.04	6382.04	0.005953	6.9	3796	6.9	0.58	1.61	125.06	550.72
Reach-1	7906.07	25-yr	5100	6382.23	6375.94	6383.15	6383.15	0.005735	7.6	5084	7.7	0.59	1.83	128.12	668.84
Reach-1	7906.07	50-yr	5900	6382.71	6375.94	6383.75	6383.75	0.005765	8.1	5874	8.2	0.61	1.98	129.72	731.66
Reach-1	7906.07	100-yr	6800	6383.23	6375.94	6384.39	6384.39	0.005791	8.5	6760	8.7	0.62	2.14	131.41	799.05
Reach-1	8051.07	Bridge													
Reach-1	8056.07	2-yr	2300	6381.04	6376.69	6379.48	6381.54	0.004845	5.6	2300	5.6	0.5	1.16	104.58	408.07
Reach-1	8056.07	5-yr	3100	6381.92	6376.69	6380.08	6382.51	0.0047	6.2	3100	6.2	0.51	1.33	108.95	501.18
Reach-1	8056.07	10-yr	3800	6382.59	6376.69	6380.55	6383.26	0.004652	6.6	3800	6.6	0.51	1.46	112.3	575.34
Reach-1	8056.07	25-yr	5100	6383.73	6376.69	6381.35	6384.52	0.005044	7.2	5100	7.2	0.54	1.67	131.13	711.74
Reach-1	8056.07	50-yr	5900	6384.39	6376.69	6381.79	6385.24	0.004605	7.4	5899	7.4	0.53	1.69	132.72	799.08
Reach-1	8056.07	100-yr	6800	6385.09	6376.69	6382.27	6385.99	0.004262	7.6	6797	7.6	0.52	1.71	134.42	892.34
Reach-1	8076.07	2-yr	2300	6381.12	6376.78	6381.65	6381.65	0.005312	5.9	2300	5.9	0.53	1.26	101.15	391.76
Reach-1	8076.07	5-yr	3100	6381.98	6376.78	6382.63	6382.63	0.005169	6.4	3100	6.4	0.53	1.44	105.46	480.89
Reach-1	8076.07	10-yr	3700	6382.67	6376.78	6383.36	6383.36	0.004774	6.7	3700	6.7	0.52	1.49	108.93	555.16
Reach-1	8076.07	25-yr	5000	6383.8	6376.78	6384.63	6384.63	0.004741	7.3	5000	7.3	0.53	1.72	114.54	680.75
Reach-1	8076.07	50-yr	5800	6384.45	6376.78	6385.35	6385.35	0.005168	7.6	5800	7.6	0.56	1.83	131.4	763.18
Reach-1	8076.07	100-yr	6600	6385.16	6376.78	6386.09	6386.09	0.004563	7.7	6598	7.7	0.54	1.78	133.92	857.62

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7751.07	2-yr	2300	6376.27	6371.8		6376.91	0.002763	6.4	2300	6.4	0.57	0.67	90.1	357.48
Reach-1	7751.07	5-yr	3100	6377.03	6371.8		6377.85	0.002906	7.2	3100	7.2	0.6	0.81	93.55	428.01
Reach-1	7751.07	10-yr	3800	6377.64	6371.8		6378.59	0.002997	7.8	3800	7.8	0.62	0.92	96.26	485.05
Reach-1	7751.07	25-yr	5100	6378.65	6371.8		6379.83	0.003061	8.7	5100	8.7	0.64	1.08	100.08	584.58
Reach-1	7751.07	50-yr	5900	6379.21	6371.8		6380.52	0.003063	9.2	5900	9.2	0.64	1.17	101.26	641.01
Reach-1	7751.07	100-yr	6800	6379.81	6371.8		6381.27	0.003056	9.7	6800	9.7	0.65	1.25	102.53	702.15
Reach-1	7823.07	2-yr	2300	6376.34	6372.3		6377.4	0.01683	8.2	2300	8.2	0.77	2.55	78.09	279.52
Reach-1	7823.07	5-yr	3100	6377.06	6372.3		6378.38	0.012089	9.2	3100	9.2	0.8	3.05	81.27	336.64
Reach-1	7823.07	10-yr	3800	6377.62	6372.3		6379.15	0.012361	9.9	3800	9.9	0.82	3.43	83.74	382.72
Reach-1	7823.07	25-yr	5100	6378.55	6372.3		6380.44	0.01268	11	5100	11	0.85	4.04	87.85	462.53
Reach-1	7823.07	50-yr	5900	6379.06	6372.3	6378.46	6381.16	0.012856	11.6	5900	11.6	0.86	4.38	90.13	508.19
Reach-1	7823.07	100-yr	6800	6379.62	6372.3		6381.92	0.012923	12.2	6800	12.2	0.87	4.71	92.58	558.87
Reach-1	7831.07	2-yr	2300	6376.41	6372.3		6377.5	0.012136	8.4	2300	8.4	0.78	2.64	77.13	274.77
Reach-1	7831.07	5-yr	3100	6377.12	6372.3		6378.49	0.012635	9.4	3100	9.4	0.82	3.16	80.7	330.95
Reach-1	7831.07	10-yr	3800	6377.68	6372.3		6379.26	0.012913	10.1	3800	10.1	0.84	3.55	83.49	376.89
Reach-1	7831.07	25-yr	5100	6378.62	6372.3		6380.55	0.013179	11.2	5100	11.2	0.86	4.15	88.18	457.28
Reach-1	7831.07	50-yr	5900	6379.13	6372.3		6381.27	0.013322	11.7	5900	11.7	0.88	4.48	90.76	503.5
Reach-1	7831.07	100-yr	6800	6379.69	6372.3		6382.03	0.013342	12.3	6800	12.3	0.89	4.8	93.56	555.02
Reach-1	7835.07	2-yr	2300	6377.03	6371.3		6377.58	0.004268	6	2300	6	0.48	1.23	81.61	385.52
Reach-1	7835.07	5-yr	3100	6377.86	6371.3		6378.58	0.004779	6.8	3100	6.8	0.52	1.54	85.76	455.11
Reach-1	7835.07	10-yr	3800	6378.51	6371.3		6379.36	0.005113	7.4	3800	7.4	0.55	1.78	89	511.82
Reach-1	7835.07	25-yr	5100	6379.58	6371.3		6380.67	0.005554	8.4	5100	8.4	0.58	2.17	94.37	610.4
Reach-1	7835.07	50-yr	5900	6380.18	6371.3		6381.39	0.005761	8.8	5900	8.8	0.6	2.38	97.34	667.45
Reach-1	7835.07	100-yr	6800	6380.82	6371.3		6382.16	0.006907	9.3	6800	9.3	0.65	2.69	113.71	731.7
Reach-1	7850.74	2-yr	2300	6377.14	6371.3		6377.65	0.003832	5.7	2300	5.7	0.46	1.12	83.41	401.67
Reach-1	7850.74	5-yr	3100	6377.99	6371.3		6378.65	0.004275	6.5	3100	6.5	0.49	1.4	87.68	474.77
Reach-1	7850.74	10-yr	3800	6378.66	6371.3		6379.45	0.004556	7.1	3800	7.1	0.52	1.62	91.03	534.58
Reach-1	7850.74	25-yr	5100	6379.77	6371.3		6380.76	0.004934	8	5100	8	0.55	1.97	96.56	638.27
Reach-1	7850.74	50-yr	5900	6380.38	6371.3		6381.49	0.005112	8.4	5900	8.4	0.56	2.16	99.62	698.23
Reach-1	7850.74	100-yr	6800	6381.08	6371.3		6382.28	0.005828	8.8	6800	8.8	0.6	2.36	115.51	775.08

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Future Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lb/sq ft)	(ft)	(sq ft)
Reach-1	7477.57	Reach-1	2300	6370.17	6364.67	6370.17	6370.17	6372.09	11	2299	11.1	1.05	1.86	60.1	208.2
Reach-1	7477.57	Reach-1	3100	6371.15	6364.67	6371.15	6373.31	0.007605	11.1	3071	11.9	1.16	1.45	87.55	279.46
Reach-1	7477.57	Reach-1	3800	6371.91	6364.67	6371.91	6374.21	0.006763	10.8	3698	12.3	1.13	1.46	97.44	351.97
Reach-1	7477.57	Reach-1	5100	6372.99	6364.67	6372.99	6375.66	0.006386	11.1	4822	13.5	1.09	1.71	102.25	459.57
Reach-1	7477.57	Reach-1	5900	6373.56	6364.67	6373.56	6376.47	0.006313	11.4	5499	14.2	1.09	1.86	104.8	518.67
Reach-1	7477.57	Reach-1	6800	6374.16	6364.67	6374.16	6377.32	0.00623	11.7	6247	14.8	1.08	2.01	107.51	582.99
Reach-1	7515.07	Reach-1	2300	6370.67	6365.27	6370.67	6372.67	0.008691	11.3	2298	11.4	1.05	1.89	55.72	204.18
Reach-1	7515.07	Reach-1	3100	6371.71	6365.27	6371.71	6373.97	0.007266	11.3	3073	12.1	1.12	1.37	87.38	274.7
Reach-1	7515.07	Reach-1	3800	6372.51	6365.27	6372.51	6374.9	0.006462	10.8	3691	12.6	1.15	1.4	96.78	350.3
Reach-1	7515.07	Reach-1	5100	6373.63	6365.27	6373.63	6376.4	0.00612	11.1	4793	13.7	1.1	1.67	101.48	461.43
Reach-1	7515.07	Reach-1	5900	6374.27	6365.27	6374.27	6377.23	0.005934	11.2	5449	14.3	1.08	1.79	104.13	526.64
Reach-1	7515.07	Reach-1	6800	6374.87	6365.27	6374.87	6378.1	0.005941	11.5	6183	15.1	1.08	1.96	106.66	590.14
Reach-1	7574.07	Reach-1	2300	6373.16	6366.71	6372.4	6374.35	0.004576	7.9	2264	8.8	0.94	0.74	108.31	290.19
Reach-1	7574.07	Reach-1	3100	6374.05	6366.71	6373.38	6375.42	0.004245	8	2960	9.6	0.89	0.89	112.89	388.91
Reach-1	7574.07	Reach-1	3800	6374.69	6366.71	6374.02	6376.22	0.00421	8.2	3551	10.3	0.88	1.01	116.12	461.21
Reach-1	7574.07	Reach-1	5100	6375.71	6366.71	6374.97	6377.55	0.004209	8.8	4621	11.4	0.88	1.22	121.36	582.5
Reach-1	7574.07	Reach-1	5900	6376.27	6366.71	6375.52	6378.29	0.004217	9.1	5265	12	0.88	1.34	124.27	651.82
Reach-1	7574.07	Reach-1	6800	6376.88	6366.71	6376.05	6379.08	0.004191	9.3	5976	12.6	0.88	1.45	127.25	728.7
Reach-1	7660.07	Reach-1	2300	6374.3	6369.58	6374.3	6375.93	0.00901	10.1	2297	10.2	1.11	1.45	86.33	228.4
Reach-1	7660.07	Reach-1	3100	6375.1	6369.58	6375.1	6376.95	0.007807	10.2	3057	11	1.1	1.46	98.93	304.19
Reach-1	7660.07	Reach-1	3800	6375.69	6369.58	6375.69	6377.74	0.007326	10.4	3703	11.6	1.08	1.56	103.53	364
Reach-1	7660.07	Reach-1	5100	6376.61	6369.58	6376.61	6379.05	0.007009	11.1	4874	12.8	1.07	1.82	107.86	461.08
Reach-1	7660.07	Reach-1	5900	6377.13	6369.58	6377.13	6379.79	0.006841	11.4	5583	13.4	1.06	1.94	110.25	517.95
Reach-1	7660.07	Reach-1	6800	6377.69	6369.58	6377.69	6380.57	0.006639	11.7	6369	14	1.06	2.07	112.66	580.98
Reach-1	7665.07	Reach-1	2300	6375.03	6370.48	6375.03	6376.44	0.009009	9.3	2289	9.6	1.05	1.41	96.83	248.13
Reach-1	7665.07	Reach-1	3100	6375.66	6370.48	6375.66	6377.36	0.008465	10	3063	10.5	1.06	1.58	102.07	310.64
Reach-1	7665.07	Reach-1	3800	6376.16	6370.48	6376.16	6378.09	0.008093	10.5	3730	11.2	1.06	1.71	104.87	362.86
Reach-1	7665.07	Reach-1	5100	6377.02	6370.48	6377.02	6379.32	0.007581	11.2	4952	12.3	1.05	1.92	109.29	454.35
Reach-1	7665.07	Reach-1	5900	6377.52	6370.48	6377.52	6380.02	0.007252	11.6	5694	12.9	1.04	2.02	111.49	509.98
Reach-1	7665.07	Reach-1	6800	6378.03	6370.48	6378.03	6380.76	0.007069	12	6525	13.5	1.05	2.15	113.67	567.31

Cottonwood Creek Bridget Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. US. (ft)	Open Area (sq ft)	Open V. (ft/s)	Q Weir (cfs)	Delta EG (ft)
Reach-1	7560.57	2-yr	2200	6373	1716.67	10.53		1.69
Reach-1	7560.57	5-yr	3300	6374.26	1716.67	9.89		1.41
Reach-1	7560.57	10-yr	3500	6374.42	1716.67	9.72		1.37
Reach-1	7560.57	25-yr	4800	6375.51	1716.67	10.25		1.2
Reach-1	7560.57	50-yr	5500	6376.02	1716.67	10.47		1.12
Reach-1	7560.57	100-yr	6400	6376.61	1716.67	10.61		1.02
Reach-1	8051.07	2-yr	2200	6380.93	1321.44	8.05		1.07
Reach-1	8051.07	5-yr	3300	6382.12	1321.44	9.29		1.17
Reach-1	8051.07	10-yr	3500	6382.31	1321.44	9.53		1.19
Reach-1	8051.07	25-yr	4800	6383.47	1321.44	10.89		1.34
Reach-1	8051.07	50-yr	5500	6384.06	1321.44	11.57		1.43
Reach-1	8051.07	100-yr	6400	6384.78	1321.44	12.4		1.55

Reach	River Sta	Profile	Q Total (cfs)	E.G. US. (ft)	W.S. US. (ft)	E.G. IC (ft)	E.G. OC (ft)	Min El Weir Flow (ft)	Q Culv Group (cfs)	Q Weir (cfs)	Delta WS (ft)	Culv Vel US (ft/s)	Culv Vel DS (ft/s)
Reach-1	13763	Culvert #1	2100	6503.81	6503.52	6502.9	6503.81	6505.49	2100		6.33	9.3	17.86
Reach-1	13763	Culvert #1	2800	6504.89	6504.57	6503.84	6504.89	6505.49	2800		6.84	10.24	19.17
Reach-1	13763	Culvert #1	3300	6505.6	6505.25	6504.47	6505.6	6505.49	3299.84	0.16	7.17	10.81	19.92
Reach-1	13763	Culvert #1	4400	6506.99	6506.57	6505.73	6506.99	6505.49	4345.51	54.49	7.8	11.85	21.19
Reach-1	13763	Culvert #1	5100	6507.4	6506.88	6506.44	6507.4	6505.49	4667.77	85.63	7.69	12.14	21.53
Reach-1	13763	Culvert #1	5900	6507.4	6506.66	6507.4	6507.4	6505.49	4659.38	85.59	7	12.16	9.24

Cottonwood Creek Culvert Results - Union Boulevard to Academy Boulevard - Existing Conditions

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit W.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lb/sq ft]	Top Width [ft]	Area [sq ft]
Reach-1	13989	2-yr	2100	6503.69	6500	6502.53	6504.17	0.002339	5.6	2100	5.6	0.55	0.46	118.15	377.01
Reach-1	13989	5-yr	2800	6504.66	6500	6503.02	6505.17	0.001721	5.7	2798	5.7	0.5	0.42	124.31	495.5
Reach-1	13989	10-yr	3300	6505.33	6500	6503.38	6505.85	0.001464	5.7	3295	5.8	0.48	0.41	128.21	579.03
Reach-1	13989	25-yr	4400	6506.63	6500	6504.02	6507.2	0.001172	5.9	4380	6.1	0.45	0.4	135.9	750.68
Reach-1	13989	50-yr	5100	6506.94	6500	6504.38	6507.63	0.001332	6.4	5073	6.7	0.49	0.47	137.77	793.64
Reach-1	13989	100-yr	5900	6506.78	6500	6504.8	6507.75	0.001942	7.6	5872	7.9	0.59	0.67	136.8	771.32
Reach-1	14287	2-yr	2100	6504.47	6502	6504.35	6505.46	0.007282	8	2100	8	0.93	1.04	114.75	263.63
Reach-1	14287	5-yr	2800	6505.12	6502	6504.82	6506.2	0.005731	8.2	2797	8.3	0.87	1.01	119.14	339.75
Reach-1	14287	10-yr	3300	6505.65	6502	6505.14	6506.73	0.004616	8.2	3293	8.3	0.81	0.94	122.73	404.05
Reach-1	14287	25-yr	4400	6506.81	6502	6505.78	6507.89	0.003163	8	4377	8.3	0.71	0.82	130.58	551.3
Reach-1	14287	50-yr	5100	6507.14	6502	6506.16	6508.4	0.00338	8.6	5069	9	0.75	0.93	132.81	594.9
Reach-1	14287	100-yr	5900	6507.12	6502	6506.58	6508.82	0.00459	10	5864	10.5	0.87	1.26	132.66	591.98
Reach-1	14677	2-yr	2100	6506.9	6504	6506.36	6507.61	0.004207	6.7	2099	6.8	0.73	0.69	119.11	313.68
Reach-1	14677	5-yr	2800	6507.29	6504	6506.85	6508.25	0.004846	7.8	2796	7.9	0.81	0.89	121.62	359.71
Reach-1	14677	10-yr	3300	6507.51	6504	6507.15	6508.68	0.005317	8.5	3294	8.7	0.86	1.04	123.13	387.79
Reach-1	14677	25-yr	4400	6508.11	6504	6507.79	6509.6	0.005475	9.5	4385	9.8	0.91	1.23	126.99	462.42
Reach-1	14677	50-yr	5100	6508.5	6504	6508.18	6510.16	0.005367	10	5077	10.3	0.91	1.31	129.4	512.5
Reach-1	14677	100-yr	5900	6508.94	6504	6508.58	6510.76	0.005217	10.4	5866	10.9	0.92	1.39	131.98	569.37

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	13483	2-yr	2100	6490.47	6488	6490.47	6491.61	0.008724	8.6	2100	8.6	1.01	1.21	110.19	245.24
Reach-1	13483	5-yr	2800	6490.95	6488	6490.95	6492.33	0.008163	9.3	2797	9.4	1.03	1.33	113.67	299.51
Reach-1	13483	10-yr	3300	6491.27	6488	6491.27	6492.81	0.007865	9.8	3294	10	1.03	1.41	115.95	336.29
Reach-1	13483	25-yr	4500	6491.98	6488	6491.98	6493.86	0.007325	10.7	4480	11	1.04	1.57	121.11	420.18
Reach-1	13483	50-yr	5200	6492.37	6488	6492.37	6494.43	0.007014	11.1	5169	11.5	1.05	1.63	125.24	469.1
Reach-1	13483	100-yr	6000	6492.8	6488	6492.8	6495.04	0.006734	11.5	5952	12.1	1.05	1.7	128.22	523.17
Reach-1	13661	2-yr	2100	6491.81	6488	6491.67	6492.98	0.006749	7.6	2033	8.8	0.98	1.03	111.92	274.89
Reach-1	13661	5-yr	2800	6492.24	6488	6492.24	6493.79	0.007476	8.7	2693	10.2	1.05	1.31	114.31	323.41
Reach-1	13661	10-yr	3300	6492.59	6488	6492.59	6494.33	0.007384	9.1	3158	10.8	1.06	1.43	116.06	363.46
Reach-1	13661	25-yr	4500	6493.41	6488	6493.41	6495.51	0.006844	9.8	4265	11.9	1.05	1.62	120.1	461.17
Reach-1	13661	50-yr	5200	6493.84	6488	6493.84	6496.15	0.006677	10.1	4907	12.5	1.05	1.73	122.01	513.37
Reach-1	13661	100-yr	6000	6494.29	6488	6494.29	6496.84	0.006616	10.6	5638	13.2	1.06	1.86	123.99	567.96
Reach-1	13700	2-yr	2100	6497.2	6494.63	6497.2	6498.44	0.002519	8.9	2100	9	1.02	0.37	98.11	235.17
Reach-1	13700	5-yr	2800	6497.73	6494.63	6497.73	6499.22	0.002349	9.7	2798	9.8	1.04	0.39	106.03	289.98
Reach-1	13700	10-yr	3300	6498.08	6494.63	6498.08	6499.74	0.002254	10.1	3296	10.3	1.05	0.41	109.65	327.6
Reach-1	13700	25-yr	4400	6498.78	6494.63	6498.78	6500.78	0.002124	10.9	4386	11.4	1.06	0.46	113.85	405.36
Reach-1	13700	50-yr	5100	6499.19	6494.63	6499.19	6501.4	0.002055	11.3	5077	11.9	1.06	0.49	115.94	452.88
Reach-1	13700	100-yr	5900	6499.66	6494.63	6499.66	6502.06	0.001962	11.6	5865	12.5	1.06	0.51	118.31	507.84
Reach-1	13763														
Reach-1	13826	2-yr	2100	6503.52	6498.7	6501.29	6503.8	0.000246	4	2094	4.2	0.37	0.06	131.09	521.59
Reach-1	13826	5-yr	2800	6504.57	6498.7	6501.77	6504.89	0.000217	4.2	2786	4.5	0.37	0.06	138.32	662.46
Reach-1	13826	10-yr	3300	6505.25	6498.7	6502.08	6505.6	0.000203	4.3	3279	4.8	0.36	0.07	142.8	758.75
Reach-1	13826	25-yr	4400	6506.57	6498.7	6502.72	6506.99	0.000189	4.6	4359	5.2	0.37	0.07	154.69	955.19
Reach-1	13826	50-yr	5100	6506.88	6498.7	6503.1	6507.4	0.000222	5.1	5049	5.8	0.4	0.09	157.48	1002.75
Reach-1	13826	100-yr	5900	6506.66	6498.7	6503.53	6507.4	0.000327	6.1	5844	6.9	0.49	0.13	155.48	968.59
Reach-1	13865	2-yr	2100	6503.39	6499.43	6502.26	6503.88	0.002233	5.5	2095	5.6	0.56	0.43	124.3	382.84
Reach-1	13865	5-yr	2800	6504.46	6499.43	6502.77	6504.96	0.001569	5.4	2782	5.7	0.5	0.38	132.79	520.82
Reach-1	13865	10-yr	3300	6505.16	6499.43	6503.07	6505.67	0.001335	5.4	3269	5.8	0.48	0.37	137.61	614.64
Reach-1	13865	25-yr	4400	6506.49	6499.43	6503.71	6507.05	0.001087	5.5	4334	6.1	0.45	0.37	147.54	803.97
Reach-1	13865	50-yr	5100	6506.78	6499.43	6504.09	6507.47	0.00126	6	5018	6.7	0.49	0.44	150.16	846.92
Reach-1	13865	100-yr	5900	6506.5	6499.43	6504.51	6507.51	0.001948	7.3	5811	8.1	0.61	0.66	147.61	804.98

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total	W.S. Elev	Min Ch El	Crit W.S.	E.G. Elev	E.G. Slope	Vel Total	Q Channel	Vel Chnl	Froude # XS	Shear Total	Top Width	Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(cfs)	(ft/s)		(lbs/sq ft)	(ft)	(sq ft)
Reach-1	13015	2-yr	2100	6479.23	6476	6479.12	6480.24	0.00771	8	2100	8	0.94	1.09	114.88	261.21
Reach-1	13015	5-yr	2800	6479.69	6476	6479.62	6480.92	0.007842	8.9	2800	8.9	0.97	1.27	120.41	314.3
Reach-1	13015	10-yr	3300	6479.99	6476	6479.93	6481.36	0.00766	9.4	3299	9.4	0.99	1.35	124.1	351.01
Reach-1	13015	25-yr	4500	6480.6	6476	6480.59	6482.33	0.007487	10.5	4493	10.6	1.02	1.55	128.78	428.62
Reach-1	13015	50-yr	5200	6480.95	6476	6480.95	6482.86	0.007282	11	5185	11.1	1.03	1.63	131.33	473.77
Reach-1	13015	100-yr	6000	6481.33	6476	6481.33	6483.43	0.007018	11.4	5973	11.6	1.03	1.7	134.19	525.31
Reach-1	13134	2-yr	2100	6480.49	6477.09	6480.49	6481.66	0.008576	8.4	2086	8.7	1.02	1.19	111.48	249.63
Reach-1	13134	5-yr	2800	6480.97	6477.09	6480.97	6482.4	0.008202	9.2	2774	9.6	1.03	1.36	113.18	303.6
Reach-1	13134	10-yr	3300	6481.3	6477.09	6481.3	6482.88	0.007896	9.7	3264	10.1	1.03	1.45	114.39	340.99
Reach-1	13134	25-yr	4500	6482.03	6477.09	6482.03	6483.96	0.00737	10.6	4437	11.2	1.03	1.63	117.53	424.85
Reach-1	13134	50-yr	5200	6482.43	6477.09	6482.43	6484.54	0.007058	11	5119	11.7	1.03	1.71	119.42	472.81
Reach-1	13134	100-yr	6000	6482.85	6477.09	6482.85	6485.17	0.006872	11.5	5895	12.3	1.04	1.81	121.33	523.24
Reach-1	13185	2-yr	2100	6484.37	6481.81	6484.37	6485.49	0.008875	8.4	2100	8.5	1.01	1.19	114.73	248.62
Reach-1	13185	5-yr	2800	6484.84	6481.81	6484.84	6486.19	0.008341	9.3	2798	9.3	1.02	1.33	117.51	302.66
Reach-1	13185	10-yr	3300	6485.15	6481.81	6485.15	6486.65	0.007987	9.7	3295	9.8	1.03	1.41	119.39	339.96
Reach-1	13185	25-yr	4500	6485.84	6481.81	6485.84	6487.67	0.007428	10.6	4486	10.9	1.03	1.57	123.62	423.48
Reach-1	13185	50-yr	5200	6486.21	6481.81	6486.21	6488.22	0.007171	11.1	5177	11.4	1.04	1.66	125.67	470
Reach-1	13185	100-yr	6000	6486.62	6481.81	6486.62	6488.82	0.006899	11.5	5965	11.9	1.04	1.74	127.65	522.08
Reach-1	13394	2-yr	2100	6486.73	6484	6486.73	6487.85	0.008894	8.4	2097	8.5	1.02	1.19	115.08	249.23
Reach-1	13394	5-yr	2800	6487.2	6484	6487.2	6488.56	0.008352	9.2	2793	9.4	1.02	1.34	116.79	303.63
Reach-1	13394	10-yr	3300	6487.51	6484	6487.51	6489.03	0.008021	9.7	3289	9.9	1.02	1.43	117.85	340.59
Reach-1	13394	25-yr	4500	6488.21	6484	6488.21	6490.06	0.007454	10.6	4477	10.9	1.02	1.61	120.1	423.09
Reach-1	13394	50-yr	5200	6488.59	6484	6488.59	6490.61	0.00715	11.1	5169	11.4	1.02	1.69	121.62	469.59
Reach-1	13394	100-yr	6000	6488.99	6484	6488.99	6491.22	0.006976	11.6	5958	12	1.03	1.8	123.18	518.24
Reach-1	13425	2-yr	2100	6489.45	6486.24	6489.45	6490.66	0.008655	8.7	2098	8.8	1.03	1.22	106.39	240.68
Reach-1	13425	5-yr	2800	6489.97	6486.24	6489.97	6491.41	0.007975	9.4	2792	9.6	1.04	1.33	110.98	296.98
Reach-1	13425	10-yr	3300	6490.3	6486.24	6490.3	6491.91	0.007702	9.9	3285	10.2	1.04	1.41	113.14	334.22
Reach-1	13425	25-yr	4500	6491.04	6486.24	6491.04	6493	0.007154	10.7	4462	11.3	1.05	1.58	117.5	419.69
Reach-1	13425	50-yr	5200	6491.44	6486.24	6491.44	6493.59	0.006938	11.1	5145	11.8	1.05	1.67	119.83	466.62
Reach-1	13425	100-yr	6000	6491.89	6486.24	6491.89	6494.22	0.006631	11.5	5922	12.3	1.05	1.74	122.48	521.23

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	12504	2-yr	2100	6469.21	6465.63	6465.63	6470.19	0.005434	7.9	2100	7.9	0.83	0.96	93.32	265.66
Reach-1	12504	5-yr	2800	6469.61	6465.63	6469.39	6470.95	0.00647	9.2	2799	9.3	0.92	1.25	96.79	303.12
Reach-1	12504	10-yr	3300	6469.87	6465.63	6469.76	6471.46	0.00703	10	3297	10.1	0.98	1.44	99.12	328.99
Reach-1	12504	25-yr	4500	6470.66	6465.63	6470.66	6472.56	0.006524	10.3	4455	11.1	1.13	1.2	147.5	437.99
Reach-1	12504	50-yr	5200	6471.08	6465.63	6471.08	6473.13	0.006214	10.4	5105	11.6	1.1	1.29	148.63	501.11
Reach-1	12504	100-yr	6000	6471.52	6465.63	6471.52	6473.73	0.006018	10.6	5839	12.1	1.08	1.4	149.8	566.47
Reach-1	12689	2-yr	2100	6470.19	6466	6466	6470.88	0.002535	6.4	2060	6.7	0.63	0.54	96.06	329.94
Reach-1	12689	5-yr	2800	6470.83	6466	6466	6471.73	0.002697	7.1	2727	7.7	0.68	0.63	103.26	394.55
Reach-1	12689	10-yr	3300	6471.26	6466	6466	6472.29	0.002776	7.5	3198	8.2	0.72	0.69	109.32	439.6
Reach-1	12689	25-yr	4500	6472.01	6466	6466	6473.43	0.003209	8.5	4323	9.7	0.84	0.79	131.8	529.1
Reach-1	12689	50-yr	5200	6472.35	6466	6466	6474.01	0.003504	9.1	4964	10.5	0.88	0.93	133.37	574.16
Reach-1	12689	100-yr	6000	6472.68	6466	6466	6474.63	0.003864	9.7	5691	11.5	0.92	1.09	134.91	619.02
Reach-1	12725	2-yr	2100	6472.4	6469.3	6472.4	6473.53	0.008655	8.4	2097	8.5	1.04	1.13	119.44	249.4
Reach-1	12725	5-yr	2800	6472.9	6469.3	6472.9	6474.24	0.007877	9	2784	9.3	1.04	1.21	125.55	310.59
Reach-1	12725	10-yr	3300	6473.21	6469.3	6473.21	6474.7	0.007639	9.4	3269	9.8	1.04	1.29	128.53	349.91
Reach-1	12725	25-yr	4500	6473.92	6469.3	6473.92	6475.7	0.007001	10.1	4416	10.8	1.04	1.43	135.12	443.37
Reach-1	12725	50-yr	5200	6474.31	6469.3	6474.31	6476.23	0.006684	10.5	5074	11.2	1.03	1.5	137.59	496.2
Reach-1	12725	100-yr	6000	6474.69	6469.3	6474.69	6476.81	0.006551	10.9	5821	11.8	1.04	1.6	139.83	549.84
Reach-1	12856	2-yr	2100	6473.37	6470	6473.16	6474.46	0.005956	7.9	2012	8.5	0.94	0.91	107.11	264.18
Reach-1	12856	5-yr	2800	6473.76	6470	6473.72	6475.24	0.006882	9.1	2654	9.9	1.04	1.17	112.77	307.39
Reach-1	12856	10-yr	3300	6474.11	6470	6474.11	6475.75	0.006783	9.5	3097	10.5	1.05	1.26	116.61	347.21
Reach-1	12856	25-yr	4500	6474.9	6470	6474.9	6476.86	0.00638	10.2	4129	11.6	1.04	1.44	120.83	440.73
Reach-1	12856	50-yr	5200	6475.29	6470	6475.29	6477.46	0.006309	10.6	4725	12.2	1.04	1.56	122.93	489.23
Reach-1	12856	100-yr	6000	6475.74	6470	6475.74	6478.1	0.006185	11	5397	12.8	1.04	1.66	125.27	544.07
Reach-1	12919	2-yr	2100	6478.32	6474.87	6478.32	6479.43	0.008804	8.5	2098	8.5	1.01	1.19	114.41	248.27
Reach-1	12919	5-yr	2800	6478.78	6474.87	6478.78	6480.13	0.008253	9.3	2793	9.3	1.02	1.32	117.42	302.6
Reach-1	12919	10-yr	3300	6479.1	6474.87	6479.1	6480.6	0.007933	9.7	3286	9.8	1.03	1.4	119.42	339.55
Reach-1	12919	25-yr	4500	6479.79	6474.87	6479.79	6481.61	0.007302	10.6	4461	10.8	1.03	1.55	123.64	424.23
Reach-1	12919	50-yr	5200	6480.16	6474.87	6480.16	6482.15	0.007065	11.1	5142	11.4	1.03	1.64	125.84	470.34
Reach-1	12919	100-yr	6000	6480.57	6474.87	6480.57	6482.74	0.006792	11.5	5915	11.9	1.03	1.71	128.24	522.45

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total [cfs]	W.S. Elev [ft]	Min Ch El [ft]	Crit W.S. [ft]	E.G. Elev [ft]	E.G. Slope [ft/ft]	Vel Total [ft/s]	Q Channel [cfs]	Vel Chnl [ft/s]	Froude # XS	Shear Total [lbsq ft]	Top Width [ft]	Area [sq ft]
Reach-1	11912	2-yr	2100	6459.98	6456	6456	6460.39	0.001789	5.1	2100	5.2	0.49	0.38	118.79	407.78
Reach-1	11912	5-yr	2800	6460.53	6456	6456	6461.07	0.001956	5.9	2798	5.9	0.54	0.46	124.69	474.81
Reach-1	11912	10-yr	3300	6460.87	6456	6456	6461.52	0.002069	6.4	3295	6.5	0.57	0.52	128.42	518.37
Reach-1	11912	25-yr	4500	6461.61	6456	6456	6462.48	0.002284	7.3	4482	7.5	0.62	0.64	136.29	616.22
Reach-1	11912	50-yr	5200	6462	6456	6456	6463.01	0.002379	7.8	5171	8.1	0.65	0.7	140.49	670.55
Reach-1	11912	100-yr	6000	6462.42	6456	6456	6463.57	0.002466	8.2	5952	8.6	0.67	0.78	142.28	730.33
Reach-1	11998	2-yr	2100	6460	6456	6456	6460.69	0.003906	6.7	2100	6.7	0.7	0.69	110.94	315.25
Reach-1	11998	5-yr	2800	6460.53	6456	6456	6461.4	0.003954	7.5	2799	7.5	0.73	0.8	114.9	374.96
Reach-1	11998	10-yr	3300	6460.86	6456	6456	6461.87	0.004037	8	3297	8.1	0.76	0.86	119.2	413.2
Reach-1	11998	25-yr	4500	6461.56	6456	6456	6462.88	0.004218	9	4486	9.2	0.81	1.04	124.16	498.25
Reach-1	11998	50-yr	5200	6461.93	6456	6456	6463.43	0.004307	9.6	5177	9.8	0.84	1.14	126.9	544.4
Reach-1	11998	100-yr	6000	6462.32	6456	6456	6464.02	0.004398	10.1	5963	10.5	0.86	1.24	130.03	594.83
Reach-1	12125	2-yr	2100	6460.62	6458	6458	6461.89	0.008364	8.9	2095	9	1.05	1.18	103.06	236.79
Reach-1	12125	5-yr	2800	6461.18	6458	6458	6462.68	0.007652	9.4	2781	9.9	1.07	1.24	112.68	296.94
Reach-1	12125	10-yr	3300	6461.54	6458	6458	6463.19	0.007318	9.7	3264	10.4	1.08	1.29	118.71	338.83
Reach-1	12125	25-yr	4500	6462.34	6458	6458	6462.34	0.006679	10.3	4398	11.4	1.07	1.41	127.76	438.14
Reach-1	12125	50-yr	5200	6462.76	6458	6458	6462.76	0.006472	10.6	5049	11.9	1.06	1.5	130.02	491.51
Reach-1	12125	100-yr	6000	6463.2	6458	6458	6463.2	0.006292	10.9	5786	12.5	1.06	1.6	132.43	549.76
Reach-1	12170	2-yr	2100	6466.06	6463.12	6463.12	6467.12	0.009143	8.3	2100	8.3	1.02	1.16	124.49	253.96
Reach-1	12170	5-yr	2800	6466.51	6463.12	6463.12	6467.79	0.008392	9	2795	9.1	1.03	1.26	129.25	312.01
Reach-1	12170	10-yr	3300	6466.81	6463.12	6463.12	6468.22	0.007999	9.4	3289	9.5	1.03	1.32	132.38	351.55
Reach-1	12170	25-yr	4500	6467.48	6463.12	6463.12	6467.48	0.007295	10.2	4458	10.5	1.03	1.44	139.31	442.29
Reach-1	12170	50-yr	5200	6467.84	6463.12	6463.12	6467.84	0.007014	10.6	5131	10.9	1.03	1.5	143.02	492.46
Reach-1	12170	100-yr	6000	6468.22	6463.12	6463.12	6470.22	0.006735	10.9	5889	11.4	1.03	1.57	146.03	548.37
Reach-1	12351	2-yr	2100	6467.9	6464	6464	6467.9	0.00826	8.7	2094	8.9	1.1	1.05	116.71	240.58
Reach-1	12351	5-yr	2800	6468.5	6464	6464	6469.9	0.007156	8.8	2757	9.6	1.1	1.03	136.38	318.53
Reach-1	12351	10-yr	3300	6468.84	6464	6464	6470.38	0.006872	9	3218	10.1	1.08	1.12	139.28	366.51
Reach-1	12351	25-yr	4500	6469.58	6464	6464	6471.41	0.006486	9.5	4300	11.1	1.06	1.3	145.32	471.31
Reach-1	12351	50-yr	5200	6469.98	6464	6464	6471.96	0.006284	9.8	4916	11.6	1.05	1.38	148.54	529.78
Reach-1	12351	100-yr	6000	6470.4	6464	6464	6472.54	0.006091	10.1	5606	12.1	1.04	1.48	150.36	593.58

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	11464	2-yr	2100	6439.34	6434	6438.84	6440.97	0.004853	9.4	2055	10.4	0.9	1.15	56.03	223.92
Reach-1	11464	5-yr	2800	6439.9	6434	6439.75	6442.19	0.005872	10.9	2728	12.3	1.02	1.52	58.93	256.64
Reach-1	11464	10-yr	3300	6440.33	6434	6440.33	6443.02	0.006266	11.7	3202	13.4	1.08	1.72	60.87	282.19
Reach-1	11464	25-yr	4500	6441.61	6434	6441.61	6444.84	0.005823	12.4	4312	14.7	1.09	1.88	66.56	363.83
Reach-1	11464	50-yr	5200	6442.3	6434	6442.3	6445.81	0.005625	12.7	4949	15.4	1.09	1.95	69.94	410.78
Reach-1	11464	100-yr	6000	6443.07	6434	6443.07	6446.85	0.005384	12.9	5666	16	1.09	2.01	73.63	465.81
Reach-1	11657	2-yr	2100	6458.24	6455.2	6458.24	6459.26	0.009033	8.1	2100	8.1	1.01	1.13	128.58	258.9
Reach-1	11657	5-yr	2800	6458.66	6455.2	6458.66	6459.91	0.008571	8.9	2798	9	1.02	1.28	131.33	313.91
Reach-1	11657	10-yr	3300	6458.95	6455.2	6458.95	6460.34	0.008213	9.4	3296	9.5	1.02	1.35	133.21	352.28
Reach-1	11657	25-yr	4500	6459.58	6455.2	6459.58	6461.28	0.007647	10.3	4487	10.5	1.03	1.52	137.32	437.88
Reach-1	11657	50-yr	5200	6459.95	6455.2	6459.95	6461.79	0.007267	10.7	5179	10.9	1.03	1.58	139.67	487.99
Reach-1	11657	100-yr	6000	6460.31	6455.2	6460.31	6462.34	0.007091	11.1	5967	11.5	1.03	1.68	141.57	539.09
Reach-1	11703	2-yr	2100	6458.81	6456		6459.63	0.006225	7.2	2100	7.2	0.85	0.89	126.77	289.68
Reach-1	11703	5-yr	2800	6459.28	6456	6459.01	6460.27	0.006218	8	2800	8	0.87	1.02	132.34	349.69
Reach-1	11703	10-yr	3300	6459.58	6456	6459.3	6460.69	0.006103	8.5	3300	8.5	0.88	1.09	135.51	389.97
Reach-1	11703	25-yr	4500	6460.25	6456	6459.93	6461.62	0.005679	9.3	4496	9.4	0.89	1.21	140.89	483.63
Reach-1	11703	50-yr	5200	6460.61	6456	6460.27	6462.12	0.005535	9.7	5191	9.9	0.9	1.29	142.66	534.02
Reach-1	11703	100-yr	6000	6461.04	6456	6460.63	6462.67	0.005227	10.1	5983	10.3	0.89	1.33	144.76	595.42
Reach-1	11834	2-yr	2100	6459.68	6456		6460.18	0.002742	5.7	2100	5.7	0.59	0.5	126.79	369.61
Reach-1	11834	5-yr	2800	6460.2	6456		6460.84	0.00287	6.4	2799	6.4	0.62	0.59	131.37	437.45
Reach-1	11834	10-yr	3300	6460.53	6456		6461.27	0.002946	6.9	3298	6.9	0.64	0.66	132.92	480.1
Reach-1	11834	25-yr	4500	6461.22	6456		6462.2	0.003096	7.8	4494	7.9	0.68	0.81	136.33	573.44
Reach-1	11834	50-yr	5200	6461.59	6456		6462.7	0.003167	8.3	5189	8.5	0.7	0.88	138.14	623.7
Reach-1	11834	100-yr	6000	6461.98	6456		6463.24	0.003241	8.8	5983	9	0.72	0.97	140.06	678.04
Reach-1	11864	2-yr	2100	6459.74	6456		6460.27	0.002706	5.8	2100	5.9	0.59	0.51	118.93	359.66
Reach-1	11864	5-yr	2800	6460.25	6456		6460.95	0.002901	6.6	2797	6.7	0.64	0.61	124.89	422.07
Reach-1	11864	10-yr	3300	6460.56	6456		6461.38	0.003049	7.1	3294	7.3	0.67	0.68	128.05	461.58
Reach-1	11864	25-yr	4500	6461.23	6456		6462.33	0.003344	8.2	4482	8.4	0.74	0.84	134.95	549.09
Reach-1	11864	50-yr	5200	6461.58	6456		6462.84	0.003482	8.7	5170	9	0.76	0.93	137.83	596.81
Reach-1	11864	100-yr	6000	6461.95	6456		6463.4	0.003626	9.3	5954	9.7	0.79	1.04	140.63	648.48

Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	10767	2-yr	2100	6431.29	6427.69	6431.29	6432.8	0.008144	9.9	2100	9.9	1	1.5	70.5	212.81
Reach-1	10767	5-yr	2800	6431.95	6427.69	6431.95	6433.75	0.007761	10.8	2800	10.8	1	1.69	72.82	260.36
Reach-1	10767	10-yr	3300	6432.38	6427.69	6432.38	6434.37	0.00759	11.3	3300	11.3	1.01	1.81	74.32	291.94
Reach-1	10767	25-yr	4500	6433.35	6427.69	6433.35	6435.71	0.007129	12.3	4500	12.3	1	2.03	77.71	365.54
Reach-1	10767	50-yr	5200	6433.84	6427.69	6433.84	6436.41	0.00703	12.9	5200	12.9	1.01	2.16	79.44	404.29
Reach-1	10767	100-yr	6000	6434.39	6427.69	6434.39	6437.17	0.006875	13.4	6000	13.4	1.01	2.28	81.35	448.21
Reach-1	10982	2-yr	2100	6433.32	6427.69	6433.32	6435.22	0.00769	11.1	2100	11.1	1	1.76	49.74	189.55
Reach-1	10982	5-yr	2800	6434.21	6427.69	6434.21	6436.4	0.007388	11.9	2800	11.9	1	1.93	54.05	236.02
Reach-1	10982	10-yr	3300	6434.78	6427.69	6434.78	6437.14	0.007217	12.3	3300	12.3	1	2.04	56.8	267.79
Reach-1	10982	25-yr	4500	6435.97	6427.69	6435.97	6438.72	0.007007	13.3	4500	13.3	1.01	2.26	62.52	338.64
Reach-1	10982	50-yr	5200	6436.6	6427.69	6436.6	6439.53	0.006881	13.7	5200	13.7	1.01	2.37	65.52	378.62
Reach-1	10982	100-yr	6000	6437.28	6427.69	6437.28	6440.38	0.006684	14.1	6000	14.1	1	2.45	68.83	424.71
Reach-1	11004	2-yr	2100	6437.82	6433.69	6437.82	6439.39	0.008079	10	2100	10	1	1.54	67.39	209.12
Reach-1	11004	5-yr	2800	6438.53	6433.69	6438.53	6440.36	0.007719	10.8	2800	10.8	1.01	1.71	71.66	258.44
Reach-1	11004	10-yr	3300	6438.99	6433.69	6438.99	6440.98	0.007507	11.3	3300	11.3	1.01	1.8	74.45	292.19
Reach-1	11004	25-yr	4500	6439.97	6433.69	6439.97	6442.3	0.006976	12.1	4498	12.2	1.06	1.76	90.11	370.92
Reach-1	11004	50-yr	5200	6440.49	6433.69	6440.49	6442.99	0.006694	12.4	5187	12.7	1.07	1.8	95.39	419.13
Reach-1	11004	100-yr	6000	6441.04	6433.69	6441.04	6443.73	0.006462	12.7	5968	13.2	1.06	1.88	99.47	472.37
Reach-1	11360	2-yr	2100	6439.9	6433.69		6440.36	0.001133	5.4	2100	5.4	0.4	0.37	70.34	389.91
Reach-1	11360	5-yr	2800	6440.78	6433.69		6441.38	0.00124	6.2	2799	6.2	0.44	0.45	73.37	452.71
Reach-1	11360	10-yr	3300	6441.33	6433.69		6442.03	0.001313	6.7	3298	6.7	0.46	0.5	75.35	493.41
Reach-1	11360	25-yr	4500	6442.45	6433.69		6443.42	0.001482	7.7	4490	7.9	0.52	0.61	82.42	581.26
Reach-1	11360	50-yr	5200	6443.02	6433.69		6444.15	0.001578	8.3	5182	8.5	0.56	0.66	88.37	629.44
Reach-1	11360	100-yr	6000	6443.6	6433.69		6444.92	0.001684	8.8	5967	9.2	0.6	0.71	94.79	683.14
Reach-1	11395	2-yr	2100	6439.66	6433.69		6440.53	0.002007	7	2073	7.5	0.59	0.58	60.72	298.98
Reach-1	11395	5-yr	2800	6440.42	6433.69		6441.62	0.002352	8.1	2753	8.9	0.67	0.74	64.99	346.61
Reach-1	11395	10-yr	3300	6440.88	6433.69		6442.32	0.002593	8.8	3234	9.7	0.72	0.86	66.95	376.86
Reach-1	11395	25-yr	4500	6441.75	6433.69		6443.83	0.003223	10.3	4382	11.7	0.82	1.17	71.09	437.04
Reach-1	11395	50-yr	5200	6442.14	6433.69	6441.07	6444.64	0.003648	11.2	5049	12.9	0.89	1.37	73.04	464.97
Reach-1	11395	100-yr	6000	6442.48	6433.69	6441.77	6445.53	0.004217	12.2	5809	14.2	0.96	1.63	74.49	490.36

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W. S. Elev (ft)	Min Ch El (ft)	Crit W. S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	10290	2-yr	2200	6419.76	6414.56	6419.76	6421.89	0.007368	11.5	2196	11.7	1.04	1.73	48.08	191.02
Reach-1	10290	5-yr	2900	6420.63	6414.56	6420.63	6423.17	0.006897	12.4	2888	12.8	1.05	1.87	50.18	233.51
Reach-1	10290	10-yr	3400	6421.21	6414.56	6421.21	6424.02	0.006615	12.9	3381	13.5	1.05	1.96	51.58	263.02
Reach-1	10290	25-yr	4600	6422.47	6414.56	6422.47	6425.88	0.006157	13.9	4555	14.9	1.06	2.13	54.91	330.47
Reach-1	10290	50-yr	5300	6423.16	6414.56	6423.16	6426.88	0.005939	14.4	5235	15.6	1.07	2.2	56.95	369.1
Reach-1	10290	100-yr	6200	6424	6414.56	6424	6428.1	0.005727	14.8	6103	16.4	1.08	2.29	59.5	417.61
Reach-1	10386	2-yr	2200	6422.06	6415.69	6422.06	6423.84	0.007764	10.7	2200	10.7	1	1.68	57.96	205.77
Reach-1	10386	5-yr	2900	6422.85	6415.69	6422.85	6424.88	0.007482	11.4	2900	11.4	1.01	1.81	63.66	253.99
Reach-1	10386	10-yr	3400	6423.31	6415.69	6423.31	6425.56	0.007175	12	3400	12	1.02	1.88	65.49	283.66
Reach-1	10386	25-yr	4600	6424.31	6415.69	6424.31	6427.05	0.00672	13.1	4594	13.3	1.04	2.05	69.48	350.88
Reach-1	10386	50-yr	5300	6424.87	6415.69	6424.87	6427.86	0.006448	13.6	5288	13.9	1.05	2.11	71.71	390.21
Reach-1	10386	100-yr	6200	6425.55	6415.69	6425.55	6428.84	0.006145	14.1	6175	14.6	1.05	2.18	74.45	440.35
Reach-1	10410	2-yr	2200	6425.38	6421.69	6425.38	6426.91	0.008239	9.9	2200	9.9	1.01	1.52	73.75	221.79
Reach-1	10410	5-yr	2900	6426.03	6421.69	6426.03	6427.81	0.007721	10.7	2900	10.7	1	1.68	76.38	271.05
Reach-1	10410	10-yr	3400	6426.44	6421.69	6426.44	6428.41	0.007584	11.2	3400	11.2	1.01	1.79	78.01	302.6
Reach-1	10410	25-yr	4600	6427.36	6421.69	6427.36	6429.69	0.007205	12.2	4600	12.2	1.01	2.01	81.68	375.86
Reach-1	10410	50-yr	5300	6427.85	6421.69	6427.85	6430.37	0.007049	12.7	5300	12.7	1.01	2.13	83.63	416.14
Reach-1	10410	100-yr	6200	6428.46	6421.69	6428.46	6431.19	0.006791	13.2	6200	13.2	1	2.23	86.08	468.18
Reach-1	10636	2-yr	2200	6426.67	6421.69	6426.37	6428.62	0.006058	11.1	2197	11.2	0.93	1.55	44.38	198.89
Reach-1	10636	5-yr	2900	6427.27	6421.69	6427.27	6429.93	0.007034	12.8	2894	13.1	1.03	1.98	45.22	226.02
Reach-1	10636	10-yr	3400	6427.87	6421.69	6427.87	6430.82	0.006771	13.4	3390	13.8	1.03	2.08	46.03	253.33
Reach-1	10636	25-yr	4600	6429.19	6421.69	6429.19	6432.77	0.006336	14.6	4576	15.2	1.05	2.27	48.02	315.08
Reach-1	10636	50-yr	5300	6429.92	6421.69	6429.92	6433.83	0.006088	15.1	5265	15.9	1.05	2.35	49.11	350.6
Reach-1	10636	100-yr	6200	6430.79	6421.69	6430.79	6435.12	0.005884	15.7	6149	16.8	1.06	2.43	51.57	394.28
Reach-1	10743	2-yr	2100	6428.42	6421.69	6428.42	6430.38	0.007748	11.2	2100	11.2	1	1.81	47.84	186.8
Reach-1	10743	5-yr	2800	6429.34	6421.69	6429.34	6431.58	0.007563	12	2800	12	1.01	1.97	53.37	233.7
Reach-1	10743	10-yr	3300	6429.95	6421.69	6429.95	6432.32	0.00735	12.4	3300	12.4	1.01	2.05	56.98	267.08
Reach-1	10743	25-yr	4500	6431.2	6421.69	6431.2	6433.87	0.006995	13.1	4500	13.1	1	2.22	64.45	343.15
Reach-1	10743	50-yr	5200	6431.83	6421.69	6431.83	6434.67	0.006882	13.5	5200	13.5	1	2.31	68.19	384.7
Reach-1	10743	100-yr	6000	6433.95	6421.69	6432.49	6435.85	0.003573	11.1	6000	11.1	0.75	1.43	80.41	542.35

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8692.2	2-yr	2200	6399.17	6394.92		6399.94	0.01004	7	2194	7	0.72	1.84	106.31	315.84
Reach-1	8692.2	5-yr	2900	6399.66	6394.92		6400.65	0.010686	7.9	2885	8	0.76	2.24	108.36	368.46
Reach-1	8692.2	10-yr	3400	6399.97	6394.92		6401.12	0.011124	8.5	3376	8.6	0.79	2.51	109.67	402.31
Reach-1	8692.2	25-yr	4600	6400.63	6394.92		6402.15	0.011988	9.7	4549	9.9	0.85	3.12	112.46	476.23
Reach-1	8692.2	50-yr	5300	6400.98	6394.92	6400.48	6402.71	0.012436	10.3	5229	10.6	0.87	3.45	113.88	515.41
Reach-1	8692.2	100-yr	6200	6401.39	6394.92	6400.97	6403.39	0.012968	11	6100	11.4	0.91	3.87	115.33	562.47
Reach-1	8730.2	2-yr	2200	6399.55	6395.1		6400.29	0.008629	6.8	2192	6.9	0.68	1.72	99.14	321.74
Reach-1	8730.2	5-yr	2900	6400.06	6395.1		6401.03	0.009332	7.8	2883	7.9	0.72	2.11	101.36	373.49
Reach-1	8730.2	10-yr	3400	6400.39	6395.1		6401.52	0.009807	8.4	3374	8.5	0.75	2.38	102.75	406.68
Reach-1	8730.2	25-yr	4600	6401.08	6395.1		6402.59	0.010819	9.6	4546	9.9	0.82	3	105.57	478.13
Reach-1	8730.2	50-yr	5300	6401.43	6395.1		6403.16	0.011363	10.3	5226	10.6	0.85	3.35	107.02	515.6
Reach-1	8730.2	100-yr	6200	6401.85	6395.1	6401.3	6403.87	0.011969	11	6097	11.5	0.88	3.77	108.77	561.23
Reach-1	9026	2-yr	2200	6404.26	6400	6404.26	6405.57	0.008613	9.2	2200	9.2	1.01	1.35	92.45	239.67
Reach-1	9026	5-yr	2900	6404.77	6400	6404.77	6406.36	0.008218	10.1	2899	10.1	1.02	1.52	94.21	287.75
Reach-1	9026	10-yr	3400	6405.14	6400	6405.14	6406.89	0.00782	10.5	3398	10.6	1.02	1.6	95.43	322.34
Reach-1	9026	25-yr	4600	6405.91	6400	6405.91	6408.06	0.007379	11.6	4594	11.8	1.03	1.8	97.98	396.47
Reach-1	9026	50-yr	5300	6406.33	6400	6406.33	6408.69	0.007144	12.1	5290	12.3	1.03	1.89	99.35	438.1
Reach-1	9026	100-yr	6200	6406.85	6400	6406.85	6409.46	0.006864	12.6	6184	13	1.04	2	101.02	490.4
Reach-1	9500	2-yr	2200	6408.62	6404	6408.62	6410.34	0.007602	10.1	2192	10.5	1.07	1.39	72.95	217.18
Reach-1	9500	5-yr	2900	6409.33	6404	6409.33	6411.36	0.007058	10.7	2878	11.5	1.09	1.49	78.67	270.89
Reach-1	9500	10-yr	3400	6409.81	6404	6409.81	6412.04	0.006699	11	3363	12	1.09	1.55	82.14	309.65
Reach-1	9500	25-yr	4600	6410.83	6404	6410.83	6413.51	0.006247	11.6	4518	13.3	1.1	1.69	89.59	397.22
Reach-1	9500	50-yr	5300	6411.45	6404	6411.45	6414.31	0.005823	11.7	5181	13.7	1.09	1.71	94.11	454
Reach-1	9500	100-yr	6200	6411.79	6404	6411.79	6415.28	0.006632	12.7	6045	15.2	1.18	2.03	96.49	486.95
Reach-1	10000	2-yr	2200	6415.68	6410	6415.68	6418.15	0.007712	12.6	2199	12.6	1.02	2.05	37.05	175.25
Reach-1	10000	5-yr	2900	6416.69	6410	6416.69	6419.63	0.007174	13.6	2896	13.8	1.04	2.17	39.18	213.72
Reach-1	10000	10-yr	3400	6417.36	6410	6417.36	6420.61	0.006861	14.1	3390	14.5	1.05	2.23	40.61	240.66
Reach-1	10000	25-yr	4600	6418.91	6410	6418.91	6422.75	0.006161	15	4563	15.8	1.06	2.29	44.99	306.49
Reach-1	10000	50-yr	5300	6419.68	6410	6419.68	6423.88	0.005986	15.5	5234	16.5	1.07	2.37	46.88	342.13
Reach-1	10000	100-yr	6200	6420.7	6410	6420.7	6425.25	0.005651	15.8	6085	17.3	1.08	2.37	50.6	391.36

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8555.2	2-yr	2200	6396.64	6393.95	6396.64	6397.75	0.08444	8.4	2179	8.5	1.01	11.32	120.96	261.52
Reach-1	8555.2	5-yr	2900	6397.1	6393.95	6397.1	6398.41	0.078376	9.1	2859	9.2	1.01	12.52	122.84	317
Reach-1	8555.2	10-yr	3400	6397.4	6393.95	6397.4	6398.85	0.075387	9.6	3342	9.7	1.01	13.29	124.08	353.83
Reach-1	8555.2	25-yr	4600	6398.06	6393.95	6398.06	6399.81	0.069803	10.5	4488	10.7	1.01	14.84	126.81	436.83
Reach-1	8555.2	50-yr	5300	6398.41	6393.95	6398.41	6400.32	0.067678	11	5150	11.2	1.01	15.66	128.26	481.6
Reach-1	8555.2	100-yr	6200	6398.84	6393.95	6398.84	6400.94	0.065209	11.5	5994	11.8	1.01	16.58	130.05	537.23
Reach-1	8563.2	2-yr	2200	6397.65	6392.88	6396.63	6398.15	0.023695	5.7	2161	5.7	0.57	4.5	125.11	387.72
Reach-1	8563.2	5-yr	2900	6398.18	6392.88	6397.06	6398.82	0.024557	6.4	2832	6.5	0.6	5.38	127.32	455.02
Reach-1	8563.2	10-yr	3400	6398.53	6392.88	6397.36	6399.26	0.02497	6.8	3307	6.9	0.61	5.93	128.76	499.72
Reach-1	8563.2	25-yr	4600	6399.29	6392.88	6398.03	6400.22	0.025633	7.7	4434	7.8	0.64	7.1	131.9	598.61
Reach-1	8563.2	50-yr	5300	6399.69	6392.88	6398.38	6400.74	0.025854	8.1	5085	8.3	0.65	7.7	133.57	652.47
Reach-1	8563.2	100-yr	6200	6400.18	6392.88	6398.81	6401.36	0.02605	8.6	5913	8.8	0.67	8.41	135.6	718.45
Reach-1	8591.2	2-yr	2200	6397.92	6394.27		6398.77	0.014682	7.3	2187	7.4	0.83	2.22	122.84	300.63
Reach-1	8591.2	5-yr	2900	6398.42	6394.27		6399.44	0.013952	8	2876	8.1	0.84	2.5	124.85	362.43
Reach-1	8591.2	10-yr	3400	6398.74	6394.27		6399.88	0.013594	8.4	3366	8.6	0.84	2.68	126.17	403.43
Reach-1	8591.2	25-yr	4600	6399.45	6394.27	6399.02	6400.86	0.013058	9.3	4536	9.6	0.86	3.07	129	493.77
Reach-1	8591.2	50-yr	5300	6399.83	6394.27	6399.37	6401.39	0.012833	9.8	5216	10.1	0.86	3.28	130.47	542.87
Reach-1	8591.2	100-yr	6200	6400.28	6394.27	6399.8	6402.02	0.012656	10.3	6085	10.7	0.87	3.53	132.22	602.19
Reach-1	8622.2	2-yr	2200	6398.45	6394.45		6399.17	0.010914	6.8	2198	6.8	0.72	1.84	118.22	324.27
Reach-1	8622.2	5-yr	2900	6398.93	6394.45		6399.84	0.011213	7.6	2894	7.7	0.76	2.19	119.74	380.91
Reach-1	8622.2	10-yr	3400	6399.24	6394.45		6400.28	0.011383	8.1	3391	8.2	0.78	2.42	120.73	418.19
Reach-1	8622.2	25-yr	4600	6399.9	6394.45		6401.25	0.011797	9.2	4578	9.4	0.82	2.93	122.83	498.82
Reach-1	8622.2	50-yr	5300	6400.25	6394.45		6401.78	0.012024	9.8	5269	9.9	0.84	3.21	123.95	541.65
Reach-1	8622.2	100-yr	6200	6400.66	6394.45	6400.12	6402.42	0.012302	10.4	6154	10.7	0.86	3.55	125.56	593.37
Reach-1	8656.2	2-yr	2200	6398.8	6394.73		6399.56	0.010862	6.9	2196	7	0.73	1.88	112.99	317.08
Reach-1	8656.2	5-yr	2900	6399.28	6394.73		6400.24	0.011356	7.8	2889	7.9	0.77	2.27	114.5	371.34
Reach-1	8656.2	10-yr	3400	6399.58	6394.73		6400.7	0.011663	8.4	3382	8.5	0.8	2.52	115.48	406.72
Reach-1	8656.2	25-yr	4600	6400.24	6394.73		6401.7	0.012323	9.5	4561	9.7	0.84	3.1	117.57	483.18
Reach-1	8656.2	50-yr	5300	6400.58	6394.73	6400.1	6402.24	0.01268	10.1	5246	10.4	0.87	3.42	118.65	523.55
Reach-1	8656.2	100-yr	6200	6400.99	6394.73	6400.57	6402.9	0.013114	10.8	6124	11.1	0.9	3.82	119.97	572.02

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8454.2	2-yr	2200	6394.11	6389.48		6394.87	0.013619	7	2198	7	0.79	2.04	128.61	315.46
Reach-1	8454.2	5-yr	2900	6394.63	6389.48		6395.53	0.012675	7.6	2895	7.6	0.78	2.27	130.42	382.75
Reach-1	8454.2	10-yr	3400	6394.98	6389.48		6395.97	0.01212	7.9	3391	8	0.78	2.41	131.64	428.49
Reach-1	8454.2	25-yr	4600	6395.73	6389.48		6396.93	0.011396	8.7	4580	8.8	0.78	2.73	134.24	527.75
Reach-1	8454.2	50-yr	5300	6396.13	6389.48		6397.44	0.011096	9.1	5271	9.2	0.78	2.89	135.64	581.78
Reach-1	8454.2	100-yr	6200	6396.61	6389.48		6398.06	0.01081	9.6	6159	9.7	0.79	3.09	137.33	647.69
Reach-1	8483.2	2-yr	2200	6394.71	6389.73		6395.3	0.015149	6.1	2189	6.2	0.65	2.6	128.46	359.31
Reach-1	8483.2	5-yr	2900	6395.21	6389.73		6395.95	0.015512	6.8	2873	6.9	0.68	3.09	130.25	423.61
Reach-1	8483.2	10-yr	3400	6395.54	6389.73		6396.38	0.015657	7.3	3360	7.4	0.69	3.4	131.47	466.48
Reach-1	8483.2	25-yr	4600	6396.25	6389.73		6397.33	0.015927	8.2	4519	8.4	0.72	4.06	134.11	560.76
Reach-1	8483.2	50-yr	5300	6396.62	6389.73		6397.83	0.016077	8.7	5191	8.9	0.73	4.42	135.5	611.25
Reach-1	8483.2	100-yr	6200	6397.08	6389.73		6398.45	0.016095	9.2	6051	9.5	0.75	4.81	137.23	674.64
Reach-1	8511.2	2-yr	2200	6395.19	6390.84		6395.67	0.010151	5.5	2182	5.6	0.55	1.96	129.4	402.02
Reach-1	8511.2	5-yr	2900	6395.73	6390.84		6396.34	0.010614	6.1	2860	6.3	0.58	2.36	131.41	471.93
Reach-1	8511.2	10-yr	3400	6396.08	6390.84		6396.77	0.01085	6.6	3341	6.7	0.6	2.62	132.73	518.24
Reach-1	8511.2	25-yr	4600	6396.84	6390.84		6397.73	0.011285	7.4	4486	7.7	0.63	3.18	135.58	619.9
Reach-1	8511.2	50-yr	5300	6397.24	6390.84		6398.24	0.011493	7.9	5149	8.1	0.64	3.48	137.08	674.42
Reach-1	8511.2	100-yr	6200	6397.73	6390.84		6398.87	0.011657	8.4	5995	8.7	0.65	3.83	138.92	742
Reach-1	8515.2	2-yr	2200	6395.54	6389		6395.72	0.001868	3.3	2168	3.4	0.26	0.59	129.38	664.13
Reach-1	8515.2	5-yr	2900	6396.14	6389		6396.39	0.002297	3.9	2841	4	0.3	0.8	131.59	742.7
Reach-1	8515.2	10-yr	3400	6396.53	6389		6396.83	0.002562	4.3	3319	4.4	0.32	0.94	133.01	794.64
Reach-1	8515.2	25-yr	4600	6397.38	6389		6397.8	0.003111	5.1	4457	5.3	0.36	1.26	137.27	908.7
Reach-1	8515.2	50-yr	5300	6397.82	6389		6398.32	0.003384	5.5	5114	5.7	0.38	1.44	139.55	970.34
Reach-1	8515.2	100-yr	6200	6398.36	6389		6398.95	0.003683	5.9	5952	6.3	0.4	1.66	142.03	1046.56
Reach-1	8535.2	2-yr	2200	6395.61	6389		6395.77	0.00378	3.2	2200	3.2	0.24	1.28	122.75	678.34
Reach-1	8535.2	5-yr	2900	6396.23	6389		6396.45	0.004706	3.8	2900	3.8	0.28	1.74	124.53	754.95
Reach-1	8535.2	10-yr	3400	6396.63	6389		6396.91	0.005291	4.2	3400	4.2	0.29	2.07	125.69	805.47
Reach-1	8535.2	25-yr	4600	6397.5	6389		6397.89	0.006456	5	4600	5	0.33	2.79	129.12	916.21
Reach-1	8535.2	50-yr	5300	6397.96	6389		6398.42	0.007038	5.4	5298	5.4	0.35	3.19	131.01	975.78
Reach-1	8535.2	100-yr	6200	6398.51	6389		6399.06	0.007685	5.9	6195	5.9	0.37	3.67	133.3	1049.4

Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8344.2	2-yr	2200	6390.5	6384		6390.65	0.003469	3.1	2196	3.1	0.24	1.15	130.29	704.98
Reach-1	8344.2	5-yr	2900	6391.11	6384		6391.32	0.00429	3.7	2890	3.7	0.27	1.56	132.78	785.06
Reach-1	8344.2	10-yr	3400	6391.5	6384		6391.76	0.004773	4.1	3384	4.1	0.29	1.83	134.37	837.96
Reach-1	8344.2	25-yr	4600	6392.36	6384		6392.73	0.00574	4.8	4563	4.9	0.32	2.43	137.82	955.11
Reach-1	8344.2	50-yr	5300	6392.82	6384		6393.25	0.006206	5.2	5246	5.3	0.34	2.77	139.66	1018.72
Reach-1	8344.2	100-yr	6200	6393.37	6384		6393.88	0.00673	5.7	6119	5.7	0.36	3.17	141.87	1096.39
Reach-1	8352.37	2-yr	2200	6392.22	6389.6	6392.22	6393.3	0.088236	8.4	2200	8.4	1.01	11.63	123.8	263.46
Reach-1	8352.37	5-yr	2900	6392.67	6389.6	6392.67	6393.95	0.082562	9.1	2900	9.1	1	12.97	125.75	319.38
Reach-1	8352.37	10-yr	3400	6392.95	6389.6	6392.95	6394.37	0.080384	9.6	3400	9.6	1.01	13.92	127	355.73
Reach-1	8352.37	25-yr	4600	6393.61	6389.6	6393.61	6395.31	0.074805	10.5	4600	10.5	1	15.64	129.85	440.01
Reach-1	8352.37	50-yr	5300	6393.95	6389.6	6393.95	6395.81	0.073524	11	5300	11	1.01	16.7	131.31	483.88
Reach-1	8352.37	100-yr	6200	6394.37	6389.6	6394.37	6396.42	0.071194	11.5	6200	11.5	1.01	17.77	133.16	540.05
Reach-1	8371.2	2-yr	2200	6393.61	6389.6		6394	0.017087	5	2200	5	0.48	3.57	129.86	440.2
Reach-1	8371.2	5-yr	2900	6394.17	6389.6		6394.67	0.018204	5.6	2900	5.6	0.5	4.35	132.3	513.93
Reach-1	8371.2	10-yr	3400	6394.54	6389.6		6395.11	0.018788	6	3400	6	0.52	4.86	133.91	563
Reach-1	8371.2	25-yr	4600	6395.33	6389.6		6396.07	0.019946	6.9	4600	6.9	0.55	5.98	137.35	670.28
Reach-1	8371.2	50-yr	5300	6395.76	6389.6		6396.58	0.020264	7.3	5300	7.3	0.56	6.51	139.12	728.6
Reach-1	8371.2	100-yr	6200	6396.26	6389.6		6397.2	0.020657	7.8	6199	7.8	0.58	7.16	141.24	799.17
Reach-1	8392.2	2-yr	2200	6393.78	6389.52		6394.19	0.005248	5.2	2200	5.2	0.51	1.04	131.88	426.09
Reach-1	8392.2	5-yr	2900	6394.35	6389.52		6394.87	0.005405	5.8	2900	5.8	0.53	1.24	134.15	502.21
Reach-1	8392.2	10-yr	3400	6394.72	6389.52		6395.31	0.005485	6.2	3400	6.2	0.54	1.37	135.63	552.73
Reach-1	8392.2	25-yr	4600	6395.53	6389.52		6396.27	0.005666	6.9	4600	6.9	0.56	1.65	138.81	662.95
Reach-1	8392.2	50-yr	5300	6395.95	6389.52		6396.79	0.005745	7.3	5300	7.3	0.57	1.8	140.5	722.54
Reach-1	8392.2	100-yr	6200	6396.46	6389.52		6397.41	0.005844	7.8	6200	7.8	0.58	1.98	142.52	794.75
Reach-1	8424.2	2-yr	2200	6393.85	6389.5		6394.48	0.010296	6.3	2200	6.3	0.69	1.67	130.14	346.82
Reach-1	8424.2	5-yr	2900	6394.42	6389.5		6395.16	0.009623	6.9	2900	6.9	0.68	1.86	132.29	420.76
Reach-1	8424.2	10-yr	3400	6394.79	6389.5		6395.6	0.009304	7.2	3400	7.2	0.68	1.99	133.7	469.79
Reach-1	8424.2	25-yr	4600	6395.58	6389.5		6396.57	0.008774	8	4600	8	0.68	2.25	136.5	576.53
Reach-1	8424.2	50-yr	5300	6396	6389.5		6397.08	0.00858	8.4	5299	8.4	0.69	2.39	137.97	634.02
Reach-1	8424.2	100-yr	6200	6396.5	6389.5		6397.71	0.008418	8.8	6196	8.8	0.69	2.57	139.73	703.58

Cottonwood Creek Channel Results - Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8222.57	2-yr	2200	6388.42	6382.8		6388.97	0.00785	5.9	2200	5.9	0.61	1.42	125.19	369.99
Reach-1	8222.57	5-yr	2900	6388.95	6382.8		6389.63	0.007985	6.6	2900	6.6	0.63	1.68	127.3	437.68
Reach-1	8222.57	10-yr	3400	6389.3	6382.8		6390.07	0.008057	7	3400	7	0.64	1.84	128.69	482.49
Reach-1	8222.57	25-yr	4600	6390.08	6382.8		6391.04	0.00811	7.9	4600	7.9	0.66	2.19	131.75	583.27
Reach-1	8222.57	50-yr	5300	6390.5	6382.8		6391.57	0.008063	8.3	5300	8.3	0.67	2.35	133.43	639.65
Reach-1	8222.57	100-yr	6200	6391.01	6382.8		6392.21	0.007961	8.7	6200	8.8	0.67	2.53	135.41	708.57
Reach-1	8256.57	2-yr	2200	6388.67	6382.84		6389.25	0.008518	6.1	2200	6.1	0.63	1.51	123.97	359.21
Reach-1	8256.57	5-yr	2900	6389.21	6382.84		6389.93	0.008571	6.8	2900	6.8	0.65	1.78	126.16	426.45
Reach-1	8256.57	10-yr	3400	6389.56	6382.84		6390.37	0.008608	7.2	3400	7.2	0.66	1.94	127.6	470.87
Reach-1	8256.57	25-yr	4600	6390.33	6382.84		6391.34	0.008606	8.1	4600	8.1	0.68	2.29	130.75	570.59
Reach-1	8256.57	50-yr	5300	6390.75	6382.84		6391.87	0.008553	8.5	5300	8.5	0.69	2.47	132.47	625.92
Reach-1	8256.57	100-yr	6200	6391.26	6382.84		6392.5	0.008497	8.9	6200	8.9	0.69	2.67	134.55	693.71
Reach-1	8285.57	2-yr	2200	6388.99	6382.92		6389.6	0.016854	6.2	2200	6.2	0.66	2.84	127.45	352.69
Reach-1	8285.57	5-yr	2900	6389.53	6382.92		6390.27	0.016496	6.9	2900	6.9	0.67	3.27	129.81	422.28
Reach-1	8285.57	10-yr	3400	6389.89	6382.92		6390.71	0.016319	7.3	3400	7.3	0.68	3.54	131.35	468.44
Reach-1	8285.57	25-yr	4600	6390.67	6382.92		6391.67	0.015897	8	4600	8	0.69	4.1	134.76	572.26
Reach-1	8285.57	50-yr	5300	6391.09	6382.92		6392.19	0.015633	8.4	5300	8.4	0.69	4.37	136.61	629.83
Reach-1	8285.57	100-yr	6200	6391.61	6382.92		6392.82	0.015354	8.8	6200	8.8	0.69	4.69	138.85	700.58
Reach-1	8320.57	2-yr	2200	6389.56	6385.66	6389.4	6390.49	0.031981	7.7	2194	7.8	0.92	4.32	131.05	286.09
Reach-1	8320.57	5-yr	2900	6390.04	6385.66	6389.85	6391.14	0.029495	8.3	2875	8.4	0.91	4.79	132.94	349.38
Reach-1	8320.57	10-yr	3400	6390.36	6385.66	6390.13	6391.56	0.028088	8.7	3358	8.8	0.91	5.06	134.21	392.17
Reach-1	8320.57	25-yr	4600	6391.07	6385.66	6390.78	6392.5	0.025575	9.4	4504	9.7	0.9	5.61	137.02	488.64
Reach-1	8320.57	50-yr	5300	6391.46	6385.66	6391.1	6393.01	0.024395	9.8	5167	10.1	0.89	5.87	138.61	542.4
Reach-1	8320.57	100-yr	6200	6391.93	6385.66	6391.53	6393.62	0.023211	10.2	6014	10.5	0.88	6.17	140.71	608.62
Reach-1	8324.57	2-yr	2200	6390.41	6384		6390.59	0.002363	3.4	2200	3.4	0.27	0.71	133.04	643.42
Reach-1	8324.57	5-yr	2900	6391	6384		6391.25	0.002865	4	2900	4	0.31	0.94	135.36	722.32
Reach-1	8324.57	10-yr	3400	6391.38	6384		6391.68	0.003171	4.4	3400	4.4	0.33	1.11	136.88	774.63
Reach-1	8324.57	25-yr	4600	6392.22	6384		6392.63	0.003778	5.2	4600	5.2	0.36	1.47	140.18	890.49
Reach-1	8324.57	50-yr	5300	6392.67	6384		6393.15	0.004064	5.6	5300	5.6	0.38	1.68	141.94	953.72
Reach-1	8324.57	100-yr	6200	6393.21	6384		6393.77	0.004384	6	6200	6	0.4	1.92	144.08	1031.1

Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8139.07	2-yr	2200	6384.57	6381		6385.2	0.01014	6.4	2200	6.4	0.64	1.93	112.27	345.83
Reach-1	8139.07	5-yr	2900	6385.1	6381		6385.9	0.010538	7.1	2897	7.2	0.67	2.28	115.98	406.98
Reach-1	8139.07	10-yr	3400	6385.45	6381		6386.36	0.010781	7.6	3393	7.7	0.69	2.53	117.25	447.13
Reach-1	8139.07	25-yr	4600	6386.18	6381		6387.36	0.01129	8.6	4578	8.7	0.73	3.09	119.95	534.51
Reach-1	8139.07	50-yr	5300	6386.56	6381		6387.89	0.011646	9.1	5268	9.3	0.75	3.41	121.33	579.63
Reach-1	8139.07	100-yr	6200	6387.02	6381		6388.53	0.011946	9.7	6153	9.9	0.76	3.78	123.03	636.07
Reach-1	8143.07	2-yr	2200	6384.96	6380		6385.25	0.003127	4.4	2200	4.4	0.37	0.81	120	504.82
Reach-1	8143.07	5-yr	2900	6385.57	6380		6385.96	0.003532	5	2897	5	0.41	1.02	123.15	579.35
Reach-1	8143.07	10-yr	3400	6385.97	6380		6386.43	0.003767	5.4	3393	5.4	0.43	1.17	124.61	628.53
Reach-1	8143.07	25-yr	4600	6386.82	6380		6387.44	0.004225	6.2	4581	6.3	0.46	1.49	127.71	736.21
Reach-1	8143.07	50-yr	5300	6387.27	6380		6387.97	0.004451	6.7	5271	6.8	0.48	1.67	129.33	793.57
Reach-1	8143.07	100-yr	6200	6387.81	6380		6388.63	0.004682	7.2	6157	7.3	0.5	1.88	131.31	864.65
Reach-1	8155.07	2-yr	2200	6384.97	6380		6385.31	0.003619	4.6	2200	4.6	0.4	0.93	114.29	476.79
Reach-1	8155.07	5-yr	2900	6385.58	6380		6386.02	0.004057	5.3	2898	5.3	0.44	1.15	119.25	548.08
Reach-1	8155.07	10-yr	3400	6385.98	6380		6386.49	0.004311	5.7	3395	5.7	0.46	1.3	120.67	595.47
Reach-1	8155.07	25-yr	4600	6386.83	6380		6387.51	0.0048	6.6	4584	6.6	0.49	1.66	123.71	699.28
Reach-1	8155.07	50-yr	5300	6387.27	6380		6388.05	0.005046	7	5275	7.1	0.51	1.85	125.3	754.42
Reach-1	8155.07	100-yr	6200	6387.81	6380		6388.72	0.005293	7.5	6161	7.6	0.53	2.09	127.24	822.8
Reach-1	8175.07	2-yr	2200	6387.3	6385	6387.3	6388.39	0.028634	8.4	2199	8.4	1.01	3.8	122.77	262.89
Reach-1	8175.07	5-yr	2900	6387.75	6385	6387.75	6389.05	0.026906	9.1	2896	9.2	1.01	4.25	124.4	317.69
Reach-1	8175.07	10-yr	3400	6388.04	6385	6388.04	6389.48	0.025899	9.6	3394	9.6	1.01	4.53	125.49	354.72
Reach-1	8175.07	25-yr	4600	6388.7	6385	6388.7	6390.43	0.024028	10.5	4585	10.6	1.01	5.08	127.89	437.92
Reach-1	8175.07	50-yr	5300	6389.03	6385	6389.03	6390.95	0.023475	11	5278	11.1	1.01	5.39	129.11	481.09
Reach-1	8175.07	100-yr	6200	6389.46	6385	6389.46	6391.57	0.022595	11.6	6167	11.7	1.02	5.71	130.66	536.26
Reach-1	8193.07	2-yr	2200	6388.06	6384.98	6387.37	6388.71	0.00913	6.4	2194	6.4	0.68	1.59	122.57	344.91
Reach-1	8193.07	5-yr	2900	6388.55	6384.98	6387.81	6389.36	0.00949	7.2	2886	7.3	0.71	1.91	124.58	404.59
Reach-1	8193.07	10-yr	3400	6388.86	6384.98	6388.12	6389.8	0.009706	7.7	3379	7.8	0.73	2.11	125.88	443.72
Reach-1	8193.07	25-yr	4600	6389.53	6384.98	6388.78	6390.75	0.01018	8.7	4556	8.9	0.77	2.58	128.66	528.61
Reach-1	8193.07	50-yr	5300	6389.9	6384.98	6389.14	6391.27	0.010267	9.2	5239	9.4	0.79	2.8	130.2	576.64
Reach-1	8193.07	100-yr	6200	6390.33	6384.98	6389.58	6391.9	0.01046	9.8	6114	10.1	0.81	3.09	132.01	633.36

Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	8079.87	2-yr	2200	6381.01	6376.78		6381.55	0.005438	5.8	2200	5.8	0.53	1.26	99.37	376.08
Reach-1	8079.87	5-yr	2900	6382.35	6376.78		6382.85	0.003662	5.6	2900	5.6	0.45	1.09	106.07	513.76
Reach-1	8079.87	10-yr	3400	6382.4	6376.78		6383.07	0.00488	6.5	3400	6.5	0.52	1.46	106.32	519.1
Reach-1	8079.87	25-yr	4600	6383.59	6376.78		6384.37	0.004586	7.1	4600	7.1	0.52	1.62	112.25	648.72
Reach-1	8079.87	50-yr	5300	6384.16	6376.78		6385.02	0.004595	7.4	5300	7.4	0.53	1.74	115.09	713.26
Reach-1	8079.87	100-yr	6200	6384.86	6376.78		6385.79	0.004959	7.7	6200	7.7	0.55	1.84	131.87	803.58
Reach-1	8086.83	2-yr	2200	6381.23	6375.78		6381.58	0.003346	4.8	2200	4.8	0.39	0.96	98.53	462.79
Reach-1	8086.83	5-yr	2900	6382.5	6375.78		6382.87	0.00279	4.9	2900	4.9	0.36	0.96	104.89	592.21
Reach-1	8086.83	10-yr	3400	6382.61	6375.78		6383.1	0.003621	5.6	3400	5.6	0.41	1.26	105.44	603.82
Reach-1	8086.83	25-yr	4600	6383.79	6375.78		6384.4	0.003772	6.3	4600	6.3	0.43	1.51	111.34	731.58
Reach-1	8086.83	50-yr	5300	6384.36	6375.78		6385.05	0.003918	6.7	5300	6.7	0.44	1.66	114.19	795.88
Reach-1	8086.83	100-yr	6200	6385.06	6375.78		6385.82	0.004447	7	6200	7	0.48	1.82	131.65	884.43
Reach-1	8098.87	2-yr	2200	6381.26	6375.78		6381.64	0.003681	5	2200	5	0.41	1.05	94.32	442.12
Reach-1	8098.87	5-yr	2900	6382.52	6375.78		6382.93	0.003088	5.1	2900	5.1	0.38	1.06	100.6	565.18
Reach-1	8098.87	10-yr	3400	6382.64	6375.78		6383.18	0.003999	5.9	3400	5.9	0.44	1.39	101.17	576.76
Reach-1	8098.87	25-yr	4600	6383.81	6375.78		6384.48	0.004174	6.6	4600	6.6	0.45	1.65	107.01	698.9
Reach-1	8098.87	50-yr	5300	6384.38	6375.78		6385.13	0.004337	7	5300	7	0.47	1.82	109.84	760.47
Reach-1	8098.87	100-yr	6200	6385.06	6375.78		6385.92	0.004458	7.4	6200	7.4	0.48	1.99	113.41	836.86
Reach-1	8114.07	2-yr	2200	6382.88	6380.1	6382.88	6384.19	0.02738	9.2	2200	9.2	1.01	4.37	92.34	239.21
Reach-1	8114.07	5-yr	2900	6383.43	6380.1	6383.43	6384.98	0.025896	10	2900	10	1.01	4.88	94.81	290.39
Reach-1	8114.07	10-yr	3400	6383.79	6380.1	6383.79	6385.49	0.025044	10.5	3400	10.5	1	5.19	96.44	325.08
Reach-1	8114.07	25-yr	4600	6384.58	6380.1	6384.58	6386.61	0.023683	11.4	4600	11.4	1	5.84	100	402.54
Reach-1	8114.07	50-yr	5300	6385	6380.1	6385	6387.2	0.023036	11.9	5300	11.9	1	6.16	101.92	445.52
Reach-1	8114.07	100-yr	6200	6385.5	6380.1	6385.5	6387.92	0.022461	12.5	6200	12.5	1.01	6.52	104.47	496.59
Reach-1	8117.07	2-yr	2200	6383.63	6381	6383.63	6384.8	0.028338	8.7	2200	8.7	1.01	4.04	110.26	253.65
Reach-1	8117.07	5-yr	2900	6384.12	6381	6384.12	6385.49	0.026659	9.4	2900	9.4	1	4.49	113.08	308.18
Reach-1	8117.07	10-yr	3400	6384.44	6381	6384.44	6385.95	0.025745	9.9	3400	9.9	1	4.78	114.94	344.98
Reach-1	8117.07	25-yr	4600	6385.13	6381	6385.13	6386.94	0.024138	10.8	4600	10.8	1.02	5.19	122.44	426.65
Reach-1	8117.07	50-yr	5300	6385.52	6381	6385.52	6387.48	0.023019	11.2	5295	11.2	1.02	5.37	125.42	474.61
Reach-1	8117.07	100-yr	6200	6385.96	6381	6385.96	6388.12	0.022361	11.7	6184	11.8	1.02	5.74	127.08	530.03

Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7868.73	2-yr	2200	6378.61	6375.8	6378.61	6379.92	0.022095	9.2	2200	9.2	1.01	3.53	92.36	239.38
Reach-1	7868.73	5-yr	3300	6379.45	6375.8	6379.45	6381.11	0.020404	10.4	3300	10.4	1	4.14	96.63	318.74
Reach-1	7868.73	10-yr	3500	6379.58	6375.8	6379.58	6381.31	0.020258	10.5	3500	10.5	1.01	4.25	97.32	331.91
Reach-1	7868.73	25-yr	4800	6380.59	6375.8	6380.59	6382.5	0.019624	11.1	4800	11.1	1.01	4.54	115.13	433.35
Reach-1	7868.73	50-yr	5500	6380.96	6375.8	6380.96	6383.03	0.019038	11.5	5500	11.5	1.01	4.79	116.52	476.67
Reach-1	7868.73	100-yr	6400	6381.43	6375.8	6381.43	6383.68	0.018462	12.1	6400	12.1	1	5.08	118.24	530.89
Reach-1	7883.17	2-yr	2200	6379.38	6375.8	6378.56	6380.11	0.009142	6.9	2200	6.9	0.67	1.83	98.58	320.47
Reach-1	7883.17	5-yr	3300	6380.38	6375.8	6379.39	6381.32	0.010086	7.8	3300	7.8	0.72	2.27	115.81	423.48
Reach-1	7883.17	10-yr	3500	6380.55	6375.8	6379.52	6381.52	0.009812	7.9	3500	7.9	0.71	2.3	116.56	443.56
Reach-1	7883.17	25-yr	4800	6381.56	6375.8	6380.48	6382.69	0.008567	8.5	4798	8.5	0.7	2.43	121.84	564.04
Reach-1	7883.17	50-yr	5500	6381.98	6375.8	6380.84	6383.23	0.008514	8.9	5494	9	0.71	2.6	123.45	615.26
Reach-1	7883.17	100-yr	6400	6382.48	6375.8	6381.29	6383.89	0.008452	9.4	6388	9.5	0.72	2.79	125.17	677.42
Reach-1	7906.07	2-yr	2200	6379.78	6375.94		6380.33	0.00622	5.9	2200	5.9	0.56	1.34	105.87	370.13
Reach-1	7906.07	5-yr	3300	6380.88	6375.94		6381.57	0.006148	6.6	3298	6.6	0.58	1.52	123.72	499.94
Reach-1	7906.07	10-yr	3500	6381.05	6375.94		6381.76	0.006069	6.7	3497	6.8	0.58	1.56	124.27	520.4
Reach-1	7906.07	25-yr	4800	6382.04	6375.94		6382.91	0.005723	7.4	4787	7.5	0.59	1.76	127.5	644.44
Reach-1	7906.07	50-yr	5500	6382.47	6375.94		6383.45	0.005749	7.8	5480	8	0.6	1.9	128.94	700.72
Reach-1	7906.07	100-yr	6400	6383	6375.94		6384.11	0.005783	8.3	6367	8.5	0.61	2.07	130.67	769.36
Reach-1	8051.07		Bridge												
Reach-1	8056.07	2-yr	2200	6380.93	6376.69	6379.41	6381.41	0.004867	5.6	2200	5.6	0.5	1.14	104	395.85
Reach-1	8056.07	5-yr	3300	6382.12	6376.69	6380.22	6382.74	0.004675	6.3	3300	6.3	0.51	1.36	109.95	523.2
Reach-1	8056.07	10-yr	3500	6382.31	6376.69	6380.35	6382.95	0.004668	6.4	3500	6.4	0.51	1.4	110.9	544.22
Reach-1	8056.07	25-yr	4800	6383.47	6376.69	6381.17	6384.25	0.005238	7.1	4800	7.1	0.55	1.67	130.47	678.07
Reach-1	8056.07	50-yr	5500	6384.06	6376.69	6381.57	6384.89	0.004798	7.3	5500	7.3	0.54	1.68	131.94	756.25
Reach-1	8056.07	100-yr	6400	6384.78	6376.69	6382.07	6385.66	0.004401	7.5	6398	7.5	0.53	1.7	133.66	851.37
Reach-1	8076.07	2-yr	2200	6381	6376.78		6381.52	0.005333	5.8	2200	5.8	0.52	1.24	100.57	380.08
Reach-1	8076.07	5-yr	2900	6382.35	6376.78		6382.83	0.003568	5.6	2900	5.6	0.45	1.06	107.31	520.16
Reach-1	8076.07	10-yr	3400	6382.4	6376.78		6383.05	0.004761	6.5	3400	6.5	0.52	1.42	107.55	525.3
Reach-1	8076.07	25-yr	4600	6383.59	6376.78		6384.35	0.004463	7	4600	7	0.51	1.58	113.49	656.81
Reach-1	8076.07	50-yr	5300	6384.16	6376.78		6384.99	0.005104	7.3	5300	7.3	0.55	1.74	130.25	724.71
Reach-1	8076.07	100-yr	6200	6384.86	6376.78		6385.76	0.004711	7.6	6199	7.6	0.54	1.77	132.85	817.37

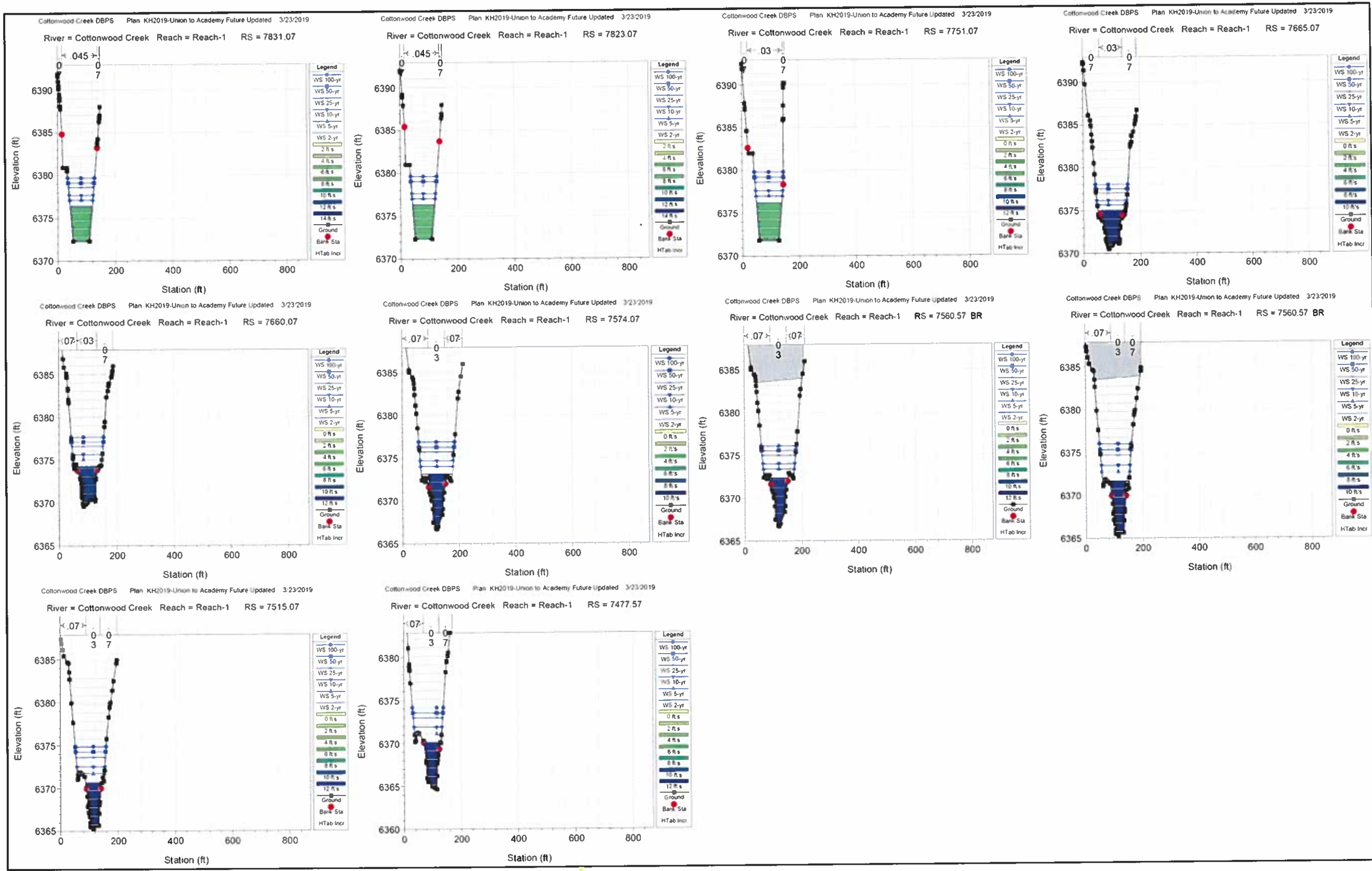
Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7751.07	2-yr	2200	6376.17	6371.8		6376.79	0.002727	6.3	2200	6.3	0.56	0.65	89.66	348.7
Reach-1	7751.07	5-yr	3300	6377.21	6371.8		6378.06	0.002946	7.4	3300	7.4	0.6	0.85	94.32	444.11
Reach-1	7751.07	10-yr	3500	6377.38	6371.8		6378.28	0.002964	7.6	3500	7.6	0.61	0.87	95.12	460.85
Reach-1	7751.07	25-yr	4800	6378.42	6371.8		6379.56	0.003064	8.5	4800	8.5	0.63	1.05	99.61	562.45
Reach-1	7751.07	50-yr	5500	6378.93	6371.8		6380.18	0.003068	9	5500	9	0.64	1.13	100.67	612.81
Reach-1	7751.07	100-yr	6400	6379.54	6371.8		6380.94	0.003062	9.5	6400	9.5	0.65	1.22	101.97	675.09
Reach-1	7823.07	2-yr	2200	6376.25	6372.3		6377.26	0.011571	8.1	2200	8.1	0.76	2.48	77.68	272.33
Reach-1	7823.07	5-yr	3300	6377.22	6372.3		6378.6	0.01222	9.4	3300	9.4	0.81	3.17	81.97	349.67
Reach-1	7823.07	10-yr	3500	6377.38	6372.3		6378.83	0.012264	9.6	3500	9.6	0.81	3.28	82.7	363.22
Reach-1	7823.07	25-yr	4800	6378.35	6372.3		6380.16	0.012597	10.8	4800	10.8	0.84	3.91	86.96	444.94
Reach-1	7823.07	50-yr	5500	6378.81	6372.3	6378.19	6380.8	0.012801	11.3	5500	11.3	0.86	4.22	88.99	485.24
Reach-1	7823.07	100-yr	6400	6379.37	6372.3	6378.77	6381.58	0.012918	11.9	6400	11.9	0.87	4.57	91.49	536.26
Reach-1	7831.07	2-yr	2200	6376.32	6372.3		6377.37	0.012018	8.2	2200	8.2	0.78	2.57	76.67	267.64
Reach-1	7831.07	5-yr	3300	6377.29	6372.3		6378.71	0.012739	9.6	3300	9.6	0.82	3.28	81.51	344.22
Reach-1	7831.07	10-yr	3500	6377.45	6372.3		6378.94	0.01282	9.8	3500	9.8	0.83	3.39	82.32	357.38
Reach-1	7831.07	25-yr	4800	6378.41	6372.3		6380.27	0.013138	10.9	4800	10.9	0.86	4.02	87.14	439.17
Reach-1	7831.07	50-yr	5500	6378.88	6372.3		6380.92	0.013283	11.5	5500	11.5	0.87	4.33	89.47	480.27
Reach-1	7831.07	100-yr	6400	6379.45	6372.3		6381.7	0.013359	12	6400	12	0.88	4.67	92.32	532.02
Reach-1	7835.07	2-yr	2200	6376.92	6371.3		6377.45	0.004187	5.8	2200	5.8	0.48	1.18	81.06	376.47
Reach-1	7835.07	5-yr	3300	6378.05	6371.3		6378.81	0.004884	7	3300	7	0.53	1.61	86.72	471.62
Reach-1	7835.07	10-yr	3500	6378.24	6371.3		6379.04	0.004981	7.2	3500	7.2	0.54	1.68	87.65	487.88
Reach-1	7835.07	25-yr	4800	6379.35	6371.3		6380.38	0.005466	8.2	4800	8.2	0.57	2.08	93.19	588.32
Reach-1	7835.07	50-yr	5500	6379.88	6371.3		6381.03	0.005665	8.6	5500	8.6	0.59	2.28	95.87	639.1
Reach-1	7835.07	100-yr	6400	6380.53	6371.3		6381.82	0.005869	9.1	6400	9.1	0.6	2.51	99.09	702.12
Reach-1	7850.74	2-yr	2200	6377.02	6371.3		6377.51	0.00376	5.6	2200	5.6	0.45	1.08	82.84	392.17
Reach-1	7850.74	5-yr	3300	6378.19	6371.3		6378.89	0.004366	6.7	3300	6.7	0.5	1.47	88.66	492.07
Reach-1	7850.74	10-yr	3500	6378.38	6371.3		6379.11	0.004451	6.9	3500	6.9	0.51	1.53	89.62	509.09
Reach-1	7850.74	25-yr	4800	6379.52	6371.3		6380.47	0.004858	7.8	4800	7.8	0.54	1.89	95.35	615.08
Reach-1	7850.74	50-yr	5500	6380.08	6371.3		6381.13	0.00503	8.2	5500	8.2	0.56	2.07	98.11	668.4
Reach-1	7850.74	100-yr	6400	6380.76	6371.3		6381.93	0.005983	8.7	6400	8.7	0.6	2.34	114.4	738.26

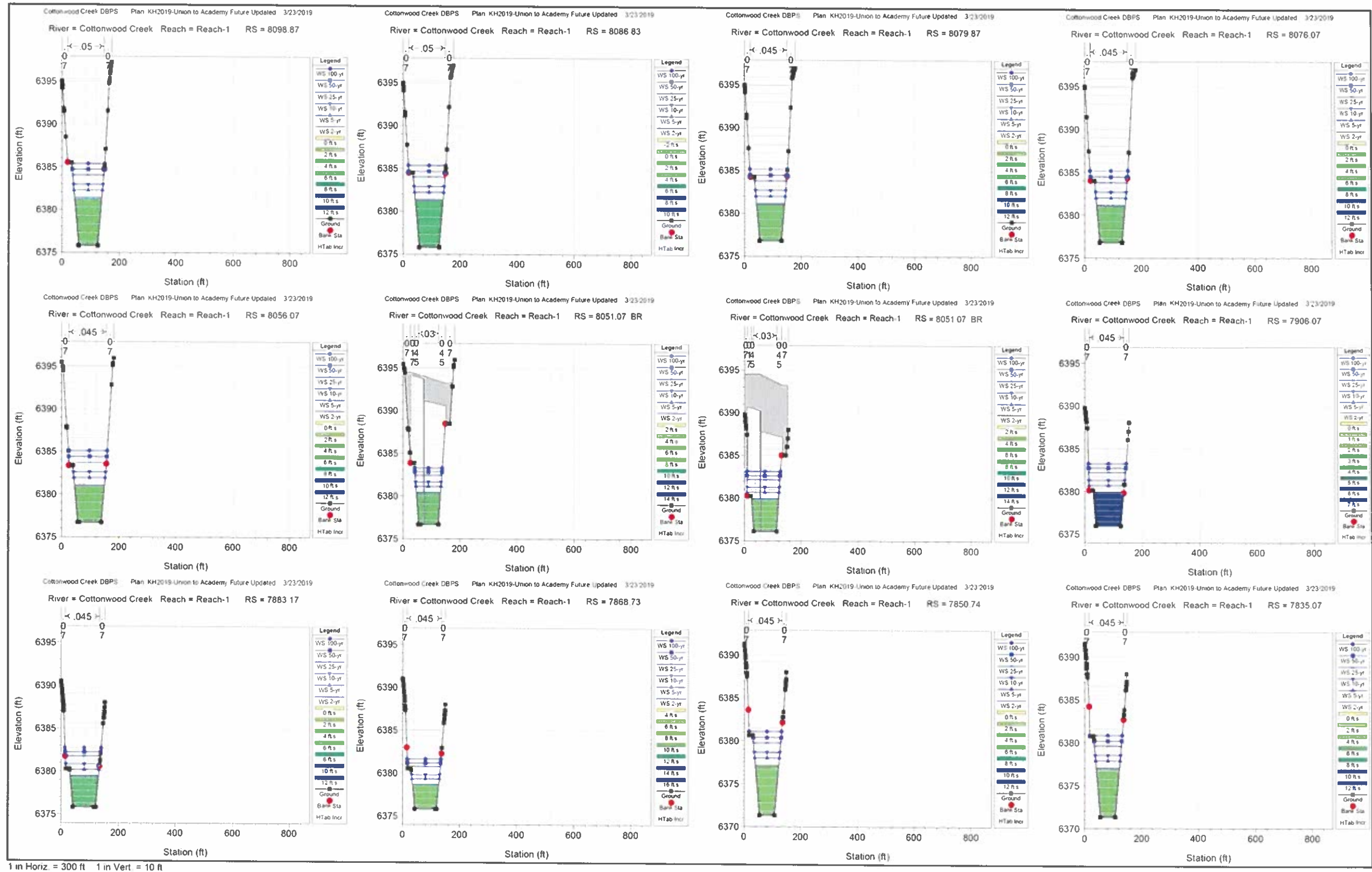
Cottonwood Creek Channel Results – Union Boulevard to Academy Boulevard - Existing Conditions

Reach	River Sta	Profile	Q Total (cfs)	W.S. Elev (ft)	Min Ch El (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Q Channel (cfs)	Vel Chnl (ft/s)	Froude # XS	Shear Total (lb/sq ft)	Top Width (ft)	Area (sq ft)
Reach-1	7477.57	2-yr	2200	6370.06	6364.67	6370.06	6371.93	0.009112	10.9	2199	11	1.03	1.89	57.47	201.55
Reach-1	7477.57	5-yr	3300	6371.4	6364.67	6371.4	6373.58	0.007178	10.9	3253	11.9	1.17	1.37	95.18	303.35
Reach-1	7477.57	10-yr	3500	6371.61	6364.67	6371.61	6373.84	0.007005	10.8	3433	12.1	1.15	1.41	96.1	322.96
Reach-1	7477.57	25-yr	4800	6372.74	6364.67	6372.74	6375.35	0.006495	11	4568	13.3	1.1	1.67	101.16	434.59
Reach-1	7477.57	50-yr	5500	6373.29	6364.67	6373.29	6376.07	0.006307	11.2	5160	13.8	1.08	1.78	103.6	490.68
Reach-1	7477.57	100-yr	6400	6373.91	6364.67	6373.91	6376.95	0.006216	11.5	5914	14.5	1.08	1.94	106.4	556.41
Reach-1	7515.07	2-yr	2200	6370.54	6365.27	6370.54	6372.5	0.008808	11.1	2199	11.2	1.04	1.89	54.59	197.42
Reach-1	7515.07	5-yr	3300	6371.99	6365.27	6371.99	6374.25	0.006808	11	3252	12.1	1.19	1.3	94.61	300.64
Reach-1	7515.07	10-yr	3500	6372.22	6365.27	6372.22	6374.52	0.006575	10.8	3427	12.3	1.17	1.33	95.57	322.69
Reach-1	7515.07	25-yr	4800	6373.41	6365.27	6373.41	6376.07	0.006112	10.9	4540	13.4	1.1	1.6	100.54	438.89
Reach-1	7515.07	50-yr	5500	6373.97	6365.27	6373.97	6376.82	0.005975	11.1	5120	14	1.09	1.72	102.89	495.96
Reach-1	7515.07	100-yr	6400	6374.62	6365.27	6374.62	6377.72	0.005908	11.4	5856	14.7	1.08	1.88	105.6	563.4
Reach-1	7560.57		Bridge												
Reach-1	7574.07	2-yr	2200	6373	6366.71	6372.27	6374.19	0.004785	8.1	2177	8.8	0.97	0.74	107.48	272.75
Reach-1	7574.07	5-yr	3300	6374.26	6366.71	6373.57	6375.66	0.004184	8	3128	9.7	0.88	0.92	113.94	412.11
Reach-1	7574.07	10-yr	3500	6374.42	6366.71	6373.77	6375.89	0.004239	8.1	3300	10	0.88	0.96	114.75	430.2
Reach-1	7574.07	25-yr	4800	6375.51	6366.71	6374.75	6377.27	0.004148	8.6	4374	11.1	0.87	1.16	120.35	558.66
Reach-1	7574.07	50-yr	5500	6376.02	6366.71	6375.25	6377.94	0.00416	8.9	4941	11.7	0.87	1.27	122.96	620.55
Reach-1	7574.07	100-yr	6400	6376.61	6366.71	6375.82	6378.74	0.004214	9.2	5662	12.4	0.88	1.4	125.92	694.15
Reach-1	7660.07	2-yr	2200	6374.19	6369.58	6374.19	6375.79	0.009312	10.1	2199	10.2	1.08	1.54	80.04	218.65
Reach-1	7660.07	5-yr	3300	6375.27	6369.58	6375.27	6377.18	0.007669	10.3	3243	11.2	1.09	1.49	100.21	321.25
Reach-1	7660.07	10-yr	3500	6375.44	6369.58	6375.44	6377.41	0.007511	10.3	3428	11.4	1.09	1.52	101.88	338.73
Reach-1	7660.07	25-yr	4800	6376.4	6369.58	6376.4	6378.77	0.007102	10.9	4607	12.6	1.07	1.77	106.91	438.69
Reach-1	7660.07	50-yr	5500	6376.89	6369.58	6376.89	6379.43	0.006854	11.2	5228	13.1	1.06	1.87	109.15	491.55
Reach-1	7660.07	100-yr	6400	6377.44	6369.58	6377.44	6380.23	0.006761	11.6	6021	13.8	1.06	2.02	111.58	552.13
Reach-1	7665.07	2-yr	2200	6374.93	6370.48	6374.93	6376.32	0.009288	9.2	2192	9.5	1.06	1.41	96.16	238.28
Reach-1	7665.07	5-yr	3300	6375.82	6370.48	6375.82	6377.58	0.008228	10.1	3254	10.7	1.05	1.6	103.05	327.48
Reach-1	7665.07	10-yr	3500	6375.96	6370.48	6375.96	6377.79	0.008209	10.3	3445	10.9	1.06	1.65	103.76	341.26
Reach-1	7665.07	25-yr	4800	6376.83	6370.48	6376.83	6379.05	0.007676	11.1	4672	12.1	1.05	1.88	108.42	433.93
Reach-1	7665.07	50-yr	5500	6377.28	6370.48	6377.28	6379.67	0.007365	11.4	5323	12.6	1.05	1.96	110.46	483.37
Reach-1	7665.07	100-yr	6400	6377.81	6370.48	6377.81	6380.43	0.007141	11.8	6156	13.2	1.04	2.09	112.72	542.22

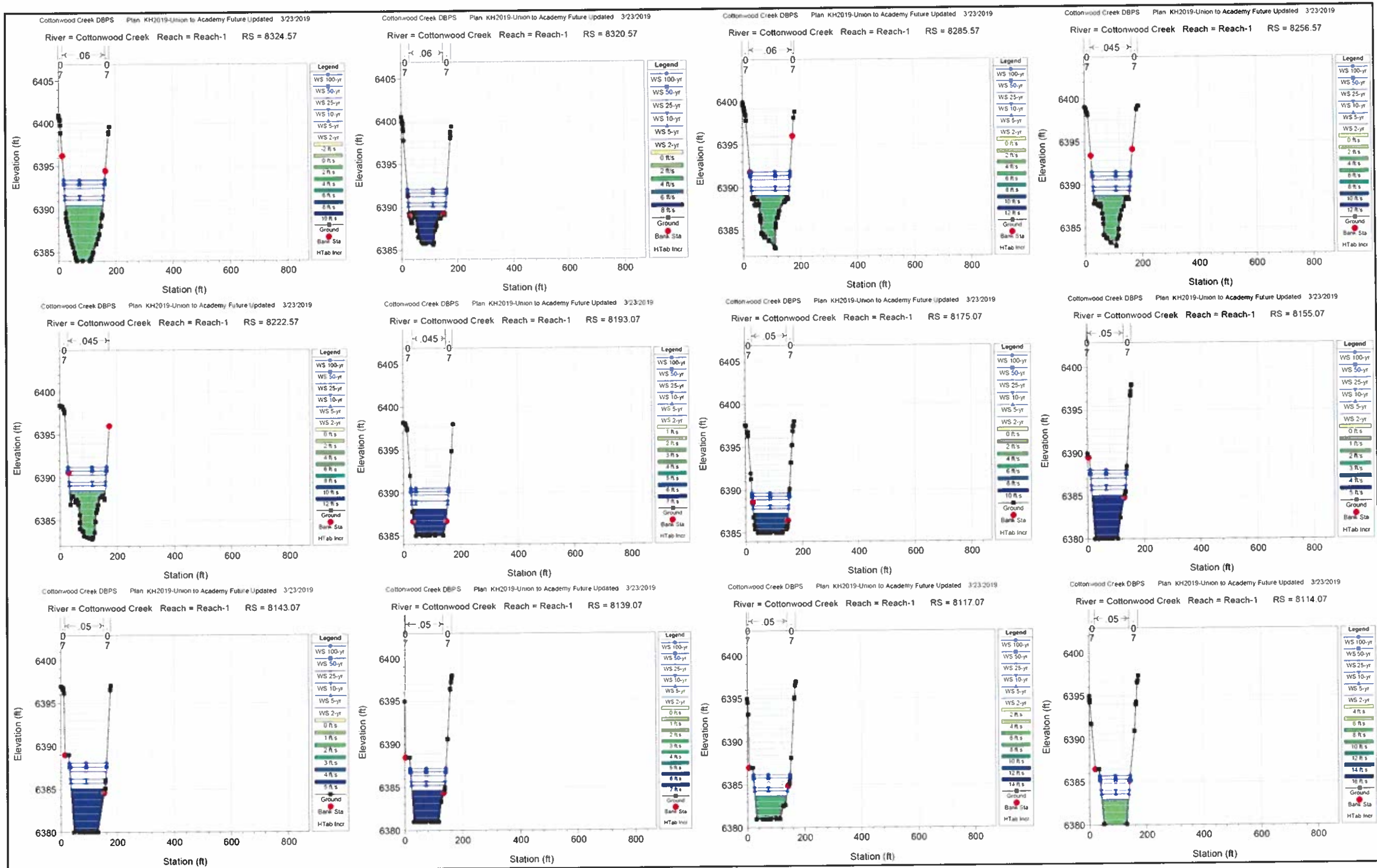
Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions



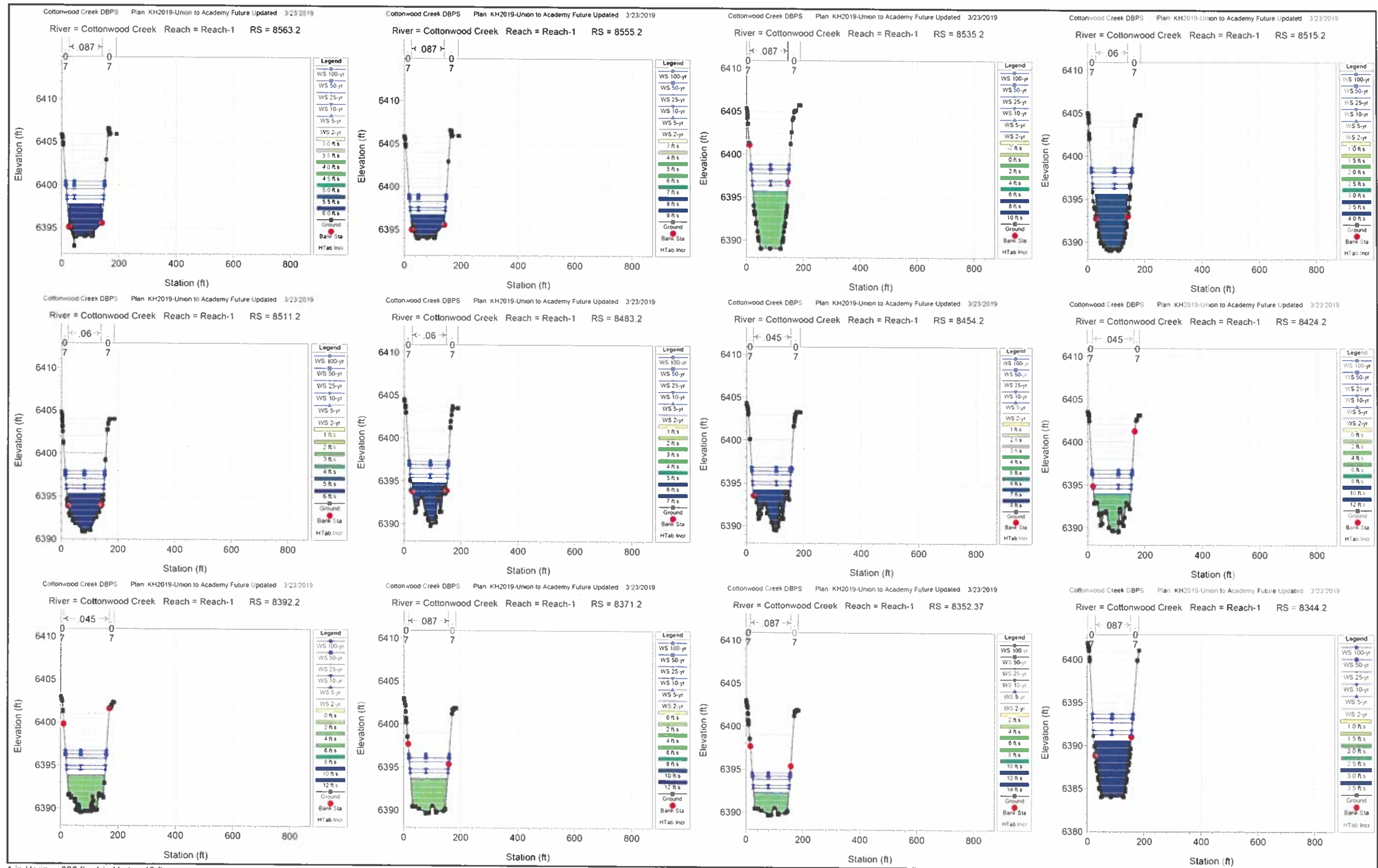
Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions



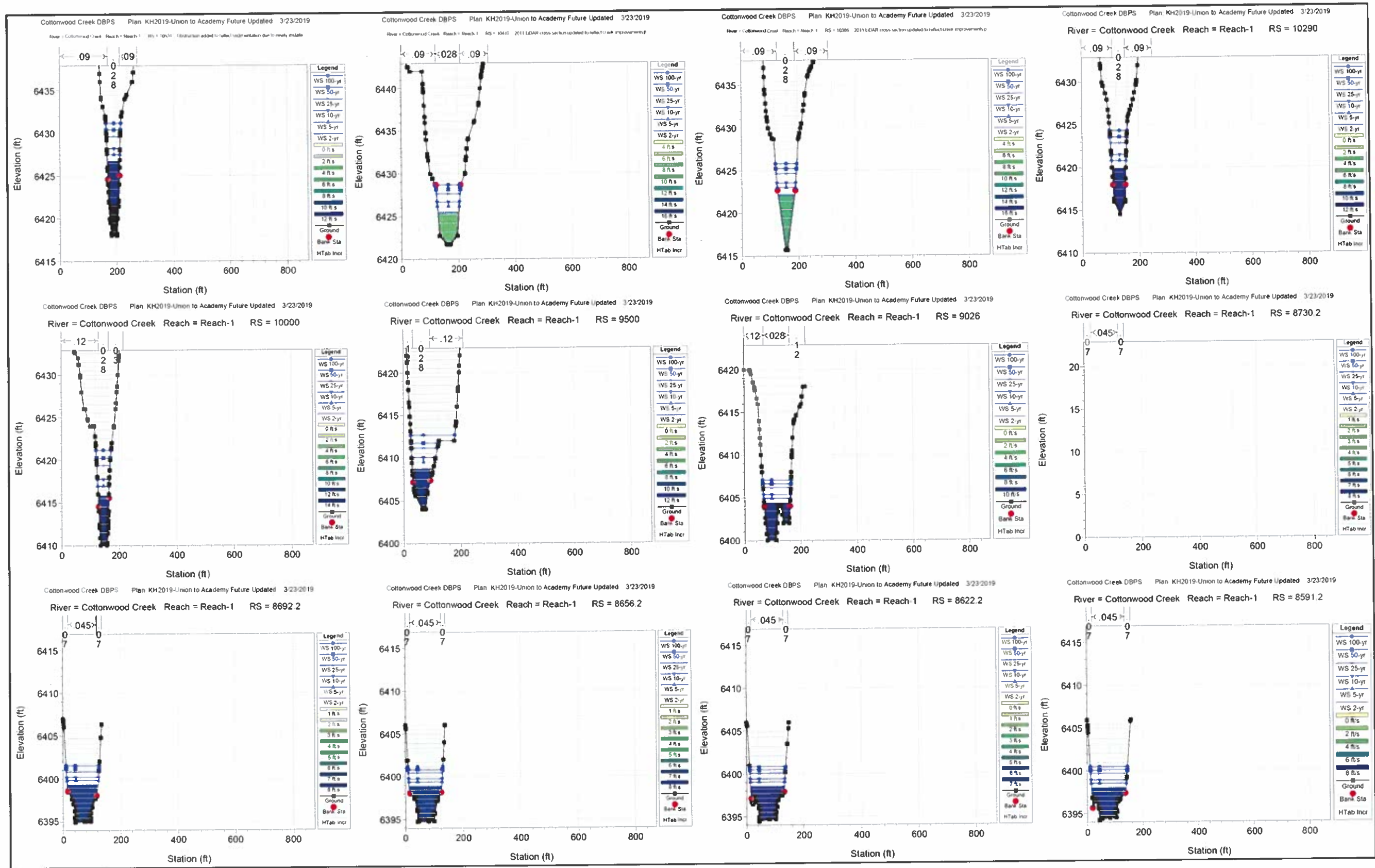
Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions



Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions

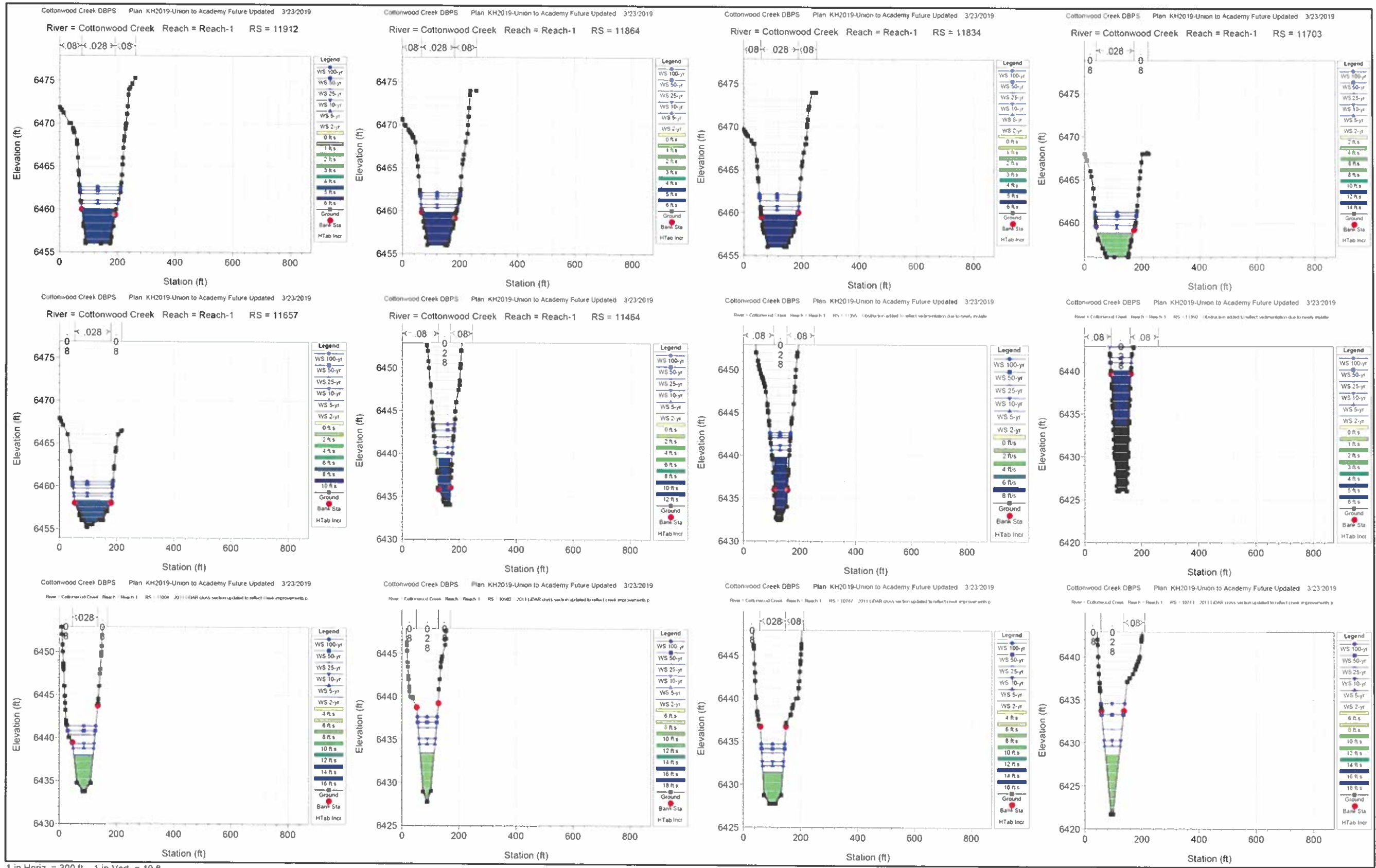


Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions

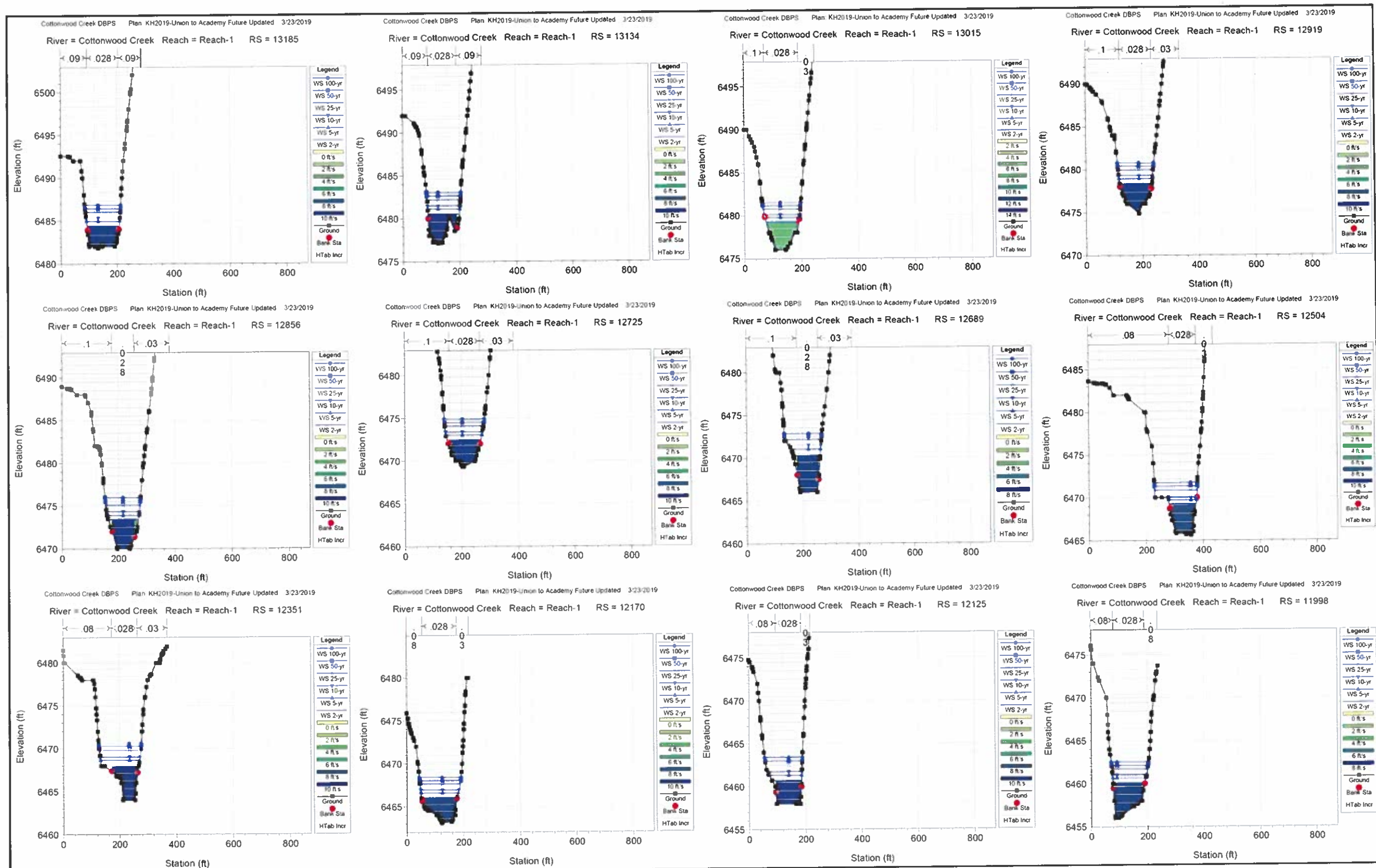


1 in Horiz = 300 ft 1 in Vert. = 10 ft

Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions

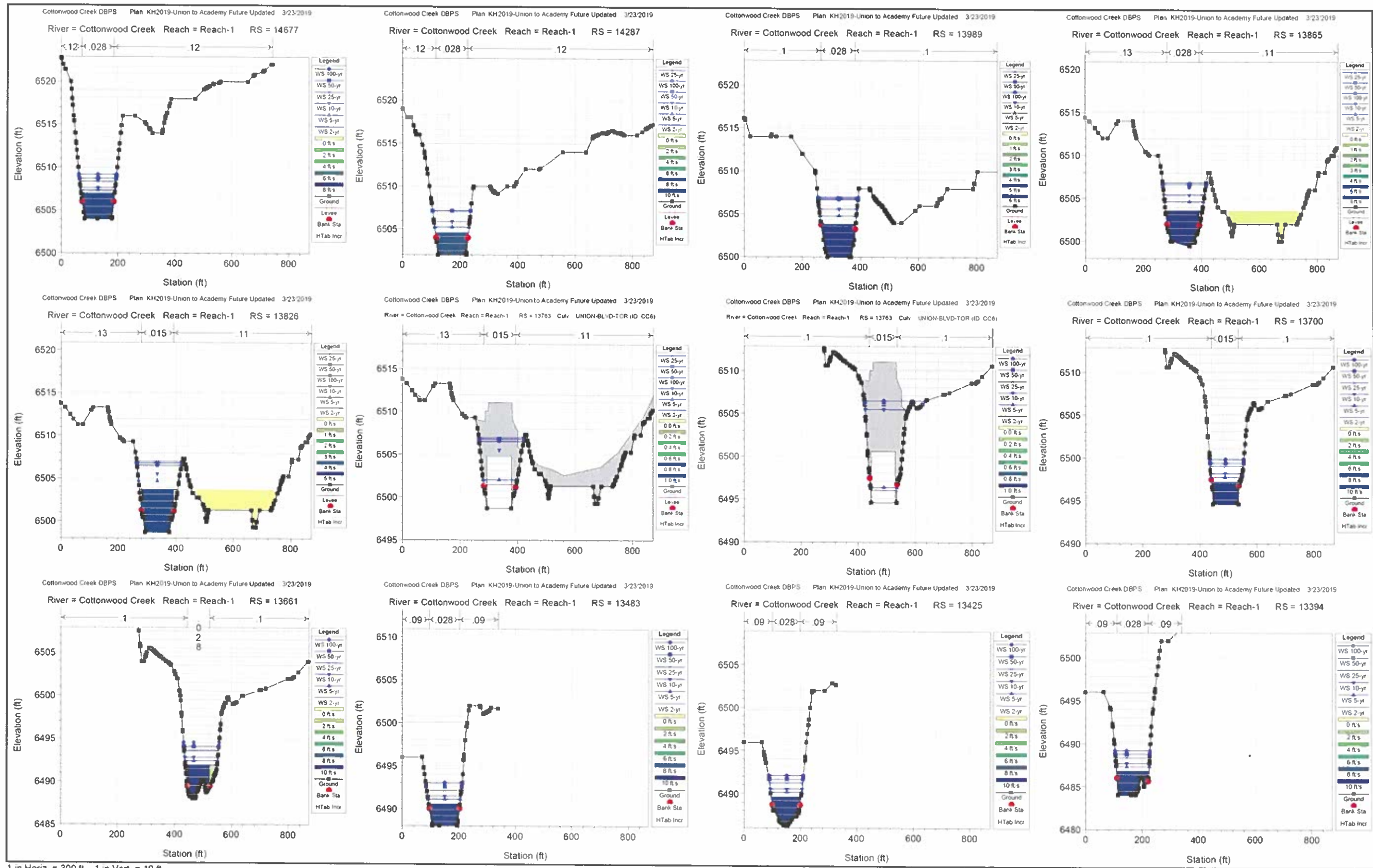


Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions



1 in Horiz = 300 ft 1 in Vert = 10 ft

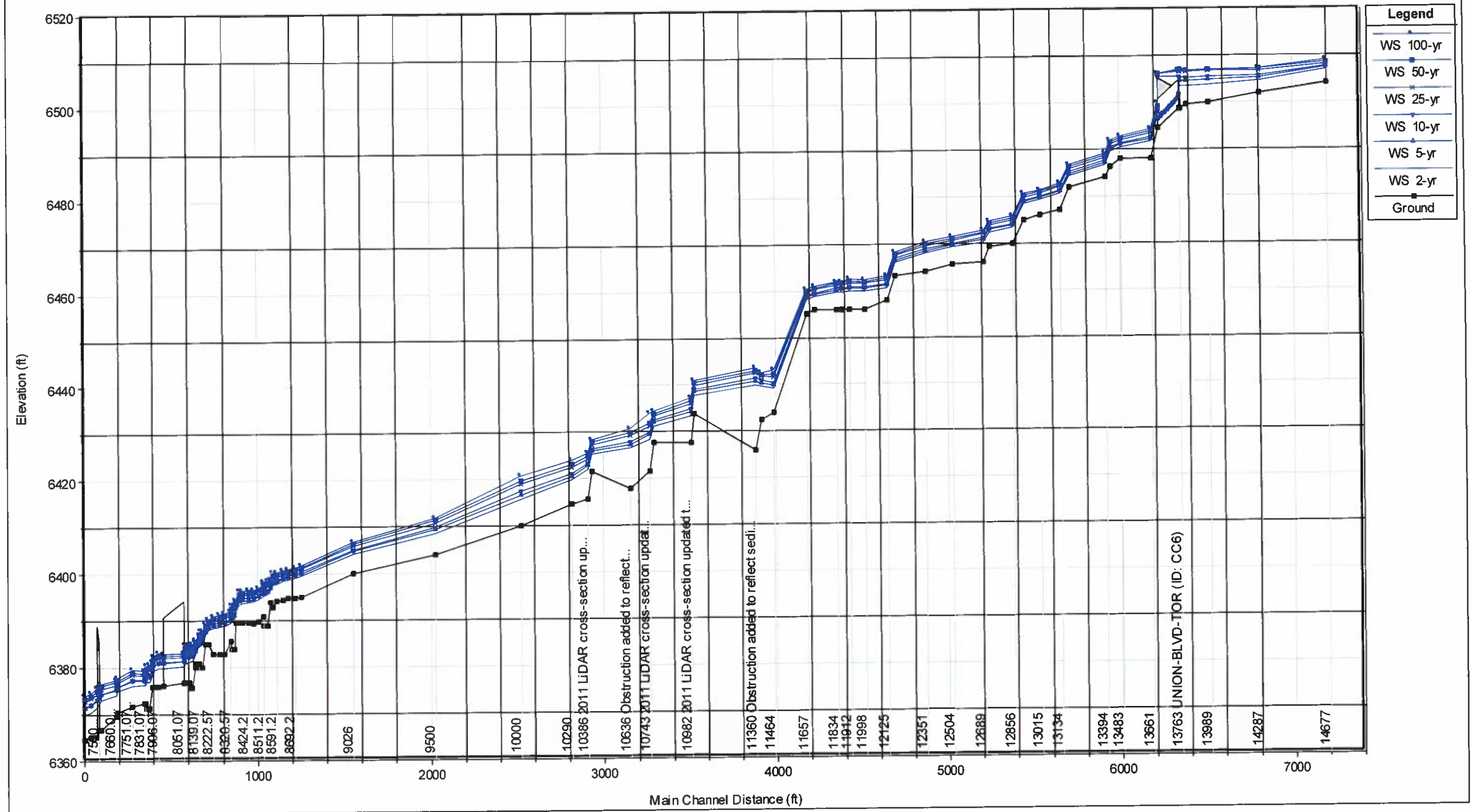
Cottonwood Creek HEC – RAS Cross Sections – Union Boulevard to Academy Boulevard – Future Conditions



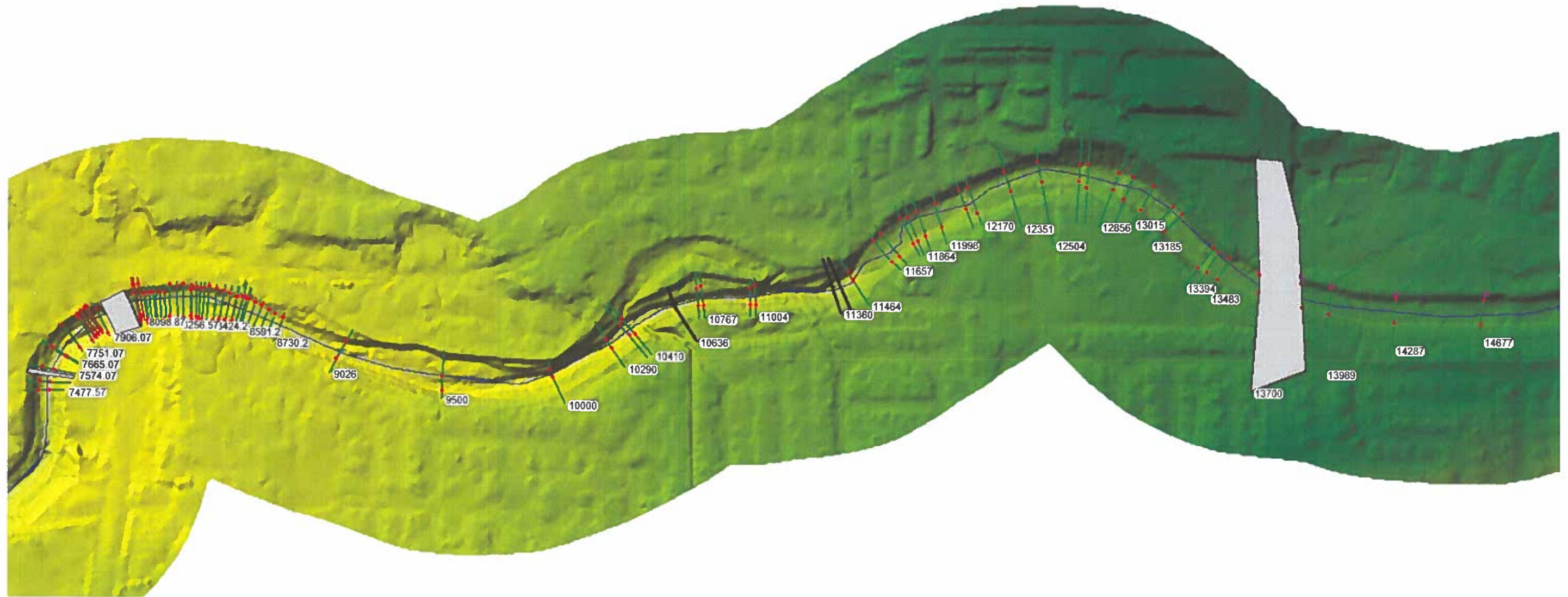
1 in Horiz = 300 ft 1 in Vert = 10 ft

Cottonwood Creek Water Surface Profiles - Union Boulevard to Academy Boulevard - Future Conditions

Cottonwood Creek DBPS Plan: KH2019-Union to Academy Ext Updated 3/23/2019



Cottonwood Creek - Union Boulevard to Academy Boulevard - HEC - RAS Cross Section Locations



Cottonwood Creek & South Pine Creek DBPS – HEC-RAS Steady Flow Data

Cottonwood Creek Main Stem Flow Profile Points														
Reach	Flow Change Location		Existing Flows Profile (cfs)						Future Flow Profile (cfs) ¹					
	HEC-HMS Junction	HEC-RAS Cross Section	2yr	5yr	10yr	25yr	50yr	100yr	2yr	5yr	10yr	25yr	50yr	100yr
Black Forest to Rangewood	JUC160	42458	78	180	300	640	850	1,100	78	180	300	640	850	1,100
	JMC052	38160	560	750	890	1,400	1,900	2,400	560	750	970	1,600	2,000	2,400
	JMC056	34211	630	840	990	1,500	2,000	2,500	630	840	1,000	1,700	2,100	2,600
	JMC172	31503	810	1,100	1,300	1,800	2,400	3,000	810	1,100	1,300	2,000	2,500	3,100
	JMC242	26035	790	1,100	1,200	2,000	2,600	3,300	920	1,300	1,600	2,300	2,700	3,500
	JLC032	20354	1,700	2,300	2,700	3,600	4,200	5,100	1,900	2,400	3,000	4,000	4,600	5,300
	JLC034	20164	1,800	2,400	2,800	3,700	4,300	5,200	1,900	2,500	3,000	4,100	4,800	5,500
Union to Academy	JLC084	14677	2,100	2,800	3,300	4,400	5,100	5,900	2,200	2,900	3,500	4,800	5,500	6,300
	JLC100	13661	2,100	2,800	3,300	4,500	5,200	6,000	2,200	3,000	3,600	4,800	5,600	6,400
	JLC150	8056.07	2,200	3,300	3,500	4,800	5,500	6,400	2,300	3,100	3,800	5,100	5,900	6,800

Rangewood Tributary Flow Profile Points														
Reach	Flow Change Location		Existing Flows Profile (cfs)						Future Flow Profile (cfs)					
	HEC-HMS Junction	HEC-RAS Cross Section	2yr	5yr	10yr	25yr	50yr	100yr	2yr	5yr	10yr	25yr	50yr	100yr
Rangewood Tributary	JRT030	12148	61	81	95	110	120	130	61	81	95	110	120	130
	JRT052	9406	110	150	180	200	230	250	110	150	180	200	230	250
	JRT102	7212	430	570	670	770	870	970	430	570	670	770	870	970
	JRT104	6430	490	650	760	870	990	1,100	490	650	760	870	990	1,100
	JRT162	3788	740	980	1,100	1,300	1,500	1,600	740	980	1,100	1,300	1,500	1,600
	JRT166	1043	990	1,300	1,500	1,700	2,000	2,200	990	1,300	1,500	1,700	2,000	2,200

1. When future flows were estimated to be less than existing flows, the existing flow value was applied.

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Appendix B. Hydraulic Analysis

**Cottonwood Creek DBPS
Gage Analysis**

Station - 07103985 COTTONWOOD CR TRIB AB RANGEWOOD DR AT CO SPRGS,																									
Station ID	7103985																								
Station Name	COTTONWOOD CR TRIB AB RANGEWOOD DR AT CO SPRGS,																								
Analysis - Type of Analysis	B17B	USGS Peak FQ vers. 7.1																							
BegYear - Beginning Year	1998																								
EngYear - Ending Year	2009																								
SkewOption - Skew Coefficient Option	Weighted																								
Skew - Skew Coefficient	-0.103																								
Mean	2.854																								
StandDev- Standard Deviation	0.484																								
AtSiteSkew - Station Skew Coefficient	-0.307																								
AtSite MSEG - Station Skew Coefficient Mean Square Error	0.6																								
Skew_Sys - Systematic Record Skew	-0.307																								
AtSiteMSEG_SYS - Mean square error of Station Skew Coefficient	0																								
RegSkew - Regional Skew	0																								
RegMSEG - Mean Square Error of Regional Skew Coefficient	0.303																								
SysPeaks - Number of Systemic Record Peaks	8																								
HisPeaks - Number of Historic Peaks	0																								
KENTAU - (unknown definition)	0.643																								
KENPLV - (unknown definition)	0.035																								
KENSLP - (unknown definition)	198.375																								
EXC_Prob - Exceedence Probability	0.995	0.99	0.98	0.975	0.96	0.95	0.9	0.8	0.7	0.6667	0.6	0.5704	0.5	0.4292	0.4	0.3	0.2	0.1	0.05	0.04	0.025	0.02	0.01	0.005	0.002
Estimate - Peak Flow Estimate for EXC_Prob	36.4	49.2	68.2	76.2	97.7	110.7	169.3	281.2	403.7	448.8	548.1	596.8	727.6	886.9	963.5	1298	1832	2937	4314	4820	5997	6609	8754	11290	15330
Variance	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Conf_Low - Peak Flow Lower Confidence Limit	3	5.1	8.9	10.8	16.5	20.4	41.3	93.1	160.6	187	246.5	276.1	355.3	449.8	494.1	678.6	947.2	1434	1965	2147	2548	2747	3405	4125	5177
Conf_Up - Peak Flow Upper Confidence Limit	105.2	131.8	168.8	183.9	223	246.1	348	543.5	772.4	862.4	1074	1184	1504	1941	2169	3305	5568	11850	22430	27040	39150	46220	74840	116200	197500
K-Value - confidence coefficient	-2.672	-2.402	-2.109	-2.008	-1.786	-1.674	-1.292	-0.8362	-0.5117	-0.4166	-0.2372	-0.1607	0.0172	0.1949	0.2693	0.5366	0.8462	1.27	1.615	1.715	1.911	1.998	2.25	2.479	2.754
Station - 07103985 COTTONWOOD CR TRIB AB RANGEWOOD DR AT CO SPRGS,																									
Station ID	7103986																								
Station Name	COTTONWOOD CR TRIB AB RANGEWOOD DR AT CO SPRGS,																								
Analysis - Type of Analysis	B17B	USGS Peak FQ vers. 7.2																							
BegYear - Beginning Year	2020																								
EngYear - Ending Year	2031																								
SkewOption - Skew Coefficient Option	Weighted																								
Skew - Skew Coefficient	49.6157																								
Mean	53.629518																								
StandDev- Standard Deviation	57.643335																								
AtSiteSkew - Station Skew Coefficient	61.657153																								
AtSite MSEG - Station Skew Coefficient Mean Square Error	65.670971																								
Skew_Sys - Systematic Record Skew	69.684788																								
AtSiteMSEG_SYS - Mean square error of Station Skew Coefficient	73.698606																								
RegSkew - Regional Skew	77.712424																								
RegMSEG - Mean Square Error of Regional Skew Coefficient	81.726241																								
SysPeaks - Number of Systemic Record Peaks	85.740059																								
HisPeaks - Number of Historic Peaks	89.753876																								
KENTAU - (unknown definition)	93.767694																								
KENPLV - (unknown definition)	97.781512																								
KENSLP - (unknown definition)	101.79533																								
EXC_Prob - Exceedence Probability	105.80915	97.41	135.42	151.425	194.44	220.45	337.7	561.6	806.7	896.9333	1095.6	1193.03	1454.7	1773.371	1926.6	2595.7	3663.8	5873.9	8627.95	9639.96	11993.98	13217.98	17507.99	22580	30660
Estimate - Peak Flow Estimate for EXC_Prob	109.82296	145.62	202.64	226.65	291.18	330.2	506.1	842	1209.7	1345.067	1643.1	1789.259	2181.8	2659.842	2889.7	3893.4	5495.6	8810.8	12941.9	14459.92	17990.95	19826.96	26261.98	33869.99	45990
Variance	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Conf_Low - Peak Flow Lower Confidence Limit	29.504	37.33067	47.52133	51.42267	60.952	66.20133	86.744	117.9851	149.7177	162.2445	193.3504	210.3857	264.4896	347.3932	393.9591	649.9821	1225.662	2995.693	6168.82	7584.287	11353.88	13578	22679.67	35986.64	62385.67
Conf_Up - Peak Flow Upper Confidence Limit	26.668	33.57967	42.01683	45.01867	51.809	55.16433	65.448	71.01697	69.16188	68.53623	69.9818	72.25538	86.8482	122.5906	147.0437	310.9504	752.4847	2279.328	5187.128	6511.644	10080.84	12205.5	20978.29	33925.38	59798.55
K-Value - confidence coefficient	23.832	29.82867	36.51233	38.61467	42.666	44.12733	44.152	24.04887	-11.394	-25.1721	-53.3868	-65.875	-90.7932	-102.212	-99.8716	-28.0813	279.3078	1562.963	4205.435	5439.002	8807.792	10833	19276.92	31864.12	57211.43

**Cottonwood Creek DBPS
Gage Analysis**

Station - 07103977 COTTONWOOD CR AT COWPOKE RD. AT COLO SPRINGS, CO																									
Station ID	7103977																								
Station Name	COTTONWOOD CR AT COWPOKE RD. AT COLO SPRINGS, CO																								
Analysis - Type of Analysis	B17B	USGS Peak FQ vers. 7.1																							
BegYear - Beginning Year	1998																								
EngYear - Ending Year	2009																								
SkewOption - Skew Coefficient Option	Weighted (weighted, station or generalized)																								
Skew - Skew Coefficient	0.345																								
Mean	1.836																								
StandDev - Standard Deviation	0.262																								
AtSiteSkew - Station Skew Coefficient	0.982																								
AtSite MSEG - Station Skew Coefficient Mean Square Error	0.558																								
Skew_Sys - Systematic Record Skew	0.982																								
AtSiteMSEG_SYS - Mean square error of Station Skew Coefficient	0																								
RegSkew - Regional Skew	0																								
RegMSEG - Mean Square Error of Regional Skew Coefficient	0.303																								
SysPeaks - Number of Systemic Record Peaks	11																								
HisPeaks - Number of Historic Peaks	0																								
KENTAU - (unknown definition)	0.291																								
KENPLV - (unknown definition)	0.241																								
KENSLP - (unknown definition)	1.429																								
EXC_Prob - Exceedence Probability	0.995	0.99	0.98	0.975	0.96	0.95	0.9	0.8	0.7	0.6667	0.6	0.5704	0.5	0.4292	0.4	0.3	0.2	0.1	0.05	0.04	0.025	0.02	0.01	0.005	0.002
Estimate - Peak Flow Estimate for EXC_Prob	17.6	19.7	22.3	23.3	25.7	27.1	32.5	40.9	48.8	51.4	57	59.6	66.2	73.7	77.2	91.5	112.4	151.2	195.3	210.8	245.8	263.6	324.1	393.5	501.1
Variance	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Conf_Low - Peak Flow Lower Confidence Limit	7.4	8.7	10.5	11.2	13	14	18.4	25.6	32.5	34.9	39.8	42	47.7	54	56.8	67.9	82.7	107.4	132.8	141.3	159.6	168.7	198.1	230.1	276.6
Conf_Up - Peak Flow Upper Confidence Limit	27.6	30.1	33.2	34.4	37.3	38.9	45.4	55.7	65.8	69.4	77.1	80.8	90.8	103.1	109	135.1	178.4	272.8	398.8	447.3	564.5	628	862.2	1163	1692
K-Value - confidence coefficient	-2.252	-2.07	-1.864	-1.792	-1.626	-1.541	-1.239	-0.854	-0.5631	-0.4752	-0.3057	-0.232	-0.0575	0.1217	0.1981	0.4798	0.8205	1.313	1.737	1.864	2.118	2.234	2.577	2.899	3.299

Station - 07103977 COTTONWOOD CR AT COWPOKE RD. AT COLO SPRINGS, CO																									
Station ID	7103978																								
Station Name	COTTONWOOD CR AT COWPOKE RD. AT COLO SPRINGS, CO																								
Analysis - Type of Analysis	B17B	USGS Peak FQ vers. 7.2																							
BegYear - Beginning Year	2020																								
EngYear - Ending Year	2031																								
SkewOption - Skew Coefficient Option	Weighted (weighted, station or generalized)																								
Skew - Skew Coefficient	5.8088																								
Mean	6.2214235																								
StandDev - Standard Deviation	6.6340471																								
AtSiteSkew - Station Skew Coefficient	7.0466706																								
AtSite MSEG - Station Skew Coefficient Mean Square Error	7.4592941																								
Skew_Sys - Systematic Record Skew	7.8719176																								
AtSiteMSEG_SYS - Mean square error of Station Skew Coefficient	8.2845412																								
RegSkew - Regional Skew	8.6971647																								
RegMSEG - Mean Square Error of Regional Skew Coefficient	9.1097882																								
SysPeaks - Number of Systemic Record Peaks	9.5224118																								
HisPeaks - Number of Historic Peaks	9.9350353																								
KENTAU - (unknown definition)	10.347659																								
KENPLV - (unknown definition)	10.760282																								
KENSLP - (unknown definition)	11.172906																								
EXC_Prob - Exceedence Probability	11.585529	38.41	43.62	45.625	50.44	53.25	64.1	81	96.9	102.1333	113.4	118.6296	131.9	146.9708	154	182.7	224.6	302.3	390.55	421.56	491.575	527.18	648.19	786.995	1002.198
Estimate - Peak Flow Estimate for EXC_Prob	11.998153	57.12	64.94	67.95	75.18	79.4	95.7	121.1	145	152.8666	169.8	177.6592	197.6	220.2416	230.8	273.9	336.8	453.4	585.8	632.32	737.35	790.76	972.28	1180.49	1503.296
Variance	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Conf_Low - Peak Flow Lower Confidence Limit	1.264	1.473333	1.581333	1.610667	1.598667	1.578667	1.214667	0.361333	-0.48413	-0.76693	-1.24093	-1.376	-1.61	-1.47107	-1.2692	0.4064	5.427333	21.084	46.716	57.38533	84.59067	99.84533	158.7693	238.132	383.9987
Conf_Up - Peak Flow Upper Confidence Limit	-3.562	-3.91167	-4.60067	-4.88533	-5.71433	-6.19183	-8.60483	-12.8657	-17.0157	-18.4545	-21.2938	-22.492	-25.4888	-28.4102	-29.5702	-33.3037	-35.5124	-31.9595	-18.8155	-12.3327	5.849667	16.61233	61.00783	124.5315	247.3482
K-Value - confidence coefficient	-8.388	-9.29667	-10.7827	-11.3813	-13.0273	-13.9623	-18.4243	-26.0927	-33.5472	-36.1421	-41.3466	-43.608	-49.3675	-55.3494	-57.8711	-67.0138	-76.4522	-85.003	-84.347	-82.0507	-72.8913	-66.6207	-36.7537	10.931	110.6977

Cottonwood Creek Drainage Basin Planning Study
Future Model Results

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RWR032	0.07	1.9	4	8.3	21	29	39
RWR034	0.05	0.7	3.8	7.4	17	23	30
RWR036	0.12	2.4	7.7	16	38	52	68
RWR037	0.12	0.3	0.8	1.4	2.9	3.8	4.8
RWR080	0.1	9.9	16	24	43	53	65
RWR091	0.03	1	5.2	9.3	19	25	31
RWR092	0.09	2.9	8	15	34	45	57
RWR093	0.12	3.4	12	21	47	65	83
RWR094	0.26	2.6	10	22	58	81	110
RWR095	0.18	21	36	50	89	110	130
RWR096	0.38	5.4	20	39	99	130	170
RWR097	0.56	3.3	14	30	74	100	120
RWR098	0.34	90	120	140	200	230	270
RWR112	1.12	150	210	260	390	460	530
RWR114	0.19	100	130	150	180	200	230
RWR116	1.31	240	320	390	570	660	760
RWR130	0.05	4.9	11	17	30	38	46
RWR140	0.21	68	90	110	160	190	220
RWR162	0.15	69	90	110	120	140	160
RWR164	0.3	100	140	160	230	270	310
RWR166	0.45	170	220	260	350	410	470
RWR168	1.97	460	610	740	1100	1300	1400
RWR170	2.05	360	510	610	860	1000	1300
SPC_OUTLET	3.78	53	70	82	92	100	120
SP010	0.2	110	140	160	180	210	230
SP020	0.21	80	110	120	140	160	170
SP030	0.22	130	170	200	220	250	280
SP040	0.18	82	110	130	140	160	180
SP050	0.12	140	180	210	230	270	300
SP060	0.23	120	160	190	210	240	270
SP070	0.1	38	50	59	66	76	83
SP080	0.24	230	310	360	400	460	510
SP090	0.1	69	91	110	120	140	150
SP100	0.25	190	250	290	330	380	410
SP110	0.18	92	120	140	160	180	200
SP120	0.29	190	260	300	330	380	420
SP130	0.22	190	250	290	330	370	410
SP140	0.1	45	59	69	77	88	97
SP150	0.26	280	370	440	490	560	620
SP160	0.29	140	180	210	240	270	300
SP170	0.14	70	92	110	120	140	150
SP180	0.21	90	120	140	160	180	200
SP190	0.15	150	200	240	260	300	330
SP200	0.09	53	70	82	92	100	120

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
UC010	0.23	5	9.8	16	26	37	51
UC020	0.32	9.7	17	26	43	59	79
UC030	0.21	6.1	11	18	29	40	54
UC040	0.12	4.1	7.4	11	18	25	33
UC050	0.27	12	19	27	43	59	78
UC060	0.23	8.9	16	23	37	50	66
UC070	0.1	3.5	6.2	9.3	15	21	27
UC080	0.18	7.5	13	20	31	42	56
UC090	0.24	7.1	13	21	34	47	63
UC100	0.34	13	23	34	55	75	99
UC110	0.1	4.9	8.4	12	19	26	34
UC120	0.29	18	29	42	65	86	110
UC130	0.19	18	23	31	47	61	78
UC140	0.23	17	26	36	54	70	90
UC150	0.09	4.3	7.4	11	17	23	30
UC160	0.1	4.4	7.7	11	18	24	32
UC165	0.22	16	24	33	48	63	79
UC170	0.22	80	110	130	180	220	270
UC180	0.11	58	76	94	120	150	170
UC190	0.14	51	67	84	110	140	170
WR010	0.07	2.3	4.3	6.5	11	15	20
WR020	0.05	1.9	3.5	5.2	8.3	11	15
WR030	0.22	70	92	110	150	190	230
WR040	0.03	1.4	2.4	3.6	5.7	7.8	10
WR050	0.09	3.6	6.4	9.5	15	21	28
WR060	0.26	8.2	15	23	38	53	71
WR070	0.1	8	10	13	20	27	35
WR080	0.08	12	15	19	26	33	42
WR090	0.22	59	77	96	130	160	200
WR100	0.19	81	110	130	170	210	250
WR110	0.21	72	94	120	160	190	240
WR120	0.05	3.5	5	7.1	11	14	19
WR130	0.16	51	68	85	110	140	170
WR140	0.09	42	56	70	93	110	140
WR150	0.15	56	74	92	120	150	180
WR160	0.08	27	36	45	63	79	99
WR170	0.08	18	24	31	44	56	70

**Cottonwood Creek Drainage Basin Planning Study
Future Model Results**

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RRT032	0.09	5.7	7.5	8.7	9.8	11	13
RRT034	0.24	47	61	72	80	92	100
RRT052	0.22	53	70	82	92	100	120
RRT054	0.42	61	81	95	110	120	130
RRT056	0.64	110	150	180	200	230	250
RRT082	0.29	190	260	300	340	380	420
RRT084	0.45	140	180	210	240	270	300
RRT086	0.74	310	400	470	530	600	660
RRT102	1.73	430	570	670	770	870	970
RRT104	0.14	69	90	110	120	140	150
RRT106	1.87	490	650	760	870	980	1100
RRT108	0.49	220	290	330	370	430	470
RRT120	0.24	160	220	250	280	320	360
RRT152	0.28	98	130	150	170	190	210
RRT154	0.44	170	230	270	300	340	380
RRT162	0.49	220	290	330	370	430	470
RRT164	2.12	580	770	900	1000	1200	1300
RRT166	2.61	740	970	1100	1300	1500	1600
RRT168	3.27	950	1300	1500	1700	1900	2100
RSPC030	0.2	110	140	160	180	210	230
RSPC032	0.21	80	100	120	140	160	170
RSPC034	0.41	180	230	270	300	340	380
RSPC050	0.18	82	110	130	140	160	180
RSPC060	0.3	150	200	240	260	300	340
RSPC070	0.63	270	360	420	470	540	590
RSPC100	1.26	470	630	730	820	940	1000
RSPC102	0.1	69	90	110	120	140	150
RSPC104	1.36	520	690	810	900	1000	1100
RSPC106	1.61	80	90	96	110	110	120
RSPC110	0.24	230	310	360	400	460	500
RSPC112	0.42	77	90	100	110	120	130
RSPC130	0.29	190	250	300	330	380	420
RSPC150	0.1	45	59	69	77	88	97
RSPC152	0.51	370	490	570	640	730	810
RSPC154	0.61	400	530	620	700	800	880
RSPC156	2.32	250	310	350	400	440	480
RSPC158	2.93	560	730	840	960	1100	1200
RSPC160	1.61	80	90	96	110	110	120
RSPC162	0.42	77	90	100	110	120	130
RSPC164	2.03	150	170	180	210	220	230
RSPC166	2.03	150	170	180	210	220	230
RSPC180	0.14	12	32	45	64	73	75
RSPC190	0.35	95	120	140	160	190	220
RSPC200	3.69	950	1300	1500	1700	1900	2100

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RT010	0.09	5.7	7.5	8.7	9.8	11	13
RT020	0.24	47	61	72	80	92	100
RT030	0.09	10	14	16	18	21	23
RT040	0.22	53	70	82	92	110	120
RT050	0.29	110	140	170	190	220	240
RT060	0.29	190	260	300	340	380	420
RT070	0.45	140	180	210	240	270	300
RT080	0.06	25	33	39	43	49	55
RT090	0.14	69	90	110	120	140	150
RT100	0.25	99	130	150	170	190	210
RT110	0.24	160	220	250	280	330	360
RT120	0.25	93	120	140	160	180	200
RT130	0.16	98	130	150	170	190	210
RT140	0.28	98	130	150	170	190	210
RT150	0.22	97	130	150	170	190	210
RT160	0.14	49	65	76	85	97	110
RUC020	0.23	2.4	3.5	8.2	25	37	51
RUC030	0.55	11	16	28	70	98	130
RUC052	0.76	12	21	38	95	140	180
RUC054	0.12	3.2	6.8	12	29	39	50
RUC056	0.88	13	26	46	110	160	220
RUC060	1.15	19	39	69	160	220	290
RUC082	1.38	27	54	95	210	290	380
RUC084	0.1	1.8	4.5	7.8	18	23	30
RUC086	1.48	28	58	100	230	310	410
RUC102	1.66	31	69	120	270	370	470
RUC104	0.24	1.8	8.1	18	47	66	87
RUC106	1.9	32	76	140	320	430	560
RUC122	2.24	37	95	170	400	540	700
RUC124	2.24	36	95	170	400	540	700
RUC126	0.1	3.5	13	21	43	55	69
RUC128	2.34	39	100	180	420	580	750
RUC130	2.63	48	120	210	470	630	820
RUC140	2.82	58	140	240	530	720	920
RUC150	3.05	75	180	290	610	800	1000
RUC160	3.14	77	180	300	630	830	1100
RUC180	0.22	53	73	83	97	110	120
RUC190	3.24	78	180	300	640	850	1100
RUC191	0.22	15	27	36	59	71	84
RUC192	3.46	93	210	340	690	900	1100
RUC194	3.79	130	260	410	810	1000	1300

Cottonwood Creek Drainage Basin Planning Study
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Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
LC010	0.27	100	140	160	180	200	230
LC020	0.3	230	310	360	400	460	510
LC030	0.3	140	190	220	250	280	320
LC040	0.3	130	170	200	230	260	290
LC050	0.07	36	47	55	61	70	78
LC060	0.28	110	140	160	180	210	230
LC070	0.2	54	71	83	93	110	120
LC080	0.24	100	140	160	180	200	220
LC090	0.15	66	87	100	110	130	140
LC100	0.14	71	93	110	120	140	150
LC110	0.17	29	38	45	50	57	63
LC120	0.12	67	88	100	110	130	140
LC130	0.05	34	44	52	58	66	73
LC140	0.1	48	63	73	82	94	100
LC150	0.13	49	65	76	85	97	110
LC160	0.29	140	180	210	240	270	300
LC170	0.4	250	330	390	430	500	550
LC180	0.28	150	200	230	260	300	330
LC190	0.2	140	180	210	240	270	300
LC200	0.23	160	210	240	270	310	340
LC210	0.18	72	96	110	120	140	160
LC220	0.17	120	160	180	210	240	260
LC230	0.34	240	310	370	410	470	520
MC010	0.09	62	82	96	110	120	140
MC020	0.1	56	73	86	96	110	120
MC030	0.15	1.3	1.7	2	5.6	10	17
MC040	0.21	92	120	140	160	180	200
MC050	0.66	82	110	130	160	190	230
MC060	0.18	85	110	130	150	170	190
MC070	0.18	86	110	130	150	170	190
MC080	0.2	120	150	180	200	230	250
MC090	0.31	64	85	99	110	130	150
MC100	0.11	45	59	69	77	88	97
MC110	0.19	160	220	250	280	320	360
MC120	0.27	120	160	190	210	240	270
MC130	0.14	110	140	160	180	210	230
MC140	0.07	60	79	93	100	120	130
MC150	0.07	16	21	25	28	32	35
MC160	0.19	51	68	79	89	100	110
MC170	0.28	170	220	260	290	340	370
MC180	0.21	130	170	200	220	250	280
MC190	0.17	75	99	120	130	150	160
MC200	0.15	67	88	100	120	130	150
MC210	0.09	51	68	79	88	100	110
MC220	0.33	140	180	210	240	270	300
MC230	0.06	56	74	86	97	110	120
MC240	0.38	98	130	150	170	190	230
PL_1	0.12	0.3	0.8	1.4	2.9	3.8	4.8
PL_2	0.56	3.3	14	30	74	100	120
PL_3	2.05	360	510	610	860	1000	1400
PL_4	0.22	53	73	83	97	110	120

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RLC032	14.26	1900	2400	3000	4000	4600	5300
RLC034	0.27	100	140	160	180	200	230
RLC036	14.53	1900	2500	3100	4100	4800	5400
RLC050	0.07	36	47	55	61	70	78
RLC082	15.13	2000	2600	3200	4300	5000	5700
RLC084	15.5	2100	2800	3300	4500	5200	6000
RLC086	0.2	54	71	83	93	110	120
RLC090	16.22	2200	2900	3500	4800	5500	6300
RLC122	16.37	2200	3000	3600	4800	5600	6400
RLC124	0.17	29	38	45	50	57	63
RLC126	16.54	2200	3000	3600	4900	5600	6400
RLC128	16.69	2300	3000	3600	4900	5700	6500
RLC140	0.05	34	44	52	58	66	73
RLC150	16.95	2300	3100	3700	5000	5800	6600
RLC180	0.4	250	330	390	430	500	550
RLC190	0.68	400	530	620	690	790	870
RLC200	0.88	540	710	830	930	1100	1200
RLC212	17.37	2300	3100	3800	5100	5900	6800
RLC214	18.48	2500	3400	4000	5500	6400	7300
RLC230	18.83	2300	3200	3800	5300	6200	7100
RMC020	0.09	62	82	96	110	120	140
RMC032	0	0	0	0	0	0	0
RMC034	0.19	14	15	35	75	96	110
RMC036	0.19	14	15	35	75	96	110
RMC052	6.06	480	700	970	1600	2000	2400
RMC054	6.4	490	720	1000	1700	2000	2500
RMC056	0.21	92	120	140	160	180	200
RMC058	6.61	530	760	1000	1700	2100	2600
RMC070	0.18	85	110	130	150	170	190
RMC082	0.36	86	110	130	170	200	230
RMC084	0.67	52	100	130	140	150	150
RMC086	0.11	45	59	69	77	88	97
RMC110	0.98	27	41	64	130	150	170
RMC120	1.17	150	190	230	250	290	320
RMC162	0.07	60	79	92	100	120	130
RMC164	0.07	16	21	25	28	32	35
RMC166	0.14	74	97	110	130	150	160
RMC171	8.71	680	1000	1200	2000	2500	3100
RMC172	0.14	110	140	160	180	210	230
RMC173	8.85	690	1000	1200	2100	2500	3100
RMC174	0.33	120	160	180	200	230	260
RMC175	9.18	740	1100	1300	2100	2600	3200
RMC190	0.21	130	170	200	220	250	280
RMC221	0.38	190	250	300	330	380	420
RMC222	0.15	67	88	100	120	130	150
RMC223	0.53	260	340	400	450	510	560
RMC224	0.09	51	67	79	88	100	110
RMC225	0.62	310	410	470	530	610	670
RMC242	10.41	920	1300	1600	2300	2700	3500
RMC244	10.47	950	1300	1600	2300	2700	3500

Cottonwood Creek Drainage Basin Planning Study
Future Model Results

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JRT010	0.09	5.7	7.5	8.7	9.8	11	13
JRT020	0.24	47	61	72	80	92	100
JRT030	0.42	61	81	95	110	120	130
JRT040	0.22	53	70	82	92	110	120
JRT052	0.64	110	150	180	200	230	250
JRT054	0.93	200	260	310	350	390	440
JRT060	0.29	190	260	300	340	380	420
JRT070	0.45	140	180	210	240	270	300
JRT082	0.74	310	400	470	530	600	660
JRT084	0.8	330	440	510	570	650	720
JRT090	0.14	69	90	110	120	140	150
JRT102	1.73	430	570	670	770	870	970
JRT104	1.87	490	650	760	870	990	1100
JRT106	2.12	580	770	900	1000	1200	1300
JRT108	0.49	220	290	330	370	430	470
JRT110	0.24	160	220	250	280	330	360
JRT120	0.49	220	290	330	370	430	470
JRT130	0.16	98	130	150	170	190	210
JRT140	0.28	98	130	150	170	190	210
JRT152	0.44	170	230	270	300	340	380
JRT154	0.66	250	330	390	440	510	570
JRT162	2.61	740	980	1100	1300	1500	1600
JRT164	3.27	950	1300	1500	1700	1900	2100
JRT166	3.41	990	1300	1500	1700	2000	2200
JSPC010	0.2	110	140	160	180	210	230
JSPC020	0.21	80	110	120	140	160	170
JSPC032	0.41	180	230	270	300	340	380
JSPC034	0.63	270	360	420	470	540	590
JSPC040	0.18	82	110	130	140	160	180
JSPC050	0.3	160	210	240	270	310	340
JSPC060	1.26	470	630	730	820	940	1000
JSPC070	0.1	38	50	59	66	76	83
JSPC080	0.24	230	310	360	400	460	510
JSPC090	0.1	69	91	110	120	140	150
JSPC102	1.36	520	690	810	900	1000	1100
JSPC106	1.61	80	90	96	110	110	120
JSPC114	0.42	77	90	100	110	120	130
JSPC120	0.29	190	260	300	330	380	420
JSPC130	0.51	370	490	570	640	730	810
JSPC140	0.1	45	59	69	77	88	97
JSPC152	0.61	410	530	630	700	800	890
JSPC154	2.93	560	730	850	960	1100	1200
JSPC156	3.19	760	1000	1200	1300	1500	1600
JSPC162	2.03	150	170	180	210	220	230
JSPC164	2.03	150	170	180	210	220	230
JSPC166	2.32	250	310	350	400	440	480
JSPC180	0.35	95	120	140	160	190	220
JSPC190	0.5	220	290	340	380	430	480
JSPC200	3.69	950	1300	1500	1700	1900	2100

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JUC010	0.23	2.4	3.5	8.2	25	37	51
JUC020	0.55	11	16	28	70	98	130
JUC030	0.76	12	21	38	95	140	180
JUC040	0.12	3.2	6.8	12	29	39	50
JUC052	0.88	13	26	46	110	160	220
JUC054	1.15	19	39	69	160	220	290
JUC060	1.38	27	54	95	210	290	380
JUC070	0.1	1.9	4.5	7.9	18	24	30
JUC082	1.48	28	58	100	230	310	410
JUC084	1.66	31	69	120	270	370	470
JUC090	0.24	1.8	8.1	18	47	66	87
JUC102	1.9	32	76	140	320	430	560
JUC104	2.24	37	95	170	400	540	700
JUC110	0.1	3.5	13	21	43	56	69
JUC122	2.24	37	95	170	400	540	700
JUC124	2.34	39	100	190	420	580	750
JUC126	2.63	48	120	210	470	630	820
JUC130	2.82	59	140	240	540	730	930
JUC140	3.05	76	180	290	620	830	1100
JUC150	3.14	77	180	300	630	830	1100
JUC160	3.24	78	180	300	640	850	1100
JUC165	0.22	15	27	36	59	71	84
JUC170	0.22	53	73	83	97	110	120
JUC180	0.33	100	140	160	200	220	240
JUC190	3.46	93	210	340	690	910	1100
JUC192	3.79	130	260	410	810	1000	1300
JUC194	3.93	150	280	420	830	1100	1300
JWR010	0.07	1.9	4	8.3	21	30	39
JWR020	0.05	0.7	3.8	7.4	17	23	30
JWR032	0.12	2.4	7.7	16	38	52	68
JWR034	0.34	91	120	140	200	230	270
JWR040	0.03	1	5.3	9.3	19	25	31
JWR050	0.09	2.9	8	15	34	45	57
JWR060	0.26	2.6	10	22	58	81	110
JWR070	0.1	10	16	24	43	54	65
JWR080	0.18	21	36	50	90	110	130
JWR092	0.12	3.4	12	21	48	66	83
JWR094	0.38	5.4	20	39	99	130	170
JWR096	0.56	26	54	89	190	240	310
JWR098	1.12	150	210	260	390	460	530
JWR100	0.19	100	130	150	180	200	230
JWR112	1.31	240	320	400	570	660	760
JWR114	1.52	310	410	510	730	860	990
JWR120	0.05	4.9	11	17	30	38	46
JWR130	0.21	68	90	110	160	190	220
JWR140	0.3	100	140	160	230	270	320
JWR150	0.15	69	90	110	120	140	160
JWR162	0.45	170	220	260	350	410	470
JWR164	1.97	460	610	750	1100	1300	1500
JWR166	2.05	360	510	610	860	1000	1400
JWR170	2.13	360	520	630	880	1000	1400

Cottonwood Creek Drainage Basin Planning Study
Future Model Results

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
CC_OUTLET	19.17	2400	3200	3900	5400	6200	7100
CHDP1_Lower	0.42	77	90	100	110	120	130
CHDP1_Upper	0.42	280	390	460	520	600	660
CHDP2	1.61	80	90	96	110	110	120
DP3	0.14	12	32	45	64	73	75
EX_4	0.98	27	41	64	130	150	170
EX_5/6	0.19	14	15	35	75	96	110
EX_8	0.67	52	100	130	140	150	150
EX_9	0.18	3.2	13	21	44	59	74
Fairfax	1.44	180	210	220	240	250	260
JLC010	0.27	100	140	160	180	200	230
JLC032	14.26	1900	2400	3000	4000	4600	5300
JLC034	14.53	1900	2500	3100	4100	4800	5500
JLC036	15.13	2000	2600	3200	4300	5000	5700
JLC050	0.07	36	47	55	61	70	78
JLC070	0.2	54	71	83	93	110	120
JLC072	0.44	150	200	230	260	300	330
JLC082	15.5	2100	2800	3300	4500	5200	6000
JLC084	16.22	2200	2900	3500	4800	5500	6300
JLC100	16.37	2200	3000	3600	4800	5600	6400
JLC110	0.17	29	38	45	50	57	63
JLC122	16.54	2200	3000	3600	4900	5600	6400
JLC124	16.69	2300	3000	3600	4900	5700	6500
JLC126	16.95	2300	3100	3700	5000	5800	6600
JLC130	0.05	34	44	52	58	66	73
JLC140	0.15	81	110	120	140	160	180
JLC150	17.37	2300	3100	3800	5100	5900	6800
JLC170	0.4	250	330	390	430	500	550
JLC180	0.68	400	530	620	690	790	870
JLC190	0.88	540	710	830	930	1100	1200
JLC200	1.11	610	800	940	1100	1200	1300
JLC212	18.48	2500	3400	4000	5500	6400	7300
JLC214	18.83	2500	3400	4100	5700	6500	7500
JLC220	0.17	120	160	180	210	240	260

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JMC010	0.09	62	82	96	110	120	140
JMC022	0.19	14	15	35	75	96	110
JMC024	0	0	0	0	0	0	0
JMC032	0.19	14	15	35	75	96	110
JMC034	0.34	14	15	36	80	110	130
JMC040	0.21	92	120	140	160	180	200
JMC052	6.06	480	710	970	1600	2000	2400
JMC053	6.06	480	700	970	1600	2000	2400
JMC054	6.4	490	720	1000	1700	2100	2500
JMC056	6.61	530	760	1000	1700	2100	2600
JMC058	7.27	590	830	1100	1800	2200	2800
JMC060	0.18	85	110	130	150	170	190
JMC070	0.36	86	110	130	170	200	230
JMC080	0.67	220	300	350	390	450	500
JMC090	0.98	27	41	64	130	150	170
JMC100	0.11	45	59	69	77	88	97
JMC110	1.17	150	190	230	250	290	320
JMC130	0.14	110	140	160	180	210	230
JMC140	0.07	60	79	93	100	120	130
JMC150	0.07	16	21	25	28	32	35
JMC162	0.14	74	97	110	130	150	160
JMC164	0.33	120	160	180	200	230	260
JMC172	8.71	680	1000	1200	2000	2500	3100
JMC174	8.85	690	1000	1200	2100	2500	3100
JMC176	9.18	740	1100	1300	2100	2600	3200
JMC178	9.46	750	1100	1300	2200	2600	3300
JMC180	0.21	130	170	200	220	250	280
JMC190	0.38	190	250	300	330	380	420
JMC200	0.15	67	88	100	120	130	150
JMC210	0.09	51	68	79	88	100	110
JMC222	0.53	260	340	400	450	510	560
JMC224	0.62	310	410	480	530	610	670
JMC225	0.06	56	74	86	97	110	120
JMC226	0.95	450	590	690	770	880	970
JMC242	10.41	920	1300	1600	2300	2700	3500
JMC244	10.47	950	1300	1600	2300	2700	3500
JMC246	10.85	1000	1400	1700	2300	2800	3600

Cottonwood Creek Drainage Basin Planning Study
Existing Model Results

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RWR032	0.07	1.9	4	8.3	21	29	39
RWR034	0.05	0.7	3.8	7.4	17	23	30
RWR036	0.12	2.4	7.7	16	39	52	67
RWR080	0.1	9.9	16	24	43	53	65
RWR091	0.03	1	5.2	9.3	19	25	31
RWR092	0.09	2.9	8	15	34	45	57
RWR093	0.12	3.4	12	21	47	65	83
RWR094	0.26	2.6	10	22	58	81	110
RWR095	0.18	21	28	40	75	94	120
RWR096	0.38	5.4	20	39	99	130	170
RWR097	0.56	26	46	79	170	230	280
RWR098	0.34	91	120	140	160	180	220
RWR112	1.12	160	220	250	400	520	660
RWR114	0.19	100	130	150	170	200	220
RWR116	1.31	250	340	390	490	640	790
RWR130	0.05	4.9	11	17	30	38	46
RWR140	0.21	68	90	110	120	140	150
RWR162	0.15	69	90	110	120	140	150
RWR164	0.3	100	140	160	180	210	230
RWR166	0.45	170	220	260	290	340	370
RWR168	1.97	470	630	740	830	970	1200
RWR170	2.05	480	640	760	850	1000	1200
SPC_OUTLET	3.78	53	70	82	92	100	120
SP010	0.2	480	640	760	850	1000	1200
SP020	0.21	80	110	120	140	160	170
SP030	0.22	130	170	200	220	250	280
SP040	0.18	82	110	130	140	160	180
SP050	0.12	140	180	210	230	270	300
SP060	0.23	120	160	190	210	240	270
SP070	0.1	38	50	59	66	76	83
SP080	0.24	230	310	360	400	460	510
SP090	0.1	69	91	110	120	140	150
SP100	0.25	190	250	290	330	380	410
SP110	0.18	92	120	140	160	180	200
SP120	0.29	190	260	300	330	380	420
SP130	0.22	190	250	290	330	370	410
SP140	0.1	45	59	69	77	88	97
SP150	0.26	280	370	440	490	560	620
SP160	0.29	140	180	210	240	270	300
SP170	0.14	70	92	110	120	140	150
SP180	0.21	90	120	140	160	180	200
SP190	0.15	150	200	240	260	300	330
SP200	0.09	53	70	82	92	100	120

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
UC010	0.23	2.4	3.5	8.2	25	37	51
UC020	0.32	8.9	13	21	45	61	79
UC030	0.21	2.3	6.6	14	37	51	68
UC040	0.12	3.2	6.8	12	29	39	50
UC050	0.27	16	23	37	78	100	130
UC060	0.23	8.7	16	26	56	74	94
UC070	0.1	1.9	4.5	7.9	18	24	30
UC080	0.18	5	15	27	58	77	97
UC090	0.24	1.8	8.1	18	47	66	87
UC100	0.34	5.2	21	39	87	120	150
UC110	0.1	3.5	13	21	43	56	69
UC120	0.29	28	78	120	220	280	330
UC130	0.19	24	46	64	110	130	150
UC140	0.23	21	39	55	91	110	130
UC150	0.09	2.9	8.8	14	29	37	46
UC160	0.1	5	11	18	38	49	61
UC165	0.22	15	27	36	59	71	84
UC170	0.22	99	130	150	170	200	220
UC180	0.11	73	96	110	130	140	160
UC190	0.14	65	85	100	110	130	140
WR010	0.07	1.9	4	8.3	21	30	39
WR020	0.05	0.7	3.8	7.4	17	23	30
WR030	0.22	91	120	140	160	180	200
WR040	0.03	1	5.3	9.3	19	25	31
WR050	0.09	2.9	8	15	34	45	57
WR060	0.26	2.6	10	22	58	81	110
WR070	0.1	10	16	24	43	56	69
WR080	0.08	14	19	22	32	41	50
WR090	0.22	75	99	120	130	150	170
WR100	0.19	100	130	150	170	200	220
WR110	0.21	91	120	140	160	180	200
WR120	0.05	4.9	11	17	30	38	46
WR130	0.16	64	85	99	110	130	140
WR140	0.09	54	71	83	93	110	120
WR150	0.15	69	90	110	120	140	150
WR160	0.08	35	47	55	61	71	85
WR170	0.08	24	31	36	41	46	55

Cottonwood Creek Drainage Basin Planning Study
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Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RRT032	0.09	5.7	7.5	8.7	9.8	11	13
RRT034	0.24	47	61	72	80	92	100
RRT052	0.22	53	70	82	92	100	120
RRT054	0.42	61	81	95	110	120	130
RRT056	0.64	110	150	180	200	230	250
RRT082	0.29	190	260	300	340	380	420
RRT084	0.45	140	180	210	240	270	300
RRT086	0.74	310	400	470	530	600	660
RRT102	1.73	430	570	670	770	870	970
RRT104	0.14	69	90	110	120	140	150
RRT106	1.87	490	650	760	870	980	1100
RRT108	0.49	220	290	330	370	430	470
RRT120	0.24	160	220	250	280	320	360
RRT152	0.28	98	130	150	170	190	210
RRT154	0.44	170	230	270	300	340	380
RRT162	0.49	220	290	330	370	430	470
RRT164	2.12	580	770	900	1000	1200	1300
RRT166	2.61	740	970	1100	1300	1500	1600
RRT168	3.27	950	1300	1500	1700	1900	2100
RSPC030	0.2	110	140	160	180	210	230
RSPC032	0.21	80	100	120	140	160	170
RSPC034	0.41	180	230	270	300	340	380
RSPC050	0.18	82	110	130	140	160	180
RSPC060	0.3	150	200	240	260	300	340
RSPC070	0.63	270	360	420	470	540	590
RSPC100	1.26	470	630	730	820	940	1000
RSPC102	0.1	69	90	110	120	140	150
RSPC104	1.36	520	690	810	900	1000	1100
RSPC106	1.61	80	90	96	110	110	120
RSPC110	0.24	230	310	360	400	460	500
RSPC112	0.42	77	90	100	110	120	130
RSPC130	0.29	190	250	300	330	380	420
RSPC150	0.1	45	59	69	77	88	97
RSPC152	0.51	370	490	570	640	730	810
RSPC154	0.61	400	530	620	700	800	880
RSPC156	2.32	250	310	350	400	440	480
RSPC158	2.93	560	730	840	960	1100	1200
RSPC160	1.61	80	90	96	110	110	120
RSPC162	0.42	77	90	100	110	120	130
RSPC164	2.03	150	170	180	210	220	230
RSPC166	2.03	150	170	180	210	220	230
RSPC180	0.14	12	32	45	64	73	75
RSPC190	0.35	95	120	140	160	190	220
RSPC200	3.69	950	1300	1500	1700	1900	2100

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RT010	0.09	5.7	7.5	8.7	9.8	11	13
RT020	0.24	47	61	72	80	92	100
RT030	0.09	10	14	16	18	21	23
RT040	0.22	53	70	82	92	110	120
RT050	0.29	110	140	170	190	220	240
RT060	0.29	190	260	300	340	380	420
RT070	0.45	140	180	210	240	270	300
RT080	0.06	25	33	39	43	49	55
RT090	0.14	69	90	110	120	140	150
RT100	0.25	99	130	150	170	190	210
RT110	0.24	160	220	250	280	330	360
RT120	0.25	93	120	140	160	180	200
RT130	0.16	98	130	150	170	190	210
RT140	0.28	98	130	150	170	190	210
RT150	0.22	97	130	150	170	190	210
RT160	0.14	49	65	76	85	97	110
RUC020	0.23	2.4	3.5	8.2	25	37	51
RUC030	0.55	11	16	28	70	98	130
RUC052	0.76	12	21	38	95	140	180
RUC054	0.12	3.2	6.8	12	29	39	50
RUC056	0.88	13	26	46	110	160	220
RUC060	1.15	19	39	69	160	220	290
RUC082	1.38	27	54	95	210	290	380
RUC084	0.1	1.8	4.5	7.8	18	23	30
RUC086	1.48	28	58	100	230	310	410
RUC102	1.66	31	69	120	270	370	470
RUC104	0.24	1.8	8.1	18	47	66	87
RUC106	1.9	32	76	140	320	430	560
RUC122	2.24	37	95	170	400	540	700
RUC124	2.24	36	95	170	400	540	700
RUC126	0.1	3.5	13	21	43	55	69
RUC128	2.34	39	100	180	420	580	750
RUC130	2.63	48	120	210	470	630	820
RUC140	2.82	58	140	240	530	720	920
RUC150	3.05	75	180	290	610	800	1000
RUC160	3.14	77	180	300	630	830	1100
RUC180	0.22	99	130	150	170	200	220
RUC190	3.24	78	180	300	640	850	1100
RUC191	0.22	15	27	36	59	71	84
RUC192	3.46	93	210	340	690	900	1100
RUC194	3.79	160	230	370	760	1000	1300

Cottonwood Creek Drainage Basin Planning Study
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Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
LC010	0.27	100	140	160	180	200	230
LC020	0.3	230	310	360	400	460	510
LC030	0.3	140	190	220	250	280	320
LC040	0.3	130	170	200	230	260	290
LC050	0.07	36	47	55	61	70	78
LC060	0.28	110	140	160	180	210	230
LC070	0.2	54	71	83	93	110	120
LC080	0.24	100	140	160	180	200	220
LC090	0.15	66	87	100	110	130	140
LC100	0.14	71	93	110	120	140	150
LC110	0.17	29	38	45	50	57	63
LC120	0.12	67	88	100	110	130	140
LC130	0.05	34	44	52	58	66	73
LC140	0.1	48	63	73	82	94	100
LC150	0.13	49	65	76	85	97	110
LC160	0.29	140	180	210	240	270	300
LC170	0.4	250	330	390	430	500	550
LC180	0.28	150	200	230	260	300	330
LC190	0.2	140	180	210	240	270	300
LC200	0.23	160	210	240	270	310	340
LC210	0.18	72	96	110	120	140	160
LC220	0.17	120	160	180	210	240	260
LC230	0.34	240	310	370	410	470	520
MC010	0.09	62	82	96	110	120	140
MC020	0.1	56	73	86	96	110	120
MC030	0.15	1.3	1.7	2	5.6	10	17
MC040	0.21	92	120	140	160	180	200
MC050	0.66	82	110	130	160	190	230
MC060	0.18	85	110	130	150	170	190
MC070	0.18	86	110	130	150	170	190
MC080	0.2	120	150	180	200	230	250
MC090	0.31	64	85	99	110	130	150
MC100	0.11	45	59	69	77	88	97
MC110	0.19	160	220	250	280	320	360
MC120	0.27	120	160	190	210	240	270
MC130	0.14	110	140	160	180	210	230
MC140	0.07	60	79	93	100	120	130
MC150	0.07	16	21	25	28	32	35
MC160	0.19	51	68	79	89	100	110
MC170	0.28	170	220	260	290	340	370
MC180	0.21	130	170	200	220	250	280
MC190	0.17	75	99	120	130	150	160
MC200	0.15	67	88	100	120	130	150
MC210	0.09	51	68	79	88	100	110
MC220	0.33	140	180	210	240	270	300
MC230	0.06	56	74	86	97	110	120
MC240	0.38	98	130	150	170	190	230

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
RLC032	14.26	1700	2300	2700	3600	4200	5100
RLC034	0.27	100	140	160	180	200	230
RLC036	14.53	1800	2400	2800	3700	4300	5200
RLC050	0.07	36	47	55	61	70	78
RLC082	15.13	1900	2500	2900	3900	4500	5300
RLC084	15.5	2000	2600	3100	4100	4800	5500
RLC086	0.2	54	71	83	93	110	120
RLC090	16.22	2100	2800	3300	4400	5100	5900
RLC122	16.37	2100	2800	3300	4400	5200	6000
RLC124	0.17	29	38	45	50	57	63
RLC126	16.54	2100	2800	3300	4500	5200	6000
RLC128	16.69	2100	2900	3400	4500	5300	6100
RLC140	0.05	34	44	52	58	66	73
RLC150	16.95	2200	2900	3400	4600	5300	6200
RLC180	0.4	250	330	390	430	500	550
RLC190	0.68	400	530	620	690	790	870
RLC200	0.88	540	710	830	930	1100	1200
RLC212	17.37	2200	3000	3500	4700	5500	6400
RLC214	18.48	2400	3200	3800	5100	6000	6900
RLC230	18.83	2200	3000	3600	4900	5800	6700
RMC020	0.09	62	82	96	110	120	140
RMC032	0	0	0	0	0	0	0
RMC034	0.19	13	15	35	54	79	99
RMC036	0.19	13	15	35	54	79	98
RMC052	6.06	560	750	880	1400	1900	2400
RMC054	6.4	570	760	900	1500	1900	2400
RMC056	0.21	92	120	140	160	180	200
RMC058	6.61	630	840	990	1500	2000	2500
RMC070	0.18	85	110	130	150	170	190
RMC082	0.36	160	210	250	280	320	350
RMC084	0.67	68	120	140	140	150	150
RMC086	0.11	45	59	69	77	88	97
RMC110	0.98	28	42	65	92	120	130
RMC120	1.17	150	190	230	250	290	320
RMC162	0.07	60	79	92	100	120	130
RMC164	0.07	16	21	25	28	32	35
RMC166	0.14	74	97	110	130	150	160
RMC171	8.71	810	1100	1300	1800	2400	3000
RMC172	0.14	110	140	160	180	210	230
RMC173	8.85	820	1100	1300	1900	2400	3000
RMC174	0.33	120	160	180	200	230	260
RMC175	9.18	890	1200	1400	1900	2500	3100
RMC190	0.21	130	170	200	220	250	280
RMC221	0.38	190	250	300	330	380	420
RMC222	0.15	67	88	100	120	130	150
RMC223	0.53	260	340	400	450	510	560
RMC224	0.09	51	67	79	88	100	110
RMC225	0.62	310	410	470	530	610	670
RMC242	10.41	790	1000	1200	2000	2600	3300
RMC244	10.47	820	1100	1300	2000	2700	3300

Cottonwood Creek Drainage Basin Planning Study
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Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JRT010	0.09	5.7	7.5	8.7	9.8	11	13
JRT020	0.24	47	61	72	80	92	100
JRT030	0.42	61	81	95	110	120	130
JRT040	0.22	53	70	82	92	110	120
JRT052	0.64	110	150	180	200	230	250
JRT054	0.93	200	260	310	350	390	440
JRT060	0.29	190	260	300	340	380	420
JRT070	0.45	140	180	210	240	270	300
JRT082	0.74	310	400	470	530	600	660
JRT084	0.8	330	440	510	570	650	720
JRT090	0.14	69	90	110	120	140	150
JRT102	1.73	430	570	670	770	870	970
JRT104	1.87	490	650	760	870	990	1100
JRT106	2.12	580	770	900	1000	1200	1300
JRT108	0.49	220	290	330	370	430	470
JRT110	0.24	160	220	250	280	330	360
JRT120	0.49	220	290	330	370	430	470
JRT130	0.16	98	130	150	170	190	210
JRT140	0.28	98	130	150	170	190	210
JRT152	0.44	170	230	270	300	340	380
JRT154	0.66	250	330	390	440	510	570
JRT162	2.61	740	980	1100	1300	1500	1600
JRT164	3.27	950	1300	1500	1700	1900	2100
JRT166	3.41	990	1300	1500	1700	2000	2200
JSPC010	0.2	110	140	160	180	210	230
JSPC020	0.21	80	110	120	140	160	170
JSPC032	0.41	180	230	270	300	340	380
JSPC034	0.63	270	360	420	470	540	590
JSPC040	0.18	82	110	130	140	160	180
JSPC050	0.3	160	210	240	270	310	340
JSPC060	1.26	470	630	730	820	940	1000
JSPC070	0.1	38	50	59	66	76	83
JSPC080	0.24	230	310	360	400	460	510
JSPC090	0.1	69	91	110	120	140	150
JSPC102	1.36	520	690	810	900	1000	1100
JSPC106	1.61	80	90	96	110	110	120
JSPC114	0.42	77	90	100	110	120	130
JSPC120	0.29	190	260	300	330	380	420
JSPC130	0.51	370	490	570	640	730	810
JSPC140	0.1	45	59	69	77	88	97
JSPC152	0.61	410	530	630	700	800	890
JSPC154	2.93	560	730	850	960	1100	1200
JSPC156	3.19	760	1000	1200	1300	1500	1600
JSPC162	2.03	150	170	180	210	220	230
JSPC164	2.03	150	170	180	210	220	230
JSPC166	2.32	250	310	350	400	440	480
JSPC180	0.35	95	120	140	160	190	220
JSPC190	0.5	220	290	340	380	430	480
JSPC200	3.69	950	1300	1500	1700	1900	2100

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JUC010	0.23	2.4	3.5	8.2	25	37	51
JUC020	0.55	11	16	28	70	98	130
JUC030	0.76	12	21	38	95	140	180
JUC040	0.12	3.2	6.8	12	29	39	50
JUC052	0.88	13	26	46	110	160	220
JUC054	1.15	19	39	69	160	220	290
JUC060	1.38	27	54	95	210	290	380
JUC070	0.1	1.9	4.5	7.9	18	24	30
JUC082	1.48	28	58	100	230	310	410
JUC084	1.66	31	69	120	270	370	470
JUC090	0.24	1.8	8.1	18	47	66	87
JUC102	1.9	32	76	140	320	430	560
JUC104	2.24	37	95	170	400	540	700
JUC110	0.1	3.5	13	21	43	56	69
JUC122	2.24	37	95	170	400	540	700
JUC124	2.34	39	100	190	420	580	750
JUC126	2.63	48	120	210	470	630	820
JUC130	2.82	59	140	240	540	730	930
JUC140	3.05	76	180	290	620	830	1100
JUC150	3.14	77	180	300	630	830	1100
JUC160	3.24	78	180	300	640	850	1100
JUC165	0.22	15	27	36	59	71	84
JUC170	0.22	99	130	150	170	200	220
JUC180	0.33	170	220	260	290	340	370
JUC190	3.46	93	210	340	690	910	1100
JUC192	3.79	160	230	370	760	1000	1300
JUC194	3.93	210	280	380	780	1000	1300
JWR010	0.07	1.9	4	8.3	21	30	39
JWR020	0.05	0.7	3.8	7.4	17	23	30
JWR032	0.12	2.4	7.7	16	38	52	68
JWR034	0.34	91	120	140	160	180	220
JWR040	0.03	1	5.3	9.3	19	25	31
JWR050	0.09	2.9	8	15	34	45	57
JWR060	0.26	2.6	10	22	58	81	110
JWR070	0.1	10	16	24	43	54	65
JWR080	0.18	21	28	40	75	94	120
JWR092	0.12	3.4	12	21	48	66	83
JWR094	0.38	5.4	20	39	99	130	170
JWR096	0.56	26	46	79	170	230	290
JWR098	1.12	160	220	250	400	530	660
JWR100	0.19	100	130	150	170	200	220
JWR112	1.31	250	340	390	490	640	790
JWR114	1.52	320	420	500	570	740	920
JWR120	0.05	4.9	11	17	30	38	46
JWR130	0.21	68	90	110	120	140	150
JWR140	0.3	100	140	160	180	210	230
JWR150	0.15	69	90	110	120	140	150
JWR162	0.45	170	220	260	290	340	370
JWR164	1.97	470	630	740	830	970	1200
JWR166	2.05	480	640	760	850	1000	1200
JWR170	2.13	500	660	780	870	1000	1300

Cottonwood Creek Drainage Basin Planning Study
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Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
CC_OUTLET	19.17	2200	3100	3600	5000	5800	6800
CHDP1_Lower	0.42	77	90	100	110	120	130
CHDP1_Upper	0.42	280	390	460	520	600	660
CHDP2	1.61	80	90	96	110	110	120
DP3	0.14	12	32	45	64	73	75
EX_4	0.98	28	42	65	92	120	130
EX_5/6	0.19	13	15	35	54	79	99
EX_8	0.67	68	120	140	140	150	150
Fairfax	1.44	180	210	220	230	240	250
JLC010	0.27	100	140	160	180	200	230
JLC032	14.26	1700	2300	2700	3600	4200	5100
JLC034	14.53	1800	2400	2800	3700	4300	5200
JLC036	15.13	1900	2500	2900	3900	4500	5300
JLC050	0.07	36	47	55	61	70	78
JLC070	0.2	54	71	83	93	110	120
JLC072	0.44	150	200	230	260	300	330
JLC082	15.5	2000	2600	3100	4100	4800	5600
JLC084	16.22	2100	2800	3300	4400	5100	5900
JLC100	16.37	2100	2800	3300	4500	5200	6000
JLC110	0.17	29	38	45	50	57	63
JLC122	16.54	2100	2800	3300	4500	5200	6000
JLC124	16.69	2100	2900	3400	4500	5300	6100
JLC126	16.95	2200	2900	3400	4600	5300	6200
JLC130	0.05	34	44	52	58	66	73
JLC140	0.15	81	110	120	140	160	180
JLC150	17.37	2200	3000	3500	4800	5500	6400
JLC170	0.4	250	330	390	430	500	550
JLC180	0.68	400	530	620	690	790	870
JLC190	0.88	540	710	830	930	1100	1200
JLC200	1.11	610	800	940	1100	1200	1300
JLC212	18.48	2400	3200	3800	5200	6000	6900
JLC214	18.83	2400	3300	3900	5300	6100	7100
JLC220	0.17	120	160	180	210	240	260

Hydrologic Element	Drainage Area (sq mi)	Results					
		2-Year Peak Discharge (cfs)	5-Year Peak Discharge (cfs)	10-Year Peak Discharge (cfs)	25-Year Peak Discharge (cfs)	50-Year Peak Discharge (cfs)	100-Year Peak Discharge (cfs)
JMC010	0.09	62	82	96	110	120	140
JMC022	0.19	13	15	35	54	79	99
JMC024	0	0	0	0	0	0	0
JMC032	0.19	13	15	35	54	79	99
JMC034	0.34	14	15	36	55	80	100
JMC040	0.21	92	120	140	160	180	200
JMC052	6.06	560	750	890	1400	1900	2400
JMC053	6.06	560	750	880	1400	1900	2400
JMC054	6.4	570	760	900	1500	1900	2400
JMC056	6.61	630	840	990	1500	2000	2500
JMC058	7.27	690	920	1100	1600	2100	2700
JMC060	0.18	85	110	130	150	170	190
JMC070	0.36	160	210	250	280	320	350
JMC080	0.67	310	420	490	550	630	690
JMC090	0.98	28	42	65	92	120	130
JMC100	0.11	45	59	69	77	88	97
JMC110	1.17	150	190	230	250	290	320
JMC130	0.14	110	140	160	180	210	230
JMC140	0.07	60	79	93	100	120	130
JMC150	0.07	16	21	25	28	32	35
JMC162	0.14	74	97	110	130	150	160
JMC164	0.33	120	160	180	200	230	260
JMC172	8.71	810	1100	1300	1800	2400	3000
JMC174	8.85	820	1100	1300	1900	2400	3000
JMC176	9.18	890	1200	1400	1900	2500	3100
JMC178	9.46	910	1200	1500	2000	2500	3200
JMC180	0.21	130	170	200	220	250	280
JMC190	0.38	190	250	300	330	380	420
JMC200	0.15	67	88	100	120	130	150
JMC210	0.09	51	68	79	88	100	110
JMC222	0.53	260	340	400	450	510	560
JMC224	0.62	310	410	480	530	610	670
JMC225	0.06	56	74	86	97	110	120
JMC226	0.95	450	590	690	770	880	970
JMC242	10.41	790	1100	1200	2000	2600	3300
JMC244	10.47	820	1100	1300	2100	2700	3300
JMC246	10.85	890	1200	1400	2100	2700	3400

Cottonwood Creek DBPS
24-Hour Rainfall Distribution for Drainage Areas Less Than 10Sq. Mi.
(Fraction of 24-Hour Depth)
Table 6-4 from Colorado Springs DCM (2014)

Ordinate	Date/Time	Cumulative Precipitation (Fraction of NOAA Atlas 2 24-Hour Rainfall Depth)
1	1/1/2000 0:00	0.000
2	1/1/2000 0:15	0.002
3	1/1/2000 0:30	0.005
4	1/1/2000 0:45	0.008
5	1/1/2000 1:00	0.011
6	1/1/2000 1:15	0.014
7	1/1/2000 1:30	0.017
8	1/1/2000 1:45	0.020
9	1/1/2000 2:00	0.023
10	1/1/2000 2:15	0.026
11	1/1/2000 2:30	0.029
12	1/1/2000 2:45	0.032
13	1/1/2000 3:00	0.035
14	1/1/2000 3:15	0.038
15	1/1/2000 3:30	0.041
16	1/1/2000 3:45	0.044
17	1/1/2000 4:00	0.048
18	1/1/2000 4:15	0.052
19	1/1/2000 4:30	0.056
20	1/1/2000 4:45	0.060
21	1/1/2000 5:00	0.060
22	1/1/2000 5:15	0.068
23	1/1/2000 5:30	0.072
24	1/1/2000 5:45	0.076
25	1/1/2000 6:00	0.080

Ordinate	Date/Time	Cumulative Precipitation (Fraction of NOAA Atlas 2 24-Hour Rainfall Depth)
26	1/1/2000 6:15	0.085
27	1/1/2000 6:30	0.090
28	1/1/2000 6:45	0.095
29	1/1/2000 7:00	0.100
30	1/1/2000 7:15	0.105
31	1/1/2000 7:30	0.110
32	1/1/2000 7:45	0.115
33	1/1/2000 8:00	0.120
34	1/1/2000 8:15	0.126
35	1/1/2000 8:30	0.133
36	1/1/2000 8:45	0.140
37	1/1/2000 9:00	0.147
38	1/1/2000 9:15	0.155
39	1/1/2000 9:30	0.163
40	1/1/2000 9:45	0.172
41	1/1/2000 10:00	0.181
42	1/1/2000 10:15	0.191
43	1/1/2000 10:30	0.203
44	1/1/2000 10:45	0.218
45	1/1/2000 11:00	0.236
46	1/1/2000 11:15	0.257
47	1/1/2000 11:30	0.283
48	1/1/2000 11:45	0.387
49	1/1/2000 12:00	0.663
50	1/1/2000 12:15	0.707

Ordinate	Date/Time	Cumulative Precipitation (Fraction of NOAA Atlas 2 24-Hour Rainfall Depth)
51	1/1/2000 12:30	0.735
52	1/1/2000 12:45	0.758
53	1/1/2000 13:00	0.776
54	1/1/2000 13:15	0.791
55	1/1/2000 13:30	0.804
56	1/1/2000 13:45	0.815
57	1/1/2000 14:00	0.825
58	1/1/2000 14:15	0.834
59	1/1/2000 14:30	0.842
60	1/1/2000 14:45	0.849
61	1/1/2000 15:00	0.856
62	1/1/2000 15:15	0.863
63	1/1/2000 15:30	0.869
64	1/1/2000 15:45	0.875
65	1/1/2000 16:00	0.881
66	1/1/2000 16:15	0.887
67	1/1/2000 16:30	0.893
68	1/1/2000 16:45	0.898
69	1/1/2000 17:00	0.903
70	1/1/2000 17:15	0.908
71	1/1/2000 17:30	0.913
72	1/1/2000 17:45	0.918
73	1/1/2000 18:00	0.922
74	1/1/2000 18:15	0.926
75	1/1/2000 18:30	0.930

Ordinate	Date/Time	Cumulative Precipitation (Fraction of NOAA Atlas 2 24-Hour Rainfall Depth)
76	1/1/2000 18:45	0.934
77	1/1/2000 19:00	0.938
78	1/1/2000 19:15	0.942
79	1/1/2000 19:30	0.946
80	1/1/2000 19:45	0.950
81	1/1/2000 20:00	0.953
82	1/1/2000 20:15	0.956
83	1/1/2000 20:30	0.959
84	1/1/2000 20:45	0.962
85	1/1/2000 21:00	0.965
86	1/1/2000 21:15	0.968
87	1/1/2000 21:30	0.971
88	1/1/2000 21:45	0.974
89	1/1/2000 22:00	0.977
90	1/1/2000 22:15	0.980
91	1/1/2000 22:30	0.983
92	1/1/2000 22:45	0.986
93	1/1/2000 23:00	0.989
94	1/1/2000 23:15	0.992
95	1/1/2000 23:30	0.995
96	1/1/2000 23:45	0.998

Cottonwood Creek DBPS
2-Hour Rainfall Distribution by Drainage Basin Area
(DARF-adjusted fraction of 1-Hour Depth)
Table 6-5 from Colorado Springs DCM (2014)

Ordinate	Date/Time	Cumulative Precipitation (Fraction of NOAA Atlas 2 24-Hour Rainfall Depth)						
		0-1 Sq. Mi.	>1-5 Sq. Mi.	>5-10 Sq. Mi.	>10-15 Sq. Mi.	>15-20 Sq. Mi.	>20-40 Sq. Mi.	>40-60 Sq. Mi.
1	1/1/2000 0:00	0	0	0	0	0	0	0
2	1/1/2000 0:05	0.014	0.014	0.014	0.014	0.015	0.015	0.017
3	1/1/2000 0:10	0.046	0.044	0.041	0.041	0.042	0.042	0.04
4	1/1/2000 0:15	0.079	0.076	0.074	0.074	0.073	0.07	0.068
5	1/1/2000 0:20	0.12	0.116	0.109	0.109	0.106	0.102	0.095
6	1/1/2000 0:25	0.179	0.176	0.169	0.168	0.163	0.157	0.147
7	1/1/2000 0:30	0.258	0.249	0.239	0.236	0.227	0.216	0.198
8	1/1/2000 0:35	0.421	0.396	0.354	0.327	0.307	0.276	0.242
9	1/1/2000 0:40	0.712	0.655	0.559	0.495	0.448	0.381	0.315
10	1/1/2000 0:45	0.824	0.756	0.637	0.56	0.506	0.422	0.345
11	1/1/2000 0:50	0.892	0.824	0.7	0.619	0.566	0.479	0.396
12	1/1/2000 0:55	0.935	0.866	0.74	0.658	0.601	0.512	0.428
13	1/1/2000 1:00	0.972	0.901	0.774	0.69	0.634	0.543	0.456
14	1/1/2000 1:05	1.004	0.934	0.806	0.717	0.661	0.57	0.482
15	1/1/2000 1:10	1.018	0.948	0.821	0.732	0.678	0.589	0.501
16	1/1/2000 1:15	1.03	0.962	0.835	0.746	0.692	0.603	0.515
17	1/1/2000 1:20	1.041	0.973	0.849	0.76	0.706	0.617	0.529
18	1/1/2000 1:25	1.052	0.984	0.863	0.774	0.72	0.631	0.543
19	1/1/2000 1:30	1.063	0.995	0.875	0.788	0.734	0.645	0.557
20	1/1/2000 1:35	1.072	1.006	0.886	0.802	0.748	0.659	0.571
21	1/1/2000 1:40	1.082	1.017	0.896	0.813	0.762	0.673	0.585
22	1/1/2000 1:45	1.091	1.026	0.907	0.824	0.773	0.687	0.599
23	1/1/2000 1:50	1.1	1.036	0.918	0.835	0.783	0.698	0.611
24	1/1/2000 1:55	1.109	1.045	0.929	0.846	0.794	0.709	0.622
25	1/1/2000 2:00	1.119	1.054	0.938	0.857	0.805	0.72	0.633

**Cottonwood Creek DBPS
Detention Reservoirs**

Existing Detention Facilities

Existing Cordera Detention Basin (EX_4)

Elevation (ft)	Area (AC)	Discharge (cfs)
0	0.0	0.0
0.78	1.9	13.0
7.1	16.9	48.1
10.07	39.3	362.7

Planned Future Detention Facilities

Wolf Ranch Detention Basin G (PL_4)

Elevation (ft)	Storage (AF)	Discharge (cfs)
0	0.0	0.0
2	0.5	1.0
4	1.0	5.0
6	4.0	80.0
8	10.0	140.0
10	16.0	200.0

Data taken from the Wolf Ranch MDDP

Wolf Ranch Detention Basin F18 (PL_2)

Elevation (ft)	Storage (AF)	Discharge (cfs)
7140	0.0	0.0
7142	1.0	1.0
7144	4.0	5.0
7146	11.0	110.0
7148	23.5	160.0
7150	41.0	170.0

Data taken from the Wolf Ranch MDDP

Wolf Ranch Detention Basin F19 (PL_1)

Elevation (ft)	Storage (AF)	Discharge (cfs)
7140	0.0	0.0
7142	1.0	1.0
7144	4.0	5.0
7146	11.0	95.0
7148	23.5	120.0
7150	41.0	135.0

Data taken from the Wolf Ranch MDDP

Wolf Ranch Detention Basin F28 (PL_3)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6968	0.0	0.0
6970	1.1	1.5
6972	5.2	4.8
6974	10.6	10.2
6976	16.7	15.6
6977	20.2	340.0
6978	24.0	520.0
6980	32.8	880.0
6982	43.0	1000.0

Data taken from the Wolf Ranch MDDP

**Cottonwood Creek DBPS
Detention Reservoirs**

Existing Detention Facilities

Chapel Hills East Detention Pond No.1 (CHDP1_Upper)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6582	0	0
6584	1.4	42.5
6586	3.1	65
6588	5.4	79.5
6590	7.7	90.5
6594	13.5	109.5

Spillway Elevation=6588 ft, Spillway Length=56 ft
Embankment Elevation=6590 ft, Embankment Length=300 ft
Data taken from the URS HEC-1 model, 1994

Chapel Hills East Detention Pond No.1 (CHDP1_Lower)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6566.5	0.0	0.0
6568	0.4	18.3
6570	3.0	61.3
6576	16.7	129.0
6578	22.0	441.2
6580	27.6	5870.2

Data taken from the Construction Drawings for
Chapel Hills Detention No. 1

Wolf Ranch Detention Basin E/D (EX_5/6)

Elevation (ft)	Area (AC)	Discharge (cfs)
6952	0.0	0.0
6953	1.5	2.2
6954	2.1	11.0
6955	3.0	15.0
6957	3.6	109.2
6959	3.9	162.9
6960	4.0	179.9
6961	4.2	509.0

Data taken from the Wolf Ranch MDDP

Chapel Hills East Detention Pond No.2 (CHDP 2)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6602	0	0
6604.5	2.8	24
6607	6.4	37
6609.5	10.8	46
6612	15	56
6614.5	21.3	63
6617	27.5	70
6619.5	33.8	76
6622	41	82
6624.5	49	88
6627	57	92
6629.5	65.4	97
6632	74.7	102
6634.5	85.5	107
6637	95.8	111
6639.5	109	115
6642	123.9	119
6644.5	144.8	596
6647	163.5	1802.0

Data taken from the URS HEC-1 model, 1995

Wolf Ranch Detention Basin A (EX_8)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6975.5	0.0	0.0
6977	2.8	1.0
6978	4.2	3.0
6979	8.9	5.0
6980	13.6	25.0
6981	16.8	100.0
6982	20.0	140.0
6983	25.0	140.0
6984	29.0	150.0
6985	34.2	155.0
6986	37.5	160.0
6987	44.2	175.0
6988	49.5	600.0

Data taken from the Wolf Ranch MDDP (Includes Existing Water Quality Retrofit)

Detention Pond No.3 (DP3)

Elevation (ft)	Storage (AF)	Discharge (cfs)
6578	0.0	0.0
6580	0.9	4.7
6582	2.0	5.6
6584	3.6	6.5
6586	5.4	72.6
6588	7.4	78.2
6590	9.8	124.2
6592	12.4	500.0

Data taken from the URS HEC-1 model, 1994

Fairfax Detention Pond (Fairfax)

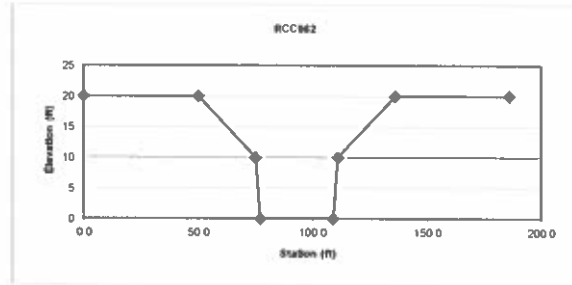
Elevation (ft)	Storage (AF)	Discharge (cfs)
6786	0.0	0.0
6788	0.0	4.7
6790	0.1	7.2
6792	0.3	9.0
6792.4	0.4	9.4
6794	0.9	87.2
6796	1.9	167.2
6798	3.8	206.8
6800	6.9	239.8
6802	11.5	268.8
6804	17.5	294.9
6806	24.6	318.9
6808	33.0	341.2
6810	42.5	362.1
6812	53.3	381.8
6814	65.6	400.6
6816	79.6	418.6
6818	95.1	435.8
6819	103.5	444.1
6820	112.3	1950.3
6822	130.4	8252.1

Data taken from the Fountain Creek Watershed Study, March 2006

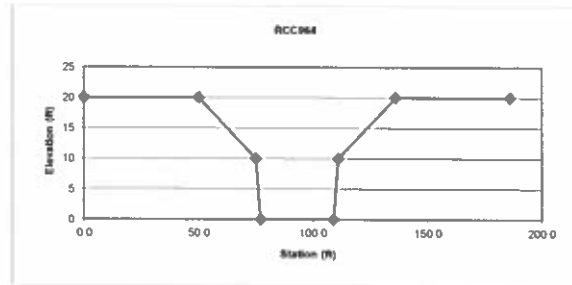
**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

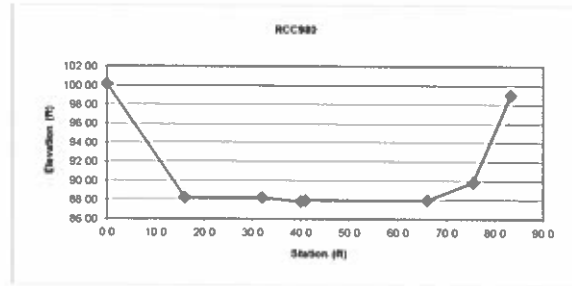
RCC962	
Station	Elevation
0.0	20
50.0	20
75.0	10
77.0	0
109.0	0
111.0	10
136.0	20
186.0	20



RCC964	
Station	Elevation
0.0	20
50.0	20
75.0	10
77.0	0
109.0	0
111.0	10
136.0	20
186.0	20



RCC980	
Station	Elevation
0.0	100.16
16.0	88.24
32.0	88.24
40.0	87.83
41.0	87.94
66.0	87.98
75.5	89.88
83.3	99.01

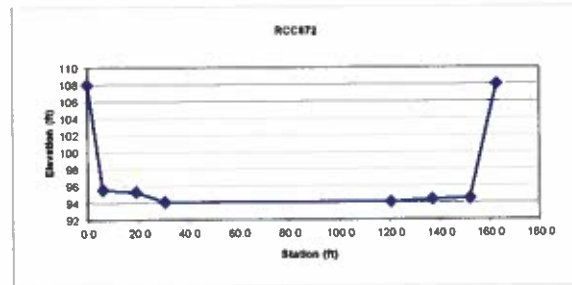


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

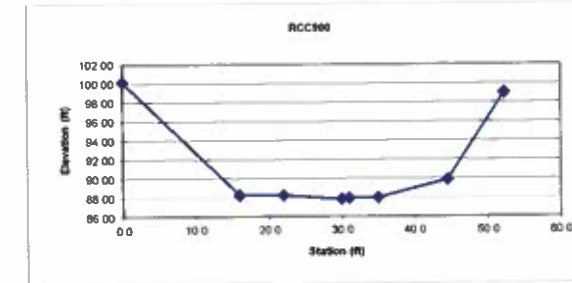
RCC872

Station	Elevation
0.0	108
6.0	95.57
19.0	95.27
30.5	94.10
120.5	94.07
137.0	94.38
152.0	94.51
163.0	108



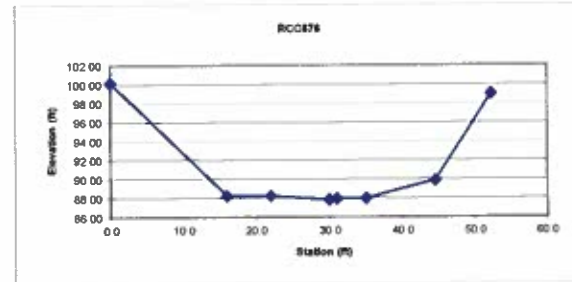
RCC900

Station	Elevation
0.0	100.16
16.0	88.24
22.0	88.24
30.0	87.83
31.0	87.94
35.0	87.98
44.5	89.88
52.3	99.01



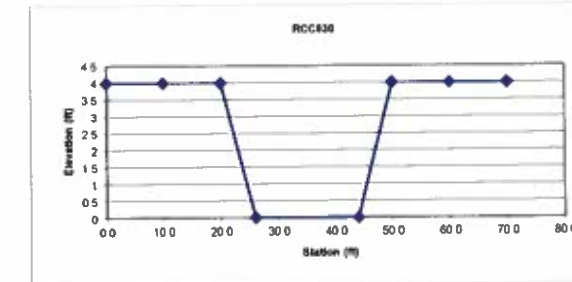
RCC876

Station	Elevation
0.0	100.16
16.0	88.24
22.0	88.24
30.0	87.83
31.0	87.94
35.0	87.98
44.5	89.88
52.3	99.01



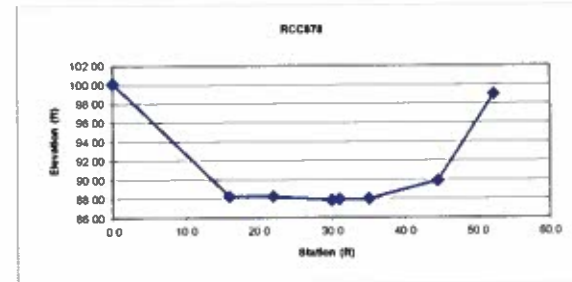
RCC930

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
44.0	0
50.0	4
60.0	4
70.0	4



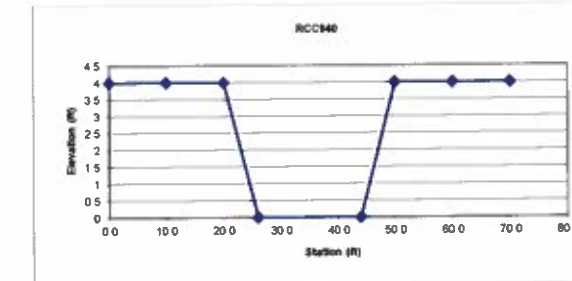
RCC878

Station	Elevation
0.0	100.16
16.0	88.24
22.0	88.24
30.0	87.83
31.0	87.94
35.0	87.98
44.5	89.88
52.3	99.01



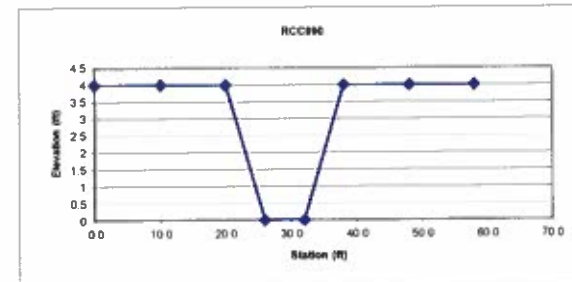
RCC940

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
44.0	0
50.0	4
60.0	4
70.0	4



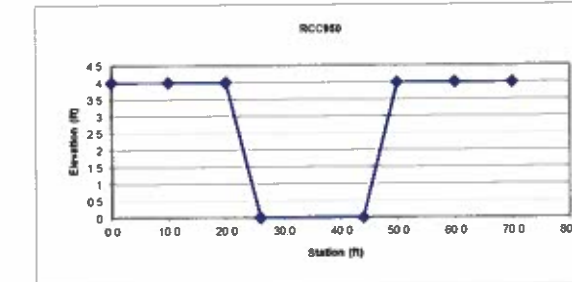
RCC890

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
32.0	0
38.0	4
48.0	4
58.0	4



RCC950

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
44.0	0
50.0	4
60.0	4
70.0	4

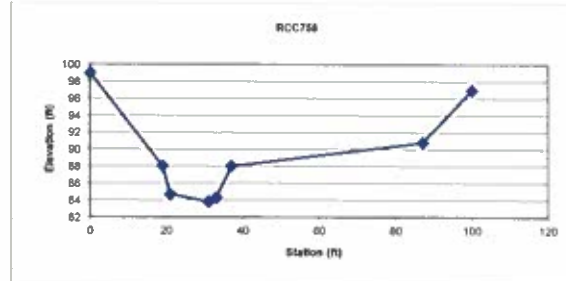


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

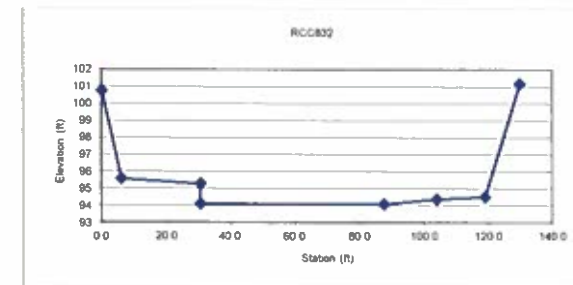
RCC758

Station	Elevation
0	99
19	88
21	84.70
31	83.80
33	84.30
37	88
87	90.8
100	97



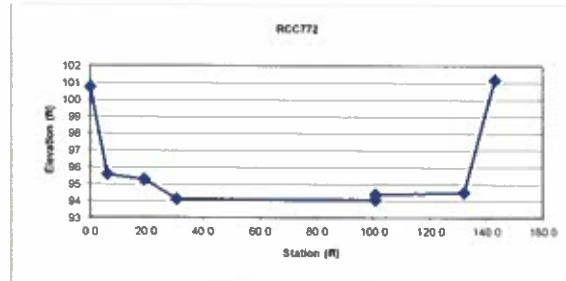
RCC832

Station	Elevation
0.0	100.73
6.0	95.57
30.5	95.27
30.5	94.10
87.5	94.07
104.0	94.38
119.0	94.51
130.0	101.19



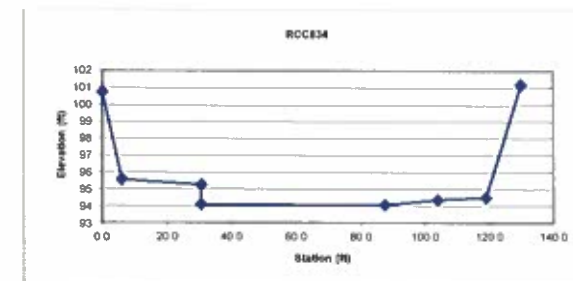
RCC772

Station	Elevation
0.0	100.73
6.0	95.57
19.0	95.27
30.5	94.10
100.5	94.07
100.5	94.38
132.0	94.51
143.0	101.19



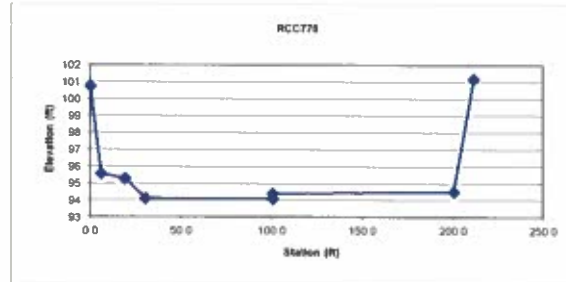
RCC834

Station	Elevation
0.0	100.73
6.0	95.57
30.5	95.27
30.5	94.10
87.5	94.07
104.0	94.38
119.0	94.51
130.0	101.19



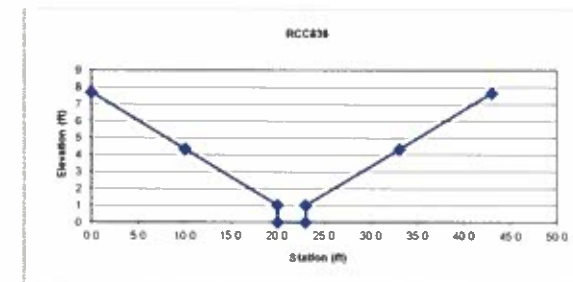
RCC776

Station	Elevation
0.0	100.73
6.0	95.57
19.0	95.27
30.5	94.10
100.5	94.07
100.5	94.38
200.5	94.51
211.5	101.19



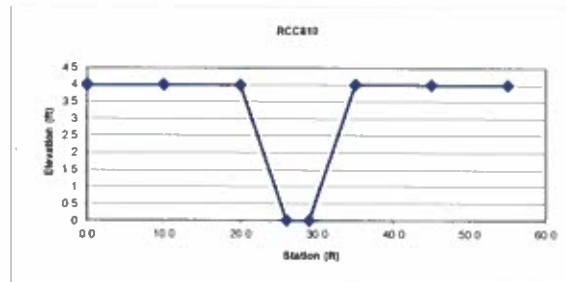
RCC836

Station	Elevation
0.0	7.67
10.0	4.33
20.0	1.00
20.0	0.00
23.0	0.00
23.0	1
33.0	4.33
43.0	7.67



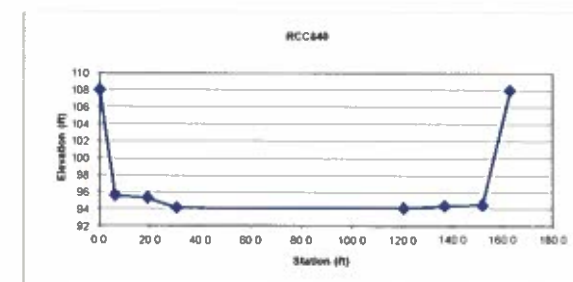
RCC810

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
29.0	0
35.0	4
45.0	4
55.0	4



RCC840

Station	Elevation
0.0	108
6.0	95.57
19.0	95.27
30.5	94.10
120.5	94.07
137.0	94.38
152.0	94.51
163.0	108

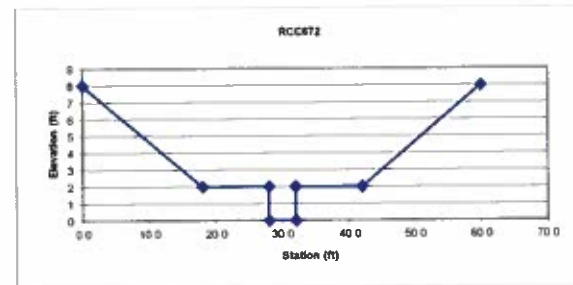


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

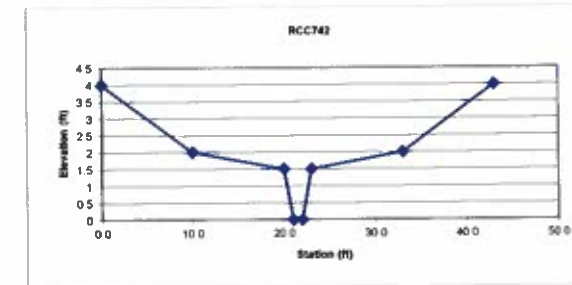
RCC672

Station	Elevation
0.0	8
18.0	2
28.0	2
28.0	0
32.0	0
32.0	2
42.0	2
60.0	8



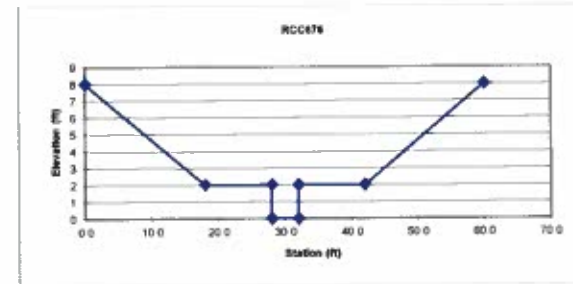
RCC742

Station	Elevation
0.0	4
10.0	2
20.0	1.50
21.0	0.00
22.0	0.00
23.0	1.5
33.0	2
43.0	4



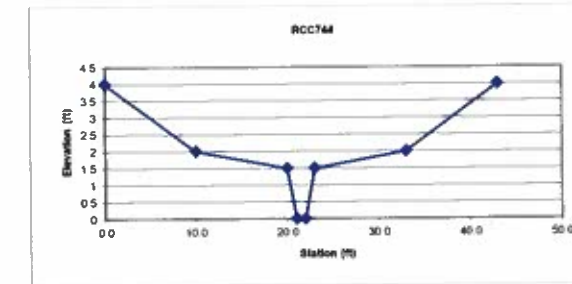
RCC676

Station	Elevation
0.0	8
18.0	2
28.0	2
28.0	0
32.0	0
32.0	2
42.0	2
60.0	8



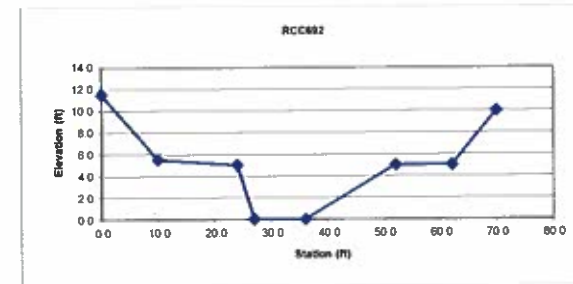
RCC744

Station	Elevation
0.0	4
10.0	2
20.0	1.50
21.0	0.00
22.0	0.00
23.0	1.5
33.0	2
43.0	4



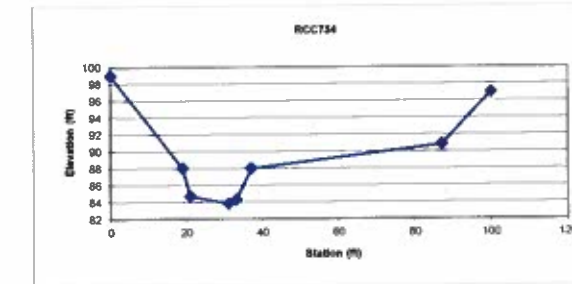
RCC692

Station	Elevation
0.0	11.5
10.0	5.5
24.0	5.0
27.0	0.0
36.0	0.0
52.0	5.0
62.0	5.0
70.0	10.0



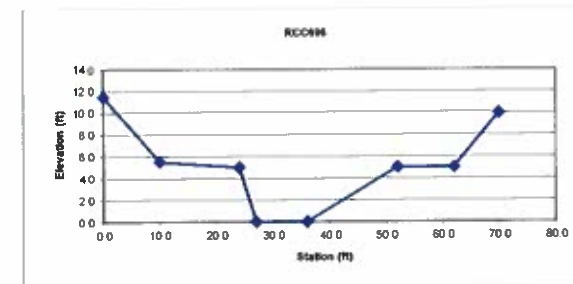
RCC754

Station	Elevation
0	99
19	88
21	84.70
31	83.80
33	84.30
37	88
87	90.8
100	97



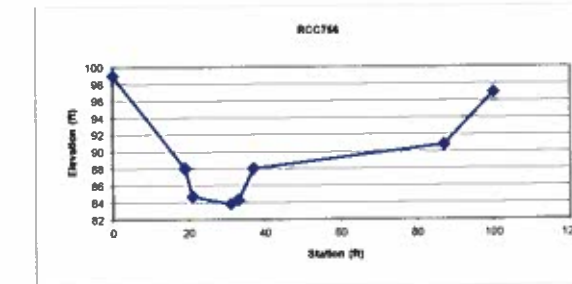
RCC696

Station	Elevation
0.0	11.5
10.0	5.5
24.0	5.0
27.0	0.0
36.0	0.0
52.0	5.0
62.0	5.0
70.0	10.0



RCC756

Station	Elevation
0	99
19	88
21	84.70
31	83.80
33	84.30
37	88
87	90.8
100	97

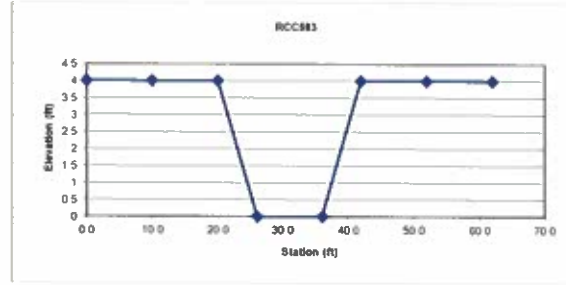


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

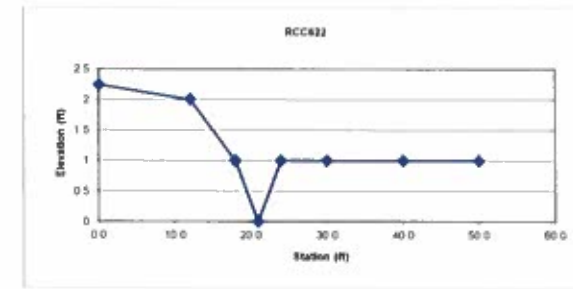
RCC583

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
36.0	0
42.0	4
52.0	4
62.0	4



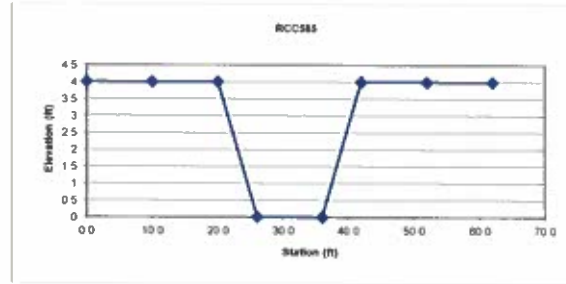
RCC622

Station	Elevation
0.0	2.24
12.0	2
18.0	1
21.0	0
24.0	1
30.0	1
40.0	1
50.0	1



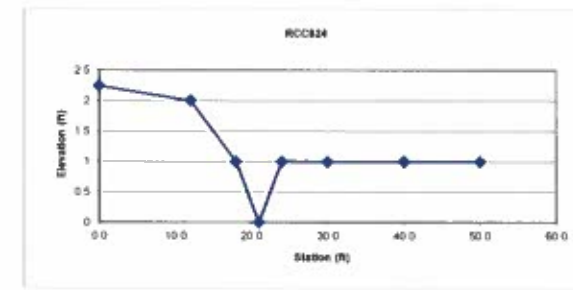
RCC585

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
36.0	0
42.0	4
52.0	4
62.0	4



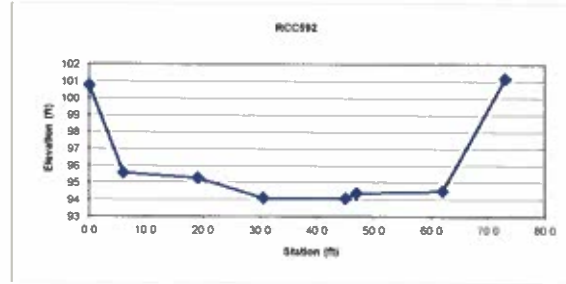
RCC624

Station	Elevation
0.0	2.24
12.0	2
18.0	1
21.0	0
24.0	1
30.0	1
40.0	1
50.0	1



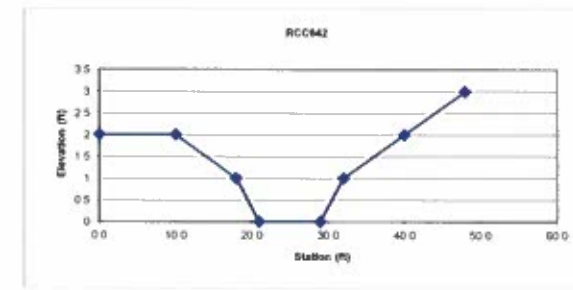
RCC592

Station	Elevation
0.0	100.73
6.0	95.57
19.0	95.27
30.5	94.1
45.0	94.07
47.0	94.38
62.0	94.51
73.0	101.19



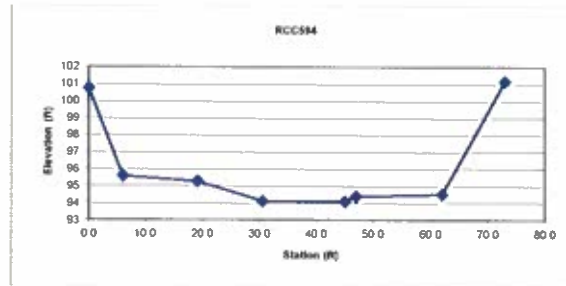
RCC642

Station	Elevation
0.0	2
10.0	2
18.0	1
21.0	0
29.0	0
32.0	1
40.0	2
48.0	3



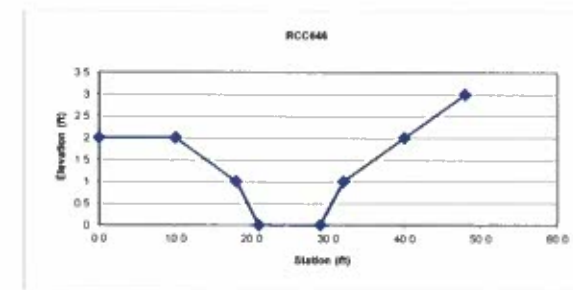
RCC594

Station	Elevation
0.0	100.73
6.0	95.57
19.0	95.27
30.5	94.1
45.0	94.07
47.0	94.38
62.0	94.51
73.0	101.19



RCC646

Station	Elevation
0.0	2
10.0	2
18.0	1
21.0	0
29.0	0
32.0	1
40.0	2
48.0	3

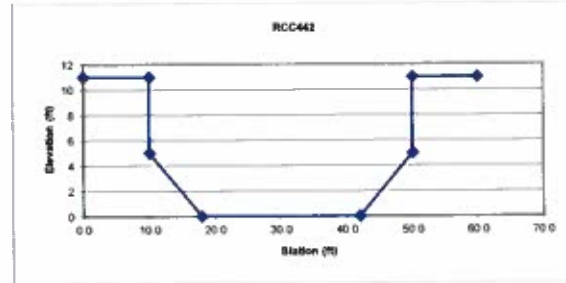


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

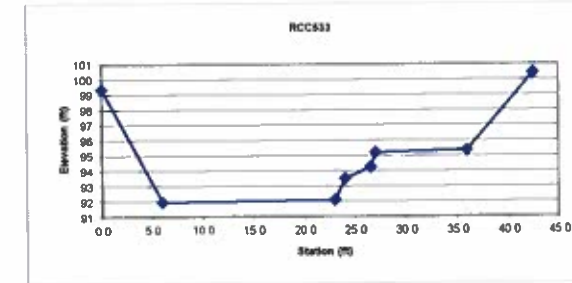
RCC442

Station	Elevation
0.0	11
10.0	11
10.0	5
18.0	0
42.0	0
50.0	5
50.0	11
60.0	11



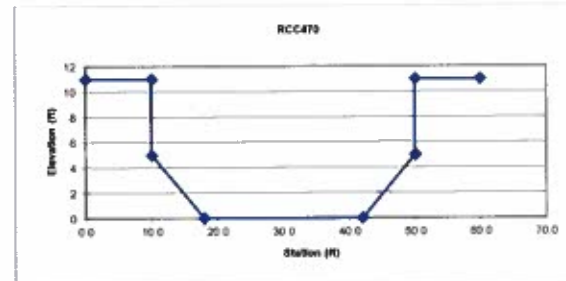
RCC533

Station	Elevation
0.0	99.37
6.0	91.95
23.0	92.08
24.0	93.48
26.5	94.24
27.0	95.2
36.0	95.36
42.5	100.44



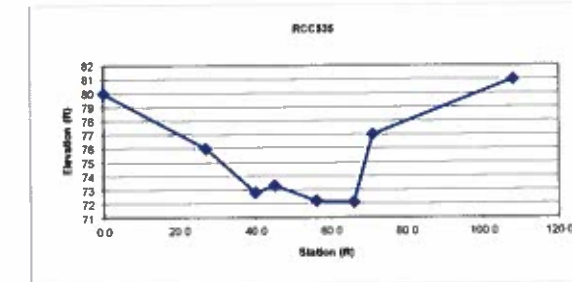
RCC470

Station	Elevation
0.0	11
10.0	11
10.0	5
18.0	0
42.0	0
50.0	5
50.0	11
60.0	11



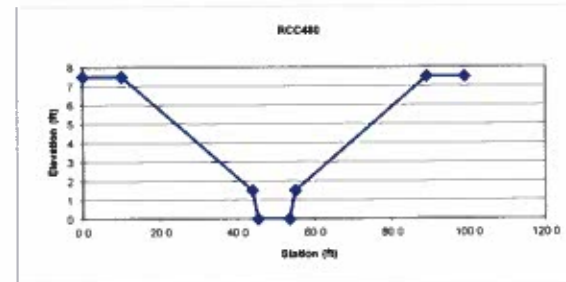
RCC535

Station	Elevation
0.0	80
27.0	76
40.0	72.8
45.0	73.3
56.0	72.2
66.0	72.1
71.0	77
108.0	81



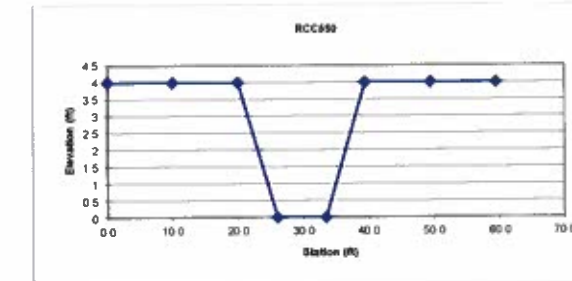
RCC480

Station	Elevation
0.0	7.5
10.0	7.5
44.0	1.5
45.5	0
53.5	0
55.0	1.5
89.0	7.5
99.0	7.5



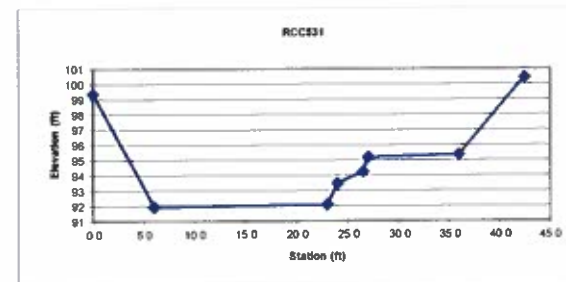
RCC550

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
33.5	0
39.5	4
49.5	4
59.5	4



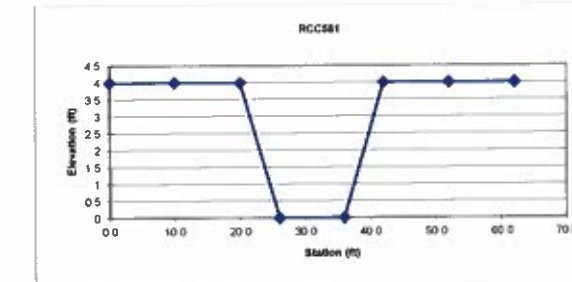
RCC531

Station	Elevation
0.0	99.37
6.0	91.95
23.0	92.08
24.0	93.48
26.5	94.24
27.0	95.2
36.0	95.36
42.5	100.44



RCC581

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
36.0	0
42.0	4
52.0	4
62.0	4

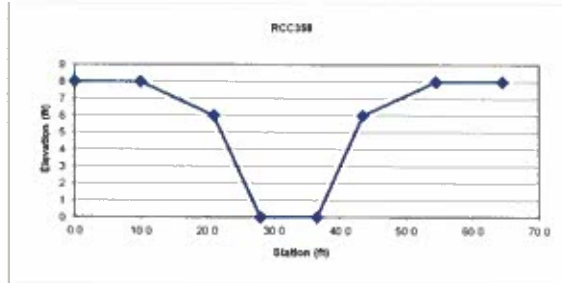


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

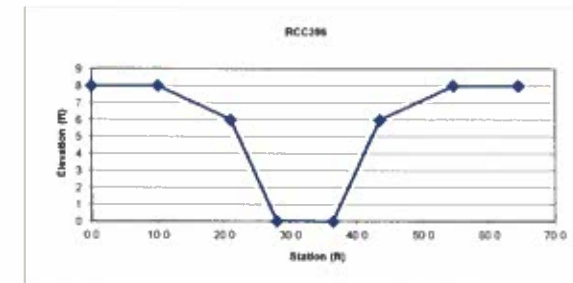
RCC358

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



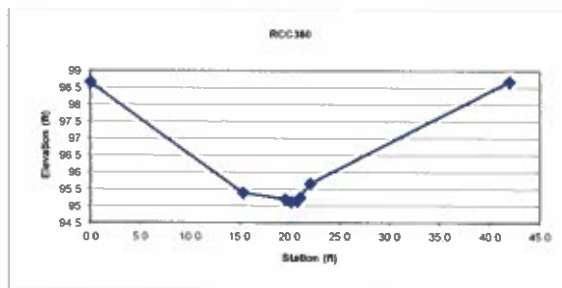
RCC396

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



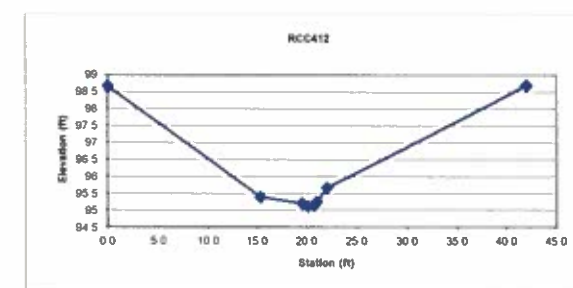
RCC360

Station	Elevation
0.0	98.66
15.3	95.39
19.5	95.2
20.1	95.12
20.7	95.14
21.0	95.25
22.0	95.66
42.0	98.7



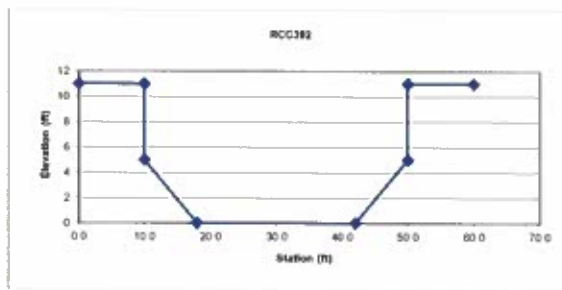
RCC412

Station	Elevation
0.0	98.66
15.3	95.39
19.5	95.2
20.1	95.12
20.7	95.14
21.0	95.25
22.0	95.66
42.0	98.7



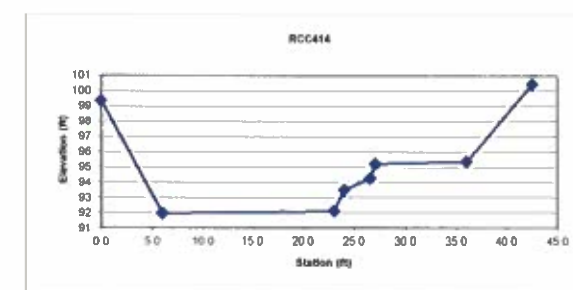
RCC392

Station	Elevation
0.0	11
10.0	11
10.0	5
18.0	0
42.0	0
50.0	5
50.0	11
60.0	11



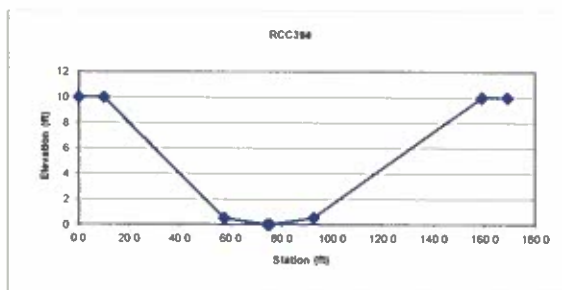
RCC414

Station	Elevation
0.0	99.37
6.0	91.95
23.0	92.08
24.0	93.48
26.5	94.24
27.0	95.2
36.0	95.36
42.5	100.44



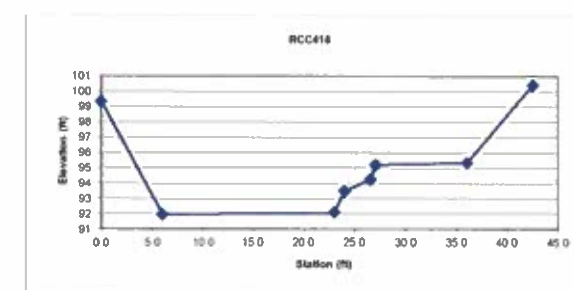
RCC394

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



RCC418

Station	Elevation
0.0	99.37
6.0	91.95
23.0	92.08
24.0	93.48
26.5	94.24
27.0	95.2
36.0	95.36
42.5	100.44

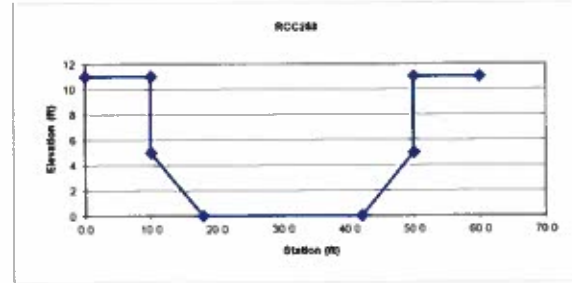


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

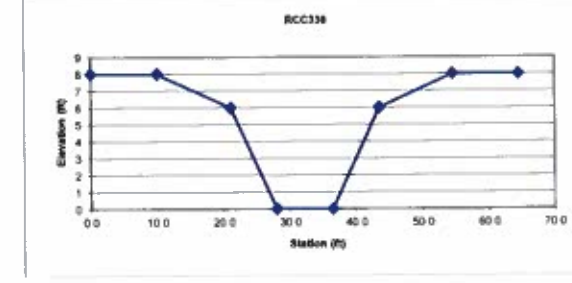
RCC288

Station	Elevation
0.0	11
10.0	11
10.0	5
18.0	0
42.0	0
50.0	5
50.0	11
60.0	11



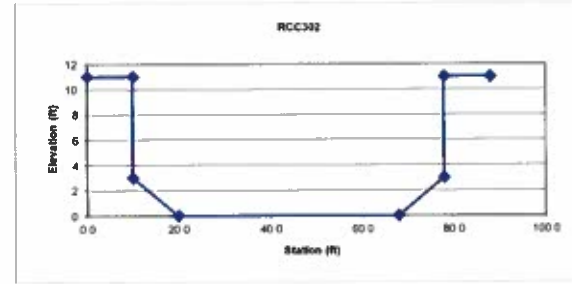
RCC330

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



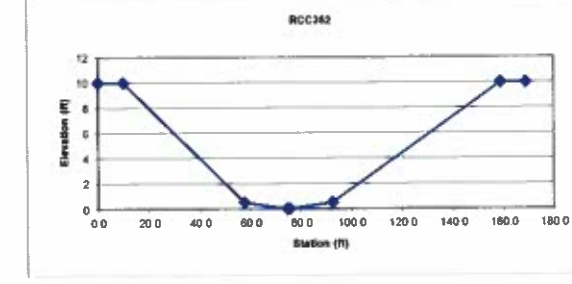
RCC302

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



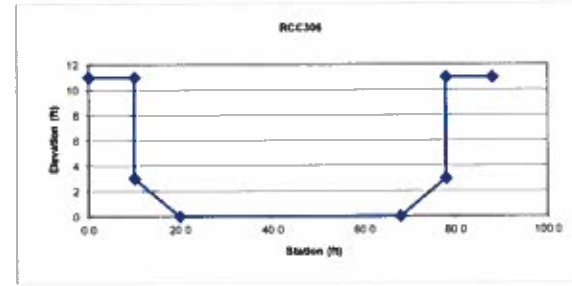
RCC352

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



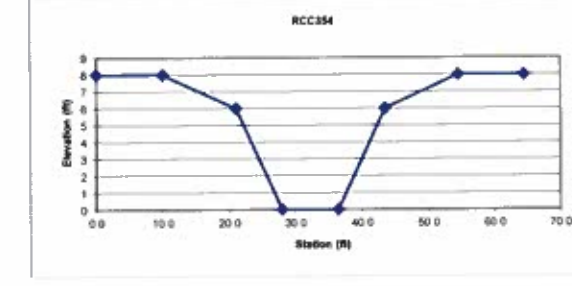
RCC306

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



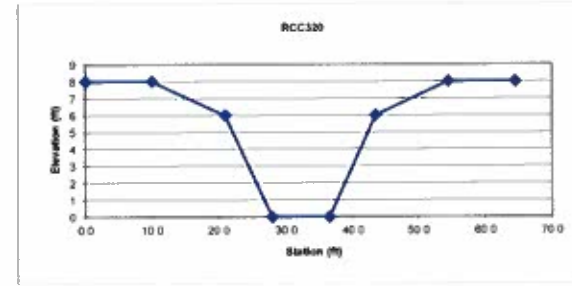
RCC354

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



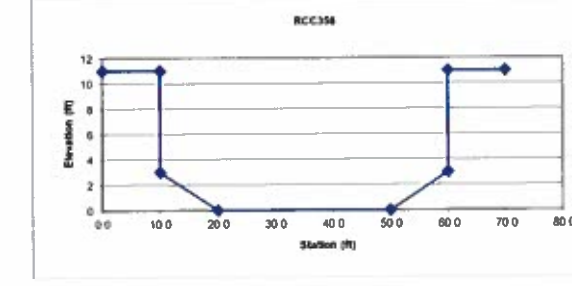
RCC320

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



RCC356

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
50.0	0
60.0	3
60.0	11
70.0	11

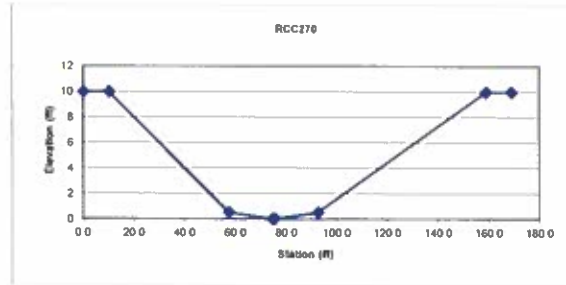


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

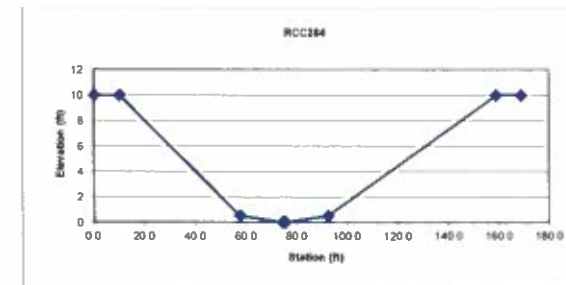
RCC270

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



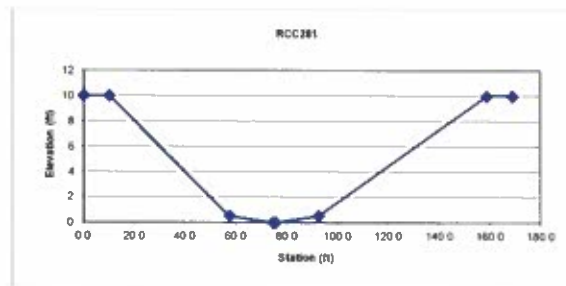
RCC284

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



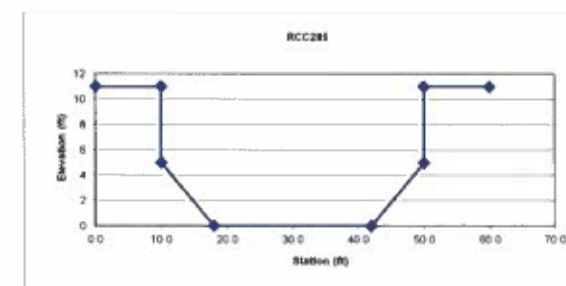
RCC281

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



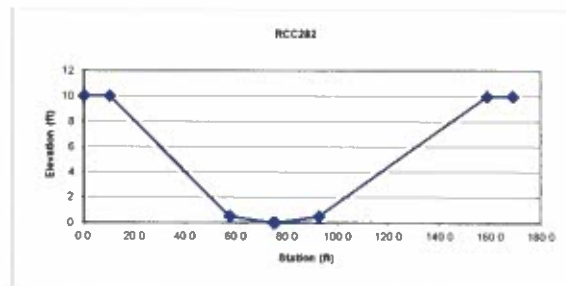
RCC285

Station	Elevation
0.0	11
10.0	11
10.0	5
18.0	0
42.0	0
50.0	5
50.0	11
60.0	11



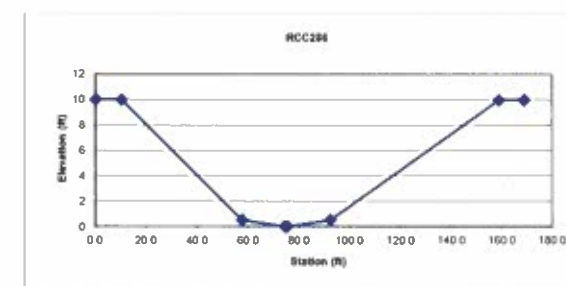
RCC282

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



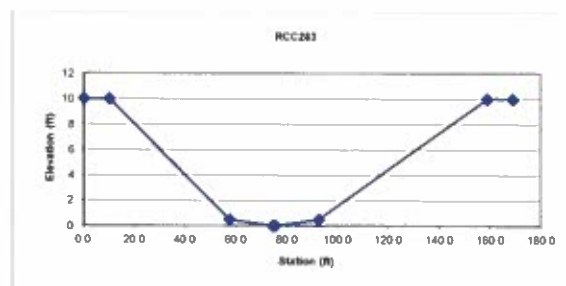
RCC286

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



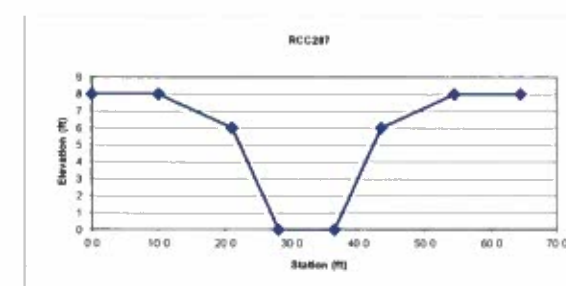
RCC283

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



RCC287

Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8

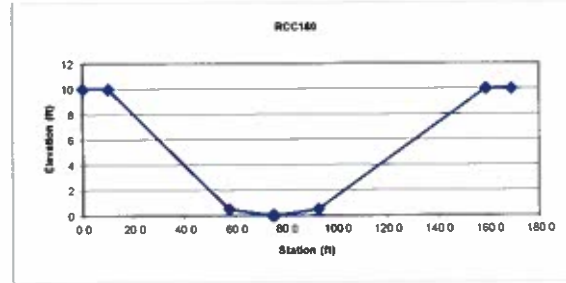


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

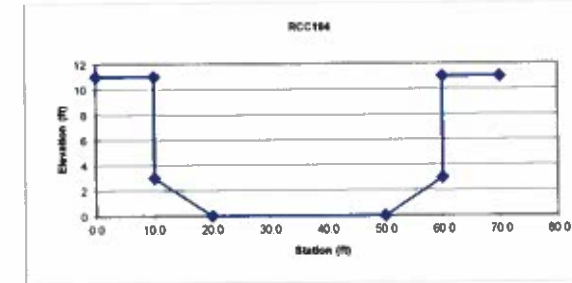
RCC180

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



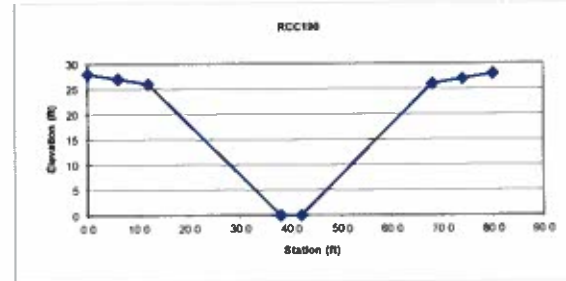
RCC194

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
50.0	0
60.0	3
60.0	11
70.0	11



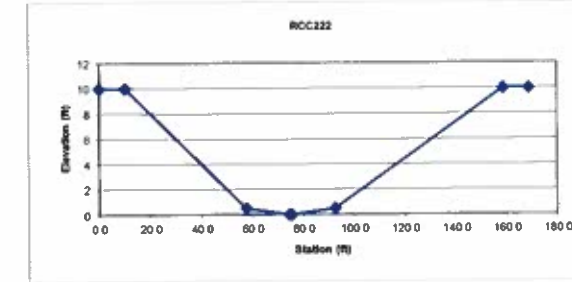
RCC190

Station	Elevation
0.0	28
6.0	27
12.0	26
38.0	0
42.0	0
68.0	26
74.0	27
80.0	28



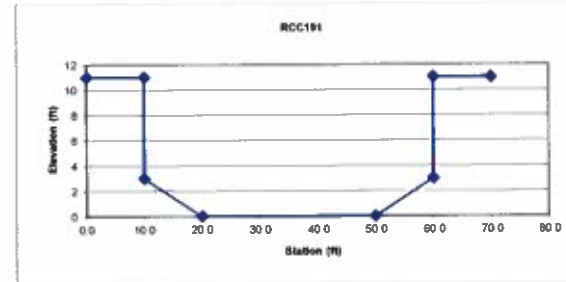
RCC222

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



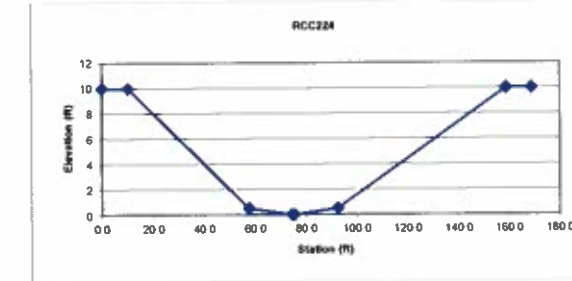
RCC191

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
50.0	0
60.0	3
60.0	11
70.0	11



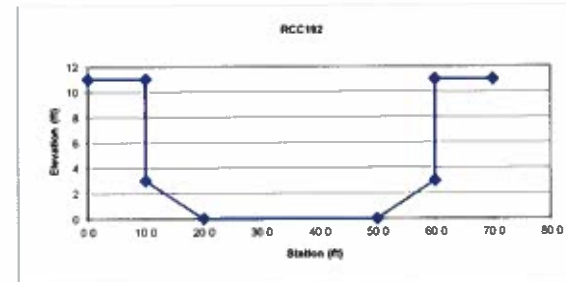
RCC224

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



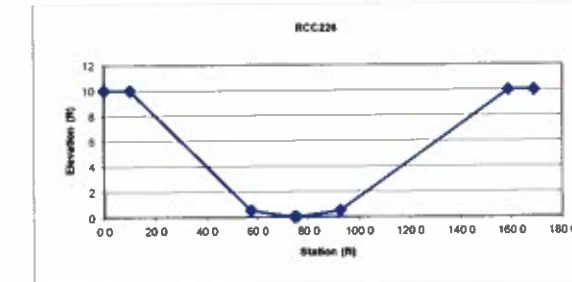
RCC192

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
50.0	0
60.0	3
60.0	11
70.0	11



RCC226

Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10

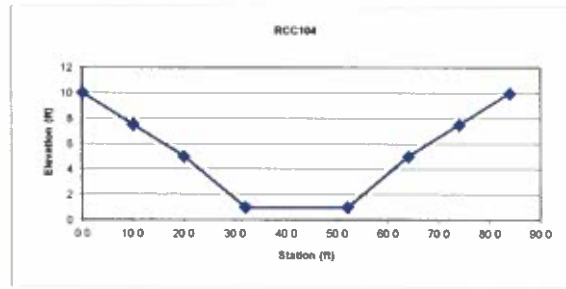


**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

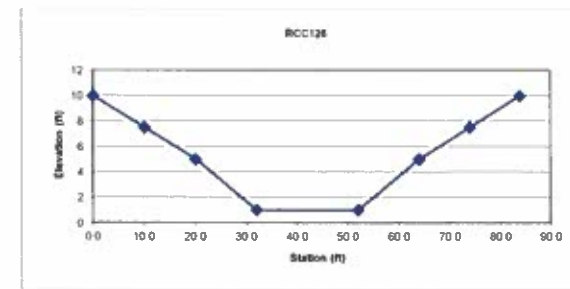
RCC104

Station	Elevation
0.0	10
10.0	7.5
20.0	5
32.0	1
52.0	1
64.0	5
74.0	7.5
84.0	10



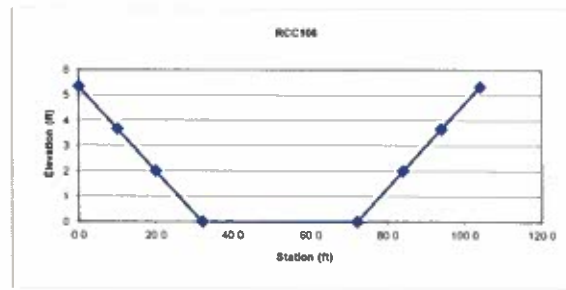
RCC126

Station	Elevation
0.0	10
10.0	7.5
20.0	5
32.0	1
52.0	1
64.0	5
74.0	7.5
84.0	10



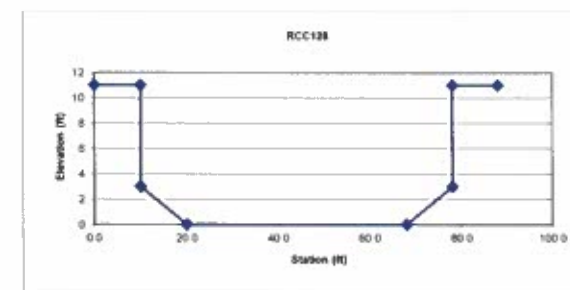
RCC106

Station	Elevation
0.0	5.33
10.0	3.67
20.0	2
32.0	0
72.0	0
84.0	2
94.0	3.67
104.0	5.33



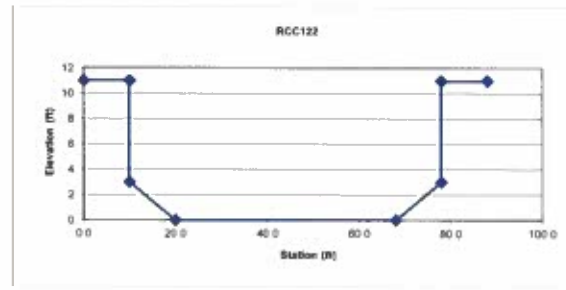
RCC128

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



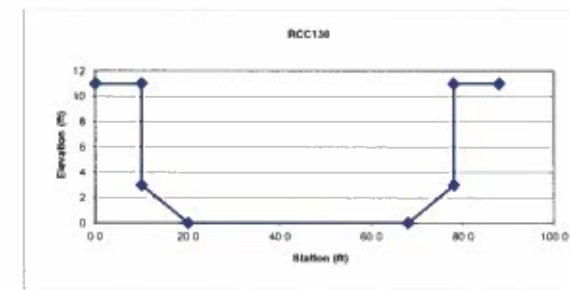
RCC122

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



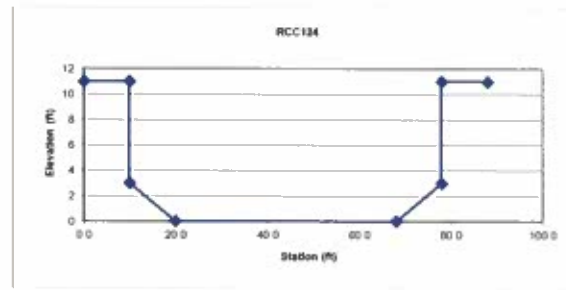
RCC130

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



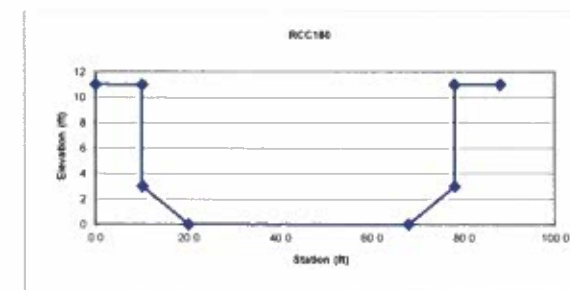
RCC124

Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



RCC160

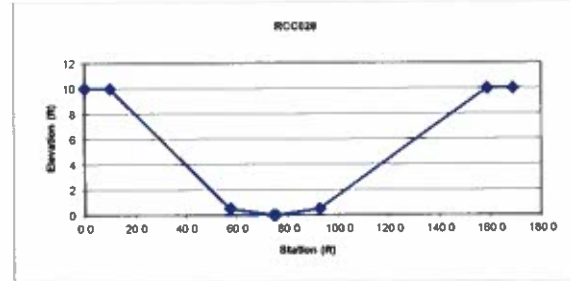
Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



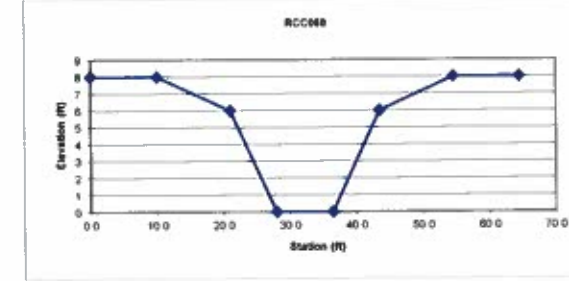
**Cottonwood Creek DBPS
8-Point Cross Sections**

Cottonwood Creek

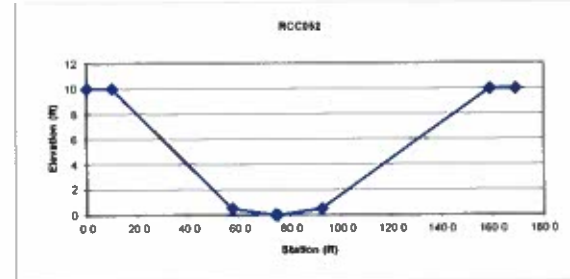
RCC020	
Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



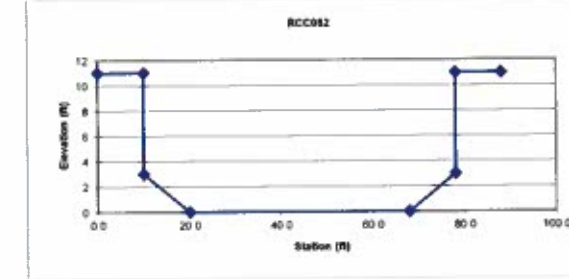
RCC060	
Station	Elevation
0.0	8
10.0	8
21.0	6
28.0	0
36.5	0
43.5	6
54.5	8
64.5	8



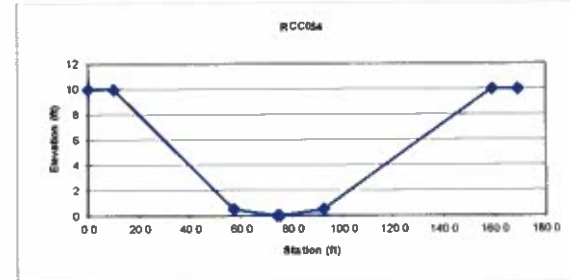
RCC052	
Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



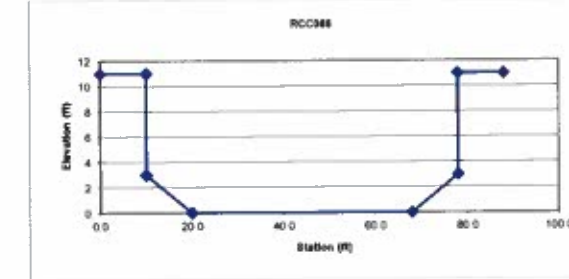
RCC082	
Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



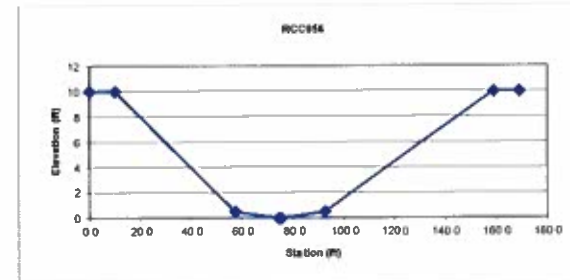
RCC054	
Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



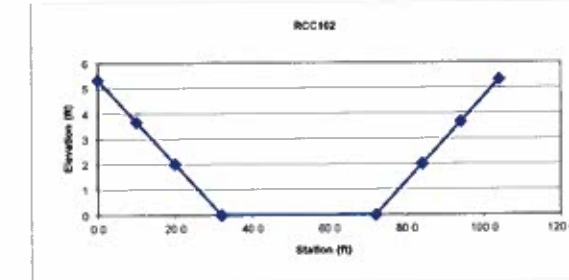
RCC086	
Station	Elevation
0.0	11
10.0	11
10.0	3
20.0	0
68.0	0
78.0	3
78.0	11
88.0	11



RCC056	
Station	Elevation
0.0	10
10.0	10
57.5	0.5
74.5	0
75.5	0
92.5	0.5
159.0	10
169.0	10



RCC102	
Station	Elevation
0.0	5.33
10.0	3.67
20.0	2
32.0	0
72.0	0
84.0	2
94.0	3.67
104.0	5.33

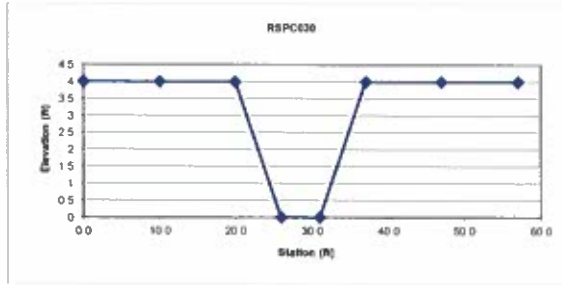


**Cottonwood Creek DBPS
8-Point Cross Sections**

South Pine Creek

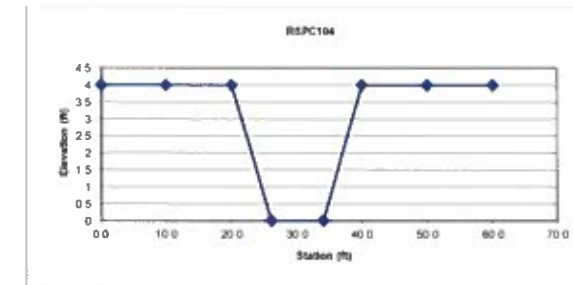
RSPC030

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
31.0	0
37.0	4
47.0	4
57.0	4



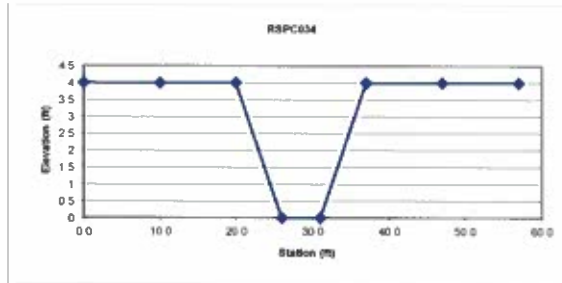
RSPC104

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
34.0	0
40.0	4
50.0	4
60.0	4



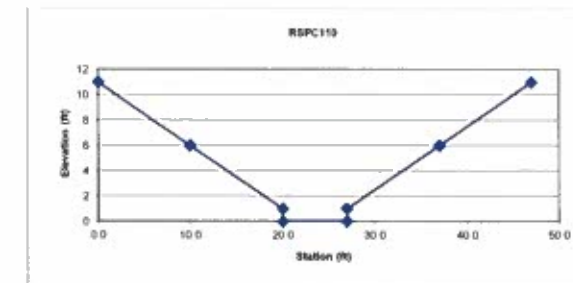
RSPC034

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
31.0	0
37.0	4
47.0	4
57.0	4



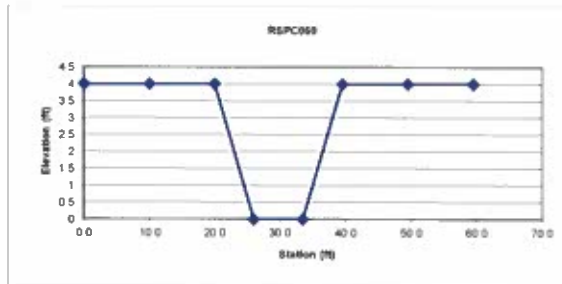
RSPC110

Station	Elevation
0.0	11
10.0	6
20.0	1
20.0	0
27.0	0
27.0	1
37.0	6
47.0	11



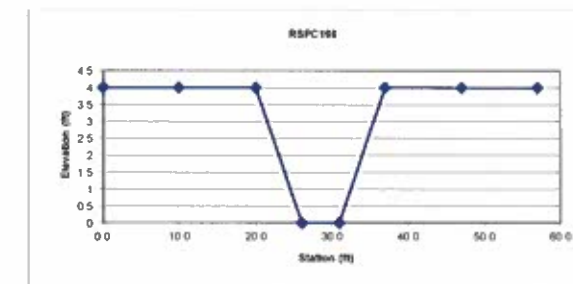
RSPC060

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
33.5	0
39.5	4
49.5	4
59.5	4



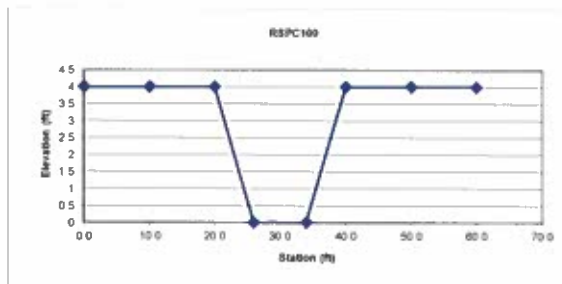
RSPC166

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
31.0	0
37.0	4
47.0	4
57.0	4



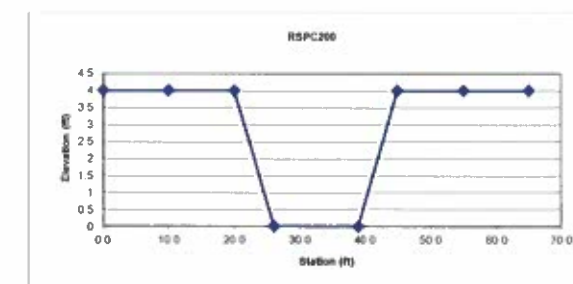
RSPC100

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
34.0	0
40.0	4
50.0	4
60.0	4



RSPC200

Station	Elevation
0.0	4
10.0	4
20.0	4
26.0	0
39.0	0
45.0	4
55.0	4
65.0	4



Cottonwood Creek DBPS
Manning's n Calculations at USGS Gage Locations

1.25-yr										
USGS Gauge #	Location	¹ Flow (cfs)	² Cross-Sectional Flow Area (ft ²)	³ Wetted Perimeter (ft)	⁴ Hydraulic Radius (ft)	⁵ Estimated Slope (ft/ft)	Surveyed Slope (ft/ft)	n _{estimated}	n _{surveyed}	Velocity (ft/s) ⁶
07103990	Cottonwood Mouth	640	92.85	78.66	1.18	0.013	0.016	0.028	0.031	6.89
07103985	Rangewood	320	48.26	23.57	2.05	0.013	0.002	0.041	0.016	6.63
07103980	Woodmen	220	32.79	56.41	0.58	0.025	0.010	0.024	0.015	6.71
07103977	Cowpoke	40	8.04	13.87	0.58	0.013	0.017	0.024	0.027	4.98

2-yr										
USGS Gauge #	Location	¹ Flow (cfs)	² Cross-Sectional Flow Area (ft ²)	³ Wetted Perimeter (ft)	⁴ Hydraulic Radius (ft)	⁵ Estimated Slope (ft/ft)	Surveyed Slope (ft/ft)	n _{estimated}	n _{surveyed}	Velocity (ft/s) ⁶
07103990	Cottonwood Mouth	1070	137.20	95.59	1.44	0.0133	0.016	0.028	0.031	7.80
07103985	Rangewood	770	91.77	31.82	2.88	0.0126	0.002	0.040	0.016	8.39
07103980	Woodmen	370	47.95	72.48	0.66	0.0250	0.010	0.023	0.015	7.72
07103977	Cowpoke	60	10.81	16.30	0.66	0.0129	0.017	0.023	0.027	5.55

5-yr										
USGS Gauge #	Location	¹ Flow (cfs)	² Cross-Sectional Flow Area (ft ²)	³ Wetted Perimeter (ft)	⁴ Hydraulic Radius (ft)	⁵ Estimated Slope (ft/ft)	Surveyed Slope (ft/ft)	n _{estimated}	n _{surveyed}	Velocity (ft/s) ⁶
07103990	Cottonwood Mouth	1790	202.84	116.17	1.75	0.0133	0.016	0.028	0.031	8.82
07103985	Rangewood	1890	177.07	43.26	4.09	0.0126	0.002	0.040	0.016	10.67
07103980	Woodmen	620	69.95	92.97	0.75	0.0250	0.010	0.022	0.014	8.86
07103977	Cowpoke	110	16.82	20.73	0.81	0.0129	0.017	0.023	0.026	6.54

10-yr										
USGS Gauge #	Location	¹ Flow (cfs)	² Cross-Sectional Flow Area (ft ²)	³ Wetted Perimeter (ft)	⁴ Hydraulic Radius (ft)	⁵ Estimated Slope (ft/ft)	Surveyed Slope (ft/ft)	n _{estimated}	n _{surveyed}	Velocity (ft/s) ⁶
07103990	Cottonwood Mouth	2340	248.63	128.59	1.93	0.0133	0.016	0.028	0.031	9.41
07103985	Rangewood	N/A	N/A	N/A	N/A	0.0126	0.002	N/A	N/A	N/A
07103980	Woodmen	810	85.05	105.75	0.80	0.0250	0.010	0.021	0.014	9.52
07103977	Cowpoke	N/A	N/A	N/A	N/A	0.0129	0.017	N/A	N/A	N/A

¹ Flow values are estimates calculated using the Log Pearson Type III Distribution using data from the USGS gages.

² Area was calculated from regression equations at the respective gages.

³ Assuming Wetted Perimeter=Width. Width was calculated from regression equations at the respective gages.

⁴ Hydraulic Radius=Cross-Sectional Flow Area/Wetted Perimeter

⁵ Estimated slopes were calculated using the existing contours obtained from the City of Colorado Springs. The slopes calculated

from the cross-sections completed by the City of Colorado Springs produced erroneous Manning's n values at the gage locations. ⁶

Velocity=Area/Wetted Perimeter

**Cottonwood Creek DBPS
Routing Calculations**

Reach	Length (ft)	Elevation Change (ft)	Slope (ft/ft)	Manning's n	Shape	Pipe Diameter (ft)	Bottom Width (ft)	Depth (ft)	L.B. Manning's n	R.B. Manning's n	Cross Section Table	Channel Manning's n Reference	Overbank Manning's n Reference
RSPC130	3,832	128	0.033	0.016	Rectangle	--	7	7	--	--	--	Concrete Box_n2	N/A
RSPC150	3,049	72	0.024	0.016	Circle	9	--	--	--	--	--	RCP	N/A
RSPC152	250	2	0.008	0.016	Rectangle	--	6.92	10.67	--	--	--	Concrete Box	N/A
RSPC154	1,796	52	0.021*	0.016	Rectangle	--	6	6	--	--	--	Concrete Box_n3	N/A
RSPC156	860	22	0.017*	0.016	Circle	7.5	--	--	--	--	--	RCP_n2	N/A
RSPC158	516	18	0.012*	0.016	Circle	7.5	--	--	--	--	--	RCP_n4	N/A
RSPC160	1,539	88	0.045*	0.016	Circle	4.5	--	--	--	--	--	RCP_n2	N/A
RSPC162	549	58	0.040*	0.016	Circle	3.5	--	--	--	--	--	RCP_n3	N/A
RSPC164	3,678	80	0.022	0.016	Circle	7.5	--	--	--	--	--	RCP	N/A
RSPC166	1,690	64	0.038	0.016	8-point	--	--	--	0.016	0.016	RSPC166	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC180	3,213	122	0.038	0.016	Circle	5	--	--	--	--	--	RCP	N/A
RSPC190	3,707	84	0.023	0.016	Circle	4.5	--	--	--	--	--	RCP	N/A
RSPC200	1,792	44	0.015*	0.016	8-point	--	--	--	0.016	0.016	RSPC200	Concrete Channel_n2	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.

* In the absence of invert information for concrete pipes and channels, slope values denoted with an asterisk were adjusted such that the existing 2-year velocity element did not exceed standard criteria of 18ft/s, per the City of Colorado Springs.
 1) All Manning's n values were increased by 25% per the City of Colorado Springs.

**Cottonwood Creek DBPS
Routing Calculations**

Reach	Length (ft)	Elevation Change (ft)	Slope (ft/ft)	Manning's n	Shape	Pipe Diameter (ft)	Bottom Width (ft)	Depth (ft)	L.B. Manning's n	R.B. Manning's n	Cross Section Table	Channel Manning's n Reference	Overbank Manning's n Reference
RMC172	546	74	0.042*	0.016	Circle	2.5	--	--	--	--	--	RCP_n4	N/A
RMC173	836	10	0.012	0.029	8-point	--	--	--	0.029	0.029	RMC173	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RMC174	220	30	0.077*	0.016	Rectangle	--	8	6	--	--	--	Concrete Box_n2	N/A
RMC175	2208	34	0.015	0.029	8-point	--	--	--	0.029	0.029	RMC175	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RMC190	2274	84	0.037	0.016	8-point	--	--	--	0.016	0.016	RMC190	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RMC221	1117	30	0.027	0.016	8-point	--	--	--	0.016	0.016	RMC221	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RMC222	1374	78	0.045*	0.016	Circle	3.5	--	--	--	--	--	RCP_n2	N/A
RMC223	936	22	0.024	0.016	8-point	--	--	--	0.016	0.016	RMC223	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RMC224	157	6	0.038	0.016	Circle	2.5	--	--	--	--	--	RCP_n2	N/A
RMC225	3432	118	0.034	0.016	8-point	--	--	--	0.016	0.016	RMC225	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RMC242	419	6	0.014	0.029	8-point	--	--	--	0.029	0.029	RMC242	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RMC244	5275	80	0.015	0.029	8-point	--	--	--	0.029	0.029	RMC244	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RRT032	4171	92	0.022	0.031	8-point	--	--	--	0.031	0.031	RRT032	Firm Soil Channel	Assume value is the same. Reference Table 1 USGS Guide
RRT034	220	4	0.018	0.031	8-point	--	--	--	0.031	0.031	RRT034	Firm Soil Channel	Assume value is the same
RRT052	3286	82	0.025	0.050	8-point	--	--	--	0.050	0.050	RRT052	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT054	2881	72	0.025	0.016	Circle	3	--	--	--	--	--	RCP	N/A
RRT056	2096	52	0.025	0.050	8-point	--	--	--	0.050	0.050	RRT056	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT082	879	14	0.016	0.050	8-point	--	--	--	0.050	0.050	RRT082	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT084	253	14	0.026*	0.016	Circle	6	--	--	--	--	--	RCP_n2	N/A
RRT086	526	12	0.023	0.050	8-point	--	--	--	0.050	0.050	RRT086	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT102	905	16	0.018	0.050	8-point	--	--	--	0.050	0.050	RRT102	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT104	260	26	0.041*	0.016	Circle	4.5	--	--	--	--	--	RCP_n2	N/A
RRT106	2147	28	0.013	0.050	8-point	--	--	--	0.050	0.050	RRT106	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT108	629	8	0.013	0.016	Circle	5.5	--	--	--	--	--	RCP	N/A
RRT120	2846	72	0.025	0.016	Circle	6	--	--	--	--	--	RCP	N/A
RRT152	482	26	0.054	0.050	8-point	--	--	--	0.050	0.050	RRT152	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT154	3020	30	0.010	0.050	8-point	--	--	--	0.050	0.050	RRT154	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT162	299	30	0.020*	0.016	Circle	8	--	--	--	--	--	RCP_n4	N/A
RRT164	512	8	0.016	0.050	8-point	--	--	--	0.050	0.050	RRT164	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT166	2879	38	0.013	0.050	8-point	--	--	--	0.050	0.050	RRT166	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RRT168	944	6	0.006	0.050	8-point	--	--	--	0.050	0.050	RRT168	Rangewood Gauge	Assuming same as channel n because of gauge calibration
RLC032	269	10	0.037	0.035	8-point	--	--	--	0.035	0.035	RLC032	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC034	902	32	0.035	0.016	Circle	3.5	--	--	--	--	--	RCP_n2	N/A
RLC036	2366	38	0.016	0.035	8-point	--	--	--	0.035	0.035	RLC036	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC050	1740	100	0.057	0.016	8-point	--	--	--	0.016	0.016	RLC050	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RLC082	1350	14	0.010	0.035	8-point	--	--	--	0.035	0.035	RLC082	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC084	2546	34	0.013	0.035	8-point	--	--	--	0.035	0.035	RLC084	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC086	3668	162	0.044	0.035	8-point	--	--	--	0.035	0.035	RLC086	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC090	163	14	0.086	0.035	8-point	--	--	--	0.035	0.035	RLC090	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC122	2829	56	0.020	0.035	8-point	--	--	--	0.035	0.035	RLC122	Cottonwood Mouth Gauge	Assuming same as channel n because of gauge calibration
RLC124	1266	60	0.047	0.016	Circle	5	--	--	--	--	--	RCP	N/A
RLC126	296	4	0.014	0.035	8-point	--	--	--	0.035	0.035	RLC126	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RLC128	36	1	0.028	0.035	8-point	--	--	--	0.035	0.035	RLC128	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RLC140	2390	106	0.044	0.016	8-point	--	--	--	0.016	0.016	RLC140	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RLC150	2369	38	0.016	0.035	8-point	--	--	--	0.035	0.035	RLC150	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RLC180	2784	88	0.032	0.016	8-point	--	--	--	0.016	0.016	RLC180	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RLC190	3530	76	0.022	0.016	8-point	--	--	--	0.016	0.016	RLC190	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RLC200	2976	92	0.031	0.016	8-point	--	--	--	0.016	0.016	RLC200	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RLC212	3391	74	0.022	0.035	8-point	--	--	--	0.035	0.035	RLC212	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RLC214	405	6	0.015	0.035	8-point	--	--	--	0.035	0.035	RLC214	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RLC230	4167	64	0.015	0.035	8-point	--	--	--	0.035	0.035	RLC230	Cottonwood Mouth Gauge	Manning's n floodplain calculation
RSPC030	3,590	76	0.021	0.016	8-point	--	--	--	0.016	0.016	RSPC030	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC032	327	14	0.043	0.016	Circle	3.5	--	--	--	--	--	RCP_n2	N/A
RSPC034	1,800	30	0.017	0.016	8-point	--	--	--	0.016	0.016	RSPC034	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC050	1,940	42	0.022	0.016	Circle	4	--	--	--	--	--	RCP	N/A
RSPC060	2,610	16	0.006	0.016	8-point	--	--	--	0.016	0.016	RSPC060	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC070	2,670	64	0.024	0.016	Rectangle	--	5.92	7.75	--	--	--	Concrete Box_n2	N/A
RSPC100	1,050	6	0.006	0.016	8-point	--	--	--	0.016	0.016	RSPC100	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC102	819	20	0.024	0.016	Circle	3.5	--	--	--	--	--	RCP	N/A
RSPC104	2,218	112	0.021*	0.016	8-point	--	--	--	0.016	0.016	RSPC104	Concrete Channel_n2	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RSPC106	147	1	0.007	0.016	Circle	3	--	--	--	--	--	RCP	N/A
RSPC110	3,828	186	0.049	0.029	8-point	--	--	--	0.029	0.029	RSPC110	Cowpoke Gauge	Assuming values are the same as that for the channel. Using Cowpoke Gauge n value.
RSPC112	190	1	0.005	0.016	Circle	4	--	--	--	--	--	RCP	N/A

**Cottonwood Creek DBPS
Routing Calculations**

Reach	Length (ft)	Elevation Change (ft)	Slope (ft/ft)	Manning's n	Shape	Pipe Diameter (ft)	Bottom Width (ft)	Depth (ft)	L.B. Manning's n	R.B. Manning's n	Cross Section Table	Channel Manning's n Reference	Overbank Manning's n Reference
RUC020	3850	74	0.019	0.029	8-point	--	--	--	0.029	0.029	RUC020	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC030	298	--	0.001	0.029	Rectangle	--	225	6	--	--	--	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC052	620	28	0.045	0.029	8-point	--	--	--	0.029	0.029	RUC052	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC054	565	30	0.053	0.029	8-point	--	--	--	0.029	0.029	RUC054	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC056	912	12	0.013	0.029	8-point	--	--	--	0.029	0.029	RUC056	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC060	2562	66	0.026	0.029	8-point	--	--	--	0.029	0.029	RUC060	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC082	740	26	0.035	0.029	8-point	--	--	--	0.029	0.029	RUC082	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC084	345	--	0.001	0.029	Rectangle	--	150	4	--	--	--	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC086	805	16	0.020	0.029	8-point	--	--	--	0.029	0.029	RUC086	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC102	794	20	0.025	0.029	8-point	--	--	--	0.029	0.029	RUC102	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC104	4154	110	0.026	0.029	8-point	--	--	--	0.029	0.029	RUC104	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC106	408	2	0.005	0.029	8-point	--	--	--	0.029	0.029	RUC106	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC122	181	6	0.033	0.029	8-point	--	--	--	0.029	0.029	RUC122	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC124	613	10	0.016	0.029	8-point	--	--	--	0.029	0.029	RUC124	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC126	647	30	0.046	0.029	8-point	--	--	--	0.029	0.029	RUC126	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC128	2261	30	0.013	0.029	8-point	--	--	--	0.029	0.029	RUC128	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC130	3202	54	0.017	0.029	8-point	--	--	--	0.029	0.029	RUC130	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC140	614	--	0.001	0.029	Rectangle	--	80	6	--	--	--	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC150	1473	--	0.001	0.029	Rectangle	--	250	10	--	--	--	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC160	2522	52	0.021	0.029	8-point	--	--	--	0.029	0.029	RUC160	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC180	2521	104	0.041	0.029	8-point	--	--	--	0.029	0.029	RUC180	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC190	878	48	0.055	0.029	8-point	--	--	--	0.029	0.029	RUC190	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC191	320	16	0.050	0.029	8-point	--	--	--	0.029	0.029	RUC191	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC192	3490	48	0.014	0.029	8-point	--	--	--	0.029	0.029	RUC192	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RUC194	330	8	0.024	0.029	8-point	--	--	--	0.029	0.029	RUC194	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR032	1332	60	0.045	0.029	8-point	--	--	--	0.029	0.029	RWR032	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR034	1027	58	0.056	0.029	8-point	--	--	--	0.029	0.029	RWR034	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR036	2407	76	0.032	0.029	8-point	--	--	--	0.029	0.029	RWR036	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR080	3810	138	0.036	0.029	8-point	--	--	--	0.029	0.029	RWR080	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR091	2251	106	0.047	0.029	8-point	--	--	--	0.029	0.029	RWR091	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR092	2377	92	0.039	0.029	8-point	--	--	--	0.029	0.029	RWR092	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR093	868	18	0.021	0.029	8-point	--	--	--	0.029	0.029	RWR093	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR094	3133	114	0.036	0.029	8-point	--	--	--	0.029	0.029	RWR094	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR095	334	12	0.036	0.029	8-point	--	--	--	0.029	0.029	RWR095	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR096	223	16	0.072	0.029	8-point	--	--	--	0.029	0.029	RWR096	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR097	1500	46	0.031	0.029	8-point	--	--	--	0.029	0.029	RWR097	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR098	1664	56	0.034	0.029	8-point	--	--	--	0.029	0.029	RWR098	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR112	3620	72	0.020	0.029	8-point	--	--	--	0.029	0.029	RWR112	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR114	573	28	0.049	0.016	Circle	4	--	--	--	--	--	RCP	N/A
RWR116	1649	38	0.023	0.029	8-point	--	--	--	0.029	0.029	RWR116	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR130	3299	98	0.030	0.029	8-point	--	--	--	0.029	0.029	RWR130	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR140	2565	66	0.026	0.029	8-point	--	--	--	0.029	0.029	RWR140	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR162	1515	36	0.024	0.029	8-point	--	--	--	0.029	0.029	RWR162	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR164	1609	26	0.016	0.029	8-point	--	--	--	0.029	0.029	RWR164	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR166	1124	66	0.059	0.029	8-point	--	--	--	0.029	0.029	RWR166	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR168	512	10	0.020	0.029	8-point	--	--	--	0.029	0.029	RWR168	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RWR170	3469	76	0.022	0.029	8-point	--	--	--	0.029	0.029	RWR170	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC020	182	1	0.005	0.016	Circle	5	--	--	--	--	--	RCP	N/A
RMC032	2770	78	0.028	0.029	8-point	--	--	--	0.029	0.029	RMC032	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC034	2896	88	0.030	0.029	8-point	--	--	--	0.029	0.029	RMC034	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC036	477	46	0.096	0.029	8-point	--	--	--	0.029	0.029	RMC036	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC052	3304	54	0.016	0.029	8-point	--	--	--	0.029	0.029	RMC052	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC054	898	14	0.016	0.029	8-point	--	--	--	0.029	0.029	RMC054	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RMC056	355	52	0.033*	0.016	Circle	6.25	--	--	--	--	--	RCP	N/A
RMC058	2736	44	0.016	0.029	8-point	--	--	--	0.029	0.029	RMC058	Woodmen Gauge	Assuming same as channel n because of gauge calibration
RMC070	402	6	0.015	0.016	Circle	2	--	--	--	--	--	RCP	N/A
RMC082	4016	104	0.026	0.029	8-point	--	--	--	0.029	0.029	RMC082	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC084	313	2	0.006	0.016	Circle	5	--	--	--	--	--	RCP	N/A
RMC086	456	24	0.053	0.016	Circle	4	--	--	--	--	--	RCP	N/A
RMC110	3264	98	0.030	0.029	8-point	--	--	--	0.029	0.029	RMC110	Cowpoke Gauge	Assuming same as channel n because of gauge calibration
RMC120	3844	116	0.030	0.016	8-point	--	--	--	0.016	0.016	RMC120	Concrete Channel	Assume trapezoidal is sized for capacity, use Manning's n for concrete channel.
RMC162	2818	102	0.036	0.016	Circle	5.5	--	--	--	--	--	RCP	N/A
RMC164	816	4	0.005	0.016	Circle	3	--	--	--	--	--	RCP	N/A
RMC166	1316	56	0.036*	0.016	Circle	5.5	--	--	--	--	--	RCP	N/A
RMC171	2623	42	0.016	0.029	8-point	--	--	--	0.029	0.029	RMC171	Woodmen Gauge	Assuming same as channel n because of gauge calibration

**Cottonwood Creek DBPS
Future Lag Time Adjustments**

Subbasin	Existing Lag Time (Min)	Future Lag Time For Adjusted Subbasins (Min)
MC010	23.63	17.72
MC060	31.46	23.60
MC070	20.84	15.63
MC080	25.7	19.28
MC100	22.82	17.11
MC110	9.81	7.36
UC170	26.04	19.53
UC180	26.64	19.98
UC190	22.16	16.62
WR030	21.53	16.15
WR080	30.34	22.76
WR090	23.01	17.26
WR100	32.88	24.66
WR110	23.14	17.35
WR130	29.6	22.20
WR140	17.46	13.10
WR150	35.23	26.42
WR160	14.1	10.57
WR170	20.9	15.67

*Note: Per the City of Colorado Springs, all basins to be developed in the future will provide local detention adequate to maintain existing runoff conditions, therefore subbasins that have the potential for future development will be modeled with existing runoff parameters, including lag time. This excludes the Wolf Ranch development which will provide modeled detention. Subbasins encompassing the Wolf Ranch development, that had an increase in percent impervious of 25% or more, had the recommended lag time adjustment applied to them per DCM as shown in the above table.

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Total	
		Total Tt (min)	Watershed Lag (min)
Cottonwood Creek			
LC100	Urban	28.36	17.01
LC110	Urban	37.69	22.62
LC120	Urban	21.14	12.69
LC130	Urban	34.93	20.96
LC140	Urban	40.49	24.29
LC150	Urban	45.55	27.33
LC160	Urban	32.83	19.70
LC170	Urban	27.15	16.29
LC180	Urban	34.24	20.54
LC190	Urban	34.32	20.59
LC200	Urban	24.64	14.78
LC210	Urban	48.59	29.15
LC220	Urban	29.58	17.75
LC230	Urban	23.39	14.03
South Pine Creek			
SP010	Urban	36.46	21.68
SP020	Urban	61.96	37.18
SP030	Urban	27.28	16.37
SP040	Urban	46.72	28.03
SP050	Urban	5.78	3.47
SP060	Urban	35.90	21.54
SP070	Urban	28.90	17.34
SP080	Urban	12.15	7.29
SP090	Urban	24.15	14.49
SP100	Urban	10.45	6.27
SP110	Urban	18.19	10.91
SP120	Urban	24.10	14.46
SP130	Urban	19.95	11.97
SP140	Urban	34.78	20.67
SP150	Urban	18.97	11.38
SP160	Urban	45.16	27.10
SP170	Urban	40.35	24.21
SP180	Urban	33.08	19.85
SP190	Urban	18.77	11.28
SP200	Urban	31.59	18.95

Notes:

- 1) All flow lengths were taken from the LFP feature class created in ArcMap
- 2) All elevation changes were taken from the contours .shp file
- 3) The Two-Year 24-hour Rainfall was taken from the NOAA Atlas 14
- 4) Overland flow (min) $T_{o} = 0.007(nL)^{0.5} P_2^{0.5} s^{-0.5}$
 - n= Manning's Roughness Coefficient (Table 3-1), Urban Hydrology for Small Watersheds Technical Release 55
 - L= Flow length (ft)
 - P₂= 2-year, 24-hour rainfall (in)
 - s= slope of hydraulic grade line (land slope, ft/ft)
- 5) Shallow Concentrated Flow Average Velocity (ft/s) = $16.13458(s^{0.5})$ if surface is unpaved and $20.3282(s^{0.5})$ if the surface is paved. Per NRCS TR-55
 - s= slope of hydraulic grade line (land slope, ft/ft)
- 6) Shallow Concentrated Flow T₁ (min) = $L/3600V$
 - L= Flow length (ft)
 - V= Shallow concentrated flow average velocity (ft/s)
- 7) Channel Flow Average Velocity (ft/s) = $1.49(R^{0.49})/S^{0.15}$
 - R= Hydraulic radius = cross sectional flow area/wetted perimeter
 - s= Slope of hydraulic grade line (land slope, ft/ft)
 - n= Manning's Roughness Coefficient
- 8) Channel Flow T₁ (min) = $L/3600V$
 - L= Flow length (ft)
 - V= Channel flow average velocity (ft/s)
- 9) Sheet flow T₁, Shallow Concentrated Flow T₁, Shallow Concentrated Flow Velocity, Channel Flow T₃, and Channel Flow Velocity equations were obtained from the Colorado Springs Drainage Criteria Manual
- 10) The maximum allowable land slope for Overland Flow is 10% and for Shallow Concentrated Flow is 5%. All instances greater than these values were replaced with the corresponding maximum value per the City of Colorado Springs
- 11) All Manning's n values for Ditch Flow, Storm Sewer Flow, and Open Channel Flow were increased by 25% per the City of Colorado Springs
- 12) $T_p = T_1 + T_2 + T_3 + T_4$
- 13) $T_{wq} = 0.6T_p$
- 14) Urban and rural subbasin designations are taken from percent impervious and referenced from previous study, assuming no major subbasin changes. Used to dictate maximum overland flow length
- 15) Per City of Colorado Springs, a standard roughness value of 0.016 for all RCP in the lag time calculations was used, accounting for an adjustment (+25% of the typical 0.013) to account for pipe losses and alignment variations. If storm sewer velocities exceeded the Colorado Springs criteria maximum of 18ft/s, they were set equal to 18ft/s.

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Total	
		Total Tt (min)	Watershed Lag (min)
Cottonwood Creek			
UC010	Rural	60.42	36.25
UC020	Rural	79.99	47.99
UC030	Rural	52.83	31.70
UC040	Rural	44.36	26.61
UC050	Urban	39.29	23.57
UC060	Urban	52.82	31.69
UC070	Rural	73.34	44.01
UC080	Urban	39.78	23.87
UC090	Rural	46.06	27.84
UC100	Rural	47.41	28.45
UC110	Rural	35.79	21.48
UC120	Rural	18.26	10.95
UC130	Urban	44.09	26.46
UC140	Urban	70.16	42.10
UC150	Rural	55.21	33.12
UC160	Rural	33.10	19.86
UC165	Urban	129.25	77.55
UC170	Rural	43.40	26.04
UC180	Rural	44.40	26.64
UC190	Rural	36.93	22.16
WR010	Rural	25.12	15.07
WR020	Rural	30.56	18.34
WR030	Rural	35.89	21.53
WR040	Rural	13.97	8.36
WR050	Rural	26.82	16.09
WR060	Rural	39.80	23.88
WR070	Urban	40.36	24.23
WR080	Rural	50.57	30.34
WR090	Rural	38.35	23.01
WR100	Rural	54.79	32.88
WR110	Rural	38.56	23.14
WR120	Urban	26.99	16.19
WR130	Rural	49.33	29.60
WR140	Rural	29.10	17.46
WR150	Rural	56.71	35.23
WR160	Rural	23.50	14.10
WR170	Rural	34.83	20.90
MC010	Urban	39.38	23.83
MC020	Urban	32.44	19.46
MC030	Rural	44.68	26.81
MC040	Urban	39.26	23.57
MC050	Urban	52.32	31.39
MC060	Rural	52.44	31.46
MC070	Rural	34.74	20.64
MC080	Rural	42.84	25.70
MC090	Urban	52.53	31.52
MC100	Urban	36.03	22.82
MC110	Urban	16.36	9.81
MC120	Urban	32.76	19.66
MC130	Urban	17.19	10.31
MC140	Urban	24.80	14.88
MC150	Rural	39.52	23.71
MC160	Urban	49.36	29.61
MC170	Urban	17.54	10.53
MC180	Urban	22.87	13.72
MC190	Urban	39.60	23.76
MC200	Urban	25.79	15.47
MC210	Urban	36.07	21.84
MC220	Urban	34.74	20.84
MC230	Urban	24.64	14.78
MC240	Urban	42.77	25.66
RT010	Urban	56.79	34.08
RT020	Urban	57.70	34.62
RT030	Urban	67.46	40.47
RT040	Rural	46.98	28.19
RT050	Urban	43.01	25.81
RT060	Urban	20.64	12.39
RT070	Urban	42.43	25.46
RT080	Urban	34.54	20.72
RT090	Urban	41.60	24.96
RT100	Urban	42.80	25.56
RT110	Urban	19.01	11.41
RT120	Urban	55.22	33.13
RT130	Urban	25.36	15.22
RT140	Urban	47.03	28.22
RT150	Urban	31.21	16.73
RT160	Urban	41.81	25.06
LC010	Urban	39.11	23.47
LC020	Urban	14.66	6.79
LC030	Urban	26.54	17.72
LC040	Urban	40.07	24.04
LC050	Urban	44.18	26.51
LC060	Urban	55.57	33.34
LC070	Urban	29.60	17.76
LC080	Urban	28.23	16.94
LC090	Urban	42.90	25.74

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Open Channel Flow											T _c (min)	
		Bottom Width (ft)	Depth (ft)	Side Slope (h:v)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Channel Slope (ft/ft)	Manning's n Description	Manning's n		Average Velocity (ft/s)
Cottonwood Creek														
LC100	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC110	Urban	35.0	0.5	34.0	28.00	69.01	0.38	1,274	70	0.055	Grass Swale	0.068	2.7	7.87
LC120	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC130	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC140	Urban	6.0	2.0	1.5	18.00	13.21	1.36	1,469	62	0.042	Concrete Channel n4	0.033	11.8	2.12
LC150	Urban	34.0	2.0	1.5	74.00	41.21	1.80	1,355	24	0.018	Cottonwood Mouth Gauge	0.035	8.4	2.70
LC160	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC170	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC180	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC190	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC200	Urban	18.0	2.0	1.5	42.00	25.21	1.67	2,976	92	0.031	Concrete Channel n4	0.033	11.3	4.38
LC210	Urban	50.0	2.0	2.0	108.00	58.94	1.83	2,899	60	0.021	Cottonwood Mouth Gauge	0.035	9.2	5.27
LC220	Urban	5.0	1.0	2.5	7.50	10.39	0.72	1,927	54	0.028	Cottonwood Mouth Gauge	0.035	5.7	5.60
LC230	Urban	50.0	2.0	2.0	108.00	58.94	1.83	780	10	0.013	Cottonwood Mouth Gauge	0.035	7.2	1.80
South Pine Creek														
SP010	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP020	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP030	Urban	5.5	2.0	1.5	17.00	12.71	1.34	2,378	40	0.017	Concrete Channel	0.016	14.4	2.75
SP040	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP050	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP060	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP070	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP080	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP090	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP100	Urban	5.0	2.0	1.0	14.00	10.88	1.31	1,686	102	0.060	Cowpoke Gauge	0.029	15.3	1.84
SP110	Urban	10.0	1.0	0.0	10.00	12.00	0.83	3,370	174	0.052	Cowpoke Gauge	0.029	10.4	5.39
SP120	Urban	2.0	2.0	4.0	20.00	18.49	1.06	2,006	88	0.044	Cowpoke Gauge	0.029	11.4	2.92
SP130	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP140	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP150	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP160	Urban	5.0	2.0	1.5	16.00	12.21	1.31	1,690	50	0.030	Concrete Channel n3	0.024	12.9	2.18
SP170	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP180	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP190	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP200	Urban	13.0	2.0	1.5	32.00	20.21	1.58	580	26	0.048	Concrete Channel n4	0.033	13.7	0.71

Notes:

- 1) All flow lengths were taken from the LFP feature class created in ArcMap
- 2) All elevation changes were taken from the contours shp file
- 3) The Two-Year 24-hour Rainfall was taken from the NOAA Atlas 14
- 4) Overland flow (min) $T_o = 0.007(nL)^{0.48} P^{0.48}$
 - n = Mannings Roughness Coefficient (Table 3-1), Urban Hydrology for Small Watersheds Technical Release 55
 - L = Flow length (ft)
 - P = 2-year 24-hour rainfall (in)
 - s = slope of hydraulic grade line (land slope, ft/ft)
- 5) Shallow Concentrated Flow Average Velocity (ft/s) $V_s = 16.13458(s^{0.5})$ if surface is unpaved and $20.3282(s^{0.5})$ if the surface is paved. Per NRCS TR-55
 - s = slope of hydraulic grade line (land slope, ft/ft)
- 6) Shallow Concentrated Flow T₁ (min) $T_1 = L/V_s$
 - L = Flow length (ft)
 - V_s = Shallow concentrated flow average velocity (ft/s)
- 7) Channel Flow Average Velocity (ft/s) $V_c = 1.49(R^{0.48})/n$
 - R = Hydraulic radius = cross sectional flow area/wetted perimeter
 - s = Slope of hydraulic grade line (land slope, ft/ft)
 - n = Mannings Roughness Coefficient
- 8) Channel Flow T₁ (min) $T_1 = L/V_c$
 - L = Flow length (ft)
 - V_c = Channel flow average velocity (ft/s)
- 9) Sheet flow T₁, Shallow Concentrated Flow T₁, Shallow Concentrated Flow Velocity, Channel Flow T₃, and Channel Flow Velocity equations were obtained from the Colorado Springs Drainage Criteria Manual
- 10) The maximum allowable land slope for Overland Flow is 10% and for Shallow Concentrated Flow is 5%. All instances greater than these values were replaced with the corresponding maximum value per the City of Colorado Springs
- 11) All Manning's n values for Ditch Flow, Storm Sewer Flow, and Open Channel Flow were increased by 25% per the City of Colorado Springs
- 12) $T_c = T_o + T_1 + T_2 + T_3$
- 13) $T_{min} = 0.6T_c$
- 14) Urban and rural subbasin designations are taken from percent impervious and referenced from previous study. Used to dictate maximum overland flow length
- 15) Per City of Colorado Springs, a standard roughness value of 0.016 for all RCP in the lag time calculations was used, accounting for an adjustment (+25% of the typical 0.013) to account for pipe losses and alignment variations. If storm sewer velocities exceeded the Colorado Springs criteria maximum of 18ft/s, they were set equal to 18ft/s.

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Open Channel Flow											T _a (min)	
		Bottom Width (ft)	Depth (ft)	Side Slope (h:v)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Channel Slope (ft/ft)	Manning's n Description	Manning's n		Average Velocity (ft/s)
Cottonwood Creek														
UC010	Rural	35.0	0.5	34.0	26.00	69.01	0.38	4,326	114	0.028	Grass Swale	0.068	1.9	38.57
UC020	Rural	35.0	0.5	34.0	26.00	69.01	0.38	6,851	192	0.028	Grass Swale	0.068	1.9	59.24
UC030	Rural	35.0	0.5	34.0	26.00	69.01	0.38	3,541	96	0.027	Grass Swale	0.068	1.9	31.13
UC040	Rural	35.0	0.5	34.0	26.00	69.01	0.38	3,310	106	0.032	Grass Swale	0.068	2.1	28.77
UC050	Urban	35.0	0.5	34.0	26.00	69.01	0.38	2,059	80	0.039	Grass Swale	0.068	2.3	15.12
UC060	Urban	35.0	0.5	34.0	26.00	69.01	0.38	4,222	160	0.038	Grass Swale	0.068	2.2	31.39
UC070	Rural	35.0	0.5	34.0	26.00	69.01	0.38	6,203	148	0.024	Grass Swale	0.068	1.8	58.13
UC080	Urban	30.0	2.0	3.0	72.00	42.65	1.69	1,637	42	0.026	Cowpoke Gauge	0.029	11.8	2.32
UC090	Rural	35.0	0.5	34.0	26.00	69.01	0.38	4,542	166	0.037	Grass Swale	0.068	2.2	34.18
UC100	Rural	30.0	2.0	3.0	72.00	42.65	1.69	3,988	88	0.022	Cowpoke Gauge	0.029	10.9	6.09
UC110	Rural	35.0	0.5	34.0	26.00	69.01	0.38	2,692	90	0.033	Grass Swale	0.068	2.1	21.31
UC120	Rural	30.0	2.0	3.0	72.00	42.65	1.69	5,716	120	0.021	Cowpoke Gauge	0.029	10.6	8.95
UC130	Urban	30.0	2.0	3.0	72.00	42.65	1.69	3,276	56	0.017	Cowpoke Gauge	0.029	9.6	5.68
UC140	Urban	35.0	0.5	34.0	26.00	69.01	0.38	6,786	194	0.029	Grass Swale	0.068	1.9	58.09
UC150	Rural	35.0	0.5	34.0	26.00	69.01	0.38	2,930	72	0.025	Grass Swale	0.068	1.8	27.05
UC160	Rural	30.0	2.0	3.0	72.00	42.65	1.69	1,883	28	0.015	Cowpoke Gauge	0.029	9.0	3.50
UC165	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC170	Rural	35.0	0.5	34.0	26.00	69.01	0.38	4,701	128	0.027	Cowpoke Gauge	0.029	4.5	17.58
UC180	Rural	35.0	0.5	34.0	26.00	69.01	0.38	1,283	56	0.044	Grass Swale	0.068	2.4	8.89
UC190	Rural	30.0	2.0	1.5	66.00	37.21	1.77	3,820	58	0.015	Cowpoke Gauge	0.029	9.4	6.80
WR010	Rural	35.0	0.5	34.0	26.00	69.01	0.38	2,137	142	0.066	Grass Swale	0.068	3.0	12.00
WR020	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR030	Rural	24.0	2.0	1.5	54.00	31.21	1.73	1,339	40	0.030	Cowpoke Gauge	0.029	12.9	1.73
WR040	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR050	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR060	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR070	Urban	35.0	0.5	34.0	26.00	69.01	0.38	2,059	104	0.051	Grass Swale	0.068	2.6	13.26
WR080	Rural	35.0	0.5	34.0	26.00	69.01	0.38	1,922	56	0.029	Grass Swale	0.068	2.0	16.30
WR090	Rural	7.5	2.0	1.0	19.00	13.18	1.44	2,450	80	0.033	Cowpoke Gauge	0.029	12.0	3.41
WR100	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR110	Rural	48.0	2.0	3.0	108.00	60.65	1.78	7,445	202	0.027	Cowpoke Gauge	0.029	12.5	9.89
WR120	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR130	Rural	35.0	0.5	34.0	26.00	69.01	0.38	3,283	96	0.029	Grass Swale	0.068	2.0	27.79
WR140	Rural	35.0	0.5	34.0	26.00	69.01	0.38	2,351	72	0.031	Grass Swale	0.068	2.0	19.45
WR150	Rural	35.0	0.5	34.0	26.00	69.01	0.38	5,213	152	0.029	Grass Swale	0.068	2.0	44.19
WR160	Rural	8.5	2.0	1.0	21.00	14.16	1.48	2,460	98	0.040	Cowpoke Gauge	0.029	13.5	3.05
WR170	Rural	8.0	0.5	5.0	5.25	13.10	0.40	2,236	92	0.041	Cowpoke Gauge	0.029	5.7	6.52
MC010	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC020	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC030	Rural	35.0	0.5	34.0	26.00	69.01	0.38	2,678	108	0.040	Grass Swale	0.068	2.3	19.30
MC040	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC050	Urban	21.0	1.5	1.0	33.75	25.24	1.34	6,045	102	0.017	Woodmen Gauge	0.029	8.2	12.33
MC060	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC070	Rural	24.0	2.0	1.5	54.00	31.21	1.73	1,671	54	0.032	Cowpoke Gauge	0.029	13.4	2.07
MC080	Rural	24.0	2.0	1.5	54.00	31.21	1.73	2,899	76	0.026	Cowpoke Gauge	0.029	12.1	4.00
MC090	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC100	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC110	Urban	16.0	2.0	1.5	26.00	17.21	1.51	1,560	38	0.024	Cowpoke Gauge	0.029	10.6	2.44
MC120	Urban	8.0	1.5	1.0	14.25	12.24	1.16	3,373	100	0.030	Concrete Channel_n2	0.019	15.1	3.71
MC130	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC140	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC150	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC160	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC170	Urban	21.0	1.5	1.0	33.75	25.24	1.34	5,397	80	0.015	Woodmen Gauge	0.029	7.7	11.75
MC180	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC190	Urban	7.5	2.0	1.5	21.00	14.71	1.43	1,269	36	0.028	Concrete Channel_n3	0.024	13.4	1.58
MC200	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC210	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC220	Urban	10.0	2.0	1.5	26.00	17.21	1.51	1,380	36	0.026	Concrete Channel_n3	0.024	13.3	1.72
MC230	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC240	Urban	42.0	1.0	10.0	52.00	62.10	0.84	5,242	80	0.015	Woodmen Gauge	0.029	5.7	15.36
RT010	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT020	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT030	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT040	Rural	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT050	Urban	8.0	1.0	3.0	11.00	14.32	0.77	5,272	124	0.024	Rangewood Gauge	0.050	3.8	22.83
RT060	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT070	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT080	Urban	4.0	2.0	0.0	8.00	8.00	1.00	963	20	0.021	Rangewood Gauge	0.050	4.3	3.74
RT090	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT100	Urban	9.0	2.0	1.0	22.00	14.66	1.50	2,917	44	0.015	Rangewood Gauge	0.050	4.8	10.13
RT110	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT120	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT130	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT140	Urban	35.0	0.5	34.0	26.00	69.01	0.38	1,620	24	0.015	Grass Swale	0.068	1.4	19.27
RT150	Urban	1.0	1.5	1.5	4.85	6.41	0.78	1,234	20	0.016	Rangewood Gauge	0.050	3.2	6.51
RT160	Urban	12.0	1.0	1.0	13.00	14.83	0.88	4,032	48	0.012	Rangewood Gauge	0.050	3.0	22.56
LC010	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC020	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC030	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC040	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC050	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC060	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC070	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC080	Urban	57.0	1.3	4.0	77.50	87.31	1.15	2,655	38	0.014	Cottonwood Mouth Gauge	0.035	5.6	7.81
LC090	Urban	No Open Channel Flow	No Open Channel Flow	No Open Channel Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Storm Sewer Flow										T ₂ (min)
		Pipe Diameter (ft)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Pipe Slope (ft/ft)	Manning's n Description	Manning's n	Average Velocity (ft/s)	
Cottonwood Creek												
LC100	Urban	3.0	3.53	4.71	0.75	1,281	38	0.030	RCP	0.016	13.0	1.84
LC110	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC120	Urban	1.75	1.20	2.75	0.44	1,065	66	0.062	RCP	0.016	13.2	1.35
LC130	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC140	Urban	3.0	3.53	4.71	0.75	1,734	78	0.044	RCP	0.016	15.8	1.82
LC150	Urban	3.0	3.53	4.71	0.75	925	34	0.037	RCP	0.016	14.5	1.08
LC160	Urban	4.0	6.28	6.28	1.00	3,152	60	0.019	RCP	0.016	12.7	4.15
LC170	Urban	6.0	14.14	9.42	1.50	2,330	124	0.049	RCP_n4	0.016	18.0	2.34
LC180	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC190	Urban	144"x96" Box	45.00	20.00	2.25	2,609	30	0.011	Concrete Box_n2	0.019	14.6	2.97
LC200	Urban	2.0	1.57	3.14	0.50	973	40	0.041	RCP	0.016	11.7	1.38
LC210	Urban	4.7	8.58	7.34	1.17	1,082	54	0.050	RCP_n4	0.016	18.0	1.00
LC220	Urban	4.0	6.28	6.28	1.00	2,508	46	0.018	RCP	0.016	12.4	3.37
LC230	Urban	4.0	6.28	6.28	1.00	2,351	84	0.033	RCP_n2	0.016	16.9	2.52
South Pine Creek												
SP010	Urban	3.0	3.53	4.71	0.75	896	24	0.027	RCP	0.016	12.4	1.21
SP020	Urban	3.5	4.81	5.50	0.88	1,649	30	0.018	RCP	0.016	11.3	2.43
SP030	Urban	3.0	3.53	4.71	0.75	267	8	0.030	RCP	0.016	13.1	0.34
SP040	Urban	3.0	3.53	4.71	0.75	4,004	92	0.023	RCP	0.016	11.5	5.82
SP050	Urban	4.0	6.28	6.28	1.00	2,519	74	0.029	RCP	0.016	15.7	2.87
SP060	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP070	Urban	71"x93" Box	22.93	13.67	1.88	926	56	0.060	Concrete Box_n4	0.033	15.9	0.97
SP080	Urban	4.0	6.28	6.28	1.00	4,558	128	0.028	RCP	0.016	15.4	4.94
SP090	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP100	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP110	Urban	1.5	0.88	2.36	0.38	648	34	0.052	RCP	0.016	10.9	0.99
SP120	Urban	2.5	2.45	3.93	0.63	1,406	46	0.033	RCP	0.016	12.1	1.93
SP130	Urban	84"x84" Box	24.50	14.00	1.75	4,704	128	0.027	Concrete Box_n4	0.033	11.0	7.14
SP140	Urban	2.5	2.45	3.93	0.63	478	18	0.038	RCP	0.016	13.0	0.81
SP150	Urban	72"x72" Box	18.00	12.00	1.50	5,707	192	0.034	Concrete Box_n4	0.033	11.0	8.83
SP160	Urban	8.0	25.13	12.57	2.00	4,368	102	0.023	RCP_n4	0.016	18.0	4.04
SP170	Urban	4.0	6.28	6.28	1.00	1,001	34	0.034	RCP_n2	0.016	17.2	0.97
SP180	Urban	4.0	6.28	6.28	1.00	1,894	62	0.033	RCP_n2	0.016	18.8	1.87
SP190	Urban	4.5	7.95	7.07	1.13	1,455	28	0.018	RCP	0.016	13.3	1.83
SP200	Urban	4.0	6.28	6.28	1.00	485	24	0.048	RCP_n3	0.016	18.0	0.45

Notes:

- 1) All flow lengths were taken from the LFP feature class created in ArcMap
- 2) All elevation changes were taken from the contours.shp file
- 3) The Two-Year 24-hour Rainfall was taken from the NOAA Atlas 14
- 4) Overland flow (min) $T_{10} = 0.07(nL)^{0.48} / (P_2)^{0.77} s^{0.4}$
 - n^{0.48} = Manning's Roughness Coefficient (Table 3-1), Urban Hydrology for Small Watersheds Technical Release 55
 - L = Flow length (ft)
 - P₂ = 2-year, 24-hour rainfall (in)
 - s^{0.4} = slope of hydraulic grade line (land slope, ft/ft)
- 5) Shallow Concentrated Flow Average Velocity (ft/s) $V_{scf} = 16.13458(s^{0.5})$ if surface is unpaved and $20.3282(s^{0.5})$ if the surface is paved. Per NRCS TR-55
 - s = slope of hydraulic grade line (land slope, ft/ft)
- 6) Shallow Concentrated Flow T₁ (min) $T_1 = L/3600V$
 - L = Flow length (ft)
 - V = Shallow concentrated flow average velocity (ft/s)
- 7) Channel Flow Average Velocity (ft/s) $V_c = 1.49(R^{0.77}) / (S^{0.48})$
 - R = Hydraulic radius = cross sectional flow area/wetted perimeter
 - s = Slope of hydraulic grade line (land slope, ft/ft)
 - n = Manning's Roughness Coefficient
- 8) Channel Flow T₁ (min) $T_1 = L/3600V$
 - L = Flow length (ft)
 - V = Channel flow average velocity (ft/s)
- 9) Sheet flow T₁, Shallow Concentrated Flow T₁, Shallow Concentrated Flow Velocity, Channel Flow T₁, and Channel Flow Velocity equations were obtained from the Colorado Springs Drainage Criteria Manual
- 10) The maximum allowable land slope for Overland Flow is 10% and for Shallow Concentrated Flow is 5%. All instances greater than these values were replaced with the corresponding maximum value per the City of Colorado Springs.
- 11) All Manning's n values for Ditch Flow, Storm Sewer Flow, and Open Channel Flow were increased by 25% per the City of Colorado Springs
- 12) $T_{scf} = T_1 + T_2 + T_3 + T_4$
- 13) $T_{scf} \geq 0.67$
- 14) Urban and rural subbasin designations are taken from percent impervious and referenced from previous study, assuming no major subbasin changes. Used to calculate maximum overland flow length
- 15) Per City of Colorado Springs, a standard roughness value of 0.016 for all RCP in the lag time calculations was used, accounting for an adjustment (+25% of the typical 0.013) to account for pipe losses and alignment. If storm sewer velocities exceeded the Colorado Springs criteria maximum of 18ft/s, they were set equal to 18ft/s

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Storm Sewer Flow										T ₁ (min)
		Pipe Diameter (ft)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Pipe Slope (ft/ft)	Manning's n Description	Manning's n	Average Velocity (ft/s)	
Cottonwood Creek												
UC010	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC020	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC030	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC040	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC050	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC060	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC070	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC080	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC090	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC100	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC110	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC120	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC130	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC140	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC150	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC160	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC165	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC170	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC180	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC190	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR010	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR020	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR030	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR040	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR050	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR060	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR070	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR080	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR090	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR100	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR110	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR120	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR130	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR140	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR150	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR160	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR170	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC010	Urban	5.0	9.82	7.85	1.25	1,580	34	0.022	RCP	0.016	15.7	1.86
MC020	Urban	3.5	4.81	5.50	0.88	1,601	44	0.027	RCP	0.016	13.9	1.92
MC030	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC040	Urban	6.0	14.14	9.42	1.50	4,401	108	0.025	RCP n3	0.016	18.0	4.08
MC050	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC060	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC070	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC080	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC090	Urban	5.0	9.82	7.85	1.25	4,213	84	0.020	RCP	0.016	16.0	4.67
MC100	Urban	4.0	6.28	6.28	1.00	2,792	44	0.016	RCP	0.016	11.5	4.04
MC110	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC120	Urban	2.5	2.45	3.93	0.83	191	28	0.147	RCP n4	0.016	18.0	0.18
MC130	Urban	2.5	2.45	3.93	0.83	1,517	46	0.030	RCP	0.016	11.7	2.17
MC140	Urban	2.5	2.45	3.93	0.83	2,341	62	0.026	RCP	0.016	10.9	3.58
MC150	Rural	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC160	Urban	5.5	11.88	8.64	1.38	2,879	114	0.040	RCP n3	0.016	18.0	2.87
MC170	Urban	4.0	6.28	6.28	1.00	2,288	106	0.048	RCP n3	0.016	18.0	2.12
MC180	Urban	5.5	11.88	8.64	1.38	1,303	18	0.014	RCP	0.016	13.3	1.63
MC190	Urban	2.5	2.45	3.93	0.83	1,196	48	0.040	RCP	0.016	13.4	1.48
MC200	Urban	3.5	4.81	5.50	0.88	3,334	100	0.030	RCP	0.016	14.5	3.82
MC210	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC220	Urban	132"x72" Box	33.00	17.00	1.94	2,052	82	0.040	Concrete Box n4	0.033	14.3	2.40
MC230	Urban	4.5	7.95	7.07	1.13	1,905	62	0.033	RCP n3	0.016	18.0	1.78
MC240	Urban	3.0	3.53	4.71	0.75	406	38	0.094	RCP n4	0.016	18.0	0.38
RT010	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT020	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT030	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT040	Rural	4.0	6.28	6.28	1.00	1,231	66	0.054	RCP n3	0.016	18.0	1.14
RT050	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT060	Urban	6.0	14.14	9.42	1.50	4,108	96	0.023	RCP n3	0.016	18.0	3.80
RT070	Urban	6.0	14.14	9.42	1.50	3,350	40	0.012	RCP	0.016	13.1	4.25
RT080	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT090	Urban	4.5	7.95	7.07	1.13	3,223	74	0.023	RCP	0.016	15.0	3.57
RT100	Urban	3.0	3.53	4.71	0.75	1,413	46	0.033	RCP	0.016	13.7	1.72
RT110	Urban	5.0	9.82	7.85	1.25	5,659	130	0.023	RCP n2	0.016	16.4	5.78
RT120	Urban	5.5	11.88	8.64	1.38	1,641	34	0.021	RCP n2	0.016	16.6	1.65
RT130	Urban	3.5	4.81	5.50	0.88	2,335	76	0.033	RCP	0.016	15.1	2.57
RT140	Urban	3.0	3.53	4.71	0.75	903	70	0.078	RCP n3	0.016	18.0	0.84
RT150	Urban	3.0	3.53	4.71	0.75	1,803	68	0.038	RCP	0.016	14.7	2.04
RT160	Urban	No Storm Sewer Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC010	Urban	3.5	4.81	5.50	0.88	3,642	156	0.043	RCP n2	0.016	17.8	3.44
LC020	Urban	4.0	6.28	6.28	1.00	3,432	150	0.044	RCP n3	0.016	18.0	3.18
LC030	Urban	4.0	6.28	6.28	1.00	5,748	214	0.037	RCP n3	0.016	18.0	5.33
LC040	Urban	4.5	7.95	7.07	1.13	4,466	158	0.035	RCP n3	0.016	18.0	4.14
LC050	Urban	3.0	3.53	4.71	0.75	539	30	0.056	RCP n3	0.016	18.0	0.50
LC060	Urban	3.0	3.53	4.71	0.75	1,552	100	0.064	RCP n3	0.016	18.0	1.44
LC070	Urban	2.5	2.45	3.93	0.83	810	54	0.067	RCP n2	0.016	17.8	0.77
LC080	Urban	2.5	2.45	3.93	0.83	719	10	0.014	RCP	0.016	7.9	1.52
LC090	Urban	3.5	4.81	5.50	0.88	2,551	164	0.064	RCP n3	0.016	18.0	2.38

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Curb & Gutter/Ditch Flow											T ₂ (min)	
		Bottom Width (ft)	Depth (ft)	Side Slope (h:v)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Channel Slope (ft/ft)	Manning's n Description	Manning's n		Average Velocity (ft/s)
Cottonwood Creek														
LC100	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,487	68	0.046	Concrete Gutter	0.016	2.9	8.82
LC110	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	788	34	0.043	Concrete Gutter	0.016	2.8	4.70
LC120	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC130	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,988	114	0.038	Concrete Gutter	0.016	2.6	18.96
LC140	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,839	60	0.033	Concrete Gutter	0.016	2.4	12.62
LC150	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	679	32	0.047	Concrete Gutter	0.016	2.9	3.88
LC160	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,696	58	0.034	Concrete Gutter	0.016	2.5	11.37
LC170	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,038	116	0.057	Concrete Gutter	0.016	3.2	10.59
LC180	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	3,425	146	0.043	Concrete Gutter	0.016	2.8	20.56
LC190	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	955	44	0.046	Concrete Gutter	0.016	2.9	5.51
LC200	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	833	54	0.065	Concrete Gutter	0.016	3.4	4.06
LC210	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,332	44	0.033	Concrete Gutter	0.016	2.4	9.08
LC220	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC230	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	578	10	0.017	Concrete Gutter	0.016	1.8	5.45
South Pine Creek														
SP010	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	949	22	0.023	Concrete Gutter	0.016	2.0	7.73
SP020	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,574	38	0.015	Concrete Gutter	0.016	1.6	26.26
SP030	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,125	40	0.036	Concrete Gutter	0.016	2.5	7.40
SP040	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	927	24	0.026	Concrete Gutter	0.016	2.2	7.14
SP050	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP060	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	4,672	126	0.027	Concrete Gutter	0.016	2.2	34.99
SP070	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,548	26	0.018	Concrete Gutter	0.016	1.8	14.27
SP080	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	982	28	0.029	Concrete Gutter	0.016	2.3	7.21
SP090	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,604	88	0.034	Concrete Gutter	0.016	2.5	17.56
SP100	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	825	36	0.044	Concrete Gutter	0.016	2.8	4.90
SP110	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	242	2	0.006	Concrete Gutter	0.016	1.2	3.30
SP120	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,621	112	0.043	Concrete Gutter	0.016	2.8	15.72
SP130	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,965	76	0.039	Concrete Gutter	0.016	2.6	12.39
SP140	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,567	158	0.062	Concrete Gutter	0.016	3.3	12.83
SP150	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
SP160	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	573	38	0.066	Concrete Gutter	0.016	3.5	2.76
SP170	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	1,387	84	0.061	Concrete Gutter	0.016	3.3	6.99
SP180	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,332	84	0.036	Concrete Gutter	0.016	2.8	15.23
SP190	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,340	72	0.031	Concrete Gutter	0.016	2.4	16.54
SP200	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.06	2,588	34	0.013	Concrete Gutter	0.016	1.5	27.99

Notes:

- 1) All flow lengths were taken from the LFP feature class created in ArcMap
- 2) All elevation changes were taken from the contours shp file
- 3) The Two-Year 24-hour Rainfall was taken from the NOAA Atlas 14
- 4) Overland flow (min) $T = 0.007(nL)^{0.58} / (P_2)^{0.44}$
 $n =$ Manning's Roughness Coefficient (Table 3-1) Urban Hydrology for Small Watersheds Technical Release 55
 $L =$ Flow length (ft)
 $P_2 =$ 2-year, 24-hour rainfall (in)
 $s =$ slope of hydraulic grade line (land slope, ft/ft)
- 5) Shallow Concentrated Flow Average Velocity (ft/s) $= 16.13458(s^{0.5})$ if surface is unpaved and $20.3282(s^{0.5})$ if the surface is paved Per NRCS TR-55
 $s =$ slope of hydraulic grade line (land slope, ft/ft)
- 6) Shallow Concentrated Flow T₁ (min) $= L/3600V$
 $L =$ Flow length (ft)
 $V =$ Shallow concentrated flow average velocity (ft/s)
- 7) Channel Flow Average Velocity (ft/s) $= 1.49(R^{0.49} / (nS^{0.04}))$
 $R =$ Hydraulic radius $=$ cross sectional flow area/wetted perimeter
 $s =$ Slope of hydraulic grade line (land slope, ft/ft)
 $n =$ Manning's Roughness Coefficient
- 8) Channel Flow T₁ (min) $= L/3600V$
 $L =$ Flow length (ft)
 $V =$ Channel flow average velocity (ft/s)
- 9) Sheet flow T₁, Shallow Concentrated Flow T₁, Shallow Concentrated Flow Velocity, Channel Flow T₃, and Channel Flow Velocity equations were obtained from the Colorado Springs Drainage Criteria Manual
- 10) The maximum allowable land slope for Overland Flow is 10% and for Shallow Concentrated Flow is 5%. All instances greater than these values were replaced with the corresponding maximum value per the City of Colorado Springs
- 11) All Manning's n values for Ditch Flow, Storm Sewer Flow, and Open Channel Flow were increased by 25% per the City of Colorado Springs
- 12) $T_2 = T_1 + T_3 + T_4$
- 13) $T_{min} = 0.6T_2$
- 14) Urban and rural subbasin designations are taken from percent impervious and referenced from previous study, assuming no major subbasin changes. Used to dictate maximum overland flow length
- 15) Per City of Colorado Springs, a standard roughness value of 0.016 for all RCP in the lag time calculations was used, accounting for an adjustment (+25% of the typical 0.013) to account for pipe losses and alignment variations. If storm sewer velocities exceeded the Colorado Springs criteria maximum of 18ft/s, they were set equal to 18ft/s

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Curb & Gutter/Ditch Flow												Average Velocity (ft/s)	T ₂ (min)
		Bottom Width (ft)	Depth (ft)	Side Slope (h:v)	Cross-Sectional Flow Area (ft ²)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Flow Length (ft)	Elevation Change (ft)	Channel Slope (ft/ft)	Manning's n Description	Manning's n			
Cottonwood Creek															
UC010	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC020	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC030	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC040	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC050	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,370	70	0.030	Concrete Gutter	0.016	2.3	17.09	
UC060	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC070	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC080	Urban	35.0	0.5	34.0	28.00	69.01	0.38	3,574	152	0.043	Grass Swale	0.068	2.4	25.09	
UC090	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC100	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,349	106	0.045	Dirt Ditch	0.031	1.5	26.36	
UC110	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC120	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC130	Urban	35.0	0.5	34.0	28.00	69.01	0.38	2,561	72	0.028	Grass Swale	0.068	1.9	22.11	
UC140	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC150	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC160	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC165	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	8,056	236	0.029	Dirt Ditch	0.031	1.2	112.20	
UC170	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC180	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
UC190	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	3,414	122	0.036	Concrete Gutter	0.016	2.5	22.39	
WR010	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR020	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	313	2	0.006	Dirt Ditch	0.031	0.8	9.33	
WR030	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR040	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR050	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR060	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	941	24	0.028	Dirt Ditch	0.031	1.1	14.05	
WR070	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	474	12	0.025	Dirt Ditch	0.031	1.1	7.10	
WR080	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR090	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR100	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,528	60	0.024	Concrete Gutter	0.016	2.1	20.34	
WR110	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR120	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,076	50	0.046	Dirt Ditch	0.031	1.5	11.90	
WR130	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR140	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR150	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR160	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
WR170	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC010	Urban	5.0	0.5	20.0	7.50	25.02	0.30	1,319	34	0.026	Grass Swale	0.068	1.8	13.85	
MC020	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	327	8	0.024	Concrete Gutter	0.016	2.1	2.59	
MC030	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC040	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,214	26	0.021	Concrete Gutter	0.016	2.0	10.28	
MC050	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,209	56	0.048	Concrete Gutter	0.016	2.9	8.98	
MC060	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	3,218	72	0.022	Concrete Gutter	0.016	2.0	26.67	
MC070	Rural	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC080	Rural	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,084	24	0.022	Concrete Gutter	0.016	2.0	9.03	
MC090	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,859	66	0.040	Concrete Gutter	0.016	2.7	10.31	
MC100	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	490	2	0.004	Concrete Gutter	0.016	0.9	8.51	
MC110	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,247	106	0.047	Concrete Gutter	0.016	2.9	12.82	
MC120	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	627	20	0.032	Concrete Gutter	0.016	2.4	4.35	
MC130	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	963	14	0.015	Concrete Gutter	0.016	1.8	9.90	
MC140	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC150	Rural	5.0	0.5	20.0	7.50	25.02	0.30	2,641	86	0.033	Grass Swale	0.068	1.8	24.67	
MC160	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	3,758	132	0.035	Concrete Gutter	0.016	2.5	24.85	
MC170	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC180	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	167	4	0.024	Concrete Gutter	0.016	2.1	1.34	
MC190	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	381	12	0.031	Concrete Gutter	0.016	2.4	2.68	
MC200	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
MC210	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,946	100	0.034	Concrete Gutter	0.016	2.5	19.82	
MC220	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,806	58	0.036	Concrete Gutter	0.016	2.6	10.48	
MC230	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	341	6	0.018	Concrete Gutter	0.016	1.8	3.19	
MC240	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,381	86	0.048	Concrete Gutter	0.016	3.0	7.66	
RT010	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,756	86	0.031	Concrete Gutter	0.016	2.4	19.34	
RT020	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	3,311	74	0.022	Concrete Gutter	0.016	2.0	27.45	
RT030	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,274	10	0.006	Dirt Ditch	0.031	0.6	34.28	
RT040	Rural	5.0	0.5	20.0	7.50	25.02	0.30	2,484	70	0.028	Grass Swale	0.068	1.7	24.95	
RT050	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,452	78	0.032	Concrete Gutter	0.016	2.4	17.04	
RT060	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	261	14	0.054	Concrete Gutter	0.016	3.1	1.40	
RT070	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,238	52	0.023	Concrete Gutter	0.016	2.0	18.20	
RT080	Urban	5.0	0.5	20.0	7.50	25.02	0.30	678	32	0.047	Grass Swale	0.068	2.1	5.26	
RT090	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,605	40	0.025	Concrete Gutter	0.016	2.1	12.80	
RT100	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,682	34	0.020	Concrete Gutter	0.016	1.9	14.66	
RT110	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT120	Urban	5.0	0.5	20.0	7.50	25.02	0.30	2,185	52	0.024	Grass Swale	0.068	1.5	23.88	
RT130	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,053	36	0.034	Concrete Gutter	0.016	2.5	7.06	
RT140	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,234	38	0.031	Concrete Gutter	0.016	2.4	8.72	
RT150	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
RT160	Urban	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	No Curb & Gutter/Ditch Flow	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00
LC010	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,129	38	0.018	Concrete Gutter	0.016	1.8	19.75	
LC020	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	731	42	0.057	Concrete Gutter	0.016	3.2	3.78	
LC030	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	642	20	0.031	Concrete Gutter	0.016	2.4	4.51	
LC040	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	330	20	0.061	Concrete Gutter	0.016	3.3	1.68	
LC050	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,425	102	0.042	Concrete Gutter	0.016	2.8	14.88	
LC060	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	3,533	136	0.038	Concrete Gutter	0.016	2.6	22.32	
LC070	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	2,182	62	0.028	Concrete Gutter	0.016	2.3	18.05	
LC080	Urban	COS Type 2 Gutter	COS Type 2 Gutter	COS Type 2 Gutter	0.07	1.30	0.08	1,218	84	0.053	Concrete Gutter	0.016	3.1	6.59	

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Overland Flow							Shallow Concentrated Flow						
		Manning's n Description	Manning's n	Flow Length (ft)	Elevation Change (ft)	Land Slope (ft/ft)	2-year 24-hour Rainfall ¹ (in)	T _o (min)	Surface Description	Unpaved (1) or Paved (2) Surface ⁴	Flow Length (ft)	Elevation Change (ft)	Watercourse Slope (ft/ft)	Velocity (ft/s)	T _c (min)
Cottonwood Creek															
LC100	Urban	Blue Grass	0.240	219	34	0.100	1.9	18.10	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC110	Urban	Short Grass Prairie	0.150	300	18	0.060	1.9	19.58	Short Grass Prairie	1	1,157	54	0.047	3.5	5.53
LC120	Urban	Short Grass Prairie	0.150	300	86	0.100	1.9	15.98	Short Grass Prairie	1	689	24	0.035	3.0	3.81
LC130	Urban	Blue Grass	0.240	141	8	0.057	1.9	15.97	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC140	Urban	Blue Grass	0.240	268	20	0.075	1.9	23.93	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC150	Urban	Blue Grass	0.240	300	14	0.047	1.9	31.62	Blue Grass	1	1,362	70	0.050	3.6	6.29
LC160	Urban	Short Grass Prairie	0.150	220	12	0.055	1.9	15.91	Short Grass Prairie	1	304	16	0.050	3.6	1.40
LC170	Urban	Short Grass Prairie	0.150	259	26	0.100	1.9	14.21	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC180	Urban	Blue Grass	0.240	78	2	0.028	1.9	13.87	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC190	Urban	Blue Grass	0.240	300	26	0.087	1.9	24.89	Blue Grass	1	244	12	0.049	3.6	1.14
LC200	Urban	Blue Grass	0.240	170	28	0.100	1.9	14.82	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
LC210	Urban	Blue Grass	0.240	300	14	0.047	1.9	31.65	Short Grass Prairie	1	343	30	0.050	3.6	1.56
LC220	Urban	Short Grass Prairie	0.150	275	20	0.073	1.9	16.97	Short Grass Prairie	1	629	20	0.032	2.9	3.84
LC230	Urban	Short Grass Prairie	0.150	245	44	0.100	1.9	13.63	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
South Pine Creek															
SP010	Urban	Short Grass Prairie	0.150	145	1.00	0.007	2.0	25.78	Short Grass Prairie	1	284	8	0.028	2.7	1.75
SP020	Urban	Blue Grass	0.240	300	12.00	0.040	2.0	33.27	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP030	Urban	Short Grass Prairie	0.150	300	44.00	0.100	2.0	15.87	Blue Grass	1	169	6	0.036	3.040	0.93
SP040	Urban	Blue Grass	0.240	265	8.00	0.030	2.0	33.77	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP050	Urban	No Overland Flow	N/A	N/A	N/A	N/A	1.9	0.00	Short Grass Prairie	1	449	10	0.022	2.4	3.11
SP060	Urban	Asphalt	0.011	64	2.00	0.031	1.9	0.91	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP070	Urban	Short Grass Prairie	0.150	231	20.00	0.087	1.9	13.97	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP080	Urban	No Overland Flow	N/A	N/A	N/A	N/A	2.0	0.00	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP090	Urban	Short Grass Prairie	0.150	20	4.00	0.100	1.9	1.82	Blue Grass	1	949	40	0.042	3.3	4.77
SP100	Urban	No Overland Flow	N/A	N/A	N/A	N/A	1.9	0.00	Blue Grass	1	729	30	0.041	3.3	3.71
SP110	Urban	Blue Grass	0.240	35	4.00	0.100	1.9	4.16	Blue Grass	1	942	52	0.050	3.6	4.35
SP120	Urban	Asphalt	0.011	124	2.00	0.018	1.9	2.01	Blue Grass	1	311	14	0.045	3.4	1.51
SP130	Urban	Asphalt	0.011	34	2.00	0.059	1.9	0.43	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP140	Urban	Blue Grass	0.240	180	8.00	0.044	1.9	21.34	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP150	Urban	Short Grass Prairie	0.150	95	8.00	0.084	1.9	6.82	Parking Lot	2	873	36	0.041	4.1	3.52
SP160	Urban	Blue Grass	0.240	280	12.00	0.043	1.9	30.84	Short Grass Prairie	1	1,155	92	0.050	3.6	5.34
SP170	Urban	Blue Grass	0.240	300	14.00	0.047	1.9	31.57	Blue Grass	1	108	2	0.019	2.2	0.82
SP180	Urban	Short Grass Prairie	0.150	300	30.00	0.100	1.9	15.97	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP190	Urban	Asphalt	0.011	41	6.00	0.100	1.9	0.40	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
SP200	Urban	Asphalt	0.011	145	2.00	0.014	1.9	2.44	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00

Notes:

- 1) All flow lengths were taken from the LFP feature class created in ArcMap
- 2) All elevation changes were taken from the contours shp file
- 3) The Two-Year 24-hour Rainfall was taken from the NOAA Atlas 14
- 4) Overland flow (min) $T_o = 0.007(L)^{0.55}(P_2)^{0.5}n^4$
 - n = Manning's Roughness Coefficient (Table 3-1) Urban Hydrology for Small Watersheds Technical Release 55
 - L = Flow length (ft)
 - P₂ = 2-year, 24-hour rainfall (in)
 - s = slope of hydraulic grade line (land slope, ft/ft)
- 5) Shallow Concentrated Flow Average Velocity (ft/s) = $16.13458(s^{0.5})$ if surface is unpaved and $20.3282(s^{0.5})$ if the surface is paved. Per NRCS TR-55
 - s = slope of hydraulic grade line (land slope, ft/ft)
- 6) Shallow Concentrated Flow T_c (min) = $L/3600V$
 - L = Flow length (ft)
 - V = Shallow concentrated flow average velocity (ft/s)
- 7) Channel Flow Average Velocity (ft/s) = $1.49(R^{0.5})/S^{0.5}$
 - R = Hydraulic radius = cross sectional flow area/wetted perimeter
 - s = slope of hydraulic grade line (land slope, ft/ft)
 - n = Manning's Roughness Coefficient
- 8) Channel Flow T_c (min) = $L/3600V$
 - L = Flow length (ft)
 - V = Channel flow average velocity (ft/s)
- 9) Sheet flow T_c, Shallow Concentrated Flow T_c, Shallow Concentrated Flow Velocity, Channel Flow T_c, and Channel Flow Velocity equations were obtained from the Colorado Springs Drainage Criteria Manual
- 10) The maximum allowable land slope for Overland Flow is 10% and for Shallow Concentrated Flow is 5%. All instances greater than these values were replaced with the corresponding maximum value per the City of Colorado Springs
- 11) All Manning's n values for Ditch Flow, Storm Sewer Flow, and Open Channel Flow were increased by 25% per the City of Colorado Springs
- 12) $T_o = T_1 + T_2 + T_3 + T_4$
- 13) $T_w = 0.6T_1$
- 14) Urban and rural subbasin designations are taken from percent impervious and referenced from previous study, assuming no major subbasin changes. Used to dictate maximum overland flow length
- 15) Per City of Colorado Springs, a standard roughness value of 0.016 for all RCP in the lag time calculations was used, accounting for an adjustment (+25% of the typical 0.013) to account for pipe losses and alignment variations. If storm sewer velocities exceeded the Colorado Springs criteria maximum of 18ft/s, they were set equal to 18ft/s

Cottonwood Creek DBPS: Lag Time Calculation
Lag Time Calculations

Subbasin	Urban or Rural Subbasin	Overland Flow							Shallow Concentrated Flow						
		Manning's n Description	Manning's n	Flow Length (ft)	Elevation Change (ft)	Land Slope (ft/ft)	2-year 24-hour Rainfall ² (in)	T ₁ (min)	Surface Description	Unpaved (1) or Paved (2) Surface ¹	Flow Length (ft)	Elevation Change (ft)	Watercourse Slope (ft/ft)	Velocity (ft/s)	T ₁ (min)
Cottonwood Creek															
UC010	Rural	Short Grass Prairie	0.150	300	26	0.087	1.9	18.85	Short Grass Prairie	1	993	42	0.042	3.3	4.99
UC020	Rural	Short Grass Prairie	0.150	300	18	0.060	2.0	18.46	Short Grass Prairie	1	266	12	0.045	3.4	1.29
UC030	Rural	Short Grass Prairie	0.150	300	20	0.067	2.0	18.62	Short Grass Prairie	1	630	28	0.044	3.4	3.09
UC040	Rural	Short Grass Prairie	0.150	300	26	0.087	2.0	18.77	Short Grass Prairie	1	171	8	0.047	3.5	0.82
UC050	Urban	Short Grass Prairie	0.150	110	12	0.100	2.0	7.08	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
UC060	Urban	Short Grass Prairie	0.150	300	14	0.047	2.0	21.42	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
UC070	Rural	Short Grass Prairie	0.150	286	32	0.100	2.0	15.22	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
UC080	Urban	Short Grass Prairie	0.150	147	8	0.054	2.0	11.37	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	1.00
UC090	Rural	Short Grass Prairie	0.150	149	12	0.081	2.0	9.87	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	2.00
UC100	Rural	Short Grass Prairie	0.150	88	4	0.059	2.0	5.97	Short Grass Prairie	1	1,693	64	0.038	3.1	8.99
UC110	Rural	Short Grass Prairie	0.150	138	6	0.043	2.0	11.88	Short Grass Prairie	1	569	38	0.050	3.6	2.63
UC120	Rural	Short Grass Prairie	0.150	134	10	0.075	2.0	9.31	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
UC130	Urban	Short Grass Prairie	0.150	250	16	0.064	2.0	16.30	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
UC140	Urban	Short Grass Prairie	0.150	198	28	0.100	2.0	11.31	Short Grass Prairie	1	165	12	0.050	3.6	0.76
UC150	Rural	Short Grass Prairie	0.150	300	8	0.027	2.0	26.78	Short Grass Prairie	1	242	8	0.033	2.9	1.37
UC160	Rural	Short Grass Prairie	0.150	300	10	0.033	2.0	24.49	Short Grass Prairie	1	1,097	54	0.049	3.6	5.11
UC165	Urban	Short Grass Prairie	0.150	300	32	0.100	2.0	15.77	Short Grass Prairie	1	276	18	0.050	3.6	1.27
UC170	Rural	Short Grass Prairie	0.150	300	10	0.033	2.0	24.48	Short Grass Prairie	1	280	10	0.038	3.2	1.37
UC180	Rural	Short Grass Prairie	0.150	300	8	0.027	2.0	26.77	Short Grass Prairie	1	1,371	36	0.028	2.6	8.74
UC190	Rural	Short Grass Prairie	0.150	123	70	0.100	2.0	7.74	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
WR010	Rural	Short Grass Prairie	0.150	239	26	0.100	2.0	13.12	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
WR020	Rural	Short Grass Prairie	0.150	144	14	0.097	2.0	8.85	Short Grass Prairie	1	2,679	210	0.050	3.6	12.38
WR030	Rural	Short Grass Prairie	0.150	225	48	0.100	2.0	12.50	Short Grass Prairie	1	4,689	242	0.050	3.6	21.86
WR040	Rural	Short Grass Prairie	0.150	41	8	0.100	2.0	3.20	Short Grass Prairie	1	2,330	184	0.050	3.6	10.76
WR050	Rural	Short Grass Prairie	0.150	160	42	0.100	2.0	9.52	Short Grass Prairie	1	3,736	186	0.050	3.6	17.30
WR060	Rural	Short Grass Prairie	0.150	159	16	0.100	2.0	9.48	Short Grass Prairie	1	3,440	164	0.048	3.5	16.27
WR070	Urban	Short Grass Prairie	0.150	300	18	0.060	2.0	19.33	Short Grass Prairie	1	138	6	0.043	3.4	0.88
WR080	Rural	Short Grass Prairie	0.150	300	10	0.033	2.0	24.44	Short Grass Prairie	1	1,851	70	0.038	3.1	9.83
WR090	Rural	Short Grass Prairie	0.150	300	12	0.049	2.0	22.71	Short Grass Prairie	1	2,345	92	0.039	3.2	12.23
WR100	Rural	Short Grass Prairie	0.150	300	10	0.033	2.0	24.43	Short Grass Prairie	1	1,698	52	0.031	2.8	10.02
WR110	Rural	Short Grass Prairie	0.150	300	8	0.027	2.0	26.72	Short Grass Prairie	1	305	8	0.028	2.8	1.95
WR120	Urban	Short Grass Prairie	0.150	229	28	0.100	2.0	12.70	Short Grass Prairie	1	517	36	0.050	3.6	2.39
WR130	Rural	Short Grass Prairie	0.150	300	26	0.087	2.0	16.88	Short Grass Prairie	1	990	44	0.044	3.4	4.85
WR140	Rural	Short Grass Prairie	0.150	80	4	0.050	2.0	7.22	Short Grass Prairie	1	322	6	0.019	2.2	2.44
WR150	Rural	Short Grass Prairie	0.150	164	6	0.037	2.0	14.62	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
WR160	Rural	Short Grass Prairie	0.150	204	6	0.029	2.0	18.88	Short Grass Prairie	1	284	8	0.030	2.8	1.57
WR170	Rural	Short Grass Prairie	0.150	300	8	0.027	2.0	26.78	Short Grass Prairie	1	282	10	0.035	3.0	1.55
MC010	Urban	Short Grass Prairie	0.150	294	10	0.034	2.0	23.88	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC020	Urban	Short Grass Prairie	0.150	300	10	0.033	2.0	24.46	Short Grass Prairie	1	565	18	0.028	2.7	3.47
MC030	Rural	Short Grass Prairie	0.150	300	14	0.047	2.0	21.40	Short Grass Prairie	1	688	22	0.032	2.9	3.97
MC040	Urban	Short Grass Prairie	0.150	300	10	0.033	2.0	24.48	Short Grass Prairie	1	72	2	0.028	2.7	0.45
MC050	Urban	Short Grass Prairie	0.150	300	10	0.033	2.0	24.54	Short Grass Prairie	1	1,293	32	0.025	2.5	8.49
MC060	Rural	Short Grass Prairie	0.150	300	18	0.060	2.0	19.30	Short Grass Prairie	1	1,373	66	0.048	3.5	6.47
MC070	Rural	Short Grass Prairie	0.150	232	32	0.100	2.0	12.81	Short Grass Prairie	1	4,298	230	0.050	3.6	18.85
MC080	Rural	Short Grass Prairie	0.150	300	10	0.033	2.0	24.44	Short Grass Prairie	1	933	30	0.032	2.9	5.37
MC090	Urban	Short Grass Prairie	0.150	199	1	0.005	2.0	37.55	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC100	Urban	Short Grass Prairie	0.150	300	12	0.040	2.0	22.73	Short Grass Prairie	1	259	6	0.023	2.5	1.76
MC110	Urban	Asphalt	0.011	119	8	0.067	2.0	1.99	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC120	Urban	Short Grass Prairie	0.150	300	10	0.033	2.0	24.52	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC130	Urban	Asphalt	0.011	88	2	0.023	2.0	1.33	Street	2	728	18	0.025	3.2	3.80
MC140	Urban	Short Grass Prairie	0.150	300	18	0.060	2.0	19.43	Short Grass Prairie	1	330	12	0.038	3.1	1.79
MC150	Rural	Short Grass Prairie	0.150	197	10	0.051	2.0	14.85	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC160	Urban	Short Grass Prairie	0.150	300	16	0.053	2.0	20.36	Short Grass Prairie	1	306	14	0.046	3.5	1.48
MC170	Urban	Asphalt	0.011	300	16	0.053	2.0	2.52	Parking Lot	2	200	4	0.020	2.9	1.16
MC180	Urban	Short Grass Prairie	0.150	300	28	0.093	2.0	16.23	Short Grass Prairie	1	797	42	0.050	3.6	3.68
MC190	Urban	Blue Grass	0.240	300	12	0.040	2.0	33.22	Blue Grass	1	142	12	0.050	3.6	0.66
MC200	Urban	Short Grass Prairie	0.150	300	20	0.067	2.0	18.57	Short Grass Prairie	1	402	6	0.015	2.0	3.40
MC210	Urban	Short Grass Prairie	0.150	285	24	0.084	2.0	16.25	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
MC220	Urban	Short Grass Prairie	0.150	300	24	0.080	2.0	17.32	Short Grass Prairie	1	611	48	0.050	3.6	2.82
MC230	Urban	Short Grass Prairie	0.150	300	18	0.060	2.0	19.46	Short Grass Prairie	1	49	4	0.050	3.6	0.23
MC240	Urban	Short Grass Prairie	0.150	287	16	0.058	1.9	19.37	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT010	Urban	Short Grass Prairie	0.150	300	4	0.013	2.0	35.46	Short Grass Prairie	1	391	16	0.041	3.3	2.00
RT020	Urban	Short Grass Prairie	0.150	300	6	0.020	1.9	30.25	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT030	Urban	Short Grass Prairie	0.150	300	12	0.040	2.0	22.90	Short Grass Prairie	1	1,633	44	0.027	2.6	10.28
RT040	Rural	Short Grass Prairie	0.150	300	18	0.060	2.0	19.45	Short Grass Prairie	1	311	18	0.050	3.6	1.44
RT050	Urban	Short Grass Prairie	0.150	38	4	0.100	1.9	3.04	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT060	Urban	Short Grass Prairie	0.150	237	16	0.068	1.9	15.44	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT070	Urban	Short Grass Prairie	0.150	300	24	0.080	1.9	17.40	Short Grass Prairie	1	558	32	0.050	3.6	2.58
RT080	Urban	Blue Grass	0.240	300	24	0.080	1.9	25.35	Short Grass Prairie	1	40	2	0.050	3.6	0.18
RT090	Urban	Short Grass Prairie	0.150	300	12	0.040	1.9	22.92	Short Grass Prairie	1	227	2	0.009	1.5	2.50
RT100	Urban	Blue Grass	0.240	113	4	0.035	1.9	16.08	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT110	Urban	Short Grass Prairie	0.150	179	10	0.056	2.0	13.25	No Shallow Concentrated Flow	N/A	N/A	N/A	N/A	N/A	0.00
RT120	Urban	Short Grass Prairie	0.150	300	10	0.033	1.9	24.64	Short Grass Prairie	1	914	32	0.035	3.0	5.05
RT130	Urban	Short Grass Prairie	0.150	196	18	0.092	1.9	11.74	Short Grass Prairie	1	863	44	0.050	3.6	3.99
RT140	Urban	Short Grass Prairie	0.150	300	32	0.100	1.9	15.95	Short Grass Prairie	1	491	32	0.050	3.6	2.27
RT150	Urban	Short Grass Prairie	0.150	300	22	0.073	1.9	18.03	Short Grass Prairie	1	1,003	56	0.050	3.6	4.63
RT160	Urban	Short Grass Prairie	0.150	300	22	0.073	1.9	18.01	Short Grass Prairie	1	268	40	0.050	3.6	1.24
LC010	Urban	Short Grass Prairie	0.150	243	42	0.100	1.9	13.42	Short Grass Prairie	1	540	38	0.050	3.6	2.49
LC020	Urban	Short Grass Prairie	0.150	91	12	0.100	1.9								

**Cottonwood Creek DBPS
Subbasin Parameters**

Subbasin	Area (mi ²)	Percent Impervious (%)		2 Hour Curve Number		24 Hour Curve Number		Lag Time (min)	
		Existing	Future	Existing	Future	Existing	Future	Existing	Future
South Pine Creek									
SP010	0.2	50.94	50.94	48.00	48.00	48.49	48.49	21.88	21.88
SP020	0.21	51.55	51.55	48.53	48.53	48.70	48.70	37.18	37.18
SP030	0.22	47.8	47.8	48.07	48.07	48.58	48.58	16.37	16.37
SP040	0.18	51.55	51.55	48.73	48.73	48.78	48.78	28.03	28.03
SP050	0.12	50.93	50.93	46.54	46.54	47.95	47.95	3.47	3.47
SP060	0.23	51.03	51.03	47.07	47.07	48.11	48.11	21.54	21.54
SP070	0.1	32.46	32.46	48.97	48.97	49.13	49.13	17.34	17.34
SP080	0.24	55.27	55.27	47.28	47.28	48.22	48.22	7.29	7.29
SP090	0.1	53	53	48.39	48.39	48.39	48.39	14.49	14.49
SP100	0.25	41.03	41.03	47.42	47.42	48.47	48.47	6.27	6.27
SP110	0.18	34.55	34.55	47.96	47.96	48.93	48.93	10.91	10.91
SP120	0.29	51.39	51.39	46.48	46.48	47.93	47.93	14.46	14.46
SP130	0.22	60.61	60.61	47.62	47.62	48.36	48.36	11.97	11.97
SP140	0.1	41.96	41.96	46.14	46.14	48.81	48.81	20.87	20.87
SP150	0.26	74.82	74.82	46.43	46.43	47.78	47.78	11.38	11.38
SP160	0.29	52.36	52.36	47.87	47.87	49.10	49.10	27.1	27.1
SP170	0.14	51.13	51.13	47.98	47.98	48.48	48.48	24.21	24.21
SP180	0.21	39.42	39.42	47.58	47.58	48.34	48.34	19.85	19.85
SP190	0.15	69.7	69.7	45.44	45.44	48.68	48.68	11.26	11.26
SP200	0.09	52.6	52.6	45.45	45.45	50.62	50.62	18.95	18.95

*Note: Per the City of Colorado Springs, all basins to be developed in the future will provide local detention adequate to maintain existing runoff conditions, therefore subbasins that have the potential for future development will be modeled with existing runoff parameters. This excludes the Wolf Ranch development which will provide modeled detention.

Cottonwood Creek DBPS

Subbasin Parameters

Subbasin	Area (mi ²)	Percent Impervious (%)		2 Hour Curve Number		24 Hour Curve Number		Lag Time (min)	
		Existing	Future	Existing	Future	Existing	Future	Existing	Future
Cottonwood Creek									
LC010	0.27	38.75	38.75	41.42	41.416	45.95	45.952	23.47	23.47
LC020	0.3	47.49	47.49	48.02	48.024	49.80	49.8	8.79	8.79
LC030	0.3	41.05	41.05	54.67	54.672	54.83	54.832	17.72	17.72
LC040	0.3	45.17	45.17	53.34	53.336	53.56	53.56	24.04	24.04
LC050	0.07	55.23	55.23	51.82	51.824	51.89	51.888	26.51	26.51
LC060	0.28	48.27	48.27	48.69	48.688	49.33	49.328	33.34	33.34
LC070	0.2	23.13	23.13	30.82	30.824	42.05	42.048	17.76	17.76
LC080	0.24	35.78	35.78	43.27	43.272	48.18	48.176	16.94	16.94
LC090	0.15	47.07	47.07	39.92	39.92	45.40	45.4	25.74	25.74
LC100	0.14	42.48	42.48	48.19	48.192	49.62	49.624	17.01	17.01
LC110	0.17	16.8	16.8	25.92	25.92	40.20	40.2	22.62	22.62
LC120	0.12	40.02	40.02	42.84	42.84	49.22	49.224	12.69	12.69
LC130	0.05	63.41	63.41	46.53	46.528	47.94	47.944	20.96	20.96
LC140	0.1	48.95	48.95	48.70	48.704	48.86	48.856	24.29	24.29
LC150	0.13	41.9	41.9	47.96	47.96	49.31	49.312	27.33	27.33
LC160	0.29	43.59	43.59	42.23	42.232	50.95	50.952	19.70	19.7
LC170	0.4	51.63	51.63	48.52	48.52	48.59	48.592	16.29	16.29
LC180	0.28	50.31	50.31	47.97	47.968	48.47	48.472	20.54	20.54
LC190	0.2	64.89	64.89	49.48	49.48	50.33	50.328	20.59	20.59
LC200	0.23	52.89	52.89	52.94	52.944	53.82	53.824	14.78	14.78
LC210	0.18	46.48	46.48	46.26	46.264	50.10	50.096	29.15	29.15
LC220	0.17	60.65	60.65	49.38	49.384	50.23	50.232	17.75	17.75
LC230	0.34	53.14	53.14	46.58	46.584	49.98	49.984	14.03	14.03
MC010	0.09	39.38	59.4	48.10	49.248	50.91	49.752	23.63	17.72
MC020	0.1	41.27	50.25	47.29	48.176	49.18	48.856	19.46	19.46
MC030	0.15	0.94	0.94	32.30	32.296	48.14	48.144	26.81	26.81
MC040	0.21	44	44.15	48.26	48.32	49.92	49.968	23.57	23.57
MC050	0.66	15.1	15.1	41.94	41.936	51.55	51.552	31.39	31.39
MC060	0.18	0	48.07	38.40	48.328	55.20	49.088	31.46	23.6
MC070	0.18	0.59	38.53	38.14	46.592	54.64	49.408	20.84	15.63
MC080	0.2	14.8	52.28	42.94	48.768	53.27	49.296	25.70	19.28
MC090	0.31	25.28	25.28	46.78	46.784	51.66	51.664	31.52	31.52
MC100	0.11	25.25	34.17	47.81	47.848	49.65	49.624	22.82	17.11
MC110	0.19	32.19	49.26	44.54	47.856	50.06	49.552	9.81	7.36
MC120	0.27	41.43	41.43	46.71	46.712	49.44	49.44	19.66	19.66
MC130	0.14	49.9	49.9	48.75	48.752	48.78	48.776	10.31	10.31
MC140	0.07	67.18	67.18	45.66	45.656	46.20	46.2	14.88	14.88
MC150	0.07	23.54	23.54	34.34	34.344	41.50	41.496	23.71	23.71
MC160	0.19	31.59	31.59	43.35	43.352	48.94	48.936	29.61	29.61
MC170	0.28	40.34	40.34	43.90	43.904	48.94	48.944	10.53	10.53
MC180	0.21	45.69	45.69	47.45	47.448	49.55	49.552	13.72	13.72
MC190	0.17	44.99	44.99	45.38	45.376	48.36	48.36	23.76	23.76
MC200	0.15	35.51	35.51	45.22	45.216	48.79	48.792	15.47	15.47
MC210	0.09	54.7	54.7	47.74	47.736	48.43	48.432	21.64	21.64
MC220	0.33	39.14	39.14	41.33	41.328	45.94	45.936	20.84	20.84
MC230	0.06	72.82	72.82	48.31	48.312	48.55	48.552	14.78	14.78
MC240	0.38	27.4	27.4	43.74	43.744	51.28	51.28	25.66	25.66
RT010	0.09	8.08	8.08	30.81	30.808	43.90	43.904	34.08	34.08
RT020	0.24	25.07	25.07	35.49	35.488	43.50	43.504	34.62	34.62
RT030	0.09	16.69	16.69	37.77	37.768	44.59	44.592	40.47	40.47
RT040	0.22	27.37	27.37	32.62	32.624	42.35	42.352	28.19	28.19

Cottonwood Creek DBPS

Subbasin Parameters

Subbasin	Area (mi ²)	Percent Impervious (%)		2 Hour Curve Number		24 Hour Curve Number		Lag Time (min)	
		Existing	Future	Existing	Future	Existing	Future	Existing	Future
Cottonwood Creek									
RT050	0.29	40.46	40.46	43.74	43.74	47.17	47.17	25.81	25.81
RT060	0.29	48	48	47.93	47.93	48.96	48.96	12.39	12.39
RT070	0.45	32.75	32.75	40.88	40.88	47.38	47.38	25.46	25.46
RT080	0.06	39.14	39.14	46.43	46.43	48.05	48.05	20.72	20.72
RT090	0.14	51.31	51.31	48.14	48.14	48.41	48.41	24.96	24.96
RT100	0.25	41.95	41.95	45.94	45.94	48.16	48.16	25.56	25.56
RT110	0.24	47.19	47.19	47.06	47.06	48.14	48.14	11.41	11.41
RT120	0.25	46.96	46.96	45.04	45.04	47.28	47.28	33.13	33.13
RT130	0.16	48.38	48.38	48.41	48.41	49.01	49.01	15.22	15.22
RT140	0.28	39.49	39.49	46.41	46.41	50.10	50.10	28.22	28.22
RT150	0.22	38.87	38.87	50.70	50.70	53.22	53.22	18.73	18.73
RT160	0.14	37.06	37.06	47.27	47.27	51.67	51.67	25.09	25.09
UC010	0.23	1.42	1.42	34.16	34.16	55.16	55.16	36.25	36.25
UC020	0.32	4.54	4.54	36.30	36.30	57.20	57.20	47.99	47.99
UC030	0.21	1.33	1.33	37.66	37.66	58.54	58.54	31.7	31.7
UC040	0.12	2.94	2.94	38.66	38.66	59.66	59.66	26.61	26.61
UC050	0.27	5.81	5.81	39.99	39.99	59.34	59.34	23.57	23.57
UC060	0.23	4.6	4.6	40.52	40.52	60.26	60.26	31.69	31.69
UC070	0.1	2.86	2.86	39.26	39.26	60.09	60.09	44.01	44.01
UC080	0.18	2.81	2.81	42.68	42.68	62.35	62.35	23.87	23.87
UC090	0.24	0.84	0.84	38.49	38.49	59.02	59.02	27.64	27.64
UC100	0.34	1.75	1.75	41.35	41.35	61.61	61.61	28.45	28.45
UC110	0.1	0.81	0.81	45.05	45.05	66.05	66.05	21.48	21.48
UC120	0.29	2.22	2.22	48.39	48.39	68.36	68.36	10.95	10.95
UC130	0.19	12.19	12.19	49.84	49.84	68.40	68.40	26.46	26.46
UC140	0.23	11.43	11.43	49.19	49.19	68.27	68.27	42.1	42.1
UC150	0.09	2.18	2.18	46.72	46.72	65.32	65.32	33.12	33.12
UC160	0.1	4.58	4.58	43.04	43.04	61.91	61.91	19.86	19.86
UC165	0.22	14.17	14.17	49.76	49.76	68.05	68.05	77.55	77.55
UC170	0.22	1.56	40.95	48.21	60.83	68.88	61.11	26.04	19.53
UC180	0.11	0	60.55	48.00	60.71	69.00	61.18	26.64	19.98
UC190	0.14	1.97	38.35	47.79	56.95	68.04	63.58	22.16	16.62
WR010	0.07	2.1	2.1	37.91	37.91	58.79	58.79	15.07	15.07
WR020	0.05	1.04	1.04	41.05	41.05	61.87	61.87	18.34	18.34
WR030	0.22	0.89	33.6	46.35	52.33	66.71	63.03	21.53	16.15
WR040	0.03	0.02	0.02	44.14	44.14	64.72	64.72	8.38	8.38
WR050	0.09	2.64	2.64	40.53	40.53	61.19	61.19	16.09	16.09
WR060	0.26	1.03	1.03	39.68	39.68	59.21	59.21	23.88	23.88
WR070	0.1	10.25	10.25	43.05	43.05	63.15	63.15	24.23	24.23
WR080	0.08	0	17.81	48.26	48.63	68.79	68.57	30.34	22.76
WR090	0.22	0	29	48.29	52.01	69.01	66.73	23.01	17.26
WR100	0.19	16.77	54.79	56.19	60.01	67.44	62.11	32.88	24.66
WR110	0.21	0.31	36.91	47.77	55.05	68.61	64.42	23.14	17.35
WR120	0.05	7.39	7.39	46.91	46.91	66.08	66.08	16.19	16.19
WR130	0.16	3.85	39.29	48.53	55.88	68.67	64.16	29.6	22.2
WR140	0.09	0.34	44.17	48.04	59.80	68.97	61.74	17.46	13.1
WR150	0.15	0	49.61	48.00	60.59	69.00	61.25	35.23	26.42
WR160	0.08	0	29.42	49.83	56.51	70.04	65.99	14.1	10.57
WR170	0.08	0.64	23.63	47.83	55.16	65.87	64.57	20.9	15.67

*Note: Per the City of Colorado Springs, all basins to be developed in the future will provide local detention adequate to maintain existing runoff conditions, therefore subbasins that have the potential for future development will be modeled with existing runoff parameters. This excludes the Wolf Ranch development which will provide modeled detention.

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Appendix A. Hydrologic Analysis