

445.99 176.54 469.5 177.41 449.93 177.54 449.97 177.55 451.49 177.55

452.4 177.23 456.37 176.74

Manning's n Values
Sta n Val Sta n Val Sta n Val
0 .35 42.73 .025 55.09 .25

Bank Stat Left Right Easiff Contr. Expan.
42.73 55.09 .1 .1

Downstream Deck/Roadway Coordinates
num= 86

Table with 6 columns: Sta, RI Cord, Lo Cord, Sta, RI Cord, Lo Cord. Contains coordinate data for the downstream deck/roadway.

Downstream Bridge Cross Section Data
Station Elevation Data num= 65

Table with 6 columns: Sta, Elev, Sta, Elev, Sta, Elev. Contains elevation data for the downstream bridge cross section.

Manning's n Values num= 3
Sta n Val Sta n Val
0 .35 34.75 .025 45.02 .35

Bank Stat Left Right Coeff Contr. Expan.
34.75 45.02 .1 .1

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
49.09 124.31 175.59 F

Upstream Embankment side slope
Downstream Embankment side slope
Maximum allowable submergence for weir flow = .29
Elevation at which weir flow begins
Energy head used in spillway design
Spillway height used in design
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name Shape Rise Span
Ramsey Rd Box 2.2 3.65
PIMA Chest # 8 - Flatbed wingwalls
PIMA Sello # 2 - Wingwall flatbed 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Opstrm Dist Length Top n Bottom n Depth blocked Entrance Loss Coef Exit Loss Coef
6 8 .013 .013 0 0

Upstream Elevation = 173.69
Centerline Station = 48
Downstream Elevation = 173.69
Centerline Station = 40

CULVERT OUTPUT PROFILE P100Yz Welland Culv Group: Ramsey Rd
Q Culv Group (m3/s) = 9.05 Culv Full Len (m) =
Barrels = 1 Culv Vel US (m/s) = 1.19
0 Barrels (m3/s) = 9.05 Culv Vel DS (m/s) = 1.19
E.G. US (m) = 175.89 Culv Inv El Up (m) = 173.65
W.S. US (m) = 175.87 Culv Inv El Dn (m) = 173.65
E.G. DS (m) = 175.82 Culv Frctn Ls (m) = 0.00
W.S. DS (m) = 175.78 Culv Exit Loss (m) = 0.03
Delta HS (m) = 0.06 Culv Exit Loss (m) = 0.04
Delta MS (m) = 0.09 0 Weir (m3/s) = 34.30
E.G. IC (m) = 175.62 Weir Sta Lfc (m) = 296.53
E.G. OC (m) = 175.89 Weir Sta Rgt (m) = 643.45
Culvert Control = Outlet Weir Submerge = 0.65
Culv MS Inlet (m) = 175.73 Weir Max Depth (m) = 2.59
Culv MS Outlet (m) = 175.78 Weir Max Depth (m) = 0.28
Culv Nsl Depth (m) = Weir Avg Depth (m) = 43.28
Culv Crs Depth (m) = 0.86 Min El Weir Flow (m) = 175.90

Warning: During subcritical analysis, while trying to calculate culvert and weir flow, the program could not get a balance of energy within the specified tolerance and number of trials. The program used the solution with the minimum error.
Warning: During the culvert inlet control computations, the program could not balance the culvert/weir flow. The reported inlet energy grade answer may not be valid.
Warning: During the culvert outlet control computations, the program could not balance the culvert/weir flow. The reported outlet energy grade answer may not be valid.

CROSS SECTION

RIVER: SOUTH-CREEK
REACH: 1
MS: 309.2

INPUT

Descriptions:
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 175.66 1.92 175.78 3.55 175.8 8.37 175.85 11.58 175.87

Station Elevation Data num= 65
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
30.02 175.89 30.43 175.86 30.87 175.83 31.46 175.81 31.6 175.82

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .35 34.75 .025 45.02 .35

Bank Stat Left Right Coeff Contr. Expan.
34.75 45.02 .1 .1

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
49.09 124.31 175.59 F

Upstream Embankment side slope
Downstream Embankment side slope
Maximum allowable submergence for weir flow = .29
Elevation at which weir flow begins
Energy head used in spillway design
Spillway height used in design
Weir crest shape = Broad Crested

Bank Sta: Left 34.75 Right 45.02 Lengths: Left Channel 24.4 Right Channel 24.4 Coeff. Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #100Yr Walland
E.G. Elev (m) 175.82 Element
W.S. Elev (m) 175.78 n-Val.
Critic W.S. (m) 175.78 Reach Len. (m)
E.G. Slope (m/s) 0.00283 Area (m2)
Q Total (m3/s) 15.87 Flow Area (m2)
Top Width (m) 50.22 Top Width (m)
W.S. Total (m/s) 0.65 Avg. Vel. (m/s)
Max Chl Dpth (m) 2.05 Hydr. Depth (m)
Conv. Total (m3/s) 930.8 Conv. (m3/s)
Length w/d. (m) 24.40 Wetted Per. (m)
Min Chl El (m) 173.69 Shear (N/m2)
Alpha 1.69 Stream Power (N/m s)
Fric Loss (m) 0.01 Cum Volume (1000 m3)
C & E Loss (m) 0.00 Cum SA (1000 m2)

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest energy was used.

CROSS SECTION
RIVER: SOUTH-CREEK
REACH: 1
RS: 264.8
INPUT
Description:
Station Elevation Data num= 135
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 176.03 .015 176.035 3.072 176.052 4.647 176.036 5.66 176.025
7.818 176.002 8.364 175.999 9.228 175.992 10.367 175.986 11.331 175.983
13.352 175.974 14.56 175.967 18.528 175.939 18.824 175.935 21.833 175.909
23.098 175.893 24.16 175.878 25.796 175.843 27.583 175.797 28.105 175.761
32.56 175.685 33.658 175.66 34.24 175.645 34.771 175.62 35.171 175.604
38.851 175.428 39.92 175.373 41.338 175.302 41.673 175.322 44.589 175.516
45.396 175.581 45.642 175.601 47.171 175.656 47.911 175.64 48.032 175.641
48.688 175.658 49.392 175.656 50.316 175.664 50.596 175.672 50.924 175.674
52.528 175.677 52.676 175.678 53.244 175.681 53.728 175.683 54.204 175.628
54.965 175.646 55.6 175.333 56.341 175.014 58.888 174.352 59.881 173.891
60.425 175.67 60.655 175.696 62.298 173.702 64.343 175.322 68.063 175.504
68.854 175.067 68.965 175.105 70.446 175.333 71.995 175.443 71.824 175.504
72.232 175.567 72.426 175.594 73.541 175.609 72.569 175.612 72.568 175.638
72.927 175.651 73.028 175.655 73.192 175.67 73.425 175.674 73.268 175.678
74.581 175.764 75.941 175.825 80.311 175.989 80.779 176.005 81.034 176.014
82.085 176.011 83.035 176.003 83.73 176.011 84.261 176.008 84.577 176.392
84.7 175.393 85.527 175.983 85.739 176.009 85.823 176.496 89.886 176.302
90.354 176.916 90.724 176.582 91.475 176.613 91.753 176.644 93.45 176.823
93.793 176.863 94.391 176.923 94.684 176.953 95.301 177.093 97.136 177.519
98.239 177.335 98.974 177.416 99.492 177.489 99.515 177.473 99.934 177.519
100.352 177.552 100.679 177.598 100.955 177.626 102.589 177.824 105.335 178.162
109.603 178.769 111.429 179.023 132.391 179.158 112.432 179.122 113.238 179.241
126.547 180.58 126.951 180.917 128.791 181.059 130.78 181.216 130.792 180.841
130.917 181.223 132.034 181.359 132.671 181.387 134.728 181.548 137.874 181.77
140.644 181.994 141.959 182.072 143.002 182.186 143.703 182.215 143.909 182.222
144.605 182.269 145.881 182.283 145.163 182.294 145.78 182.326 149.925 182.505

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .35 55.6 .025 58.965 .35
Rank Sta: Left 55.6 Right 58.965 Lengths: Left Channel 24.4 Right Channel 24.4 Coeff. Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #100Yr Walland
E.G. Elev (m) 175.82 Element
W.S. Elev (m) 175.78 n-Val.
Critic W.S. (m) 175.78 Reach Len. (m)
E.G. Slope (m/s) 0.00283 Area (m2)
Q Total (m3/s) 15.87 Flow Area (m2)
Top Width (m) 50.22 Top Width (m)
W.S. Total (m/s) 0.65 Avg. Vel. (m/s)
Max Chl Dpth (m) 2.05 Hydr. Depth (m)
Conv. Total (m3/s) 930.8 Conv. (m3/s)
Length w/d. (m) 24.40 Wetted Per. (m)
Min Chl El (m) 173.69 Shear (N/m2)
Alpha 1.69 Stream Power (N/m s)
Fric Loss (m) 0.01 Cum Volume (1000 m3)
C & E Loss (m) 0.00 Cum SA (1000 m2)

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	176.4	-02	176.41	6.39	176.28	10.75	176.19	11.5	176.18
12.26	176.16	14.53	176.14	15.58	176.13	20.02	176.08	26.52	176
30.02	175.95	31.76	175.92	33.22	175.89	35.47	175.82	37.94	175.73
40.02	175.66	44.77	175.51	46.28	175.46	47.08	175.43	47.81	175.38
48.36	175.35	52.42	175	54.89	174.89	56.04	174.75	57.3	174.8
61.31	175.22	62.42	175.23	62.73	175.23	64.86	175.4	65.96	175.43
70.02	175.54	72.43	175.61	73.21	175.63	74.53	175.66	75.25	175.69
76.95	175.44	82.18	173.89	82.87	173.69	85.19	173.7	85.93	174.73
92.38	174.98	92.91	175.02	95.39	175.44	96.56	175.65	97.38	175.76
100.82	176.09	104.46	176.88	110.03	177.17	114.74	177.68	116.17	177.85
117.9	178.05	118.25	178.08	118.86	178.14	119.16	178.17	120.07	178.79
130.03	179.56	136.25	180.6	140.03	181.24	143.66	181.88	150.94	183.1
151.3	183.17	151.68	183.24	153.97	183.74	156.14	183.5	157.28	183.56
157.93	182.6	160.03	183.87	163.24	183.73	168.78	183.94	169.13	183.95
169.4	183.94	170.11	183.95	170.7	183.94	171.31	183.95	175.74	183.93

* 0.000230 * Area (m2) * 5.26 * 20.03 * 1.68 *
 * 15.67 * Flow (m3/s) * 0.08 * 15.56 * 0.03 *
 * 46.35 * Top Width (m) * 24.11 * 13.36 * 5.27 *
 * 0.58 * Avg. Vel. (m/s) * 0.01 * 0.78 * 0.02 *
 * 2.09 * Hyd. Depth (m) * 0.19 * 1.50 * 0.29 *
 * 1033.7 * Conv. (m3/s) * 5.0 * 1626.6 * 2.1 *
 * 24.60 * Wetted Per. (m) * 27.37 * 13.81 * 5.92 *
 * 173.69 * Shear (N/m2) * 0.44 * 3.27 * 0.64 *
 * 1.78 * Stream Power (W/m2) * 0.01 * 2.54 * 0.01 *
 * 0.01 * Cum Volume (1000 m3) * 1.90 * 3.23 * 0.18 *
 * 0.00 * Cum SA (1000 m2) * 7.55 * 17.28 * 0.68 *

CROSS SECTION
 RIVER: SOUTH-CREEK
 REACH: 1
 INPUT
 Description:
 Station Elevation Data num= 135
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .35 66.025 .025 80.938 .35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	176.215	-017	176.223	3.646	176.188	5.518	176.158	6.745	176.138
9.286	176.896	9.922	176.889	11.02	176.106	12.849	176.063	13.425	176.057
15.903	176.036	17.29	176.024	22.002	175.973	22.472	175.967	25.926	175.929
27.429	175.907	28.59	175.884	30.633	175.831	32.766	175.763	34.563	175.711
38.665	175.598	39.869	175.56	40.66	175.537	41.29	175.5	43.765	175.477
45.133	175.214	47.405	175.171	49.089	175.028	49.486	175.064	52.95	175.376
52.908	175.45	54.176	175.415	56.015	175.513	56.985	175.535	57.028	175.537
57.817	175.558	58.653	175.57	59.774	175.591	60.04	175.5	60.472	175.607
62.377	175.641	62.533	175.644	63.227	175.658	63.902	175.684	64.367	175.644
65.246	176.618	66.023	175.387	67.122	175.088	68.308	174.352	70.991	175.891
71.847	173.69	71.898	173.692	73.794	173.701	75.91	173.968	79.937	174.773
80.887	175.024	80.948	175.022	82.432	175.294	83.392	175.442	83.826	175.511
84.219	175.58	84.433	175.612	84.551	175.63	84.579	175.633	84.816	175.662
84.94	175.677	85.074	175.688	85.208	175.704	85.342	175.715	85.362	175.718
86.611	175.84	87.998	175.957	92.4	176.284	92.473	176.311	92.131	176.336
94.102	176.92	92.153	176.94	93.954	176.481	96.941	176.507	96.711	176.518
96.854	176.525	97.67	176.565	97.884	176.589	102.013	177.059	102.034	177.063
102.947	177.108	102.921	177.144	103.684	177.215	103.982	177.247	105.679	177.94
106.021	177.471	106.623	177.532	106.922	177.562	108.151	177.71	109.399	177.852
110.346	178.256	111.256	178.07	111.783	178.13	111.803	178.132	112.226	178.183
112.669	178.232	112.979	178.272	113.253	178.304	114.808	178.511	117.682	178.851
121.995	179.929	123.84	179.812	124.611	179.982	124.652	179.972	125.687	180.082
127.581	180.361	131.175	180.903	134.735	181.417	138.303	181.947	138.737	182.082
136.114	182.065	139.522	182.02	141.28	182.214	143.39	182.354	143.442	182.359
143.529	182.365	144.657	182.444	145.2	182.494	147.139	182.609	150.537	182.75
153.176	182.915	154.581	182.978	156.041	183.063	156.447	183.082	156.555	183.081
157.357	183.109	157.536	183.114	157.941	183.117	158.945	183.128	162.732	183.217

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .35 66.025 .025 80.938 .35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	176.4	-02	176.41	6.39	176.28	10.75	176.19	11.5	176.18
12.26	176.16	14.53	176.14	15.58	176.13	20.02	176.08	26.52	176
30.02	175.95	31.76	175.92	33.22	175.89	35.47	175.82	37.94	175.73
40.02	175.66	44.77	175.51	46.28	175.46	47.08	175.43	47.81	175.38
48.36	175.35	52.42	175	54.89	174.89	56.04	174.75	57.3	174.8
61.31	175.22	62.42	175.23	62.73	175.23	64.86	175.4	65.96	175.43
70.02	175.54	72.43	175.61	73.21	175.63	74.53	175.66	75.25	175.69
76.95	175.44	82.18	173.89	82.87	173.69	85.19	173.7	85.93	174.73
92.38	174.98	92.91	175.02	95.39	175.44	96.56	175.65	97.38	175.76
100.82	176.09	104.46	176.88	110.03	177.17	114.74	177.68	116.17	177.85
117.9	178.05	118.25	178.08	118.86	178.14	119.16	178.17	120.07	178.79
130.03	179.56	136.25	180.6	140.03	181.24	143.66	181.88	150.94	183.1
151.3	183.17	151.68	183.24	153.97	183.74	156.14	183.5	157.28	183.56
157.93	182.6	160.03	183.87	163.24	183.73	168.78	183.94	169.13	183.95
169.4	183.94	170.11	183.95	170.7	183.94	171.31	183.95	175.74	183.93

CROSS SECTION OUTPUT Profile #1001: Welland
 * E.G. Elev (m) * 175.79 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.02 * Wet. n-Val. * 0.350 * 0.925 * 0.350 *
 * W.S. Elev (m) * 175.77 * Reach Len. (m) * 29.82 * 29.82 * 29.82 *
 * Crit W.S. (m) * * Flow Area (m2) * 16.06 * 23.93 * 1.67 *
 * E.G. Slope (m/m) * 0.000160 * Area (m2) * 16.06 * 23.93 * 1.67 *
 * Q Total (m3/s) * 15.67 * Flow (m3/s) * 0.32 * 15.32 * 0.03 *
 * Top Width (m) * 50.74 * Top Width (m) * 39.70 * 16.66 * 4.58 *
 * Vel Total (m/s) * 0.28 * Avg. Vel. (m/s) * 0.02 * 0.64 * 0.02 *
 * Max Ch Depth (m) * 2.08 * Hyd. Depth (m) * 0.40 * 1.45 * 0.37 *
 * Conv. Total (m3/s) * 1238.4 * Conv. (m3/s) * 25.0 * 1210.9 * 2.4 *
 * Min Ch El (m) * 173.69 * Shear (N/m2) * 0.63 * 2.23 * 0.64 *
 * Alpha * * Stream Power (W/m2) * 0.01 * 1.43 * 0.01 *
 * Frict Loss (m) * 0.00 * Cum Volume (1000 m3) * 1.33 * 4.16 * 0.10 *
 * C.F. Loss (m) * 0.00 * Cum SA (1000 m2) * 5.59 * 16.65 * 0.63 *

CROSS SECTION OUTPUT Profile #1002: Welland
 * E.G. Elev (m) * 175.79 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.02 * Wet. n-Val. * 0.350 * 0.925 * 0.350 *
 * W.S. Elev (m) * 175.77 * Reach Len. (m) * 29.82 * 29.82 * 29.82 *
 * Crit W.S. (m) * * Flow Area (m2) * 16.06 * 23.93 * 1.67 *
 * E.G. Slope (m/m) * 0.000160 * Area (m2) * 16.06 * 23.93 * 1.67 *
 * Q Total (m3/s) * 15.67 * Flow (m3/s) * 0.32 * 15.32 * 0.03 *
 * Top Width (m) * 50.74 * Top Width (m) * 39.70 * 16.66 * 4.58 *
 * Vel Total (m/s) * 0.28 * Avg. Vel. (m/s) * 0.02 * 0.64 * 0.02 *
 * Max Ch Depth (m) * 2.08 * Hyd. Depth (m) * 0.40 * 1.45 * 0.37 *
 * Conv. Total (m3/s) * 1238.4 * Conv. (m3/s) * 25.0 * 1210.9 * 2.4 *
 * Min Ch El (m) * 173.69 * Shear (N/m2) * 0.63 * 2.23 * 0.64 *
 * Alpha * * Stream Power (W/m2) * 0.01 * 1.43 * 0.01 *
 * Frict Loss (m) * 0.00 * Cum Volume (1000 m3) * 1.33 * 4.16 * 0.10 *
 * C.F. Loss (m) * 0.00 * Cum SA (1000 m2) * 5.59 * 16.65 * 0.63 *

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	176.4	-02	176.41	6.39	176.28	10.75	176.19	11.5	176.18
12.26	176.16	14.53	176.14	15.58	176.13	20.02	176.08	26.52	176
30.02	175.95	31.76	175.92	33.22	175.89	35.47	175.82	37.94	175.73
40.02	175.66	44.77	175.51	46.28	175.46	47.08	175.43	47.81	175.38
48.36	175.35	52.42	175	54.89	174.89	56.04	174.75	57.3	174.8
61.31	175.22	62.42	175.23	62.73	175.23	64.86	175.4	65.96	175.43
70.02	175.54	72.43	175.61	73.21	175.63	74.53	175.66	75.25	175.69
76.95	175.44	82.18	173.89	82.87	173.69	85.19	173.7	85.93	174.73
92.38	174.98	92.91	175.02	95.39	175.44	96.56	175.65	97.38	175.76
100.82	176.09	104.46	176.88	110.03	177.17	114.74	177.68	116.17	177.85
117.9	178.05	118.25	178.08	118.86	178.14	119.16	178.17	120.07	178.79
130.03	179.56	136.25	180.6	140.03	181.24	143.66	181.88	150.94	183.1
151.3	183.17	151.68	183.24	153.97	183.74	156.14	183.5	157.28	183.56
157.93	182.6	160.03	183.87	163.24	183.73	168.78	183.94	169.13	183.95
169.4	183.94	170.11	183.95	170.7	183.94	171.31	183.95	175.74	183.93

CROSS SECTION OUTPUT Profile #1003: Welland
 * E.G. Elev (m) * 175.79 * Element * Left OB * Channel * Right OB *
 * Vel Head (m) * 0.02 * Wet. n-Val. * 0.350 * 0.925 * 0.350 *
 * W.S. Elev (m) * 175.77 * Reach Len. (m) * 29.82 * 29.82 * 29.82 *
 * Crit W.S. (m) * * Flow Area (m2) * 16.06 * 23.93 * 1.67 *
 * E.G. Slope (m/m) * 0.000160 * Area (m2) * 16.06 * 23.93 * 1.67 *
 * Q Total (m3/s) * 15.67 * Flow (m3/s) * 0.32 * 15.32 * 0.03 *
 * Top Width (m) * 50.74 * Top Width (m) * 39.70 * 16.66 * 4.58 *
 * Vel Total (m/s) * 0.28 * Avg. Vel. (m/s) * 0.02 * 0.64 * 0.02 *
 * Max Ch Depth (m) * 2.08 * Hyd. Depth (m) * 0.40 * 1.45 * 0.37 *
 * Conv. Total (m3/s) * 1238.4 * Conv. (m3/s) * 25.0 * 1210.9 * 2.4 *
 * Min Ch El (m) * 173.69 * Shear (N/m2) * 0.63 * 2.23 * 0.64 *
 * Alpha * * Stream Power (W/m2) * 0.01 * 1.43 * 0.01 *
 * Frict Loss (m) * 0.00 * Cum Volume (1000 m3) * 1.33 * 4.16 * 0.10 *
 * C.F. Loss (m) * 0.00 * Cum SA (1000 m2) * 5.59 * 16.65

CROSS SECTION

RIVER: SOUTH-CREEK
REACH: 1
RS: 151.54

INPUT

Station Elevation Data table with columns: Sta, Elev, num, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Includes description: 0 177.792, 9.068 177.448, 9.938 177.416, 15.255 177.108, 17.582 177.093, 20.619 177.066, 24.695 176.952, 28.771 176.834, 32.847 176.716, 36.923 176.598, 40.999 176.480, 45.075 176.362, 49.151 176.244, 53.227 176.126, 57.303 176.008, 61.379 175.890, 65.455 175.772, 69.531 175.654, 73.607 175.536, 77.683 175.418, 81.759 175.300, 85.835 175.182, 89.911 175.064, 93.987 174.946, 98.063 174.828, 102.139 174.710, 106.215 174.592, 110.291 174.474, 114.367 174.356, 118.443 174.238, 122.519 174.120, 126.595 174.002, 130.671 173.884, 134.747 173.766, 138.823 173.648, 142.899 173.530, 146.975 173.412, 151.051 173.294, 155.127 173.176, 159.203 173.058, 163.279 172.940, 167.355 172.822, 171.431 172.704, 175.507 172.586, 179.583 172.468, 183.659 172.350, 187.735 172.232, 191.811 172.114, 195.887 171.996, 199.963 171.878, 204.039 171.760, 208.115 171.642, 212.191 171.524, 216.267 171.406, 220.343 171.288, 224.419 171.170, 228.495 171.052, 232.571 170.934, 236.647 170.816, 240.723 170.698, 244.799 170.580, 248.875 170.462, 252.951 170.344, 257.027 170.226, 261.103 170.108, 265.179 169.990, 269.255 169.872, 273.331 169.754, 277.407 169.636, 281.483 169.518, 285.559 169.400, 289.635 169.282, 293.711 169.164, 297.787 169.046, 301.863 168.928, 305.939 168.810, 310.015 168.692, 314.091 168.574, 318.167 168.456, 322.243 168.338, 326.319 168.220, 330.395 168.102, 334.471 167.984, 338.547 167.866, 342.623 167.748, 346.699 167.630, 350.775 167.512, 354.851 167.394, 358.927 167.276, 363.003 167.158, 367.079 167.040, 371.155 166.922, 375.231 166.804, 379.307 166.686, 383.383 166.568, 387.459 166.450, 391.535 166.332, 395.611 166.214, 399.687 166.096, 403.763 165.978, 407.839 165.860, 411.915 165.742, 415.991 165.624, 420.067 165.506, 424.143 165.388, 428.219 165.270, 432.295 165.152, 436.371 165.034, 440.447 164.916, 444.523 164.798, 448.599 164.680, 452.675 164.562, 456.751 164.444, 460.827 164.326, 464.903 164.208, 468.979 164.090, 473.055 163.972, 477.131 163.854, 481.207 163.736, 485.283 163.618, 489.359 163.500, 493.435 163.382, 497.511 163.264, 501.587 163.146, 505.663 163.028, 509.739 162.910, 513.815 162.792, 517.891 162.674, 521.967 162.556, 526.043 162.438, 530.119 162.320, 534.195 162.202, 538.271 162.084, 542.347 161.966, 546.423 161.848, 550.499 161.730, 554.575 161.612, 558.651 161.494, 562.727 161.376, 566.803 161.258, 570.879 161.140, 574.955 161.022, 579.031 160.904, 583.107 160.786, 587.183 160.668, 591.259 160.550, 595.335 160.432, 599.411 160.314, 603.487 160.196, 607.563 160.078, 611.639 159.960, 615.715 159.842, 619.791 159.724, 623.867 159.606, 627.943 159.488, 632.019 159.370, 636.095 159.252, 640.171 159.134, 644.247 159.016, 648.323 158.898, 652.399 158.780, 656.475 158.662, 660.551 158.544, 664.627 158.426, 668.703 158.308, 672.779 158.190, 676.855 158.072, 680.931 157.954, 685.007 157.836, 689.083 157.718, 693.159 157.600, 697.235 157.482, 701.311 157.364, 705.387 157.246, 709.463 157.128, 713.539 157.010, 717.615 156.892, 721.691 156.774, 725.767 156.656, 729.843 156.538, 733.919 156.420, 737.995 156.302, 742.071 156.184, 746.147 156.066, 750.223 155.948, 754.299 155.830, 758.375 155.712, 762.451 155.594, 766.527 155.476, 770.603 155.358, 774.679 155.240, 778.755 155.122, 782.831 155.004, 786.907 154.886, 790.983 154.768, 795.059 154.650, 799.135 154.532, 803.211 154.414, 807.287 154.296, 811.363 154.178, 815.439 154.060, 819.515 153.942, 823.591 153.824, 827.667 153.706, 831.743 153.588, 835.819 153.470, 839.895 153.352, 843.971 153.234, 848.047 153.116, 852.123 152.998, 856.199 152.880, 860.275 152.762, 864.351 152.644, 868.427 152.526, 872.503 152.408, 876.579 152.290, 880.655 152.172, 884.731 152.054, 888.807 151.936, 892.883 151.818, 896.959 151.700, 901.035 151.582, 905.111 151.464, 909.187 151.346, 913.263 151.228, 917.339 151.110, 921.415 150.992, 925.491 150.874, 929.567 150.756, 933.643 150.638, 937.719 150.520, 941.795 150.402, 945.871 150.284, 949.947 150.166, 954.023 150.048, 958.099 149.930, 962.175 149.812, 966.251 149.694, 970.327 149.576, 974.403 149.458, 978.479 149.340, 982.555 149.222, 986.631 149.104, 990.707 148.986, 994.783 148.868, 998.859 148.750, 1002.935 148.632, 1007.011 148.514, 1011.087 148.396, 1015.163 148.278, 1019.239 148.160, 1023.315 148.042, 1027.391 147.924, 1031.467 147.806, 1035.543 147.688, 1039.619 147.570, 1043.695 147.452, 1047.771 147.334, 1051.847 147.216, 1055.923 147.098, 1060.000 146.980, 1064.076 146.862, 1068.152 146.744, 1072.228 146.626, 1076.304 146.508, 1080.380 146.390, 1084.456 146.272, 1088.532 146.154, 1092.608 146.036, 1096.684 145.918, 1100.760 145.800, 1104.836 145.682, 1108.912 145.564, 1112.988 145.446, 1117.064 145.328, 1121.140 145.210, 1125.216 145.092, 1129.292 144.974, 1133.368 144.856, 1137.444 144.738, 1141.520 144.620, 1145.596 144.502, 1149.672 144.384, 1153.748 144.266, 1157.824 144.148, 1161.900 144.030, 1165.976 143.912, 1170.052 143.794, 1174.128 143.676, 1178.204 143.558, 1182.280 143.440, 1186.356 143.322, 1190.432 143.204, 1194.508 143.086, 1198.584 142.968, 1202.660 142.850, 1206.736 142.732, 1210.812 142.614, 1214.888 142.496, 1218.964 142.378, 1223.040 142.260, 1227.116 142.142, 1231.192 142.024, 1235.268 141.906, 1239.344 141.788, 1243.420 141.670, 1247.496 141.552, 1251.572 141.434, 1255.648 141.316, 1259.724 141.198, 1263.800 141.080, 1267.876 140.962, 1271.952 140.844, 1276.028 140.726, 1280.104 140.608, 1284.180 140.490, 1288.256 140.372, 1292.332 140.254, 1296.408 140.136, 1300.484 140.018, 1304.560 139.900, 1308.636 139.782, 1312.712 139.664, 1316.788 139.546, 1320.864 139.428, 1324.940 139.310, 1329.016 139.192, 1333.092 139.074, 1337.168 138.956, 1341.244 138.838, 1345.320 138.720, 1349.396 138.602, 1353.472 138.484, 1357.548 138.366, 1361.624 138.248, 1365.700 138.130, 1369.776 138.012, 1373.852 137.894, 1377.928 137.776, 1382.004 137.658, 1386.080 137.540, 1390.156 137.422, 1394.232 137.304, 1398.308 137.186, 1402.384 137.068, 1406.460 136.950, 1410.536 136.832, 1414.612 136.714, 1418.688 136.596, 1422.764 136.478, 1426.840 136.360, 1430.916 136.242, 1434.992 136.124, 1439.068 136.006, 1443.144 135.888, 1447.220 135.770, 1451.296 135.652, 1455.372 135.534, 1459.448 135.416, 1463.524 135.298, 1467.600 135.180, 1471.676 135.062, 1475.752 134.944, 1479.828 134.826, 1483.904 134.708, 1487.980 134.590, 1492.056 134.472, 1496.132 134.354, 1500.208 134.236, 1504.284 134.118, 1508.360 133.999, 1512.436 133.881, 1516.512 133.763, 1520.588 133.645, 1524.664 133.527, 1528.740 133.409, 1532.816 133.291, 1536.892 133.173, 1540.968 133.055, 1545.044 132.937, 1549.120 132.819, 1553.196 132.701, 1557.272 132.583, 1561.348 132.465, 1565.424 132.347, 1569.500 132.229, 1573.576 132.111, 1577.652 131.993, 1581.728 131.875, 1585.804 131.757, 1589.880 131.639, 1593.956 131.521, 1598.032 131.403, 1602.108 131.285, 1606.184 131.167, 1610.260 131.049, 1614.336 130.931, 1618.412 130.813, 1622.488 130.695, 1626.564 130.577, 1630.640 130.459, 1634.716 130.341, 1638.792 130.223, 1642.868 130.105, 1646.944 129.987, 1651.020 129.869, 1655.096 129.751, 1659.172 129.633, 1663.248 129.515, 1667.324 129.397, 1671.400 129.279, 1675.476 129.161, 1679.552 129.043, 1683.628 128.925, 1687.704 128.807, 1691.780 128.689, 1695.856 128.571, 1699.932 128.453, 1704.008 128.335, 1708.084 128.217, 1712.160 128.099, 1716.236 127.981, 1720.312 127.863, 1724.388 127.745, 1728.464 127.627, 1732.540 127.509, 1736.616 127.391, 1740.692 127.273, 1744.768 127.155, 1748.844 127.037, 1752.920 126.919, 1756.996 126.801, 1761.072 126.683, 1765.148 126.565, 1769.224 126.447, 1773.300 126.329, 1777.376 126.211, 1781.452 126.093, 1785.528 125.975, 1789.604 125.857, 1793.680 125.739, 1797.756 125.621, 1801.832 125.503, 1805.908 125.385, 1810.000 125.267, 1814.080 125.149, 1818.160 125.031, 1822.240 124.913, 1826.320 124.795, 1830.400 124.677, 1834.480 124.559, 1838.560 124.441, 1842.640 124.323, 1846.720 124.205, 1850.800 124.087, 1854.880 123.969, 1858.960 123.851, 1863.040 123.733, 1867.120 123.615, 1871.200 123.497, 1875.280 123.379, 1879.360 123.261, 1883.440 123.143, 1887.520 123.025, 1891.600 122.907, 1895.680 122.789, 1899.760 122.671, 1903.840 122.553, 1907.920 122.435, 1912.000 122.317, 1916.080 122.199, 1920.160 122.081, 1924.240 121.963, 1928.320 121.845, 1932.400 121.727, 1936.480 121.609, 1940.560 121.491, 1944.640 121.373, 1948.720 121.255, 1952.800 121.137, 1956.880 121.019, 1960.960 120.901, 1965.040 120.783, 1969.120 120.665, 1973.200 120.547, 1977.280 120.429, 1981.360 120.311, 1985.440 120.193, 1989.520 120.075, 1993.600 119.957, 1997.680 119.839, 2001.760 119.721, 2005.840 119.603, 2009.920 119.485, 2014.000 119.367, 2018.080 119.249, 2022.160 119.131, 2026.240 119.013, 2030.320 118.895, 2034.400 118.777, 2038.480 118.659, 2042.560 118.541, 2046.640 118.423, 2050.720 118.305, 2054.800 118.187, 2058.880 118.069, 2062.960 117.951, 2067.040 117.833, 2071.120 117.715, 2075.200 117.597, 2079.280 117.479, 2083.360 117.361, 2087.440 117.243, 2091.520 117.125, 2095.600 117.007, 2099.680 116.889, 2103.760 116.771, 2107.840 116.653, 2111.920 116.535, 2116.000 116.417, 2120.080 116.299, 2124.160 116.181, 2128.240 116.063, 2132.320 115.945, 2136.400 115.827, 2140.480 115.709, 2144.560 115.591, 2148.640 115.473, 2152.720 115.355, 2156.800 115.237, 2160.880 115.119, 2164.960 114.999, 2169.040 114.881, 2173.120 114.763, 2177.200 114.645, 2181.280 114.527, 2185.360 114.409, 2189.440 114.291, 2193.520 114.173, 2197.600 114.055, 2201.680 113.937, 2205.760 113.819, 2209.840 113.701, 2213.920 113.583, 2218.000 113.465, 2222.080 113.347, 2226.160 113.229, 2230.240 113.111, 2234.320 112.993, 2238.400 112.875, 2242.480 112.757, 2246.560 112.639, 2250.640 112.521, 2254.720 112.403, 2258.800 112.285, 2262.880 112.167, 2266.960 112.049, 2271.040 111.931, 2275.120 111.813, 2279.200 111.695, 2283.280 111.577, 2287.360 111.459, 2291.440 111.341, 2295.520 111.223, 2299.600 111.105, 2303.680 110.987, 2307.760 110.869, 2311.840 110.751, 2315.920 110.633, 2320.000 110.515, 2324.080 110.397, 2328.160 110.279, 2332.240 110.161, 2336.320 110.043, 2340.400 109.925, 2344.480 109.807, 2348.560 109.689, 2352.640 109.571, 2356.720 109.453, 2360.800 109.335, 2364.880 109.217, 2368.960 109.099, 2373.040 108.981, 2377.120 108.863, 2381.200 108.745, 2385.280 108.627, 2389.360 108.509, 2393.440 108.391, 2397.520 108.273, 2401.600 108.155, 2405.680 108.037, 2409.760 107.919, 2413.840 107.801, 2417.920 107.683, 2422.000 107.565, 2426.080 107.447, 2430.160 107.329, 2434.240 107.211, 2438.320 107.093, 2442.400 106.975, 2446.480 106.857, 2450.560 106.739, 2454.640 106.621, 2458.720 106.503, 2462.800 106.385, 2466.880 106.267, 2470.960 106.149, 2475.040 106.031, 2479.120 105.913, 2483.200 105.795, 2487.280 105.677, 2491.360 105.559, 2495.440 105.441, 2499.520 105.323, 2503.600 105.205, 2507.680 105.087, 2511.760 104.969, 2515.840 104.851, 2519.920 104.733, 2524.000 104.615, 2528.080 104.497, 2532.160 104.379, 2536.240 104.261, 2540.320 104.143, 2544.400 104.025, 2548.480 103.907, 2552.560 103.789, 2556.640 103.671, 2560.720 103.553, 2564.800 103.435, 2568.880 103.317, 2572.960 103.199, 2577.040 103.081, 2581.120 102.963, 2585.200 102.845, 2589.280 102.727, 2593.360 102.609, 2597.440 102.491, 2601.520 102.373, 2605.600 102.255, 2609.680 102.137, 2613.760 102.019, 2617.840 101.901, 2621.920 101.783, 2626.000 101.665, 2630.080 101.547, 2634.160 101.429, 2638.240 101.311, 2642.320 101.193, 2646.400 101.075, 2650.480 100.957, 2654.560 100.839, 2658.640 100.721, 2662.720 100.603, 2666.800 100.485, 2670.880 100.367, 2674.960 100.249, 2679.040 100.131, 2683.120 100.013, 2687.200 99.895, 2691.280 99.777, 2695.360 99.659, 2699.440 99.541, 2703.520 99.423, 2707.600 99.305, 2711.680 99.187, 2715.760 99.069, 2719.840 98.951, 2723.920 98.833, 2728.000 98.715, 2732.080 98.597, 2736.160 98.479, 2740.240 98.361, 2744.320 98.243, 2748.400 98.125, 2752.480 98.007, 2756.560 97.889, 2760.640 97.771, 2764.720 97.653, 2768.800 97.535, 2772.880 97.417, 2776.960 97.299, 2781.040 97.181, 2785.120 97.063, 2789.200 96.945, 2793.280 96.827, 2797.360 96.709, 2801.440 96.591, 2805.520 96.473, 2809.600 96.355, 2813.680 96.237, 2817.760 96.119, 2821.8

198.011 181.535 199.312 181.753 201.287 181.903 202.355 181.98 203.187 182.037
 203.677 182.073 204.319 182.116 204.365 182.12 204.547 182.128 204.758 182.161
 206.666 182.297 209.589 182.522 213.716 182.869 215.607 182.917 216.477 183.057
 222.945 183.52 224.569 183.641 225.166 183.68 225.692 183.719 226.287 183.742
 228.637 183.831 231.856 183.938 232.172 183.943 232.432 183.993 234.1 184.027
 236.092 184.079 237.233 184.112 241.403 184.243 241.669 184.242 245.903 184.234
 249.327 184.398 249.893 184.406 250.184 184.405 250.632 184.41 251.165 184.415
 251.98 184.514 252.823 184.482 255.713 184.437 258.67 184.44

Manning's n Values Sta n Val num= 3
 Sta n Val Sta n Val
 0 .35 124.51 .025 144.482 .35
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Cent. Expan.
 124.51 144.462 29.82 29.82 29.82 29.82

CROSS SECTION OUTPUT Profile #10042 Wolland

Sta	Elev (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Slope (m/m)	Q Total (m ³ /s)	Top Width (m)	Vel Local (m/s)	Max Chl Dpth (m)	Conv. Total (m ² /s)	Langh Wcd. (m)	Wing Ch Sl (m)	Alpha	Frict Loss (m)	C E Loss (m)	Left OB	Right OB	Channel	Right OB
0	175.78	175.78	175.78	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
10	176.488	176.488	176.488	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
20	177.182	177.182	177.182	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
30	177.876	177.876	177.876	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
40	178.570	178.570	178.570	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
50	179.264	179.264	179.264	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
60	179.958	179.958	179.958	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
70	180.652	180.652	180.652	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
80	181.346	181.346	181.346	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
90	182.040	182.040	182.040	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
100	182.734	182.734	182.734	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
110	183.428	183.428	183.428	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
120	184.122	184.122	184.122	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
130	184.816	184.816	184.816	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
140	185.510	185.510	185.510	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
150	186.204	186.204	186.204	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
160	186.898	186.898	186.898	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
170	187.592	187.592	187.592	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
180	188.286	188.286	188.286	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
190	188.980	188.980	188.980	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
200	189.674	189.674	189.674	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
210	190.368	190.368	190.368	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
220	191.062	191.062	191.062	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
230	191.756	191.756	191.756	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
240	192.450	192.450	192.450	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
250	193.144	193.144	193.144	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
260	193.838	193.838	193.838	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
270	194.532	194.532	194.532	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
280	195.226	195.226	195.226	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
290	195.920	195.920	195.920	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
300	196.614	196.614	196.614	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
310	197.308	197.308	197.308	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
320	198.002	198.002	198.002	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
330	198.696	198.696	198.696	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
340	199.390	199.390	199.390	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
350	200.084	200.084	200.084	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
360	200.778	200.778	200.778	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
370	201.472	201.472	201.472	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
380	202.166	202.166	202.166	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
390	202.860	202.860	202.860	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
400	203.554	203.554	203.554	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
410	204.248	204.248	204.248	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
420	204.942	204.942	204.942	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
430	205.636	205.636	205.636	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
440	206.330	206.330	206.330	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
450	207.024	207.024	207.024	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
460	207.718	207.718	207.718	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
470	208.412	208.412	208.412	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
480	209.106	209.106	209.106	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
490	209.800	209.800	209.800	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350
500	210.494	210.494	210.494	0.000146	15.67	15.67	0.45	2.09	1292.9	29.82	173.97	1.65	0.00	0.00	0.350	0.350	0.350	0.350

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
112.855	175.798	113.043	172.808	113.205	175.801	113.366	175.824	114.74	175.855		
114.902	175.859	114.982	175.868	115.31	175.875	116.06	175.888	117.648	175.9		
118.162	175.911	119.223	175.916	119.767	175.922	119.866	175.906	120.234	175.933		
121.06	175.909	121.247	175.909	123.609	175.909	123.815	175.918	124.83	175.889		
125.539	175.827	126.339	175.845	127.011	175.855	127.684	175.865	128.394	175.859		
128.71	175.861	130.252	175.873	133.134	175.848	134.574	175.833	136.994	175.812		
137.091	175.812	137.262	175.805	137.561	175.813	138.16	175.8	138.876	175.796		
140.663	175.75	140.422	175.659	140.53	175.632	142.442	175.108	143.413	174.918		
145.491	174.166	146.273	173.959	146.334	173.929	147.102	173.668	147.436	173.674		
150.462	173.684	151.28	173.759	154.089	174.211	155.28	174.314	155.931	174.384		
158.388	175.133	159.4	175.307	160.11	175.411	161.458	175.629	161.666	175.46		
164.32	175.664	164.8	175.891	165.304	175.906	165.326	175.919	165.39	175.923		
166.736	176.024	167.156	176.066	168.394	175.182	172.394	176.531	176.023	176.879		
171.816	176.954	177.812	177.041	178.439	177.05	179.127	177.145	180.016	177.27		
184.023	176.538	186.433	177.755	186.674	177.782	186.738	177.791	186.775	177.8		
186.895	177.81	187.489	177.963	189.459	175.028	194.599	178.522	196.758	178.729		
196.975	178.749	197.347	178.806	197.657	178.816	197.882	178.842	198.858	178.89		
199.27	178.98	199.898	179.03	200.818	179.117	201.472	178.16	202.766	179.307		
205.466	178.737	206.223	178.547	206.547	179.696	206.741	179.941	207.054	179.937		
208.151	180.157	208.684	180.242	217.324	181.606	217.68	181.693	219.55	181.993		
220.131	182.102	221.591	182.362	223.709	182.462	224.808	182.522	225.784	182.564		
226.318	182.591	227.019	182.623	227.07	182.627	227.268	182.644	227.459	182.666		
229.583	182.768	232.776	182.929	237.223	183.209	239.236	183.266	240.259	183.270		
241.363	183.723	249.245	183.821	249.789	183.85	250.362	183.879	251.014	183.901		
251.829	183.989	257.095	184.084	257.432	184.084	258.835	184.137	259.797	184.169		
261.721	184.224	262.967	184.259	267.521	184.377	267.813	184.384	272.427	184.497		
276.175	184.511	276.784	184.589	277.111	184.586	277.661	184.565	278.183	184.569		
278.074	184.572	279.595	184.58	283.152	184.596	286.38	184.61				

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
56.62	177.8	57.18	177.78	58.17	177.75	58.58	177.72	63.82	177.47		
64.89	177.46	65.44	177.47	66.59	177.46	67.28	177.45	68.08	177.43		
68.8	177.27	69.76	177.34	70.67	177.34	71.46	177.34	74.98	177.05		
75.79	177.06	76.58	177.01	78.58	176.84	80.62	176.85	81.34	176.75		
82.94	176.67	83.55	176.66	84.9	176.45	85.85	176.33	86.92	176.27		
87.98	176.21	88.48	176.16	89.21	176.13	89.61	176.11	90.36	176.03		
91.08	175.97	91.5	175.91	92.20	175.84	92.68	175.79	93.46	175.73		
94.72	175.72	94.65	175.69	94.88	175.66	95.07	175.65	96.07	175.63		
96.22	175.62	97.28	175.61	98.25	175.58	99.34	175.58	100.25	175.56		
101.22	175.59	102.53	175.57	103.56	175.58	104.59	175.58	105.85	175.61		
103.7	175.62	104.75	175.63	105.75	175.67	106.9	175.68	108.83	175.67		
107.05	175.68	107.95	175.69	109.83	175.76	110.93	175.78	113.31	175.75		
114.21	175.68	114.68	175.77	115.3	175.78	115.82	175.8	116.42	175.81		
117.63	175.82	117.98	175.83	118.19	175.84	118.59	175.85	121.24	175.86		
121.78	175.84	121.92	175.86	122.16	175.87	125.72	175.94	124.53	175.95		
126.31	175.95	126.98	175.97	128	175.99	128.05	176	128.29	176.02		
131.96	176.03	132.2	176.04	133.42	176.03	134.53	176.01	134.94	176.01		
134.86	176.03	137.7	176.02	137.93	176.03	139.06	175.99	139.85	175.91		
140.74	175.93	141.48	175.94	142.24	175.95	143.03	175.94	145.1	175.95		
152.6	175.85	152.91	175.84	153.02	175.85	153.91	175.93	156.03	175.81		
156.43	175.71	156.55	175.68	158.58	175.16	159.45	174.86	161.64	174.16		
162.3	174.97	163.15	173.66	163.52	173.67	170.14	173.69	171.53	174.22		
171.95	174.34	172.22	174.42	173.32	174.28	176.41	173.47	178.81	175.83		
181.73	176	182.25	176.02	182.58	176.01	182.82	176.04	184.33	176.13		
184.42	177.01	185.28	177.09	186.36	177.18	187.04	177.23	188.75	177.35		
203.16	177.59	205.73	177.92	205.97	177.85	206.04	177.96	206.08	177.97		
206.21	177.98	208.99	178.22	217.14	178.57	217.75	179.03	217.88	179.14		
218.13	179.07	218.75	179.12	223.42	178.56	226.37	180.04	227.56	180.07		
227.52	180.23	227.73	180.27	228.07	180.32	229.27	180.51	238.99	182.13		
241.62	182.55	242.25	182.67	243.79	182.93	245.13	181.02	247.43	181.06		
248.98	183.69	248.96	183.11	249.72	183.13	249.89	183.15	250.74	183.17		
252.5	183.24	260.85	183.57	264.12	183.69	271.78	183.94	275.74	184.06		
282.71	184.24	287.35	184.37	293.64	184.54	299.57	184.66	302.51	184.72		
310.99	184.76	314.08	184.78								

Manning's n Values num= 3

CROSS SECTION OUTPUT Profile #1007 Welland

E.G. Elev (m) * 175.77 * Element * 0.350

Vel Head (m) * 0.02 * n-Val. * 29.82 * Channel * Right * 0.350

M.S. Elev (m) * 175.76 * Reach Len. (m) * 29.82 * 29.82

Crit N.S. (m) * 0.000144 * Flow Area (m2) * 4.53 * 27.62

E.G. Slope (m/m) * 15.67 * Area (m2) * 4.53 * 27.62

Top Width (m) * 31.62 * Flow (m3/s) * 0.05 * 15.62 * 0.00

Top Total (m) * 0.49 * Top Width (m) * 29.21 * 21.12 * 1.28

Max Ch Depth (m) * 2.09 * Hydr. Depth (m) * 0.01 * 1.31 * 0.05

Conv. Total (m3/s) * 1103.7 * Conv. (m3/s) * 3.8 * 1259.9 * 0.0

Length Wid. (m) * 29.82 * Wetted Per. (m) * 29.24 * 21.65 * 1.29

Alpha * 1.35 * Stream Power (N/m s) * 0.22 * 1.81 * 0.07

Fretch Loss (m) * 0.00 * Cum Volume (1000 m3) * 0.10 * 1.02 * 0.00

C & E Loss (m) * 0.00 * Cum SA (1000 m2) * 1.24 * 14.61 * 0.02

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RAVER: SOUTH-CREEK num= 202

REACH: 1

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

D 178.88 2.47 179.78 3.62 179.75 6.62 179.49 14.19 179.15

14.25 179.16 16.29 179.14 14.32 179.13 14.34 179.16 16.37 179.15

14.39 179.14 16.42 179.15 14.44 179.14 14.45 179.15 16.46 179.13

25.62 178.53 24.83 178.52 25.17 178.5 25.53 178.49 25.81 178.48

25.82 178.49 26.51 178.47 35.88 178.28 36.71 178.29 36.93 178.29

38.52 178.24 46.63 178.00 50.54 177.99 53.95 177.84 55.15 177.82

RAVER: SOUTH-CREEK num= 202

REACH: 1

Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

D 178.88 2.47 179.78 3.62 179.75 6.62 179.49 14.19 179.15

14.25 179.16 16.29 179.14 14.32 179.13 14.34 179.16 16.37 179.15

14.39 179.14 16.42 179.15 14.44 179.14 14.45 179.15 16.46 179.13

25.62 178.53 24.83 178.52 25.17 178.5 25.53 178.49 25.81 178.48

25.82 178.49 26.51 178.47 35.88 178.28 36.71 178.29 36.93 178.29

38.52 178.24 46.63 178.00 50.54 177.99 53.95 177.84 55.15 177.82

Number of Culverts = 1

Culvert Name Shape Size Span
 Culvert #1 Circular 2
 FWA Chart # 2 - Ductile Metal Pipe Culvert
 Solution Criteria - Highest U.S. ZC
 Culvert Upstream Dist 48 Top n Bottom n Depth Blocked Entrance Loss Coef Exit Loss Coef
 1 .019 0 .5

Number of Barrels = 2
 Upstream Elevation = 173.36
 Centerline Stations
 Sta. 165
 Downstream Elevation = 173.36
 Centerline Stations
 Sta. 165

CULVERT OUTPUT PROFILE #100VI Welland Cuvl Group: Culvert #1

Q Cuvl Group (m ³ /s)	15.91	Cuvl Full Len (m)	7.58
# Barrels	2	Cuvl Vel US (m/s)	3.68
S.G. DS (m)	173.77	Cuvl Inv El Up (m)	173.36
W.S. DS (m)	173.71	Cuvl Fractn LS (m)	0.26
Delta DS (m)	2.06	Cuvl Exit Loss (m)	0.17
Delta US (m)	2.07	Wair Sta L&C (m)	
E.G. OC (m)	173.77	Wair Sta Rgt (m)	
E.G. OC (m)	173.77	Wair Submrg	
Culvert Control	Outlet	Wair Max Depth (m)	
Culv MS Inlet (m)	173.26	Wair Avg Depth (m)	
Culv MS Outlet (m)	174.73	Wair Flow Area (m ²)	
Culv Max Depth (m)	1.37	Min El. Wair Flow (m)	177.82

CROSS SECTION

RIVER: SOUTH-CREEK
 REACH: 1 RS: 5.1

INPUT
 Description: Station Elevation 0.64 num= 3
 Sta Elev Sta Elev Sta Elev
 0 173.63 9.68 173.64 457.93 173.64
 Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .35 0 .025 457.93 .35
 Bank Slo: Left Right Coef Contr. Depan.
 0 457.93 .1 .3

CROSS SECTION OUTPUT Profile #100VI Welland

E.G. Elev (m)	173.71	Element	Channel	Right OS
Vel Head (m)	0.03	Wc. n-Val.		
W.S. Elev (m)	173.69	Reach Len. (m)		
Crit W.S. (m)	173.69	Flow Area (m ²)	22.39	
E.G. Slope (m/m)	0.017647	Area (m ²)	22.39	
Q Total (m ³ /s)	15.91	Flow (m ³ /s)	15.91	
Top Width (m)	457.93	Top Width (m)	457.93	
Vel Total (m/s)	0.71	Avg. Vel. (m/s)	0.71	
Max Chl Depth (m)	0.66	Rydz. Depth (m)	0.05	
Conv. Total (m ³ /s)	119.8	Conv. (m ³ /s)	119.8	
Length Wed. (m)		Wetted Per. (m)	458.04	
Min Chl El (m)	173.53	Shear (N/m ²)	9.46	
Alpha	1.00	Stream Power (N/m s)	6.03	
Frctn Loss (m)		Cum Volume (1000 m ³)		
C & E Loss (m)		Cum SA (1000 m ²)		