
Bushkill Creek at U.S. Route 209

PIKE COUNTY, PENNSYLVANIA

**HYDROLOGICAL AND HYDRAULICS
ANALYSIS REPORT**

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I. INTRODUCTION

1.1 Objective and Scope

The purpose of this study is to perform hydrological and hydraulic analyses for Bushkill Creek at U.S. Route 209, located in Bushkill, Pike County, Pennsylvania.

1.2 Project Description

The project site is shown in Figure 1.

1.3 Previous Studies

According to a review of FEMA flood insurance rate maps (FEMA Panel No. 42103C0510C, there is no detailed study was performed for Bushkill Creek in the study area. The FEMA map is shown in Appendix E.

1.4 Reference Datum

The North American Vertical Datum (NAVD) of 1988 was used in this project.

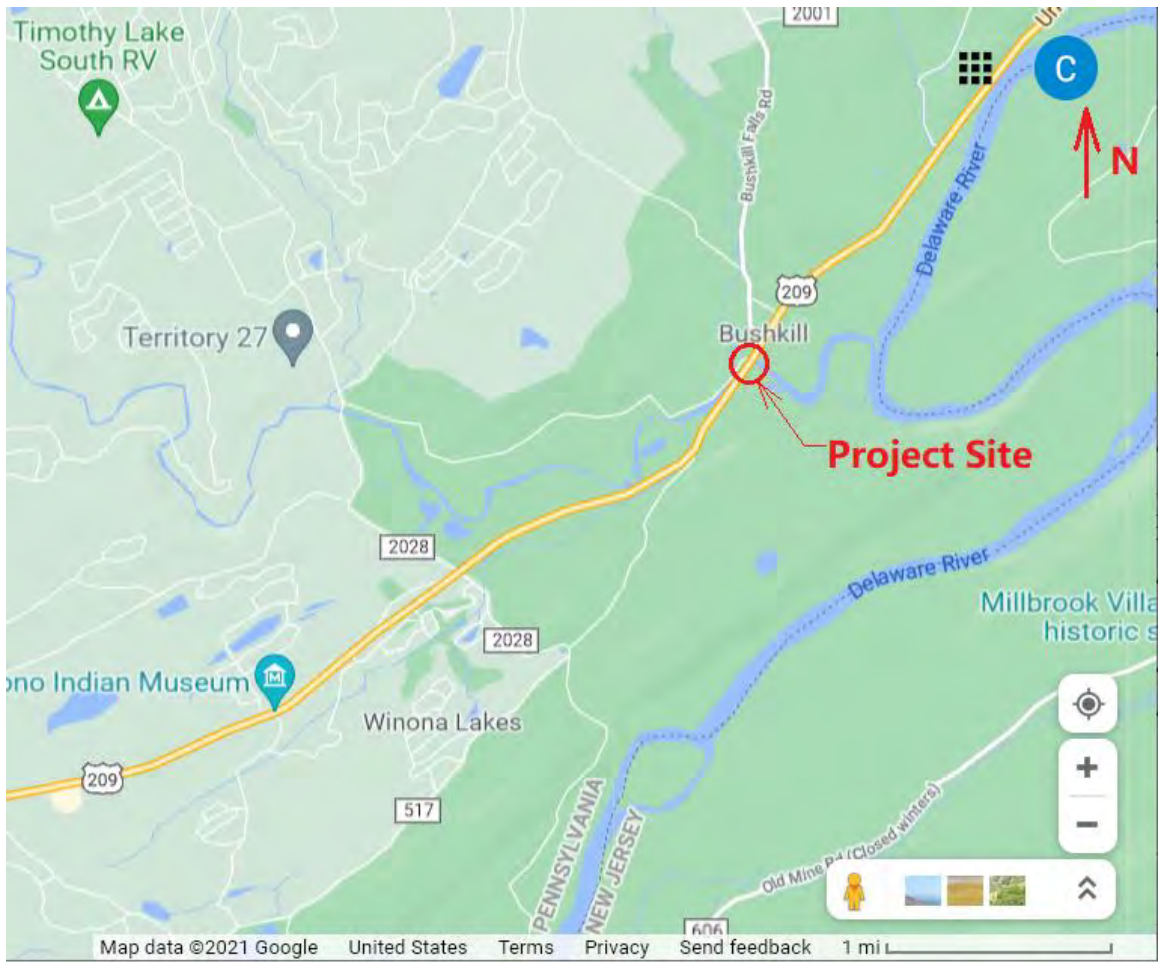


Figure 1. Location Map



Figure 2. Vicinity Map

II. HYDROLOGY ANALYSIS

2.1 Watershed

The Bushkill Creek watershed area to the project site is 157 square miles. The watershed was determined using USGS StreamStats website. The drainage area is shown in Appendix A.

2.2 Preferred Hydrology

According to the 2015 “*PennDOT Drainage Manual*”, Section 7.3.H, “If a design flow rate is being computed for a location on the same "main stem" of a stream within 0.5 to 1.5 times the gage's basin area, stream gage records shall be used to compute design or flood discharges. The hydrologic analysis for the gage should follow the suggestions of Bulletin 17B, Guidelines for Determining Flood Frequency (U.S. Water Resources Council, 1982)”.

There is a USGS gage station located on Bushkill Creek. The watershed area of Bushkill Creek at the gage station is 117 square miles. The gage has continuous hydrological record from 1909 to date. Therefore, the USGS gage data was used to compute the peak discharges at the project site. The USGS's computer program PEAKFQ was used to perform the analysis. The peak discharges and Flood-Frequency Curve at the project site are presented in Table 1 and Figure 3. The USGS gage data and PEAKFQ analysis result are presented in Appendix A.

Table 1. Bushkill Creek Peak Discharges at U.S. Route 209

Return Period (years)	Peak Discharge (cfs)
2	2435
10	5279
25	7593
50	9839
100	12630
500	21976

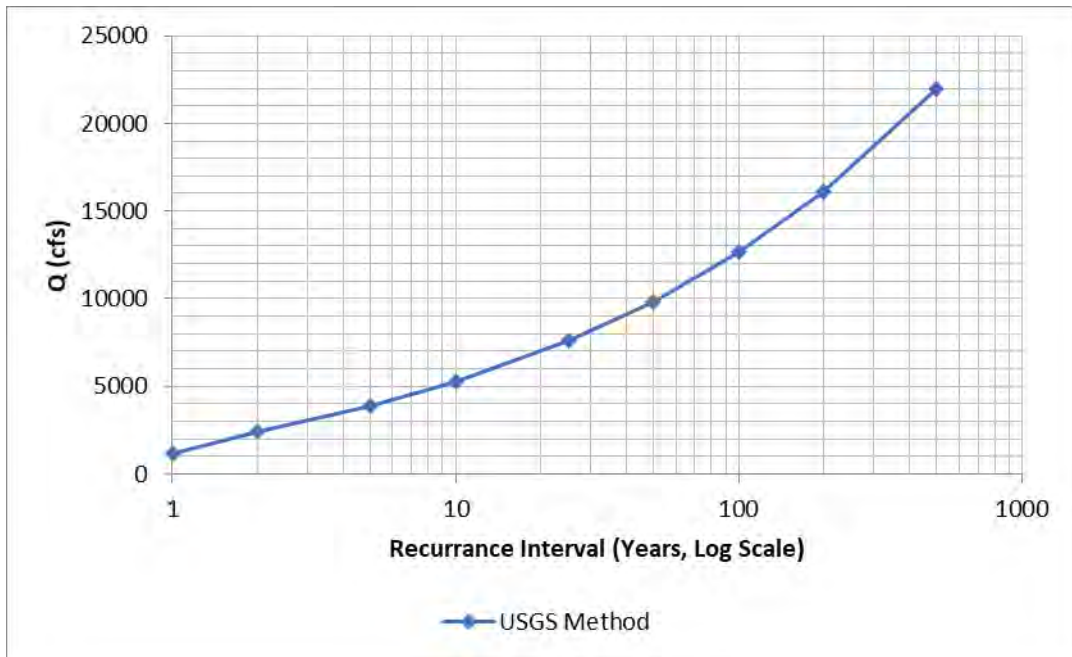


Figure 3. Flood-Frequency Curve

III. HYDRAULIC ANALYSIS

3.1 Objectives

The objectives of the analysis are to evaluate the hydraulic condition for Bushkill Creek at the project site and determine water surface profiles for the existing condition for the 2, 10, 25, 50, and 100-year storm events.

3.2 Methodology and Input Data

The water surface profiles were computed using the Hydrologic Engineering Center's River Analysis System computer program (HEC-RAS 6.0.0). The HEC-RAS program was designed to perform one-dimensional hydraulic analysis, and it has the ability to perform subcritical, supercritical, and mixed flow regime calculations.

Data used to develop the HEC-RAS model include cross-sections, Manning's n values, loss coefficients, structure type and dimensions, roadway profile, and boundary conditions.

Initially the selection of the flow regime was addressed since the boundary conditions to be imposed are related to the flow regime. A model of mixed flow regime was conducted to check if supercritical flow exists. The result showed that subcritical flow is predominant. Hydraulic analysis for subcritical flow computations was performed.

3.2.1 Cross Section Data

Twenty-one (21) representative cross-sections for Bushkill Creek were used to develop the HEC-RAS model. They were based on a 1-foot contour mapping and field survey information. Due to high flows and on-going construction at the US 209 bridge crossing of Bushkill Creek, bathymetric survey of the channel sections was not completed. The cross-sections were coded from left to right facing downstream. The analyzed reach extends approximately 2,585 feet.

3.2.2 Boundary Conditions

For subcritical flow regime computation, the starting water surface elevation at the downstream boundary needs to be specified. In the models, the starting water surface elevations at the downstream boundary were specified based on the stream slopes at the downstream boundary.

Peak discharges based on analyzing USGS gage data were specified at the most upstream cross-section.

3.2.3 Manning's Roughness Coefficients

Roughness coefficient guidelines in the *HEC-RAS Hydraulic Reference Manual* were utilized in estimating Manning's ' n ' values. The ' n ' values are described as follows:

Channels:	(1) 0.035 – 0.050	Clean, winding, some pools, shoals, weeds, and stones
	(2) 0.045 – 0.060	Same as above, but more stones
	(2) 0.050 – 0.080	Sluggish reaches, weedy, deep pools
Floodplains:	(1) 0.040 – 0.080	Light brush and trees, in summer
	(2) 0.070 – 0.160	Medium to dense brush, in summer

The Manning's 'n' value used for the channel ranges from 0.035 to 0.05. The Manning's 'n' value was selected based on channel conditions such as stream surface materials, pools, weeds, and debris jams. The 'n' value used for the floodplain ranges from 0.08 to 0.10 which was based on the full growth season.

3.2.4 Energy Loss Coefficients

Several loss coefficients are used to evaluate energy losses in the HEC-RAS model. They are

- Manning's 'n' value for friction loss;
- Contraction and expansion coefficients;
- Structure loss coefficients to evaluate losses related to weir shape, and pressure flow.

Friction losses are calculated using the Manning's equation. Losses due to the contraction and expansion of flow between cross-sections are determined according to

$$h_{ce} = C \left| \frac{\alpha_1 V_1^2}{2g} - \frac{\alpha_2 V_2^2}{2g} \right|$$

in which, C = contraction or expansion loss coefficient; V_1, V_2 = average velocities; α_1, α_2 = velocity weighting coefficients. Contraction and expansion coefficients of 0.1 and 0.3 were used where the change in river cross-section is gradual. At the bridge, coefficients of 0.3 and 0.5 were used to account for the large contraction and expansion losses.

3.3 Hydraulic Modeling for Existing Condition

The study reach for Bushkill Creek is approximately 2,585 feet long, modeled using twenty-one (21) cross-sections. As stated above, the input data for the cross-sections were based on a 1-foot contour mapping and field survey information.

The existing bridge of Route 209, located between Cross Sections 7 and 8, is three span concrete slab bridge with a total length of 189.5 feet and a width of 44.2 feet. The elevation of the bridge low chord is 357.1 feet at the left abutment, and 356.1 at the right abutment (facing downstream). The abutments are vertical with wingwalls. The roadway elevation at the bridge varies from 360 to 361 feet. The underclearance at the thalweg is approximately 11 to 12 feet.

3.4 Hydraulic Modeling for Erosion & Sediment Maintenance Condition

A plan for erosion & sediment maintenance has been proposed under the Project NP_DEWA 14(18), 121(1). With the plan, sediments in some areas will be removed and the piers of the existing Route 209 bridge will be protected with riprap. The plan is presented in Appendix C. The erosion & sediment maintenance condition is modeled by modifying the existing condition HEC-RAS model based on the proposed erosion & sediment maintenance plan.

3.5 Hydraulic Modeling Results

The hydraulic models for the existing and erosion & sediment maintenance conditions were run with the peak discharges from USGS gage data analysis. Table 2 presents the hydraulic analysis results for the 2, 10, 25, 50, and 100-year events. The differences of the 100-year water surface elevations between the existing and erosion & sediment maintenance conditions are minor. The model results show the Route 209 bridge can pass the 100-year flood flow. However, the south approach roadway is flooded by the 10-year flood. The 100-year floodplain map is presented in Appendix D. The Little Bushkill Creek joins Bushkill Creek between Cross Section 9 and Cross Section 12 on the left side (facing downstream). The floodplain boundary between Cross Section 9 and Cross Section 12 on the left side is left open to represent it. A 100-year floodplain map including FEMA map is also presented.

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	21	2-yr	Maintenance	2435.00	357.64	361.32	360.45	361.75	0.004208	5.34	490.66	195.40	0.57
Main	21	2-yr	Existing	2435.00	357.64	361.32	360.45	361.75	0.004208	5.34	490.66	195.40	0.57
Main	21	10-yr	Maintenance	5279.00	357.64	362.87	361.71	363.61	0.004178	7.15	898.20	341.14	0.61
Main	21	10-yr	Existing	5279.00	357.64	362.87	361.71	363.61	0.004178	7.15	898.20	341.14	0.61
Main	21	25-yr	Maintenance	7593.00	357.64	363.89	362.66	364.76	0.003836	7.91	1393.40	668.39	0.61
Main	21	25-yr	Existing	7593.00	357.64	363.89	362.66	364.76	0.003836	7.91	1393.40	668.39	0.61
Main	21	50-yr	Maintenance	9839.00	357.64	364.38	363.62	365.52	0.004578	9.16	1743.40	764.65	0.67
Main	21	50-yr	Existing	9839.00	357.64	364.38	363.62	365.52	0.004578	9.16	1743.40	764.65	0.67
Main	21	100-yr	Maintenance	12630.00	357.64	364.98	364.03	366.26	0.004785	10.01	2218.72	804.11	0.70
Main	21	100-yr	Existing	12630.00	357.64	364.98	364.03	366.26	0.004785	10.01	2218.72	804.11	0.70
Main	20	2-yr	Maintenance	2435.00	356.37	360.07	359.16	360.46	0.005642	5.91	581.62	228.65	0.65
Main	20	2-yr	Existing	2435.00	356.37	360.07	359.16	360.46	0.005642	5.91	581.62	228.65	0.65
Main	20	10-yr	Maintenance	5279.00	356.37	361.69	360.34	362.37	0.005217	7.85	1116.96	493.07	0.68
Main	20	10-yr	Existing	5279.00	356.37	361.69	360.34	362.37	0.005217	7.85	1116.96	493.07	0.68
Main	20	25-yr	Maintenance	7593.00	356.37	362.53	360.63	363.51	0.005932	9.48	1652.61	707.70	0.75
Main	20	25-yr	Existing	7593.00	356.37	362.53	360.63	363.51	0.005932	9.48	1652.61	707.70	0.75
Main	20	50-yr	Maintenance	9839.00	356.37	363.17	361.77	364.16	0.005506	9.90	2113.06	743.61	0.74
Main	20	50-yr	Existing	9839.00	356.37	363.17	361.77	364.16	0.005506	9.90	2113.06	743.61	0.74
Main	20	100-yr	Maintenance	12630.00	356.37	363.87	362.05	364.88	0.005188	10.39	2641.93	770.74	0.73
Main	20	100-yr	Existing	12630.00	356.37	363.87	362.05	364.88	0.005188	10.39	2641.93	770.74	0.73
Main	19	2-yr	Maintenance	2435.00	354.91	358.94	357.50	359.33	0.002699	5.04	516.91	203.49	0.48
Main	19	2-yr	Existing	2435.00	354.91	358.94	357.50	359.33	0.002699	5.04	516.91	203.49	0.48
Main	19	10-yr	Maintenance	5279.00	354.91	360.43	359.16	361.13	0.003390	7.01	1072.61	511.06	0.56
Main	19	10-yr	Existing	5279.00	354.91	360.43	359.16	361.13	0.003390	7.01	1072.61	511.06	0.56
Main	19	25-yr	Maintenance	7593.00	354.91	361.42	360.41	362.20	0.003195	7.70	1693.14	699.49	0.56
Main	19	25-yr	Existing	7593.00	354.91	361.42	360.41	362.20	0.003195	7.70	1693.14	699.49	0.56
Main	19	50-yr	Maintenance	9839.00	354.91	361.95	361.22	362.86	0.003532	8.58	2067.87	709.62	0.60
Main	19	50-yr	Existing	9839.00	354.91	361.95	361.22	362.86	0.003532	8.58	2067.87	709.62	0.60
Main	19	100-yr	Maintenance	12630.00	354.91	362.55	361.91	363.60	0.003789	9.45	2510.70	748.92	0.63
Main	19	100-yr	Existing	12630.00	354.91	362.55	361.91	363.60	0.003789	9.45	2510.70	748.92	0.63
Main	18	2-yr	Maintenance	2435.00	354.21	357.80	357.22	358.40	0.005014	6.48	522.42	336.43	0.64
Main	18	2-yr	Existing	2435.00	354.21	357.80	357.22	358.40	0.005014	6.48	522.42	336.43	0.64
Main	18	10-yr	Maintenance	5279.00	354.21	359.08	358.72	360.01	0.005733	8.68	1027.69	462.06	0.72
Main	18	10-yr	Existing	5279.00	354.21	359.08	358.72	360.01	0.005733	8.68	1027.69	462.06	0.72
Main	18	25-yr	Maintenance	7593.00	354.21	359.86	359.46	361.06	0.006263	10.09	1469.97	646.44	0.78

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	18	25-yr	Existing	7593.00	354.21	359.86	359.46	361.06	0.006263	10.09	1469.97	646.44	0.78
Main	18	50-yr	Maintenance	9839.00	354.21	360.58	360.34	361.74	0.005578	10.38	1948.02	679.05	0.75
Main	18	50-yr	Existing	9839.00	354.21	360.58	360.34	361.74	0.005578	10.38	1948.02	679.05	0.75
Main	18	100-yr	Maintenance	12630.00	354.21	361.38	360.85	362.51	0.005005	10.68	2493.90	693.54	0.72
Main	18	100-yr	Existing	12630.00	354.21	361.38	360.85	362.51	0.005005	10.68	2493.90	693.54	0.72
Main	17	2-yr	Maintenance	2435.00	353.13	356.25	356.19	357.12	0.010591	7.67	377.39	254.47	0.88
Main	17	2-yr	Existing	2435.00	353.13	356.25	356.19	357.12	0.010591	7.67	377.40	254.47	0.88
Main	17	10-yr	Maintenance	5279.00	353.13	358.06	357.47	358.98	0.005999	8.28	969.36	564.01	0.73
Main	17	10-yr	Existing	5279.00	353.13	358.06	357.47	358.98	0.005999	8.28	969.36	564.01	0.73
Main	17	25-yr	Maintenance	7593.00	353.13	359.14	357.98	360.02	0.004632	8.53	1579.46	803.86	0.67
Main	17	25-yr	Existing	7593.00	353.13	359.14	357.98	360.02	0.004632	8.53	1579.46	803.86	0.67
Main	17	50-yr	Maintenance	9839.00	353.13	359.93	359.24	360.82	0.004133	8.87	2075.49	947.63	0.64
Main	17	50-yr	Existing	9839.00	353.13	359.93	359.24	360.82	0.004133	8.87	2075.49	947.63	0.64
Main	17	100-yr	Maintenance	12630.00	353.13	360.80	359.79	361.69	0.003669	9.16	2668.17	993.26	0.62
Main	17	100-yr	Existing	12630.00	353.13	360.80	359.79	361.69	0.003669	9.16	2668.17	993.26	0.62
Main	16	2-yr	Maintenance	2435.00	351.56	355.80	354.57	356.26	0.003313	5.45	470.14	199.25	0.52
Main	16	2-yr	Existing	2435.00	351.56	355.80	354.57	356.26	0.003313	5.45	470.14	199.24	0.52
Main	16	10-yr	Maintenance	5279.00	351.56	357.74	356.30	358.36	0.002737	6.68	1182.09	800.37	0.51
Main	16	10-yr	Existing	5279.00	351.56	357.74	356.30	358.36	0.002737	6.68	1182.09	800.37	0.51
Main	16	25-yr	Maintenance	7593.00	351.56	358.83	357.48	359.51	0.002541	7.29	1726.83	1011.09	0.51
Main	16	25-yr	Existing	7593.00	351.56	358.83	357.48	359.51	0.002541	7.29	1726.83	1011.09	0.51
Main	16	50-yr	Maintenance	9839.00	351.56	359.57	358.15	360.35	0.002645	8.01	2117.69	1039.63	0.53
Main	16	50-yr	Existing	9839.00	351.56	359.57	358.15	360.35	0.002645	8.01	2117.69	1039.63	0.53
Main	16	100-yr	Maintenance	12630.00	351.56	360.38	358.87	361.26	0.002744	8.76	2554.67	1091.33	0.55
Main	16	100-yr	Existing	12630.00	351.56	360.38	358.87	361.26	0.002744	8.76	2554.67	1091.33	0.55
Main	15	2-yr	Maintenance	2435.00	350.76	355.34	353.84	355.89	0.003198	5.96	426.01	156.34	0.53
Main	15	2-yr	Existing	2435.00	350.76	355.34	353.84	355.89	0.003198	5.96	426.01	156.34	0.53
Main	15	10-yr	Maintenance	5279.00	350.76	356.85	356.04	357.93	0.004616	8.63	864.30	497.42	0.66
Main	15	10-yr	Existing	5279.00	350.76	356.85	356.04	357.93	0.004616	8.63	864.30	497.42	0.66
Main	15	25-yr	Maintenance	7593.00	350.76	357.43	357.43	359.00	0.006136	10.67	1123.54	763.09	0.78
Main	15	25-yr	Existing	7593.00	350.76	357.43	357.43	359.00	0.006136	10.67	1123.54	763.09	0.78
Main	15	50-yr	Maintenance	9839.00	350.76	358.17	358.17	359.84	0.005978	11.40	1484.24	964.40	0.78
Main	15	50-yr	Existing	9839.00	350.76	358.17	358.17	359.84	0.005978	11.40	1484.24	964.40	0.78
Main	15	100-yr	Maintenance	12630.00	350.76	358.84	358.84	360.72	0.006297	12.47	1814.44	1053.45	0.82
Main	15	100-yr	Existing	12630.00	350.76	358.84	358.84	360.72	0.006297	12.47	1814.44	1053.45	0.82

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	14	2-yr	Maintenance	2435.00	350.51	354.86	353.66	355.46	0.003828	6.26	457.51	292.60	0.57
Main	14	2-yr	Existing	2435.00	350.51	354.86	353.66	355.46	0.003828	6.26	457.50	292.59	0.57
Main	14	10-yr	Maintenance	5279.00	350.51	356.90	356.06	357.35	0.002302	6.32	1857.56	967.68	0.47
Main	14	10-yr	Existing	5279.00	350.51	356.90	356.06	357.35	0.002302	6.32	1857.56	967.68	0.47
Main	14	25-yr	Maintenance	7593.00	350.51	357.31	356.52	357.95	0.003231	7.85	2273.18	1051.20	0.57
Main	14	25-yr	Existing	7593.00	350.51	357.31	356.52	357.95	0.003231	7.85	2273.18	1051.20	0.57
Main	14	50-yr	Maintenance	9839.00	350.51	358.24	357.31	358.74	0.002390	7.44	3273.22	1083.03	0.50
Main	14	50-yr	Existing	9839.00	350.51	358.22	357.31	358.73	0.002419	7.47	3257.26	1083.03	0.50
Main	14	100-yr	Maintenance	12630.00	350.51	359.02	357.82	359.49	0.002153	7.59	4121.52	1083.03	0.48
Main	14	100-yr	Existing	12630.00	350.51	359.06	357.82	359.52	0.002096	7.51	4162.31	1083.03	0.48
Main	13	2-yr	Maintenance	2435.00	350.05	353.69	353.32	354.69	0.008634	8.03	318.83	149.71	0.83
Main	13	2-yr	Existing	2435.00	350.05	353.69	353.32	354.69	0.008634	8.03	318.83	149.71	0.83
Main	13	10-yr	Maintenance	5279.00	350.05	355.36	355.36	356.73	0.008097	9.89	829.64	614.97	0.85
Main	13	10-yr	Existing	5279.00	350.05	355.36	355.36	356.73	0.008097	9.89	829.64	614.97	0.85
Main	13	25-yr	Maintenance	7593.00	350.05	356.88	356.51	357.51	0.003319	7.74	2270.46	1031.85	0.57
Main	13	25-yr	Existing	7593.00	350.05	356.88	356.51	357.51	0.003319	7.74	2270.46	1031.85	0.57
Main	13	50-yr	Maintenance	9839.00	350.05	358.00	356.90	358.42	0.002033	6.83	3434.42	1039.15	0.46
Main	13	50-yr	Existing	9839.00	350.05	357.98	356.90	358.40	0.002063	6.87	3415.33	1039.10	0.46
Main	13	100-yr	Maintenance	12630.00	350.05	358.79	357.33	359.20	0.001874	7.06	4260.34	1041.20	0.45
Main	13	100-yr	Existing	12630.00	350.05	358.84	357.33	359.24	0.001818	6.98	4306.99	1041.32	0.44
Main	12	2-yr	Maintenance	2435.00	349.39	352.37	352.37	353.42	0.012025	8.46	338.95	173.45	0.95
Main	12	2-yr	Existing	2435.00	349.39	352.37	352.37	353.42	0.012025	8.46	338.95	173.45	0.95
Main	12	10-yr	Maintenance	5279.00	349.39	353.96	353.96	355.45	0.010486	10.36	657.80	237.19	0.95
Main	12	10-yr	Existing	5279.00	349.39	353.96	353.96	355.45	0.010486	10.36	657.80	237.19	0.95
Main	12	25-yr	Maintenance	7593.00	349.39	354.87	354.87	356.71	0.009836	11.62	895.87	282.36	0.95
Main	12	25-yr	Existing	7593.00	349.39	354.87	354.87	356.71	0.009836	11.62	895.87	282.36	0.95
Main	12	50-yr	Maintenance	9839.00	349.39	355.75	355.47	357.77	0.008832	12.36	1208.49	543.14	0.93
Main	12	50-yr	Existing	9839.00	349.39	355.61	355.47	357.73	0.009610	12.67	1135.85	463.30	0.96
Main	12	100-yr	Maintenance	12630.00	349.39	357.25	355.86	358.71	0.005186	11.12	2281.77	846.57	0.74
Main	12	100-yr	Existing	12630.00	349.39	357.09	355.86	358.72	0.005824	11.61	2152.10	831.09	0.78
Main	11	2-yr	Maintenance	2435.00	348.00	351.25	351.06	352.07	0.010652	7.27	334.96	156.31	0.88
Main	11	2-yr	Existing	2435.00	348.00	351.27	351.06	352.08	0.010270	7.19	338.80	156.49	0.86
Main	11	10-yr	Maintenance	5279.00	348.00	353.13	352.45	354.15	0.006007	8.15	695.73	215.81	0.73
Main	11	10-yr	Existing	5279.00	348.00	353.03	352.45	354.10	0.006600	8.39	673.24	212.59	0.76

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	11	25-yr	Maintenance	7593.00	348.00	354.64	353.34	355.65	0.003973	8.23	1083.05	298.64	0.62
Main	11	25-yr	Existing	7593.00	348.00	354.47	353.34	355.56	0.004469	8.55	1032.00	289.58	0.66
Main	11	50-yr	Maintenance	9839.00	348.00	355.89	354.18	356.91	0.003162	8.43	1499.86	368.55	0.57
Main	11	50-yr	Existing	9839.00	348.00	355.72	354.18	356.81	0.003456	8.66	1439.18	359.42	0.60
Main	11	100-yr	Maintenance	12630.00	348.00	357.11	355.04	358.17	0.002723	8.75	2004.63	478.65	0.55
Main	11	100-yr	Existing	12630.00	348.00	357.01	355.04	358.11	0.002863	8.90	1958.19	452.97	0.56
Main	10	2-yr	Maintenance	2435.00	347.00	350.47	350.31	351.41	0.011254	7.76	313.89	138.21	0.91
Main	10	2-yr	Existing	2435.00	347.00	350.43	350.31	351.40	0.012023	7.92	307.39	137.84	0.94
Main	10	10-yr	Maintenance	5279.00	347.00	352.79	351.78	353.81	0.005315	8.10	651.82	152.46	0.69
Main	10	10-yr	Existing	5279.00	347.00	352.62	351.78	353.73	0.006025	8.43	625.86	151.36	0.73
Main	10	25-yr	Maintenance	7593.00	347.00	354.20	352.76	355.39	0.004280	8.72	874.66	162.93	0.65
Main	10	25-yr	Existing	7593.00	347.00	353.97	352.76	355.26	0.004925	9.10	837.23	161.04	0.69
Main	10	50-yr	Maintenance	9839.00	347.00	355.27	353.59	356.66	0.004015	9.48	1061.09	191.78	0.65
Main	10	50-yr	Existing	9839.00	347.00	355.04	353.59	356.53	0.004524	9.83	1018.17	179.63	0.68
Main	10	100-yr	Maintenance	12630.00	347.00	356.12	354.50	357.89	0.004391	10.74	1253.55	244.00	0.69
Main	10	100-yr	Existing	12630.00	347.00	355.95	354.50	357.82	0.004754	11.01	1212.57	240.00	0.71
Main	9	2-yr	Maintenance	2435.00	346.50	350.63	349.10	351.02	0.002587	4.98	488.51	137.85	0.47
Main	9	2-yr	Existing	2435.00	346.50	350.60	349.10	350.99	0.002669	5.03	483.70	137.70	0.47
Main	9	10-yr	Maintenance	5279.00	346.50	352.90	350.66	353.53	0.002515	6.37	830.83	164.29	0.49
Main	9	10-yr	Existing	5279.00	346.50	352.74	350.65	353.41	0.002779	6.57	805.00	162.92	0.51
Main	9	25-yr	Maintenance	7593.00	346.50	354.32	351.74	355.12	0.002324	7.19	1086.76	197.05	0.49
Main	9	25-yr	Existing	7593.00	346.50	354.11	351.74	354.97	0.002596	7.43	1044.76	194.13	0.52
Main	9	50-yr	Maintenance	9839.00	346.50	355.42	352.59	356.39	0.002317	7.94	1307.31	203.94	0.50
Main	9	50-yr	Existing	9839.00	346.50	355.21	352.59	356.24	0.002552	8.18	1263.51	202.84	0.52
Main	9	100-yr	Maintenance	12630.00	346.50	356.32	353.47	357.58	0.002618	9.08	1492.78	208.47	0.54
Main	9	100-yr	Existing	12630.00	346.50	356.17	353.47	357.48	0.002780	9.25	1461.61	207.72	0.56
Main	8	2-yr	Maintenance	2435.00	344.00	350.59	347.71	350.74	0.000755	3.07	792.49	181.69	0.26
Main	8	2-yr	Existing	2435.00	345.00	350.56	347.72	350.70	0.000767	3.10	785.40	181.61	0.26
Main	8	10-yr	Maintenance	5279.00	344.00	352.89	349.14	353.18	0.000895	4.34	1215.98	187.28	0.30
Main	8	10-yr	Existing	5279.00	345.00	352.73	349.15	353.03	0.000961	4.45	1185.29	186.92	0.31
Main	8	25-yr	Maintenance	7593.00	344.00	354.34	349.98	354.75	0.000944	5.10	1490.73	190.32	0.32
Main	8	25-yr	Existing	7593.00	345.00	354.13	350.00	354.55	0.001023	5.25	1449.26	189.87	0.33
Main	8	50-yr	Maintenance	9839.00	344.00	355.46	350.71	355.98	0.001023	5.80	1704.30	192.59	0.34
Main	8	50-yr	Existing	9839.00	345.00	355.24	350.72	355.79	0.001095	5.94	1662.64	192.16	0.35
Main	8	100-yr	Maintenance	12630.00	344.00	356.38	351.53	357.08	0.001221	6.75	1882.32	194.50	0.38

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	8	100-yr	Existing	12630.00	345.00	356.23	351.54	356.96	0.001268	6.86	1853.21	194.16	0.39
Main	7.5		Bridge										
Main	7	2-yr	Maintenance	2435.00	344.00	350.08	347.38	350.22	0.000713	2.97	818.63	187.86	0.25
Main	7	2-yr	Existing	2435.00	345.00	350.48	347.76	350.63	0.000807	3.10	785.34	188.64	0.27
Main	7	10-yr	Maintenance	5279.00	344.00	352.27	348.58	352.56	0.000885	4.27	1235.23	191.88	0.30
Main	7	10-yr	Existing	5279.00	345.00	352.60	349.19	352.90	0.000986	4.44	1188.38	192.40	0.31
Main	7	25-yr	Maintenance	7593.00	344.00	353.68	349.40	354.08	0.000946	5.04	1507.31	194.13	0.32
Main	7	25-yr	Existing	7593.00	345.00	353.97	350.00	354.39	0.001046	5.23	1454.08	194.59	0.34
Main	7	50-yr	Maintenance	9839.00	344.00	354.76	350.12	355.28	0.001033	5.74	1718.17	195.85	0.34
Main	7	50-yr	Existing	9839.00	345.00	355.06	350.71	355.61	0.001120	5.92	1667.62	196.33	0.35
Main	7	100-yr	Maintenance	12630.00	344.00	355.63	350.92	356.33	0.001249	6.72	1888.79	197.36	0.38
Main	7	100-yr	Existing	12630.00	345.00	356.01	351.49	356.74	0.001304	6.85	1854.82	198.18	0.39
Main	6	2-yr	Maintenance	2435.00	345.00	350.02	347.28	350.18	0.000801	3.14	774.98	181.97	0.27
Main	6	2-yr	Existing	2435.00	345.50	350.10	349.03	350.49	0.003793	5.01	486.08	182.42	0.54
Main	6	10-yr	Maintenance	5279.00	345.00	352.19	348.64	352.51	0.000970	4.47	1185.54	197.66	0.31
Main	6	10-yr	Existing	5279.00	345.50	352.20	350.41	352.76	0.002591	6.01	883.06	197.67	0.49
Main	6	25-yr	Maintenance	7593.00	345.00	353.60	349.51	354.02	0.001020	5.24	1475.99	219.80	0.33
Main	6	25-yr	Existing	7593.00	345.50	353.56	351.23	354.25	0.002270	6.67	1164.66	219.17	0.48
Main	6	50-yr	Maintenance	9839.00	345.00	354.67	350.28	355.22	0.001096	5.93	1719.49	227.84	0.35
Main	6	50-yr	Existing	9839.00	345.50	354.63	351.93	355.45	0.002179	7.29	1407.76	227.79	0.48
Main	6	100-yr	Maintenance	12630.00	345.00	355.53	351.12	356.26	0.001314	6.91	1914.90	229.42	0.39
Main	6	100-yr	Existing	12630.00	345.50	355.50	352.74	356.56	0.002419	8.30	1606.63	229.37	0.52
Main	5	2-yr	Maintenance	2435.00	345.00	349.80	347.84	350.10	0.001750	4.39	554.65	141.34	0.39
Main	5	2-yr	Existing	2435.00	345.50	349.91	348.39	350.30	0.002713	5.06	481.69	138.30	0.48
Main	5	10-yr	Maintenance	5279.00	345.00	351.79	349.37	352.40	0.002211	6.25	844.66	149.85	0.46
Main	5	10-yr	Existing	5279.00	345.50	351.84	350.00	352.58	0.003132	6.89	766.57	153.16	0.54
Main	5	25-yr	Maintenance	7593.00	345.00	353.07	350.37	353.90	0.002334	7.32	1041.68	159.53	0.49
Main	5	25-yr	Existing	7593.00	345.50	353.10	351.03	354.07	0.003106	7.90	962.65	159.83	0.56
Main	5	50-yr	Maintenance	9839.00	345.00	353.99	351.24	355.07	0.002566	8.35	1192.57	165.57	0.53
Main	5	50-yr	Existing	9839.00	345.50	354.04	351.88	355.26	0.003255	8.88	1115.98	165.76	0.59
Main	5	100-yr	Maintenance	12630.00	345.00	354.50	352.21	356.06	0.003417	10.05	1277.43	169.01	0.61
Main	5	100-yr	Existing	12630.00	345.50	354.57	352.80	356.31	0.004216	10.61	1204.56	169.54	0.68
Main	4	2-yr	Maintenance	2435.00	345.00	349.71	347.58	349.96	0.002908	4.02	607.87	158.76	0.35

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	4	2-yr	Existing	2435.00	345.40	349.71	348.28	350.09	0.005398	5.00	499.03	158.77	0.47
Main	4	10-yr	Maintenance	5279.00	345.00	351.70	349.05	352.22	0.003506	5.78	940.29	175.02	0.42
Main	4	10-yr	Existing	5279.00	345.40	351.62	349.80	352.34	0.005703	6.88	817.75	174.18	0.52
Main	4	25-yr	Maintenance	7593.00	345.00	352.99	349.98	353.70	0.003732	6.80	1174.08	185.69	0.44
Main	4	25-yr	Existing	7593.00	345.40	352.88	350.75	353.83	0.005725	7.93	1045.37	185.23	0.54
Main	4	50-yr	Maintenance	9839.00	345.00	353.93	350.82	354.84	0.004136	7.76	1349.87	189.69	0.48
Main	4	50-yr	Existing	9839.00	345.40	353.82	351.59	355.01	0.006085	8.93	1220.50	189.25	0.57
Main	4	100-yr	Maintenance	12630.00	345.00	354.43	351.74	355.76	0.005567	9.36	1444.81	191.74	0.56
Main	4	100-yr	Existing	12630.00	345.40	354.26	352.57	355.99	0.008238	10.79	1304.40	191.06	0.67
Main	3	2-yr	Maintenance	2435.00	345.30	349.19	348.05	349.58	0.006267	5.10	514.89	188.99	0.50
Main	3	2-yr	Existing	2435.00	345.30	349.19	348.05	349.58	0.006267	5.10	514.89	188.99	0.50
Main	3	10-yr	Maintenance	5279.00	345.30	351.20	349.37	351.82	0.005414	6.55	918.22	207.53	0.51
Main	3	10-yr	Existing	5279.00	345.30	351.20	349.37	351.82	0.005414	6.55	918.22	207.53	0.51
Main	3	25-yr	Maintenance	7593.00	345.30	352.52	350.33	353.31	0.005129	7.41	1288.51	309.80	0.51
Main	3	25-yr	Existing	7593.00	345.30	352.52	350.33	353.31	0.005129	7.41	1288.51	309.80	0.51
Main	3	50-yr	Maintenance	9839.00	345.30	353.56	351.07	354.44	0.004850	7.96	1611.99	310.56	0.51
Main	3	50-yr	Existing	9839.00	345.30	353.56	351.07	354.44	0.004850	7.96	1611.99	310.56	0.51
Main	3	100-yr	Maintenance	12630.00	345.30	353.93	351.67	355.20	0.006634	9.61	1728.27	310.83	0.60
Main	3	100-yr	Existing	12630.00	345.30	353.93	351.67	355.20	0.006634	9.61	1728.27	310.83	0.60
Main	2	2-yr	Maintenance	2435.00	344.83	349.01	346.56	349.10	0.001720	2.87	1130.61	395.73	0.27
Main	2	2-yr	Existing	2435.00	344.83	349.01	346.56	349.10	0.001720	2.87	1130.61	395.73	0.27
Main	2	10-yr	Maintenance	5279.00	344.83	351.14	347.55	351.32	0.001707	3.91	1851.97	463.27	0.29
Main	2	10-yr	Existing	5279.00	344.83	351.14	347.55	351.32	0.001707	3.91	1851.97	463.27	0.29
Main	2	25-yr	Maintenance	7593.00	344.83	352.55	348.23	352.78	0.001658	4.47	2334.83	480.00	0.30
Main	2	25-yr	Existing	7593.00	344.83	352.55	348.23	352.78	0.001658	4.47	2334.83	480.00	0.30
Main	2	50-yr	Maintenance	9839.00	344.83	353.73	348.80	353.94	0.001335	4.44	3352.77	480.00	0.27
Main	2	50-yr	Existing	9839.00	344.83	353.73	348.80	353.94	0.001335	4.44	3352.77	480.00	0.27
Main	2	100-yr	Maintenance	12630.00	344.83	354.20	349.45	354.50	0.001801	5.35	3571.46	480.00	0.32
Main	2	100-yr	Existing	12630.00	344.83	354.20	349.45	354.50	0.001801	5.35	3571.46	480.00	0.32
Main	1	2-yr	Maintenance	2435.00	344.00	348.29	346.97	348.62	0.005003	4.76	562.88	313.26	0.45
Main	1	2-yr	Existing	2435.00	344.00	348.29	346.97	348.62	0.005003	4.76	562.88	313.26	0.45
Main	1	10-yr	Maintenance	5279.00	344.00	350.23	348.29	350.83	0.005001	6.42	931.26	332.08	0.49
Main	1	10-yr	Existing	5279.00	344.00	350.23	348.29	350.83	0.005001	6.42	931.26	332.08	0.49
Main	1	25-yr	Maintenance	7593.00	344.00	351.50	349.16	352.28	0.005002	7.39	1200.09	370.00	0.51
Main	1	25-yr	Existing	7593.00	344.00	351.50	349.16	352.28	0.005002	7.39	1200.09	370.00	0.51

Table 2: Hydraulic Model Results for Existing and Erosion & Sediment Maintenance Conditions

HEC-RAS River: Bushkill Reach: Main (Continued)

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	1	50-yr	Maintenance	9839.00	344.00	352.53	349.93	353.48	0.005002	8.15	1425.82	370.00	0.52
Main	1	50-yr	Existing	9839.00	344.00	352.53	349.93	353.48	0.005002	8.15	1425.82	370.00	0.52
Main	1	100-yr	Maintenance	12630.00	344.00	353.57	350.49	354.11	0.002999	6.86	2655.75	370.00	0.41
Main	1	100-yr	Existing	12630.00	344.00	353.57	350.49	354.11	0.002999	6.86	2655.75	370.00	0.41

REFERENCES

1. US Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS River Analysis System, User's Manual*, Version 6.0.0, May, 2021
2. US Army Corps of Engineers, Hydrologic Engineering Center, *HEC-RAS River Analysis System, Hydraulic Reference Manual*, Version 6.0.0, May, 2021

APPENDIX A

HYDROLOGICAL ANALYSIS RESULTS

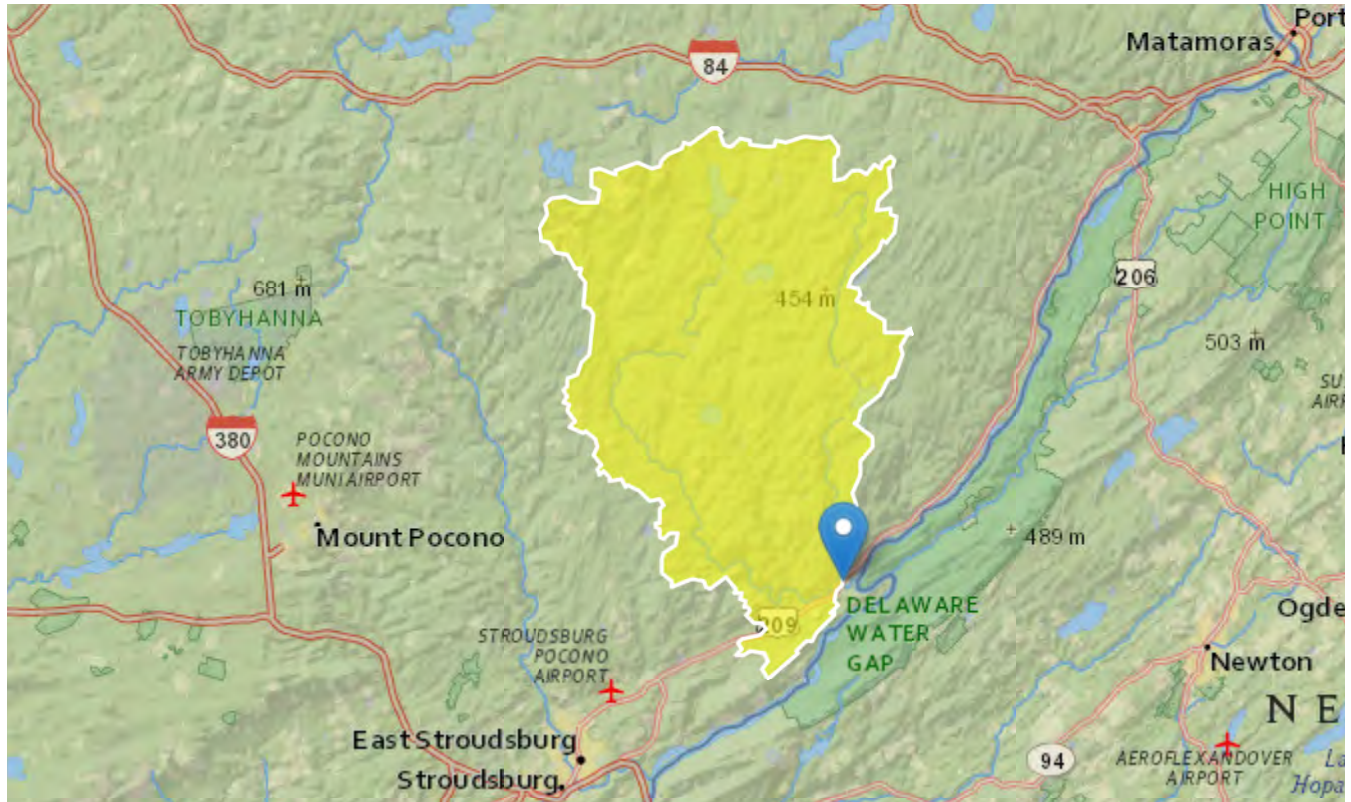
StreamStats Report for Bushkill Creek at Rt. 209

Region ID: PA

Workspace ID: PA20210908185512039000

Clicked Point (Latitude, Longitude): 41.09164, -75.00268

Time: 2021-09-08 14:59:18 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	4.366	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	4.567	degrees
BSLPDRPA20 v1	Unadjusted basin slope, in degrees, from PA v1	4.9847	degrees
CARBON	Percentage of area of carbonate rock	0.57	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	245227.4921	meters

Parameter Code	Parameter Description	Value	Unit
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	249034.3675	meters
DRN	Drainage quality index from STATSGO	3.9	dimensionless
DRNAREA	Area that drains to a point on a stream	157	square miles
ELEV	Mean Basin Elevation	1233	feet
ELEVMAX	Maximum basin elevation	2057	feet
FOREST	Percentage of area covered by forest	82.3525	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	100	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	0.5124	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	5.7981	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	6.298	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.6116	percent
LONG_OUT	Longitude of Basin Outlet	-75.002625	degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	56.5	degrees F
OUTLETXA83	X coordinate of the outlet, in NAD_1983_Albers, meters	251747.8026	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	236554.0708	meters
PRECIP	Mean Annual Precipitation	43	inches
ROCKDEP	Depth to rock	5.1	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	14.27	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	1.33	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	208.59	miles

Parameter

Code	Parameter Description	Value	Unit
URBAN	Percentage of basin with urban development	3.8681	percent

Peak-Flow Statistics Parameters [Peak Flow Region 1 SIR 2019 5094]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	3.04	1490
ELEVMAX	Maximum Basin Elevation	2057	feet	1470	2690

Peak-Flow Statistics Flow Report [Peak Flow Region 1 SIR 2019 5094]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
50-percent AEP flood	3990	ft ³ /s	25.2
20-percent AEP flood	6240	ft ³ /s	28.3
10-percent AEP flood	8020	ft ³ /s	30.3
4-percent AEP flood	10600	ft ³ /s	32.4
2-percent AEP flood	12800	ft ³ /s	33.6
1-percent AEP flood	15200	ft ³ /s	35.6
0.5-percent AEP flood	17800	ft ³ /s	37.5
0.2-percent AEP flood	21800	ft ³ /s	40.4

Peak-Flow Statistics Citations

Roland, M.A., and Stuckey, M.H., 2019, Development of regression equations for the estimation of flood flows at ungaged streams in Pennsylvania: U.S. Geological Survey Scientific Investigations Report 2019–5094, 36 p. ([https:// doi.org/10.3133/sir20195094](https://doi.org/10.3133/sir20195094))

Low-Flow Statistics Parameters [Low Flow Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	4.84	982
PRECIP	Mean Annual Precipitation	43	inches	33.1	47.1

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
GLACIATED	Percent of Glaciation	100	percent	0	100
FOREST	Percent Forest	82.3525	percent	41	100

Low-Flow Statistics Flow Report [Low Flow Region 5]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	24.7	ft ³ /s	38	38
30 Day 2 Year Low Flow	32.4	ft ³ /s	33	33
7 Day 10 Year Low Flow	12.5	ft ³ /s	57	57
30 Day 10 Year Low Flow	16.1	ft ³ /s	51	51
90 Day 10 Year Low Flow	24.1	ft ³ /s	41	41

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (<http://pubs.usgs.gov/sir/2006/5130/>)

Annual Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	2.26	1720
ELEV	Mean Basin Elevation	1233	feet	130	2700
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
FOREST	Percent Forest	82.3525	percent	5.1	100
URBAN	Percent Urban	3.8681	percent	0	89

Annual Flow Statistics Flow Report [Statewide Mean and Base Flow]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
Mean Annual Flow	263	ft ³ /s	12	12

Annual Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (<http://pubs.usgs.gov/sir/2006/5130/>)

General Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0.57	percent	0	99
FOREST	Percent Forest	82.3525	percent	5.1	100
URBAN	Percent Urban	3.8681	percent	0	89

General Flow Statistics Flow Report [Statewide Mean and Base Flow]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
Harmonic Mean Streamflow	72.1	ft ³ /s	38	38

General Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (<http://pubs.usgs.gov/sir/2006/5130/>)

Base Flow Statistics Parameters [Statewide Mean and Base Flow]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	2.26	1720
PRECIP	Mean Annual Precipitation	43	inches	33.1	50.4
CARBON	Percent Carbonate	0.57	percent	0	99
FOREST	Percent Forest	82.3525	percent	5.1	100
URBAN	Percent Urban	3.8681	percent	0	89

Base Flow Statistics Flow Report [Statewide Mean and Base Flow]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
Base Flow 10 Year Recurrence Interval	106	ft^3/s	21	21
Base Flow 25 Year Recurrence Interval	95	ft^3/s	21	21
Base Flow 50 Year Recurrence Interval	88.5	ft^3/s	23	23

Base Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (<http://pubs.usgs.gov/sir/2006/5130/>)

Bankfull Statistics Parameters [Statewide Bankfull Noncarbonate 2018 5066]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	2.62	207
CARBON	Percent Carbonate	0.57	percent		

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	0.07722	940.1535

Bankfull Statistics Parameters [83.8 Percent (132 square miles) Appalacian Plateaus P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	0.081081	536.995602

Bankfull Statistics Parameters [16.2 Percent (25.4 square miles) Valley and Ridge P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	0.100386	395.999604

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
----------------	----------------	-------	-------	-----------	-----------

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	157	square miles	0.07722	59927.7393
Bankfull Statistics Flow Report [Statewide Bankfull Noncarbonate 2018 5066]					
PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)					
Statistic		Value	Unit	SE	
Bankfull Area		685	ft^2	64	
Bankfull Streamflow		3530	ft^3/s	74	
Bankfull Width		146	ft	59	
Bankfull Depth		4.61	ft	56	
Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]					
Statistic		Value	Unit		
Bieger_D_channel_width		124	ft		
Bieger_D_channel_depth		4.78	ft		
Bieger_D_channel_cross_sectional_area		606	ft^2		
Bankfull Statistics Flow Report [83.8 Percent (132 square miles) Appalacian Plateaus P Bieger 2015]					
Statistic		Value	Unit		
Bieger_P_channel_width		138	ft		
Bieger_P_channel_depth		4.87	ft		
Bieger_P_channel_cross_sectional_area		667	ft^2		
Bankfull Statistics Flow Report [16.2 Percent (25.4 square miles) Valley and Ridge P Bieger 2015]					
Statistic		Value	Unit		
Bieger_P_channel_width		34.8	ft		
Bieger_P_channel_depth		1.31	ft		
Bieger_P_channel_cross_sectional_area		476	ft^2		
Bankfull Statistics Flow Report [USA Bieger 2015]					
Statistic		Value	Unit		

Statistic	Value	Unit	
Bieger_USA_channel_width	22.4	ft	
Bieger_USA_channel_depth	1.08	ft	
Bieger_USA_channel_cross_sectional_area	262	ft^2	
Bankfull Statistics Flow Report [Area-Averaged]			
PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)			
Statistic	Value	Unit	SE
Bankfull Area	685	ft^2	64
Bankfull Streamflow	3530	ft^3/s	74
Bankfull Width	146	ft	59
Bankfull Depth	4.61	ft	56
Bieger_D_channel_width	124	ft	
Bieger_D_channel_depth	4.78	ft	
Bieger_D_channel_cross_sectional_area	606	ft^2	
Bieger_P_channel_width	121	ft	
Bieger_P_channel_depth	4.29	ft	
Bieger_P_channel_cross_sectional_area	636	ft^2	
Bieger_USA_channel_width	22.4	ft	
Bieger_USA_channel_depth	1.08	ft	
Bieger_USA_channel_cross_sectional_area	262	ft^2	
Bankfull Statistics Citations			
Clune, J.W., Chaplin, J.J., and White, K.E.,2018, Comparison of regression relations of bankfull discharge and channel geometry for the glaciated and nonglaciated settings of Pennsylvania and southern New York: U.S. Geological Survey Scientific Investigations Report 2018–5066, 20 p. (https://doi.org/10.3133/sir20185066)			
Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverPages)			

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Application Version: 4.6.2

StreamStats Services Version: 1.2.22

NSS Services Version: 2.1.2

peak_Bush Kill.txt

Z01439500				
H01439500		USGS		
N01439500	4105170750217004242089sw02040104117			421.13
Y01439500	Bush Kill at Shoemakers, PA			
301439500	19090220	2270	5.00	
301439500	19100307	1190	3.80	
301439500	19110614	1120	3.70	
301439500	19120315	1190	3.80	
301439500	19130328	1350	4.00	
301439500	19140329	1350	4.00	
301439500	19150224	2070	4.75	
301439500	19160402	1430	4.10	
301439500	19170327	1510	4.20	
301439500	19180226	1970	4.70	
301439500	19190722	2380	5.10	
301439500	19200724	5250	7.20	
301439500	19210310	1780	4.50	
301439500	19220308	1780	4.50	
301439500	19230324	1270	3.90	
301439500	19240930	2830	5.50	
301439500	19250212	1430	4.09	
301439500	19251116	2380	5.10	
301439500	19261116	2830	5.50	
301439500	19271019	1970	4.70	
301439500	19290315	1190	3.83	
301439500	19291118	1150	3.75	
301439500	19310329	1080	3.70	
301439500	19320401	1430	4.10	
301439500	19330916	3070	5.70	
301439500	19340412	1040	3.62	
301439500	19350710	3330	5.90	
301439500	19360318	4770	6.92	
301439500	19370406	1240	3.90	
301439500	19380125	2070	4.80	
301439500	19381206	2540	4.99	
301439500	19400331	2790	5.22	
301439500	19410406	1220	3.74	
301439500	19420928	2920	5.28	
301439500	19421230	1710	4.33	
301439500	19440425	1500	4.10	
301439500	19450719	3900	5.99	
301439500	19460528	2080	4.58	2 5.67
301439500	19470406	1580	4.19	
301439500	19480321	2080	4.59	
301439500	19481231	1780	4.46	
301439500	19500329	1540	4.17	
301439500	19510331	2860	5.62	
301439500	19511108	2980	5.37	
301439500	19521211	4680	6.50	
301439500	19531207	928	3.35	
301439500	19550819	23400	13.95	
301439500	19551016	3680	5.96	
301439500	19570406	1460	4.08	
301439500	19571221	3050	5.50	
301439500	19590306	1260	3.80	
301439500	19600405	1800	4.41	
301439500	19610226	1890	4.05	
301439500	19620408	1060	3.09	
301439500	19630327	2680	4.77	
301439500	19640310	1800	3.96	2 4.14
301439500	19650209	8042		4.90
301439500	19660306	8801		5.93
301439500	19670315	1200	3.29	
301439500	19680530	2290	4.44	
301439500	19690728	7300	8.36	
301439500	19700402	3130	5.39	
301439500	19701023	2070	4.38	
301439500	19720623	3360	5.59	
301439500	19730203	1730	3.90	
301439500	19731221	4280	6.34	
301439500	19741208	2910	5.19	
301439500	19760128	2830	5.12	
301439500	19770225	2120	4.43	
301439500	19780109	4720	6.67	
301439500	19790125	2830	5.12	
301439500	19800322	2670	4.97	
301439500	19810512	2770	5.06	
301439500	19820204	1300	3.51	

			peak_Bush Kill.txt		
301439500	19830416	3160	5.18		
301439500	19840405	3340	5.65	2	5.65
301439500	19850927	1420	3.66		
301439500	19860315	2730	4.92		
301439500	19870913	2580	4.78		
301439500	19871130	1260	3.42		
301439500	19890506	2120	4.34		
301439500	19891020	3260	5.38		
301439500	19901204	2470	4.38		
301439500	19920531	1780	3.77		
301439500	19930401	3210	5.50		
301439500	19940328	1750	4.04		
301439500	19950308	1280	3.65		
301439500	19960127	4990	7.01		
301439500	19961202	3060	5.35		
301439500	19980512	1450	3.78		
301439500	19990124	1360	3.68		
301439500	20000228	895	3.09		
301439500	20001217	1930	4.27		
301439500	20020529	1210	3.51		
301439500	20030622	2340	4.68		
301439500	20040918	5330	7.27		
301439500	20050403	5670	7.51		
301439500	20060628	5380	7.31		
301439500	20070416	2790	5.11		
301439500	20080309	2750	5.07	2	5.17
301439500	20081212	2590	4.92		
301439500	20100125	1940	4.28		
301439500	20110828	5480	7.35		
301439500	20111208	1480	3.80		
301439500	20130611	1740	4.08		
301439500	20140501	2030	4.31		
301439500	20150701	2790	5.11		
301439500	20160225	22202	4.38		
301439500	20170407	1970	4.42		
301439500	20180225	1550	3.95		
301439500	20190124	2070	4.48		
301439500	20200804	1530	3.97		

PEAK_BUSH KILL AT GAGE01439500.PRT

1
 Program PeakFq U. S. GEOLOGICAL SURVEY Seq.002.000
 Version 7.3 Annual peak flow frequency analysis Run Date / Time
 10/25/2019 09/21/2021 16:33

--- PROCESSING OPTIONS ---

Plot option = Graphics device
 Basin char output = None
 Print option = Yes
 Debug print = No
 Input peaks listing = Long
 Input peaks format = WATSTORE peak file
 Input files used:
 peaks (ascii) - C:\Water\PeakFQ\data\PEAK_BUSH KILL AT GAGE01439500.INP
 specifications - C:\Water\PeakFQ\data\PKFQWPSF.TMP
 Output file(s):
 main - C:\Water\PeakFQ\data\PEAK_BUSH KILL AT GAGE01439500.PRT

*** User responsible for assessment and interpretation of the following analysis ***

1
 Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.001
 Version 7.3 Annual peak flow frequency analysis Run Date / Time
 10/25/2019 09/21/2021 16:33

Station - 01439500 Bush Kill at Shoemakers, PA

TABLE 1 - INPUT DATA SUMMARY

Number of peaks in record	=	112
Peaks not used in analysis	=	0
Gaged peaks in analysis	=	112
Historic peaks in analysis	=	0
Beginning Year	=	1909
Ending Year	=	2020
Historical Period Length	=	112
Skew option	=	WEIGHTED
Regional skew	=	0.541
Standard error	=	0.550
Mean Square error	=	0.303
Gage base discharge	=	0.0
User supplied high outlier threshold	=	--
User supplied PILF (LO) criterion	=	--
Plotting position parameter	=	0.00
Type of analysis		EMA
PILF (LO) Test Method		MGBT
Perceptible Ranges:		
Start Year	End Year	Lower Bound Upper Bound
1909	2020	0.0 INF
		DEFAULT
Interval Data	=	None Specified

TABLE 2 - DIAGNOSTIC MESSAGE AND PILF RESULTS

EMA002W-CONFIDENCE INTERVALS ARE NOT EXACT IF HISTORIC PERIOD > 0

MULTIPLE GRUBBS-BECK TEST RESULTS
 MULTIPLE GRUBBS-BECK PILF THRESHOLD N/A
 NUMBER OF PILFS IDENTIFIED 0

Kendall's Tau Parameters

TAU	P-VALUE	MEDIAN SLOPE	No. of PEAKS
-----	---------	--------------	--------------

Page 1

PEAK_BUSH KILL AT GAGE01439500.PRT

GAGED PEAKS 0.136 0.034 5.483 112

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.002
Version 7.3 Annual peak flow frequency analysis Run Date / Time
10/25/2019 09/21/2021 16:33

Station - 01439500 Bush Kill at Shoemakers, PA

TABLE 3 - ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	LOGARITHMIC		
	MEAN	STANDARD DEVIATION	SKEW
EMA WITHOUT REG SKEW	3.3319	0.2266	1.006
EMA WITH REG SKEW	3.3319	0.2266	0.876
EMA ESTIMATE OF MSE OF SKEW WITHOUT REG SKEW			0.1175
EMA ESTIMATE OF MSE OF SKEW W/GAGED PEAKS ONLY (AT-SITE)			0.1175

TABLE 4 - ANNUAL FREQUENCY CURVE -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	<- EMA ESTIMATE -> WITH REG SKEW WITHOUT REG SKEW		<- FOR EMA ESTIMATE WITH REG SKEW -> LOG VARIANCE OF EST. <-CONFIDENCE LIMITS-> 5.0% LOWER 95.0% UPPER		
0.9950	852.7	903.5	0.0025	704.6	1032.0
0.9900	894.9	939.5	0.0018	762.3	1053.0
0.9500	1055.	1081.	0.0006	954.3	1156.0
0.9000	1177.	1193.	0.0004	1084.0	1265.0
0.8000	1375.	1377.	0.0004	1279.0	1480.0
0.6667	1627.	1617.	0.0004	1505.0	1766.0
0.5000	1992.	1970.	0.0005	1823.0	2182.0
0.4292	2184.	2159.	0.0006	1991.0	2404.0
0.2000	3212.	3187.	0.0010	2880.0	3664.0
0.1000	4317.	4322.	0.0016	3774.0	5203.0
0.0400	6138.	6239.	0.0034	5118.0	8214.0
0.0200	7863.	8102.	0.0054	6291.0	11590.0
0.0100	9966.	10420.	0.0082	7623.0	16330.0
0.0050	12530.	13300.	0.0118	9142.0	22990.0
0.0020	16790.	18190.	0.0177	11480.0	36050.0

*Note: If Station skew option is selected then EMA ESTIMATE WITH REG SKEW will display values for and be equal to EMA ESTIMATE WITHOUT REG SKEW.

1

Program PeakFq U. S. GEOLOGICAL SURVEY Seq.001.003
Version 7.3 Annual peak flow frequency analysis Run Date / Time
10/25/2019 09/21/2021 16:33

Station - 01439500 Bush Kill at Shoemakers, PA

TABLE 5 - INPUT DATA LISTING

WATER YEAR	PEAK VALUE	PEAKFQ CODES	FLOW INTERVALS (WHERE LOWER BOUND NOT = UPPER BOUND) LOWER BOUND UPPER BOUND REMARKS		
1909	2270.0				
1910	1190.0				
1911	1120.0				
1912	1190.0				
1913	1350.0				
1914	1350.0				
1915	2070.0				
1916	1430.0				
1917	1510.0				
1918	1970.0				

1919	2380.0
1920	5250.0
1921	1780.0
1922	1780.0
1923	1270.0
1924	2830.0
1925	1430.0
1926	2380.0
1927	2830.0
1928	1970.0
1929	1190.0
1930	1150.0
1931	1080.0
1932	1430.0
1933	3070.0
1934	1040.0
1935	3330.0
1936	4770.0
1937	1240.0
1938	2070.0
1939	2540.0
1940	2790.0
1941	1220.0
1942	2920.0
1943	1710.0
1944	1500.0
1945	3900.0
1946	2080.0
1947	1580.0
1948	2080.0
1949	1780.0
1950	1540.0
1951	2860.0
1952	2980.0
1953	4680.0
1954	928.0
1955	23400.0
1956	3680.0
1957	1460.0
1958	3050.0
1959	1260.0
1960	1800.0
1961	1890.0
1962	1060.0
1963	2680.0
1964	1800.0
1965	804.0
1966	880.0
1967	1200.0
1968	2290.0
1969	7300.0
1970	3130.0
1971	2070.0
1972	3360.0
1973	1730.0
1974	4280.0
1975	2910.0
1976	2830.0
1977	2120.0
1978	4720.0
1979	2830.0
1980	2670.0
1981	2770.0
1982	1300.0
1983	3160.0
1984	3340.0
1985	1420.0
1986	2730.0
1987	2580.0
1988	1260.0
1989	2120.0
1990	3260.0
1991	2470.0
1992	1780.0
1993	3210.0
1994	1750.0
1995	1280.0
1996	4990.0

1997	3060.0
1998	1450.0
1999	1360.0
2000	895.0
2001	1930.0
2002	1210.0
2003	2340.0
2004	5330.0
2005	5670.0
2006	5380.0
2007	2790.0
2008	2750.0
2009	2590.0
2010	1940.0
2011	5480.0
2012	1480.0
2013	1740.0
2014	2030.0
2015	2790.0
2016	2220.0
2017	1970.0
2018	1550.0
2019	2070.0
2020	1530.0

Explanation of peak discharge qualification codes

PeakFQ CODE	NWIS CODE	DEFINITION
D	3	Dam failure, non-recurrent flow anomaly
G	8	Discharge greater than stated value
X	3+8	Both of the above
L	4	Discharge less than stated value
K	6 OR C	Known effect of regulation or urbanization
O	0	Opportunistic peak
H	7	Historic peak
- Minus-flagged discharge -- Not used in computation		
-8888.0 -- No discharge value given		
- Minus-flagged water year -- Historic peak used in computation		

1

Program PeakFq	U. S. GEOLOGICAL SURVEY	Seq.001.004
Version 7.3	Annual peak flow frequency analysis	Run Date / Time
10/25/2019		09/21/2021 16:33

Station - 01439500 Bush Kill at Shoemakers, PA

TABLE 6 - EMPIRICAL FREQUENCY CURVES -- HIRSCH-STEDINGER PLOTTING POSITIONS

WATER YEAR	RANKED DISCHARGE	EMA ESTIMATE	FLOW INTERVALS (WHERE LOWER BOUND NOT = UPPER BOUND)	
			LOWER BOUND	UPPER BOUND
1955	23400.0	0.0088		
1969	7300.0	0.0177		
2005	5670.0	0.0265		
2011	5480.0	0.0354		
2006	5380.0	0.0442		
2004	5330.0	0.0531		
1920	5250.0	0.0619		
1996	4990.0	0.0708		
1936	4770.0	0.0796		
1978	4720.0	0.0885		
1953	4680.0	0.0973		
1974	4280.0	0.1062		
1945	3900.0	0.1150		
1956	3680.0	0.1239		
1972	3360.0	0.1327		
1984	3340.0	0.1416		
1935	3330.0	0.1504		
1990	3260.0	0.1593		
1993	3210.0	0.1681		

1983	3160.0	0.1770
1970	3130.0	0.1858
1933	3070.0	0.1947
1997	3060.0	0.2035
1958	3050.0	0.2124
1952	2980.0	0.2212
1942	2920.0	0.2301
1975	2910.0	0.2389
1951	2860.0	0.2478
1924	2830.0	0.2832
1927	2830.0	0.2743
1976	2830.0	0.2655
1979	2830.0	0.2566
1940	2790.0	0.3097
2007	2790.0	0.3009
2015	2790.0	0.2920
1981	2770.0	0.3186
2008	2750.0	0.3274
1986	2730.0	0.3363
1963	2680.0	0.3451
1980	2670.0	0.3540
2009	2590.0	0.3628
1987	2580.0	0.3717
1939	2540.0	0.3805
1991	2470.0	0.3894
1919	2380.0	0.4071
1926	2380.0	0.3982
2003	2340.0	0.4159
1968	2290.0	0.4248
1909	2270.0	0.4336
2016	2220.0	0.4425
1977	2120.0	0.4602
1989	2120.0	0.4513
1946	2080.0	0.4779
1948	2080.0	0.4690
1915	2070.0	0.5133
1938	2070.0	0.5044
1971	2070.0	0.4956
2019	2070.0	0.4867
2014	2030.0	0.5221
1918	1970.0	0.5487
1928	1970.0	0.5398
2017	1970.0	0.5310
2010	1940.0	0.5575
2001	1930.0	0.5664
1961	1890.0	0.5752
1960	1800.0	0.5929
1964	1800.0	0.5841
1921	1780.0	0.6283
1922	1780.0	0.6195
1949	1780.0	0.6106
1992	1780.0	0.6018
1994	1750.0	0.6372
2013	1740.0	0.6460
1973	1730.0	0.6549
1943	1710.0	0.6637
1947	1580.0	0.6726
2018	1550.0	0.6814
1950	1540.0	0.6903
2020	1530.0	0.6991
1917	1510.0	0.7080
1944	1500.0	0.7168
2012	1480.0	0.7257
1957	1460.0	0.7345
1998	1450.0	0.7434
1916	1430.0	0.7699
1925	1430.0	0.7611
1932	1430.0	0.7522
1985	1420.0	0.7788
1999	1360.0	0.7876
1913	1350.0	0.8053
1914	1350.0	0.7965
1982	1300.0	0.8142
1995	1280.0	0.8230
1923	1270.0	0.8319
1959	1260.0	0.8496
1988	1260.0	0.8407
1937	1240.0	0.8584

1941	1220.0	0.8673
2002	1210.0	0.8761
1967	1200.0	0.8850
1910	1190.0	0.9115
1912	1190.0	0.9027
1929	1190.0	0.8938
1930	1150.0	0.9204
1911	1120.0	0.9292
1931	1080.0	0.9381
1962	1060.0	0.9469
1934	1040.0	0.9558
1954	928.0	0.9646
2000	895.0	0.9735
1966	880.0	0.9823
1965	804.0	0.9912

1

Program PeakFq
Version 7.3
10/25/2019

U. S. GEOLOGICAL SURVEY
Annual peak flow frequency analysis

Seq.001.005
Run Date / Time
09/21/2021 16:33

Station - 01439500 Bush Kill at Shoemakers, PA

TABLE 7 - EMA REPRESENTATION OF DATA

		<----- OBSERVED ----->		<----- EMA ----->		<----- USER-ENTERED ----->		<----- FINAL ----->	
WATER	YEAR	Q_LOWER	Q_UPPER	Q_LOWER	Q_UPPER	PERCEPTIBLE RANGES	PERCEPTIBLE RANGES	PERCEPTIBLE RANGES	PERCEPTIBLE RANGES
						LOWER	UPPER	LOWER	UPPER
	1909	2270.0	2270.0	2270.0	2270.0	0.0	INF	0.0	INF
	1910	1190.0	1190.0	1190.0	1190.0	0.0	INF	0.0	INF
	1911	1120.0	1120.0	1120.0	1120.0	0.0	INF	0.0	INF
	1912	1190.0	1190.0	1190.0	1190.0	0.0	INF	0.0	INF
	1913	1350.0	1350.0	1350.0	1350.0	0.0	INF	0.0	INF
	1914	1350.0	1350.0	1350.0	1350.0	0.0	INF	0.0	INF
	1915	2070.0	2070.0	2070.0	2070.0	0.0	INF	0.0	INF
	1916	1430.0	1430.0	1430.0	1430.0	0.0	INF	0.0	INF
	1917	1510.0	1510.0	1510.0	1510.0	0.0	INF	0.0	INF
	1918	1970.0	1970.0	1970.0	1970.0	0.0	INF	0.0	INF
	1919	2380.0	2380.0	2380.0	2380.0	0.0	INF	0.0	INF
	1920	5250.0	5250.0	5250.0	5250.0	0.0	INF	0.0	INF
	1921	1780.0	1780.0	1780.0	1780.0	0.0	INF	0.0	INF
	1922	1780.0	1780.0	1780.0	1780.0	0.0	INF	0.0	INF
	1923	1270.0	1270.0	1270.0	1270.0	0.0	INF	0.0	INF
	1924	2830.0	2830.0	2830.0	2830.0	0.0	INF	0.0	INF
	1925	1430.0	1430.0	1430.0	1430.0	0.0	INF	0.0	INF
	1926	2380.0	2380.0	2380.0	2380.0	0.0	INF	0.0	INF
	1927	2830.0	2830.0	2830.0	2830.0	0.0	INF	0.0	INF
	1928	1970.0	1970.0	1970.0	1970.0	0.0	INF	0.0	INF
	1929	1190.0	1190.0	1190.0	1190.0	0.0	INF	0.0	INF
	1930	1150.0	1150.0	1150.0	1150.0	0.0	INF	0.0	INF
	1931	1080.0	1080.0	1080.0	1080.0	0.0	INF	0.0	INF
	1932	1430.0	1430.0	1430.0	1430.0	0.0	INF	0.0	INF
	1933	3070.0	3070.0	3070.0	3070.0	0.0	INF	0.0	INF
	1934	1040.0	1040.0	1040.0	1040.0	0.0	INF	0.0	INF
	1935	3330.0	3330.0	3330.0	3330.0	0.0	INF	0.0	INF
	1936	4770.0	4770.0	4770.0	4770.0	0.0	INF	0.0	INF
	1937	1240.0	1240.0	1240.0	1240.0	0.0	INF	0.0	INF
	1938	2070.0	2070.0	2070.0	2070.0	0.0	INF	0.0	INF
	1939	2540.0	2540.0	2540.0	2540.0	0.0	INF	0.0	INF
	1940	2790.0	2790.0	2790.0	2790.0	0.0	INF	0.0	INF
	1941	1220.0	1220.0	1220.0	1220.0	0.0	INF	0.0	INF
	1942	2920.0	2920.0	2920.0	2920.0	0.0	INF	0.0	INF
	1943	1710.0	1710.0	1710.0	1710.0	0.0	INF	0.0	INF
	1944	1500.0	1500.0	1500.0	1500.0	0.0	INF	0.0	INF
	1945	3900.0	3900.0	3900.0	3900.0	0.0	INF	0.0	INF
	1946	2080.0	2080.0	2080.0	2080.0	0.0	INF	0.0	INF
	1947	1580.0	1580.0	1580.0	1580.0	0.0	INF	0.0	INF
	1948	2080.0	2080.0	2080.0	2080.0	0.0	INF	0.0	INF
	1949	1780.0	1780.0	1780.0	1780.0	0.0	INF	0.0	INF
	1950	1540.0	1540.0	1540.0	1540.0	0.0	INF	0.0	INF
	1951	2860.0	2860.0	2860.0	2860.0	0.0	INF	0.0	INF
	1952	2980.0	2980.0	2980.0	2980.0	0.0	INF	0.0	INF
	1953	4680.0	4680.0	4680.0	4680.0	0.0	INF	0.0	INF
	1954	928.0	928.0	928.0	928.0	0.0	INF	0.0	INF
	1955	23400.0	23400.0	23400.0	23400.0	0.0	INF	0.0	INF
	1956	3680.0	3680.0	3680.0	3680.0	0.0	INF	0.0	INF

PEAK_BUSH KILL AT GAGE01439500.PRT

1957	1460.0	1460.0	1460.0	1460.0	0.0	INF	0.0	INF
1958	3050.0	3050.0	3050.0	3050.0	0.0	INF	0.0	INF
1959	1260.0	1260.0	1260.0	1260.0	0.0	INF	0.0	INF
1960	1800.0	1800.0	1800.0	1800.0	0.0	INF	0.0	INF
1961	1890.0	1890.0	1890.0	1890.0	0.0	INF	0.0	INF
1962	1060.0	1060.0	1060.0	1060.0	0.0	INF	0.0	INF
1963	2680.0	2680.0	2680.0	2680.0	0.0	INF	0.0	INF
1964	1800.0	1800.0	1800.0	1800.0	0.0	INF	0.0	INF
1965	804.0	804.0	804.0	804.0	0.0	INF	0.0	INF
1966	880.0	880.0	880.0	880.0	0.0	INF	0.0	INF
1967	1200.0	1200.0	1200.0	1200.0	0.0	INF	0.0	INF
1968	2290.0	2290.0	2290.0	2290.0	0.0	INF	0.0	INF
1969	7300.0	7300.0	7300.0	7300.0	0.0	INF	0.0	INF
1970	3130.0	3130.0	3130.0	3130.0	0.0	INF	0.0	INF
1971	2070.0	2070.0	2070.0	2070.0	0.0	INF	0.0	INF
1972	3360.0	3360.0	3360.0	3360.0	0.0	INF	0.0	INF
1973	1730.0	1730.0	1730.0	1730.0	0.0	INF	0.0	INF
1974	4280.0	4280.0	4280.0	4280.0	0.0	INF	0.0	INF
1975	2910.0	2910.0	2910.0	2910.0	0.0	INF	0.0	INF
1976	2830.0	2830.0	2830.0	2830.0	0.0	INF	0.0	INF
1977	2120.0	2120.0	2120.0	2120.0	0.0	INF	0.0	INF
1978	4720.0	4720.0	4720.0	4720.0	0.0	INF	0.0	INF
1979	2830.0	2830.0	2830.0	2830.0	0.0	INF	0.0	INF
1980	2670.0	2670.0	2670.0	2670.0	0.0	INF	0.0	INF
1981	2770.0	2770.0	2770.0	2770.0	0.0	INF	0.0	INF
1982	1300.0	1300.0	1300.0	1300.0	0.0	INF	0.0	INF
1983	3160.0	3160.0	3160.0	3160.0	0.0	INF	0.0	INF
1984	3340.0	3340.0	3340.0	3340.0	0.0	INF	0.0	INF
1985	1420.0	1420.0	1420.0	1420.0	0.0	INF	0.0	INF
1986	2730.0	2730.0	2730.0	2730.0	0.0	INF	0.0	INF
1987	2580.0	2580.0	2580.0	2580.0	0.0	INF	0.0	INF
1988	1260.0	1260.0	1260.0	1260.0	0.0	INF	0.0	INF
1989	2120.0	2120.0	2120.0	2120.0	0.0	INF	0.0	INF
1990	3260.0	3260.0	3260.0	3260.0	0.0	INF	0.0	INF
1991	2470.0	2470.0	2470.0	2470.0	0.0	INF	0.0	INF
1992	1780.0	1780.0	1780.0	1780.0	0.0	INF	0.0	INF
1993	3210.0	3210.0	3210.0	3210.0	0.0	INF	0.0	INF
1994	1750.0	1750.0	1750.0	1750.0	0.0	INF	0.0	INF
1995	1280.0	1280.0	1280.0	1280.0	0.0	INF	0.0	INF
1996	4990.0	4990.0	4990.0	4990.0	0.0	INF	0.0	INF
1997	3060.0	3060.0	3060.0	3060.0	0.0	INF	0.0	INF
1998	1450.0	1450.0	1450.0	1450.0	0.0	INF	0.0	INF
1999	1360.0	1360.0	1360.0	1360.0	0.0	INF	0.0	INF
2000	895.0	895.0	895.0	895.0	0.0	INF	0.0	INF
2001	1930.0	1930.0	1930.0	1930.0	0.0	INF	0.0	INF
2002	1210.0	1210.0	1210.0	1210.0	0.0	INF	0.0	INF
2003	2340.0	2340.0	2340.0	2340.0	0.0	INF	0.0	INF
2004	5330.0	5330.0	5330.0	5330.0	0.0	INF	0.0	INF
2005	5670.0	5670.0	5670.0	5670.0	0.0	INF	0.0	INF
2006	5380.0	5380.0	5380.0	5380.0	0.0	INF	0.0	INF
2007	2790.0	2790.0	2790.0	2790.0	0.0	INF	0.0	INF
2008	2750.0	2750.0	2750.0	2750.0	0.0	INF	0.0	INF
2009	2590.0	2590.0	2590.0	2590.0	0.0	INF	0.0	INF
2010	1940.0	1940.0	1940.0	1940.0	0.0	INF	0.0	INF
2011	5480.0	5480.0	5480.0	5480.0	0.0	INF	0.0	INF
2012	1480.0	1480.0	1480.0	1480.0	0.0	INF	0.0	INF
2013	1740.0	1740.0	1740.0	1740.0	0.0	INF	0.0	INF
2014	2030.0	2030.0	2030.0	2030.0	0.0	INF	0.0	INF
2015	2790.0	2790.0	2790.0	2790.0	0.0	INF	0.0	INF
2016	2220.0	2220.0	2220.0	2220.0	0.0	INF	0.0	INF
2017	1970.0	1970.0	1970.0	1970.0	0.0	INF	0.0	INF
2018	1550.0	1550.0	1550.0	1550.0	0.0	INF	0.0	INF
2019	2070.0	2070.0	2070.0	2070.0	0.0	INF	0.0	INF
2020	1530.0	1530.0	1530.0	1530.0	0.0	INF	0.0	INF

1

End PeakFQ analysis.

Stations processed : 1
 Number of errors : 0
 Stations skipped : 0
 Station years : 112

Data records may have been ignored for the stations listed below.
 (Card type must be Y, Z, N, H, I, 2, 3, 4, or *.)
 (2, 4, and * records are ignored.)

For the station below, the following records were ignored:

FINISHED PROCESSING STATION: 01439500 USGS Bush Kill at Shoemakers, PA

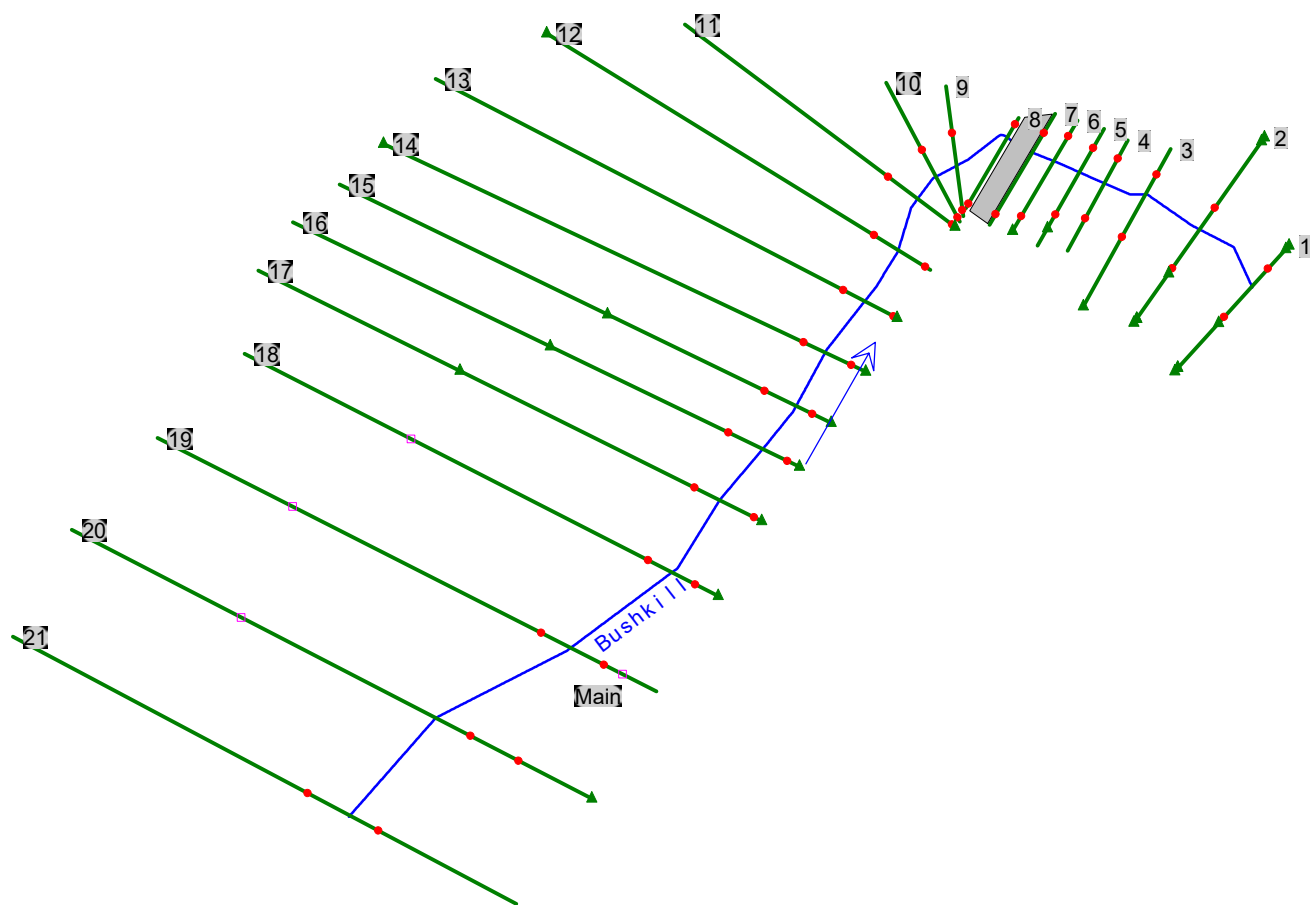
For the station below, the following records were ignored:

FINISHED PROCESSING STATION:

Region 1								
	$Q/Q_g = (A/A_g)^b$							
	Ag=	117	sq. mi	A=	157	sq. mi	(A/Ag)=	1.34188
		Qg				b		Q
0.995	852.7	903.5		1.005		0.7700		1133.1
0.99	894.9	939.5		1.010				
0.95	1055	1081		1.053				
0.9	1177	1193		1.111				
0.8	1375	1377		1.250				
0.6667	1627	1617		1.500				
0.5	1992	1970		2.000		0.7199		2434.5
0.4292	2184	2159		2.330				
0.2	3212	3187		5.000		0.6931		3907.5
0.1	4317	4322		10.000		0.6803		5279.2
0.04	6138	6239		25.000		0.6679		7593.0
0.02	7863	8102		50.000		0.6606		9839.2
0.01	9966	10420		100.000		0.6543		12630.8
0.005	12530	13300		200.000		0.6489		16096.3
0.002	16790	18190		500.000		0.6430		21976.2

APPENDIX B

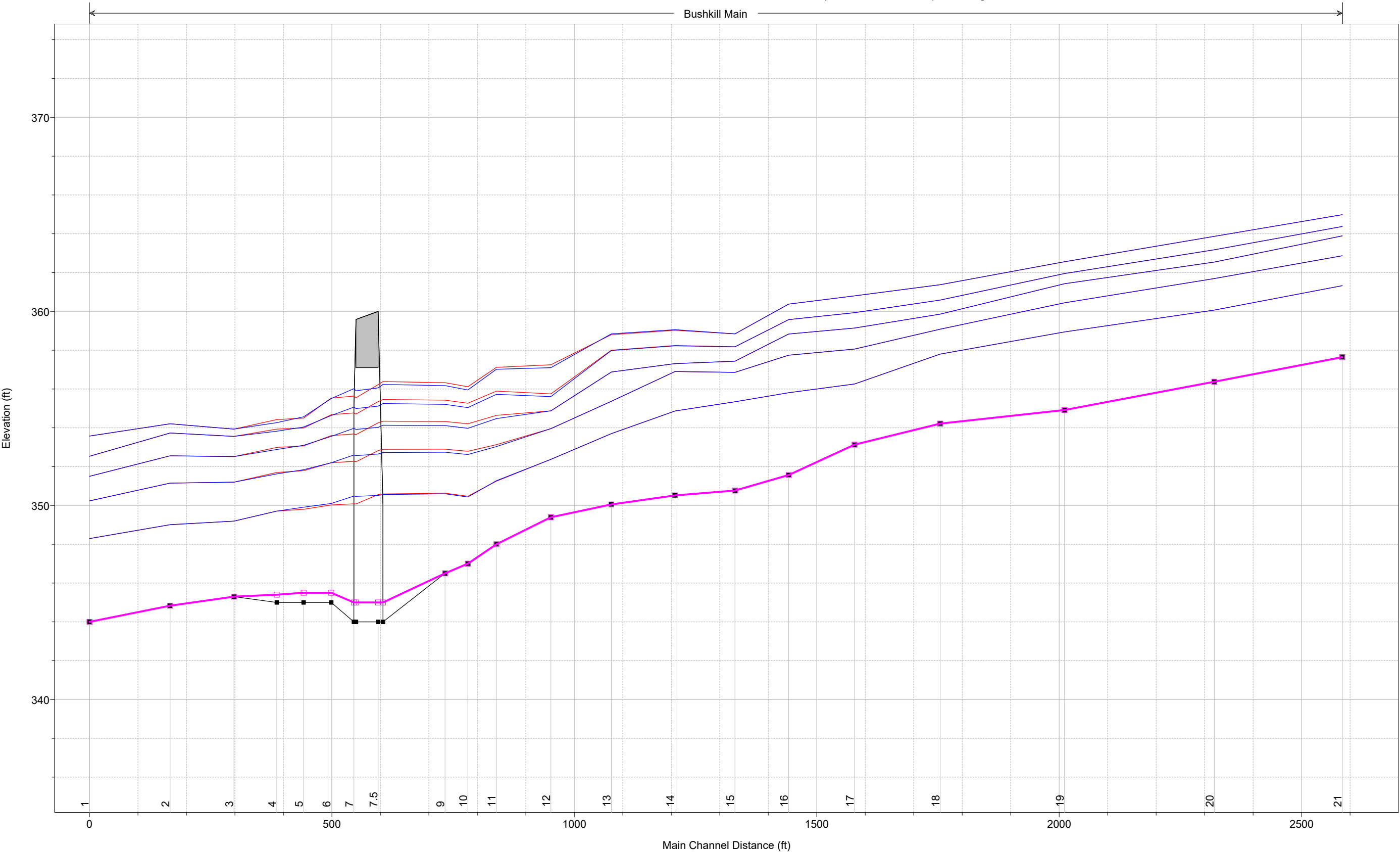
HYDRAULIC ANALYSIS RESULTS



Bushkill Creek at US Route 209

Plan: 1) Maintenance 2) Existing

Bushkill Main



Legend	
WS 100-yr - Maintenance	
WS 100-yr - Existing	
WS 50-yr - Maintenance	
WS 50-yr - Existing	
WS 25-yr - Existing	
WS 25-yr - Maintenance	
WS 10-yr - Existing	
WS 10-yr - Maintenance	
WS 2-yr - Existing	
WS 2-yr - Maintenance	
Ground	
Ground	

1 in Horiz. = 200 ft 1 in Vert. = 5 ft

HEC-RAS HEC-RAS 6.2 March 2022
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X  X          X  X      X  X      X
X      X  X          X          X  X      X  X      X
XXXXXXX XXXX      X          XXX XXXX      XXXXXX      XXXX
X      X  X          X          X  X      X  X          X
X      X  X          X  X          X  X      X  X          X
X      X  XXXXXX      XXXX      X  X      X  X      XXXXX

```

PROJECT DATA

Project Title: Bushkill Creek at US Route 209
Project File : Bushkill_12.prj
Run Date and Time: 10/20/2022 10:08:53 PM

Project in English units

Project Description:

Floodplain Study for Bushkill Creek at US Route 209, Pike County, Pennsylvania

PLAN DATA

Plan Title: Existing Condition

Plan File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.p01

Geometry Title: Existing Condition

Geometry File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.g01

Flow Title : Peak Discharges

Flow File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.f01

Plan Summary Information:

Number of: Cross Sections =	21	Multiple Openings =	0
Culverts =	0	Inline Structures =	0
Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed at all cross sections
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Peak Discharges

Flow File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.f01

Flow Data (cfs)

River	Reach	RS	2-yr	10-yr	25-yr	50-yr	100-yr
Bushkill	Main	21	2435	5279	7593	9839	12630

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Bushkill	Main	2-yr		Normal S = 0.005
Bushkill	Main	10-yr		Normal S = 0.005
Bushkill	Main	25-yr		Normal S = 0.005
Bushkill	Main	50-yr		Normal S = 0.005
Bushkill	Main	100-yr		Normal S = 0.003

GEOMETRY DATA

Geometry Title: Existing Condition

Geometry File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.g01

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 21

INPUT

Description:

Station	Elevation	Data	num=	453						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	366.61	2.5	366.44	5	366.29	7.5	366.26	10	366.19	
12.5	366.01	14.99	365.93	17.49	365.88	19.99	365.78	22.49	365.8	
24.99	365.77	27.49	365.65	29.99	365.54	32.49	365.63	34.99	365.79	
37.49	365.79	39.98	365.83	42.48	365.71	44.98	365.65	47.48	365.68	
49.98	365.68	52.48	365.74	54.98	365.86	57.48	365.96	59.98	366.04	
62.48	366.07	64.98	366.14	67.47	366.2	69.97	366.25	72.47	366.26	
79.97	366.35	82.47	366.37	84.97	366.39	87.47	366.43	89.97	366.46	
92.46	366.49	94.96	366.47	97.46	366.44	99.96	366.3	102.46	366.05	
104.96	365.99	107.46	365.96	109.96	365.9	112.46	365.89	114.96	365.79	
117.46	365.72	119.95	365.67	122.45	365.6	124.95	365.47	127.45	365.33	
129.95	365.25	132.45	365.23	134.95	365.26	137.45	365.36	139.95	365.54	
142.45	365.8	144.95	366.05	147.44	366.21	149.94	366.24	152.44	366.38	
154.94	366.61	159.94	367.07	162.44	367.4	164.94	367.61	167.44	367.72	
169.94	367.87	172.43	367.92	174.93	368.08	177.43	368.17	179.93	368.28	
182.43	368.22	184.93	368.26	187.43	368.34	189.93	368.42	192.43	368.5	
194.93	368.55	197.42	368.83	199.92	369.02	202.42	368.94	204.92	368.96	
207.42	368.93	209.92	368.8	212.42	368.46	214.92	368.32	217.42	368.26	
219.92	368.25	222.42	368.22	224.91	368.16	227.41	368.15	229.91	368.19	

232.41	368.15	234.91	368.04	237.41	367.82	239.91	367.54	242.41	367.3
244.91	367.09	247.41	366.83	249.91	366.55	252.4	366.41	254.9	366.3
257.4	366.17	259.9	366.1	262.4	366.09	264.9	366.09	267.4	366.08
269.9	366.07	274.9	366.25	277.39	366.35	279.89	366.4	284.89	366.42
287.39	366.42	289.89	366.35	292.39	366.24	294.89	366.13	297.39	366.06
299.89	365.94	302.39	365.86	304.88	365.7	309.88	365.3	312.38	365.14
314.88	364.98	317.38	364.8	319.88	364.62	322.38	364.38	324.88	364.2
327.38	364.06	329.87	363.97	332.37	363.94	334.87	363.81	337.37	363.51
339.87	363.44	342.37	363.38	344.87	363.33	347.37	363.37	349.87	363.47
352.37	363.58	354.87	363.76	357.36	363.98	359.86	364.15	362.36	364.26
364.86	364.38	367.36	364.54	369.86	364.8	372.36	364.68	374.86	364.38
377.36	364.13	379.86	364.01	382.35	363.98	384.85	363.85	387.35	363.75
394.85	363.39	397.35	363.31	399.85	363.26	402.35	363.2	404.85	363.15
407.35	363.08	409.84	362.95	412.34	362.9	414.84	362.95	417.34	362.92
419.84	362.78	422.34	362.67	424.84	362.55	427.34	362.37	429.84	362.18
432.34	361.97	434.83	361.76	437.33	361.62	439.83	361.58	442.33	361.61
444.83	361.7	447.33	361.76	449.83	361.79	452.33	361.8	457.33	361.82
459.83	361.84	462.32	361.85	464.82	361.92	467.32	361.92	469.82	361.96
472.32	362	474.82	361.91	477.32	361.99	479.82	362.2	482.32	362.43
484.82	362.77	487.32	362.83	489.81	362.72	492.31	362.84	494.81	362.81
497.31	362.8	499.81	362.8	502.31	362.89	504.81	362.91	507.31	362.92
509.81	362.89	512.31	362.85	514.8	362.76	517.3	362.66	519.8	362.7
522.3	362.87	524.8	363.13	527.3	363.37	529.8	363.62	532.3	363.88
534.8	364.16	537.3	364.33	539.8	364.43	542.29	364.45	544.79	364.48
547.29	364.46	549.79	364.43	552.29	364.32	554.79	364.27	557.29	364.13
559.79	363.97	562.29	363.82	564.79	363.64	567.28	363.37	569.78	363.2
572.28	363.16	574.78	363.1	577.28	363.02	579.78	362.93	582.28	362.95
584.78	363.07	587.28	363.09	589.78	363.07	592.28	363.02	594.77	363.05
597.27	363.27	599.77	363.4	602.27	363.27	604.77	363.12	607.27	363.17
609.77	363.17	614.77	363.33	617.27	363.42	619.77	363.44	622.26	363.31
624.76	363.02	627.26	362.75	629.76	362.62	632.26	362.48	634.76	362.27
637.26	362.1	639.76	361.95	642.26	361.84	644.76	361.6	647.26	361.41
649.75	361.21	652.25	361.07	654.75	361.18	657.25	361.38	659.75	361.58
662.25	361.74	664.75	361.87	667.25	361.94	669.75	361.97	672.25	361.96
674.74	361.95	677.24	361.67	679.74	361.03	682.24	360.12	684.74	359.33
687.24	358.58	689.74	358.2	692.24	357.96	694.74	357.74	697.24	357.64
699.74	357.67	702.23	357.71	704.73	357.75	707.23	357.81	709.73	358.12
712.23	358.71	714.73	359.04	717.23	359.23	719.73	359.39	722.23	359.53
724.73	359.74	727.23	359.79	729.72	359.79	732.22	359.77	734.72	359.71
737.22	359.61	739.72	359.55	742.22	359.67	744.72	359.75	747.22	359.72
749.72	359.67	752.22	359.49	754.72	359.22	757.21	358.82	759.71	358.69
762.21	358.71	764.71	358.65	767.21	358.57	769.71	358.53	772.21	358.47
774.71	358.38	777.21	358.19	779.71	357.97	782.21	357.93	784.7	357.97
787.2	357.96	789.7	357.99	792.2	357.94	794.7	357.85	797.2	357.8
799.7	357.76	802.2	357.79	804.7	357.83	807.2	357.85	809.7	357.91
812.19	357.99	814.69	357.98	817.19	357.88	819.69	357.92	822.19	358.02
824.69	357.89	827.19	357.73	829.69	357.81	832.19	357.88	834.69	358.11
837.18	359.07	839.68	361.07	842.18	363.47	844.68	365.19	847.18	365.44
849.68	365.43	852.18	365.37	854.68	365.45	857.18	364.88	859.68	364.21
862.18	363.64	864.67	362.86	867.17	361.74	869.67	360.73	872.17	359.77
874.67	359.26	877.17	359.13	879.67	358.91	882.17	358.62	884.67	358.52
887.17	358.72	889.67	359.16	892.16	359.81	894.66	361.67	897.16	363.5
899.66	363.85	902.16	364.11	904.66	364.1	907.16	364.09	909.66	364.16
912.16	364.24	914.66	364.33	917.15	364.21	919.65	364.11	922.15	363.99
924.65	363.86	927.15	363.71	929.65	363.59	932.15	363.61	934.65	363.59
937.15	363.55	939.65	363.58	942.15	363.83	944.64	363.89	947.14	363.75
949.64	363.66	952.14	363.6	954.64	363.74	957.14	363.71	959.64	363.66
962.14	363.79	967.14	363.65	969.64	363.6	972.13	363.6	974.63	363.56
977.13	363.5	979.63	363.51	982.13	363.46	984.63	363.39	987.13	363.5
989.63	363.67	992.13	363.65	994.63	363.43	997.13	363.33	999.62	363.35
1002.12	363.35	1004.62	363.33	1007.12	363.36	1009.62	363.4	1012.12	363.37

1014.62	363.35	1017.12	363.47	1019.62	363.7	1022.12	363.69	1024.61	363.69
1027.11	363.74	1029.61	363.72	1032.11	363.66	1034.61	363.61	1037.11	363.63
1039.61	363.71	1042.11	363.83	1044.61	363.99	1047.11	364.16	1049.61	364.13
1052.1	364.16	1054.6	364.23	1057.1	364.21	1059.6	364.14	1062.1	363.94
1064.6	363.85	1067.1	363.83	1069.6	363.85	1072.1	363.8	1074.6	363.71
1077.1	363.66	1079.59	363.57	1082.09	363.52	1084.59	363.5	1087.09	363.6
1089.59	363.67	1092.09	363.51	1094.59	363.42	1097.09	363.38	1099.59	363.38
1102.09	363.31	1104.59	363.27	1107.08	363.25	1109.58	363.24	1112.08	363.38
1114.58	363.47	1117.08	363.57	1119.58	363.7	1122.08	363.96	1124.58	364.28
1127.08	364.57	1129.58	364.8	1132.07	365.04	1134.57	365.24	1137.07	365.48
1139.57	365.74	1142.07	366	1144.57	366.22	1147.07	366.39	1149.57	366.32
1152.07	366.3	1154.57	366.3	1157.07	366.35				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	677.24	.035	839.68	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	677.24	839.68		256	263.74	260		.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 20

INPUT

Description:

Station	Elevation	Data	num=	470					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	366.05	2.5	366.17	4.99	366.25	7.49	366.27	9.99	366.33
12.48	366.42	14.98	366.42	17.48	366.44	19.97	366.64	22.47	366.84
24.96	366.91	27.46	366.88	29.96	366.84	32.45	366.85	34.95	366.79
37.45	366.71	39.94	366.64	42.44	366.63	44.94	366.63	47.43	366.56
49.93	366.55	52.43	366.66	54.92	366.79	57.42	366.78	59.91	366.81
62.41	366.83	64.91	366.69	67.4	366.6	69.9	366.63	72.4	366.65
74.89	366.6	77.39	366.55	79.89	366.51	82.38	366.35	84.88	366.28
87.38	366.24	89.87	366.16	92.37	366.11	94.86	366.03	97.36	366.04
99.86	365.94	102.35	365.83	104.85	365.87	107.35	365.83	109.84	365.82
112.34	365.85	114.84	365.84	117.33	365.74	119.83	365.64	122.33	365.59
124.82	365.52	127.32	365.41	129.81	365.35	132.31	365.28	134.81	365.29
137.3	365.29	139.8	365.22	142.3	365.12	144.79	365.1	147.29	365.12
149.79	365.04	152.28	365.05	154.78	365.03	157.28	365	159.77	364.97
162.27	364.99	164.76	365.03	167.26	365.08	169.76	365.12	172.25	365.31
174.75	365.37	177.25	365.38	179.74	365.36	182.24	365.28	184.74	365.17
187.23	365.15	189.73	365.23	192.23	365.14	194.72	365.18	197.22	365.13
199.71	365	202.21	364.91	204.71	364.9	207.2	364.78	209.7	364.69
212.2	364.74	214.69	364.7	217.19	364.56	219.69	364.49	222.18	364.35
224.68	364.31	227.18	364.35	229.67	364.29	232.17	364.24	234.66	364.16
237.16	364.18	239.66	364.16	242.15	364.1	244.65	364.09	247.15	364.11
249.64	364.07	252.14	364.03	254.64	363.9	257.13	363.91	259.63	363.95
262.13	363.95	264.62	363.98	267.12	364.05	269.62	364.05	272.11	364.04
274.61	364.08	277.1	364.16	279.6	364.4	282.1	364.49	284.59	364.49
287.09	364.4	289.59	364.33	292.08	364.25	294.58	364.18	297.08	364.16
299.57	364.11	302.07	364.02	304.57	364.04	307.06	364.03	309.56	363.99
312.05	363.9	314.55	363.89	317.05	363.81	319.54	363.65	322.04	363.65
324.54	363.63	327.03	363.69	329.53	363.87	332.03	363.95	334.52	363.77
337.02	363.65	339.52	363.72	342.01	363.84	344.51	363.97	347	364.02
349.5	363.96	352	364.01	354.49	364.02	356.99	363.99	359.49	364
361.98	364.01	364.48	364.04	366.98	364.1	369.47	364.1	371.97	364.14
374.47	364.24	376.96	364.26	379.46	364.27	381.95	364.36	384.45	364.42

386.95	364.44	389.44	364.32	391.94	364.11	394.44	364.03	396.93	364.11
399.43	364.17	401.93	364.23	404.42	364.21	406.92	364.09	409.42	364.01
411.91	364	414.41	364.03	416.9	363.92	419.4	363.72	421.9	363.56
424.39	363.44	426.89	363.32	429.39	363.11	431.88	362.9	434.38	362.57
436.88	362.36	439.37	362.36	441.87	362.31	444.37	362.2	446.86	362.08
449.36	361.96	451.85	361.84	454.35	361.77	456.85	361.76	459.34	361.72
461.84	361.7	464.34	361.63	466.83	361.61	469.33	361.59	471.83	361.52
474.32	361.39	476.82	361.33	481.81	361.33	484.31	361.28	486.8	361.34
489.3	361.25	491.8	361.1	494.29	361.13	496.79	361.23	499.29	361.25
501.78	361.31	504.28	361.56	506.78	361.66	509.27	361.7	511.77	361.8
514.27	361.96	516.76	362.11	519.26	361.98	521.75	361.89	524.25	361.9
526.75	361.96	529.24	361.98	531.74	361.9	534.24	361.89	536.73	362
539.23	361.96	541.73	361.99	544.22	362.09	546.72	362.17	549.22	362.11
551.71	362.05	554.21	362.12	556.7	362.26	559.2	362.35	561.7	362.34
564.19	362.32	566.69	362.36	569.19	362.3	571.68	362.24	574.18	362.13
576.68	362.1	579.17	362.05	581.67	361.94	584.17	361.88	586.66	361.9
589.16	361.91	591.65	361.92	594.15	361.97	596.65	361.94	599.14	362.02
601.64	362.16	604.14	362.21	606.63	362.03	609.13	361.94	611.63	361.87
614.12	361.86	616.62	361.8	619.11	361.73	621.61	361.58	624.11	361.47
626.6	361.42	629.1	361.38	631.6	361.35	634.09	361.4	636.59	361.35
639.09	361.27	641.58	361.29	644.08	361.3	646.58	361.27	649.07	361.36
651.57	361.35	654.06	361.28	656.56	361.27	659.06	361.24	661.55	361.17
664.05	361.09	666.55	361	669.04	360.89	674.04	360.63	676.53	360.54
679.03	360.61	681.53	360.83	684.02	360.95	686.52	361.14	689.01	361.36
691.51	361.52	694.01	361.56	696.5	361.64	699	361.74	701.5	361.8
703.99	361.88	708.99	362	711.48	362.06	713.98	362.07	716.48	362.05
718.97	361.99	721.47	361.96	723.96	361.91	728.96	361.77	731.45	361.74
733.95	361.75	736.45	361.85	738.94	361.89	741.44	361.76	743.94	361.47
746.43	361.26	748.93	361.03	751.42	360.81	753.92	360.99	756.42	361.15
758.91	360.98	761.41	360.83	763.91	360.74	766.4	360.59	768.9	360.4
771.4	360.34	773.89	360.04	776.39	359.48	778.89	358.74	781.38	357.93
783.88	357.38	786.37	357.19	788.87	357.2	791.37	357.23	793.86	357.21
796.36	357.21	798.86	357.25	801.35	357.23	803.85	357.21	806.35	357.25
808.84	357.14	811.34	357.06	813.84	357.13	816.33	357.13	818.83	357.09
821.32	357.1	826.32	357.1	828.81	357.12	831.31	357.11	833.81	357.09
836.3	357.06	838.8	357.09	841.3	357.1	843.79	357.12	846.29	357.12
848.78	357.11	851.28	357.05	853.78	357.09	856.27	357.12	861.27	357.06
863.76	357.04	866.26	357.05	868.76	357.05	871.25	357.04	873.75	357.25
876.25	357.47	878.74	357.88	881.24	358.16	883.73	358.43	886.23	358.82
888.73	359.5	891.22	360.31	893.72	360.71	896.22	360.65	898.71	360.51
901.21	360.34	903.71	360.13	906.2	359.98	908.7	360.09	911.2	360.16
913.69	359.89	916.19	359.31	918.68	358.67	921.18	357.98	923.68	357.78
926.17	357.84	928.67	357.95	931.17	358.08	933.66	358.08	936.16	358.05
938.66	358.08	941.15	357.98	943.65	357.96	946.15	357.82	948.64	357.72
951.14	357.7	953.63	357.65	956.13	357.65	958.63	357.59	961.12	357.53
963.62	357.55	966.12	357.55	968.61	357.49	971.11	357.29	973.61	357.04
976.1	356.69	978.6	356.48	981.09	356.42	986.09	356.4	988.58	356.43
991.08	356.42	993.58	356.41	996.07	356.41	998.57	356.43	1001.07	356.43
1003.56	356.42	1006.06	356.37	1008.56	356.64	1011.05	357.38	1013.55	358.03
1016.04	358.85	1018.54	359.57	1021.04	360.19	1023.53	360.49	1026.03	360.61
1028.53	360.65	1031.02	361	1033.52	361.33	1036.02	361.51	1038.51	361.28
1041.01	360.81	1043.51	360.53	1046	360.53	1048.5	360.58	1050.99	360.59
1053.49	360.59	1055.99	360.49	1058.48	360.39	1060.98	360.53	1063.48	360.7
1065.97	360.82	1068.47	360.79	1070.97	360.75	1073.46	360.87	1075.96	361.07
1078.46	361.09	1080.95	361.22	1083.45	361.19	1085.95	361.15	1088.44	361.24
1090.94	361.24	1093.43	361.33	1095.93	361.43	1098.43	361.48	1100.92	361.52
1103.42	361.55	1105.92	361.66	1108.41	361.73	1110.91	361.69	1113.41	361.73
1115.9	361.64	1118.4	361.66	1120.9	361.86	1123.39	362	1125.89	362
1128.39	362.06	1130.88	361.96	1133.38	361.75	1135.87	361.82	1138.37	362.14
1140.87	362.41	1143.36	362.6	1145.86	362.77	1148.36	362.89	1150.85	362.91
1153.35	362.92	1155.85	362.97	1158.34	363	1160.84	363.07	1163.34	363.06

1165.83	363.22	1168.33	363.29	1170.82	363.14	1173.32	363.08	1175.82	363.13
1178.31	363.2	1180.81	363.25	1183.31	363.32	1185.8	363.4	1188.3	363.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	911.2	.035	1021.04	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	911.2	1021.04		251 309.2	255		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1188.3	1188.3	365	F

Left Levee Station= 386.95 Elevation= 364.44

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 19

INPUT

Description:

Station	Elevation	Data	num=	451						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	368.53	2.5	368.48	4.99	368.46	7.49	368.5	9.99	368.59	
12.49	368.63	14.98	368.67	17.48	368.66	19.98	368.6	22.47	368.46	
24.97	368.36	27.47	368.28	29.97	368.25	32.46	368.17	34.96	368.07	
37.46	368.03	39.95	367.97	42.45	367.9	44.95	367.85	47.45	367.82	
49.94	367.76	54.94	367.74	57.43	367.67	59.93	367.63	62.43	367.56	
64.93	367.48	67.42	367.44	69.92	367.41	72.42	367.36	74.91	367.23	
77.41	367.07	79.91	366.97	82.41	367	84.9	366.89	87.4	366.82	
89.9	366.87	92.39	367.05	94.89	366.94	97.39	366.76	99.89	366.5	
102.38	366.33	104.88	366.3	107.38	366.31	109.87	366.37	112.37	366.37	
114.87	366.36	117.37	366.36	119.86	366.43	122.36	366.38	124.86	366.41	
127.35	366.52	129.85	366.64	132.35	366.59	134.85	366.5	137.34	366.48	
139.84	366.59	142.34	366.56	144.83	366.56	147.33	366.55	149.83	366.42	
152.33	366.29	154.82	366.22	157.32	366.16	159.82	366.13	162.31	366.02	
164.81	365.87	167.31	365.78	169.81	365.73	172.3	365.59	174.8	365.51	
177.3	365.43	179.79	365.38	182.29	365.36	184.79	365.29	187.29	365.23	
189.78	365.21	192.28	365.21	194.78	365.11	197.27	365.03	199.77	364.89	
202.27	364.82	204.77	364.73	207.26	364.61	209.76	364.47	212.26	364.38	
214.75	364.24	217.25	363.96	219.75	363.76	222.25	363.6	224.74	363.37	
227.24	363.1	229.74	362.85	232.23	362.56	234.73	362.24	237.23	362	
239.73	361.69	242.22	361.45	244.72	361.31	247.22	361.15	249.71	361.01	
252.21	360.89	254.71	360.8	257.21	360.67	259.7	360.59	262.2	360.69	
264.7	360.64	267.19	360.7	269.69	360.83	272.19	360.95	274.69	361.19	
277.18	361.43	279.68	361.52	282.18	361.63	284.67	361.67	287.17	361.89	
289.67	362.02	292.17	362.04	294.66	362.23	297.16	362.51	299.66	362.48	
302.15	362.54	304.65	362.64	307.15	362.66	309.65	362.56	312.14	362.44	
314.64	362.28	317.14	362.02	319.63	361.77	322.13	361.52	324.63	361.04	
327.13	360.68	329.62	360.35	332.12	360.05	334.62	359.89	337.11	359.83	
339.61	359.79	342.11	359.74	344.61	359.76	347.1	359.78	349.6	359.89	
352.1	360.16	354.59	360.28	357.09	360.3	359.59	360.2	362.09	360	
364.58	359.78	367.08	359.73	369.58	359.63	372.07	359.51	374.57	359.46	
377.07	359.59	379.57	359.6	382.06	359.56	384.56	359.64	387.06	359.61	
389.55	359.55	392.05	359.66	394.55	359.83	397.05	359.94	399.54	360.05	
402.04	360.06	404.54	360	407.03	360.05	409.53	360.2	412.03	360.27	
414.53	360.51	417.02	360.71	419.52	360.65	422.02	360.62	424.51	360.52	
427.01	360.59	429.51	360.72	432.01	360.78	434.5	360.75	437	360.61	
439.5	360.47	441.99	360.36	444.49	360.36	446.99	360.35	449.49	360.35	
451.98	360.39	454.48	360.43	456.98	360.47	459.47	360.58	461.97	360.67	

464.47	360.78	466.97	360.76	469.46	360.75	471.96	360.81	474.46	360.88
476.95	360.86	479.45	360.82	481.95	360.71	484.44	360.65	486.94	360.64
489.44	360.5	491.94	360.51	494.43	360.59	496.93	360.62	499.43	360.63
501.92	360.7	504.42	360.88	506.92	361.04	509.42	361.15	511.91	361.25
514.41	361.22	516.91	361.16	519.4	361.2	521.9	361.14	524.4	361.07
526.9	361.02	529.39	361	531.89	361	534.39	361.01	536.88	360.99
541.88	360.87	544.38	360.84	546.87	360.85	549.37	360.88	551.87	360.87
554.36	360.82	556.86	360.69	559.36	360.86	561.86	360.97	564.35	360.93
566.85	360.93	569.35	360.86	571.84	360.71	574.34	360.57	576.84	360.39
579.34	360.23	581.83	359.86	584.33	359.54	586.83	359.36	589.32	359.26
591.82	359.25	594.32	359.3	596.82	359.41	599.31	359.52	601.81	359.54
604.31	359.46	606.8	359.32	609.3	359.3	611.8	359.33	614.3	359.31
616.79	359.3	619.29	359.29	621.79	359.27	624.28	359.26	626.78	359.27
631.78	359.23	634.27	359.21	636.77	359.24	639.27	359.3	641.76	359.34
644.26	359.39	646.76	359.36	649.26	359.33	651.75	359.33	654.25	359.36
656.75	359.4	659.24	359.43	661.74	359.44	664.24	359.47	666.74	359.48
669.23	359.46	671.73	359.48	674.23	359.5	676.72	359.49	679.22	359.45
681.72	359.37	684.22	359.3	686.71	359.23	689.21	359.14	691.71	359.29
694.2	359.31	696.7	359.4	701.7	359.52	704.19	359.51	706.69	359.52
709.19	359.6	711.68	359.65	714.18	359.58	716.68	359.51	719.18	359.42
721.67	359.34	724.17	359.26	726.67	359.26	729.16	359.28	731.66	359.36
734.16	359.41	736.66	359.44	739.15	359.48	741.65	359.45	744.15	359.55
746.64	359.72	749.14	359.82	751.64	359.75	754.14	359.51	756.63	359.05
759.13	358.78	761.63	358.52	764.12	358.48	766.62	358.44	769.12	358.43
771.62	358.42	774.11	358.41	776.61	358.36	779.11	358.14	781.6	357.98
784.1	357.91	786.6	357.88	789.1	357.9	791.59	357.92	794.09	358.01
796.59	358.21	799.08	358.4	801.58	358.54	804.08	358.53	806.58	358.4
809.07	358.4	811.57	358.46	814.07	358.48	816.56	358.5	819.06	358.55
821.56	358.64	824.06	358.91	826.55	359.18	829.05	359.15	831.55	359.35
834.04	359.74	836.54	360.13	839.04	360.34	841.54	360.49	844.03	360.59
846.53	360.66	849.03	360.72	851.52	360.77	854.02	360.82	856.52	360.84
859.02	360.8	861.51	360.76	864.01	360.72	866.51	360.64	869	360.54
871.5	360.33	874	359.52	876.5	358.6	878.99	357.44	881.49	356.32
883.99	355.71	886.48	355.5	888.98	355.35	891.48	355.34	893.98	355.48
896.47	355.51	898.97	355.39	901.47	355.36	903.96	355.33	906.46	355.29
908.96	355.27	911.46	355.28	913.95	355.26	916.45	355.28	918.95	355.29
921.44	355.26	923.94	355.26	926.44	355.21	928.93	355.13	931.43	355.17
933.93	355.25	936.43	355.21	938.92	355.15	941.42	355.19	943.92	355.2
946.41	355.16	948.91	355.13	951.41	355.14	953.91	355.11	956.4	355.01
958.9	354.97	961.4	355.04	963.89	355.06	966.39	355.04	968.89	355.04
971.39	355.02	973.88	355.02	976.38	355.01	978.88	355	981.37	355.02
983.87	354.94	986.37	354.92	988.87	354.94	991.36	354.91	993.86	354.91
996.36	354.96	998.85	355.03	1001.35	355.22	1003.85	355.94	1006.35	357.1
1008.84	358.05	1011.34	358.69	1013.84	359.32	1016.33	360.04	1018.83	360.75
1021.33	361.28	1023.83	361.7	1026.32	361.91	1028.82	362	1031.32	362.21
1033.81	362.14	1036.31	361.99	1038.81	361.98	1041.31	362	1043.8	362.09
1046.3	362.14	1048.8	362.17	1051.3	362.13	1053.79	362.12	1056.29	362.31
1058.79	362.56	1061.28	362.52	1063.78	362.31	1066.28	362.19	1068.78	362.13
1071.27	362.17	1073.77	362.21	1076.27	362.1	1078.76	361.93	1081.26	361.79
1083.76	361.7	1086.26	361.66	1088.75	361.68	1093.75	361.7	1096.24	361.68
1098.74	361.69	1101.24	361.73	1103.74	361.73	1106.23	361.68	1108.73	361.66
1111.23	361.6	1113.72	361.58	1116.22	361.61	1118.72	361.61	1121.22	361.66
1123.71	361.82	1126.21	361.94	1128.71	362.01	1131.21	362.05	1133.7	362.1
1136.2	362.14								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
0	.08	874	.035	1016.33	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	874	1016.33		232	256.29	231		.1	.3

Left Levee Station= 307.15 Elevation= 362.66
Right Levee Station= 1058.79 Elevation= 362.56

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 18

INPUT

Description:

Station	Elevation	Data	num=	432						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	366.37	2.49	366.65	4.99	366.96	7.48	367.08	9.98	367.05	
12.47	366.8	14.97	366.41	17.46	366.28	19.96	366.32	22.45	366.09	
24.95	366.05	27.44	365.96	29.94	365.98	32.43	365.92	34.93	365.89	
37.42	365.87	39.92	365.79	42.41	365.73	44.91	365.64	47.4	365.57	
49.9	365.51	52.39	365.46	54.89	365.37	57.38	365.34	59.88	365.32	
62.37	365.25	64.87	365.26	67.36	365.22	69.86	365.23	72.35	365.17	
74.85	365.17	77.34	365.16	79.84	365.16	82.33	365.15	84.83	365.17	
87.32	365.17	89.82	365.12	92.31	365.1	94.81	365.11	97.3	365.13	
99.8	365.16	102.29	365.17	104.79	365.25	107.28	365.31	109.78	365.31	
112.27	365.25	114.77	365.15	117.26	365.13	119.76	365.15	122.25	365.26	
124.75	365.63	127.24	365.82	129.73	365.45	132.23	365.16	134.72	365.17	
137.22	365.06	139.71	364.97	142.21	364.91	144.7	364.78	147.2	364.64	
149.69	364.43	152.19	364.19	154.68	364.09	157.18	363.72	159.67	363.17	
162.17	362.75	164.66	362.27	167.16	361.45	169.65	360.85	172.15	360.41	
174.64	359.98	177.14	359.47	179.63	359.09	182.13	358.77	184.62	358.33	
187.12	358.12	189.61	358.16	192.11	358.16	194.6	358.15	197.1	358.12	
199.59	358.08	202.09	357.96	204.58	357.91	207.08	357.99	209.57	358.11	
212.07	358.26	214.56	358.44	217.06	358.63	219.55	358.84	222.05	359.11	
224.54	359.31	227.04	359.32	229.53	359.31	232.03	359.4	234.52	359.42	
237.02	359.45	239.51	359.57	242.01	359.67	244.5	359.88	247	359.91	
249.49	359.87	251.99	359.83	254.48	359.91	256.98	359.97	259.47	359.91	
261.97	359.74	264.46	359.57	266.96	359.62	269.45	359.88	271.94	360.09	
274.44	360	276.93	359.91	279.43	359.77	281.92	359.6	284.42	359.49	
286.91	359.39	289.41	359.4	291.9	359.47	294.4	359.58	296.89	359.59	
299.39	359.61	301.88	359.76	304.38	359.71	306.87	359.6	309.37	359.54	
311.86	359.59	314.36	359.64	316.85	359.68	319.35	359.67	321.84	359.48	
324.34	359.35	326.83	359.22	329.33	359.16	331.82	359.25	334.32	359.3	
336.81	359.19	339.31	359.18	341.8	359.16	344.3	359.23	346.79	359.32	
349.29	359.42	351.78	359.68	354.28	359.84	356.77	359.95	359.27	360.08	
361.76	360.28	364.26	360.49	366.75	360.8	369.25	361.24	371.74	361.62	
374.24	361.98	376.73	362.28	379.23	362.49	381.72	362.19	384.22	361.83	
386.71	361.38	389.21	361.1	391.7	360.95	394.2	360.88	396.69	360.85	
399.19	360.68	401.68	360.56	404.17	360.47	406.67	360.47	409.16	360.42	
411.66	360.34	414.15	360.27	416.65	360.11	419.14	359.74	421.64	359.69	
424.13	359.8	426.63	359.7	429.12	359.58	431.62	359.43	434.11	359.35	
436.61	359.35	439.1	359.34	441.6	359.31	444.09	359.22	446.59	359.15	
449.08	359.15	451.58	359.16	454.07	359.21	456.57	359.32	459.06	359.43	
461.56	359.42	464.05	359.29	466.55	359.27	469.04	359.3	471.54	359.39	
474.03	359.52	476.53	359.7	479.02	359.81	481.52	359.82	484.01	359.75	
486.51	359.7	489	359.74	491.5	359.76	493.99	359.75	496.49	359.73	
498.98	359.46	501.48	359.17	503.97	358.88	506.47	358.3	508.96	357.44	
511.46	356.58	513.95	356.21	516.45	356.13	518.94	356.1	521.44	356.1	
523.93	356.12	526.42	356.15	528.92	356.16	531.41	356.18	533.91	356.22	
536.4	356.46	538.9	356.86	541.39	357.13	543.89	357.21	546.38	357.33	
548.88	357.54	551.37	357.77	553.87	357.8	556.36	357.56	558.86	357.49	
561.35	357.64	563.85	357.55	566.34	357.46	568.84	357.5	571.33	357.6	
573.83	357.47	576.32	357.19	578.82	356.88	581.31	356.77	583.81	356.88	
586.3	357.03	588.8	357.24	591.29	357.28	593.79	357.25	596.28	357.28	

598.78	357.32	601.27	357.24	603.77	357.56	606.26	357.13	608.76	356.84
611.25	356.66	613.75	356.47	616.24	356.52	618.74	356.68	621.23	356.85
623.73	356.7	626.22	356.5	628.72	356.27	631.21	356.23	633.71	356.28
636.2	356.35	638.7	356.35	641.19	356.3	643.69	356.22	646.18	356.4
648.68	356.65	651.17	356.85	653.67	357.12	656.16	357.12	658.65	357.13
661.15	357.16	663.64	357.29	666.14	357.38	668.63	357.4	671.13	357.19
673.62	357.17	676.12	357.3	678.61	357.56	681.11	357.8	683.6	358.01
686.1	358.2	688.59	358.42	691.09	358.69	693.58	358.95	696.08	359.17
698.57	359.33	701.07	359.48	703.56	359.5	706.06	359.39	708.55	359.29
711.05	359.22	713.54	359.2	716.04	359.19	718.53	359.2	721.03	359.28
723.52	359.3	726.02	359.21	728.51	359.21	731.01	359.23	733.5	359.25
736	359.24	738.49	359.08	740.99	358.89	743.48	358.8	745.98	358.82
748.47	358.99	750.97	359.11	753.46	359.05	755.96	358.93	758.45	358.88
760.95	358.79	763.44	358.74	765.94	358.23	768.43	357.93	770.93	358.06
773.42	358.37	775.92	358.63	778.41	358.78	780.91	358.79	783.4	358.78
785.9	358.7	788.39	358.64	790.88	358.56	793.38	358.44	795.87	358.25
798.37	358.06	800.86	357.99	803.36	358	805.85	357.97	808.35	357.93
810.84	357.86	813.34	357.79	815.83	357.69	818.33	357.65	820.82	357.66
823.32	357.62	825.81	357.58	828.31	357.57	830.8	357.6	833.3	357.66
835.79	357.74	838.29	357.92	840.78	358.15	843.28	358.35	845.77	358.63
848.27	358.99	850.76	359.32	853.26	359.46	855.75	359.58	858.25	359.69
860.74	359.73	863.24	359.74	865.73	359.78	868.23	359.78	870.72	359.66
873.22	359.5	875.71	359.35	878.21	359.12	880.7	358.74	883.2	358.3
885.69	358.06	888.19	357.87	890.68	357.65	893.18	357.52	895.67	357.29
898.17	357.09	900.66	356.96	903.16	356.79	905.65	356.63	908.15	356.53
910.64	356.55	913.14	356.7	915.63	356.83	918.12	357.06	920.62	357.1
923.11	356.89	925.61	356.6	928.1	356.07	930.6	355.29	933.09	354.8
935.59	354.51	938.08	354.23	940.58	354.29	943.07	354.32	945.57	354.3
948.06	354.32	950.56	354.34	953.05	354.34	955.55	354.36	958.04	354.33
960.54	354.38	963.03	354.3	965.53	354.3	968.02	354.31	973.01	354.31
975.51	354.3	978	354.29	980.5	354.31	982.99	354.25	985.49	354.29
987.98	354.26	992.97	354.26	995.47	354.23	997.96	354.21	1000.46	354.24
1002.95	354.31	1005.45	354.26	1007.94	354.31	1010.44	354.32	1012.93	354.32
1015.43	354.3	1017.92	354.31	1020.42	354.32	1022.91	354.67	1025.41	355.72
1027.9	357.4	1030.4	358.36	1032.89	358.88	1035.39	358.9	1037.88	359.02
1040.38	359.12	1042.87	359.18	1045.36	359.19	1047.86	359.14	1050.35	359.27
1052.85	359.27	1055.34	359.22	1057.84	359.2	1060.33	359.32	1062.83	359.63
1065.32	359.92	1067.82	360.02	1070.31	360.06	1072.81	360.17	1075.3	360.26
1077.8	360.34	1080.29	360.38						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	920.62	.035	1027.9	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	920.62	1027.9		174 176.77	174	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1080.29	1080.29	362.5	F

Left Levee Station= 379.23 Elevation= 362.49

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 17

INPUT

Description:

Station	Elevation	Data	num=	452						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	

0	360.9	2.5	361.31	5	361.83	7.49	362.06	9.99	362.16
12.49	362.06	14.99	361.93	17.49	361.84	19.99	361.78	22.48	361.83
24.98	361.96	27.48	362.06	29.98	362.13	32.48	362.18	34.97	362.26
37.47	362.29	39.97	362.29	42.47	362.28	44.97	362.24	47.46	362.25
49.96	362.26	52.46	362.44	54.96	362.37	57.46	362.23	59.96	362.22
62.45	362.22	64.95	362.11	67.45	362.03	69.95	362.09	72.45	362.23
74.94	362.19	77.44	362.18	79.94	362.09	82.44	362.1	84.94	361.97
87.43	361.95	92.43	362.05	94.93	362.12	97.43	362.12	99.93	362.14
102.42	362.1	104.92	362.04	107.42	362.02	109.92	362.01	112.42	362.14
114.91	362.23	117.41	362.3	119.91	362.41	122.41	362.5	124.91	362.55
127.4	362.67	129.9	362.68	132.4	362.59	134.9	362.44	137.4	362.13
139.9	361.76	142.39	361.58	144.89	361.37	147.39	361.05	149.89	360.42
152.39	359.22	154.88	358.03	157.38	357.18	159.88	356.91	162.38	356.92
164.88	356.92	167.37	356.91	169.87	356.94	172.37	356.92	174.87	356.93
177.37	356.97	179.87	357.04	182.36	357.09	184.86	357.15	187.36	357.28
189.86	357.2	192.36	357.34	194.85	357.27	197.35	357.18	199.85	357.16
202.35	357.15	204.85	357.21	207.34	357.33	209.84	357.37	214.84	357.51
217.34	357.57	219.84	357.55	222.33	357.62	224.83	357.72	227.33	357.85
229.83	358.04	232.33	358.26	234.82	358.42	237.32	358.37	239.82	358.3
242.32	358.22	244.82	358.27	247.31	358.36	249.81	358.37	252.31	358.43
254.81	358.51	257.31	358.61	259.81	358.74	262.3	358.84	264.8	358.91
267.3	358.97	269.8	359.06	272.3	359.22	274.79	359.4	277.29	359.53
279.79	359.58	282.29	359.56	284.79	359.34	287.28	359.16	289.78	358.88
292.28	358.92	294.78	358.97	297.28	358.95	299.78	359.02	302.27	359.13
304.77	359.13	307.27	358.98	309.77	358.89	312.27	358.95	314.76	358.98
317.26	359.03	319.76	359	322.26	359.02	324.76	359.04	327.25	359.06
329.75	359.05	332.25	359.11	334.75	359.22	337.25	359.38	339.75	359.46
342.24	359.4	344.74	359.32	349.74	359.24	352.24	359.18	354.73	359.16
357.23	359.33	359.73	359.42	362.23	359.47	364.73	359.43	367.22	359.34
369.72	359.25	372.22	359.19	374.72	359.09	377.22	358.93	379.72	358.8
382.21	358.8	384.71	358.86	387.21	358.85	389.71	358.86	392.21	358.84
394.7	358.89	397.2	358.92	399.7	358.94	402.2	359.04	404.7	359.28
407.19	359.33	409.69	359.4	412.19	359.45	414.69	359.53	417.19	359.6
419.69	359.72	422.18	359.82	424.68	359.8	427.18	359.96	429.68	360.08
432.18	360.11	434.67	360.09	437.17	359.93	439.67	359.85	442.17	359.85
444.67	359.86	447.16	359.87	449.66	359.88	452.16	359.97	454.66	360.07
457.16	360.13	459.66	360.14	462.15	360.1	464.65	360.08	467.15	360.02
469.65	360.02	472.15	360.06	474.64	360	477.14	359.79	479.64	359.94
482.14	360.06	484.64	360.04	487.13	359.94	489.63	359.74	492.13	359.63
494.63	359.7	497.13	359.85	499.63	359.84	502.12	359.65	507.12	359.59
509.62	359.63	512.12	359.65	514.61	359.68	517.11	359.78	519.61	359.79
522.11	359.5	524.61	359.27	527.1	359.33	529.6	359.27	532.1	359.06
534.6	358.83	537.1	358.81	539.6	358.89	542.09	358.83	544.59	358.73
547.09	358.66	549.59	358.64	552.09	358.54	554.58	358.49	557.08	358.47
559.58	358.33	562.08	358.08	564.58	358.01	567.08	358	569.57	357.93
572.07	357.93	574.57	357.91	577.07	357.94	579.57	357.95	582.06	357.98
584.56	357.92	587.06	357.6	589.56	357.42	592.06	357.19	594.55	356.68
597.05	356.1	599.55	355.71	602.05	355.59	604.55	355.49	607.05	355.4
609.54	355.43	612.04	355.47	614.54	355.42	617.04	355.45	619.54	355.41
622.03	355.33	624.53	355.3	627.03	355.32	629.53	355.29	632.03	355.31
634.52	355.36	637.02	355.36	639.52	355.34	642.02	355.34	644.52	355.41
647.02	355.37	649.51	355.35	652.01	355.32	654.51	355.33	657.01	355.35
659.51	355.33	662	355.31	664.5	355.38	667	355.36	669.5	355.38
672	355.37	674.5	355.57	676.99	355.78	679.49	356.11	681.99	356.26
684.49	356.37	686.99	356.58	689.48	357.09	691.98	357.71	694.48	358.07
696.98	357.94	699.48	357.66	701.98	357.41	704.47	357.27	706.97	357.22
709.47	357.19	711.97	357.22	714.47	357.28	716.96	357.38	724.46	357.47
726.96	357.56	729.45	357.7	731.95	357.79	734.45	357.9	736.95	357.92
739.45	357.92	741.95	357.9	744.44	357.92	746.94	358.03	749.44	358.15
751.94	358.18	754.44	358.25	756.93	358.22	759.43	358.22	761.93	358.23
764.43	358.2	766.93	358.19	769.43	358.14	771.92	358.12	774.42	358.13

776.92	358.16	779.42	358.21	781.92	358.21	784.41	358.19	786.91	358.05
789.41	357.96	791.91	358.04	794.41	358.15	796.9	358.17	799.4	358.2
801.9	358.07	804.4	357.82	806.9	357.71	809.4	357.62	811.89	357.56
814.39	357.6	816.89	357.59	819.39	357.57	821.89	357.55	824.38	357.58
826.88	357.63	829.38	357.73	831.88	357.62	834.38	357.62	836.88	357.54
839.37	357.62	841.87	357.75	844.37	357.96	846.87	358.05	849.37	357.96
851.86	357.77	854.36	357.67	856.86	357.68	859.36	357.66	861.86	357.71
864.35	357.65	866.85	357.62	869.35	357.53	871.85	357.48	874.35	357.48
876.85	357.43	879.34	357.47	881.84	357.4	884.34	357.32	886.84	357.07
889.34	356.79	891.83	356.62	894.33	356.51	896.83	356.33	899.33	356.23
901.83	356.21	904.33	356.23	906.82	356.22	909.32	356.23	911.82	356.16
914.32	356.11	916.82	356.05	919.31	355.89	921.81	355.82	924.31	355.87
926.81	355.92	929.31	355.94	931.8	356.08	934.3	356.2	936.8	356.22
939.3	356.27	941.8	356.48	944.3	357.02	946.79	357.86	949.29	358.53
951.79	358.79	954.29	358.86	956.79	358.9	959.28	358.92	961.78	358.9
964.28	358.84	966.78	358.76	969.28	358.63	971.78	358.44	974.27	358.05
976.77	357.53	979.27	357.14	981.77	357.14	984.27	357.6	986.76	357.69
989.26	356.99	991.76	356.1	994.26	355.6	996.76	355	999.25	354.4
1001.75	353.87	1004.25	353.64	1006.75	353.51	1009.25	353.33	1011.75	353.2
1014.24	353.13	1016.74	353.13	1019.24	353.2	1021.74	353.43	1024.24	353.54
1026.73	353.65	1029.23	353.85	1031.73	353.85	1034.23	353.94	1036.73	354.12
1039.22	354.18	1041.72	354.17	1044.22	353.94	1046.72	353.89	1049.22	353.82
1051.72	353.81	1054.21	353.85	1056.71	353.85	1059.21	353.84	1061.71	353.84
1064.21	353.83	1066.7	353.82	1069.2	353.73	1071.7	353.79	1074.2	353.76
1076.7	353.77	1079.2	353.79	1081.69	353.78	1084.19	353.78	1086.69	353.81
1089.19	353.78	1091.69	353.76	1094.18	353.73	1096.68	353.74	1099.18	353.76
1101.68	353.77	1104.18	353.78	1106.67	353.77	1109.17	353.77	1111.67	353.83
1114.17	354.16	1116.67	354.81	1119.16	355.77	1121.66	356.59	1124.16	357.19
1126.66	357.82	1129.16	358.47	1131.66	358.77	1134.15	358.63	1136.65	358.45
1139.15	358.36	1141.65	358.46						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	989.26	.035	1124.16	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	989.26	1124.16		130 135.75	130		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	457.15	362	F
1141.65	1141.65	362	F

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 16

INPUT

Description:

Station	Elevation	Data	num=	448						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	361	2.5	360.86	5	360.61	7.5	360.58	9.99	360.3	
12.49	359.47	14.99	358.67	17.49	357.97	19.99	357.67	22.49	357.56	
24.98	357.62	27.48	357.91	29.98	358.6	32.48	359.72	34.98	360.65	
37.48	361.04	39.97	361.22	42.47	361.29	44.97	361.22	47.47	361.09	
49.97	360.98	52.47	360.9	54.96	360.87	57.46	360.91	59.96	360.51	
62.46	360.3	64.96	360.15	67.46	359.98	69.95	359.75	72.45	359.31	
74.95	358.8	77.45	358.4	79.95	357.84	82.45	357.38	84.94	357.19	
87.44	357.13	89.94	357.01	92.44	356.9	94.94	356.88	97.44	356.95	
99.93	356.98	102.43	356.95	104.93	356.88	107.43	356.88	109.93	356.87	

112.43	356.88	114.92	356.89	117.42	356.96	119.92	357.11	122.42	357.23
124.92	357.2	127.42	357.09	129.91	357	132.41	357.02	134.91	357.15
137.41	357.23	139.91	357.25	142.41	357.13	144.9	357.11	147.4	357.18
149.9	357.27	152.4	357.35	154.9	357.42	157.4	357.45	159.89	357.42
162.39	357.39	164.89	357.36	169.89	357.3	172.39	357.3	174.88	357.31
177.38	357.29	179.88	357.28	182.38	357.22	184.88	357.23	187.38	357.19
189.87	357.29	192.37	357.45	194.87	357.46	197.37	357.42	199.87	357.38
202.37	357.35	204.86	357.35	207.36	357.23	209.86	357.21	212.36	357.17
214.86	357.11	217.36	357.1	219.85	357.04	222.35	357.03	224.85	357.1
227.35	357.19	229.85	357.31	232.35	357.52	234.84	357.53	237.34	357.61
239.84	357.66	242.34	357.65	244.84	357.66	247.34	357.61	249.83	357.49
252.33	357.33	254.83	357.27	257.33	357.27	259.83	357.09	262.33	356.98
264.82	356.82	267.32	356.69	269.82	356.69	272.32	356.91	274.82	357.09
277.32	357.08	279.81	357.09	282.31	357.2	284.81	357.3	287.31	357.5
289.81	357.62	292.31	357.71	294.8	357.67	297.3	357.74	299.8	357.77
302.3	357.73	304.8	357.66	307.3	357.61	309.79	357.63	312.29	357.63
314.79	357.58	317.29	357.61	319.79	357.64	322.29	357.66	324.78	357.68
327.28	357.71	332.28	357.59	334.78	357.66	337.28	357.9	339.77	358.05
342.27	358.04	344.77	357.94	347.27	357.86	349.77	357.85	352.27	357.84
354.76	357.85	357.26	357.89	359.76	357.81	362.26	357.81	364.76	357.78
367.26	357.76	369.75	357.86	372.25	357.96	374.75	358	377.25	357.97
379.75	357.97	382.25	358.03	384.74	358.08	387.24	358.04	389.74	357.99
392.24	358	394.74	357.91	397.24	357.8	399.74	357.77	402.23	357.69
404.73	357.6	407.23	357.35	409.73	357.23	412.23	357.23	414.73	357.25
417.22	357.24	419.72	357.38	422.22	357.63	424.72	357.8	427.22	357.66
429.72	357.55	432.21	357.39	434.71	357.28	437.21	357.26	439.71	357.24
442.21	357.3	444.71	357.31	447.2	357.35	449.7	357.6	452.2	357.72
454.7	357.72	457.2	357.88	459.7	357.81	462.19	357.64	464.69	357.74
467.19	357.86	469.69	357.91	472.19	357.81	474.69	357.74	477.18	357.75
479.68	357.72	482.18	357.73	484.68	357.75	487.18	357.73	489.68	357.69
492.17	357.66	494.67	357.72	497.17	357.79	499.67	357.8	502.17	357.74
504.67	357.78	507.16	357.92	509.66	358.23	512.16	358.44	514.66	358.46
517.16	358.45	519.66	358.34	522.15	358.17	524.65	358.15	527.15	358.23
529.65	358.39	532.15	358.49	534.65	358.52	537.14	358.58	539.64	358.63
542.14	358.64	544.64	358.7	547.14	358.78	549.64	358.83	552.13	358.9
554.63	359.16	557.13	359.7	559.63	359.78	562.13	359.8	564.63	359.81
567.12	359.99	569.62	360.17	572.12	360.3	574.62	360.44	577.12	360.6
579.62	360.67	582.11	360.55	584.61	360.35	587.11	360.22	589.61	360.26
592.11	360.42	594.61	360.37	597.1	360.16	599.6	359.82	602.1	359.68
604.6	359.67	607.1	359.61	609.6	359.43	612.1	359.19	614.59	359.16
617.09	359.05	619.59	359	622.09	358.78	624.59	358.34	627.09	357.59
629.58	357.12	632.08	356.61	634.58	356.05	637.08	355.76	639.58	355.58
642.08	355.39	644.57	355.28	647.07	355.28	649.57	355.43	652.07	355.79
654.57	355.79	657.07	355.49	659.56	355.35	662.06	355.37	664.56	355.38
667.06	355.35	672.06	355.33	674.55	355.34	677.05	355.31	679.55	355.33
682.05	355.31	684.55	355.32	689.54	355.32	692.04	355.33	697.04	355.33
699.54	355.36	702.04	355.56	704.53	355.79	707.03	356.11	709.53	356.3
712.03	356.22	714.53	356.04	717.03	355.94	719.52	355.95	722.02	355.98
724.52	356.02	727.02	355.98	729.52	356.02	732.02	355.93	734.51	355.81
737.01	355.82	739.51	355.89	742.01	355.94	744.51	355.94	747.01	355.92
749.5	355.94	752	355.99	754.5	355.97	757	355.97	759.5	355.99
762	355.99	764.49	355.89	766.99	355.88	769.49	355.91	771.99	355.98
774.49	356.02	776.99	356.02	779.48	356.04	781.98	356.24	784.48	356.47
786.98	356.59	789.48	356.42	791.98	356.33	794.47	356.28	796.97	356.3
799.47	356.24	801.97	356.11	804.47	356.08	806.97	356.12	809.47	356.07
811.96	355.99	814.46	355.99	816.96	356.07	819.46	356.07	821.96	356.03
824.46	356.12	826.95	356.26	829.45	356.51	834.45	356.75	836.95	356.92
839.45	356.84	841.94	356.71	844.44	356.73	846.94	356.72	849.44	356.77
851.94	356.83	854.44	356.92	856.93	356.95	859.43	356.92	861.93	356.86
864.43	356.83	866.93	356.87	869.43	356.97	871.92	357.04	874.42	357.08
876.92	357.03	879.42	357.01	881.92	356.87	884.42	356.89	886.91	356.89

889.41	356.7	891.91	356.63	894.41	356.66	896.91	356.57	899.41	356.47
901.9	356.52	904.4	356.77	906.9	357.03	909.4	357	911.9	356.94
914.4	357.04	916.89	357.12	919.39	357.18	921.89	357.17	924.39	357.18
929.39	357.12	931.88	357.13	934.38	357.26	936.88	357.38	939.38	357.51
944.38	357.81	946.87	357.97	949.37	358.1	951.87	358.24	954.37	358.4
956.87	358.46	959.37	358.48	961.86	358.48	964.36	358.47	966.86	358.43
969.36	358.35	971.86	358.24	974.36	358.09	976.85	357.93	979.35	357.4
981.85	356.1	984.35	355.24	986.85	354.45	991.85	352.75	994.34	352.09
996.84	351.73	999.34	351.61	1001.84	351.56	1004.34	351.59	1006.84	351.86
1009.33	352.3	1011.83	352.65	1014.33	352.79	1016.83	352.91	1019.33	352.94
1021.83	352.91	1024.32	352.82	1026.82	352.67	1029.32	352.64	1031.82	352.56
1034.32	352.5	1036.82	352.45	1039.31	352.4	1041.81	352.34	1044.31	352.31
1046.81	352.22	1049.31	352.15	1051.8	352.11	1054.3	352.06	1056.8	352.06
1059.3	352.19	1061.8	352.17	1064.3	352.14	1066.79	352.1	1069.29	351.99
1071.79	351.91	1074.29	351.83	1076.79	351.75	1079.29	351.73	1081.78	351.77
1084.28	352.07	1086.78	351.99	1091.78	352.07	1094.28	352.04	1096.77	352.13
1099.27	352.32	1101.77	352.26	1104.27	352.21	1106.77	352.24	1109.27	352.68
1111.76	354.03	1114.26	355.96	1116.76	357.46	1119.26	357.97	1121.76	357.9
1124.26	357.93	1126.75	357.79	1129.25	357.68	1131.75	357.28	1134.25	357.07
1136.75	357.06	1139.25	357.12	1141.74	357.17				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	981.85	.035	1114.26	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	981.85	1114.26		110 110.75	110		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	579.62	361	F
1141.74	1141.74	361	F

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 15

INPUT

Description:

Station	Elevation	Data	num=	440
Sta	Elev	Sta	Elev	Sta Elev Sta Elev
0	357.91	2.5	357.67	4.99 357.43 7.49 357.27 9.99 357.32
12.49	357.48	14.98	357.54	17.48 357.51 19.98 357.5 22.48 357.55
24.97	357.74	27.47	357.91	29.97 357.74 32.47 357.75 34.96 357.8
37.46	357.85	39.96	357.91	42.46 357.84 44.95 357.61 47.45 357.75
49.95	358.07	52.45	358.03	54.94 358.11 57.44 358.08 59.94 358
62.44	357.72	64.93	357.58	67.43 357.39 69.93 357.21 72.43 357.17
74.92	357.2	77.42	357.15	79.92 357.21 82.42 357.13 84.91 357.08
87.41	356.98	89.91	356.89	92.4 356.88 94.9 356.96 97.4 356.88
99.9	356.81	102.39	356.68	104.89 356.55 107.39 356.56 109.89 356.55
112.38	356.53	114.88	356.53	117.38 356.48 119.88 356.45 122.37 356.41
124.87	356.41	127.37	356.49	129.87 356.41 132.36 356.37 134.86 356.57
137.36	356.61	139.86	356.66	142.35 356.69 144.85 356.69 147.35 356.78
149.85	356.86	152.34	356.95	154.84 356.96 157.34 356.99 159.84 357.2
162.33	357.42	164.83	357.41	167.33 357.29 169.83 357.31 172.32 357.47
174.82	357.44	177.32	357.49	179.82 357.53 182.31 357.64 184.81 357.57
187.31	357.42	189.81	357.26	192.3 357.2 194.8 357.32 197.3 357.2
199.79	357.01	202.29	356.87	204.79 356.91 207.29 356.9 209.78 356.78
212.28	356.68	214.78	356.63	217.28 356.69 219.77 356.77 222.27 356.86
224.77	356.97	227.27	357.05	229.76 357.17 232.26 357.25 234.76 357.23

237.26	357.23	239.75	357.31	242.25	357.35	244.75	357.21	247.25	357.14
249.74	357.15	252.24	357.19	254.74	357.27	257.24	357.34	259.73	357.55
262.23	357.72	264.73	357.92	267.23	358.04	269.72	358.17	272.22	358.39
274.72	358.58	277.22	358.61	279.71	358.36	282.21	358.19	284.71	358.24
287.2	358.29	289.7	358.28	292.2	358.3	294.7	358.43	297.19	358.53
299.69	358.6	302.19	358.84	304.69	358.79	307.18	358.77	309.68	358.74
312.18	358.82	314.68	358.86	317.17	358.89	319.67	358.85	322.17	358.77
324.67	358.65	327.16	358.56	329.66	358.44	332.16	358.44	334.66	358.5
337.15	358.49	339.65	358.41	342.15	358.33	344.65	358.25	347.14	358.17
349.64	357.97	352.14	357.89	354.64	357.83	357.13	357.73	359.63	357.61
362.13	357.51	364.63	357.42	367.12	357.4	369.62	357.47	372.12	357.43
374.62	357.31	377.11	357.19	379.61	357.08	382.11	357.03	384.61	356.89
387.1	356.77	389.6	356.67	392.1	356.49	394.59	356.38	397.09	356.46
399.59	356.59	402.09	356.65	404.58	356.77	407.08	357.01	409.58	357.29
412.08	357.52	414.57	357.61	417.07	357.52	419.57	357.48	422.07	357.42
424.56	357.37	427.06	357.53	429.56	357.72	432.06	357.74	434.55	357.76
437.05	357.8	439.55	357.79	442.05	357.85	444.54	357.99	447.04	358.06
449.54	358.07	452.04	358.03	454.53	358	457.03	358	459.53	358.12
462.03	358.22	464.52	358.08	467.02	357.82	469.52	357.7	472.02	357.57
474.51	357.54	477.01	357.63	479.51	357.53	482.01	357.41	484.5	357.32
487	357.29	489.5	357.28	491.99	357.24	494.49	357.2	496.99	357.25
499.49	357.29	501.98	357.42	504.48	357.62	506.98	357.79	509.48	357.61
511.97	357.35	514.47	357.36	516.97	357.34	519.47	357.25	521.96	357.21
524.46	357.14	526.96	357.02	529.46	356.96	531.95	356.88	534.45	356.89
536.95	356.76	539.45	356.74	541.94	356.87	544.44	357.11	546.94	357.49
549.44	357.94	551.93	358.34	554.43	358.41	556.93	358.39	559.43	358.45
561.92	358.69	564.42	359.08	566.92	359.17	569.41	359.07	574.41	359.05
576.91	358.98	579.4	358.93	581.9	358.98	584.4	359.16	586.9	359.27
589.39	359.27	591.89	359.3	594.39	359.36	596.89	359.32	599.38	359.37
601.88	359.4	604.38	359.39	606.88	359.3	609.37	359.07	611.87	358.71
614.37	358.4	616.87	357.96	619.36	357.11	621.86	356.31	624.36	355.8
626.86	355.45	629.35	355.35	631.85	355.33	634.35	355.31	636.84	355.26
639.34	355.27	641.84	355.29	644.34	355.3	646.83	355.4	649.33	355.67
651.83	355.89	654.33	356.21	656.82	356.3	659.32	356.25	664.32	356.11
666.81	356.05	671.81	355.87	674.31	355.73	676.8	355.59	679.3	355.42
681.8	355.36	684.3	355.4	686.79	355.36	689.29	355.39	691.79	355.52
694.29	355.94	696.78	356.45	699.28	356.65	701.78	356.48	704.27	356.27
706.77	356.15	709.27	355.97	711.77	355.94	714.26	355.82	716.76	355.62
719.26	355.43	721.76	355.36	724.25	355.55	726.75	355.66	729.25	355.67
731.75	355.65	734.24	355.55	736.74	355.52	739.24	355.58	741.74	355.58
744.23	355.66	746.73	355.81	749.23	356.05	751.73	356.05	754.22	356.08
756.72	356.15	759.22	356.34	761.72	356.69	764.21	356.95	766.71	357.05
769.21	357.14	771.7	357.08	774.2	357.15	776.7	357.11	779.2	357.12
781.69	357.1	784.19	356.99	786.69	356.89	789.19	356.89	791.68	357.07
794.18	357.16	796.68	357.12	799.18	357.13	801.67	357.03	804.17	357.18
806.67	357.27	809.17	357.24	811.66	357.13	814.16	357.02	816.66	356.98
819.16	356.89	821.65	356.78	824.15	356.7	826.65	356.69	829.15	356.58
831.64	356.45	834.14	356.41	836.64	356.51	839.13	356.55	841.63	356.5
844.13	356.55	846.63	356.31	849.12	356.27	851.62	356.23	854.12	356.07
856.62	355.84	859.11	355.7	861.61	355.61	864.11	355.64	866.61	355.73
869.1	355.7	871.6	355.54	874.1	355.51	876.6	355.47	879.09	355.28
881.59	355.15	884.09	355.07	886.59	355.02	889.08	354.98	891.58	354.92
896.58	354.98	899.07	354.9	901.57	354.7	904.07	354.53	906.57	354.42
909.06	354.36	911.56	354.45	914.06	354.82	916.55	355.21	919.05	355.49
921.55	355.75	924.05	356	926.54	356.24	929.04	356.72	931.54	357.25
934.04	357.42	936.53	357.5	939.03	357.53	941.53	357.59	944.03	357.58
946.52	357.49	949.02	357.38	951.52	357.25	954.02	357.11	956.51	356.7
959.01	355.95	961.51	355.06	964.01	354.15	966.5	353.27	969	352.18
971.5	351.37	974	351.15	976.49	351	978.99	350.86	981.49	350.82
983.98	350.85	986.48	350.89	988.98	350.89	991.48	350.93	993.97	350.91
996.47	350.88	998.97	350.81	1001.47	350.87	1003.96	350.9	1006.46	350.9

1008.96	350.92	1011.46	350.89	1013.95	350.93	1016.45	350.85	1018.95	350.9
1021.45	350.9	1023.94	350.82	1026.44	350.76	1028.94	350.81	1031.44	350.96
1033.93	350.99	1036.43	350.87	1038.93	350.83	1041.43	350.79	1043.92	350.76
1046.42	350.81	1048.92	350.78	1051.42	350.78	1053.91	351.07	1056.41	352.27
1058.91	353.81	1061.41	354.99	1063.9	355.69	1066.4	356.15	1068.9	356.38
1071.39	356.44	1073.89	356.47	1076.39	356.49	1078.89	356.39	1081.39	356.46
1083.88	356.59	1086.38	356.6	1088.88	356.65	1091.37	356.64	1093.87	356.57
1098.87	356.45	1101.36	356.39	1103.86	356.41	1106.36	356.48	1108.86	356.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	959.01	.035	1066.4	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	959.01	1066.4		122 123.66	122	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	604.38	360	F
1108.86	1108.86	360	F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 14

INPUT

Description:

Station Elevation Data			num= 433							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	358.07	2.5	357.97	4.99	357.85	7.49	357.71	9.98	357.6	
12.48	357.56	14.97	357.5	17.47	357.37	19.96	357.38	22.46	357.33	
24.95	357.13	27.45	356.89	29.95	356.67	32.44	356.61	34.94	356.55	
37.43	356.57	39.93	356.53	42.42	356.49	44.92	356.38	47.41	356.46	
49.91	356.62	52.4	356.8	54.9	356.84	57.4	356.84	59.89	356.96	
62.39	357.02	64.88	357.21	67.38	357.34	69.87	357.33	72.37	357.32	
74.86	357.28	77.36	357.21	79.85	357.08	82.35	357.04	84.85	357.08	
87.34	357.12	89.84	356.89	92.33	356.82	94.83	356.83	97.32	356.93	
99.82	356.95	102.31	356.81	104.81	356.58	107.31	356.49	109.8	356.54	
112.3	356.69	114.79	356.88	117.29	356.92	119.78	356.93	122.28	356.63	
124.77	356.34	127.27	355.99	129.76	356.07	132.26	356.09	134.76	355.91	
137.25	355.64	139.75	355.49	142.24	355.63	144.74	355.59	147.23	355.43	
149.73	355.43	152.22	355.45	154.72	355.45	157.21	355.49	159.71	355.53	
162.21	355.6	164.7	355.7	167.2	355.66	169.69	355.67	172.19	355.77	
174.68	356.3	177.18	356.63	179.67	356.92	182.17	357.21	184.66	357.41	
187.16	357.21	189.66	357.04	192.15	357.13	194.65	357.16	197.14	357.09	
199.64	357.04	202.13	357.04	204.63	357.01	207.12	356.96	209.62	356.91	
212.11	356.95	214.61	356.95	217.11	356.93	219.6	356.85	222.1	356.76	
224.59	356.93	227.09	356.96	229.58	356.71	232.08	356.61	234.57	356.53	
237.07	356.59	239.57	356.64	242.06	356.57	244.56	356.39	247.05	356.11	
249.55	356.08	252.04	356.13	254.54	356.19	257.03	356.26	259.53	356.41	
262.02	356.55	264.52	356.58	267.02	356.55	269.51	356.49	272.01	356.48	
274.5	356.37	277	356.39	279.49	356.52	281.99	356.51	284.48	356.53	
286.98	356.49	289.47	356.46	291.97	356.28	294.47	356.13	296.96	356.16	
299.46	356.12	301.95	355.96	304.45	355.71	306.94	355.46	309.44	355.49	
311.93	355.57	314.43	355.61	316.92	355.6	319.42	355.62	321.92	355.53	
324.41	355.45	326.91	355.5	329.4	355.48	331.9	355.4	334.39	355.5	
336.89	355.4	339.38	355.36	341.88	355.37	344.37	355.38	349.37	355.36	
351.86	355.36	354.36	355.41	356.85	355.49	359.35	355.54	361.84	355.47	
364.34	355.37	366.83	355.36	369.33	355.34	371.82	355.15	374.32	354.85	
376.82	354.62	379.31	354.37	381.81	354.64	384.3	355.26	386.8	355.61	

389.29	355.75	391.79	355.42	394.28	354.85	396.78	354.16	399.27	353.91
401.77	353.92	404.27	353.94	406.76	353.95	409.26	354.12	411.75	354.37
414.25	354.61	416.74	354.92	419.24	355.15	421.73	354.9	424.23	354.34
426.72	354.07	429.22	354.24	431.72	355.05	434.21	354.97	436.71	354.51
439.2	354.18	441.7	354.14	444.19	354.17	446.69	354.13	449.18	354.24
451.68	354.51	454.17	354.7	456.67	355.17	459.17	355.31	461.66	355.34
464.16	355.34	466.65	355.35	469.15	355.34	471.64	355.34	474.14	355.36
476.63	355.36	479.13	355.35	481.62	355.25	484.12	355.25	486.62	355.23
489.11	355.25	491.61	355.28	494.1	355.34	496.6	355.36	499.09	355.33
501.59	355.33	504.08	355.31	506.58	355.34	509.07	355.37	511.57	355.47
514.07	355.62	516.56	355.76	519.06	355.75	521.55	355.69	524.05	355.63
526.54	355.41	529.04	355.26	531.53	354.88	534.03	354.63	536.52	354.38
539.02	354.27	541.52	354.35	544.01	354.71	546.51	354.95	549	355.05
551.5	354.92	553.99	354.78	556.49	354.66	558.98	354.73	561.48	354.8
563.97	355.01	566.47	355.12	568.97	355.17	571.46	355.2	573.96	355.36
576.45	355.46	578.95	355.27	581.44	355.27	583.94	355.29	586.43	355.33
588.93	355.5	591.43	355.5	593.92	355.41	596.42	355.3	598.91	355.22
601.41	355.16	603.9	355.11	606.4	355.05	608.89	354.99	611.39	354.93
613.88	354.88	616.38	354.86	618.87	354.64	621.37	354.4	623.87	354.73
626.36	355.72	628.86	356.5	631.35	356.73	633.85	356.81	636.34	356.57
638.84	356.03	641.33	355.27	643.83	354.55	646.32	353.87	648.82	353.58
651.32	353.61	653.81	353.6	656.31	353.6	658.8	353.67	661.3	353.83
663.79	353.96	666.29	354.04	668.78	354.09	671.28	353.92	673.78	354.06
676.27	354.38	678.77	354.56	681.26	354.81	683.76	355.08	686.25	355.36
688.75	355.37	691.24	355.36	693.74	355.37	696.23	355.37	698.73	355.38
701.22	355.4	703.72	355.52	706.22	355.7	708.71	355.65	711.21	355.72
713.7	355.65	716.2	355.56	718.69	355.44	721.19	355.31	723.68	355.17
726.18	354.97	728.68	354.97	731.17	355.04	733.67	354.96	736.16	354.96
738.66	355.15	741.15	355.29	743.65	355.62	746.14	355.79	748.64	355.94
751.13	356.07	753.63	356.07	756.13	355.68	758.62	355.39	761.12	355.24
763.61	355.11	766.11	355.27	768.6	355.43	771.1	355.32	773.59	355.2
776.09	355.16	778.58	355.13	781.08	355.14	783.57	355.18	786.07	355.28
788.57	355.48	791.06	355.67	793.56	355.84	796.05	355.67	798.55	355.44
801.04	355.37	803.54	355.19	806.03	355.07	808.53	354.98	811.03	354.82
813.52	354.74	816.02	354.76	818.51	354.72	821.01	354.74	823.5	354.8
826	354.85	828.49	354.85	830.99	354.84	833.48	354.85	835.98	354.93
838.48	354.93	840.97	354.95	843.47	355	845.96	354.95	848.46	354.89
850.95	354.87	853.45	354.87	855.94	354.84	858.44	354.78	860.93	354.77
863.43	354.73	865.93	354.74	868.42	354.7	870.92	354.73	873.41	354.75
875.91	354.77	878.4	354.75	880.9	354.69	883.39	354.71	885.89	354.81
888.38	354.86	890.88	354.86	893.38	354.97	895.87	354.95	898.37	354.93
900.86	354.92	903.36	354.99	905.85	355.17	908.35	355.45	910.84	355.89
913.34	356.19	915.83	356.36	918.33	356.43	920.83	356.51	923.32	356.56
925.82	356.56	928.31	356.53	930.81	356.46	933.3	356.37	935.8	356.25
938.29	356.09	940.79	355.85	943.28	355.43	945.78	354.76	948.28	353.95
950.77	353.06	953.27	352.23	955.76	351.47	958.26	350.95	960.75	350.72
963.25	350.65	965.74	350.65	968.24	350.66	970.73	350.62	973.23	350.61
975.73	350.62	978.22	350.61	980.72	350.61	983.21	350.58	985.71	350.51
988.2	350.65	990.7	350.73	993.19	350.75	995.69	350.7	998.18	350.7
1003.18	350.56	1005.67	350.56	1008.17	350.58	1010.66	350.6	1013.16	350.65
1015.65	350.66	1018.15	350.68	1020.64	350.66	1023.14	350.62	1025.63	350.58
1028.13	350.59	1030.63	350.59	1033.12	350.63	1035.62	351.04	1038.11	351.42
1040.61	352.1	1043.1	353.14	1045.6	354.44	1048.09	355.24	1050.59	355.63
1053.08	355.77	1055.58	355.9	1058.08	356.01	1060.57	356.15	1063.07	356.28
1065.56	356.36	1068.06	356.53	1070.55	356.76	1073.05	356.86	1075.54	356.88
1078.04	356.93	1080.53	357.03	1083.03	357.1				

Manning's	n Values	num=	3
Sta	n Val	Sta	n Val
0	.08	943.28	.035
		1050.59	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	943.28	1050.59		138 131.49	129.5		.1	.3
Ineffective Flow		num=	2					
Sta L	Sta R	Elev	Permanent					
0	0	360	F					
1083.03	1083.03	360	F					

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 13

INPUT

Description:

Station	Elevation	Data	num=	400					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	362.28	2.5	362.14	5	361.62	7.5	361.06	10	360.23
12.5	359.26	15	358.27	17.5	357.35	20	356.48	22.5	356.04
25	355.96	27.5	355.96	30	355.81	32.5	355.82	35	355.8
37.5	355.77	40	355.91	42.5	356.02	44.99	356.04	47.49	355.75
49.99	355.63	52.49	355.63	54.99	355.64	57.49	355.72	59.99	355.74
62.49	355.86	64.99	356.33	67.49	356.12	69.99	355.98	72.49	356.07
74.99	356.15	77.49	356.21	79.99	356.22	82.49	356.24	84.99	356.27
87.49	356.2	89.99	355.98	92.49	355.9	94.99	355.85	97.49	355.7
99.99	355.61	102.49	355.49	104.99	355.18	107.49	354.95	109.99	355.03
112.49	355.1	114.99	355.01	117.49	354.81	119.99	354.78	122.49	354.85
124.99	354.74	127.49	354.83	129.98	355.13	132.48	355.42	134.98	355.46
137.48	355.43	139.98	355.49	142.48	355.48	144.98	355.41	147.48	355.37
149.98	355.38	154.98	355.38	157.48	355.37	162.48	355.37	164.98	355.36
167.48	355.34	169.98	355.22	172.48	355.04	174.98	355.02	177.48	355.03
182.48	355.33	184.98	355.38	187.48	355.37	189.98	355.16	192.48	355.12
194.98	355.13	197.48	354.99	199.98	354.73	202.48	354.21	204.98	353.86
207.48	353.79	209.98	353.76	212.48	353.74	214.97	353.8	217.47	353.99
219.97	354.39	222.47	354.91	224.97	355.38	227.47	355.71	229.97	355.63
232.47	355.56	234.97	355.48	237.47	355.45	239.97	355.39	242.47	355.35
244.97	355.33	249.97	355.29	252.47	355.36	254.97	355.38	257.47	355.38
259.97	355.39	262.47	355.4	267.47	355.42	269.97	355.42	272.47	355.39
274.97	355.43	277.47	355.38	279.97	355.35	282.47	355.36	289.97	355.36
292.47	355.35	294.97	355.35	299.97	355.33	302.46	355.4	304.96	355.41
307.46	355.36	309.96	355.24	312.46	354.65	314.96	353.98	317.46	353.66
319.96	353.64	322.46	353.65	324.96	353.66	327.46	353.92	329.96	354.61
332.46	355.14	334.96	355.38	337.46	355.39	339.96	355.36	342.46	355.3
344.96	355.23	347.46	355.08	349.96	354.81	352.46	354.52	354.96	354.23
357.46	353.97	359.96	353.95	362.46	354.17	364.96	354.43	367.46	354.73
369.96	355.03	372.46	355.32	374.96	355.54	377.46	355.54	379.96	355.39
384.96	355.31	387.46	355.3	389.95	355.34	392.45	355.37	394.95	355.46
397.45	355.56	399.95	355.61	402.45	355.66	404.95	355.72	407.45	355.74
409.95	355.81	412.45	355.95	414.95	356.12	417.45	356.25	419.95	356.23
422.45	356.18	424.95	356.13	427.45	356.08	429.95	356.04	432.45	355.99
437.45	355.89	439.95	355.82	442.45	355.73	444.95	355.61	447.45	355.47
449.95	355.77	452.45	356.15	454.95	356.19	457.45	355.96	459.95	355.59
462.45	355.52	464.95	355.47	467.45	355.3	469.95	355.11	472.45	355.14
474.95	355.25	477.44	355.39	479.94	355.51	482.44	355.6	484.94	355.68
487.44	355.71	489.94	355.84	492.44	355.88	494.94	355.59	497.44	355.54
499.94	355.55	502.44	355.56	504.94	355.55	509.94	355.55	514.94	355.51
517.44	355.49	519.94	355.48	522.44	355.46	527.44	355.42	529.94	355.41
532.44	355.39	537.44	355.37	539.94	355.37	542.44	355.36	547.44	355.36
549.94	355.35	552.44	355.35	554.94	355.36	562.44	355.39	564.94	355.41
567.43	355.42	572.43	355.42	574.93	355.46	577.43	355.51	579.93	355.43
582.43	355.39	584.93	355.37	587.43	355.37	589.93	355.36	594.93	355.36

597.43	355.35	604.93	355.35	607.43	355.36	609.93	355.35	612.43	355.09
614.93	354.53	617.43	353.94	619.93	353.5	622.43	353.39	624.93	353.42
627.43	353.46	629.93	353.47	632.43	353.5	634.93	353.63	637.43	353.81
639.93	354.03	642.43	354.21	644.93	354.39	647.43	354.6	649.93	354.75
652.43	354.83	654.92	354.9	657.42	354.97	659.92	355.05	662.42	355.09
664.92	355.16	667.42	355.19	669.92	355.27	672.42	355.3	674.92	355.34
677.42	355.33	679.92	355.23	682.42	355.08	684.92	354.92	687.42	354.74
689.92	354.57	692.42	354.4	694.92	354.2	697.42	354.04	699.92	353.85
702.42	353.67	704.92	353.48	707.42	353.3	709.92	353.11	712.42	352.93
714.92	352.84	717.42	352.49	719.92	352.47	722.42	353.09	724.92	353.89
727.42	354.69	729.92	355.24	732.42	355.25	734.92	354.97	737.42	355.07
739.92	355.11	742.41	355.26	744.91	355.23	747.41	355.15	749.91	355.1
752.41	355.05	754.91	355	757.41	354.91	762.41	354.79	764.91	354.8
767.41	354.8	769.91	354.69	772.41	354.56	774.91	354.47	777.41	354.45
779.91	354.53	782.41	354.62	784.91	354.88	787.41	354.92	789.91	354.74
792.41	354.61	794.91	354.56	797.41	354.53	799.91	354.63	802.41	354.71
804.91	354.59	807.41	354.61	809.91	354.55	812.41	354.6	814.91	354.69
817.41	354.69	819.91	354.63	822.41	354.63	824.91	354.72	827.41	354.77
829.9	354.78	832.4	354.71	834.9	354.65	837.4	354.63	839.9	354.64
842.4	354.67	844.9	354.71	847.4	354.73	849.9	354.69	852.4	354.62
854.9	354.52	857.4	354.38	859.9	354.29	862.4	354.16	864.9	354.19
867.4	354.26	869.9	354.27	872.4	354.24	874.9	354.25	877.4	354.24
879.9	354.22	882.4	354.29	884.9	354.56	887.4	355.13	889.9	355.83
892.4	356.17	894.9	356.02	897.4	356.01	899.9	356.12	9004.9	356.12
907.4	356.05	909.9	355.96	912.4	355.82	914.9	355.65	917.39	355.52
919.89	355.38	922.39	355.19	924.89	355.08	927.39	355.16	929.89	355.32
932.39	355.42	934.89	355.25	937.39	354.38	939.89	352.9	942.39	351.97
944.89	351.56	947.39	351.23	949.89	350.87	952.39	350.54	954.89	350.28
957.39	350.17	959.89	350.1	962.39	350.12	964.89	350.21	967.39	350.25
969.89	350.23	972.39	350.26	974.89	350.27	977.39	350.26	979.89	350.17
982.39	350.18	984.89	350.16	987.39	350.23	989.89	350.24	992.39	350.2
994.89	350.15	997.39	350.14	999.89	350.1	1002.39	350.05	1004.88	350.15
1007.38	350.18	1009.88	350.19	1012.38	350.21	1014.88	350.24	1017.38	350.3
1019.88	350.42	1022.38	350.55	1024.88	350.61	1027.38	350.66	1029.88	351.64
1032.38	352.66	1034.88	353.3	1037.38	353.49	1039.88	353.61	1042.38	353.81
1044.88	354.13	1047.38	355.07	1049.88	356.57	1052.38	357.49	1054.88	357.76

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .08 932.39 .035 1047.38 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 932.39 1047.38 141 124.46 121 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1054.88 1054.88 360 F

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 12

INPUT

Description:

Station	Elevation	Data	num=	366						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	358.16	2.49	357.83	4.99	357.58	7.48	357.52	9.98	357.54	
12.47	357.45	14.96	357.41	17.46	357.32	19.95	357.28	22.44	357.34	
24.94	357.3	27.43	357.2	29.93	357.1	32.42	357.07	34.91	357.01	
37.41	356.88	39.9	356.8	42.39	356.75	44.89	356.83	47.38	356.89	

49.88	356.82	52.37	356.69	54.86	356.82	57.36	356.93	59.85	357.07
62.35	357.27	64.84	357.42	67.33	357.5	69.83	357.56	72.32	357.62
74.81	357.65	77.31	357.68	79.8	357.63	82.3	357.61	84.79	357.46
87.28	357.25	89.78	357.16	92.27	357.05	94.76	356.99	97.26	356.99
99.75	356.98	102.25	356.89	104.74	356.86	107.23	356.91	109.73	357.03
112.22	357.17	114.72	357.38	117.21	357.48	119.7	357.37	122.2	357.3
124.69	357.3	127.18	357.21	129.68	357.04	132.17	356.95	134.67	356.84
137.16	356.77	139.65	356.61	142.15	356.55	144.64	356.6	147.13	356.73
149.63	356.65	152.12	356.46	154.62	356.54	157.11	356.46	159.6	356.48
162.1	356.54	164.59	356.61	167.08	356.6	169.58	356.59	172.07	356.63
174.57	356.66	177.06	356.7	179.55	356.65	182.05	356.57	184.54	356.42
187.04	356.26	189.53	356.23	192.02	356.15	194.52	356.06	197.01	355.94
199.5	355.87	202	355.73	204.49	355.85	206.99	355.9	209.48	355.86
211.97	355.86	214.47	355.88	216.96	355.99	219.46	356.12	221.95	356.23
224.44	356.32	226.94	356.36	229.43	356.42	231.92	356.49	234.42	356.6
236.91	356.36	239.41	356.39	241.9	356.42	244.39	356.4	246.89	356.34
249.38	356.32	251.87	356.27	254.37	356.26	256.86	356.27	259.36	356.21
261.85	356.16	264.34	356.17	266.84	356.24	269.33	356.31	271.82	356.36
274.32	356.37	276.81	356.37	279.31	356.36	281.8	356.36	284.29	356.32
286.79	356.16	289.28	356.14	291.78	356.09	294.27	356.12	296.76	356.06
299.26	355.76	301.75	355.56	304.24	355.51	306.74	355.47	309.23	355.44
311.73	355.43	314.22	355.36	316.71	355.41	319.21	355.57	321.7	355.68
324.2	355.74	326.69	355.8	329.18	355.76	331.68	355.7	334.17	355.6
336.66	355.57	339.16	355.6	341.65	355.72	344.15	355.84	346.64	355.77
349.13	355.66	351.63	355.54	354.12	355.64	356.61	355.66	359.11	355.65
361.6	355.66	364.1	355.74	366.59	355.77	369.08	355.74	371.58	355.61
374.07	355.55	376.56	355.42	379.06	355.37	381.55	355.34	384.05	355.33
386.54	355.34	389.03	355.35	391.53	355.36	394.02	355.37	396.52	355.38
399.01	355.39	401.5	355.4	404	355.41	406.49	355.42	408.98	355.44
411.48	355.43	413.97	355.39	416.47	355.35	418.96	355.3	421.45	355.24
423.95	355.25	426.44	355.32	428.93	355.35	431.43	355.37	433.92	355.37
436.42	355.43	438.91	355.53	441.4	355.59	443.9	355.7	446.39	355.75
448.89	355.82	451.38	355.8	453.87	355.74	456.37	355.61	458.86	355.6
461.35	355.68	463.85	355.7	466.34	355.72	471.33	355.72	473.82	355.64
476.32	355.59	478.81	355.57	481.3	355.62	483.8	355.64	486.29	355.61
488.79	355.58	491.28	355.54	493.77	355.52	496.27	355.54	498.76	355.64
501.26	355.66	506.24	355.54	508.74	355.55	511.23	355.65	513.72	355.7
516.22	355.52	518.71	354.98	521.21	354.45	523.7	353.92	526.19	353.46
528.69	353.04	531.18	352.71	533.67	352.41	536.17	352.31	538.66	352.77
541.16	353.45	543.65	354.09	546.14	354.83	548.64	355.47	551.13	355.46
553.63	355.49	556.12	355.44	558.61	355.38	561.11	355.46	563.6	355.58
566.09	355.39	568.59	355.21	571.08	355.19	573.58	355.35	576.07	355.67
578.56	355.88	581.06	355.85	583.55	355.78	586.04	355.61	588.54	355.52
591.03	355.53	593.53	355.57	596.02	355.61	598.51	355.47	601.01	355.17
603.5	354.96	606	354.81	608.49	354.57	610.98	354.48	613.48	354.47
615.97	354.42	618.46	354.38	620.96	354.31	623.45	354.21	625.95	354.09
628.44	353.96	630.93	353.55	633.43	352.53	635.92	351.63	638.41	350.99
640.91	350.71	643.4	350.31	645.9	350.18	648.39	350.03	650.88	350.42
653.38	350.71	655.87	351.11	658.37	351.43	660.86	351.62	663.35	351.35
665.85	351.32	668.34	351.44	670.83	351.57	673.33	351.66	675.82	351.56
678.32	351.54	680.81	351.66	683.3	351.68	685.8	351.55	688.29	351.54
690.78	351.53	693.28	351.74	695.77	352.34	698.27	352.86	700.76	353.28
703.25	353.37	705.75	353.56	708.24	353.58	710.74	353.45	713.23	353.43
715.72	353.5	718.22	353.57	720.71	353.65	723.2	353.92	725.7	354.56
728.19	355.29	730.69	355.86	733.18	355.9	735.67	355.98	738.17	356.06
740.66	356.12	743.15	356.19	745.65	356.24	748.14	356.3	750.64	356.22
753.13	356.08	755.62	356	758.12	355.98	760.61	355.98	763.11	356.05
765.6	356.21	768.09	355.99	770.59	355.4	773.08	354.85	775.57	354.6
778.07	354.61	780.56	353.97	783.06	353.25	785.55	352.29	788.04	351.35
790.54	350.73	793.03	350.28	795.53	350.04	798.02	349.96	800.51	349.89
803.01	349.77	805.5	349.7	807.99	349.68	810.49	349.69	812.98	349.69

815.48	349.7	817.97	349.73	820.46	349.78	822.96	349.77	825.45	349.79
827.94	349.8	830.44	349.81	832.93	349.79	835.43	349.78	837.92	349.72
840.41	349.59	842.91	349.43	845.4	349.39	847.89	349.43	850.39	349.48
852.88	349.53	855.38	349.58	857.87	349.61	860.36	349.62	862.86	349.63
865.35	349.67	867.85	349.68	870.34	349.68	872.83	349.64	875.33	349.63
877.82	349.68	880.31	349.73	882.81	349.82	885.3	349.88	887.8	350.17
890.29	350.68	892.78	351.52	895.28	352.5	897.77	353.15	900.27	353.48
902.76	353.83	905.25	354.4	907.75	355.42	910.24	356.81	912.73	358.13
915.23	358.74								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	780.56	.035	902.76	.08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

780.56	902.76	122.5	112.37	105.5	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	0	360	F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 11

INPUT

Description:

Station Elevation Data		num= 271							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.14	2.49	359.13	4.98	359.07	7.47	359.03	9.97	359.05
12.46	359.03	14.95	358.92	17.44	358.81	19.93	358.74	22.42	358.69
24.91	358.74	27.41	358.75	32.39	358.63	34.88	358.51	37.37	358.48
39.86	358.42	42.35	358.37	44.85	358.35	47.34	358.35	49.83	358.37
52.32	358.5	54.81	358.5	57.3	358.41	59.79	358.21	62.29	358.06
64.78	357.96	67.27	357.85	69.76	357.74	72.25	357.73	74.74	357.67
77.23	357.53	79.73	357.35	82.22	357.26	84.71	357.18	87.2	357.04
89.69	356.99	92.18	357.01	94.67	356.84	97.17	356.69	99.66	356.59
102.15	356.54	104.64	356.54	107.13	356.76	109.62	356.93	112.11	357.03
114.61	357.11	117.1	357.24	119.59	357.36	122.08	357.43	124.57	357.54
127.06	357.56	129.55	357.4	132.05	357.47	134.54	357.6	137.03	357.8
139.52	357.85	142.01	357.82	146.99	357.62	149.49	357.52	151.98	357.4
154.47	357.33	156.96	357.12	159.45	357.04	161.94	357.02	164.43	357.02
166.93	356.98	171.91	357.08	174.4	357.1	176.89	357.09	179.38	357.15
181.87	357.19	184.37	357.3	186.86	357.24	189.35	357.1	191.84	357.14
194.33	357.32	196.82	357.45	199.31	357.52	201.81	357.45	204.3	357.3
206.79	357.18	209.28	357.11	211.77	356.87	214.26	356.49	216.75	356.13
219.25	356.08	221.74	356	224.23	356.09	226.72	356.2	229.21	356.37
231.7	356.57	234.19	356.55	236.69	356.43	239.18	356.4	241.67	356.34
244.16	356.2	246.65	356.22	249.14	356.32	251.63	356.45	254.13	356.29
256.62	355.64	259.11	355.03	261.6	354.82	264.09	354.77	266.58	354.9
269.07	355.2	271.57	355.23	274.06	355.16	276.55	354.98	279.04	354.74
281.53	354.56	284.02	354.54	286.51	354.71	289.01	355.21	291.5	355.71
293.99	356.3	296.48	356.97	298.97	357.52	301.46	357.81	303.95	358.19
306.45	358.66	308.94	358.9	311.43	358.91	313.92	358.75	316.41	357.32
318.9	356.24	321.39	355.84	323.89	355.69	326.38	355.72	328.87	355.72
331.36	355.74	333.85	355.73	336.34	355.59	338.83	355.35	341.33	354.95
343.82	354.52	346.31	354.35	348.8	354.32	351.29	354.34	353.78	354.26
356.27	354.16	358.77	354.17	361.26	354.16	363.75	354.05	366.24	354.13
368.73	354.21	371.22	354.52	373.71	354.97	376.21	355.39	378.7	355.42
381.19	355.13	383.68	354.68	386.17	354.11	388.66	353.6	391.15	353.49

393.65	353.49	396.14	353.33	398.63	353.18	401.12	353.12	403.61	353.14
406.1	353.3	408.59	353.49	411.09	353.65	413.58	353.71	416.07	353.78
418.56	353.82	421.05	353.77	423.54	353.75	426.03	353.54	428.53	353.2
431.02	352.8	433.51	352.69	436	352.74	438.49	352.41	440.98	352.23
443.47	352.04	445.97	351.95	448.46	351.86	450.95	351.79	453.44	351.66
455.93	351.52	458.42	351.48	460.92	351.52	463.41	351.49	465.9	351.5
468.39	351.49	473.37	351.57	475.86	351.85	478.35	352.51	480.85	353.77
483.34	355.64	485.83	357.78	488.32	358.47	490.81	358.87	493.3	358.95
495.79	358.94	498.29	358.98	500.78	359.08	503.27	359.06	505.76	359.04
508.25	358.95	510.74	358.81	513.23	356.58	515.73	352.94	518.22	351.41
520.71	350.64	523.2	350.59	525.69	350.53	528.18	350.46	530.67	350.35
533.17	350.23	535.66	350.14	538.15	350	540.64	349.88	543.13	349.84
545.62	349.78	548.11	349.64	550.61	349.54	553.1	349.52	555.59	349.53
558.08	349.51	560.57	349.49	563.06	349.48	565.55	349.47	568.05	349.43
570.54	349.4	573.03	349.41	575.52	349.4	578.01	349.4	580.5	349.41
583	349.39	585.49	349.37	587.98	349.3	590.47	349.2	592.96	349.1
595.45	349	597.94	348.9	600.43	348.8	602.93	348.7	605.42	348.6
607.91	348.5	610.4	348.4	615.38	348.2	617.87	348	620.37	348
622.86	348	625.35	348	627.84	348	630.33	348	632.82	348
635.31	348	637.81	348	640.3	348	642.79	348	645.28	348
647.77	348	650.26	348	652.75	348	655.25	348.2	657.74	348.4
660.23	348.6	662.72	348.8	665.21	349.28	667.7	349.87	670.19	350.27
672.69	350.66	675.18	351.28	677.67	352.54	680.16	354.02	682.65	355.58
685.14	357.12								

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .08	515.73 .035	677.67 .08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
515.73	677.67	81.5	59.05	34	.1	.3	
Ineffective Flow	num=	1					
Sta L	Sta R	Elev	Permanent				
685.14	685.14	360	F				

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 10

INPUT

Description:									
Station Elevation	Data	num=	128						
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 363.54	2.5 363.11	4.99 362.51	7.49 361.83	9.98 361.1					
12.48 360.38	14.97 359.87	17.47 359.31	19.96 358.73	22.46 358.47					
24.95 358.13	27.45 357.71	29.94 357.4	32.44 357.16	34.94 357.04					
37.43 356.88	39.93 356.69	42.42 356.66	44.92 356.84	47.41 357					
49.91 356.95	52.4 356.93	54.9 356.86	57.39 356.97	59.89 357.22					
62.39 357.12	64.88 356.44	67.38 355.74	69.87 355.43	72.37 355.46					
74.86 355.8	77.36 356.17	79.85 356.22	82.35 356.02	84.84 355.79					
87.34 355.6	89.84 355.51	92.33 355.41	94.83 355.45	97.32 355.5					
99.82 355.33	102.31 355.08	104.81 355.14	107.3 355.23	109.8 355.3					
112.29 355.4	114.79 355.47	117.28 355.51	119.78 355.56	122.28 355.54					
124.77 355.45	127.27 355.34	129.76 355.25	132.26 355.1	134.75 354.83					
137.25 354.55	139.74 354.44	142.24 354.51	144.73 354.46	147.23 354.36					
149.73 354	152.22 353.52	154.72 353.1	157.21 352.72	159.71 352.06					
162.2 351.36	164.7 350.87	167.19 350.4	169.69 349.89	172.18 349.52					
174.68 349.37	177.17 349.29	179.67 349.2	182.17 349.1	184.66 349.02					
187.16 349.01	189.65 348.95	192.15 348.93	194.64 348.95	197.14 348.98					

199.63	348.94	202.13	348.87	204.62	348.8	207.12	348.6	209.62	348.4
212.11	348.2	214.61	348	217.1	347.2	219.6	347	222.09	347
224.59	347	227.08	347	229.58	347	232.07	347	234.57	347
237.07	347	239.56	347	242.06	347	244.55	347	247.05	347
249.54	347	252.04	347	254.53	347	257.03	347	259.52	347
262.02	347	267.01	347	269.51	348.1	272	348.2	274.5	348.3
276.99	348.4	279.49	348.5	281.98	348.6	284.48	348.7	286.97	348.8
289.47	348.85	291.96	348.93	294.46	349.08	296.96	349.25	299.45	349.39
301.95	349.72	304.44	350.24	306.94	351.29	309.43	352.94	311.93	354.68
314.42	356.27	316.92	357.65	319.41	358.65				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	154.72	.035	309.43	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	154.72	309.43		57.5 47.11	32		.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 9

INPUT

Description:

Station	Elevation	Data	num=	62						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	363.17	2.49	363.1	4.97	363.01	7.46	362.96	9.95	362.87	
12.44	362.47	14.92	361.94	17.41	361.8	19.9	361.89	22.39	361.91	
24.87	361.93	27.36	361.97	29.85	361.99	32.34	362.05	34.82	361.92	
37.31	361.37	39.8	360.59	42.29	359.61	44.77	358.63	47.26	357.87	
52.24	356.43	54.72	355.71	57.21	355	59.7	354.44	62.19	354.18	
64.67	354.03	67.16	353.92	69.65	353.84	72.14	353.8	74.62	353.79	
77.11	353.76	79.6	353.66	82.09	353.53	84.57	353.34	87.06	353.16	
89.55	352.84	92.04	352.51	94.52	352.32	96	352	112	351	
115.5	350	124.5	349	131	348	141	347	151	346.5	
161	346.5	171	346.5	208	346.5	218	346.5	228	346.5	
238	347	248.5	348	249.5	349	250.5	350	251.5	351	
252.5	352	253.5	353	256.21	353.37	258.69	354.8	261.18	356.38	
263.67	357.7	266.16	358.68							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	96	.035	253.5	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	96	253.5		128 127.88	56		.3	.5

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 8

INPUT

Description:

Station	Elevation	Data	num=	85						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	360.55	2.49	360.71	4.99	360.91	7.48	360.83	9.98	360.15	
12.47	356.49	14.96	352.82	17.46	349.92	19.95	348	22.44	347	

24.94	346.5	27.43	346	29.93	345.5	32.42	345	34.91	345
37.41	345	39.9	345	42.39	345	44.89	345	47.38	345
49.88	345	52.37	345	54.86	345	57.36	345	59.85	345
62.34	345	64.84	345	67.33	345	69.83	345	72.32	345
74.81	345	77.31	345	79.8	345	82.29	345	84.79	345
87.28	345	89.78	345	92.27	345	94.76	345	97.26	345
99.75	345	102.24	345	104.74	345	109.73	345	112.22	345
114.71	345.2	117.21	345.4	119.7	345.6	122.2	345.8	124.69	346
127.18	346.1	129.68	346.2	132.17	346.3	134.66	346.4	137.16	346.5
139.65	346.6	142.15	346.7	144.64	346.8	147.13	346.9	149.63	347
152.12	347.1	154.61	347.2	157.11	347.3	159.6	347.4	162.1	347.5
164.59	347.6	167.08	347.7	169.58	347.8	172.07	347.9	174.56	348
177.06	348.2	179.55	348.4	182.05	348.6	184.54	348.62	187.03	348.6
189.53	348.68	192.02	348.73	194.51	348.78	197.01	349.61	199.5	351.17
202	352.75	204.49	354.51	206.98	356.36	209.48	357.03	211.97	356.91

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	14.96	.035	202	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	14.96	202		60 60.09	60		.3	.5

BRIDGE

RIVER: Bushkill
 REACH: Main RS: 7.5

INPUT

Description:

Distance from Upstream XS = 10
 Deck/Roadway Width = 45.5
 Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num=	10								
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	361		300		10	361		300	
16	364.6		300		16	364.6		357.1	
201.5	363.6		300		207.5	363.6		300	
250	360		300						

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	85					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.55	2.49	360.71	4.99	360.91	7.48	360.83	9.98	360.15
12.47	356.49	14.96	352.82	17.46	349.92	19.95	348	22.44	347
24.94	346.5	27.43	346	29.93	345.5	32.42	345	34.91	345
37.41	345	39.9	345	42.39	345	44.89	345	47.38	345
49.88	345	52.37	345	54.86	345	57.36	345	59.85	345
62.34	345	64.84	345	67.33	345	69.83	345	72.32	345
74.81	345	77.31	345	79.8	345	82.29	345	84.79	345
87.28	345	89.78	345	92.27	345	94.76	345	97.26	345
99.75	345	102.24	345	104.74	345	109.73	345	112.22	345
114.71	345.2	117.21	345.4	119.7	345.6	122.2	345.8	124.69	346
127.18	346.1	129.68	346.2	132.17	346.3	134.66	346.4	137.16	346.5
139.65	346.6	142.15	346.7	144.64	346.8	147.13	346.9	149.63	347
152.12	347.1	154.61	347.2	157.11	347.3	159.6	347.4	162.1	347.5
164.59	347.6	167.08	347.7	169.58	347.8	172.07	347.9	174.56	348
177.06	348.2	179.55	348.4	182.05	348.6	184.54	348.62	187.03	348.6
189.53	348.68	192.02	348.73	194.51	348.78	197.01	349.61	199.5	351.17

202 352.75 204.49 354.51 206.98 356.36 209.48 357.03 211.97 356.91

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .08 14.96 .035 202 .08

Bank Sta: Left Right Coeff Contr. Expan.
 14.96 202 .3 .5

Downstream Deck/Roadway Coordinates
 num= 10
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord
 0 361 300 42 361 300 42 364.6 300
 48 364.6 300 48 364.6 357.1 233.5 363.6 356.1
 233.5 363.6 300 239.5 363.6 300 239.5 360 300
 260 360 300

Downstream Bridge Cross Section Data
 Station Elevation Data num= 103
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 360.02 2.49 360.09 4.98 359.91 7.47 359.6 9.96 359.21
 12.45 358.94 14.95 358.64 17.44 358.2 19.93 357.78 22.42 357.45
 24.91 356.79 27.4 356.79 29.89 357.07 32.38 357.35 34.87 357.43
 37.36 357.6 39.85 357.78 42.34 355.76 44.84 352.13 47.33 348.7
 49.82 347.88 54.8 347 57.29 346.5 59.78 346 62.27 345.5
 64.76 345 67.25 345 69.74 345 72.23 345 74.73 345
 77.22 345 79.71 345 82.2 345 84.69 345 87.18 345
 89.67 345 92.16 345 94.65 345 97.14 345 99.63 345
 102.12 345 104.62 345 107.11 345 112.09 345 114.58 345
 117.07 345 119.56 345 122.05 345 124.54 345 127.03 345
 129.52 345 132.02 345 134.51 345 137 345 139.49 345
 141.98 345 144.47 345.2 146.96 345.4 149.45 345.6 151.94 345.8
 154.43 346 156.92 346.1 159.41 346.2 161.91 346.3 164.4 346.4
 166.89 346.5 169.38 346.6 171.87 346.7 176.85 346.8 179.34 346.9
 181.83 347 184.32 347.1 186.81 347.2 189.3 347.3 191.8 347.4
 194.29 347.5 196.78 347.6 199.27 347.7 201.76 347.8 204.25 347.9
 206.74 348 209.23 348.2 211.72 348.4 214.21 348.6 216.7 348.6
 219.19 348.69 221.69 348.63 224.18 348.65 226.67 348.67 229.16 348.69
 231.65 348.72 234.14 349.99 236.63 352.28 239.12 355.03 241.61 357.26
 244.1 358.23 246.59 358.88 249.09 359.08 251.58 359.19 254.07 359.37
 256.56 359.49 259.05 359.54 261.54 359.64

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .08 44.84 .035 236.63 .08

Bank Sta: Left Right Coeff Contr. Expan.
 44.84 236.63 .3 .5

Upstream Embankment side slope = 1 horiz. to 1.0 vertical
 Downstream Embankment side slope = 1 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .98
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
 Pier Station Upstream= 77.25 Downstream= 109.25

Upstream	num=	4							
Width	Elev	Width	Elev	Width	Elev	Width	Elev		
4	330	4	350	3	357	3	360		
Downstream	num=	4							
Width	Elev	Width	Elev	Width	Elev	Width	Elev		
4	330	4	350	3	357	3	360		

Pier Data

Pier Station	Upstream=	140.25	Downstream=	172.25
Upstream	num=	4		
Width	Elev	Width	Elev	Width
4	330	4	350	3
Downstream	num=	4		
Width	Elev	Width	Elev	Width
4	330	4	350	3

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Momentum Cd = 2

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd =

Submerged Inlet + Outlet Cd = .8

Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 7

INPUT

Description:

Station	Elevation	Data	num=	103						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	360.02	2.49	360.09	4.98	359.91	7.47	359.6	9.96	359.21	
12.45	358.94	14.95	358.64	17.44	358.2	19.93	357.78	22.42	357.45	
24.91	356.79	27.4	356.79	29.89	357.07	32.38	357.35	34.87	357.43	
37.36	357.6	39.85	357.78	42.34	355.76	44.84	352.13	47.33	348.7	
49.82	347.88	54.8	347	57.29	346.5	59.78	346	62.27	345.5	
64.76	345	67.25	345	69.74	345	72.23	345	74.73	345	
77.22	345	79.71	345	82.2	345	84.69	345	87.18	345	
89.67	345	92.16	345	94.65	345	97.14	345	99.63	345	
102.12	345	104.62	345	107.11	345	112.09	345	114.58	345	
117.07	345	119.56	345	122.05	345	124.54	345	127.03	345	
129.52	345	132.02	345	134.51	345	137	345	139.49	345	
141.98	345	144.47	345.2	146.96	345.4	149.45	345.6	151.94	345.8	
154.43	346	156.92	346.1	159.41	346.2	161.91	346.3	164.4	346.4	
166.89	346.5	169.38	346.6	171.87	346.7	176.85	346.8	179.34	346.9	
181.83	347	184.32	347.1	186.81	347.2	189.3	347.3	191.8	347.4	

194.29	347.5	196.78	347.6	199.27	347.7	201.76	347.8	204.25	347.9
206.74	348	209.23	348.2	211.72	348.4	214.21	348.6	216.7	348.6
219.19	348.69	221.69	348.63	224.18	348.65	226.67	348.67	229.16	348.69
231.65	348.72	234.14	349.99	236.63	352.28	239.12	355.03	241.61	357.26
244.1	358.23	246.59	358.88	249.09	359.08	251.58	359.19	254.07	359.37
256.56	359.49	259.05	359.54	261.54	359.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	44.84	.035	236.63	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	44.84	236.63		46.5	46.58	46.5		.3	.5

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 6

INPUT

Description:

Station	Elevation	Data	num=	105						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	360.75	2.48	360.67	4.96	360.4	7.43	360.01	9.91	359.7	
12.39	359.45	14.87	359.25	17.35	358.9	19.82	358.4	22.3	358.06	
24.78	357.5	27.26	356.81	29.73	356.07	32.21	354.77	34.69	352.9	
37.17	350.99	39.65	349.64	42.12	348.72	44.6	348.2	47.08	347.95	
49.56	347.73	52.04	347.57	54.51	347.5	56.99	347.2	59.47	347	
61.95	346.4	66.9	346.2	69.38	346	71.86	345.8	74.34	345.6	
76.81	345.5	79.29	345.5	81.77	345.5	84.25	345.5	86.73	345.5	
89.2	345.5	91.68	345.5	94.16	345.5	96.64	345.5	99.12	345.5	
101.59	345.5	104.07	345.5	106.55	345.5	109.03	345.5	111.51	345.5	
113.98	345.6	116.46	345.8	118.94	346	121.42	346.2	123.89	346.4	
126.37	346.6	128.85	346.8	131.33	347	133.81	347.1	136.28	347.2	
138.76	347.3	141.24	347.37	143.72	347.69	146.2	348.15	148.67	348.65	
151.15	348.96	153.63	349.17	156.11	349.26	158.59	349.19	161.06	349.07	
163.54	349.06	166.02	349.07	168.5	349.05	170.97	349.1	173.45	349.29	
175.93	349.34	178.41	349.19	180.89	348.84	183.36	348.6	185.84	348.41	
188.32	348.31	190.8	348.27	193.28	348.28	195.75	348.29	198.23	348.23	
200.71	348.3	203.19	348.36	205.67	348.41	208.14	348.49	210.62	348.64	
213.1	348.84	215.58	349.18	218.06	349.53	220.53	349.93	223.01	350.52	
225.49	351.08	227.97	351.53	230.44	351.92	232.92	352.16	235.4	352.41	
237.88	352.64	240.36	352.81	242.83	352.97	245.31	353.2	247.79	353.35	
250.27	353.44	252.75	353.54	255.22	353.71	257.7	353.83	260.18	353.9	

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	37.17	.035	225.49	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	37.17	225.49		57	57.11	57		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
260.18	260.18	358	F

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 5

INPUT

Description:

Station Elevation Data		num= 106							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.77	2.5	360.74	5	360.77	7.5	360.73	10	360.62
12.5	360.64	15	360.59	17.5	360.43	20	360.29	22.5	360
25	359.77	27.5	359.67	30	359.44	32.49	359.1	34.99	358.69
37.49	357.99	39.99	357	42.49	355.27	44.99	352.33	47.49	349.1
49.99	348.04	52.49	347.76	54.99	347.61	57.49	347.31	59.99	346.99
62.49	346.78	64.99	346.6	67.49	346.4	69.99	346.2	72.49	346
74.99	345.8	77.49	345.6	79.99	345.5	82.49	345.5	84.99	345.5
89.99	345.5	92.49	345.5	94.99	345.5	97.48	345.5	99.98	345.5
102.48	345.5	104.98	345.5	107.48	345.5	109.98	345.5	112.48	345.5
114.98	345.5	117.48	345.5	119.98	345.5	122.48	345.5	124.98	345.5
127.48	345.5	129.98	345.5	132.48	345.5	134.98	345.5	137.48	345.5
139.98	345.6	142.48	345.8	144.98	346	147.48	346.2	149.98	346.4
154.98	346.65	157.48	346.64	159.97	346.65	162.47	346.66	164.97	346.7
167.47	347.01	169.97	347.68	172.47	348.35	174.97	348.83	177.47	349.12
179.97	349.3	182.47	349.52	184.97	349.88	187.47	350.21	189.97	350.43
192.47	350.52	194.97	350.85	197.47	351.47	199.97	352.34	202.47	352.9
204.97	353.19	207.47	353.5	209.97	354.23	212.47	355.02	214.97	355.59
217.47	356.12	219.97	356.74	222.46	357.35	224.96	357.78	227.46	358.11
229.96	358.22	232.46	358.39	234.96	358.35	237.46	358.4	239.96	357.86
242.46	357.52	244.96	357.51	247.46	357.63	249.96	357.65	254.96	357.67
257.46	357.25	262.46	356.87	264.96	356.33	267.46	355.51	269.96	354.79
272.46	354.17								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.08	44.99	.035	199.97	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.99	199.97		55.3	55.37	55.3	.1	.3
Ineffective Flow	num=		1					
Sta L	Sta R	Elev	Permanent					
232.46	272.46	358.4	F					

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 4

INPUT

Description:

Station Elevation Data		num= 103							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.99	2.48	359.92	4.96	359.89	7.44	359.8	9.92	359.68
12.4	359.65	14.88	359.69	17.36	359.74	19.84	359.77	22.32	359.59
24.8	359.22	27.28	358.57	29.76	357.41	32.24	355.52	34.72	353.62
37.2	351.96	39.68	350.39	42.16	349.03	44.64	347.91	47.12	346.89
49.6	346.35	52.08	346.2	54.56	346.1	57.04	346	59.52	345.8
62	345.6	64.48	345.5	66.96	345.4	69.44	345.4	71.92	345.4
74.4	345.4	76.88	345.4	79.36	345.4	81.84	345.4	84.32	345.4
86.8	345.4	89.28	345.4	91.76	345.4	94.24	345.4	96.72	345.4
99.2	345.4	101.68	345.4	104.16	345.4	106.64	345.4	109.12	345.4
111.6	345.4	114.08	345.5	116.56	345.6	119.04	345.8	121.52	346
124	346.1	126.48	346.2	128.96	346.3	131.44	346.33	133.92	346.33
136.4	346.37	138.88	346.43	141.36	346.48	143.84	346.6	146.32	346.54
148.8	346.62	151.28	346.68	153.76	346.72	156.24	346.76	158.72	346.8

163.68	346.88	166.16	346.87	168.64	347.02	171.12	347.67	173.6	348.1
176.08	348.38	178.56	348.59	181.04	348.9	183.52	348.95	186	348.65
188.48	348.55	190.96	348.66	193.44	348.9	195.92	349.23	198.4	349.52
200.88	349.88	203.36	350.27	205.84	350.68	208.32	351.04	210.8	351.5
213.28	351.77	215.76	352.05	218.24	352.37	220.72	352.77	223.2	353.64
225.68	354.52	228.16	354.95	230.64	355.23	233.12	355.26	235.6	355.29
238.08	355.43	240.56	355.71	243.04	356.02	245.52	356.23	248	356.43
250.48	356.5	252.96	356.31	255.44	355.77				

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .1	42.16 .05	181.04 .1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
42.16	181.04	88	88.24	88	.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 3

INPUT

Description:

Station Elevation Data	num=	148
Sta Elev	Sta Elev	Sta Elev
0 356.85	2.49 357.07	4.98 357.12
12.46 357.25	14.95 357.51	17.44 357.57
24.92 357.45	27.41 357.52	29.9 357.62
37.37 357.76	39.87 357.65	42.36 357.66
49.83 357.79	52.32 357.26	54.81 354.78
62.29 347.01	64.78 346.5	67.27 346.4
74.75 345.8	77.24 345.6	79.73 345.4
87.21 345.3	89.7 345.3	92.19 345.3
99.66 345.3	102.15 345.3	104.65 345.3
112.12 345.3	114.61 345.3	117.1 345.3
124.58 345.3	127.07 345.3	129.56 345.3
137.04 345.5	139.53 345.6	142.02 345.7
149.49 345.74	151.99 345.73	154.48 345.86
161.95 346.32	164.44 346.26	166.94 346.22
174.41 345.94	176.9 346.09	179.39 346.37
186.87 347.28	189.36 347.43	191.85 347.54
199.33 347.34	201.82 347.84	204.31 348.12
211.78 347.37	214.28 347.79	216.77 348.12
224.24 347.29	226.73 347.24	229.22 347.56
236.7 348.45	239.19 348.78	241.68 349.2
249.16 349.33	251.65 348.98	254.14 348.73
261.62 350.81	264.11 351.08	266.6 351.41
274.07 351.68	276.57 351.65	279.06 351.44
286.53 351.22	289.02 351.38	291.51 351.64
298.99 351.5	301.48 351.38	303.97 351.36
311.45 351.36	313.94 351.3	316.43 351.46
323.9 351.65	326.4 351.71	328.89 351.62
336.36 351.5	338.85 351.44	341.35 351.52
348.82 351.63	351.31 351.72	353.8 351.73
361.28 352.25	363.77 352.25	366.26 352.03

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .1	59.8 .05	204.31 .1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.8	204.31		134 131.6	125.5		.1	.3
Ineffective Flow	num=		1					
Sta L	Sta R	Elev	Permanent					
366.26	366.26	355	F					

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 2

INPUT

Description:

Station	Elevation	Data	num=	183					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	348.79	0	348.79	2.5	349.11	5	349.3	7.49	349.46
9.99	349.55	12.49	349.59	14.99	349.45	17.49	348.97	19.99	348.47
22.48	348.03	24.98	347.54	27.48	347.04	29.98	346.47	32.48	345.91
34.97	345.53	37.47	345.32	39.97	345.24	42.47	344.95	44.97	344.72
47.47	344.57	49.96	344.5	52.46	344.47	54.96	344.51	59.96	344.49
62.45	344.56	64.95	344.63	67.45	344.63	69.95	344.62	72.45	344.67
74.94	344.8	77.44	344.91	79.94	344.93	82.44	344.86	84.94	344.8
87.44	344.78	89.93	344.76	92.43	344.72	94.93	344.73	97.43	344.8
99.93	344.81	102.42	344.79	107.42	344.67	109.92	344.66	112.42	344.71
114.92	344.8	117.41	344.89	119.91	345.03	122.41	345.16	127.41	345.02
129.9	345.09	132.4	345.11	134.9	345.11	137.4	345.05	139.9	344.94
142.4	345.07	144.89	345.15	147.39	345.29	149.89	345.39	152.39	345.47
154.89	345.59	157.38	345.92	159.88	346.33	162.38	346.69	164.88	347.02
167.38	347.3	169.88	347.57	172.37	347.48	174.87	347.04	177.37	346.46
179.87	345.92	182.37	345.49	184.86	345.47	187.36	345.48	189.86	345.44
192.36	345.43	194.86	345.34	197.36	345.37	199.85	345.38	202.35	345.32
204.85	345.32	207.35	345.31	209.85	345.21	212.34	345.26	217.34	345.26
219.84	345.2	222.34	345.19	224.84	345.14	227.33	345.12	229.83	345.09
232.33	345	234.83	344.89	237.33	344.88	239.82	344.83	242.32	344.85
244.82	344.9	247.32	344.99	249.82	345.04	252.32	345.2	254.81	345.22
257.31	345.25	259.81	345.11	262.31	345.1	264.81	345.18	267.3	345.24
269.8	345.35	272.3	345.45	274.8	345.51	277.3	345.66	279.79	345.74
282.29	345.7	284.79	345.67	287.29	345.74	289.79	345.93	292.29	346.03
294.78	346.01	297.28	345.93	299.78	346.03	302.28	346.04	304.78	345.77
307.27	345.45	309.77	345.19	312.27	345.02	314.77	345	317.27	344.97
319.77	345.17	322.26	345.3	324.76	345.41	327.26	345.99	329.46	347.15
332.26	348.25	334.75	349	337.25	349.49	339.75	349.87	342.25	350.07
344.75	350.06	347.25	349.71	349.74	348.9	352.24	348.08	354.74	347.31
357.24	346.89	359.74	346.9	362.23	346.93	364.73	347.17	367.23	347.31
369.73	347.3	372.23	347.67	374.73	347.83	377.22	347.78	379.72	347.45
382.22	347.06	384.72	346.73	387.22	346.43	389.71	346.21	392.21	346.21
394.71	346.47	397.21	346.51	399.71	346.26	402.21	346.21	404.7	346.07
407.2	346.62	409.7	347.24	412.2	347.93	414.7	348.65	417.19	349.33
419.69	349.78	422.19	350.19	424.69	350.33	427.19	350.36	429.69	350.09
432.18	349.85	434.68	349.76	437.18	349.83	439.68	350.08	442.18	350.26
444.67	350.56	447.17	350.84	449.67	350.99	452.17	351.03	454.67	351.29
457.17	351.6	459.66	351.66	470	351.66				

Manning's n Values	num=	3		
Sta n Val	Sta	n Val	Sta	n Val
-10 .1	172.37	.05	329.46	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	172.37	329.46		164.5 166.3	151.5		.1	.3
Ineffective Flow	num=		3					

Sta L	Sta R	Elev	Permanent
-10	0	355	F
342.25	460	353	F
460	470	355	F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 1

INPUT

Description:

Station	Elevation	Data	num=	136
Sta	Elev	Sta	Elev	Sta
-10	350.74	0	350.74	2.5
10	350.35	12.49	350.54	14.99
22.49	347.08	24.99	346.61	27.49
34.98	346.15	37.48	346.11	39.98
49.98	346.31	52.48	346.6	54.98
62.47	345.28	64.97	345.12	67.47
74.97	344.8	77.46	344.78	79.96
87.46	344.77	89.96	344.7	92.46
99.95	344.78	102.45	344.8	104.95
112.45	344.83	114.95	344.85	117.45
124.94	344.83	127.44	344.76	129.94
142.44	344.67	144.93	344.69	147.43
154.93	345.3	157.43	345.32	159.93
167.42	344.85	169.92	344.85	172.42
179.92	344.95	182.42	344.74	184.92
192.41	344.11	194.91	344.53	197.41
204.91	348.45	207.41	349.5	209.9
217.4	351.06	219.9	350.94	222.4
229.9	348.79	232.39	348.12	234.89
242.39	345.71	244.89	345.49	247.39
254.88	345.36	257.38	345.36	259.88
267.38	345.41	269.88	345.36	272.38
279.87	345.23	282.37	345.22	284.87
292.37	345.24	294.87	345.21	297.36
307.36	345.27	309.86	345.27	312.36
322.35	345.28	324.85	345.36	327.35
334.85	345.33	337.35	345.47	339.85
360	346.35			

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
-10 .1	57.91 .05	199.91 .1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
57.91	199.91	0	0	0	.1	.3	

Ineffective Flow	num=	3
Sta L	Sta R	Elev
-10	0	355
217.5	350	353
350	360	355

SUMMARY OF MANNING'S N VALUES

River: Bushkill

Reach	River Sta.	n1	n2	n3
Main	21	.08	.035	.08
Main	20	.08	.035	.08
Main	19	.08	.035	.08
Main	18	.08	.035	.08
Main	17	.08	.035	.08
Main	16	.08	.035	.08
Main	15	.08	.035	.08
Main	14	.08	.035	.08
Main	13	.08	.035	.08
Main	12	.08	.035	.08
Main	11	.08	.035	.08
Main	10	.08	.035	.08
Main	9	.08	.035	.08
Main	8	.08	.035	.08
Main	7.5	Bridge		
Main	7	.08	.035	.08
Main	6	.08	.035	.08
Main	5	.08	.035	.08
Main	4	.1	.05	.1
Main	3	.1	.05	.1
Main	2	.1	.05	.1
Main	1	.1	.05	.1

SUMMARY OF REACH LENGTHS

River: Bushkill

Reach	River Sta.	Left	Channel	Right
Main	21	256	263.74	260
Main	20	251	309.2	255
Main	19	232	256.29	231
Main	18	174	176.77	174
Main	17	130	135.75	130
Main	16	110	110.75	110
Main	15	122	123.66	122
Main	14	138	131.49	129.5
Main	13	141	124.46	121
Main	12	122.5	112.37	105.5
Main	11	81.5	59.05	34
Main	10	57.5	47.11	32
Main	9	128	127.88	56
Main	8	60	60.09	60
Main	7.5	Bridge		
Main	7	46.5	46.58	46.5
Main	6	57	57.11	57
Main	5	55.3	55.37	55.3
Main	4	88	88.24	88
Main	3	134	131.6	125.5
Main	2	164.5	166.3	151.5
Main	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Bushkill

Reach	River Sta.	Contr.	Expan.
Main	21	.1	.3
Main	20	.1	.3
Main	19	.1	.3
Main	18	.1	.3
Main	17	.1	.3
Main	16	.1	.3
Main	15	.1	.3
Main	14	.1	.3
Main	13	.1	.3
Main	12	.1	.3
Main	11	.1	.3
Main	10	.1	.3
Main	9	.3	.5
Main	8	.3	.5
Main	7.5	Bridge	
Main	7	.3	.5
Main	6	.1	.3
Main	5	.1	.3
Main	4	.1	.3
Main	3	.1	.3
Main	2	.1	.3
Main	1	.1	.3

HEC-RAS HEC-RAS 6.2 March 2022
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X      X XXXXXX   XXXX      XXXX      XX      XXXX
X      X X      X X      X X      X X      X
X      X X      X      X X      X X      X
XXXXXXX XXXX   X      XXX XXXX   XXXXXX   XXXX
X      X X      X      X X      X X      X      X
X      X X      X X      X X      X X      X
X      X XXXXXX   XXXX      X X      X X      XXXXX

```

PROJECT DATA

Project Title: Bushkill Creek at US Route 209
Project File : Bushkill_12.prj
Run Date and Time: 10/11/2022 11:01:57 PM

Project in English units

Project Description:

Floodplain Study for Bushkill Creek at US Route 209, Pike County, Pennsylvania

PLAN DATA

Plan Title: Proposed Maintenance Condition

Plan File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.p02

Geometry Title: Proposed Maintenance Condition

Geometry File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.g02

Flow Title : Peak Discharges

Flow File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.f01

Plan Summary Information:

Number of:	Cross Sections =	21	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	1	Lateral Structures =	0

Computational Information

Water surface calculation tolerance =	0.01
Critical depth calculation tolerance =	0.01
Maximum number of iterations =	20
Maximum difference tolerance =	0.3
Flow tolerance factor =	0.001

Computation Options

Critical depth computed at all cross sections
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Peak Discharges

Flow File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.f01

Flow Data (cfs)

River	Reach	RS	2-yr	10-yr	25-yr	50-yr	100-yr
Bushkill	Main	21	2435	5279	7593	9839	12630

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Bushkill	Main	2-yr		Normal S = 0.005
Bushkill	Main	10-yr		Normal S = 0.005
Bushkill	Main	25-yr		Normal S = 0.005
Bushkill	Main	50-yr		Normal S = 0.005
Bushkill	Main	100-yr		Normal S = 0.003

GEOMETRY DATA

Geometry Title: Proposed Maintenance Condition

Geometry File : o:\TRANSDWG\water\PP\proposal\PA_Bushkill Village_H&H\ras\ras2\Bushkill_12.g02

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 21

INPUT

Description:

Station	Elevation	Data	num=	453						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	366.61	2.5	366.44	5	366.29	7.5	366.26	10	366.19	
12.5	366.01	14.99	365.93	17.49	365.88	19.99	365.78	22.49	365.8	
24.99	365.77	27.49	365.65	29.99	365.54	32.49	365.63	34.99	365.79	
37.49	365.79	39.98	365.83	42.48	365.71	44.98	365.65	47.48	365.68	
49.98	365.68	52.48	365.74	54.98	365.86	57.48	365.96	59.98	366.04	
62.48	366.07	64.98	366.14	67.47	366.2	69.97	366.25	72.47	366.26	
79.97	366.35	82.47	366.37	84.97	366.39	87.47	366.43	89.97	366.46	
92.46	366.49	94.96	366.47	97.46	366.44	99.96	366.3	102.46	366.05	
104.96	365.99	107.46	365.96	109.96	365.9	112.46	365.89	114.96	365.79	
117.46	365.72	119.95	365.67	122.45	365.6	124.95	365.47	127.45	365.33	
129.95	365.25	132.45	365.23	134.95	365.26	137.45	365.36	139.95	365.54	
142.45	365.8	144.95	366.05	147.44	366.21	149.94	366.24	152.44	366.38	
154.94	366.61	159.94	367.07	162.44	367.4	164.94	367.61	167.44	367.72	
169.94	367.87	172.43	367.92	174.93	368.08	177.43	368.17	179.93	368.28	
182.43	368.22	184.93	368.26	187.43	368.34	189.93	368.42	192.43	368.5	
194.93	368.55	197.42	368.83	199.92	369.02	202.42	368.94	204.92	368.96	
207.42	368.93	209.92	368.8	212.42	368.46	214.92	368.32	217.42	368.26	
219.92	368.25	222.42	368.22	224.91	368.16	227.41	368.15	229.91	368.19	

232.41	368.15	234.91	368.04	237.41	367.82	239.91	367.54	242.41	367.3
244.91	367.09	247.41	366.83	249.91	366.55	252.4	366.41	254.9	366.3
257.4	366.17	259.9	366.1	262.4	366.09	264.9	366.09	267.4	366.08
269.9	366.07	274.9	366.25	277.39	366.35	279.89	366.4	284.89	366.42
287.39	366.42	289.89	366.35	292.39	366.24	294.89	366.13	297.39	366.06
299.89	365.94	302.39	365.86	304.88	365.7	309.88	365.3	312.38	365.14
314.88	364.98	317.38	364.8	319.88	364.62	322.38	364.38	324.88	364.2
327.38	364.06	329.87	363.97	332.37	363.94	334.87	363.81	337.37	363.51
339.87	363.44	342.37	363.38	344.87	363.33	347.37	363.37	349.87	363.47
352.37	363.58	354.87	363.76	357.36	363.98	359.86	364.15	362.36	364.26
364.86	364.38	367.36	364.54	369.86	364.8	372.36	364.68	374.86	364.38
377.36	364.13	379.86	364.01	382.35	363.98	384.85	363.85	387.35	363.75
394.85	363.39	397.35	363.31	399.85	363.26	402.35	363.2	404.85	363.15
407.35	363.08	409.84	362.95	412.34	362.9	414.84	362.95	417.34	362.92
419.84	362.78	422.34	362.67	424.84	362.55	427.34	362.37	429.84	362.18
432.34	361.97	434.83	361.76	437.33	361.62	439.83	361.58	442.33	361.61
444.83	361.7	447.33	361.76	449.83	361.79	452.33	361.8	457.33	361.82
459.83	361.84	462.32	361.85	464.82	361.92	467.32	361.92	469.82	361.96
472.32	362	474.82	361.91	477.32	361.99	479.82	362.2	482.32	362.43
484.82	362.77	487.32	362.83	489.81	362.72	492.31	362.84	494.81	362.81
497.31	362.8	499.81	362.8	502.31	362.89	504.81	362.91	507.31	362.92
509.81	362.89	512.31	362.85	514.8	362.76	517.3	362.66	519.8	362.7
522.3	362.87	524.8	363.13	527.3	363.37	529.8	363.62	532.3	363.88
534.8	364.16	537.3	364.33	539.8	364.43	542.29	364.45	544.79	364.48
547.29	364.46	549.79	364.43	552.29	364.32	554.79	364.27	557.29	364.13
559.79	363.97	562.29	363.82	564.79	363.64	567.28	363.37	569.78	363.2
572.28	363.16	574.78	363.1	577.28	363.02	579.78	362.93	582.28	362.95
584.78	363.07	587.28	363.09	589.78	363.07	592.28	363.02	594.77	363.05
597.27	363.27	599.77	363.4	602.27	363.27	604.77	363.12	607.27	363.17
609.77	363.17	614.77	363.33	617.27	363.42	619.77	363.44	622.26	363.31
624.76	363.02	627.26	362.75	629.76	362.62	632.26	362.48	634.76	362.27
637.26	362.1	639.76	361.95	642.26	361.84	644.76	361.6	647.26	361.41
649.75	361.21	652.25	361.07	654.75	361.18	657.25	361.38	659.75	361.58
662.25	361.74	664.75	361.87	667.25	361.94	669.75	361.97	672.25	361.96
674.74	361.95	677.24	361.67	679.74	361.03	682.24	360.12	684.74	359.33
687.24	358.58	689.74	358.2	692.24	357.96	694.74	357.74	697.24	357.64
699.74	357.67	702.23	357.71	704.73	357.75	707.23	357.81	709.73	358.12
712.23	358.71	714.73	359.04	717.23	359.23	719.73	359.39	722.23	359.53
724.73	359.74	727.23	359.79	729.72	359.79	732.22	359.77	734.72	359.71
737.22	359.61	739.72	359.55	742.22	359.67	744.72	359.75	747.22	359.72
749.72	359.67	752.22	359.49	754.72	359.22	757.21	358.82	759.71	358.69
762.21	358.71	764.71	358.65	767.21	358.57	769.71	358.53	772.21	358.47
774.71	358.38	777.21	358.19	779.71	357.97	782.21	357.93	784.7	357.97
787.2	357.96	789.7	357.99	792.2	357.94	794.7	357.85	797.2	357.8
799.7	357.76	802.2	357.79	804.7	357.83	807.2	357.85	809.7	357.91
812.19	357.99	814.69	357.98	817.19	357.88	819.69	357.92	822.19	358.02
824.69	357.89	827.19	357.73	829.69	357.81	832.19	357.88	834.69	358.11
837.18	359.07	839.68	361.07	842.18	363.47	844.68	365.19	847.18	365.44
849.68	365.43	852.18	365.37	854.68	365.45	857.18	364.88	859.68	364.21
862.18	363.64	864.67	362.86	867.17	361.74	869.67	360.73	872.17	359.77
874.67	359.26	877.17	359.13	879.67	358.91	882.17	358.62	884.67	358.52
887.17	358.72	889.67	359.16	892.16	359.81	894.66	361.67	897.16	363.5
899.66	363.85	902.16	364.11	904.66	364.1	907.16	364.09	909.66	364.16
912.16	364.24	914.66	364.33	917.15	364.21	919.65	364.11	922.15	363.99
924.65	363.86	927.15	363.71	929.65	363.59	932.15	363.61	934.65	363.59
937.15	363.55	939.65	363.58	942.15	363.83	944.64	363.89	947.14	363.75
949.64	363.66	952.14	363.6	954.64	363.74	957.14	363.71	959.64	363.66
962.14	363.79	967.14	363.65	969.64	363.6	972.13	363.6	974.63	363.56
977.13	363.5	979.63	363.51	982.13	363.46	984.63	363.39	987.13	363.5
989.63	363.67	992.13	363.65	994.63	363.43	997.13	363.33	999.62	363.35
1002.12	363.35	1004.62	363.33	1007.12	363.36	1009.62	363.4	1012.12	363.37

1014.62	363.35	1017.12	363.47	1019.62	363.7	1022.12	363.69	1024.61	363.69
1027.11	363.74	1029.61	363.72	1032.11	363.66	1034.61	363.61	1037.11	363.63
1039.61	363.71	1042.11	363.83	1044.61	363.99	1047.11	364.16	1049.61	364.13
1052.1	364.16	1054.6	364.23	1057.1	364.21	1059.6	364.14	1062.1	363.94
1064.6	363.85	1067.1	363.83	1069.6	363.85	1072.1	363.8	1074.6	363.71
1077.1	363.66	1079.59	363.57	1082.09	363.52	1084.59	363.5	1087.09	363.6
1089.59	363.67	1092.09	363.51	1094.59	363.42	1097.09	363.38	1099.59	363.38
1102.09	363.31	1104.59	363.27	1107.08	363.25	1109.58	363.24	1112.08	363.38
1114.58	363.47	1117.08	363.57	1119.58	363.7	1122.08	363.96	1124.58	364.28
1127.08	364.57	1129.58	364.8	1132.07	365.04	1134.57	365.24	1137.07	365.48
1139.57	365.74	1142.07	366	1144.57	366.22	1147.07	366.39	1149.57	366.32
1152.07	366.3	1154.57	366.3	1157.07	366.35				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	677.24	.035	839.68	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	677.24	839.68		256	263.74	260		.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 20

INPUT

Description:

Station	Elevation	Data	num=	470					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	366.05	2.5	366.17	4.99	366.25	7.49	366.27	9.99	366.33
12.48	366.42	14.98	366.42	17.48	366.44	19.97	366.64	22.47	366.84
24.96	366.91	27.46	366.88	29.96	366.84	32.45	366.85	34.95	366.79
37.45	366.71	39.94	366.64	42.44	366.63	44.94	366.63	47.43	366.56
49.93	366.55	52.43	366.66	54.92	366.79	57.42	366.78	59.91	366.81
62.41	366.83	64.91	366.69	67.4	366.6	69.9	366.63	72.4	366.65
74.89	366.6	77.39	366.55	79.89	366.51	82.38	366.35	84.88	366.28
87.38	366.24	89.87	366.16	92.37	366.11	94.86	366.03	97.36	366.04
99.86	365.94	102.35	365.83	104.85	365.87	107.35	365.83	109.84	365.82
112.34	365.85	114.84	365.84	117.33	365.74	119.83	365.64	122.33	365.59
124.82	365.52	127.32	365.41	129.81	365.35	132.31	365.28	134.81	365.29
137.3	365.29	139.8	365.22	142.3	365.12	144.79	365.1	147.29	365.12
149.79	365.04	152.28	365.05	154.78	365.03	157.28	365	159.77	364.97
162.27	364.99	164.76	365.03	167.26	365.08	169.76	365.12	172.25	365.31
174.75	365.37	177.25	365.38	179.74	365.36	182.24	365.28	184.74	365.17
187.23	365.15	189.73	365.23	192.23	365.14	194.72	365.18	197.22	365.13
199.71	365	202.21	364.91	204.71	364.9	207.2	364.78	209.7	364.69
212.2	364.74	214.69	364.7	217.19	364.56	219.69	364.49	222.18	364.35
224.68	364.31	227.18	364.35	229.67	364.29	232.17	364.24	234.66	364.16
237.16	364.18	239.66	364.16	242.15	364.1	244.65	364.09	247.15	364.11
249.64	364.07	252.14	364.03	254.64	363.9	257.13	363.91	259.63	363.95
262.13	363.95	264.62	363.98	267.12	364.05	269.62	364.05	272.11	364.04
274.61	364.08	277.1	364.16	279.6	364.4	282.1	364.49	284.59	364.49
287.09	364.4	289.59	364.33	292.08	364.25	294.58	364.18	297.08	364.16
299.57	364.11	302.07	364.02	304.57	364.04	307.06	364.03	309.56	363.99
312.05	363.9	314.55	363.89	317.05	363.81	319.54	363.65	322.04	363.65
324.54	363.63	327.03	363.69	329.53	363.87	332.03	363.95	334.52	363.77
337.02	363.65	339.52	363.72	342.01	363.84	344.51	363.97	347	364.02
349.5	363.96	352	364.01	354.49	364.02	356.99	363.99	359.49	364
361.98	364.01	364.48	364.04	366.98	364.1	369.47	364.1	371.97	364.14
374.47	364.24	376.96	364.26	379.46	364.27	381.95	364.36	384.45	364.42

386.95	364.44	389.44	364.32	391.94	364.11	394.44	364.03	396.93	364.11
399.43	364.17	401.93	364.23	404.42	364.21	406.92	364.09	409.42	364.01
411.91	364	414.41	364.03	416.9	363.92	419.4	363.72	421.9	363.56
424.39	363.44	426.89	363.32	429.39	363.11	431.88	362.9	434.38	362.57
436.88	362.36	439.37	362.36	441.87	362.31	444.37	362.2	446.86	362.08
449.36	361.96	451.85	361.84	454.35	361.77	456.85	361.76	459.34	361.72
461.84	361.7	464.34	361.63	466.83	361.61	469.33	361.59	471.83	361.52
474.32	361.39	476.82	361.33	481.81	361.33	484.31	361.28	486.8	361.34
489.3	361.25	491.8	361.1	494.29	361.13	496.79	361.23	499.29	361.25
501.78	361.31	504.28	361.56	506.78	361.66	509.27	361.7	511.77	361.8
514.27	361.96	516.76	362.11	519.26	361.98	521.75	361.89	524.25	361.9
526.75	361.96	529.24	361.98	531.74	361.9	534.24	361.89	536.73	362
539.23	361.96	541.73	361.99	544.22	362.09	546.72	362.17	549.22	362.11
551.71	362.05	554.21	362.12	556.7	362.26	559.2	362.35	561.7	362.34
564.19	362.32	566.69	362.36	569.19	362.3	571.68	362.24	574.18	362.13
576.68	362.1	579.17	362.05	581.67	361.94	584.17	361.88	586.66	361.9
589.16	361.91	591.65	361.92	594.15	361.97	596.65	361.94	599.14	362.02
601.64	362.16	604.14	362.21	606.63	362.03	609.13	361.94	611.63	361.87
614.12	361.86	616.62	361.8	619.11	361.73	621.61	361.58	624.11	361.47
626.6	361.42	629.1	361.38	631.6	361.35	634.09	361.4	636.59	361.35
639.09	361.27	641.58	361.29	644.08	361.3	646.58	361.27	649.07	361.36
651.57	361.35	654.06	361.28	656.56	361.27	659.06	361.24	661.55	361.17
664.05	361.09	666.55	361	669.04	360.89	674.04	360.63	676.53	360.54
679.03	360.61	681.53	360.83	684.02	360.95	686.52	361.14	689.01	361.36
691.51	361.52	694.01	361.56	696.5	361.64	699	361.74	701.5	361.8
703.99	361.88	708.99	362	711.48	362.06	713.98	362.07	716.48	362.05
718.97	361.99	721.47	361.96	723.96	361.91	728.96	361.77	731.45	361.74
733.95	361.75	736.45	361.85	738.94	361.89	741.44	361.76	743.94	361.47
746.43	361.26	748.93	361.03	751.42	360.81	753.92	360.99	756.42	361.15
758.91	360.98	761.41	360.83	763.91	360.74	766.4	360.59	768.9	360.4
771.4	360.34	773.89	360.04	776.39	359.48	778.89	358.74	781.38	357.93
783.88	357.38	786.37	357.19	788.87	357.2	791.37	357.23	793.86	357.21
796.36	357.21	798.86	357.25	801.35	357.23	803.85	357.21	806.35	357.25
808.84	357.14	811.34	357.06	813.84	357.13	816.33	357.13	818.83	357.09
821.32	357.1	826.32	357.1	828.81	357.12	831.31	357.11	833.81	357.09
836.3	357.06	838.8	357.09	841.3	357.1	843.79	357.12	846.29	357.12
848.78	357.11	851.28	357.05	853.78	357.09	856.27	357.12	861.27	357.06
863.76	357.04	866.26	357.05	868.76	357.05	871.25	357.04	873.75	357.25
876.25	357.47	878.74	357.88	881.24	358.16	883.73	358.43	886.23	358.82
888.73	359.5	891.22	360.31	893.72	360.71	896.22	360.65	898.71	360.51
901.21	360.34	903.71	360.13	906.2	359.98	908.7	360.09	911.2	360.16
913.69	359.89	916.19	359.31	918.68	358.67	921.18	357.98	923.68	357.78
926.17	357.84	928.67	357.95	931.17	358.08	933.66	358.08	936.16	358.05
938.66	358.08	941.15	357.98	943.65	357.96	946.15	357.82	948.64	357.72
951.14	357.7	953.63	357.65	956.13	357.65	958.63	357.59	961.12	357.53
963.62	357.55	966.12	357.55	968.61	357.49	971.11	357.29	973.61	357.04
976.1	356.69	978.6	356.48	981.09	356.42	986.09	356.4	988.58	356.43
991.08	356.42	993.58	356.41	996.07	356.41	998.57	356.43	1001.07	356.43
1003.56	356.42	1006.06	356.37	1008.56	356.64	1011.05	357.38	1013.55	358.03
1016.04	358.85	1018.54	359.57	1021.04	360.19	1023.53	360.49	1026.03	360.61
1028.53	360.65	1031.02	361	1033.52	361.33	1036.02	361.51	1038.51	361.28
1041.01	360.81	1043.51	360.53	1046	360.53	1048.5	360.58	1050.99	360.59
1053.49	360.59	1055.99	360.49	1058.48	360.39	1060.98	360.53	1063.48	360.7
1065.97	360.82	1068.47	360.79	1070.97	360.75	1073.46	360.87	1075.96	361.07
1078.46	361.09	1080.95	361.22	1083.45	361.19	1085.95	361.15	1088.44	361.24
1090.94	361.24	1093.43	361.33	1095.93	361.43	1098.43	361.48	1100.92	361.52
1103.42	361.55	1105.92	361.66	1108.41	361.73	1110.91	361.69	1113.41	361.73
1115.9	361.64	1118.4	361.66	1120.9	361.86	1123.39	362	1125.89	362
1128.39	362.06	1130.88	361.96	1133.38	361.75	1135.87	361.82	1138.37	362.14
1140.87	362.41	1143.36	362.6	1145.86	362.77	1148.36	362.89	1150.85	362.91
1153.35	362.92	1155.85	362.97	1158.34	363	1160.84	363.07	1163.34	363.06

1165.83	363.22	1168.33	363.29	1170.82	363.14	1173.32	363.08	1175.82	363.13
1178.31	363.2	1180.81	363.25	1183.31	363.32	1185.8	363.4	1188.3	363.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	911.2	.035	1021.04	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	911.2	1021.04		251 309.2	255		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1188.3	1188.3	365	F

Left Levee Station= 386.95 Elevation= 364.44

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 19

INPUT

Description:

Station	Elevation	Data	num=	451						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	368.53	2.5	368.48	4.99	368.46	7.49	368.5	9.99	368.59	
12.49	368.63	14.98	368.67	17.48	368.66	19.98	368.6	22.47	368.46	
24.97	368.36	27.47	368.28	29.97	368.25	32.46	368.17	34.96	368.07	
37.46	368.03	39.95	367.97	42.45	367.9	44.95	367.85	47.45	367.82	
49.94	367.76	54.94	367.74	57.43	367.67	59.93	367.63	62.43	367.56	
64.93	367.48	67.42	367.44	69.92	367.41	72.42	367.36	74.91	367.23	
77.41	367.07	79.91	366.97	82.41	367	84.9	366.89	87.4	366.82	
89.9	366.87	92.39	367.05	94.89	366.94	97.39	366.76	99.89	366.5	
102.38	366.33	104.88	366.3	107.38	366.31	109.87	366.37	112.37	366.37	
114.87	366.36	117.37	366.36	119.86	366.43	122.36	366.38	124.86	366.41	
127.35	366.52	129.85	366.64	132.35	366.59	134.85	366.5	137.34	366.48	
139.84	366.59	142.34	366.56	144.83	366.56	147.33	366.55	149.83	366.42	
152.33	366.29	154.82	366.22	157.32	366.16	159.82	366.13	162.31	366.02	
164.81	365.87	167.31	365.78	169.81	365.73	172.3	365.59	174.8	365.51	
177.3	365.43	179.79	365.38	182.29	365.36	184.79	365.29	187.29	365.23	
189.78	365.21	192.28	365.21	194.78	365.11	197.27	365.03	199.77	364.89	
202.27	364.82	204.77	364.73	207.26	364.61	209.76	364.47	212.26	364.38	
214.75	364.24	217.25	363.96	219.75	363.76	222.25	363.6	224.74	363.37	
227.24	363.1	229.74	362.85	232.23	362.56	234.73	362.24	237.23	362	
239.73	361.69	242.22	361.45	244.72	361.31	247.22	361.15	249.71	361.01	
252.21	360.89	254.71	360.8	257.21	360.67	259.7	360.59	262.2	360.69	
264.7	360.64	267.19	360.7	269.69	360.83	272.19	360.95	274.69	361.19	
277.18	361.43	279.68	361.52	282.18	361.63	284.67	361.67	287.17	361.89	
289.67	362.02	292.17	362.04	294.66	362.23	297.16	362.51	299.66	362.48	
302.15	362.54	304.65	362.64	307.15	362.66	309.65	362.56	312.14	362.44	
314.64	362.28	317.14	362.02	319.63	361.77	322.13	361.52	324.63	361.04	
327.13	360.68	329.62	360.35	332.12	360.05	334.62	359.89	337.11	359.83	
339.61	359.79	342.11	359.74	344.61	359.76	347.1	359.78	349.6	359.89	
352.1	360.16	354.59	360.28	357.09	360.3	359.59	360.2	362.09	360	
364.58	359.78	367.08	359.73	369.58	359.63	372.07	359.51	374.57	359.46	
377.07	359.59	379.57	359.6	382.06	359.56	384.56	359.64	387.06	359.61	
389.55	359.55	392.05	359.66	394.55	359.83	397.05	359.94	399.54	360.05	
402.04	360.06	404.54	360	407.03	360.05	409.53	360.2	412.03	360.27	
414.53	360.51	417.02	360.71	419.52	360.65	422.02	360.62	424.51	360.52	
427.01	360.59	429.51	360.72	432.01	360.78	434.5	360.75	437	360.61	
439.5	360.47	441.99	360.36	444.49	360.36	446.99	360.35	449.49	360.35	
451.98	360.39	454.48	360.43	456.98	360.47	459.47	360.58	461.97	360.67	

464.47	360.78	466.97	360.76	469.46	360.75	471.96	360.81	474.46	360.88
476.95	360.86	479.45	360.82	481.95	360.71	484.44	360.65	486.94	360.64
489.44	360.5	491.94	360.51	494.43	360.59	496.93	360.62	499.43	360.63
501.92	360.7	504.42	360.88	506.92	361.04	509.42	361.15	511.91	361.25
514.41	361.22	516.91	361.16	519.4	361.2	521.9	361.14	524.4	361.07
526.9	361.02	529.39	361	531.89	361	534.39	361.01	536.88	360.99
541.88	360.87	544.38	360.84	546.87	360.85	549.37	360.88	551.87	360.87
554.36	360.82	556.86	360.69	559.36	360.86	561.86	360.97	564.35	360.93
566.85	360.93	569.35	360.86	571.84	360.71	574.34	360.57	576.84	360.39
579.34	360.23	581.83	359.86	584.33	359.54	586.83	359.36	589.32	359.26
591.82	359.25	594.32	359.3	596.82	359.41	599.31	359.52	601.81	359.54
604.31	359.46	606.8	359.32	609.3	359.3	611.8	359.33	614.3	359.31
616.79	359.3	619.29	359.29	621.79	359.27	624.28	359.26	626.78	359.27
631.78	359.23	634.27	359.21	636.77	359.24	639.27	359.3	641.76	359.34
644.26	359.39	646.76	359.36	649.26	359.33	651.75	359.33	654.25	359.36
656.75	359.4	659.24	359.43	661.74	359.44	664.24	359.47	666.74	359.48
669.23	359.46	671.73	359.48	674.23	359.5	676.72	359.49	679.22	359.45
681.72	359.37	684.22	359.3	686.71	359.23	689.21	359.14	691.71	359.29
694.2	359.31	696.7	359.4	701.7	359.52	704.19	359.51	706.69	359.52
709.19	359.6	711.68	359.65	714.18	359.58	716.68	359.51	719.18	359.42
721.67	359.34	724.17	359.26	726.67	359.26	729.16	359.28	731.66	359.36
734.16	359.41	736.66	359.44	739.15	359.48	741.65	359.45	744.15	359.55
746.64	359.72	749.14	359.82	751.64	359.75	754.14	359.51	756.63	359.05
759.13	358.78	761.63	358.52	764.12	358.48	766.62	358.44	769.12	358.43
771.62	358.42	774.11	358.41	776.61	358.36	779.11	358.14	781.6	357.98
784.1	357.91	786.6	357.88	789.1	357.9	791.59	357.92	794.09	358.01
796.59	358.21	799.08	358.4	801.58	358.54	804.08	358.53	806.58	358.4
809.07	358.4	811.57	358.46	814.07	358.48	816.56	358.5	819.06	358.55
821.56	358.64	824.06	358.91	826.55	359.18	829.05	359.15	831.55	359.35
834.04	359.74	836.54	360.13	839.04	360.34	841.54	360.49	844.03	360.59
846.53	360.66	849.03	360.72	851.52	360.77	854.02	360.82	856.52	360.84
859.02	360.8	861.51	360.76	864.01	360.72	866.51	360.64	869	360.54
871.5	360.33	874	359.52	876.5	358.6	878.99	357.44	881.49	356.32
883.99	355.71	886.48	355.5	888.98	355.35	891.48	355.34	893.98	355.48
896.47	355.51	898.97	355.39	901.47	355.36	903.96	355.33	906.46	355.29
908.96	355.27	911.46	355.28	913.95	355.26	916.45	355.28	918.95	355.29
921.44	355.26	923.94	355.26	926.44	355.21	928.93	355.13	931.43	355.17
933.93	355.25	936.43	355.21	938.92	355.15	941.42	355.19	943.92	355.2
946.41	355.16	948.91	355.13	951.41	355.14	953.91	355.11	956.4	355.01
958.9	354.97	961.4	355.04	963.89	355.06	966.39	355.04	968.89	355.04
971.39	355.02	973.88	355.02	976.38	355.01	978.88	355	981.37	355.02
983.87	354.94	986.37	354.92	988.87	354.94	991.36	354.91	993.86	354.91
996.36	354.96	998.85	355.03	1001.35	355.22	1003.85	355.94	1006.35	357.1
1008.84	358.05	1011.34	358.69	1013.84	359.32	1016.33	360.04	1018.83	360.75
1021.33	361.28	1023.83	361.7	1026.32	361.91	1028.82	362	1031.32	362.21
1033.81	362.14	1036.31	361.99	1038.81	361.98	1041.31	362	1043.8	362.09
1046.3	362.14	1048.8	362.17	1051.3	362.13	1053.79	362.12	1056.29	362.31
1058.79	362.56	1061.28	362.52	1063.78	362.31	1066.28	362.19	1068.78	362.13
1071.27	362.17	1073.77	362.21	1076.27	362.1	1078.76	361.93	1081.26	361.79
1083.76	361.7	1086.26	361.66	1088.75	361.68	1093.75	361.7	1096.24	361.68
1098.74	361.69	1101.24	361.73	1103.74	361.73	1106.23	361.68	1108.73	361.66
1111.23	361.6	1113.72	361.58	1116.22	361.61	1118.72	361.61	1121.22	361.66
1123.71	361.82	1126.21	361.94	1128.71	362.01	1131.21	362.05	1133.7	362.1
1136.2	362.14								

Manning's		n	Values	num=		3		
Sta	n	Val	Sta	n	Val	Sta	n	Val
0		.08	874		.035	1016.33		.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	874	1016.33		232	256.29	231		.1	.3

Left Levee Station= 307.15 Elevation= 362.66
 Right Levee Station= 1058.79 Elevation= 362.56

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 18

INPUT

Description:

Station	Elevation	Data	num=	432						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	366.37	2.49	366.65	4.99	366.96	7.48	367.08	9.98	367.05	
12.47	366.8	14.97	366.41	17.46	366.28	19.96	366.32	22.45	366.09	
24.95	366.05	27.44	365.96	29.94	365.98	32.43	365.92	34.93	365.89	
37.42	365.87	39.92	365.79	42.41	365.73	44.91	365.64	47.4	365.57	
49.9	365.51	52.39	365.46	54.89	365.37	57.38	365.34	59.88	365.32	
62.37	365.25	64.87	365.26	67.36	365.22	69.86	365.23	72.35	365.17	
74.85	365.17	77.34	365.16	79.84	365.16	82.33	365.15	84.83	365.17	
87.32	365.17	89.82	365.12	92.31	365.1	94.81	365.11	97.3	365.13	
99.8	365.16	102.29	365.17	104.79	365.25	107.28	365.31	109.78	365.31	
112.27	365.25	114.77	365.15	117.26	365.13	119.76	365.15	122.25	365.26	
124.75	365.63	127.24	365.82	129.73	365.45	132.23	365.16	134.72	365.17	
137.22	365.06	139.71	364.97	142.21	364.91	144.7	364.78	147.2	364.64	
149.69	364.43	152.19	364.19	154.68	364.09	157.18	363.72	159.67	363.17	
162.17	362.75	164.66	362.27	167.16	361.45	169.65	360.85	172.15	360.41	
174.64	359.98	177.14	359.47	179.63	359.09	182.13	358.77	184.62	358.33	
187.12	358.12	189.61	358.16	192.11	358.16	194.6	358.15	197.1	358.12	
199.59	358.08	202.09	357.96	204.58	357.91	207.08	357.99	209.57	358.11	
212.07	358.26	214.56	358.44	217.06	358.63	219.55	358.84	222.05	359.11	
224.54	359.31	227.04	359.32	229.53	359.31	232.03	359.4	234.52	359.42	
237.02	359.45	239.51	359.57	242.01	359.67	244.5	359.88	247	359.91	
249.49	359.87	251.99	359.83	254.48	359.91	256.98	359.97	259.47	359.91	
261.97	359.74	264.46	359.57	266.96	359.62	269.45	359.88	271.94	360.09	
274.44	360	276.93	359.91	279.43	359.77	281.92	359.6	284.42	359.49	
286.91	359.39	289.41	359.4	291.9	359.47	294.4	359.58	296.89	359.59	
299.39	359.61	301.88	359.76	304.38	359.71	306.87	359.6	309.37	359.54	
311.86	359.59	314.36	359.64	316.85	359.68	319.35	359.67	321.84	359.48	
324.34	359.35	326.83	359.22	329.33	359.16	331.82	359.25	334.32	359.3	
336.81	359.19	339.31	359.18	341.8	359.16	344.3	359.23	346.79	359.32	
349.29	359.42	351.78	359.68	354.28	359.84	356.77	359.95	359.27	360.08	
361.76	360.28	364.26	360.49	366.75	360.8	369.25	361.24	371.74	361.62	
374.24	361.98	376.73	362.28	379.23	362.49	381.72	362.19	384.22	361.83	
386.71	361.38	389.21	361.1	391.7	360.95	394.2	360.88	396.69	360.85	
399.19	360.68	401.68	360.56	404.17	360.47	406.67	360.47	409.16	360.42	
411.66	360.34	414.15	360.27	416.65	360.11	419.14	359.74	421.64	359.69	
424.13	359.8	426.63	359.7	429.12	359.58	431.62	359.43	434.11	359.35	
436.61	359.35	439.1	359.34	441.6	359.31	444.09	359.22	446.59	359.15	
449.08	359.15	451.58	359.16	454.07	359.21	456.57	359.32	459.06	359.43	
461.56	359.42	464.05	359.29	466.55	359.27	469.04	359.3	471.54	359.39	
474.03	359.52	476.53	359.7	479.02	359.81	481.52	359.82	484.01	359.75	
486.51	359.7	489	359.74	491.5	359.76	493.99	359.75	496.49	359.73	
498.98	359.46	501.48	359.17	503.97	358.88	506.47	358.3	508.96	357.44	
511.46	356.58	513.95	356.21	516.45	356.13	518.94	356.1	521.44	356.1	
523.93	356.12	526.42	356.15	528.92	356.16	531.41	356.18	533.91	356.22	
536.4	356.46	538.9	356.86	541.39	357.13	543.89	357.21	546.38	357.33	
548.88	357.54	551.37	357.77	553.87	357.8	556.36	357.56	558.86	357.49	
561.35	357.64	563.85	357.55	566.34	357.46	568.84	357.5	571.33	357.6	
573.83	357.47	576.32	357.19	578.82	356.88	581.31	356.77	583.81	356.88	
586.3	357.03	588.8	357.24	591.29	357.28	593.79	357.25	596.28	357.28	

598.78	357.32	601.27	357.24	603.77	357.56	606.26	357.13	608.76	356.84
611.25	356.66	613.75	356.47	616.24	356.52	618.74	356.68	621.23	356.85
623.73	356.7	626.22	356.5	628.72	356.27	631.21	356.23	633.71	356.28
636.2	356.35	638.7	356.35	641.19	356.3	643.69	356.22	646.18	356.4
648.68	356.65	651.17	356.85	653.67	357.12	656.16	357.12	658.65	357.13
661.15	357.16	663.64	357.29	666.14	357.38	668.63	357.4	671.13	357.19
673.62	357.17	676.12	357.3	678.61	357.56	681.11	357.8	683.6	358.01
686.1	358.2	688.59	358.42	691.09	358.69	693.58	358.95	696.08	359.17
698.57	359.33	701.07	359.48	703.56	359.5	706.06	359.39	708.55	359.29
711.05	359.22	713.54	359.2	716.04	359.19	718.53	359.2	721.03	359.28
723.52	359.3	726.02	359.21	728.51	359.21	731.01	359.23	733.5	359.25
736	359.24	738.49	359.08	740.99	358.89	743.48	358.8	745.98	358.82
748.47	358.99	750.97	359.11	753.46	359.05	755.96	358.93	758.45	358.88
760.95	358.79	763.44	358.74	765.94	358.23	768.43	357.93	770.93	358.06
773.42	358.37	775.92	358.63	778.41	358.78	780.91	358.79	783.4	358.78
785.9	358.7	788.39	358.64	790.88	358.56	793.38	358.44	795.87	358.25
798.37	358.06	800.86	357.99	803.36	358	805.85	357.97	808.35	357.93
810.84	357.86	813.34	357.79	815.83	357.69	818.33	357.65	820.82	357.66
823.32	357.62	825.81	357.58	828.31	357.57	830.8	357.6	833.3	357.66
835.79	357.74	838.29	357.92	840.78	358.15	843.28	358.35	845.77	358.63
848.27	358.99	850.76	359.32	853.26	359.46	855.75	359.58	858.25	359.69
860.74	359.73	863.24	359.74	865.73	359.78	868.23	359.78	870.72	359.66
873.22	359.5	875.71	359.35	878.21	359.12	880.7	358.74	883.2	358.3
885.69	358.06	888.19	357.87	890.68	357.65	893.18	357.52	895.67	357.29
898.17	357.09	900.66	356.96	903.16	356.79	905.65	356.63	908.15	356.53
910.64	356.55	913.14	356.7	915.63	356.83	918.12	357.06	920.62	357.1
923.11	356.89	925.61	356.6	928.1	356.07	930.6	355.29	933.09	354.8
935.59	354.51	938.08	354.23	940.58	354.29	943.07	354.32	945.57	354.3
948.06	354.32	950.56	354.34	953.05	354.34	955.55	354.36	958.04	354.33
960.54	354.38	963.03	354.3	965.53	354.3	968.02	354.31	973.01	354.31
975.51	354.3	978	354.29	980.5	354.31	982.99	354.25	985.49	354.29
987.98	354.26	992.97	354.26	995.47	354.23	997.96	354.21	1000.46	354.24
1002.95	354.31	1005.45	354.26	1007.94	354.31	1010.44	354.32	1012.93	354.32
1015.43	354.3	1017.92	354.31	1020.42	354.32	1022.91	354.67	1025.41	355.72
1027.9	357.4	1030.4	358.36	1032.89	358.88	1035.39	358.9	1037.88	359.02
1040.38	359.12	1042.87	359.18	1045.36	359.19	1047.86	359.14	1050.35	359.27
1052.85	359.27	1055.34	359.22	1057.84	359.2	1060.33	359.32	1062.83	359.63
1065.32	359.92	1067.82	360.02	1070.31	360.06	1072.81	360.17	1075.3	360.26
1077.8	360.34	1080.29	360.38						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	920.62	.035	1027.9	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	920.62	1027.9		174 176.77	174		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1080.29	1080.29	362.5	F

Left Levee Station= 379.23 Elevation= 362.49

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 17

INPUT

Description:

Station	Elevation	Data	num=	452						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	

0	360.9	2.5	361.31	5	361.83	7.49	362.06	9.99	362.16
12.49	362.06	14.99	361.93	17.49	361.84	19.99	361.78	22.48	361.83
24.98	361.96	27.48	362.06	29.98	362.13	32.48	362.18	34.97	362.26
37.47	362.29	39.97	362.29	42.47	362.28	44.97	362.24	47.46	362.25
49.96	362.26	52.46	362.44	54.96	362.37	57.46	362.23	59.96	362.22
62.45	362.22	64.95	362.11	67.45	362.03	69.95	362.09	72.45	362.23
74.94	362.19	77.44	362.18	79.94	362.09	82.44	362.1	84.94	361.97
87.43	361.95	92.43	362.05	94.93	362.12	97.43	362.12	99.93	362.14
102.42	362.1	104.92	362.04	107.42	362.02	109.92	362.01	112.42	362.14
114.91	362.23	117.41	362.3	119.91	362.41	122.41	362.5	124.91	362.55
127.4	362.67	129.9	362.68	132.4	362.59	134.9	362.44	137.4	362.13
139.9	361.76	142.39	361.58	144.89	361.37	147.39	361.05	149.89	360.42
152.39	359.22	154.88	358.03	157.38	357.18	159.88	356.91	162.38	356.92
164.88	356.92	167.37	356.91	169.87	356.94	172.37	356.92	174.87	356.93
177.37	356.97	179.87	357.04	182.36	357.09	184.86	357.15	187.36	357.28
189.86	357.2	192.36	357.34	194.85	357.27	197.35	357.18	199.85	357.16
202.35	357.15	204.85	357.21	207.34	357.33	209.84	357.37	214.84	357.51
217.34	357.57	219.84	357.55	222.33	357.62	224.83	357.72	227.33	357.85
229.83	358.04	232.33	358.26	234.82	358.42	237.32	358.37	239.82	358.3
242.32	358.22	244.82	358.27	247.31	358.36	249.81	358.37	252.31	358.43
254.81	358.51	257.31	358.61	259.81	358.74	262.3	358.84	264.8	358.91
267.3	358.97	269.8	359.06	272.3	359.22	274.79	359.4	277.29	359.53
279.79	359.58	282.29	359.56	284.79	359.34	287.28	359.16	289.78	358.88
292.28	358.92	294.78	358.97	297.28	358.95	299.78	359.02	302.27	359.13
304.77	359.13	307.27	358.98	309.77	358.89	312.27	358.95	314.76	358.98
317.26	359.03	319.76	359	322.26	359.02	324.76	359.04	327.25	359.06
329.75	359.05	332.25	359.11	334.75	359.22	337.25	359.38	339.75	359.46
342.24	359.4	344.74	359.32	349.74	359.24	352.24	359.18	354.73	359.16
357.23	359.33	359.73	359.42	362.23	359.47	364.73	359.43	367.22	359.34
369.72	359.25	372.22	359.19	374.72	359.09	377.22	358.93	379.72	358.8
382.21	358.8	384.71	358.86	387.21	358.85	389.71	358.86	392.21	358.84
394.7	358.89	397.2	358.92	399.7	358.94	402.2	359.04	404.7	359.28
407.19	359.33	409.69	359.4	412.19	359.45	414.69	359.53	417.19	359.6
419.69	359.72	422.18	359.82	424.68	359.8	427.18	359.96	429.68	360.08
432.18	360.11	434.67	360.09	437.17	359.93	439.67	359.85	442.17	359.85
444.67	359.86	447.16	359.87	449.66	359.88	452.16	359.97	454.66	360.07
457.16	360.13	459.66	360.14	462.15	360.1	464.65	360.08	467.15	360.02
469.65	360.02	472.15	360.06	474.64	360	477.14	359.79	479.64	359.94
482.14	360.06	484.64	360.04	487.13	359.94	489.63	359.74	492.13	359.63
494.63	359.7	497.13	359.85	499.63	359.84	502.12	359.65	507.12	359.59
509.62	359.63	512.12	359.65	514.61	359.68	517.11	359.78	519.61	359.79
522.11	359.5	524.61	359.27	527.1	359.33	529.6	359.27	532.1	359.06
534.6	358.83	537.1	358.81	539.6	358.89	542.09	358.83	544.59	358.73
547.09	358.66	549.59	358.64	552.09	358.54	554.58	358.49	557.08	358.47
559.58	358.33	562.08	358.08	564.58	358.01	567.08	358	569.57	357.93
572.07	357.93	574.57	357.91	577.07	357.94	579.57	357.95	582.06	357.98
584.56	357.92	587.06	357.6	589.56	357.42	592.06	357.19	594.55	356.68
597.05	356.1	599.55	355.71	602.05	355.59	604.55	355.49	607.05	355.4
609.54	355.43	612.04	355.47	614.54	355.42	617.04	355.45	619.54	355.41
622.03	355.33	624.53	355.3	627.03	355.32	629.53	355.29	632.03	355.31
634.52	355.36	637.02	355.36	639.52	355.34	642.02	355.34	644.52	355.41
647.02	355.37	649.51	355.35	652.01	355.32	654.51	355.33	657.01	355.35
659.51	355.33	662	355.31	664.5	355.38	667	355.36	669.5	355.38
672	355.37	674.5	355.57	676.99	355.78	679.49	356.11	681.99	356.26
684.49	356.37	686.99	356.58	689.48	357.09	691.98	357.71	694.48	358.07
696.98	357.94	699.48	357.66	701.98	357.41	704.47	357.27	706.97	357.22
709.47	357.19	711.97	357.22	714.47	357.28	716.96	357.38	724.46	357.47
726.96	357.56	729.45	357.7	731.95	357.79	734.45	357.9	736.95	357.92
739.45	357.92	741.95	357.9	744.44	357.92	746.94	358.03	749.44	358.15
751.94	358.18	754.44	358.25	756.93	358.22	759.43	358.22	761.93	358.23
764.43	358.2	766.93	358.19	769.43	358.14	771.92	358.12	774.42	358.13

776.92	358.16	779.42	358.21	781.92	358.21	784.41	358.19	786.91	358.05
789.41	357.96	791.91	358.04	794.41	358.15	796.9	358.17	799.4	358.2
801.9	358.07	804.4	357.82	806.9	357.71	809.4	357.62	811.89	357.56
814.39	357.6	816.89	357.59	819.39	357.57	821.89	357.55	824.38	357.58
826.88	357.63	829.38	357.73	831.88	357.62	834.38	357.62	836.88	357.54
839.37	357.62	841.87	357.75	844.37	357.96	846.87	358.05	849.37	357.96
851.86	357.77	854.36	357.67	856.86	357.68	859.36	357.66	861.86	357.71
864.35	357.65	866.85	357.62	869.35	357.53	871.85	357.48	874.35	357.48
876.85	357.43	879.34	357.47	881.84	357.4	884.34	357.32	886.84	357.07
889.34	356.79	891.83	356.62	894.33	356.51	896.83	356.33	899.33	356.23
901.83	356.21	904.33	356.23	906.82	356.22	909.32	356.23	911.82	356.16
914.32	356.11	916.82	356.05	919.31	355.89	921.81	355.82	924.31	355.87
926.81	355.92	929.31	355.94	931.8	356.08	934.3	356.2	936.8	356.22
939.3	356.27	941.8	356.48	944.3	357.02	946.79	357.86	949.29	358.53
951.79	358.79	954.29	358.86	956.79	358.9	959.28	358.92	961.78	358.9
964.28	358.84	966.78	358.76	969.28	358.63	971.78	358.44	974.27	358.05
976.77	357.53	979.27	357.14	981.77	357.14	984.27	357.6	986.76	357.69
989.26	356.99	991.76	356.1	994.26	355.6	996.76	355	999.25	354.4
1001.75	353.87	1004.25	353.64	1006.75	353.51	1009.25	353.33	1011.75	353.2
1014.24	353.13	1016.74	353.13	1019.24	353.2	1021.74	353.43	1024.24	353.54
1026.73	353.65	1029.23	353.85	1031.73	353.85	1034.23	353.94	1036.73	354.12
1039.22	354.18	1041.72	354.17	1044.22	353.94	1046.72	353.89	1049.22	353.82
1051.72	353.81	1054.21	353.85	1056.71	353.85	1059.21	353.84	1061.71	353.84
1064.21	353.83	1066.7	353.82	1069.2	353.73	1071.7	353.79	1074.2	353.76
1076.7	353.77	1079.2	353.79	1081.69	353.78	1084.19	353.78	1086.69	353.81
1089.19	353.78	1091.69	353.76	1094.18	353.73	1096.68	353.74	1099.18	353.76
1101.68	353.77	1104.18	353.78	1106.67	353.77	1109.17	353.77	1111.67	353.83
1114.17	354.16	1116.67	354.81	1119.16	355.77	1121.66	356.59	1124.16	357.19
1126.66	357.82	1129.16	358.47	1131.66	358.77	1134.15	358.63	1136.65	358.45
1139.15	358.36	1141.65	358.46						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	989.26	.035	1124.16	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	989.26	1124.16		130 135.75	130		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	457.15	362	F
1141.65	1141.65	362	F

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 16

INPUT

Description:

Station	Elevation	Data	num=	448						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	361	2.5	360.86	5	360.61	7.5	360.58	9.99	360.3	
12.49	359.47	14.99	358.67	17.49	357.97	19.99	357.67	22.49	357.56	
24.98	357.62	27.48	357.91	29.98	358.6	32.48	359.72	34.98	360.65	
37.48	361.04	39.97	361.22	42.47	361.29	44.97	361.22	47.47	361.09	
49.97	360.98	52.47	360.9	54.96	360.87	57.46	360.91	59.96	360.51	
62.46	360.3	64.96	360.15	67.46	359.98	69.95	359.75	72.45	359.31	
74.95	358.8	77.45	358.4	79.95	357.84	82.45	357.38	84.94	357.19	
87.44	357.13	89.94	357.01	92.44	356.9	94.94	356.88	97.44	356.95	
99.93	356.98	102.43	356.95	104.93	356.88	107.43	356.88	109.93	356.87	

112.43	356.88	114.92	356.89	117.42	356.96	119.92	357.11	122.42	357.23
124.92	357.2	127.42	357.09	129.91	357	132.41	357.02	134.91	357.15
137.41	357.23	139.91	357.25	142.41	357.13	144.9	357.11	147.4	357.18
149.9	357.27	152.4	357.35	154.9	357.42	157.4	357.45	159.89	357.42
162.39	357.39	164.89	357.36	169.89	357.3	172.39	357.3	174.88	357.31
177.38	357.29	179.88	357.28	182.38	357.22	184.88	357.23	187.38	357.19
189.87	357.29	192.37	357.45	194.87	357.46	197.37	357.42	199.87	357.38
202.37	357.35	204.86	357.35	207.36	357.23	209.86	357.21	212.36	357.17
214.86	357.11	217.36	357.1	219.85	357.04	222.35	357.03	224.85	357.1
227.35	357.19	229.85	357.31	232.35	357.52	234.84	357.53	237.34	357.61
239.84	357.66	242.34	357.65	244.84	357.66	247.34	357.61	249.83	357.49
252.33	357.33	254.83	357.27	257.33	357.27	259.83	357.09	262.33	356.98
264.82	356.82	267.32	356.69	269.82	356.69	272.32	356.91	274.82	357.09
277.32	357.08	279.81	357.09	282.31	357.2	284.81	357.3	287.31	357.5
289.81	357.62	292.31	357.71	294.8	357.67	297.3	357.74	299.8	357.77
302.3	357.73	304.8	357.66	307.3	357.61	309.79	357.63	312.29	357.63
314.79	357.58	317.29	357.61	319.79	357.64	322.29	357.66	324.78	357.68
327.28	357.71	332.28	357.59	334.78	357.66	337.28	357.9	339.77	358.05
342.27	358.04	344.77	357.94	347.27	357.86	349.77	357.85	352.27	357.84
354.76	357.85	357.26	357.89	359.76	357.81	362.26	357.81	364.76	357.78
367.26	357.76	369.75	357.86	372.25	357.96	374.75	358	377.25	357.97
379.75	357.97	382.25	358.03	384.74	358.08	387.24	358.04	389.74	357.99
392.24	358	394.74	357.91	397.24	357.8	399.74	357.77	402.23	357.69
404.73	357.6	407.23	357.35	409.73	357.23	412.23	357.23	414.73	357.25
417.22	357.24	419.72	357.38	422.22	357.63	424.72	357.8	427.22	357.66
429.72	357.55	432.21	357.39	434.71	357.28	437.21	357.26	439.71	357.24
442.21	357.3	444.71	357.31	447.2	357.35	449.7	357.6	452.2	357.72
454.7	357.72	457.2	357.88	459.7	357.81	462.19	357.64	464.69	357.74
467.19	357.86	469.69	357.91	472.19	357.81	474.69	357.74	477.18	357.75
479.68	357.72	482.18	357.73	484.68	357.75	487.18	357.73	489.68	357.69
492.17	357.66	494.67	357.72	497.17	357.79	499.67	357.8	502.17	357.74
504.67	357.78	507.16	357.92	509.66	358.23	512.16	358.44	514.66	358.46
517.16	358.45	519.66	358.34	522.15	358.17	524.65	358.15	527.15	358.23
529.65	358.39	532.15	358.49	534.65	358.52	537.14	358.58	539.64	358.63
542.14	358.64	544.64	358.7	547.14	358.78	549.64	358.83	552.13	358.9
554.63	359.16	557.13	359.7	559.63	359.78	562.13	359.8	564.63	359.81
567.12	359.99	569.62	360.17	572.12	360.3	574.62	360.44	577.12	360.6
579.62	360.67	582.11	360.55	584.61	360.35	587.11	360.22	589.61	360.26
592.11	360.42	594.61	360.37	597.1	360.16	599.6	359.82	602.1	359.68
604.6	359.67	607.1	359.61	609.6	359.43	612.1	359.19	614.59	359.16
617.09	359.05	619.59	359	622.09	358.78	624.59	358.34	627.09	357.59
629.58	357.12	632.08	356.61	634.58	356.05	637.08	355.76	639.58	355.58
642.08	355.39	644.57	355.28	647.07	355.28	649.57	355.43	652.07	355.79
654.57	355.79	657.07	355.49	659.56	355.35	662.06	355.37	664.56	355.38
667.06	355.35	672.06	355.33	674.55	355.34	677.05	355.31	679.55	355.33
682.05	355.31	684.55	355.32	689.54	355.32	692.04	355.33	697.04	355.33
699.54	355.36	702.04	355.56	704.53	355.79	707.03	356.11	709.53	356.3
712.03	356.22	714.53	356.04	717.03	355.94	719.52	355.95	722.02	355.98
724.52	356.02	727.02	355.98	729.52	356.02	732.02	355.93	734.51	355.81
737.01	355.82	739.51	355.89	742.01	355.94	744.51	355.94	747.01	355.92
749.5	355.94	752	355.99	754.5	355.97	757	355.97	759.5	355.99
762	355.99	764.49	355.89	766.99	355.88	769.49	355.91	771.99	355.98
774.49	356.02	776.99	356.02	779.48	356.04	781.98	356.24	784.48	356.47
786.98	356.59	789.48	356.42	791.98	356.33	794.47	356.28	796.97	356.3
799.47	356.24	801.97	356.11	804.47	356.08	806.97	356.12	809.47	356.07
811.96	355.99	814.46	355.99	816.96	356.07	819.46	356.07	821.96	356.03
824.46	356.12	826.95	356.26	829.45	356.51	834.45	356.75	836.95	356.92
839.45	356.84	841.94	356.71	844.44	356.73	846.94	356.72	849.44	356.77
851.94	356.83	854.44	356.92	856.93	356.95	859.43	356.92	861.93	356.86
864.43	356.83	866.93	356.87	869.43	356.97	871.92	357.04	874.42	357.08
876.92	357.03	879.42	357.01	881.92	356.87	884.42	356.89	886.91	356.89

889.41	356.7	891.91	356.63	894.41	356.66	896.91	356.57	899.41	356.47
901.9	356.52	904.4	356.77	906.9	357.03	909.4	357	911.9	356.94
914.4	357.04	916.89	357.12	919.39	357.18	921.89	357.17	924.39	357.18
929.39	357.12	931.88	357.13	934.38	357.26	936.88	357.38	939.38	357.51
944.38	357.81	946.87	357.97	949.37	358.1	951.87	358.24	954.37	358.4
956.87	358.46	959.37	358.48	961.86	358.48	964.36	358.47	966.86	358.43
969.36	358.35	971.86	358.24	974.36	358.09	976.85	357.93	979.35	357.4
981.85	356.1	984.35	355.24	986.85	354.45	991.85	352.75	994.34	352.09
996.84	351.73	999.34	351.61	1001.84	351.56	1004.34	351.59	1006.84	351.86
1009.33	352.3	1011.83	352.65	1014.33	352.79	1016.83	352.91	1019.33	352.94
1021.83	352.91	1024.32	352.82	1026.82	352.67	1029.32	352.64	1031.82	352.56
1034.32	352.5	1036.82	352.45	1039.31	352.4	1041.81	352.34	1044.31	352.31
1046.81	352.22	1049.31	352.15	1051.8	352.11	1054.3	352.06	1056.8	352.06
1059.3	352.19	1061.8	352.17	1064.3	352.14	1066.79	352.1	1069.29	351.99
1071.79	351.91	1074.29	351.83	1076.79	351.75	1079.29	351.73	1081.78	351.77
1084.28	352.07	1086.78	351.99	1091.78	352.07	1094.28	352.04	1096.77	352.13
1099.27	352.32	1101.77	352.26	1104.27	352.21	1106.77	352.24	1109.27	352.68
1111.76	354.03	1114.26	355.96	1116.76	357.46	1119.26	357.97	1121.76	357.9
1124.26	357.93	1126.75	357.79	1129.25	357.68	1131.75	357.28	1134.25	357.07
1136.75	357.06	1139.25	357.12	1141.74	357.17				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	981.85	.035	1114.26	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	981.85	1114.26		110 110.75	110		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	579.62	361	F
1141.74	1141.74	361	F

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 15

INPUT

Description:

Station	Elevation	Data	num=	440
Sta	Elev	Sta	Elev	Sta Elev Sta Elev
0	357.91	2.5	357.67	4.99 357.43 7.49 357.27 9.99 357.32
12.49	357.48	14.98	357.54	17.48 357.51 19.98 357.5 22.48 357.55
24.97	357.74	27.47	357.91	29.97 357.74 32.47 357.75 34.96 357.8
37.46	357.85	39.96	357.91	42.46 357.84 44.95 357.61 47.45 357.75
49.95	358.07	52.45	358.03	54.94 358.11 57.44 358.08 59.94 358
62.44	357.72	64.93	357.58	67.43 357.39 69.93 357.21 72.43 357.17
74.92	357.2	77.42	357.15	79.92 357.21 82.42 357.13 84.91 357.08
87.41	356.98	89.91	356.89	92.4 356.88 94.9 356.96 97.4 356.88
99.9	356.81	102.39	356.68	104.89 356.55 107.39 356.56 109.89 356.55
112.38	356.53	114.88	356.53	117.38 356.48 119.88 356.45 122.37 356.41
124.87	356.41	127.37	356.49	129.87 356.41 132.36 356.37 134.86 356.57
137.36	356.61	139.86	356.66	142.35 356.69 144.85 356.69 147.35 356.78
149.85	356.86	152.34	356.95	154.84 356.96 157.34 356.99 159.84 357.2
162.33	357.42	164.83	357.41	167.33 357.29 169.83 357.31 172.32 357.47
174.82	357.44	177.32	357.49	179.82 357.53 182.31 357.64 184.81 357.57
187.31	357.42	189.81	357.26	192.3 357.2 194.8 357.32 197.3 357.2
199.79	357.01	202.29	356.87	204.79 356.91 207.29 356.9 209.78 356.78
212.28	356.68	214.78	356.63	217.28 356.69 219.77 356.77 222.27 356.86
224.77	356.97	227.27	357.05	229.76 357.17 232.26 357.25 234.76 357.23

237.26	357.23	239.75	357.31	242.25	357.35	244.75	357.21	247.25	357.14
249.74	357.15	252.24	357.19	254.74	357.27	257.24	357.34	259.73	357.55
262.23	357.72	264.73	357.92	267.23	358.04	269.72	358.17	272.22	358.39
274.72	358.58	277.22	358.61	279.71	358.36	282.21	358.19	284.71	358.24
287.2	358.29	289.7	358.28	292.2	358.3	294.7	358.43	297.19	358.53
299.69	358.6	302.19	358.84	304.69	358.79	307.18	358.77	309.68	358.74
312.18	358.82	314.68	358.86	317.17	358.89	319.67	358.85	322.17	358.77
324.67	358.65	327.16	358.56	329.66	358.44	332.16	358.44	334.66	358.5
337.15	358.49	339.65	358.41	342.15	358.33	344.65	358.25	347.14	358.17
349.64	357.97	352.14	357.89	354.64	357.83	357.13	357.73	359.63	357.61
362.13	357.51	364.63	357.42	367.12	357.4	369.62	357.47	372.12	357.43
374.62	357.31	377.11	357.19	379.61	357.08	382.11	357.03	384.61	356.89
387.1	356.77	389.6	356.67	392.1	356.49	394.59	356.38	397.09	356.46
399.59	356.59	402.09	356.65	404.58	356.77	407.08	357.01	409.58	357.29
412.08	357.52	414.57	357.61	417.07	357.52	419.57	357.48	422.07	357.42
424.56	357.37	427.06	357.53	429.56	357.72	432.06	357.74	434.55	357.76
437.05	357.8	439.55	357.79	442.05	357.85	444.54	357.99	447.04	358.06
449.54	358.07	452.04	358.03	454.53	358	457.03	358	459.53	358.12
462.03	358.22	464.52	358.08	467.02	357.82	469.52	357.7	472.02	357.57
474.51	357.54	477.01	357.63	479.51	357.53	482.01	357.41	484.5	357.32
487	357.29	489.5	357.28	491.99	357.24	494.49	357.2	496.99	357.25
499.49	357.29	501.98	357.42	504.48	357.62	506.98	357.79	509.48	357.61
511.97	357.35	514.47	357.36	516.97	357.34	519.47	357.25	521.96	357.21
524.46	357.14	526.96	357.02	529.46	356.96	531.95	356.88	534.45	356.89
536.95	356.76	539.45	356.74	541.94	356.87	544.44	357.11	546.94	357.49
549.44	357.94	551.93	358.34	554.43	358.41	556.93	358.39	559.43	358.45
561.92	358.69	564.42	359.08	566.92	359.17	569.41	359.07	574.41	359.05
576.91	358.98	579.4	358.93	581.9	358.98	584.4	359.16	586.9	359.27
589.39	359.27	591.89	359.3	594.39	359.36	596.89	359.32	599.38	359.37
601.88	359.4	604.38	359.39	606.88	359.3	609.37	359.07	611.87	358.71
614.37	358.4	616.87	357.96	619.36	357.11	621.86	356.31	624.36	355.8
626.86	355.45	629.35	355.35	631.85	355.33	634.35	355.31	636.84	355.26
639.34	355.27	641.84	355.29	644.34	355.3	646.83	355.4	649.33	355.67
651.83	355.89	654.33	356.21	656.82	356.3	659.32	356.25	664.32	356.11
666.81	356.05	671.81	355.87	674.31	355.73	676.8	355.59	679.3	355.42
681.8	355.36	684.3	355.4	686.79	355.36	689.29	355.39	691.79	355.52
694.29	355.94	696.78	356.45	699.28	356.65	701.78	356.48	704.27	356.27
706.77	356.15	709.27	355.97	711.77	355.94	714.26	355.82	716.76	355.62
719.26	355.43	721.76	355.36	724.25	355.55	726.75	355.66	729.25	355.67
731.75	355.65	734.24	355.55	736.74	355.52	739.24	355.58	741.74	355.58
744.23	355.66	746.73	355.81	749.23	356.05	751.73	356.05	754.22	356.08
756.72	356.15	759.22	356.34	761.72	356.69	764.21	356.95	766.71	357.05
769.21	357.14	771.7	357.08	774.2	357.15	776.7	357.11	779.2	357.12
781.69	357.1	784.19	356.99	786.69	356.89	789.19	356.89	791.68	357.07
794.18	357.16	796.68	357.12	799.18	357.13	801.67	357.03	804.17	357.18
806.67	357.27	809.17	357.24	811.66	357.13	814.16	357.02	816.66	356.98
819.16	356.89	821.65	356.78	824.15	356.7	826.65	356.69	829.15	356.58
831.64	356.45	834.14	356.41	836.64	356.51	839.13	356.55	841.63	356.5
844.13	356.55	846.63	356.31	849.12	356.27	851.62	356.23	854.12	356.07
856.62	355.84	859.11	355.7	861.61	355.61	864.11	355.64	866.61	355.73
869.1	355.7	871.6	355.54	874.1	355.51	876.6	355.47	879.09	355.28
881.59	355.15	884.09	355.07	886.59	355.02	889.08	354.98	891.58	354.92
896.58	354.98	899.07	354.9	901.57	354.7	904.07	354.53	906.57	354.42
909.06	354.36	911.56	354.45	914.06	354.82	916.55	355.21	919.05	355.49
921.55	355.75	924.05	356	926.54	356.24	929.04	356.72	931.54	357.25
934.04	357.42	936.53	357.5	939.03	357.53	941.53	357.59	944.03	357.58
946.52	357.49	949.02	357.38	951.52	357.25	954.02	357.11	956.51	356.7
959.01	355.95	961.51	355.06	964.01	354.15	966.5	353.27	969	352.18
971.5	351.37	974	351.15	976.49	351	978.99	350.86	981.49	350.82
983.98	350.85	986.48	350.89	988.98	350.89	991.48	350.93	993.97	350.91
996.47	350.88	998.97	350.81	1001.47	350.87	1003.96	350.9	1006.46	350.9

1008.96	350.92	1011.46	350.89	1013.95	350.93	1016.45	350.85	1018.95	350.9
1021.45	350.9	1023.94	350.82	1026.44	350.76	1028.94	350.81	1031.44	350.96
1033.93	350.99	1036.43	350.87	1038.93	350.83	1041.43	350.79	1043.92	350.76
1046.42	350.81	1048.92	350.78	1051.42	350.78	1053.91	351.07	1056.41	352.27
1058.91	353.81	1061.41	354.99	1063.9	355.69	1066.4	356.15	1068.9	356.38
1071.39	356.44	1073.89	356.47	1076.39	356.49	1078.89	356.39	1081.39	356.46
1083.88	356.59	1086.38	356.6	1088.88	356.65	1091.37	356.64	1093.87	356.57
1098.87	356.45	1101.36	356.39	1103.86	356.41	1106.36	356.48	1108.86	356.53

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	959.01	.035	1066.4	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	959.01	1066.4		122	123.66		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	604.38	360	F
1108.86	1108.86	360	F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 14

INPUT

Description:

Station Elevation Data			num= 433							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	358.07	2.5	357.97	4.99	357.85	7.49	357.71	9.98	357.6	
12.48	357.56	14.97	357.5	17.47	357.37	19.96	357.38	22.46	357.33	
24.95	357.13	27.45	356.89	29.95	356.67	32.44	356.61	34.94	356.55	
37.43	356.57	39.93	356.53	42.42	356.49	44.92	356.38	47.41	356.46	
49.91	356.62	52.4	356.8	54.9	356.84	57.4	356.84	59.89	356.96	
62.39	357.02	64.88	357.21	67.38	357.34	69.87	357.33	72.37	357.32	
74.86	357.28	77.36	357.21	79.85	357.08	82.35	357.04	84.85	357.08	
87.34	357.12	89.84	356.89	92.33	356.82	94.83	356.83	97.32	356.93	
99.82	356.95	102.31	356.81	104.81	356.58	107.31	356.49	109.8	356.54	
112.3	356.69	114.79	356.88	117.29	356.92	119.78	356.93	122.28	356.63	
124.77	356.34	127.27	355.99	129.76	356.07	132.26	356.09	134.76	355.91	
137.25	355.64	139.75	355.49	142.24	355.63	144.74	355.59	147.23	355.43	
149.73	355.43	152.22	355.45	154.72	355.45	157.21	355.49	159.71	355.53	
162.21	355.6	164.7	355.7	167.2	355.66	169.69	355.67	172.19	355.77	
174.68	356.3	177.18	356.63	179.67	356.92	182.17	357.21	184.66	357.41	
187.16	357.21	189.66	357.04	192.15	357.13	194.65	357.16	197.14	357.09	
199.64	357.04	202.13	357.04	204.63	357.01	207.12	356.96	209.62	356.91	
212.11	356.95	214.61	356.95	217.11	356.93	219.6	356.85	222.1	356.76	
224.59	356.93	227.09	356.96	229.58	356.71	232.08	356.61	234.57	356.53	
237.07	356.59	239.57	356.64	242.06	356.57	244.56	356.39	247.05	356.11	
249.55	356.08	252.04	356.13	254.54	356.19	257.03	356.26	259.53	356.41	
262.02	356.55	264.52	356.58	267.02	356.55	269.51	356.49	272.01	356.48	
274.5	356.37	277	356.39	279.49	356.52	281.99	356.51	284.48	356.53	
286.98	356.49	289.47	356.46	291.97	356.28	294.47	356.13	296.96	356.16	
299.46	356.12	301.95	355.96	304.45	355.71	306.94	355.46	309.44	355.49	
311.93	355.57	314.43	355.61	316.92	355.6	319.42	355.62	321.92	355.53	
324.41	355.45	326.91	355.5	329.4	355.48	331.9	355.4	334.39	355.5	
336.89	355.4	339.38	355.36	341.88	355.37	344.37	355.38	349.37	355.36	
351.86	355.36	354.36	355.41	356.85	355.49	359.35	355.54	361.84	355.47	
364.34	355.37	366.83	355.36	369.33	355.34	371.82	355.15	374.32	354.85	
376.82	354.62	379.31	354.37	381.81	354.64	384.3	355.26	386.8	355.61	

389.29	355.75	391.79	355.42	394.28	354.85	396.78	354.16	399.27	353.91
401.77	353.92	404.27	353.94	406.76	353.95	409.26	354.12	411.75	354.37
414.25	354.61	416.74	354.92	419.24	355.15	421.73	354.9	424.23	354.34
426.72	354.07	429.22	354.24	431.72	355.05	434.21	354.97	436.71	354.51
439.2	354.18	441.7	354.14	444.19	354.17	446.69	354.13	449.18	354.24
451.68	354.51	454.17	354.7	456.67	355.17	459.17	355.31	461.66	355.34
464.16	355.34	466.65	355.35	469.15	355.34	471.64	355.34	474.14	355.36
476.63	355.36	479.13	355.35	481.62	355.25	484.12	355.25	486.62	355.23
489.11	355.25	491.61	355.28	494.1	355.34	496.6	355.36	499.09	355.33
501.59	355.33	504.08	355.31	506.58	355.34	509.07	355.37	511.57	355.47
514.07	355.62	516.56	355.76	519.06	355.75	521.55	355.69	524.05	355.63
526.54	355.41	529.04	355.26	531.53	354.88	534.03	354.63	536.52	354.38
539.02	354.27	541.52	354.35	544.01	354.71	546.51	354.95	549	355.05
551.5	354.92	553.99	354.78	556.49	354.66	558.98	354.73	561.48	354.8
563.97	355.01	566.47	355.12	568.97	355.17	571.46	355.2	573.96	355.36
576.45	355.46	578.95	355.27	581.44	355.27	583.94	355.29	586.43	355.33
588.93	355.5	591.43	355.5	593.92	355.41	596.42	355.3	598.91	355.22
601.41	355.16	603.9	355.11	606.4	355.05	608.89	354.99	611.39	354.93
613.88	354.88	616.38	354.86	618.87	354.64	621.37	354.4	623.87	354.73
626.36	355.72	628.86	356.5	631.35	356.73	633.85	356.81	636.34	356.57
638.84	356.03	641.33	355.27	643.83	354.55	646.32	353.87	648.82	353.58
651.32	353.61	653.81	353.6	656.31	353.6	658.8	353.67	661.3	353.83
663.79	353.96	666.29	354.04	668.78	354.09	671.28	353.92	673.78	354.06
676.27	354.38	678.77	354.56	681.26	354.81	683.76	355.08	686.25	355.36
688.75	355.37	691.24	355.36	693.74	355.37	696.23	355.37	698.73	355.38
701.22	355.4	703.72	355.52	706.22	355.7	708.71	355.65	711.21	355.72
713.7	355.65	716.2	355.56	718.69	355.44	721.19	355.31	723.68	355.17
726.18	354.97	728.68	354.97	731.17	355.04	733.67	354.96	736.16	354.96
738.66	355.15	741.15	355.29	743.65	355.62	746.14	355.79	748.64	355.94
751.13	356.07	753.63	356.07	756.13	355.68	758.62	355.39	761.12	355.24
763.61	355.11	766.11	355.27	768.6	355.43	771.1	355.32	773.59	355.2
776.09	355.16	778.58	355.13	781.08	355.14	783.57	355.18	786.07	355.28
788.57	355.48	791.06	355.67	793.56	355.84	796.05	355.67	798.55	355.44
801.04	355.37	803.54	355.19	806.03	355.07	808.53	354.98	811.03	354.82
813.52	354.74	816.02	354.76	818.51	354.72	821.01	354.74	823.5	354.8
826	354.85	828.49	354.85	830.99	354.84	833.48	354.85	835.98	354.93
838.48	354.93	840.97	354.95	843.47	355	845.96	354.95	848.46	354.89
850.95	354.87	853.45	354.87	855.94	354.84	858.44	354.78	860.93	354.77
863.43	354.73	865.93	354.74	868.42	354.7	870.92	354.73	873.41	354.75
875.91	354.77	878.4	354.75	880.9	354.69	883.39	354.71	885.89	354.81
888.38	354.86	890.88	354.86	893.38	354.97	895.87	354.95	898.37	354.93
900.86	354.92	903.36	354.99	905.85	355.17	908.35	355.45	910.84	355.89
913.34	356.19	915.83	356.36	918.33	356.43	920.83	356.51	923.32	356.56
925.82	356.56	928.31	356.53	930.81	356.46	933.3	356.37	935.8	356.25
938.29	356.09	940.79	355.85	943.28	355.43	945.78	354.76	948.28	353.95
950.77	353.06	953.27	352.23	955.76	351.47	958.26	350.95	960.75	350.72
963.25	350.65	965.74	350.65	968.24	350.66	970.73	350.62	973.23	350.61
975.73	350.62	978.22	350.61	980.72	350.61	983.21	350.58	985.71	350.51
988.2	350.65	990.7	350.73	993.19	350.75	995.69	350.7	998.18	350.7
1003.18	350.56	1005.67	350.56	1008.17	350.58	1010.66	350.6	1013.16	350.65
1015.65	350.66	1018.15	350.68	1020.64	350.66	1023.14	350.62	1025.63	350.58
1028.13	350.59	1030.63	350.59	1033.12	350.63	1035.62	351.04	1038.11	351.42
1040.61	352.1	1043.1	353.14	1045.6	354.44	1048.09	355.24	1050.59	355.63
1053.08	355.77	1055.58	355.9	1058.08	356.01	1060.57	356.15	1063.07	356.28
1065.56	356.36	1068.06	356.53	1070.55	356.76	1073.05	356.86	1075.54	356.88
1078.04	356.93	1080.53	357.03	1083.03	357.1				

Manning's	n Values		num=	3
Sta	n Val	Sta	n Val	Sta
0	.08	943.28	.035	1050.59
				.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	943.28	1050.59		138 131.49	129.5		.1	.3
Ineffective Flow		num=	2					
Sta L	Sta R	Elev	Permanent					
0	0	360	F					
1083.03	1083.03	360	F					

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 13

INPUT

Description:

Station	Elevation	Data	num=	400						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	362.28	2.5	362.14	5	361.62	7.5	361.06	10	360.23	
12.5	359.26	15	358.27	17.5	357.35	20	356.48	22.5	356.04	
25	355.96	27.5	355.96	30	355.81	32.5	355.82	35	355.8	
37.5	355.77	40	355.91	42.5	356.02	44.99	356.04	47.49	355.75	
49.99	355.63	52.49	355.63	54.99	355.64	57.49	355.72	59.99	355.74	
62.49	355.86	64.99	356.33	67.49	356.12	69.99	355.98	72.49	356.07	
74.99	356.15	77.49	356.21	79.99	356.22	82.49	356.24	84.99	356.27	
87.49	356.2	89.99	355.98	92.49	355.9	94.99	355.85	97.49	355.7	
99.99	355.61	102.49	355.49	104.99	355.18	107.49	354.95	109.99	355.03	
112.49	355.1	114.99	355.01	117.49	354.81	119.99	354.78	122.49	354.85	
124.99	354.74	127.49	354.83	129.98	355.13	132.48	355.42	134.98	355.46	
137.48	355.43	139.98	355.49	142.48	355.48	144.98	355.41	147.48	355.37	
149.98	355.38	154.98	355.38	157.48	355.37	162.48	355.37	164.98	355.36	
167.48	355.34	169.98	355.22	172.48	355.04	174.98	355.02	177.48	355.03	
182.48	355.33	184.98	355.38	187.48	355.37	189.98	355.16	192.48	355.12	
194.98	355.13	197.48	354.99	199.98	354.73	202.48	354.21	204.98	353.86	
207.48	353.79	209.98	353.76	212.48	353.74	214.97	353.8	217.47	353.99	
219.97	354.39	222.47	354.91	224.97	355.38	227.47	355.71	229.97	355.63	
232.47	355.56	234.97	355.48	237.47	355.45	239.97	355.39	242.47	355.35	
244.97	355.33	249.97	355.29	252.47	355.36	254.97	355.38	257.47	355.38	
259.97	355.39	262.47	355.4	267.47	355.42	269.97	355.42	272.47	355.39	
274.97	355.43	277.47	355.38	279.97	355.35	282.47	355.36	289.97	355.36	
292.47	355.35	294.97	355.35	299.97	355.33	302.46	355.4	304.96	355.41	
307.46	355.36	309.96	355.24	312.46	354.65	314.96	353.98	317.46	353.66	
319.96	353.64	322.46	353.65	324.96	353.66	327.46	353.92	329.96	354.61	
332.46	355.14	334.96	355.38	337.46	355.39	339.96	355.36	342.46	355.3	
344.96	355.23	347.46	355.08	349.96	354.81	352.46	354.52	354.96	354.23	
357.46	353.97	359.96	353.95	362.46	354.17	364.96	354.43	367.46	354.73	
369.96	355.03	372.46	355.32	374.96	355.54	377.46	355.54	379.96	355.39	
384.96	355.31	387.46	355.3	389.95	355.34	392.45	355.37	394.95	355.46	
397.45	355.56	399.95	355.61	402.45	355.66	404.95	355.72	407.45	355.74	
409.95	355.81	412.45	355.95	414.95	356.12	417.45	356.25	419.95	356.23	
422.45	356.18	424.95	356.13	427.45	356.08	429.95	356.04	432.45	355.99	
437.45	355.89	439.95	355.82	442.45	355.73	444.95	355.61	447.45	355.47	
449.95	355.77	452.45	356.15	454.95	356.19	457.45	355.96	459.95	355.59	
462.45	355.52	464.95	355.47	467.45	355.3	469.95	355.11	472.45	355.14	
474.95	355.25	477.44	355.39	479.94	355.51	482.44	355.6	484.94	355.68	
487.44	355.71	489.94	355.84	492.44	355.88	494.94	355.59	497.44	355.54	
499.94	355.55	502.44	355.56	504.94	355.55	509.94	355.55	514.94	355.51	
517.44	355.49	519.94	355.48	522.44	355.46	527.44	355.42	529.94	355.41	
532.44	355.39	537.44	355.37	539.94	355.37	542.44	355.36	547.44	355.36	
549.94	355.35	552.44	355.35	554.94	355.36	562.44	355.39	564.94	355.41	
567.43	355.42	572.43	355.42	574.93	355.46	577.43	355.51	579.93	355.43	
582.43	355.39	584.93	355.37	587.43	355.37	589.93	355.36	594.93	355.36	

597.43	355.35	604.93	355.35	607.43	355.36	609.93	355.35	612.43	355.09
614.93	354.53	617.43	353.94	619.93	353.5	622.43	353.39	624.93	353.42
627.43	353.46	629.93	353.47	632.43	353.5	634.93	353.63	637.43	353.81
639.93	354.03	642.43	354.21	644.93	354.39	647.43	354.6	649.93	354.75
652.43	354.83	654.92	354.9	657.42	354.97	659.92	355.05	662.42	355.09
664.92	355.16	667.42	355.19	669.92	355.27	672.42	355.3	674.92	355.34
677.42	355.33	679.92	355.23	682.42	355.08	684.92	354.92	687.42	354.74
689.92	354.57	692.42	354.4	694.92	354.2	697.42	354.04	699.92	353.85
702.42	353.67	704.92	353.48	707.42	353.3	709.92	353.11	712.42	352.93
714.92	352.84	717.42	352.49	719.92	352.47	722.42	353.09	724.92	353.89
727.42	354.69	729.92	355.24	732.42	355.25	734.92	354.97	737.42	355.07
739.92	355.11	742.41	355.26	744.91	355.23	747.41	355.15	749.91	355.1
752.41	355.05	754.91	355	757.41	354.91	762.41	354.79	764.91	354.8
767.41	354.8	769.91	354.69	772.41	354.56	774.91	354.47	777.41	354.45
779.91	354.53	782.41	354.62	784.91	354.88	787.41	354.92	789.91	354.74
792.41	354.61	794.91	354.56	797.41	354.53	799.91	354.63	802.41	354.71
804.91	354.59	807.41	354.61	809.91	354.55	812.41	354.6	814.91	354.69
817.41	354.69	819.91	354.63	822.41	354.63	824.91	354.72	827.41	354.77
829.9	354.78	832.4	354.71	834.9	354.65	837.4	354.63	839.9	354.64
842.4	354.67	844.9	354.71	847.4	354.73	849.9	354.69	852.4	354.62
854.9	354.52	857.4	354.38	859.9	354.29	862.4	354.16	864.9	354.19
867.4	354.26	869.9	354.27	872.4	354.24	874.9	354.25	877.4	354.24
879.9	354.22	882.4	354.29	884.9	354.56	887.4	355.13	889.9	355.83
892.4	356.17	894.9	356.02	897.4	356.01	899.9	356.12	9004.9	356.12
907.4	356.05	909.9	355.96	912.4	355.82	914.9	355.65	917.39	355.52
919.89	355.38	922.39	355.19	924.89	355.08	927.39	355.16	929.89	355.32
932.39	355.42	934.89	355.25	937.39	354.38	939.89	352.9	942.39	351.97
944.89	351.56	947.39	351.23	949.89	350.87	952.39	350.54	954.89	350.28
957.39	350.17	959.89	350.1	962.39	350.12	964.89	350.21	967.39	350.25
969.89	350.23	972.39	350.26	974.89	350.27	977.39	350.26	979.89	350.17
982.39	350.18	984.89	350.16	987.39	350.23	989.89	350.24	992.39	350.2
994.89	350.15	997.39	350.14	999.89	350.1	1002.39	350.05	1004.88	350.15
1007.38	350.18	1009.88	350.19	1012.38	350.21	1014.88	350.24	1017.38	350.3
1019.88	350.42	1022.38	350.55	1024.88	350.61	1027.38	350.66	1029.88	351.64
1032.38	352.66	1034.88	353.3	1037.38	353.49	1039.88	353.61	1042.38	353.81
1044.88	354.13	1047.38	355.07	1049.88	356.57	1052.38	357.49	1054.88	357.76

Manning's n Values num= 3
Sta n Val Sta n Val
0 .08 932.39 .035 1047.38 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
932.39 1047.38 141 124.46 121 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
1054.88 1054.88 360 F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 12

INPUT

Description:

Station	Elevation	Data	num=	366						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
0	358.16	2.49	357.83	4.99	357.58	7.48	357.52	9.98	357.54	
12.47	357.45	14.96	357.41	17.46	357.32	19.95	357.28	22.44	357.34	
24.94	357.3	27.43	357.2	29.93	357.1	32.42	357.07	34.91	357.01	
37.41	356.88	39.9	356.8	42.39	356.75	44.89	356.83	47.38	356.89	

49.88	356.82	52.37	356.69	54.86	356.82	57.36	356.93	59.85	357.07
62.35	357.27	64.84	357.42	67.33	357.5	69.83	357.56	72.32	357.62
74.81	357.65	77.31	357.68	79.8	357.63	82.3	357.61	84.79	357.46
87.28	357.25	89.78	357.16	92.27	357.05	94.76	356.99	97.26	356.99
99.75	356.98	102.25	356.89	104.74	356.86	107.23	356.91	109.73	357.03
112.22	357.17	114.72	357.38	117.21	357.48	119.7	357.37	122.2	357.3
124.69	357.3	127.18	357.21	129.68	357.04	132.17	356.95	134.67	356.84
137.16	356.77	139.65	356.61	142.15	356.55	144.64	356.6	147.13	356.73
149.63	356.65	152.12	356.46	154.62	356.54	157.11	356.46	159.6	356.48
162.1	356.54	164.59	356.61	167.08	356.6	169.58	356.59	172.07	356.63
174.57	356.66	177.06	356.7	179.55	356.65	182.05	356.57	184.54	356.42
187.04	356.26	189.53	356.23	192.02	356.15	194.52	356.06	197.01	355.94
199.5	355.87	202	355.73	204.49	355.85	206.99	355.9	209.48	355.86
211.97	355.86	214.47	355.88	216.96	355.99	219.46	356.12	221.95	356.23
224.44	356.32	226.94	356.36	229.43	356.42	231.92	356.49	234.42	356.6
236.91	356.36	239.41	356.39	241.9	356.42	244.39	356.4	246.89	356.34
249.38	356.32	251.87	356.27	254.37	356.26	256.86	356.27	259.36	356.21
261.85	356.16	264.34	356.17	266.84	356.24	269.33	356.31	271.82	356.36
274.32	356.37	276.81	356.37	279.31	356.36	281.8	356.36	284.29	356.32
286.79	356.16	289.28	356.14	291.78	356.09	294.27	356.12	296.76	356.06
299.26	355.76	301.75	355.56	304.24	355.51	306.74	355.47	309.23	355.44
311.73	355.43	314.22	355.36	316.71	355.41	319.21	355.57	321.7	355.68
324.2	355.74	326.69	355.8	329.18	355.76	331.68	355.7	334.17	355.6
336.66	355.57	339.16	355.6	341.65	355.72	344.15	355.84	346.64	355.77
349.13	355.66	351.63	355.54	354.12	355.64	356.61	355.66	359.11	355.65
361.6	355.66	364.1	355.74	366.59	355.77	369.08	355.74	371.58	355.61
374.07	355.55	376.56	355.42	379.06	355.37	381.55	355.34	384.05	355.33
386.54	355.34	389.03	355.35	391.53	355.36	394.02	355.37	396.52	355.38
399.01	355.39	401.5	355.4	404	355.41	406.49	355.42	408.98	355.44
411.48	355.43	413.97	355.39	416.47	355.35	418.96	355.3	421.45	355.24
423.95	355.25	426.44	355.32	428.93	355.35	431.43	355.37	433.92	355.37
436.42	355.43	438.91	355.53	441.4	355.59	443.9	355.7	446.39	355.75
448.89	355.82	451.38	355.8	453.87	355.74	456.37	355.61	458.86	355.6
461.35	355.68	463.85	355.7	466.34	355.72	471.33	355.72	473.82	355.64
476.32	355.59	478.81	355.57	481.3	355.62	483.8	355.64	486.29	355.61
488.79	355.58	491.28	355.54	493.77	355.52	496.27	355.54	498.76	355.64
501.26	355.66	506.24	355.54	508.74	355.55	511.23	355.65	513.72	355.7
516.22	355.52	518.71	354.98	521.21	354.45	523.7	353.92	526.19	353.46
528.69	353.04	531.18	352.71	533.67	352.41	536.17	352.31	538.66	352.77
541.16	353.45	543.65	354.09	546.14	354.83	548.64	355.47	551.13	355.46
553.63	355.49	556.12	355.44	558.61	355.38	561.11	355.46	563.6	355.58
566.09	355.39	568.59	355.21	571.08	355.19	573.58	355.35	576.07	355.67
578.56	355.88	581.06	355.85	583.55	355.78	586.04	355.61	588.54	355.52
591.03	355.53	593.53	355.57	596.02	355.61	598.51	355.47	601.01	355.17
603.5	354.96	606	354.81	608.49	354.57	610.98	354.48	613.48	354.47
615.97	354.42	618.46	354.38	620.96	354.31	623.45	354.21	625.95	354.09
628.44	353.96	630.93	353.55	633.43	352.53	635.92	351.63	638.41	350.99
640.91	350.71	643.4	350.31	645.9	350.18	648.39	350.03	650.88	350.42
653.38	350.71	655.87	351.11	658.37	351.43	660.86	351.62	663.35	351.35
665.85	351.32	668.34	351.44	670.83	351.57	673.33	351.66	675.82	351.56
678.32	351.54	680.81	351.66	683.3	351.68	685.8	351.55	688.29	351.54
690.78	351.53	693.28	351.74	695.77	352.34	698.27	352.86	700.76	353.28
703.25	353.37	705.75	353.56	708.24	353.58	710.74	353.45	713.23	353.43
715.72	353.5	718.22	353.57	720.71	353.65	723.2	353.92	725.7	354.56
728.19	355.29	730.69	355.86	733.18	355.9	735.67	355.98	738.17	356.06
740.66	356.12	743.15	356.19	745.65	356.24	748.14	356.3	750.64	356.22
753.13	356.08	755.62	356	758.12	355.98	760.61	355.98	763.11	356.05
765.6	356.21	768.09	355.99	770.59	355.4	773.08	354.85	775.57	354.6
778.07	354.61	780.56	353.97	783.06	353.25	785.55	352.29	788.04	351.35
790.54	350.73	793.03	350.28	795.53	350.04	798.02	349.96	800.51	349.89
803.01	349.77	805.5	349.7	807.99	349.68	810.49	349.69	812.98	349.69

815.48	349.7	817.97	349.73	820.46	349.78	822.96	349.77	825.45	349.79
827.94	349.8	830.44	349.81	832.93	349.79	835.43	349.78	837.92	349.72
840.41	349.59	842.91	349.43	845.4	349.39	847.89	349.43	850.39	349.48
852.88	349.53	855.38	349.58	857.87	349.61	860.36	349.62	862.86	349.63
865.35	349.67	867.85	349.68	870.34	349.68	872.83	349.64	875.33	349.63
877.82	349.68	880.31	349.73	882.81	349.82	885.3	349.88	887.8	350.17
890.29	350.68	892.78	351.52	895.28	352.5	897.77	353.15	900.27	353.48
902.76	353.83	905.25	354.4	907.75	355.42	910.24	356.81	912.73	358.13
915.23	358.74								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	780.56	.035	902.76	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
780.56	902.76	122.5	112.37	105.5		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	0	360	F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 11

INPUT

Description:

Station Elevation Data		num= 271							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.14	2.49	359.13	4.98	359.07	7.47	359.03	9.97	359.05
12.46	359.03	14.95	358.92	17.44	358.81	19.93	358.74	22.42	358.69
24.91	358.74	27.41	358.75	32.39	358.63	34.88	358.51	37.37	358.48
39.86	358.42	42.35	358.37	44.85	358.35	47.34	358.35	49.83	358.37
52.32	358.5	54.81	358.5	57.3	358.41	59.79	358.21	62.29	358.06
64.78	357.96	67.27	357.85	69.76	357.74	72.25	357.73	74.74	357.67
77.23	357.53	79.73	357.35	82.22	357.26	84.71	357.18	87.2	357.04
89.69	356.99	92.18	357.01	94.67	356.84	97.17	356.69	99.66	356.59
102.15	356.54	104.64	356.54	107.13	356.76	109.62	356.93	112.11	357.03
114.61	357.11	117.1	357.24	119.59	357.36	122.08	357.43	124.57	357.54
127.06	357.56	129.55	357.4	132.05	357.47	134.54	357.6	137.03	357.8
139.52	357.85	142.01	357.82	146.99	357.62	149.49	357.52	151.98	357.4
154.47	357.33	156.96	357.12	159.45	357.04	161.94	357.02	164.43	357.02
166.93	356.98	171.91	357.08	174.4	357.1	176.89	357.09	179.38	357.15
181.87	357.19	184.37	357.3	186.86	357.24	189.35	357.1	191.84	357.14
194.33	357.32	196.82	357.45	199.31	357.52	201.81	357.45	204.3	357.3
206.79	357.18	209.28	357.11	211.77	356.87	214.26	356.49	216.75	356.13
219.25	356.08	221.74	356	224.23	356.09	226.72	356.2	229.21	356.37
231.7	356.57	234.19	356.55	236.69	356.43	239.18	356.4	241.67	356.34
244.16	356.2	246.65	356.22	249.14	356.32	251.63	356.45	254.13	356.29
256.62	355.64	259.11	355.03	261.6	354.82	264.09	354.77	266.58	354.9
269.07	355.2	271.57	355.23	274.06	355.16	276.55	354.98	279.04	354.74
281.53	354.56	284.02	354.54	286.51	354.71	289.01	355.21	291.5	355.71
293.99	356.3	296.48	356.97	298.97	357.52	301.46	357.81	303.95	358.19
306.45	358.66	308.94	358.9	311.43	358.91	313.92	358.75	316.41	357.32
318.9	356.24	321.39	355.84	323.89	355.69	326.38	355.72	328.87	355.72
331.36	355.74	333.85	355.73	336.34	355.59	338.83	355.35	341.33	354.95
343.82	354.52	346.31	354.35	348.8	354.32	351.29	354.34	353.78	354.26
356.27	354.16	358.77	354.17	361.26	354.16	363.75	354.05	366.24	354.13
368.73	354.21	371.22	354.52	373.71	354.97	376.21	355.39	378.7	355.42
381.19	355.13	383.68	354.68	386.17	354.11	388.66	353.6	391.15	353.49

393.65	353.49	396.14	353.33	398.63	353.18	401.12	353.12	403.61	353.14
406.1	353.3	408.59	353.49	411.09	353.65	413.58	353.71	416.07	353.78
418.56	353.82	421.05	353.77	423.54	353.75	426.03	353.54	428.53	353.2
431.02	352.8	433.51	352.69	436	352.74	438.49	352.41	440.98	352.23
443.47	352.04	445.97	351.95	448.46	351.86	450.95	351.79	453.44	351.66
455.93	351.52	458.42	351.48	460.92	351.52	463.41	351.49	465.9	351.5
468.39	351.49	473.37	351.57	475.86	351.85	478.35	352.51	480.85	353.77
483.34	355.64	485.83	357.78	488.32	358.47	490.81	358.87	493.3	358.95
495.79	358.94	498.29	358.98	500.78	359.08	503.27	359.06	505.76	359.04
508.25	358.95	510.74	358.81	513.23	356.58	515.73	352.94	518.22	351.41
520.71	350.64	523.2	350.59	525.69	350.53	528.18	350.46	530.67	350.35
533.17	350.23	535.66	350.14	538.15	350	540.64	349.88	543.13	349.84
545.62	349.78	548.11	349.64	550.61	349.54	553.1	349.52	555.59	349.53
558.08	349.51	560.57	349.49	563.06	349.48	565.55	349.47	568.05	349.43
570.54	349.4	573.03	349.41	575.52	349.4	578.01	349.4	580.5	349.41
583	349.39	585.49	349.37	587.98	349.3	590.47	349.2	592.96	349.1
595.45	349	597.94	348.9	600.43	348.8	602.93	348.7	605.42	348.6
607.91	348.5	610.4	348.4	615.38	348.2	617.87	348	620.37	348
622.86	348	625.35	348	627.84	348	630.33	348	632.82	348
635.31	348	637.81	348	640.3	348	642.79	348	645.28	348
647.77	348	650.26	348	652.75	348	655.25	348.2	657.74	348.4
660.23	348.6	662.72	348.8	665.21	349.28	667.7	349.87	670.19	350.27
672.69	350.66	675.18	351.28	677.67	352.54	680.16	354.02	682.65	355.58
685.14	357.12								

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .08	515.73 .035	677.67 .08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
515.73	677.67	81.5	59.05	34	.1	.3	
Ineffective Flow	num=	1					
Sta L	Sta R	Elev	Permanent				
685.14	685.14	360	F				

CROSS SECTION

RIVER: Bushkill
 REACH: Main RS: 10

INPUT

Description:

Station Elevation	Data	num=	128
Sta Elev	Sta Elev	Sta Elev	Sta Elev
0 363.54	2.5 363.11	4.99 362.51	7.49 361.83
12.48 360.38	14.97 359.87	17.47 359.31	19.96 358.73
24.95 358.13	27.45 357.71	29.94 357.4	32.44 357.16
37.43 356.88	39.93 356.69	42.42 356.66	44.92 356.84
49.91 356.95	52.4 356.93	54.9 356.86	57.39 356.97
62.39 357.12	64.88 356.44	67.38 355.74	69.87 355.43
74.86 355.8	77.36 356.17	79.85 356.22	82.35 356.02
87.34 355.6	89.84 355.51	92.33 355.41	94.83 355.45
99.82 355.33	102.31 355.08	104.81 355.14	107.3 355.23
112.29 355.4	114.79 355.47	117.28 355.51	119.78 355.56
124.77 355.45	127.27 355.34	129.76 355.25	132.26 355.1
137.25 354.55	139.74 354.44	142.24 354.51	144.73 354.46
149.73 354	152.22 353.52	154.72 353.1	157.21 352.72
162.2 351.36	164.7 350.87	167.19 350.4	169.69 349.89
174.68 349.37	177.17 349.29	179.67 349.2	182.17 349.1
187.16 349.01	189.65 348.95	192.15 348.93	194.64 348.95
			197.14 348.98

199.63	348.94	202.13	348.87	204.62	348.8	207.12	348.6	209.62	348.4
212.11	348.2	214.61	348	217.1	347.2	219.6	347	222.09	347
224.59	347	227.08	347	229.58	347	232.07	347	234.57	347
237.07	347	239.56	347	242.06	347	244.55	347	247.05	347
249.54	347	252.04	347	254.53	347	257.03	347	259.52	347
262.02	347	267.01	347	269.51	348.1	272	348.2	274.5	348.3
276.99	348.4	279.49	348.5	281.98	348.6	284.48	348.7	286.97	348.8
289.47	348.85	291.96	348.93	294.46	349.08	296.96	349.25	299.45	349.39
301.95	349.72	304.44	350.24	306.94	351.29	309.43	352.94	311.93	354.68
314.42	356.27	316.92	357.65	319.41	358.65				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	154.72	.035	309.43	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	154.72	309.43		57.5 47.11	32		.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 9

INPUT

Description:

Station	Elevation	Data	num=	62						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	363.17	2.49	363.1	4.97	363.01	7.46	362.96	9.95	362.87	
12.44	362.47	14.92	361.94	17.41	361.8	19.9	361.89	22.39	361.91	
24.87	361.93	27.36	361.97	29.85	361.99	32.34	362.05	34.82	361.92	
37.31	361.37	39.8	360.59	42.29	359.61	44.77	358.63	47.26	357.87	
52.24	356.43	54.72	355.71	57.21	355	59.7	354.44	62.19	354.18	
64.67	354.03	67.16	353.92	69.65	353.84	72.14	353.8	74.62	353.79	
77.11	353.76	79.6	353.66	82.09	353.53	84.57	353.34	87.06	353.16	
89.55	352.84	92.04	352.51	94.52	352.32	96	352	112	351	
115.5	350	124.5	349	131	348	141	347	151	346.5	
161	346.5	171	346.5	208	346.5	218	346.5	228	346.5	
238	347	248.5	348	249.5	349	250.5	350	251.5	351	
252.5	352	253.5	353	256.21	353.37	258.69	354.8	261.18	356.38	
263.67	357.7	266.16	358.68							

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	96	.035	253.5	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	96	253.5		128 127.88	56		.3	.5

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 8

INPUT

Description:

Station	Elevation	Data	num=	67						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	360.55	2.49	360.71	4.99	360.91	7.48	360.83	9.98	360.15	
12.47	356.49	14.96	352.82	17.46	349.92	19.95	348	22.44	347	

24.94	346.5	27.43	346	29.93	345.5	32.42	345	36.3	344
37.41	344	39.9	344	42.39	344	44.89	344	47.38	344
49.88	344	52.37	344	54.86	344	57.36	344	62	344
64	345	66	346	68	347	87.5	347	89.5	346
95.5	345	97.26	345	99.75	345	102.24	345	104.74	345
109.73	345	112.22	345	114.71	345	117.21	345	119.7	345
122.2	345	123	345	129	346	131	347	150	347
152	346	159	345.8	162	346	166	347	169.58	347.8
172.07	347.9	174.56	348	177.06	348.2	179.55	348.4	182.05	348.6
184.54	348.62	187.03	348.6	189.53	348.68	192.02	348.73	194.51	348.78
197.01	349.61	199.5	351.17	202	352.75	204.49	354.51	206.98	356.36
209.48	357.03	211.97	356.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	14.96	.035	202	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	14.96	202		60 60.09	60		.3	.5

BRIDGE

RIVER: Bushkill

REACH: Main RS: 7.5

INPUT

Description:

Distance from Upstream XS = 10

Deck/Roadway Width = 45.5

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		361		300	10		361		300	10		364.6		300
16		364.6		300	16		364.6		357.1	201.5		363.6		356.1
201.5		363.6		300	207.5		363.6		300	207.5		360		300
250		360		300										

Upstream Bridge Cross Section Data

Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.55	2.49	360.71	4.99	360.91	7.48	360.83	9.98	360.15
12.47	356.49	14.96	352.82	17.46	349.92	19.95	348	22.44	347
24.94	346.5	27.43	346	29.93	345.5	32.42	345	36.3	344
37.41	344	39.9	344	42.39	344	44.89	344	47.38	344
49.88	344	52.37	344	54.86	344	57.36	344	62	344
64	345	66	346	68	347	87.5	347	89.5	346
95.5	345	97.26	345	99.75	345	102.24	345	104.74	345
109.73	345	112.22	345	114.71	345	117.21	345	119.7	345
122.2	345	123	345	129	346	131	347	150	347
152	346	159	345.8	162	346	166	347	169.58	347.8
172.07	347.9	174.56	348	177.06	348.2	179.55	348.4	182.05	348.6
184.54	348.62	187.03	348.6	189.53	348.68	192.02	348.73	194.51	348.78
197.01	349.61	199.5	351.17	202	352.75	204.49	354.51	206.98	356.36
209.48	357.03	211.97	356.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	14.96	.035	202	.08

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	14.96	202		.3	.5

Downstream Deck/Roadway Coordinates

num= 10

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0		361		300	42		361		300	42		364.6		300
48		364.6		300	48		364.6		357.1	233.5		363.6		356.1
233.5		363.6		300	239.5		363.6		300	239.5		360		300
260		360		300										

Downstream Bridge Cross Section Data

Station Elevation Data

num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.02	2.49	360.09	4.98	359.91	7.47	359.6	9.96	359.21
12.45	358.94	14.95	358.64	17.44	358.2	19.93	357.78	22.42	357.45
24.91	356.79	27.4	356.79	29.89	357.07	32.38	357.35	34.87	357.43
37.36	357.6	39.85	357.78	42.34	355.76	44.84	352.13	47.33	348.7
51.3	347	53.3	346	55.3	345	62.8	344	76.3	345
77.22	345	79.71	345	84.69	346	101	347	118.5	347
120.5	346	123.5	345	124.54	345	127.03	345	129.52	345
132.02	345	134.51	345	137	345	139.49	345	141.98	345
144.47	345	146.96	345	149.45	345	151.94	345	154.43	345
157.5	345	161	346	163	347	181	347	183	346
186	345	189.3	345	191.8	345	194.29	345	196.78	345
199.27	345	201.76	345	204.25	345	206.74	345	209.23	345
211.72	345	214.21	345	216.7	345	219.19	345	221.69	345
224.18	345	227	345	230	346	231	347	232	348
233	349	236.63	352.28	239.12	355.03	241.61	357.26	244.1	358.23
246.59	358.88	249.09	359.08	251.58	359.19	254.07	359.37	256.56	359.49
259.05	359.54	261.54	359.64						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	44.84	.035	236.63	.08

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	44.84	236.63		.3	.5

Upstream Embankment side slope = 1 horiz. to 1.0 vertical
Downstream Embankment side slope = 1 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data

Pier Station Upstream= 77.25 Downstream= 109.25

Upstream num= 4

Width	Elev	Width	Elev	Width	Elev	Width	Elev
4	330	4	350	3	357	3	360

Downstream num= 4

Width	Elev	Width	Elev	Width	Elev	Width	Elev
4	330	4	350	3	357	3	360

Pier Data

Pier Station Upstream= 140.25 Downstream= 172.25

Upstream num= 4

Width	Elev	Width	Elev	Width	Elev	Width	Elev
4	330	4	350	3	357	3	360

Downstream num= 4

Width	Elev	Width	Elev	Width	Elev	Width	Elev
4	330	4	350	3	357	3	360

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Momentum Cd = 2

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd =

Submerged Inlet + Outlet Cd = .8

Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Bushkill

REACH: Main RS: 7

INPUT

Description:

Station	Elevation	Data	num=	82					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.02	2.49	360.09	4.98	359.91	7.47	359.6	9.96	359.21
12.45	358.94	14.95	358.64	17.44	358.2	19.93	357.78	22.42	357.45
24.91	356.79	27.4	356.79	29.89	357.07	32.38	357.35	34.87	357.43
37.36	357.6	39.85	357.78	42.34	355.76	44.84	352.13	47.33	348.7
51.3	347	53.3	346	55.3	345	62.8	344	76.3	345
77.22	345	79.71	345	84.69	346	101	347	118.5	347
120.5	346	123.5	345	124.54	345	127.03	345	129.52	345
132.02	345	134.51	345	137	345	139.49	345	141.98	345
144.47	345	146.96	345	149.45	345	151.94	345	154.43	345
157.5	345	161	346	163	347	181	347	183	346
186	345	189.3	345	191.8	345	194.29	345	196.78	345
199.27	345	201.76	345	204.25	345	206.74	345	209.23	345
211.72	345	214.21	345	216.7	345	219.19	345	221.69	345
224.18	345	227	345	230	346	231	347	232	348
233	349	236.63	352.28	239.12	355.03	241.61	357.26	244.1	358.23
246.59	358.88	249.09	359.08	251.58	359.19	254.07	359.37	256.56	359.49
259.05	359.54	261.54	359.64						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	44.84	.035	236.63	.08

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	44.84	236.63		46.5	46.58	46.5		.3	.5

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 6

INPUT

Description:

Station	Elevation	Data	num=	105
Sta	Elev	Sta	Elev	Sta Elev Sta Elev Sta Elev
0	360.75	2.48	360.67	4.96 360.4 7.43 360.01 9.91 359.7
12.39	359.45	14.87	359.25	17.35 358.9 19.82 358.4 22.3 358.06
24.78	357.5	27.26	356.81	29.73 356.07 32.21 354.77 34.69 352.9
37.17	350.99	39.65	349.64	42.12 348.72 44.6 348.2 47.08 347.95
49.56	347.73	52.04	347.57	54.51 347.5 56.99 347.2 59.47 347
61.95	346.4	66.9	346.2	69.38 346 71.86 345.8 74.34 345.6
76.81	345.5	79.29	345.5	81.77 345.5 84.25 345.5 86.73 345.5
89.2	345.5	91.68	345.5	94.16 345.5 96.64 345.5 99.12 345.5
101.59	345.5	104.07	345	106.55 345 109.03 345 111.51 345
113.98	345	116.46	345	118.94 345 121.42 345 123.89 345
126.37	345	128.85	345	131.33 345 133.81 345 136.28 345
138.76	345	141.24	345	143.72 345 146.2 345 148.67 345
151.15	345	153.63	345	156.11 345 158.59 345 161.06 345
163.54	345	166.02	345	168.5 345 170.97 345 173.45 345
175.93	345	178.41	345	180.89 345 183.36 345 185.84 345
188.32	345	190.8	345	193.28 345 195.75 345 198.23 345
200.71	345	203.19	345	204 345 207 346 210 347
213	348	216	349	218 349.5 220.53 349.93 223.01 350.52
225.49	351.08	227.97	351.53	230.44 351.92 232.92 352.16 235.4 352.41
237.88	352.64	240.36	352.81	242.83 352.97 245.31 353.2 247.79 353.35
250.27	353.44	252.75	353.54	255.22 353.71 257.7 353.83 260.18 353.9

Manning's n	Values	num=	3
Sta	n Val	Sta	n Val
0	.08	37.17	.035
225.49	.08		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	37.17	225.49		57	57.11	57		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
260.18	260.18	358	F

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 5

INPUT

Description:

Station	Elevation	Data	num=	101
Sta	Elev	Sta	Elev	Sta Elev Sta Elev Sta Elev
0	360.77	2.5	360.74	5 360.77 7.5 360.73 10 360.62
12.5	360.64	15	360.59	17.5 360.43 20 360.29 22.5 360
25	359.77	27.5	359.67	30 359.44 32.49 359.1 34.99 358.69
37.49	357.99	39.99	357	42.49 355.27 44.99 352.33 47.49 349.1
49.99	348.04	52.49	347.76	54.99 347.61 57.49 347.31 59.99 346.99
62.49	346.78	64.99	346.6	67.49 346.4 69.99 346.2 72.49 346
74.99	345.8	77.49	345.6	79.99 345.5 82.49 345.5 84.99 345.5
89.99	345.5	92.49	345.5	94.99 345.5 97.48 345.5 99.98 345.5
102.48	345.5	104.98	345.5	107.48 345.5 109.98 345.5 112.48 345.5

114.98	345.5	117.48	345.5	119.98	345.5	122.48	345.5	126	345
129.98	345	132.48	345	134.98	345	137.48	345	139.98	345
142.48	345	144.98	345	147.48	345	149.98	345	154.98	345
157.48	345	159.97	345	162.47	345	164.97	345	167.47	345
169.97	345	171.5	345	175	346	178.5	347	182	348
185.5	349	189	350	192.5	351	196	352	202.47	352.9
204.97	353.19	207.47	353.5	209.97	354.23	212.47	355.02	214.97	355.59
217.47	356.12	219.97	356.74	222.46	357.35	224.96	357.78	227.46	358.11
229.96	358.22	232.46	358.39	234.96	358.35	237.46	358.4	239.96	357.86
242.46	357.52	244.96	357.51	247.46	357.63	249.96	357.65	254.96	357.67
257.46	357.25	262.46	356.87	264.96	356.33	267.46	355.51	269.96	354.79
272.46	354.17								

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.08	44.99	.035
		196	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	44.99	196		55.3	55.37		.1	.3
Ineffective Flow		num=	1					
Sta L	Sta R	Elev	Permanent					
232.46	272.46	358.4	F					

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 4

INPUT

Description:

Station Elevation	Data	num=	82
Sta	Elev	Sta	Elev
0	359.99	2.48	359.92
12.4	359.65	14.88	359.69
24.8	359.22	27.28	358.57
37.2	351.96	39.68	350.39
49.6	346.35	52.08	346.2
62	345.6	64.48	345.5
74.4	345.4	76.88	345.4
86.8	345.4	89.28	345.4
99.2	345.4	101.68	345.4
111.6	345	114.08	345
124	345	128.5	345
186	348	193.44	348.9
203.36	350.27	205.84	350.68
215.76	352.05	218.24	352.37
228.16	354.95	230.64	355.23
240.56	355.71	243.04	356.02
252.96	356.31	255.44	355.77

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
0	.1	42.16	.05
		193.44	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	42.16	193.44		88	88.24		.1	.3

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 3

INPUT

Description:

Station Elevation Data		num= 148							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.85	2.49	357.07	4.98	357.12	7.47	357.04	9.97	357.12
12.46	357.25	14.95	357.51	17.44	357.57	19.93	357.5	22.42	357.44
24.92	357.45	27.41	357.52	29.9	357.62	32.39	357.79	34.88	357.86
37.37	357.76	39.87	357.65	42.36	357.66	44.85	357.74	47.34	357.72
49.83	357.79	52.32	357.26	54.81	354.78	57.31	351.35	59.8	348.67
62.29	347.01	64.78	346.5	67.27	346.4	69.76	346.17	72.26	345.95
74.75	345.8	77.24	345.6	79.73	345.4	82.22	345.3	84.71	345.3
87.21	345.3	89.7	345.3	92.19	345.3	94.68	345.3	97.17	345.3
99.66	345.3	102.15	345.3	104.65	345.3	107.14	345.3	109.63	345.3
112.12	345.3	114.61	345.3	117.1	345.3	119.6	345.3	122.09	345.3
124.58	345.3	127.07	345.3	129.56	345.3	132.05	345.3	134.55	345.4
137.04	345.5	139.53	345.6	142.02	345.7	144.51	345.75	147	345.77
149.49	345.74	151.99	345.73	154.48	345.86	156.97	346.09	159.46	346.3
161.95	346.32	164.44	346.26	166.94	346.22	169.43	346.07	171.92	345.93
174.41	345.94	176.9	346.09	179.39	346.37	181.89	346.65	184.38	347.09
186.87	347.28	189.36	347.43	191.85	347.54	194.34	347.31	196.83	347.14
199.33	347.34	201.82	347.84	204.31	348.12	206.8	347.82	209.29	347.29
211.78	347.37	214.28	347.79	216.77	348.12	219.26	348.04	221.75	347.64
224.24	347.29	226.73	347.24	229.22	347.56	231.72	347.86	234.21	348.1
236.7	348.45	239.19	348.78	241.68	349.2	244.17	349.37	246.67	349.41
249.16	349.33	251.65	348.98	254.14	348.73	256.63	349.09	259.12	350.1
261.62	350.81	264.11	351.08	266.6	351.41	269.09	351.65	271.58	351.72
274.07	351.68	276.57	351.65	279.06	351.44	281.55	351.36	284.04	351.29
286.53	351.22	289.02	351.38	291.51	351.64	294.01	351.65	296.5	351.61
298.99	351.5	301.48	351.38	303.97	351.36	306.46	351.4	308.96	351.45
311.45	351.36	313.94	351.3	316.43	351.46	318.92	351.57	321.41	351.54
323.9	351.65	326.4	351.71	328.89	351.62	331.38	351.52	333.87	351.5
336.36	351.5	338.85	351.44	341.35	351.52	343.84	351.51	346.33	351.51
348.82	351.63	351.31	351.72	353.8	351.73	356.3	351.72	358.79	351.92
361.28	352.25	363.77	352.25	366.26	352.03				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	59.8	.05	204.31	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
59.8 204.31 134 131.6 125.5 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
366.26 366.26 355 F

CROSS SECTION

RIVER: Bushkill

REACH: Main

RS: 2

INPUT

Description:

Station Elevation Data				num=		183			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	348.79	0	348.79	2.5	349.11	5	349.3	7.49	349.46
9.99	349.55	12.49	349.59	14.99	349.45	17.49	348.97	19.99	348.47
22.48	348.03	24.98	347.54	27.48	347.04	29.98	346.47	32.48	345.91

34.97	345.53	37.47	345.32	39.97	345.24	42.47	344.95	44.97	344.72
47.47	344.57	49.96	344.5	52.46	344.47	54.96	344.51	59.96	344.49
62.45	344.56	64.95	344.63	67.45	344.63	69.95	344.62	72.45	344.67
74.94	344.8	77.44	344.91	79.94	344.93	82.44	344.86	84.94	344.8
87.44	344.78	89.93	344.76	92.43	344.72	94.93	344.73	97.43	344.8
99.93	344.81	102.42	344.79	107.42	344.67	109.92	344.66	112.42	344.71
114.92	344.8	117.41	344.89	119.91	345.03	122.41	345.16	127.41	345.02
129.9	345.09	132.4	345.11	134.9	345.11	137.4	345.05	139.9	344.94
142.4	345.07	144.89	345.15	147.39	345.29	149.89	345.39	152.39	345.47
154.89	345.59	157.38	345.92	159.88	346.33	162.38	346.69	164.88	347.02
167.38	347.3	169.88	347.57	172.37	347.48	174.87	347.04	177.37	346.46
179.87	345.92	182.37	345.49	184.86	345.47	187.36	345.48	189.86	345.44
192.36	345.43	194.86	345.34	197.36	345.37	199.85	345.38	202.35	345.32
204.85	345.32	207.35	345.31	209.85	345.21	212.34	345.26	217.34	345.26
219.84	345.2	222.34	345.19	224.84	345.14	227.33	345.12	229.83	345.09
232.33	345	234.83	344.89	237.33	344.88	239.82	344.83	242.32	344.85
244.82	344.9	247.32	344.99	249.82	345.04	252.32	345.2	254.81	345.22
257.31	345.25	259.81	345.11	262.31	345.1	264.81	345.18	267.3	345.24
269.8	345.35	272.3	345.45	274.8	345.51	277.3	345.66	279.79	345.74
282.29	345.7	284.79	345.67	287.29	345.74	289.79	345.93	292.29	346.03
294.78	346.01	297.28	345.93	299.78	346.03	302.28	346.04	304.78	345.77
307.27	345.45	309.77	345.19	312.27	345.02	314.77	345	317.27	344.97
319.77	345.17	322.26	345.3	324.76	345.41	327.26	345.99	329.46	347.15
332.26	348.25	334.75	349	337.25	349.49	339.75	349.87	342.25	350.07
344.75	350.06	347.25	349.71	349.74	348.9	352.24	348.08	354.74	347.31
357.24	346.89	359.74	346.9	362.23	346.93	364.73	347.17	367.23	347.31
369.73	347.3	372.23	347.67	374.73	347.83	377.22	347.78	379.72	347.45
382.22	347.06	384.72	346.73	387.22	346.43	389.71	346.21	392.21	346.21
394.71	346.47	397.21	346.51	399.71	346.26	402.21	346.21	404.7	346.07
407.2	346.62	409.7	347.24	412.2	347.93	414.7	348.65	417.19	349.33
419.69	349.78	422.19	350.19	424.69	350.33	427.19	350.36	429.69	350.09
432.18	349.85	434.68	349.76	437.18	349.83	439.68	350.08	442.18	350.26
444.67	350.56	447.17	350.84	449.67	350.99	452.17	351.03	454.67	351.29
457.17	351.6	459.66	351.66	470	351.66				

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
-10 .1 172.37 .05 329.46 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
172.37 329.46 164.5 166.3 151.5 .1 .3
Ineffective Flow num= 3
Sta L Sta R Elev Permanent
-10 0 355 F
342.25 460 353 F
460 470 355 F

CROSS SECTION

RIVER: Bushkill
REACH: Main RS: 1

INPUT

Description:

Station Elevation Data num= 136
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
-10 350.74 0 350.74 2.5 350.63 5 350.5 7.5 350.35
10 350.35 12.49 350.54 14.99 350.13 17.49 349.17 19.99 348.05
22.49 347.08 24.99 346.61 27.49 346.3 29.99 346.05 32.49 346.09
34.98 346.15 37.48 346.11 39.98 346.04 42.48 345.91 44.98 345.99

49.98	346.31	52.48	346.6	54.98	346.94	57.91	346.87	59.97	345.76
62.47	345.28	64.97	345.12	67.47	344.93	69.97	344.89	72.47	344.83
74.97	344.8	77.46	344.78	79.96	344.87	82.46	344.8	84.96	344.75
87.46	344.77	89.96	344.7	92.46	344.74	94.96	344.77	97.46	344.81
99.95	344.78	102.45	344.8	104.95	344.82	107.45	344.84	109.95	344.78
112.45	344.83	114.95	344.85	117.45	344.82	119.95	344.73	122.44	344.83
124.94	344.83	127.44	344.76	129.94	344.7	137.44	344.58	139.94	344.62
142.44	344.67	144.93	344.69	147.43	344.83	149.93	345	152.43	345.16
154.93	345.3	157.43	345.32	159.93	345.31	162.43	345.19	164.93	345
167.42	344.85	169.92	344.85	172.42	344.91	174.92	344.91	177.42	344.95
179.92	344.95	182.42	344.74	184.92	344.36	187.41	344	189.91	344.02
192.41	344.11	194.91	344.53	197.41	345.44	199.91	346.4	202.41	347.46
204.91	348.45	207.41	349.5	209.9	350.19	212.4	350.61	214.9	350.88
217.4	351.06	219.9	350.94	222.4	350.54	224.9	349.91	227.4	349.24
229.9	348.79	232.39	348.12	234.89	347.39	237.39	346.58	239.89	345.97
242.39	345.71	244.89	345.49	247.39	345.38	249.89	345.28	252.38	345.33
254.88	345.36	257.38	345.36	259.88	345.31	262.38	345.3	264.88	345.39
267.38	345.41	269.88	345.36	272.38	345.28	274.87	345.29	277.37	345.28
279.87	345.23	282.37	345.22	284.87	345.24	287.37	345.23	289.87	345.22
292.37	345.24	294.87	345.21	297.36	345.17	299.86	345.19	304.86	345.25
307.36	345.27	309.86	345.27	312.36	345.23	317.36	345.21	319.85	345.21
322.35	345.28	324.85	345.36	327.35	345.37	329.85	345.33	332.35	345.29
334.85	345.33	337.35	345.47	339.85	345.79	342.34	346.01	344.84	346.35
360	346.35								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-10	.1	57.91	.05	199.91	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	57.91	199.91		0	0	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
-10	0	355	F
217.5	350	353	F
350	360	355	F

SUMMARY OF MANNING'S N VALUES

River: Bushkill

Reach	River Sta.	n1	n2	n3
Main	21	.08	.035	.08
Main	20	.08	.035	.08
Main	19	.08	.035	.08
Main	18	.08	.035	.08
Main	17	.08	.035	.08
Main	16	.08	.035	.08
Main	15	.08	.035	.08
Main	14	.08	.035	.08
Main	13	.08	.035	.08
Main	12	.08	.035	.08
Main	11	.08	.035	.08
Main	10	.08	.035	.08
Main	9	.08	.035	.08
Main	8	.08	.035	.08
Main	7.5	Bridge		
Main	7	.08	.035	.08

Main	6	.08	.035	.08
Main	5	.08	.035	.08
Main	4	.1	.05	.1
Main	3	.1	.05	.1
Main	2	.1	.05	.1
Main	1	.1	.05	.1

SUMMARY OF REACH LENGTHS

River: Bushkill

Reach	River Sta.	Left	Channel	Right
Main	21	256	263.74	260
Main	20	251	309.2	255
Main	19	232	256.29	231
Main	18	174	176.77	174
Main	17	130	135.75	130
Main	16	110	110.75	110
Main	15	122	123.66	122
Main	14	138	131.49	129.5
Main	13	141	124.46	121
Main	12	122.5	112.37	105.5
Main	11	81.5	59.05	34
Main	10	57.5	47.11	32
Main	9	128	127.88	56
Main	8	60	60.09	60
Main	7.5	Bridge		
Main	7	46.5	46.58	46.5
Main	6	57	57.11	57
Main	5	55.3	55.37	55.3
Main	4	88	88.24	88
Main	3	134	131.6	125.5
Main	2	164.5	166.3	151.5
Main	1	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Bushkill

Reach	River Sta.	Contr.	Expan.
Main	21	.1	.3
Main	20	.1	.3
Main	19	.1	.3
Main	18	.1	.3
Main	17	.1	.3
Main	16	.1	.3
Main	15	.1	.3
Main	14	.1	.3
Main	13	.1	.3
Main	12	.1	.3
Main	11	.1	.3
Main	10	.1	.3
Main	9	.3	.5

Main	8		.3	.5
Main	7.5	Bridge		
Main	7		.3	.5
Main	6		.1	.3
Main	5		.1	.3
Main	4		.1	.3
Main	3		.1	.3
Main	2		.1	.3
Main	1		.1	.3

APPENDIX C

U.S. ROUTE 209 BRIDGE PLAN

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620 140556	PA	NP-DEWA 14(18), 121(1)	A01

INDEX TO SHEETS

SHEET NO	DESCRIPTION
A01	Title Sheet
A02	Symbols And Abbreviations
A03	Location Map
A04-A07	Survey Information
B01-B03	Typical Sections
C01	Tabulation of Quantities
C02-C05	Summaries and Schedules
D01-D04	Construction Plans
M01	Erosion & Sediment Control Narrative
M02-M07	Erosion & Sediment Control Plans
M08-M11	Staging Locations
M12-M15	Soil Disturbance & Stream Impacts Plans
M16-M17	Proposed Contours & Stream Boundaries
M18-M23	Landscape & Seeding Plans
N01-N07	Temporary Traffic Control Plans
P01-P02	Permanent Signing & Striping Plans
R01-R11	Bridge Plans
S01-S26	Standards And Details



Know what's below.
Call before you dig.

PLANS PREPARED BY



U.S. Department of Transportation
Federal Highway
Administration

EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
JANUARY, 2020

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

DELAWARE WATER GAP NATIONAL
RECREATION AREA

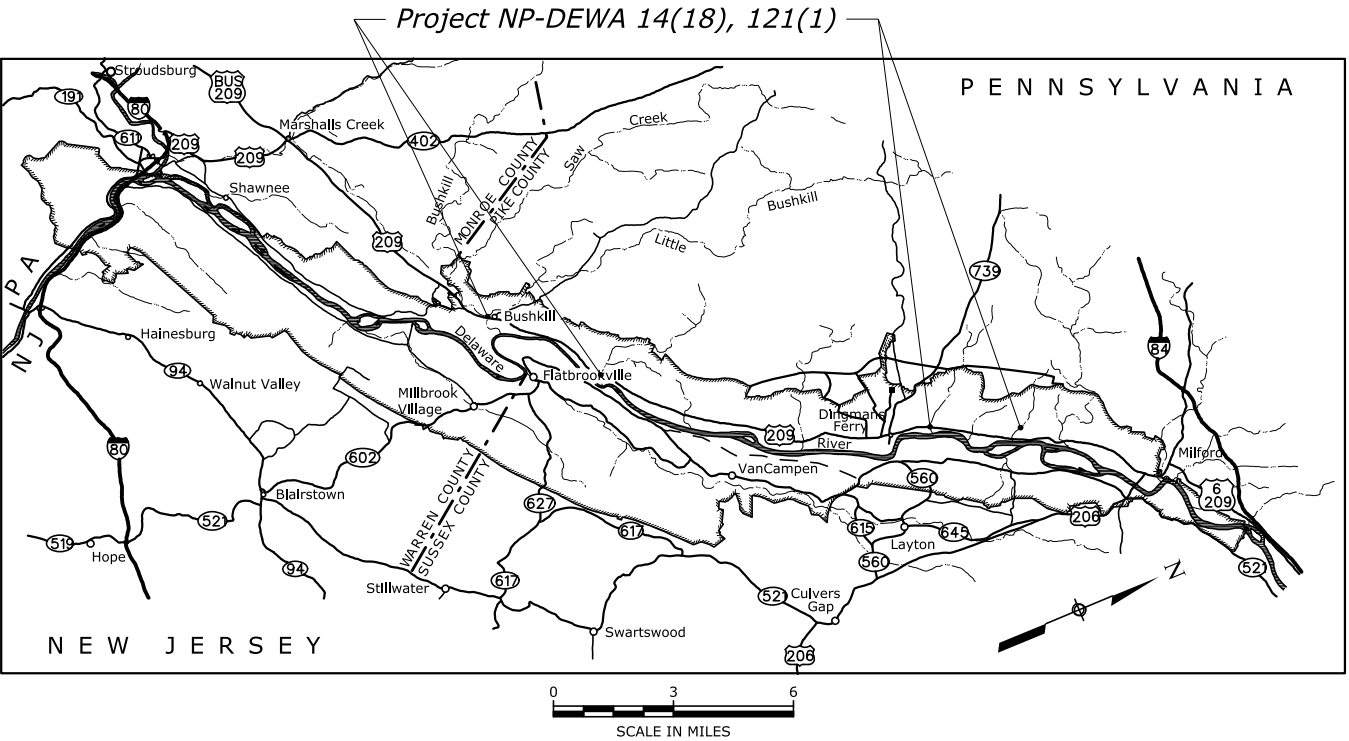
PLANS FOR PROPOSED

PROJECT NP-DEWA 14(18), 121(1)

PMIS # 222412, 222537, 222539, 222540

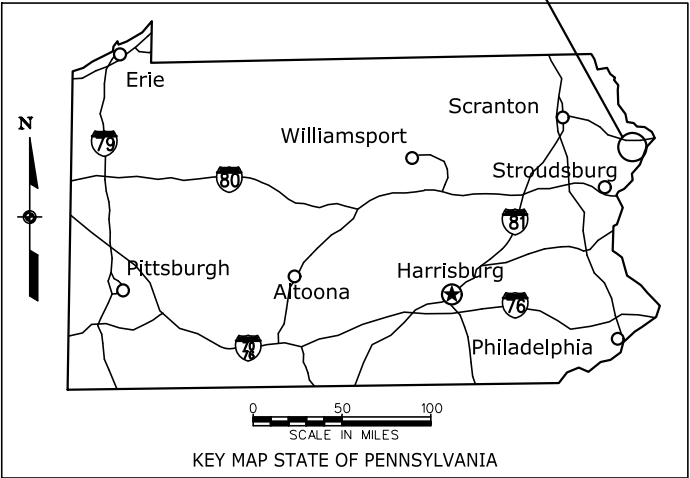
REHABILITATION AND PREVENTATIVE MAINTENANCE OF BRIDGES

DELAWARE, LEHMAN, AND MIDDLE SMITHFIELD TOWNSHIPS, PENNSYLVANIA
PIKE COUNTY, PENNSYLVANIA



Schedule	Description	Structure No.	Width	Length	BIP Report Date	RIP Milepost/Cycle #
A	Adams Creek Bridge	NO. 4320-013P	26.3'	28'	11/14/17	Rte. 0014, MP 14.6 / Cycle 5
A	Bushkill Creek Bridge	NO. 4320-009P	45'	189.7'	11/15/17	Rte. 0014, MP 1.4 / Cycle 5
A	Toms Creek Bridge	NO. 4320-049P	48.8'	62.5'	11/15/17	Rte. 0014, MP 4.9 / Cycle 5
A	Conashaugh Creek Culvert	NO. 4320-022P	11.8'	26'	11/11/13	Rte. 0121, MP 0.4 / Cycle 5

NP-DEWA 14(18), 121(1)



DESCRIPTION OF PROJECT

IMPROVEMENT: Structure rehabilitation, preventative bridge maintenance, scour protection of structures, roadway pavement maintenance, and guardrail installation at 4 bridges sites.

PROJECT LENGTH: 0.06 Miles

LANE MILES: 0.12 Miles

BRIDGE:	TYPE
Adams Creek Bridge	Concrete Tee Beam
Bushkill Creek Bridge	Steel Girder
Toms Creek Bridge	Prestressed Concrete Girder
Conashaugh Creek Culvert	Concrete Arch Culvert

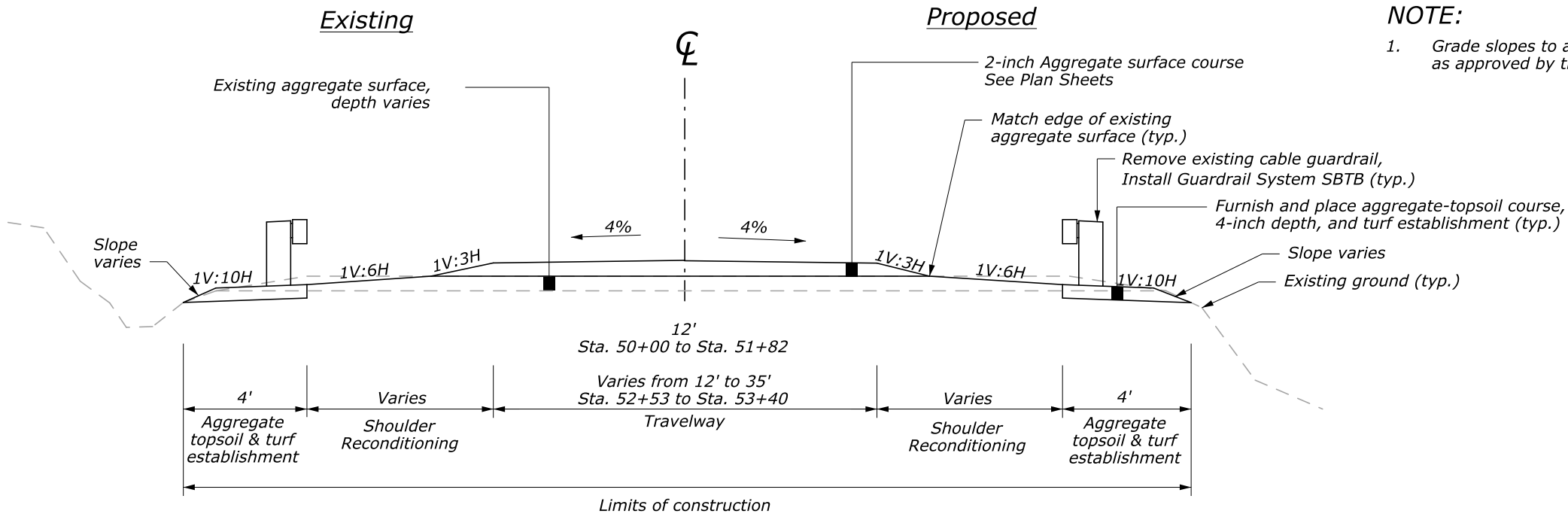
DESIGN DESIGNATION:	U.S. ROUTE 209	ZIMMERMANN ROAD
ADT (2020)	6500	50
ADT (2040)	6800	70
DHV	N/A	11
D	50/50	50/50
%Truck	N/A	N/A
V (MPH)	40	25
C/A	None	None
e(max)	Match Existing	N/A

SPECIFICATIONS:

"Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects", FP-14.

Project Manager	Highway Design Manager	Lead Designer
Ramesh Kotadia	Shoukat Nawaz	Francisco Santaliz

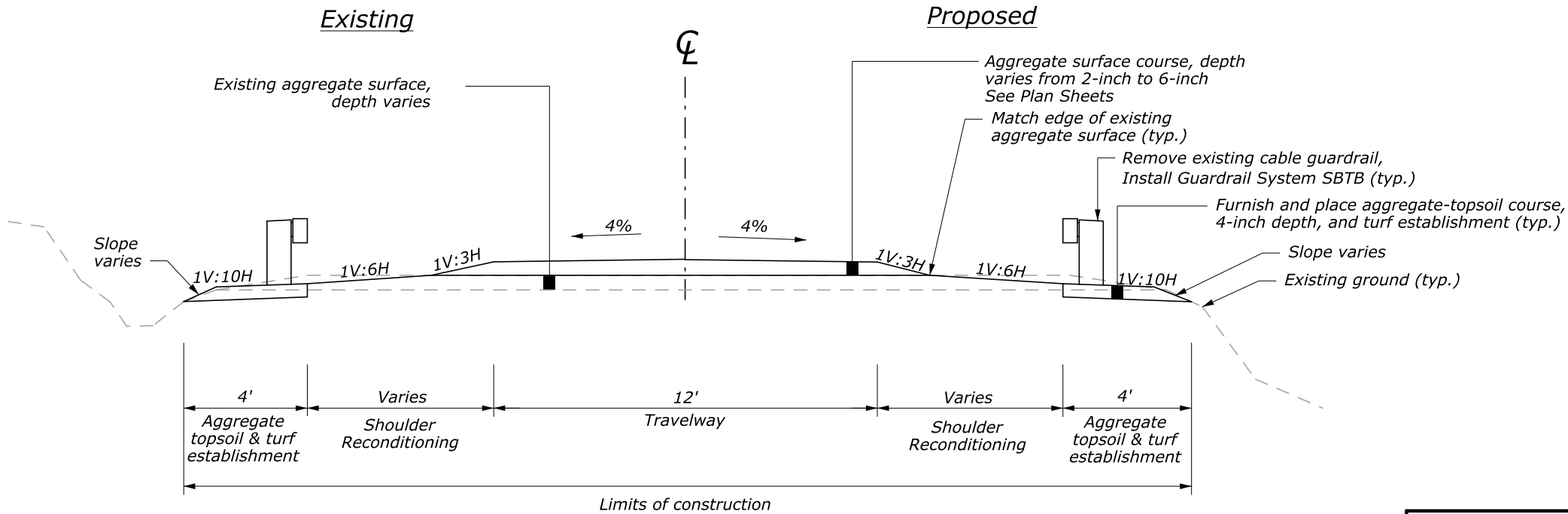
PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620, 140556	PA	NP-DEWA 14(18), 121(1)	B01



NOTE:

1. Grade slopes to achieve positive drainage as approved by the CO.

**Conashaugh Creek Culvert
Zimmeramn Road
Sta. 50+00 to Sta. 51+82, Sta. 52+53 to Sta. 53+40**



**Conashaugh Creek Culvert (Culvert Approaches)
Zimmermann Road
Sta. 51+82 to Sta. 52+07, Sta. 52+23 to Sta. 52+53**

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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

**DELAWARE WATER GAP
NATIONAL RECREATION AREA**

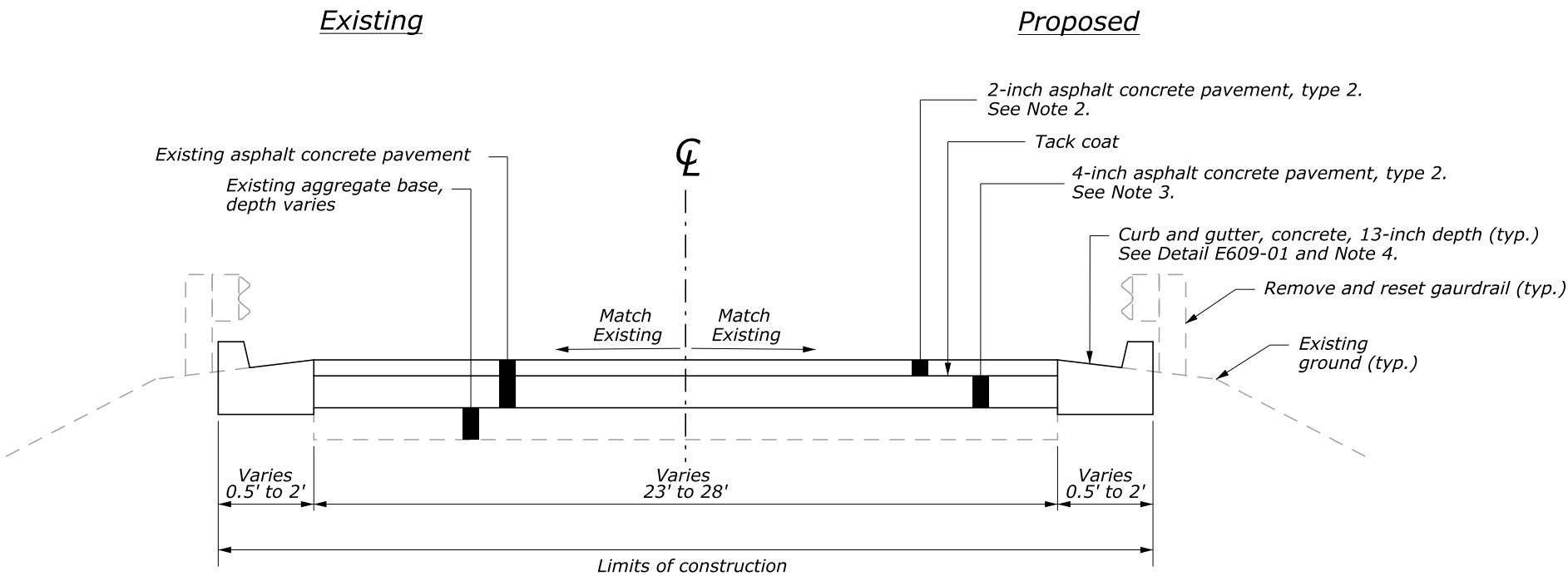
TYPICAL SECTIONS

NO SCALE

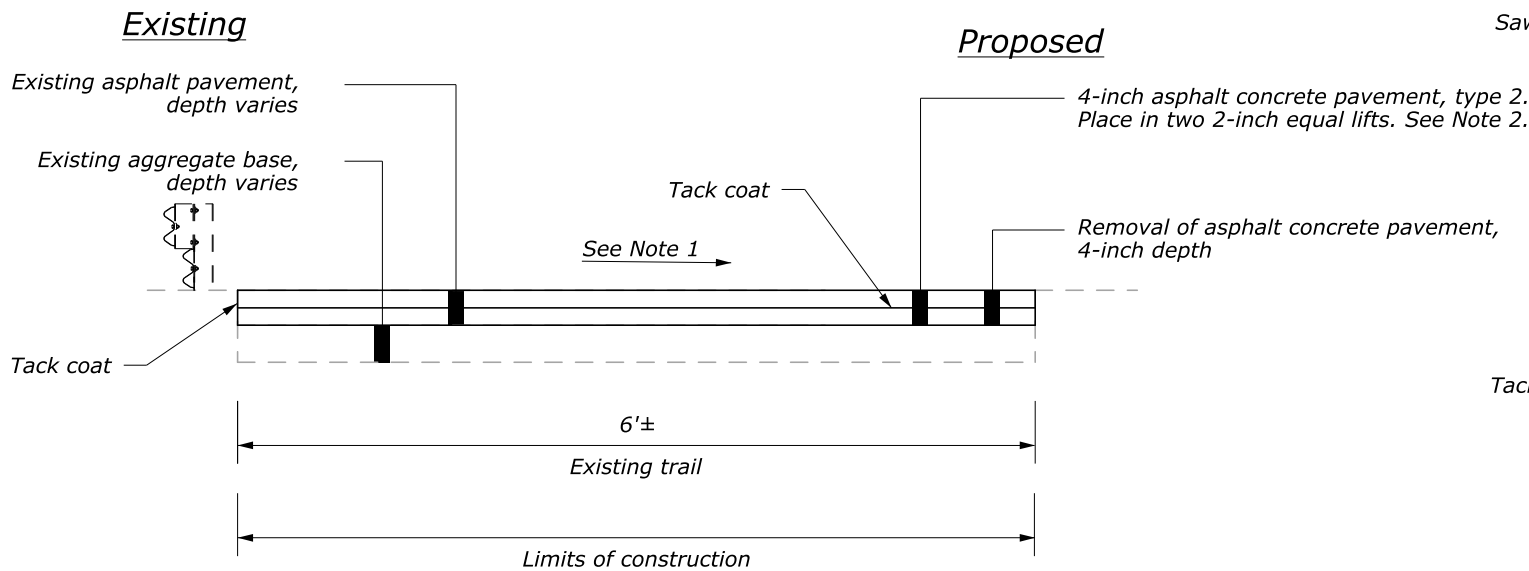
PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620, 140556	PA	NP-DEWA 14(18), 121(1)	B03

NOTES:

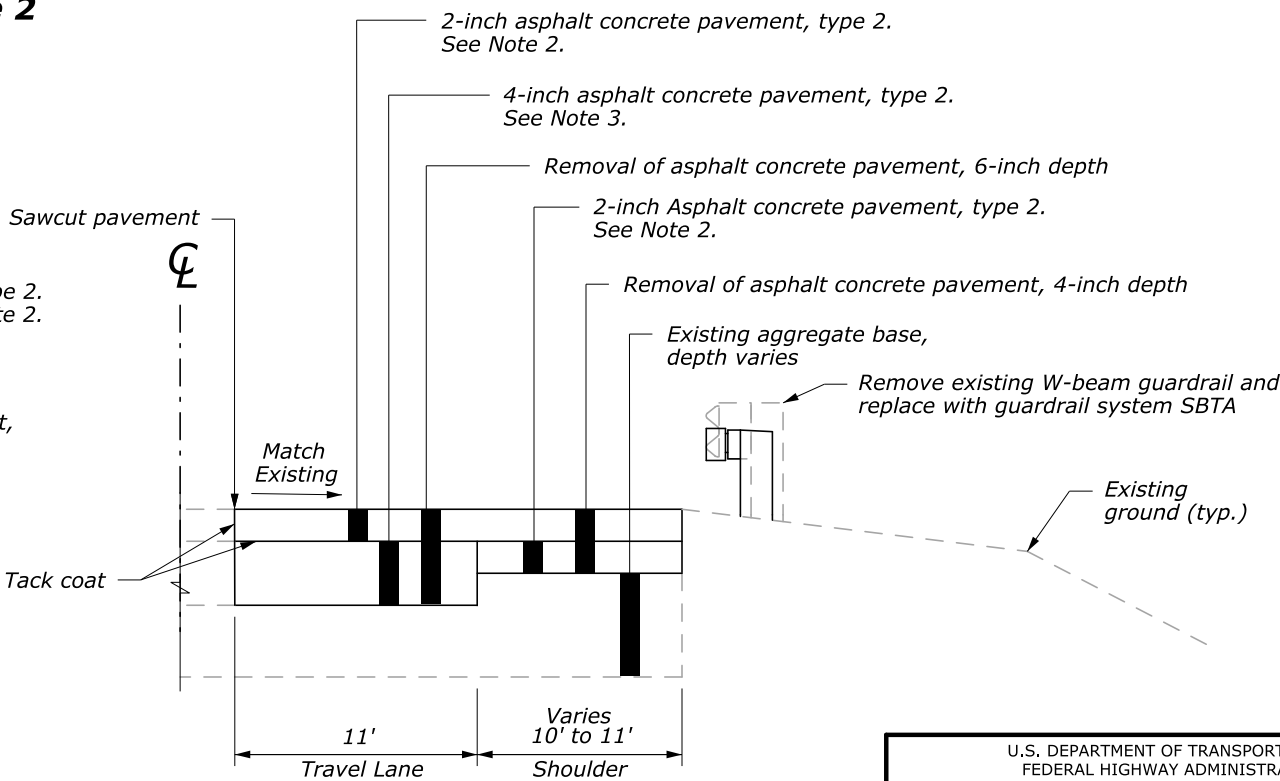
1. Grade slopes to achieve positive drainage as approved by the CO.
2. Use ½-inch nominal maximum size aggregate, 0.3 to <3 million ESAL, PG 64-22
3. Use ¾-inch nominal maximum size aggregate, 0.3 to <3 million ESAL, PG 64-22
4. Place curb below the face of the guardrail.



**Adams Creek Bridge Approach
U.S. Route 209
Asphalt Concrete Pavement Patch, Type 2**



**Toms Creek Trail
U.S. Route 209
Asphalt Concrete Pavement Patch, Type 3**



**Bushkill Creek Bridge Northern Approach
U.S. Route 209
Asphalt Concrete Pavement Patch, Type 2**

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DELAWARE WATER GAP
NATIONAL RECREATION AREA

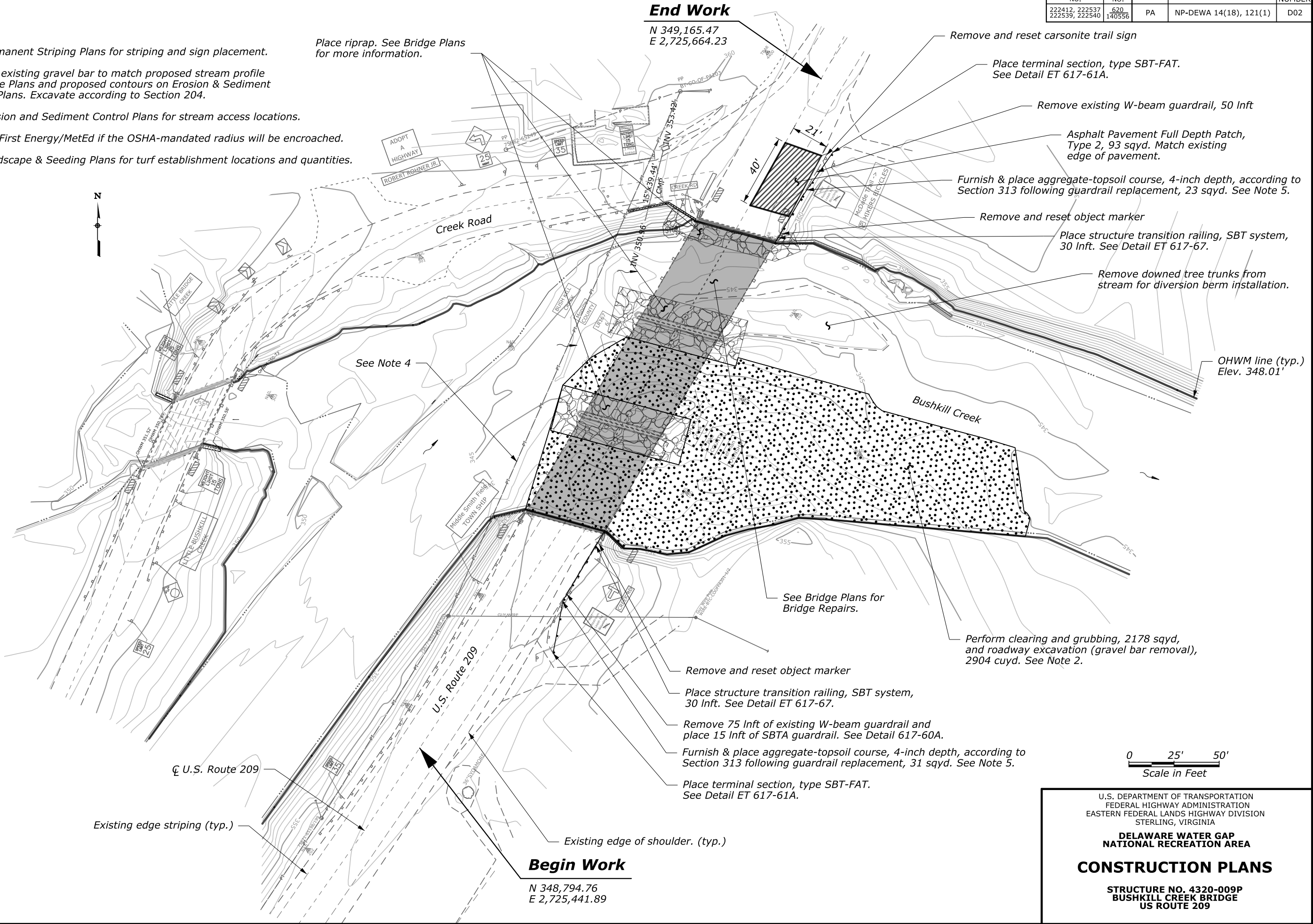
TYPICAL SECTIONS

NO SCALE

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620, 140556	PA	NP-DEWA 14(18), 121(1)	D02

NOTES:

1. See Permanent Striping Plans for striping and sign placement.
2. Remove existing gravel bar to match proposed stream profile on Bridge Plans and proposed contours on Erosion & Sediment Control Plans. Excavate according to Section 204.
3. See Erosion and Sediment Control Plans for stream access locations.
4. Contact First Energy/MetEd if the OSHA-mandated radius will be encroached.
5. See Landscape & Seeding Plans for turf establishment locations and quantities.



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DELAWARE WATER GAP
NATIONAL RECREATION AREA

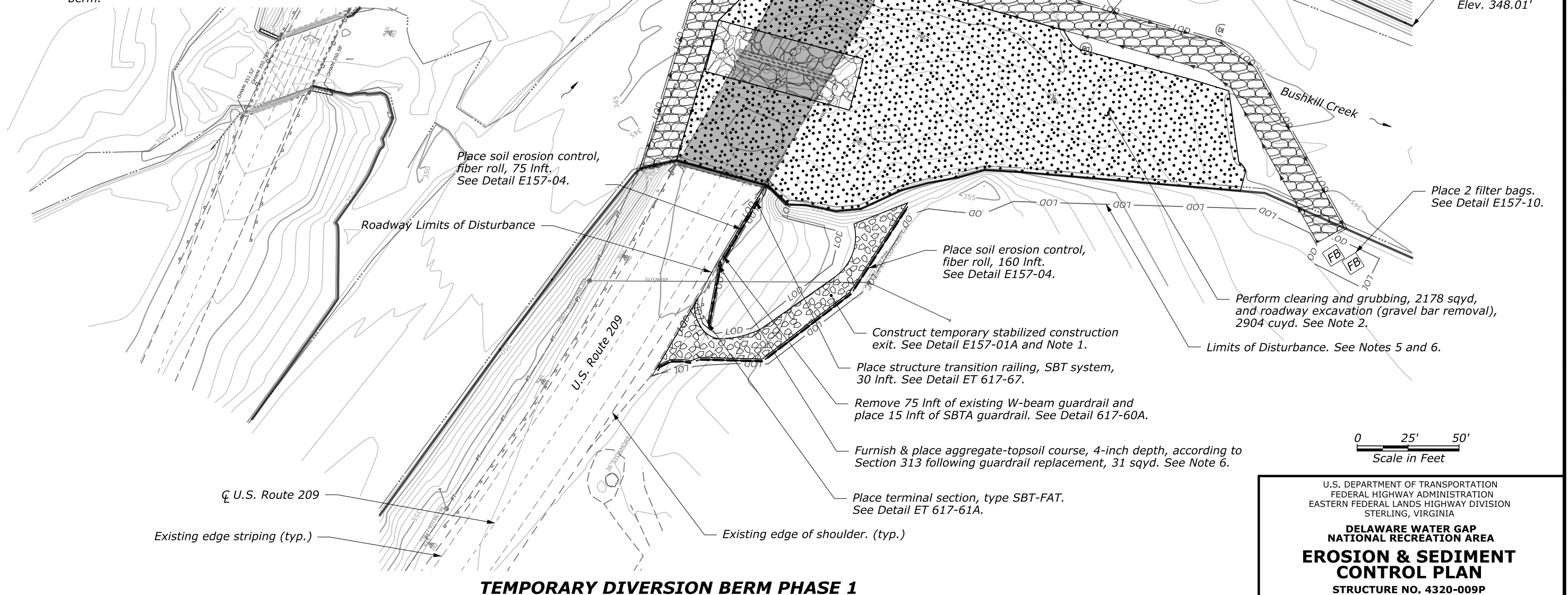
CONSTRUCTION PLANS

STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537 222539, 222540	620 140556	PA	NP-DEWA 14(18), 121(1)	M04

NOTES:

1. *Do not encroach water way when placing temporary stabilized construction exit.*
2. *Place diversion one phase at a time. Remove diversion and restore disturbed land before moving to next phase.*
3. *See Construction Plans for proposed roadway repairs.*
4. *See Bridge Plans for proposed bridge repairs.*
5. *Perform selective clearing and grubbing on stream bank and construction exit, 705 sqyd.*
6. *See Landscape & Seeding Plans for turf establishment locations and quantities.*
7. *Construct temporary diversion berm in accordance with the following requirements:*
 - a. *Do not excavate river rock below water level.*
 - b. *Reuse excavated material for access to construct temporary diversion berm.*
 - c. *Use excavated material to the maximum extent possible. If imported material is necessary, provide according to Subsection 157.10(a).*
 - d. *Remove all materials used to construct temporary diversion berm.*



13-Jan-2020 01:16 PM M:\PROJECTS\dwad\1418_1211\InProj_Dev\CADD\M02-M23-DEWA\1418_1211_eas.sdg

NOTES:

- 1. See Erosion and Sediment Control Plans for proposed sediment control measures.
- 2. See Construction Plans for proposed roadway repairs.
- 3. See Bridge Plans for proposed bridge repairs.

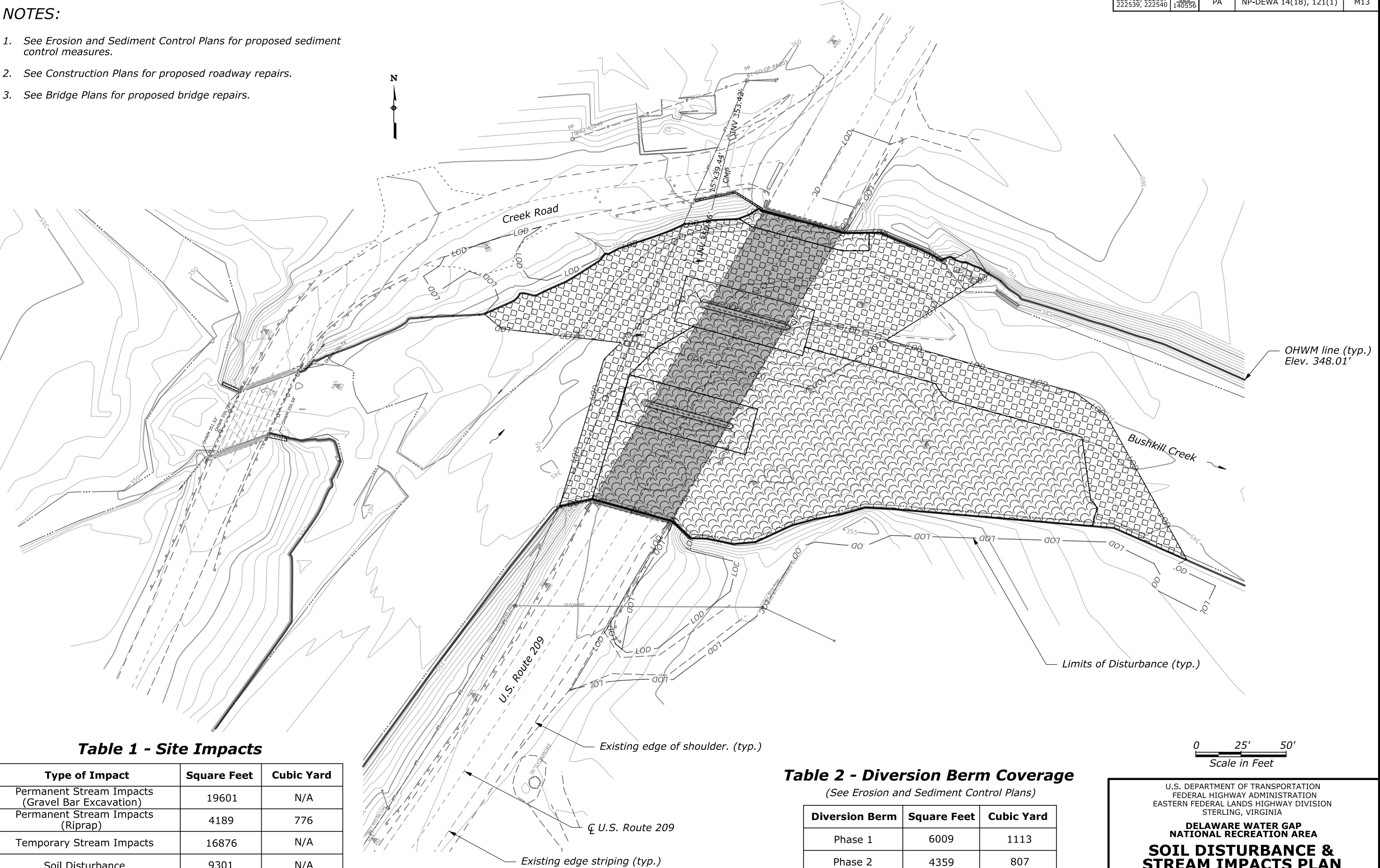


Table 1 - Site Impacts

Type of Impact	Square Feet	Cubic Yard
Permanent Stream Impacts (Gravel Bar Excavation)	19601	N/A
Permanent Stream Impacts (Riprap)	4189	776
Temporary Stream Impacts	16876	N/A
Soil Disturbance	9301	N/A

Table 2 - Diversion Berm Coverage

(See Erosion and Sediment Control Plans)

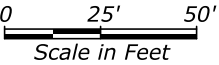
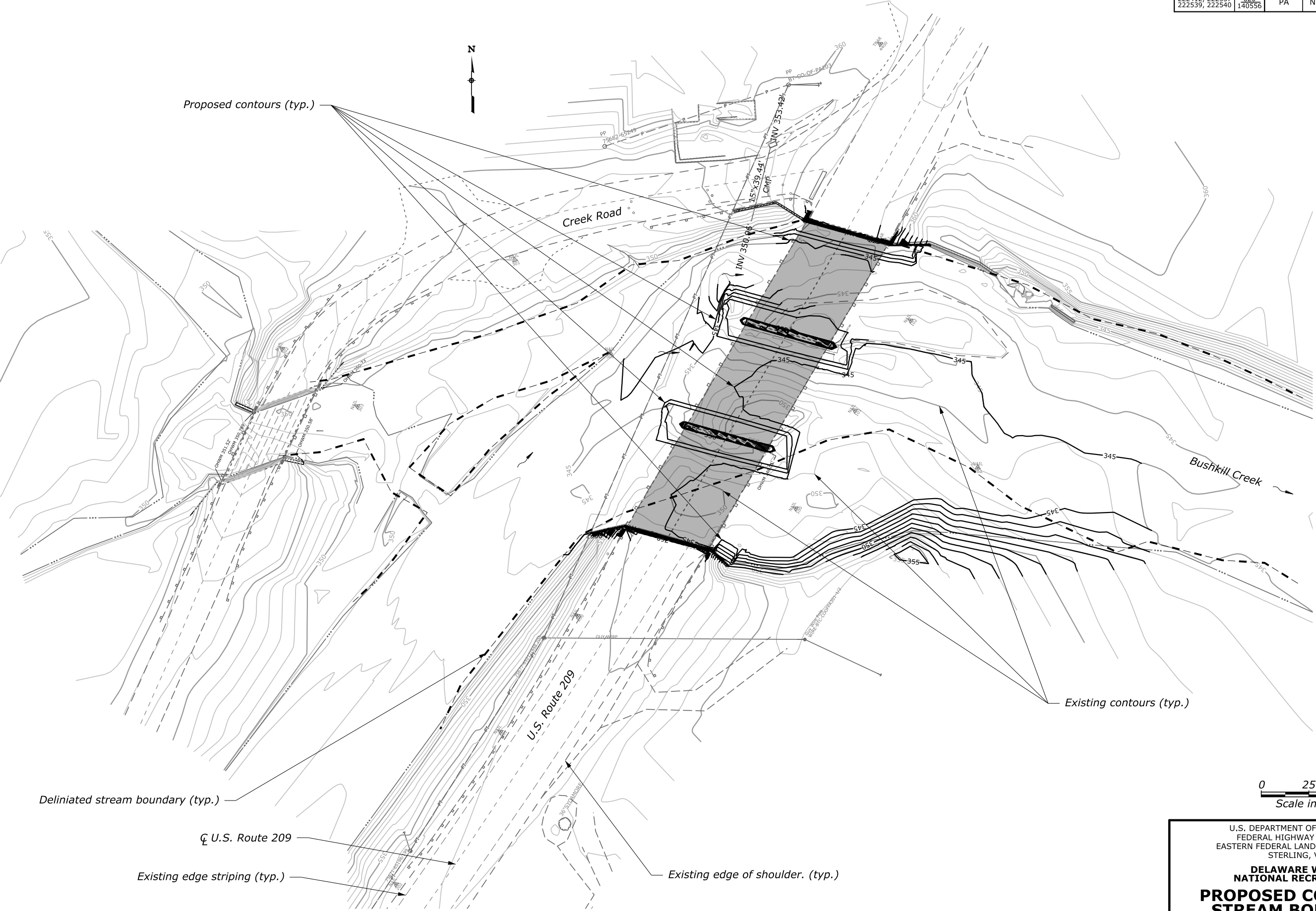
Diversion Berm	Square Feet	Cubic Yard
Phase 1	6009	1113
Phase 2	4359	807

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

DELAWARE WATER GAP
NATIONAL RECREATION AREA
SOIL DISTURBANCE &
STREAM IMPACTS PLAN

STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620, 140556	PA	NP-DEWA 14(18), 121(1)	M17



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STERLING, VIRGINIA

**DELAWARE WATER GAP
NATIONAL RECREATION AREA**

**PROPOSED CONTOURS &
STREAM BOUNDARIES**

**STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209**

Table 1 - Trees
Container, native, seed-grown trees

Scientific Name	Common Name	Size	Spacing (Between Trees)	Number (See Note 6)
<i>Acer Saccharum</i>	Sugar Maple	6' - 8' Height	35' - 50'	0
<i>Cornus Florida</i>	Flowering Dogwood	6' - 8' Height	20'	2
<i>Betula Alleghaniensis</i>	Yellow Birch	6' - 8' Height	20' - 30'	1
<i>Prunus Pensylvanica</i>	Fire Cherry	6' - 8' Height	10' - 12'	50
<i>Platanus Occidentalis</i>	American Sycamore	6' - 8' Height	40'	0

Table 2 - Shrubs
Container, native, seed-grown shrubs

Scientific Name	Common Name	Size	Spacing (Between Shrubs)	Number (See Note 6)
<i>Salix Discolor</i>	Pussy Willow	18" - 24" Height	5' - 10'	15
<i>Ilex Verticillata</i>	Winterberry	18" - 24" Height	3' - 5'	16
<i>Callicarpa Americana</i>	Beauty Bush	18" - 24" Height	3' - 6'	16
<i>Rhododendron Periclymenoides</i>	Pinxterbloom Azalea	18" - 24" Height	3' - 6'	16
<i>Myrica Pensylvanica</i>	Northern Bayberry	18" - 24" Height	3' - 4'	15

NOTES:

- See Erosion and Sediment Control Plans for proposed sediment control measures.
- See Construction Plans for proposed roadway repairs.
- See Bridge Plans for proposed bridge repairs.
- Apply 737 square yards of turf establishment in disturbed areas within the limits of disturbance on stream bank and construction exit according to Section 625. Place plantings in disturbed areas on construction exit.
- Exact tree and shrub planting locations will be determined by the CO.
- Adjust the number of planting species based on species availability and as directed by the CO.
- Plant trees and shrubs according to Detail E626-A.
- Place rolled erosion control product, Type 2.B, 737 square yards in disturbed areas within the limits of disturbance and according to Detail E629-01.

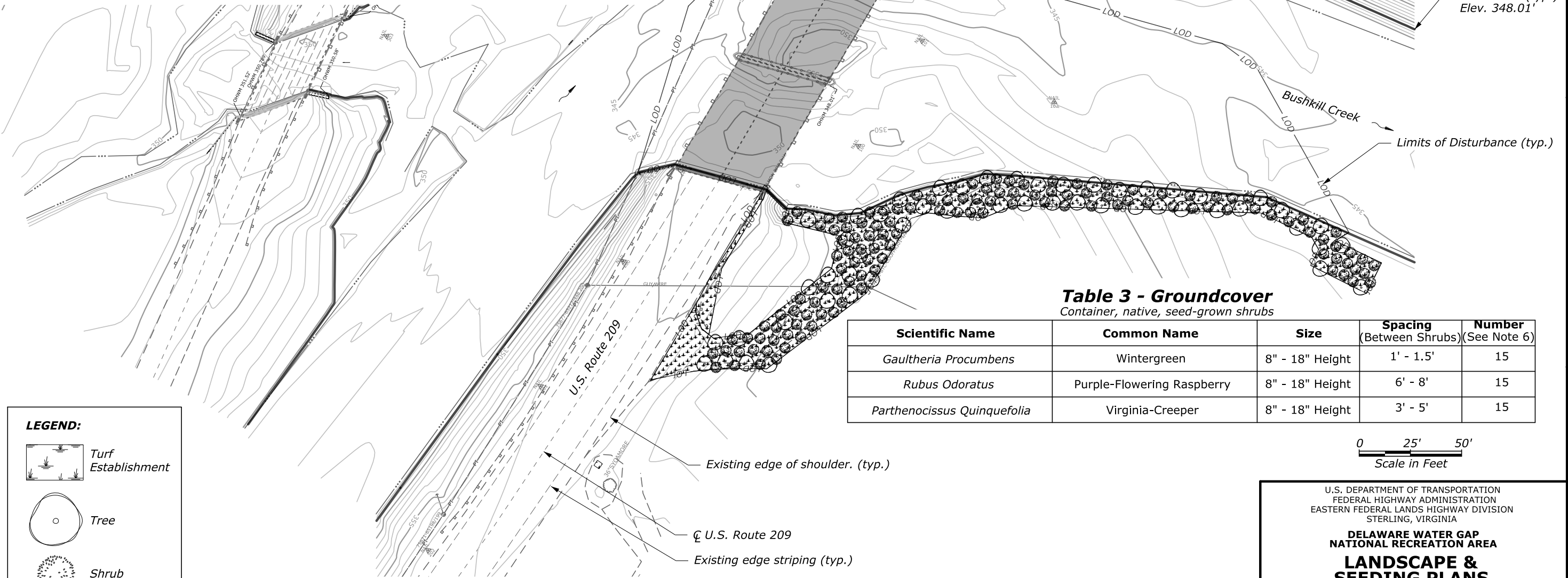


Table 3 - Groundcover
Container, native, seed-grown shrubs

Scientific Name	Common Name	Size	Spacing (Between Shrubs)	Number (See Note 6)
<i>Gaultheria Procumbens</i>	Wintergreen	8" - 18" Height	1' - 1.5'	15
<i>Rubus Odoratus</i>	Purple-Flowering Raspberry	8" - 18" Height	6' - 8'	15
<i>Parthenocissus Quinquefolia</i>	Virginia-Creeper	8" - 18" Height	3' - 5'	15

0 25' 50'
Scale in Feet

U.S. DEPARTMENT OF TRANSPORTATION
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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

DELAWARE WATER GAP
NATIONAL RECREATION AREA

LANDSCAPE & SEEDING PLANS
STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209

Table 1 - Trees
Container, native, seed-grown trees

Scientific Name	Common Name	Size	Spacing (Between Trees)	Number (See Note 6)
<i>Acer Saccharum</i>	Sugar Maple	6' - 8' Height	35' - 50'	0
<i>Cornus Florida</i>	Flowering Dogwood	6' - 8' Height	20'	1
<i>Betula Alleghaniensis</i>	Yellow Birch	6' - 8' Height	20' - 30'	1
<i>Prunus Pensylvanica</i>	Fire Cherry	6' - 8' Height	10' - 12'	0
<i>Platanus Occidentalis</i>	American Sycamore	6' - 8' Height	40'	1

NOTES:

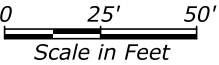
- See Erosion and Sediment Control Plans for proposed sediment control measures.
- See Construction Plans for proposed roadway repairs.
- See Bridge Plans for proposed bridge repairs.
- Apply 186 square yards of turf establishment in disturbed areas within the limits of disturbance on stream bank and construction exit according to Section 625. Place plantings in disturbed areas on construction exit.
- Exact tree and shrub planting locations will be determined by the CO.
- Adjust the number of planting species based on species availability and as directed by the CO.
- Plant trees and shrubs according to Detail E626-A.
- Place rolled erosion control product, Type 2.B, 186 square yards in disturbed areas within the limits of disturbance and according to Detail E629-01.

Table 2 - Shrubs
Container, native, seed-grown shrubs

Scientific Name	Common Name	Size	Spacing (Between Shrubs)	Number (See Note 6)
<i>Salix Discolor</i>	Pussy Willow	18" - 24" Height	5' - 10'	2
<i>Ilex Verticillata</i>	Winterberry	18" - 24" Height	3' - 5'	2
<i>Callicarpa Americana</i>	Beauty Bush	18" - 24" Height	3' - 6'	2
<i>Rhododendron Periclymenoides</i>	Pinxterbloom Azalea	18" - 24" Height	3' - 6'	2
<i>Myrica Pensylvanica</i>	Northern Bayberry	18" - 24" Height	3' - 4'	2

Table 3 - Groundcover
Container, native, seed-grown shrubs

Scientific Name	Common Name	Size	Spacing (Between Shrubs)	Number (See Note 6)
<i>Gaultheria Procumbens</i>	Wintergreen	8" - 18" Height	1' - 1.5'	2
<i>Rubus Odoratus</i>	Purple-Flowering Raspberry	8" - 18" Height	6' - 8'	3
<i>Parthenocissus Quinquefolia</i>	Virginia-Creeper	8" - 18" Height	3' - 5'	3



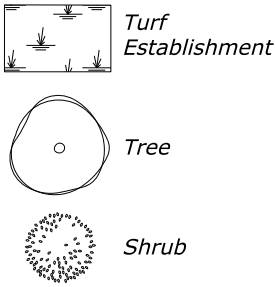
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

**DELAWARE WATER GAP
NATIONAL RECREATION AREA**

**LANDSCAPE &
SEEDING PLANS**

**STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209**

LEGEND:



LANDSCAPING PHASE 2

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620, 140556	PA	NP-DEWA 14(18), 121(1)	P02

NOTE:

1. The length of the pedestrian separation markings is 400 feet from diagonal to diagonal.

Place double yellow solid pavement markings (typ.), 39 Inft. See Detail E634-03A. Match southern end to existing markings and stop northern end where existing markings stop.

See Construction Plans for roadway repairs and Bridge Plans for bridge repairs.

Remove and reset carsonite trail sign

Remove and reset object marker

Install Delineators, type flexible Federal Standard 20059 (Brown) color with retroreflective sheet every 25'. (typ.)

Place "MCDADE TRAIL" word marking every 50', 96 sqft. (typ.) See Detail E634-A

Place white solid pavement markings, type D, 1410 Inft. (typ.) See Detail E634-03A

Trail, 7' - 9'
Pedestrian Separation
Travelway

Pedestrian Separation and Trail Detail
(See Note 1)

Install Bicycle sign (W11-1) with Share the Road plaque (W16-1P).



(30" X 30")



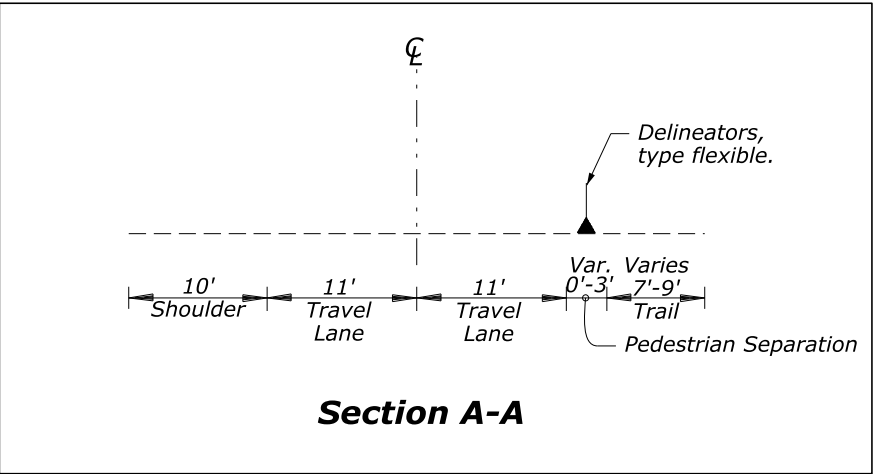
(18" X 24")

Existing edge of shoulder. (typ.)

U.S. Route 209

Existing edge striping (typ.)

Remove and reset object marker



0 25' 50'
Scale in Feet

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

**DELAWARE WATER GAP
NATIONAL RECREATION AREA**
**PERMANENT SIGNING
& STRIPING PLAN**
STRUCTURE NO. 4320-009P
BUSHKILL CREEK BRIDGE
US ROUTE 209

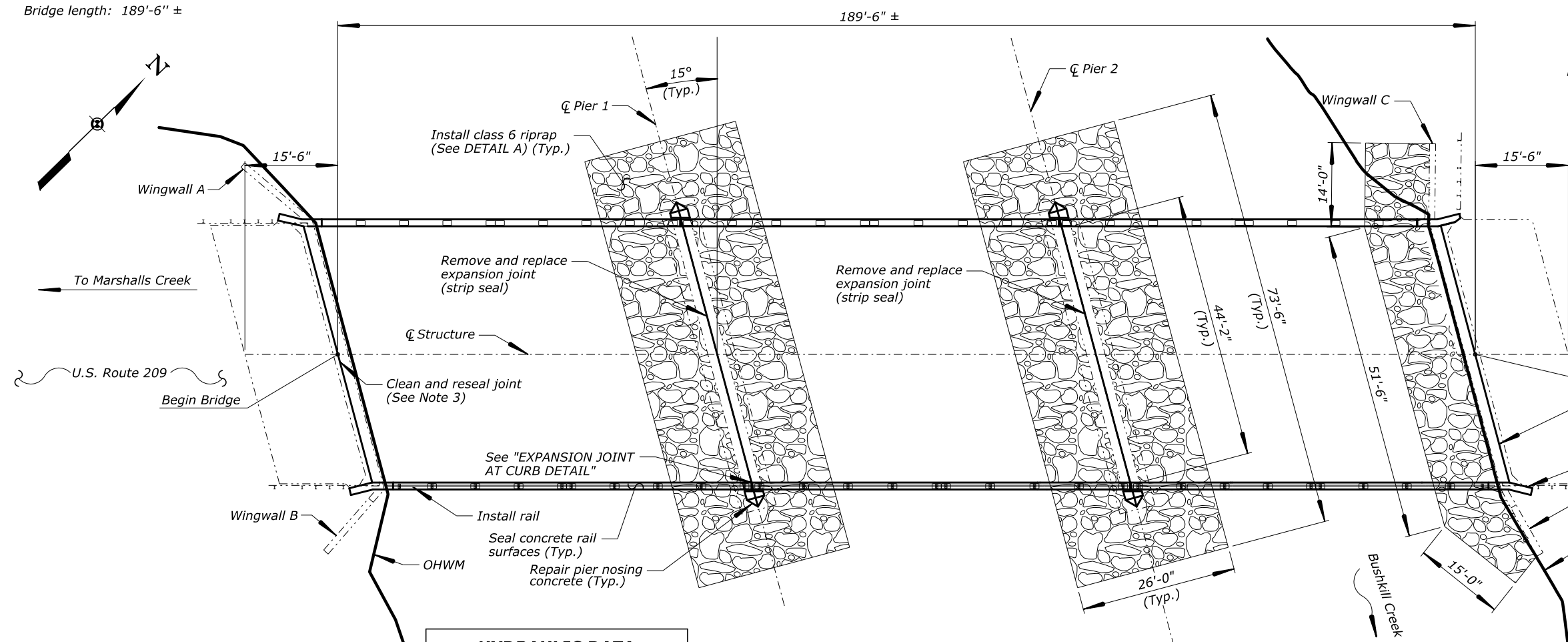
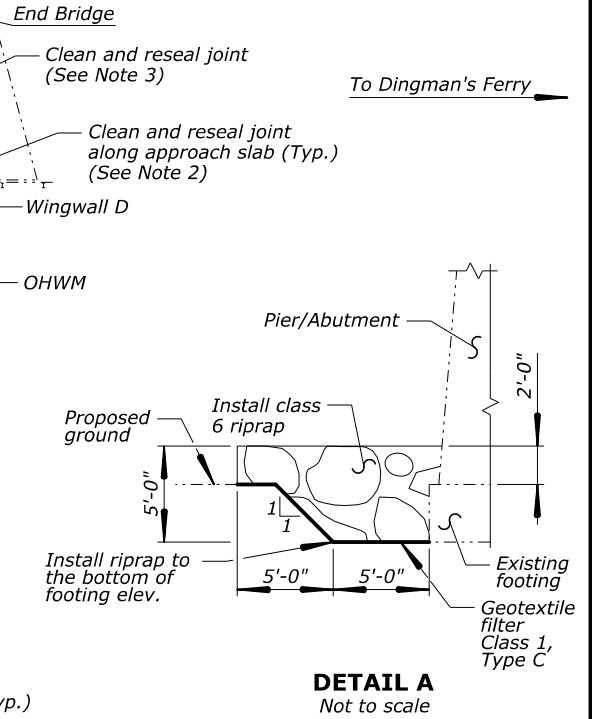
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10-Mar-2020 07:25 AM

PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620 140556	PA	NP-DEWA 14(18) 121(1)	R03

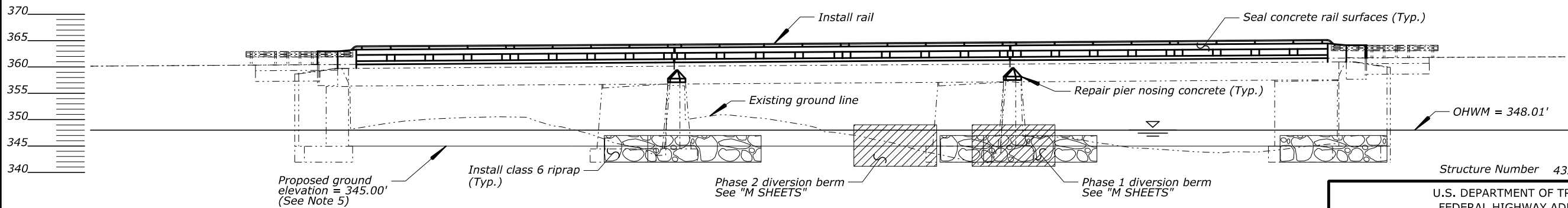
- Notes:
- See "CONCRETE REPAIR (4320-009P)" for approximate concrete repair areas.
 - See "MISCELLANEOUS DETAILS (4320-009P)" and "RAIL DETAILS (4320-009P)" sheets for additional information.
 - See "MISCELLANEOUS DETAILS (4320-049P)" sheet for "JOINT DETAIL".
 - See "M SHEETS" for additional information on proposed ground elevation. Ground elevation must be at or above top elevation of pier footings.



ESTIMATED REPAIR QUANTITIES		
DESCRIPTION OF WORK	UNITS	APPROX. QUANTITY
Class 6 Riprap	TON	1250

HYDRAULIC DATA		
STORM EVENT	FLOW (CFS)	WSEL (FT)
Q ₁₀	8070	352.59
Q ₅₀	13500	354.98
Q ₁₀₀	16300	356.04

PLAN



PIER 1

PIER 2

ELEVATION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DELAWARE WATER GAP
NATIONAL RECREATION AREA

BRIDGE OVER BUSHKILL CREEK

PLAN AND ELEVATION
(4320-009P)

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE PLAN SHEET	DATE	BRP NO.
								ANM	ANM	DW	3/32" = 1'-0"	George Choubah	3 of 10	September 2019	BRP-1253

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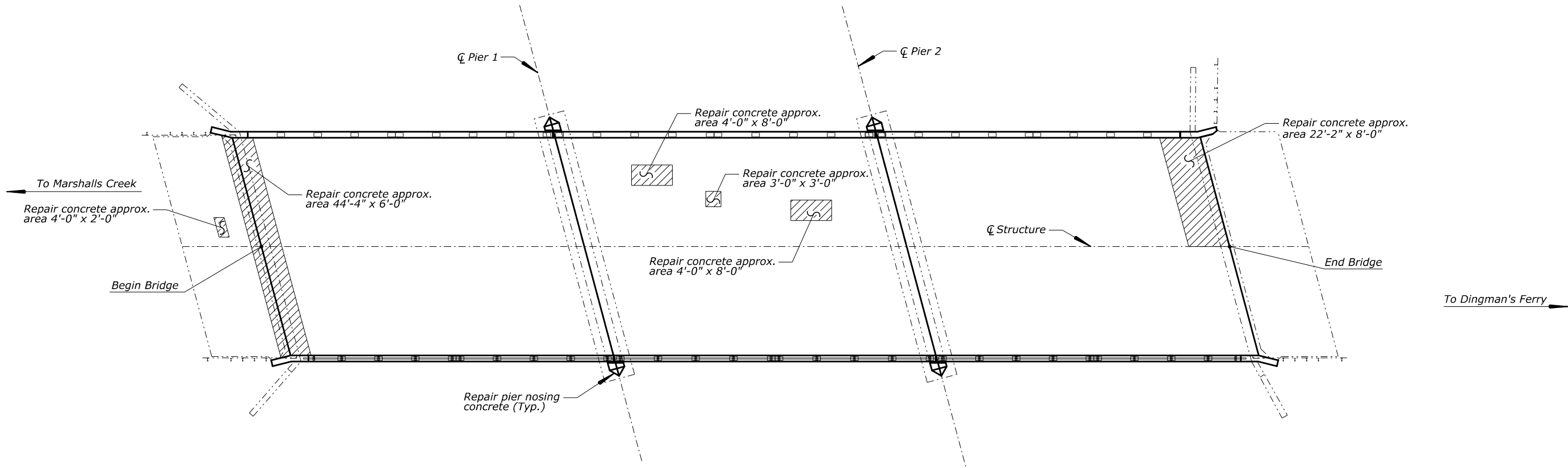
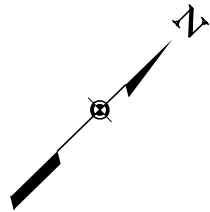
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PMIS NO.	NPS NO.	STATE	PROJECT	SHEET NUMBER
222412, 222537, 222539, 222540	620 140556	PA	NP-DEWA 14(18) 121(1)	R04

- Notes:
1. Remove and repair unsound and deteriorated concrete on topside of deck and on pier nosing as directed by the CO.
 2. See "MISCELLANEOUS DETAILS (4320-009P)" sheet for additional information on pier nosing.
 3. See "CONCRETE REPAIR DETAILS" for additional information.

Bridge length: 189'-6" ±



PLAN

ESTIMATED REPAIR QUANTITIES		
DESCRIPTION OF WORK	UNITS	APPROX. QUANTITY
Repair Concrete	Sq.Yd.	80

Structure Number 4320-009P

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DELAWARE WATER GAP
NATIONAL RECREATION AREA

BRIDGE OVER BUSHKILL CREEK

CONCRETE REPAIR
(4320-009P)

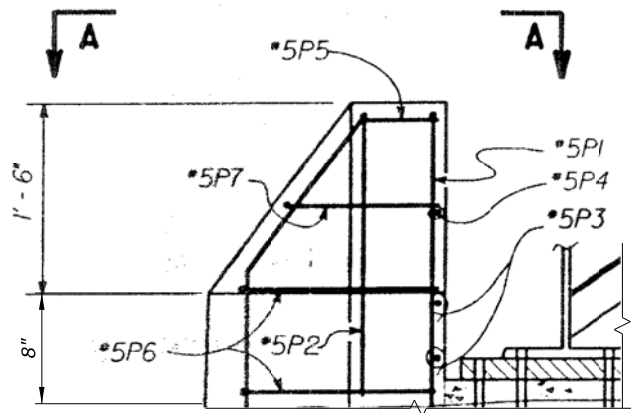
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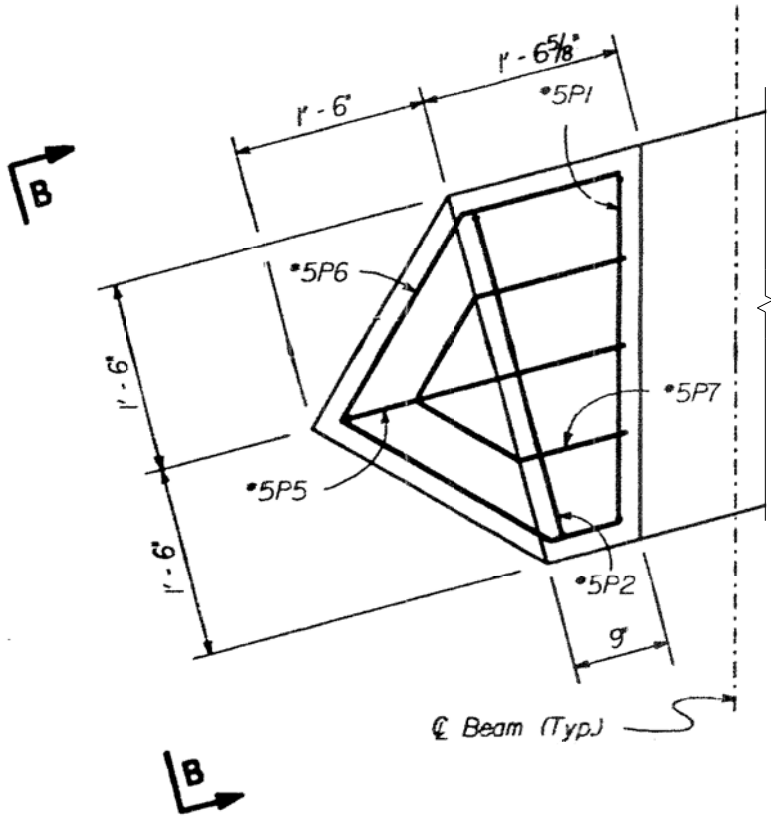
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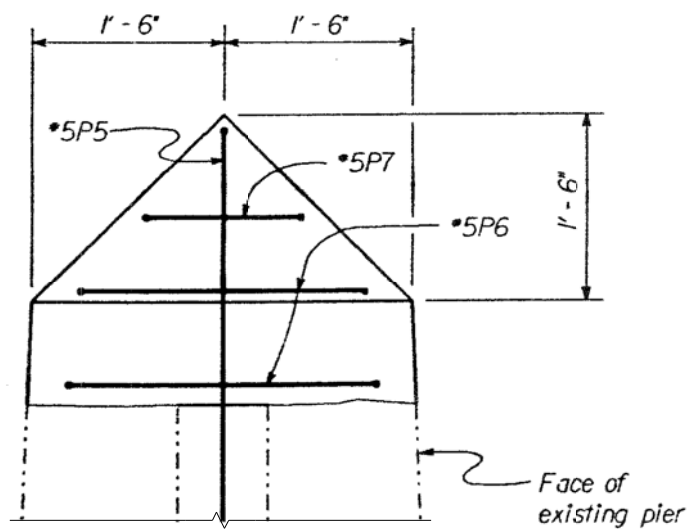
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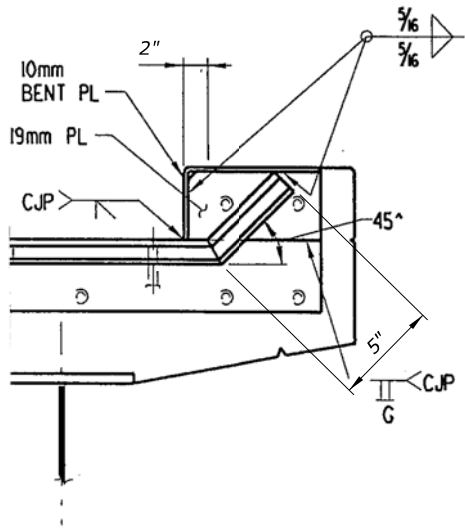
TOP OF PIER NOSING DETAIL



VIEW A-A

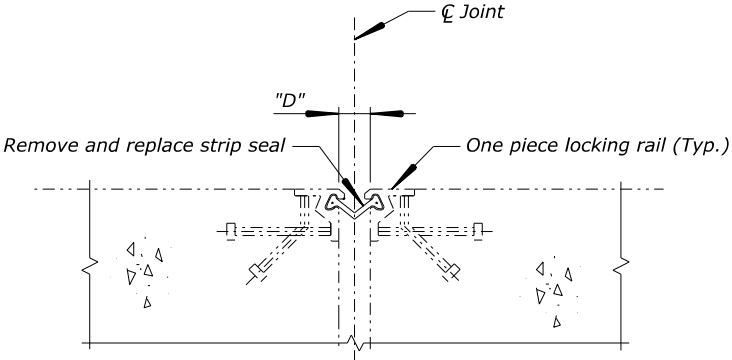


VIEW B-B

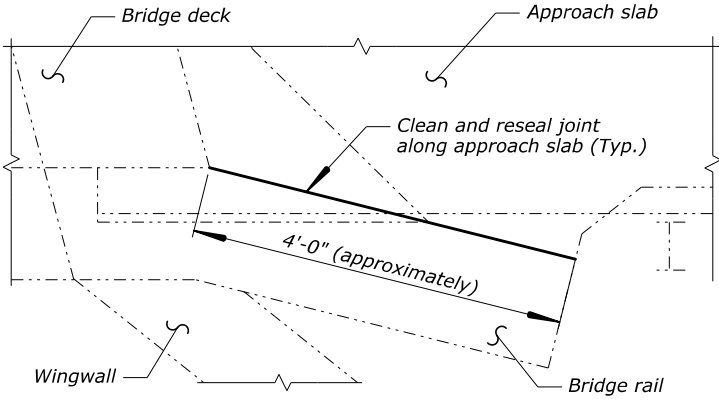


EXPANSION JOINT AT CURB DETAIL

- Notes:
1. Determine and provide strip seal dimension base upon joint opening size and expected movement. Submit shop drawings and supporting documents to the CO for approval before ordering seal.
 2. See "MISCELLANEOUS DETAILS (4320-049P)" sheet for additional joint details.



EXPANSION JOINT DETAIL (STRIP SEAL)



JOINT DETAIL (APPROACH SLAB)
(Northeast approach shown, other approaches similar)

Structure Number 4320-009P

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DELAWARE WATER GAP
NATIONAL RECREATION AREA

BRIDGE OVER BUSHKILL CREEK

MISCELLANEOUS DETAILS
(4320-009P)

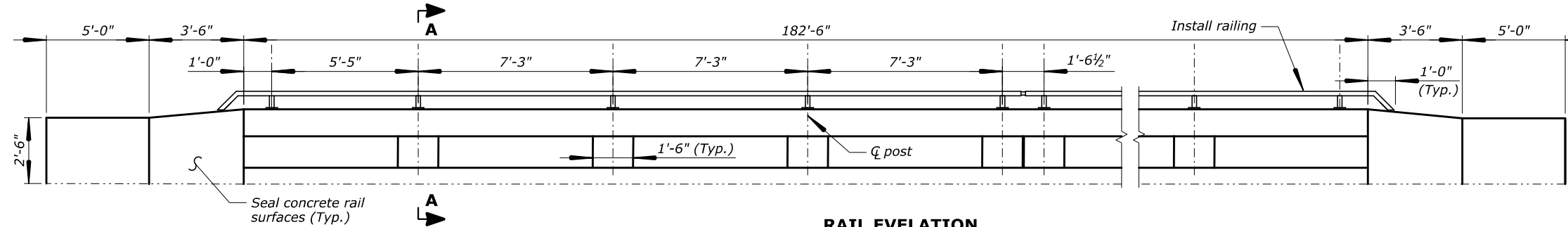
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								ANM	ANM	DW	No scale	George Choubah	5 of 10	September 2019	BRP-1253

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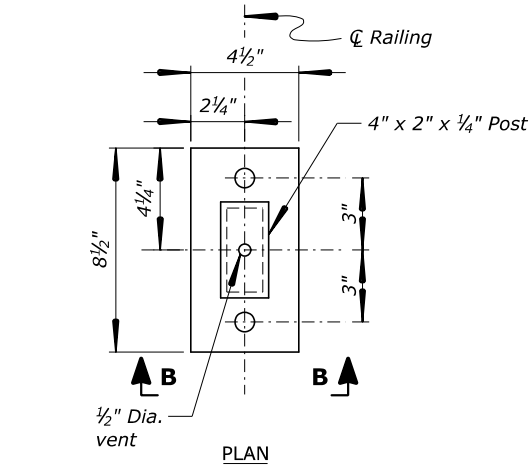
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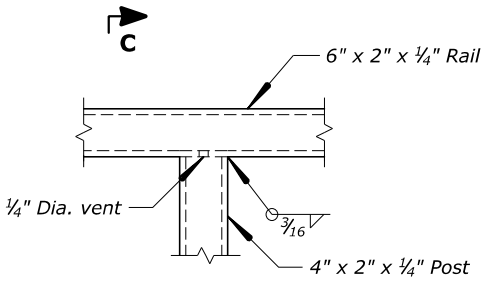
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222412, 222537, 222539, 222540	620 140556	PA	NP-DEWA 14(18) 121(1)	R06



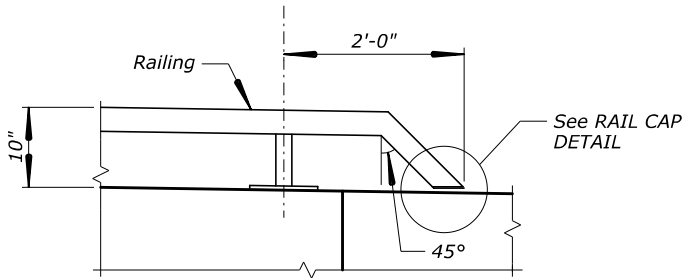
RAIL ELEVATION



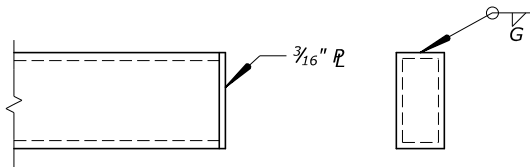
PLAN



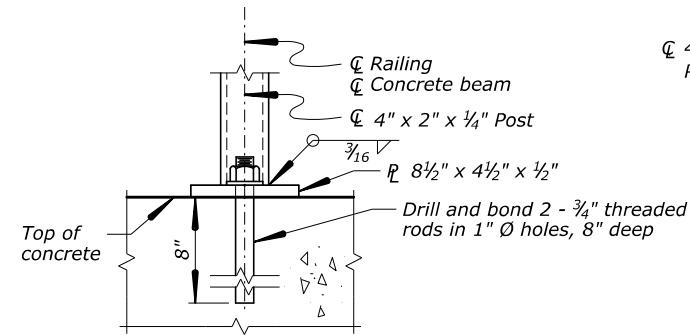
ELEVATION



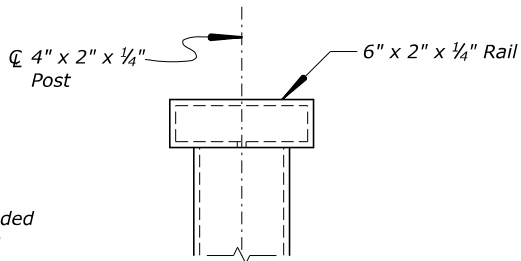
RAIL END DETAIL



RAIL CAP DETAIL

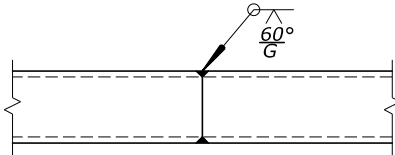


SECTION B-B

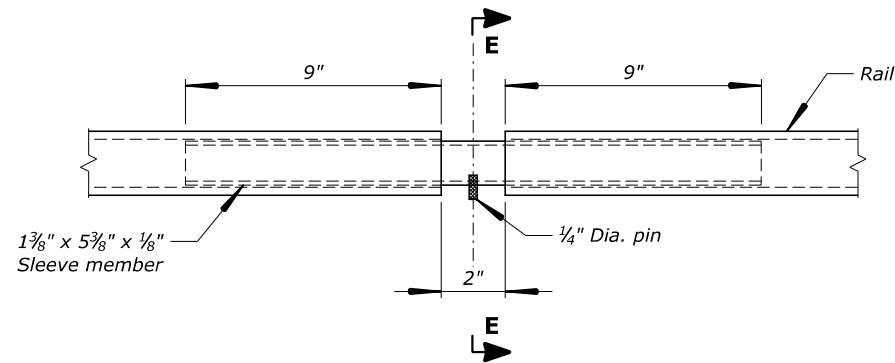


SECTION C-C

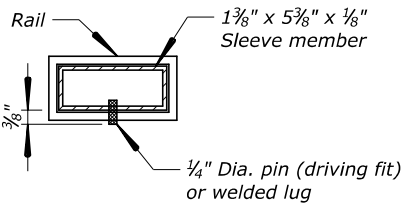
STEEL RAIL CONNECTION



TUBE - WELDED SPLICE



AT CONSTRUCTION OR EXPANSION JOINTS

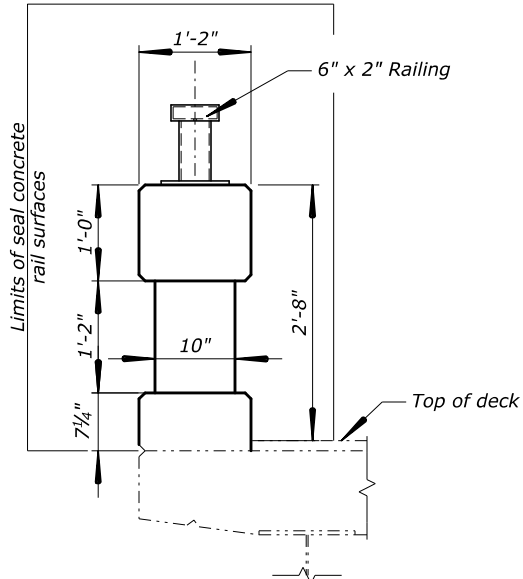


SECTION E-E

SPLICE DETAILS

Notes:

1. Install post normal to concrete railing.
2. Submit shop drawings for rail, post spacing, and hardware to the CO for approval.
3. Place rail splice in the rails spanning deck joints. Increase joint width in rails to match joint width and increase sleeve length accordingly.
4. Provide PMS Black #4 paint finish for railing.



SECTION A-A

Structure Number 4320-009P

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DELAWARE WATER GAP
NATIONAL RECREATION AREA

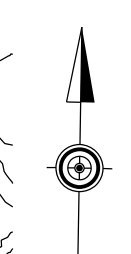
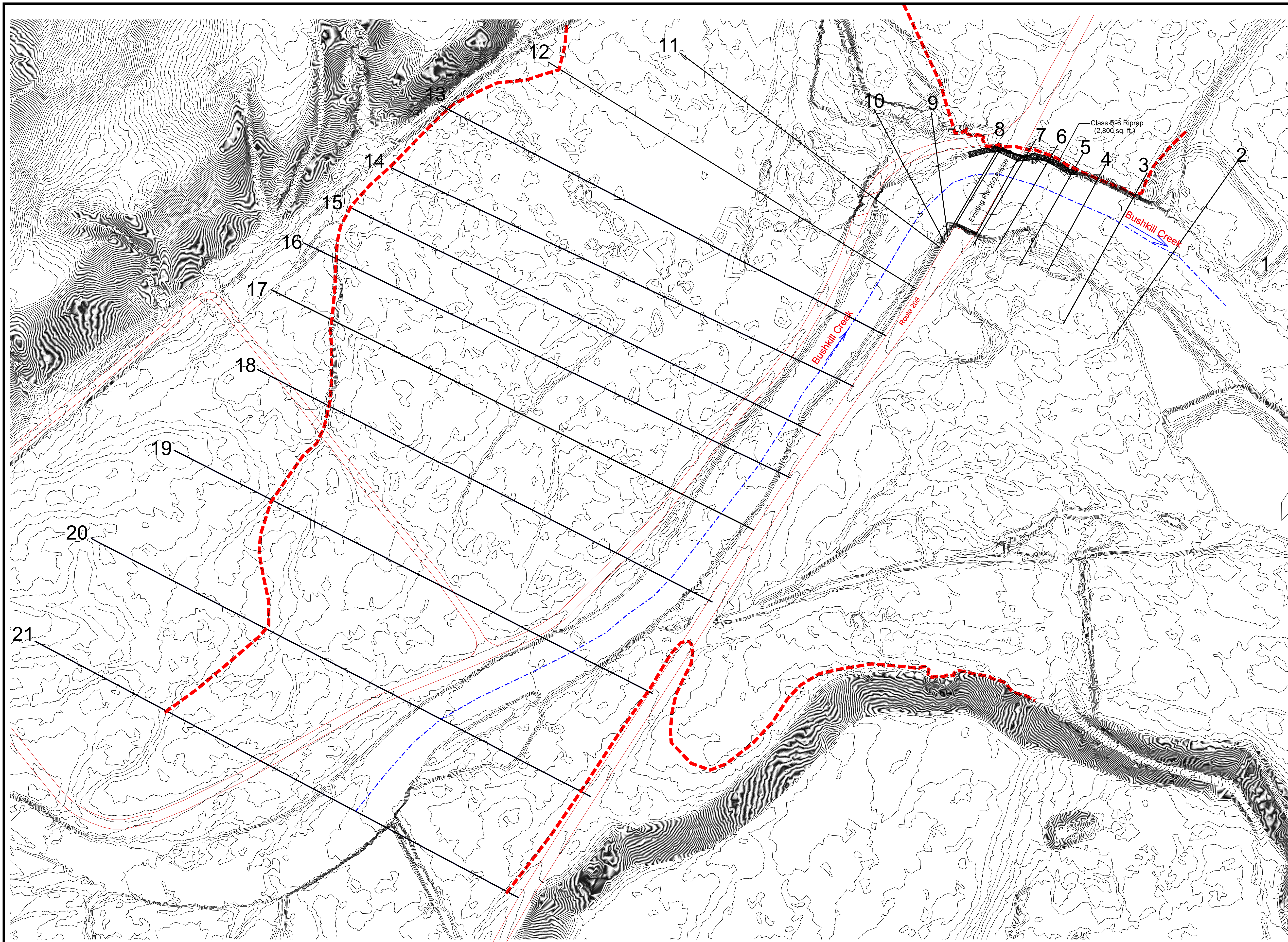
BRIDGE OVER BUSHKILL CREEK

RAIL DETAILS
(4320-009P)

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE PLAN SHEET	DATE	BRP NO.
								ANM	ANM	DW	No scale	George Choubah	6 of 10	September 2019	BRP-1253

APPENDIX D

100-YEAR FLOODPLAIN MAP



DATA SOURCES:
The topographic information in the vicinity of the project site was provided by LIDAR data and survey.

COORDINATES, BEARINGS AND DISTANCES SHOWN
HEREON ARE REFERRED TO PENNSYLVANIA STATE COORDINATE SYSTEM (NAD83, NAVD88)

FLOODPLAIN STUDY
BUSHKILL CREEK
AT U.S. ROUTE 209
Pike County, Pennsylvania

10710 Gilroy Road, Hunt Valley, MD 21031
Phone: 443.589.2400 Fax: 443.589.2401
www.centuryeng.com

ISSUE DATES		BASE:	
REVIEW:	10.20.2022	DRAWN:	_____
BID:	_____	DESIGNED:	_____
PERMIT:	_____	CHECKED BY:	_____
CONSTRUCTION:	_____	DATE CHECKED:	_____
SCALE:	1" = 100'	DRAWING:	_____
PROJECT NO.:	_____		of _____

———— HEC-RAS Cross Section
----- 100-year Floodplain Boundary

AREA OF MINIMAL FLOOD HAZARD

Zone X

42103C0510C
eff. 10/6/2000

4210
eff. 10

Zone A

Zone A

Township of Middle Smithfield
421890

———— HEC-RAS Cross Section
----- 100-year Floodplain Boundary

42089C0309E

DATA SOURCES:
The topographic information in the vicinity of the project site was provided by LIDAR data and survey.
COORDINATES, BEARINGS AND DISTANCES SHOWN HEREON ARE REFERRED TO PENNSYLVANIA STATE COORDINATE SYSTEM (NAD83, NAVD88)

FLOODPLAIN STUDY
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CENTURY
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10710 Gilroy Road, Hunt Valley, MD 21031
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ISSUE DATES		BASE:	
REVIEW:	10.20.2022	DRAWN:	_____
BID:	_____	DESIGNED:	_____
PERMIT:	_____	CHECKED BY:	_____
CONSTRUCTION:	_____	DATE CHECKED:	_____
SCALE:	1" = 100'	DRAWING:	_____ of _____
PROJECT NO.:	_____		

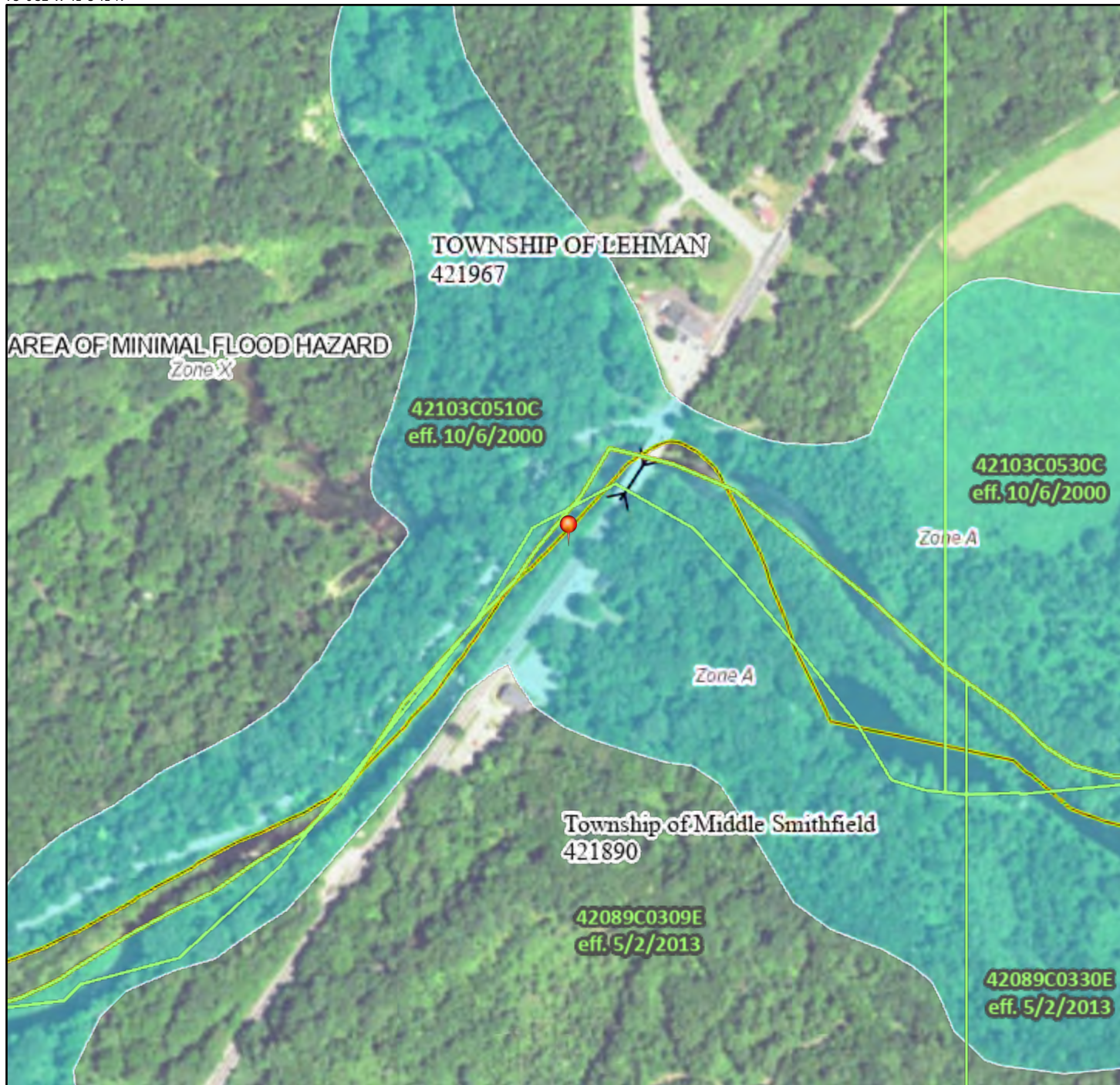
APPENDIX E

FEMA FLOOD INSURANCE RATE MAP

National Flood Hazard Layer FIRMette



75°0'32"W 41°5'41"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
OTHER FEATURES		Levee, Dike, or Floodwall
		Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **9/27/2021 at 12:02 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

74°59'54"W 41°5'14"N