

Hydrology and Hydraulics Report

for

Trescott Township, Rice Bridge #2714

WIN 026089.00

Hydrology Report

Rice Bridge carries ME Route 191 over Rice Stream in Trescott Twp. Rice Stream has a drainage basin of 3.19 square miles, 12.04% of which is wetlands, and its mean annual precipitation is 45.4 inches. It originates in an area of wetlands approximately 1/3rd of a mile west of Rice Bridge, in Trescott Twp. Rice Stream flows approximately 0.1 miles downstream from Rice Bridge until its confluence with Moose Cove in the Atlantic Ocean.

Rice Stream itself has not been featured in a FEMA floodmap. However, the area including Rice Bridge was included in a 2017 floodmap for Moose Cove. 1% Interval flood elevations for Moose Cove do extend up Rice Stream, but not above a small waterfall downstream of Rice Bridge; the ocean also does not flood any portion of Route 191.

Flow data was prepared using USGS Regression equations (Hodgkins 1999 and Hodgkins/Lombard 2015) and data from USGS StreamStats.

Summary

Drainage Area	3.19	mi ²
Q1.1	65	ft ³ /s
Q10	245	ft ³ /s
Q25	310	ft ³ /s
Q50	365	ft ³ /s
Q100	415	ft ³ /s
Q500	545	ft ³ /s

Reported by: Casey, William
Date: August 21, 2024

Note: All elevations based on North American Vertical Datum (NAVD) of 1988.

Hydraulic Report

INTRODUCTION

Rice Bridge carries ME Route 191 over Rice Stream in Trescott Twp. Colson Stream flows approximately 0.1 miles downstream from Rice Bridge until its confluence with the Atlantic Ocean

STREAM GEOMORPHOLOGY

Rice Bridge is located shortly before a 90° bend in Rice Stream. The channel is relatively straight immediately upstream of the bridge. The channel is sinuous (sinuosity of 1.55) over the entire reach analyzed. The channel shape is roughly trapezoidal over the length of the reach, mostly with exposed bedrock as a streambed. The streambed has an average slope of 0.004 upstream and 0.08 downstream. Most of the upstream and all the downstream overbanks are overgrown with thick trees and brush. A section of the northern upstream overbank is a field with some exposed bedrock. The banks are especially steep downstream of the bridge near the road.

MODELLING PARAMETERS

Boundary conditions were chosen based on available data. The boundary condition checked was the Normal Depth, with the values used being the streambed slope up and downstream of the bridge. Sensitivity analysis showed that the model is not sensitive to the normal depth, as changes in this parameter barely changed the elevation results; increasing this value by one and two orders of magnitude had negligible impacts on the water surface elevations.

Manning's Roughness Coefficients for the channel and overbanks were selected based on bank and overbank materials. Sensitivity analysis for the Manning's coefficients was conducted by changing the coefficients up and down by an order of magnitude and rerunning the model. Decreasing the Manning's roughness coefficients by one order of magnitude caused the Q1.1 water surface to drop by approximately 0.5' and the Q5 elevation to drop by approximately 1.5'. The other profiles dropped by varying amounts between 1' and 1.5'. Increasing the Manning's roughness coefficients had greater effects on the model. Increasing the coefficients by one order of magnitude caused the Q1.1 water surface to rise by 3', and all the others to rise by 4', showing the model to be more sensitive to increases in the Manning's coefficients. The coefficients were calibrated by comparing the stream width at bankfull flows to the bankfull width, and water surface elevations at the bridge for Q1.1 and Q5 flows to the height of water stains on the existing abutments.

Ineffective flow areas were determined using expansion and contraction coefficients from the bridge for cross-sections up and downstream.

The provided bankfull width was checked by inputting the bankfull flow and running the model to see if the bank stations at that flow matched the bankfull width. The analysis showed them to be close for most cross sections.

Stream Parameters

Cross Sections & Alignment	Extracted from survey data
Channel Manning's Coefficient (n)	Bedrock, cobbles, some silt: 0.04
Overbank Manning's Coefficient (n)	High Grass: 0.05
	Heavy brush with trees: 0.16
	Brush with trees: 0.1
	Grass, some brush, some trees: 0.08
Abutment Manning's Coefficient (n)	Concrete: 0.03
Boundary Conditions, Normal Depth (S)	Upstream bed slope: 0.004
	Downstream bed slope: 0.08
Expansion Coefficient	0.3
Contraction Coefficient	0.5

EXISTING BRIDGE

The existing bridge has a concrete slab on cast-in-place mass concrete abutments. It has a clear span of 12' and an out-to-out width of 23'. The boundary condition tested was a normal depth approximation based on the upstream and downstream slope. The flow regime was assumed to be mixed. This is because the constriction of the bridge causes the stream to briefly become critical at higher rates of flow.

The existing bridge was analyzed for Q50 and Q100 flows. The model shows 3.4' of freeboard at Q50 and 2.4' of freeboard at Q100, which is well within allowable clearances specified in the BDG. However, the constriction of the bridge causes an increase in velocity.

Prior inspection reports indicate that the banks are stable for scour.

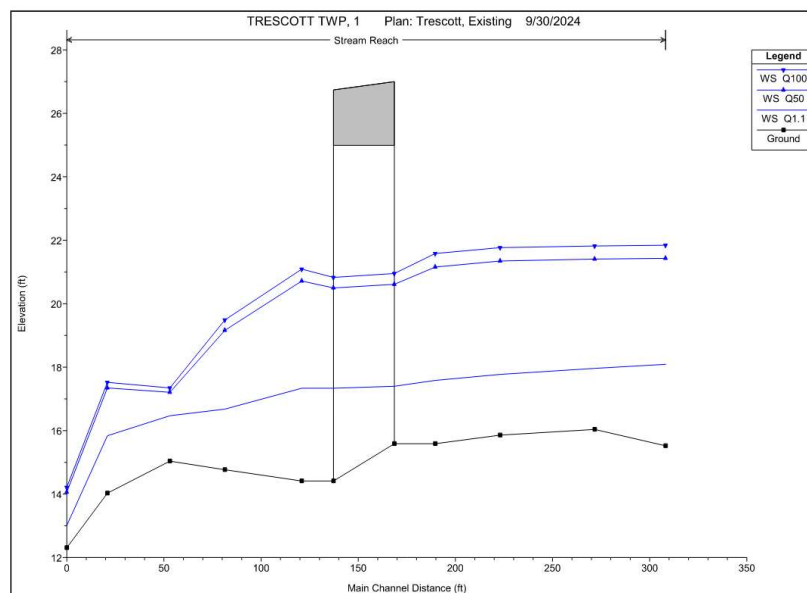


Figure 1: Water surface profile of stream reach for existing Rice Bridge, showing Q1.1, Q50, and Q100 water surface elevations for flows from Rice Stream.

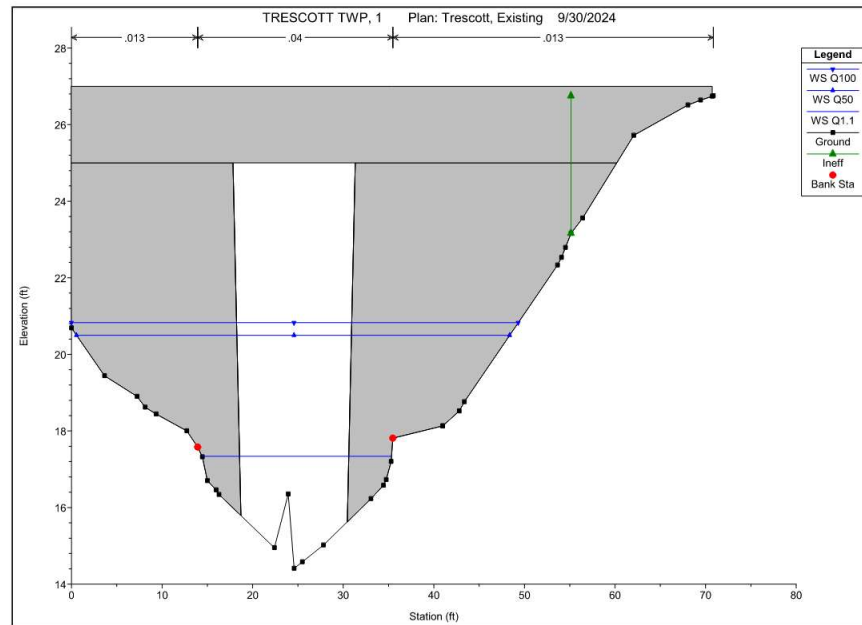


Figure 2: Cross section of the downstream side of existing Rice Bridge, showing Q1.1, Q50, and Q100 water surface elevations for flows from Rice Stream.

PROPOSED BRIDGE

Rice Stream's geometry will change at the bridge site because of the new bridge. The existing bridge is a constriction. Because Rice Stream is a Tier 1 Atlantic salmon habitat, the constriction will be eliminated. The proposed frame will have a 19' span to accommodate a 1.2 bankfull width. The rest of the stream geometry will remain unchanged, with heavy riprap for slope protection.

The proposed bridge was analyzed for Q50 and Q100 flows. The model shows 2.5' of freeboard at Q50 and 2.1' of freeboard at Q100. These clearances are less than existing, since the underside of the buried structure will be lower than a slab, and the roadway vertical profile will be lowered to improve ride quality. However, the proposed clearances are still adequate, as per the Bridge Design Guide. Additionally, the increase in span will increase the bridge's hydraulic area.

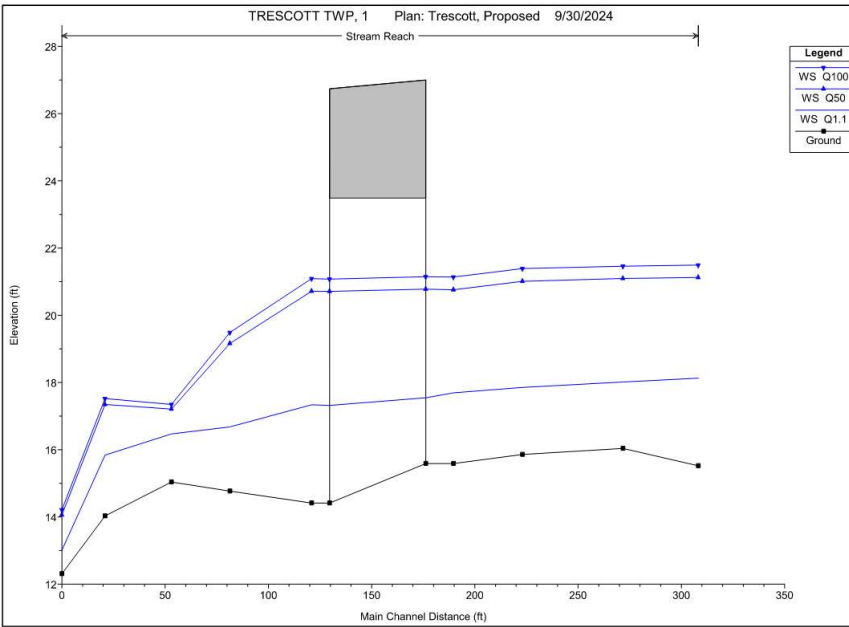


Figure 3: Water surface profile of stream reach for the proposed Rice Bridge, showing Q1.1, Q50, and Q100 water surface elevations for flows from Rice Stream.

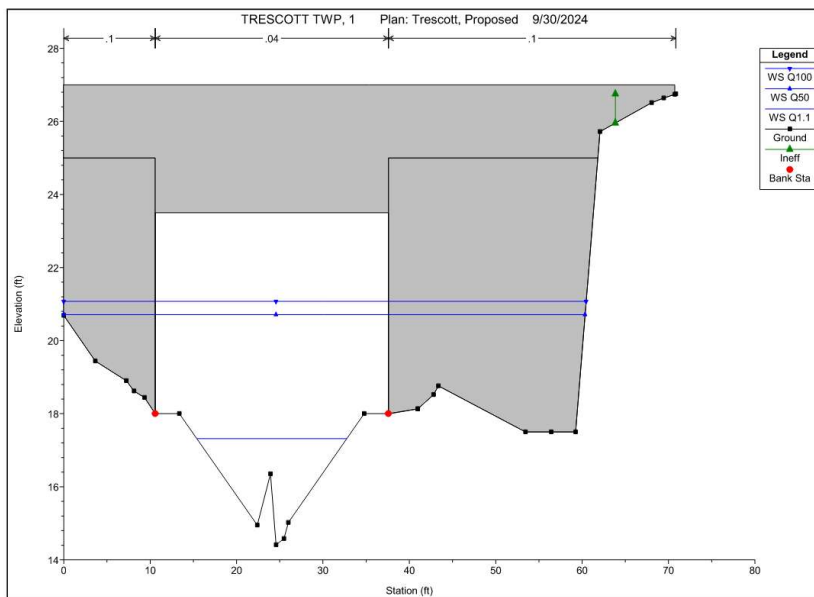


Figure 4: Cross section of the downstream side of the proposed Rice Bridge, showing Q1.1, Q50, and Q100 water surface elevations for flows from Colson Stream.

CONCLUSION

Hydraulics were not a controlling factor of design. The existing structure has adequate freeboard, and due to environmental considerations, the new structure will have a longer span and larger hydraulic opening. Scour was not a consideration, as the existing and proposed structures are founded on competent bedrock. Environmental considerations were the driving factor for design.

Summary

		Existing Structure	Recommended Structure
		12' Span Concrete Slab	19' Span 3-Sided Frame
Total Area of Waterway Opening	ft ²	119	189
Headwater elevation @ Q _{1.1}	ft	17.6	17.89
Headwater elevation @ Q ₁₀	ft	20.0	19.43
Headwater elevation @ Q ₂₅	ft	20.6	20.51
Headwater elevation @ Q ₅₀	ft	21.2	20.98
Headwater elevation @ Q ₁₀₀	ft	21.6	21.39
Headwater elevation @ Q ₅₀₀	ft	22.6	22.39
Freeboard @ Q ₅₀	ft	3.42	2.52
Freeboard @ Q ₁₀₀	ft	2.40	2.11
Outlet Velocity @ Q _{1.1}	ft/s	1.88	1.88
Outlet Velocity @ Q ₁₀	ft/s	2.78	2.78
Outlet Velocity @ Q ₂₅	ft/s	2.98	2.99
Outlet Velocity @ Q ₅₀	ft/s	3.14	3.14
Outlet Velocity @ Q ₁₀₀	ft/s	3.28	3.27

Reported by: Casey, William

Date: November 13, 2024

Note: All elevations based on North American Vertical Datum (NAVD) of 1988.

Appendix A

Hydraulic Data

Proposed Bridge Hydraulic Summary

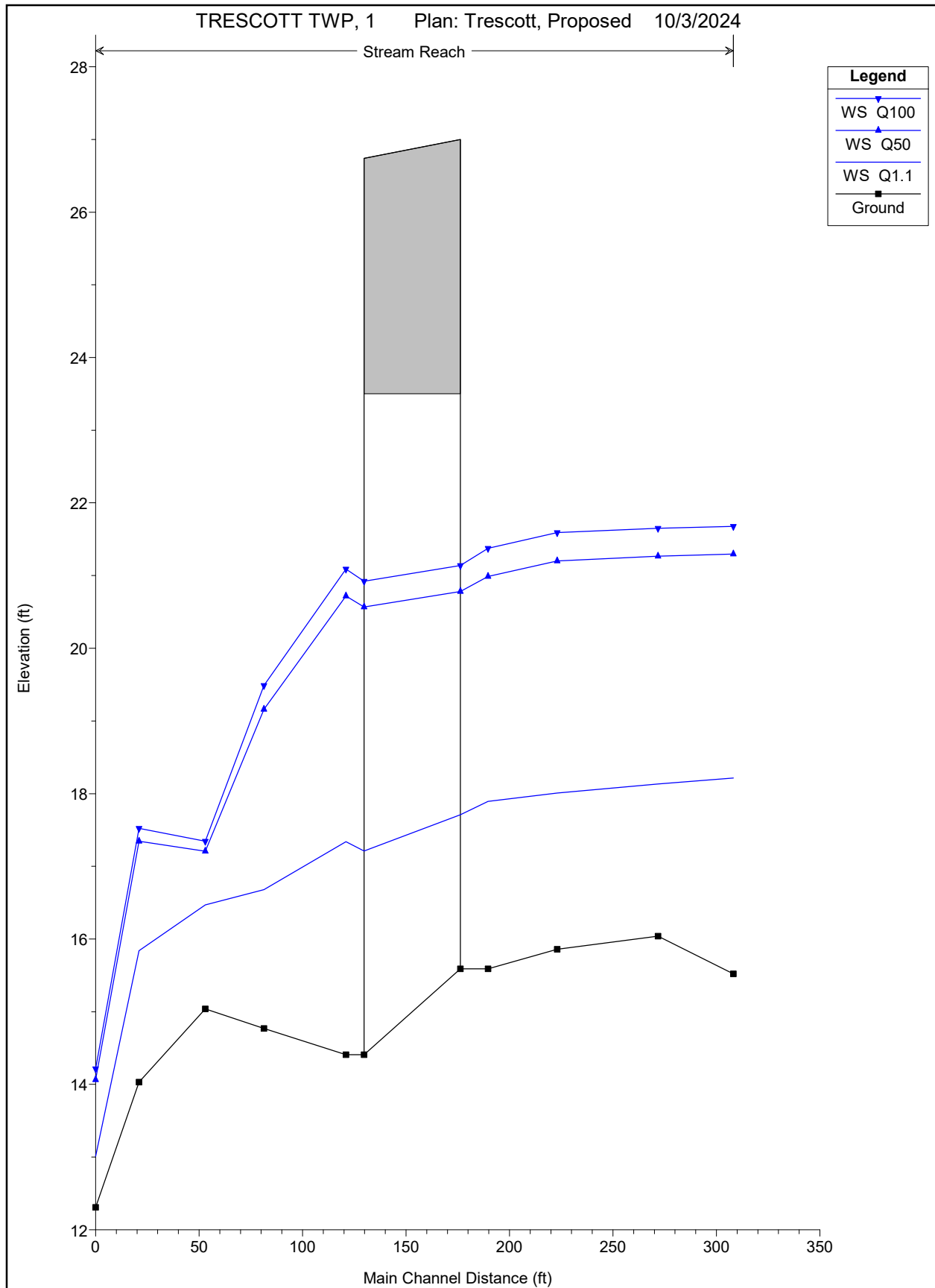
HEC-RAS Plan: 006 River: Stream Reach: Reach

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	320.9419	Q1.1	65.00	15.52	18.22	17.31	18.30	0.003278	2.26	28.73	24.15	0.37
Reach	320.9419	Q5	195.00	15.52	19.78	18.30	19.82	0.001163	1.65	138.38	131.36	0.23
Reach	320.9419	Q10	245.00	15.52	20.26	18.62	20.29	0.000702	1.53	204.97	144.94	0.19
Reach	320.9419	Q25	310.00	15.52	20.84	19.01	20.87	0.000456	1.46	292.49	158.06	0.16
Reach	320.9419	Q50	365.00	15.52	21.29	19.12	21.32	0.000354	1.43	370.35	184.51	0.14
Reach	320.9419	Q100	415.00	15.52	21.69	19.21	21.72	0.000292	1.41	445.69	194.74	0.13
Reach	320.9419	BFF	17.50	15.52	17.21	16.45	17.25	0.002542	1.63	10.75	12.24	0.31
Reach	320.9419	Q500	545.00	15.52	22.65	19.44	22.68	0.000204	1.39	645.25	219.51	0.12
Reach	289.0419	Q1.1	65.00	16.04	18.13	17.29	18.19	0.002270	1.91	33.96	28.88	0.31
Reach	289.0419	Q5	195.00	16.04	19.74	18.07	19.79	0.000837	1.78	148.16	106.69	0.21
Reach	289.0419	Q10	245.00	16.04	20.22	18.29	20.27	0.000642	1.78	206.49	133.89	0.19
Reach	289.0419	Q25	310.00	16.04	20.81	18.65	20.85	0.000492	1.78	290.62	155.16	0.17
Reach	289.0419	Q50	365.00	16.04	21.27	18.79	21.31	0.000412	1.77	365.85	171.24	0.16
Reach	289.0419	Q100	415.00	16.04	21.67	18.90	21.71	0.000358	1.77	436.45	182.25	0.15
Reach	289.0419	BFF	17.50	16.04	17.08	16.72	17.13	0.004808	1.79	9.76	16.22	0.41
Reach	289.0419	Q500	545.00	16.04	22.63	19.16	22.67	0.000267	1.76	620.34	196.04	0.14
Reach	239.2219	Q1.1	65.00	15.86	18.01	17.01	18.08	0.002012	2.27	32.97	23.05	0.30
Reach	239.2219	Q5	195.00	15.86	19.63	17.90	19.73	0.001377	2.83	121.38	74.66	0.27
Reach	239.2219	Q10	245.00	15.86	20.13	18.09	20.22	0.001126	2.81	160.08	79.01	0.25
Reach	239.2219	Q25	310.00	15.86	20.72	18.69	20.81	0.000965	2.86	209.96	95.42	0.24
Reach	239.2219	Q50	365.00	15.86	21.20	18.92	21.27	0.000813	2.80	257.41	104.40	0.22
Reach	239.2219	Q100	415.00	15.86	21.61	19.12	21.68	0.000706	2.76	301.50	111.58	0.21
Reach	239.2219	BFF	17.50	15.86	16.91	16.46	16.95	0.002640	1.56	11.38	17.68	0.31
Reach	239.2219	Q500	545.00	15.86	22.59	19.57	22.65	0.000514	2.63	419.28	126.20	0.18
Reach	205.7926	Q1.1	65.00	15.59	17.89	16.90	18.00	0.002663	2.66	25.25	16.88	0.34
Reach	205.7926	Q5	195.00	15.59	19.43	17.96	19.65	0.002761	3.96	63.54	32.86	0.38
Reach	205.7926	Q10	245.00	15.59	19.91	18.29	20.15	0.002561	4.17	80.85	39.48	0.37
Reach	205.7926	Q25	310.00	15.59	20.51	18.77	20.74	0.002235	4.28	106.46	45.50	0.36
Reach	205.7926	Q50	365.00	15.59	20.98	19.06	21.21	0.002000	4.33	128.93	49.34	0.34
Reach	205.7926	Q100	415.00	15.59	21.39	19.25	21.62	0.001819	4.36	150.01	52.94	0.33
Reach	205.7926	BFF	17.50	15.59	16.83	16.29	16.87	0.002371	1.61	10.87	12.16	0.30
Reach	205.7926	Q500	545.00	15.59	22.39	19.73	22.60	0.001453	4.36	207.05	61.38	0.31
Reach	200.2	Bridge										
Reach	137.1344	Q1.1	65.00	14.41	17.34		17.39	0.001564	1.88	34.58	20.92	0.26
Reach	137.1344	Q5	195.00	14.41	19.13		19.24	0.001163	2.60	87.50	38.75	0.25
Reach	137.1344	Q10	245.00	14.41	19.66		19.77	0.001098	2.78	109.08	42.94	0.25
Reach	137.1344	Q25	310.00	14.41	20.25		20.38	0.001054	2.99	135.58	46.39	0.25
Reach	137.1344	Q50	365.00	14.41	20.71		20.86	0.001023	3.14	157.59	49.07	0.25
Reach	137.1344	Q100	415.00	14.41	21.11		21.26	0.000999	3.27	177.44	51.43	0.25
Reach	137.1344	BFF	17.50	14.41	16.26		16.29	0.001796	1.28	13.67	16.44	0.25
Reach	137.1344	Q500	545.00	14.41	22.05		22.23	0.000945	3.54	228.72	57.08	0.25
Reach	97.52296	Q1.1	65.00	14.77	16.68	16.56	17.20	0.019985	5.76	11.28	8.60	0.89
Reach	97.52296	Q5	195.00	14.77	17.91	17.91	19.02	0.020113	8.46	23.98	13.11	0.98
Reach	97.52296	Q10	245.00	14.77	18.31	18.31	19.55	0.018237	8.97	29.81	15.54	0.96
Reach	97.52296	Q25	310.00	14.77	18.79	18.79	20.15	0.016436	9.49	37.63	20.22	0.93
Reach	97.52296	Q50	365.00	14.77	19.13	19.13	20.62	0.015966	9.99	43.27	23.03	0.94
Reach	97.52296	Q100	415.00	14.77	19.41	19.41	21.02	0.015664	10.41	48.14	25.34	0.94
Reach	97.52296	BFF	17.50	14.77	16.01	15.70	16.15	0.008502	2.90	6.04	7.12	0.55
Reach	97.52296	Q500	545.00	14.77	20.08	20.08	21.96	0.015108	11.39	60.09	29.63	0.95
Reach	69.22539	Q1.1	65.00	15.04	16.47		16.71	0.010594	3.93	16.63	16.39	0.67
Reach	69.22539	Q5	195.00	15.04	16.71	17.12	18.14	0.048264	9.59	20.89	18.78	1.47
Reach	69.22539	Q10	245.00	15.04	16.86	17.40	18.67	0.053476	10.83	23.73	20.21	1.58
Reach	69.22539	Q25	310.00	15.04	17.05	17.74	19.28	0.056113	12.05	27.82	22.14	1.65
Reach	69.22539	Q50	365.00	15.04	17.21	18.01	19.74	0.056415	12.86	31.54	23.79	1.68
Reach	69.22539	Q100	415.00	15.04	17.35	18.22	20.13	0.056474	13.51	34.96	25.20	1.70
Reach	69.22539	BFF	17.50	15.04	15.77		15.87	0.010556	2.57	6.80	11.94	0.60
Reach	69.22539	Q500	545.00	15.04	17.68	18.72	21.06	0.056478	14.99	43.85	28.56	1.75
Reach	37.09337	Q1.1	65.00	14.03	15.84	15.84	16.20	0.024855	4.85	14.10	20.54	0.95
Reach	37.09337	Q5	195.00	14.03	16.63	16.63	17.35	0.020732	6.99	32.15	25.51	0.98
Reach	37.09337	Q10	245.00	14.03	16.89	16.89	17.69	0.019252	7.45	38.98	27.35	0.96
Reach	37.09337	Q25	310.00	14.03	17.17	17.17	18.09	0.018550	8.04	47.00	29.30	0.97
Reach	37.09337	Q50	365.00	14.03	17.34	17.40	18.41	0.019523	8.68	52.08	30.40	1.01
Reach	37.09337	Q100	415.00	14.03	17.52	17.61	18.67	0.019176	9.04	57.71	31.58	1.01
Reach	37.09337	BFF	17.50	14.03	15.05	15.05	15.30	0.034699	4.02	4.35	9.12	1.03
Reach	37.09337	Q500	545.00	14.03	17.70	18.05	19.37	0.025873	10.99	63.30	32.70	1.19
Reach	16.17068	Q1.1	65.00	12.31	13.01	13.41	14.72	0.307533	10.51	6.19	16.80	3.05
Reach	16.17068	Q5	195.00	12.31	13.51	14.23	16.20	0.169200	13.17	14.81	17.91	2.55

HEC-RAS Plan: 006 River: Stream Reach: Reach (Continued)

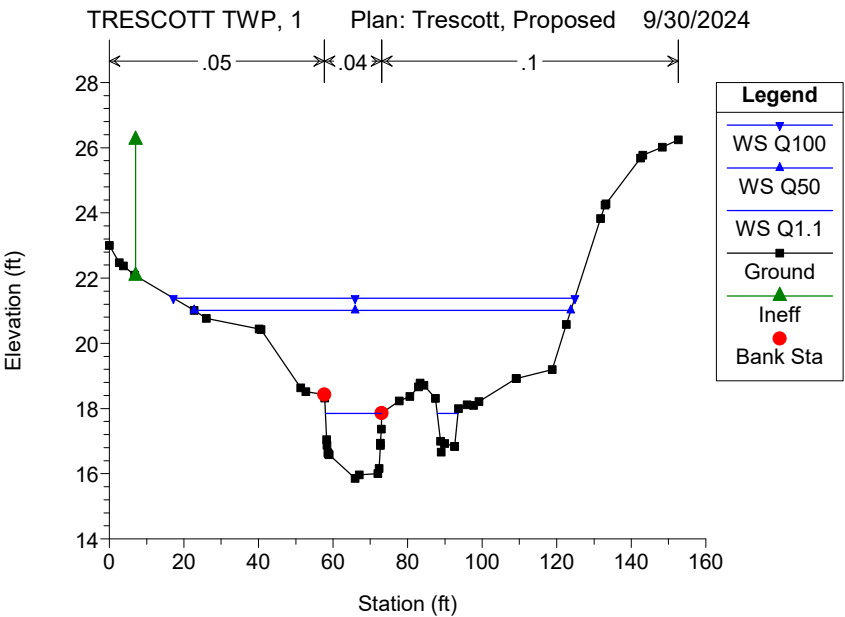
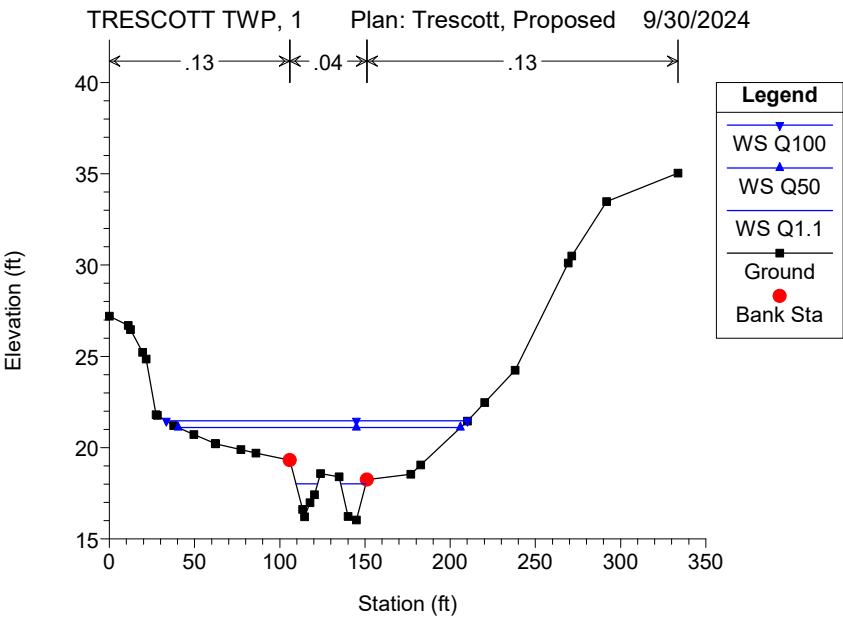
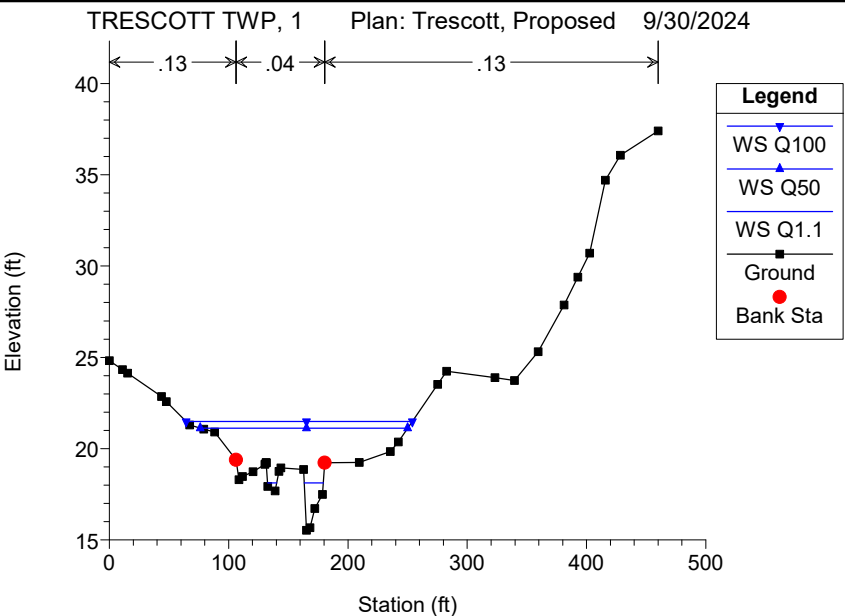
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach	16.17068	Q10	245.00	12.31	13.67	14.48	16.61	0.148755	13.75	17.82	18.20	2.45
Reach	16.17068	Q25	310.00	12.31	13.89	14.79	17.05	0.127938	14.27	21.72	18.53	2.32
Reach	16.17068	Q50	365.00	12.31	14.06	15.04	17.36	0.113835	14.57	25.05	18.81	2.23
Reach	16.17068	Q100	415.00	12.31	14.21	15.25	17.65	0.105369	14.87	27.91	19.05	2.17
Reach	16.17068	BFF	17.50	12.31	12.73	12.96	13.59	0.325866	7.43	2.35	11.27	2.87
Reach	16.17068	Q500	545.00	12.31	14.61	15.74	18.27	0.086843	15.36	35.54	20.93	2.02

Proposed Bridge Channel Profile

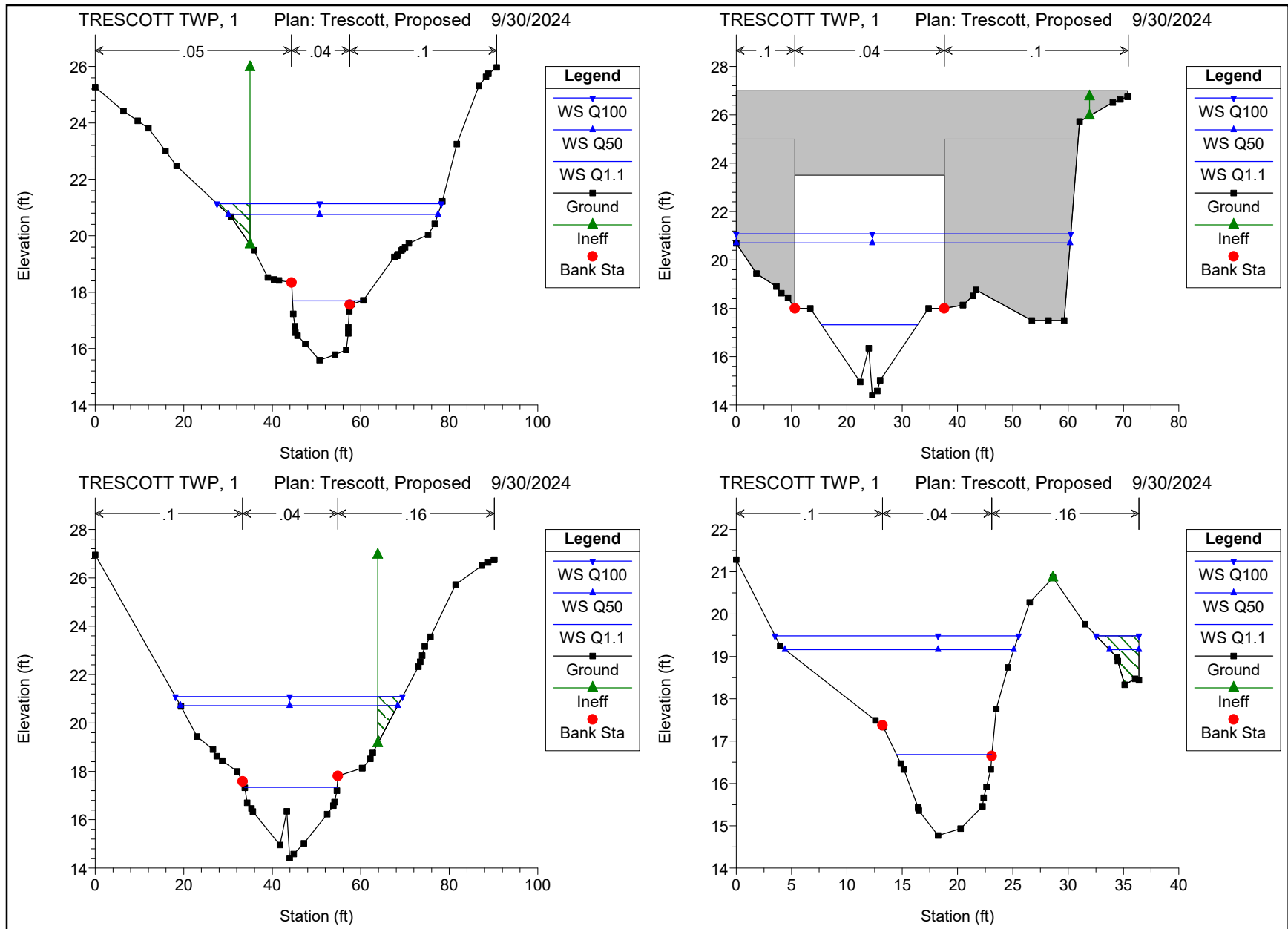


Proposed Bridge Cross Sections

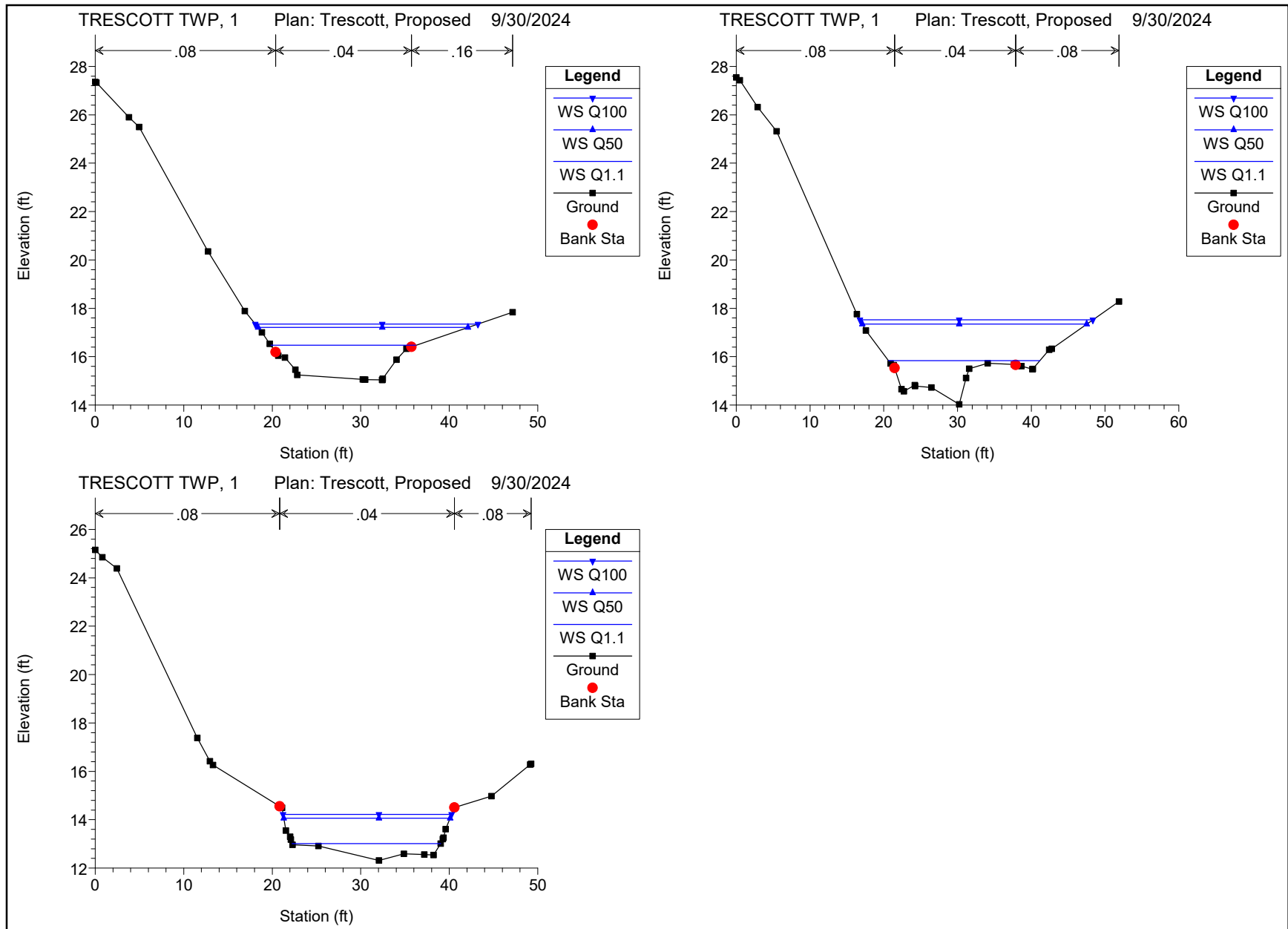
No Data for Plot



Proposed Bridge Cross Sections



Proposed Bridge Cross Sections

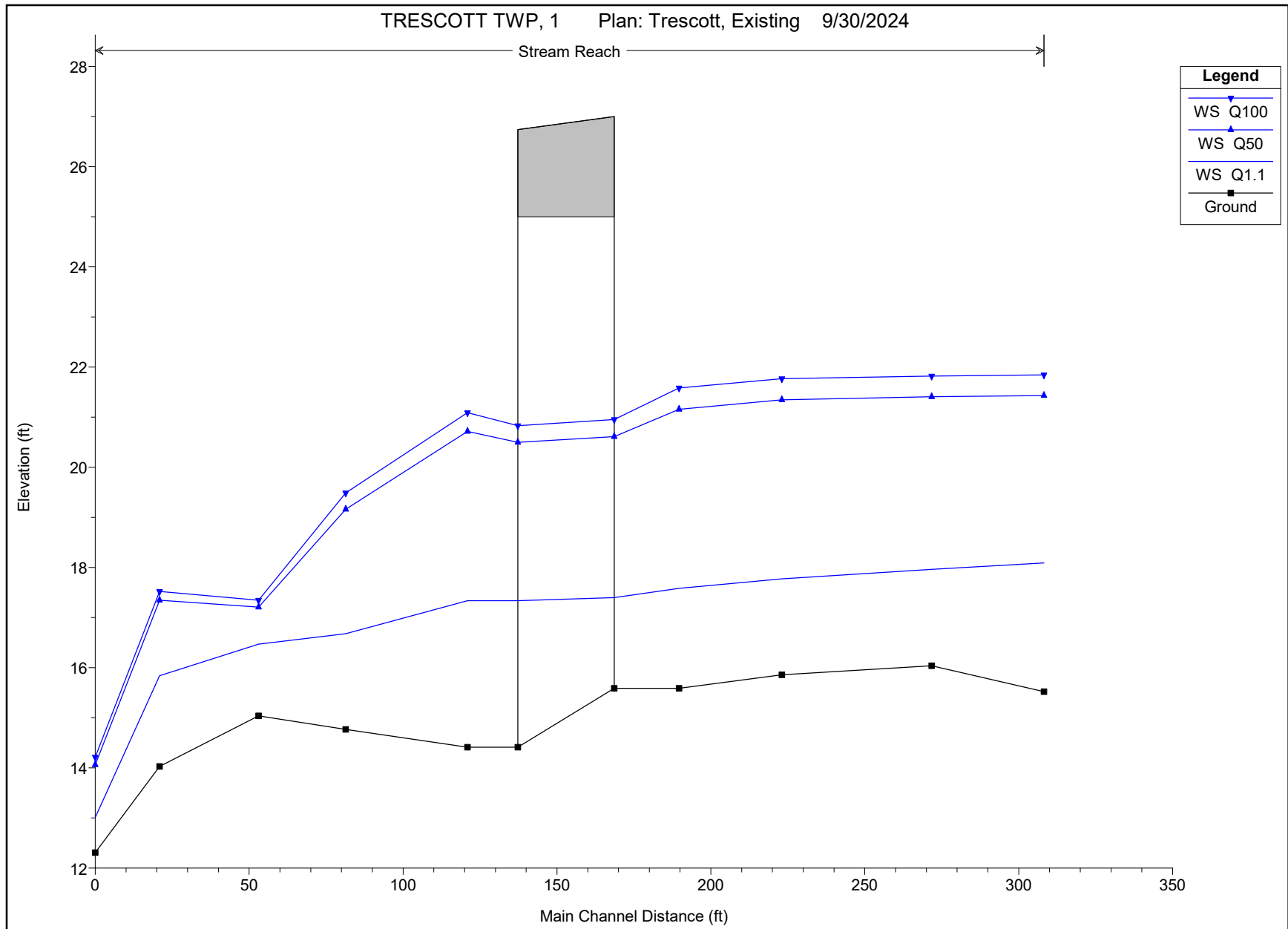


Existing Bridge Hydraulic Summary

HEC-RAS Plan: 006 River: Stream Reach: Reach

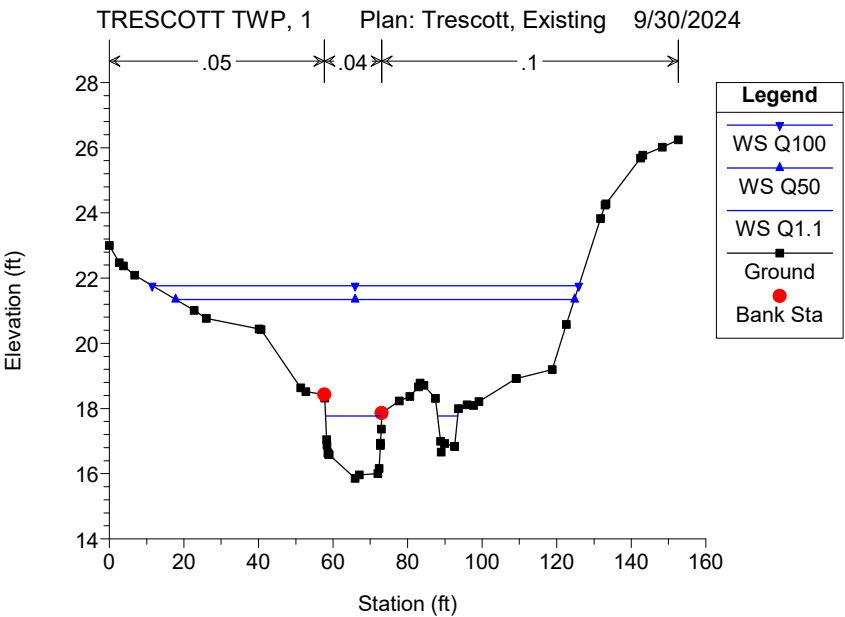
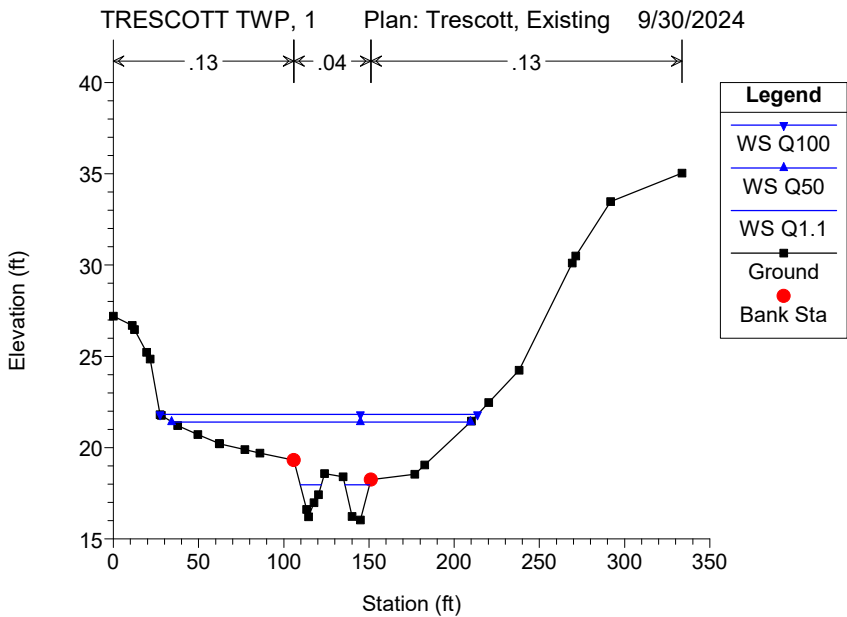
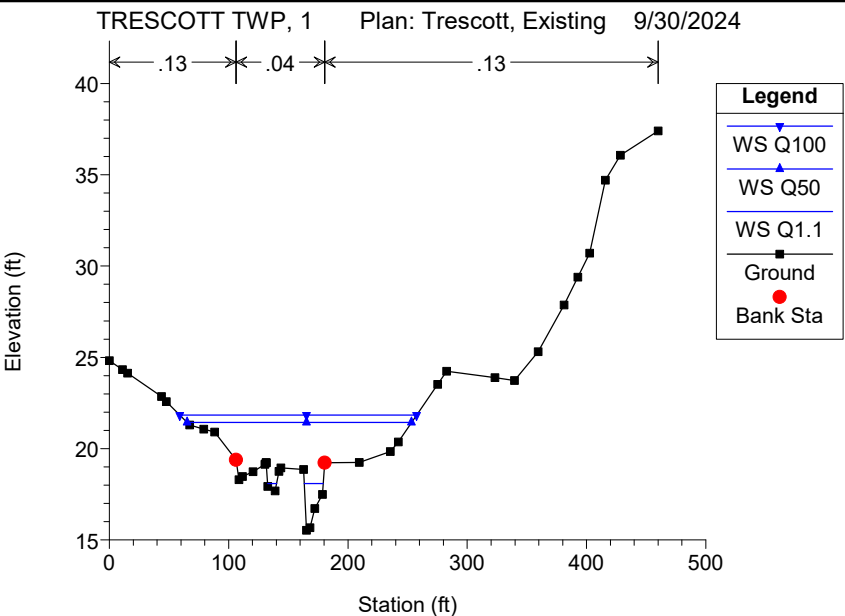
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Reach	289.0419	Q5	195.00	16.04	19.74	18.07	19.79	0.000837	1.78	148.16	106.69	0.21
Reach	289.0419	Q10	245.00	16.04	20.22	18.29	20.27	0.000642	1.78	206.49	133.89	0.19
Reach	289.0419	Q25	310.00	16.04	20.81	18.65	20.85	0.000492	1.78	290.62	155.16	0.17
Reach	289.0419	Q50	365.00	16.04	21.27	18.79	21.31	0.000412	1.77	365.85	171.24	0.16
Reach	289.0419	Q100	415.00	16.04	21.67	18.90	21.71	0.000358	1.77	436.45	182.25	0.15
Reach	289.0419	Q500	545.00	16.04	22.63	19.16	22.67	0.000267	1.76	620.34	196.04	0.14
Reach	239.2219	Q1.1	65.00	15.86	18.01	17.01	18.08	0.002012	2.27	32.97	23.05	0.30
Reach	239.2219	Q5	195.00	15.86	19.63	17.90	19.73	0.001377	2.83	121.38	74.66	0.27
Reach	239.2219	Q10	245.00	15.86	20.13	18.09	20.22	0.001126	2.81	160.08	79.01	0.25
Reach	239.2219	Q25	310.00	15.86	20.72	18.69	20.81	0.000965	2.86	209.96	95.42	0.24
Reach	239.2219	Q50	365.00	15.86	21.20	18.92	21.27	0.000813	2.80	257.41	104.40	0.22
Reach	239.2219	Q100	415.00	15.86	21.61	19.12	21.68	0.000706	2.76	301.50	111.58	0.21
Reach	239.2219	Q500	545.00	15.86	22.59	19.57	22.65	0.000514	2.63	419.28	126.20	0.18
Reach	205.7926	Q1.1	65.00	15.59	17.89	16.90	18.00	0.002663	2.66	25.25	16.88	0.34
Reach	205.7926	Q5	195.00	15.59	19.43	17.96	19.65	0.002761	3.96	63.54	32.86	0.38
Reach	205.7926	Q10	245.00	15.59	19.91	18.29	20.15	0.002561	4.17	80.85	39.48	0.37
Reach	205.7926	Q25	310.00	15.59	20.51	18.77	20.74	0.002235	4.28	106.46	45.50	0.36
Reach	205.7926	Q50	365.00	15.59	20.98	19.06	21.21	0.002000	4.33	128.93	49.34	0.34
Reach	205.7926	Q100	415.00	15.59	21.39	19.25	21.62	0.001819	4.36	150.01	52.94	0.33
Reach	205.7926	Q500	545.00	15.59	22.39	19.73	22.60	0.001453	4.36	207.05	61.38	0.31
Reach	200.2	Bridge										
Reach	137.1344	Q1.1	65.00	14.41	17.34		17.39	0.001564	1.88	34.58	20.92	0.26
Reach	137.1344	Q5	195.00	14.41	19.13		19.24	0.001163	2.60	87.50	38.75	0.25
Reach	137.1344	Q10	245.00	14.41	19.66		19.77	0.001098	2.78	109.08	42.94	0.25
Reach	137.1344	Q25	310.00	14.41	20.25		20.38	0.001054	2.99	135.58	46.39	0.25
Reach	137.1344	Q50	365.00	14.41	20.71		20.86	0.001023	3.14	157.59	49.07	0.25
Reach	137.1344	Q100	415.00	14.41	21.11		21.26	0.000999	3.27	177.44	51.43	0.25
Reach	137.1344	Q500	545.00	14.41	22.05		22.23	0.000945	3.54	228.72	57.08	0.25
Reach	97.52296	Q1.1	65.00	14.77	16.68	16.56	17.20	0.019985	5.76	11.28	8.60	0.89
Reach	97.52296	Q5	195.00	14.77	17.91	17.91	19.02	0.020113	8.46	23.98	13.11	0.98
Reach	97.52296	Q10	245.00	14.77	18.31	18.31	19.55	0.018237	8.97	29.81	15.54	0.96
Reach	97.52296	Q25	310.00	14.77	18.79	18.79	20.15	0.016436	9.49	37.63	20.22	0.93
Reach	97.52296	Q50	365.00	14.77	19.13	19.13	20.62	0.015966	9.99	43.27	23.03	0.94
Reach	97.52296	Q100	415.00	14.77	19.41	19.41	21.02	0.015664	10.41	48.14	25.34	0.94
Reach	97.52296	Q500	545.00	14.77	20.08	20.08	21.96	0.015108	11.39	60.09	29.63	0.95
Reach	69.22539	Q1.1	65.00	15.04	16.47		16.71	0.010594	3.93	16.63	16.39	0.67
Reach	69.22539	Q5	195.00	15.04	16.71	17.12	18.14	0.048264	9.59	20.89	18.78	1.47
Reach	69.22539	Q10	245.00	15.04	16.86	17.40	18.67	0.053476	10.83	23.73	20.21	1.58
Reach	69.22539	Q25	310.00	15.04	17.05	17.74	19.28	0.056113	12.05	27.82	22.14	1.65
Reach	69.22539	Q50	365.00	15.04	17.21	18.01	19.74	0.056415	12.86	31.54	23.79	1.68
Reach	69.22539	Q100	415.00	15.04	17.35	18.22	20.13	0.056474	13.51	34.96	25.20	1.70
Reach	69.22539	Q500	545.00	15.04	17.68	18.72	21.06	0.056478	14.99	43.85	28.56	1.75
Reach	37.09337	Q1.1	65.00	14.03	15.84	15.84	16.20	0.024855	4.85	14.10	20.54	0.95
Reach	37.09337	Q5	195.00	14.03	16.63	16.63	17.35	0.020732	6.99	32.15	25.51	0.98
Reach	37.09337	Q10	245.00	14.03	16.89	16.89	17.69	0.019252	7.45	38.98	27.35	0.96
Reach	37.09337	Q25	310.00	14.03	17.17	17.17	18.09	0.018550	8.04	47.00	29.30	0.97
Reach	37.09337	Q50	365.00	14.03	17.34	17.40	18.41	0.019523	8.68	52.08	30.40	1.01
Reach	37.09337	Q100	415.00	14.03	17.52	17.61	18.67	0.019176	9.04	57.71	31.58	1.01
Reach	37.09337	Q500	545.00	14.03	17.70	18.05	19.37	0.025873	10.99	63.30	32.70	1.19
Reach	16.17068	Q1.1	65.00	12.31	13.01	13.41	14.72	0.307533	10.51	6.19	16.80	3.05
Reach	16.17068	Q5	195.00	12.31	13.51	14.23	16.20	0.169200	13.17	14.81	17.91	2.55
Reach	16.17068	Q10	245.00	12.31	13.67	14.48	16.61	0.148755	13.75	17.82	18.20	2.45
Reach	16.17068	Q25	310.00	12.31	13.89	14.79	17.05	0.127938	14.27	21.72	18.53	2.32
Reach	16.17068	Q50	365.00	12.31	14.06	15.04	17.36	0.113835	14.57	25.05	18.81	2.23
Reach	16.17068	Q100	415.00	12.31	14.21	15.25	17.65	0.105369	14.87	27.91	19.05	2.17
Reach	16.17068	Q500	545.00	12.31	14.61	15.74	18.27	0.086843	15.36	35.54	20.93	2.02

Existing Bridge Channel Profile

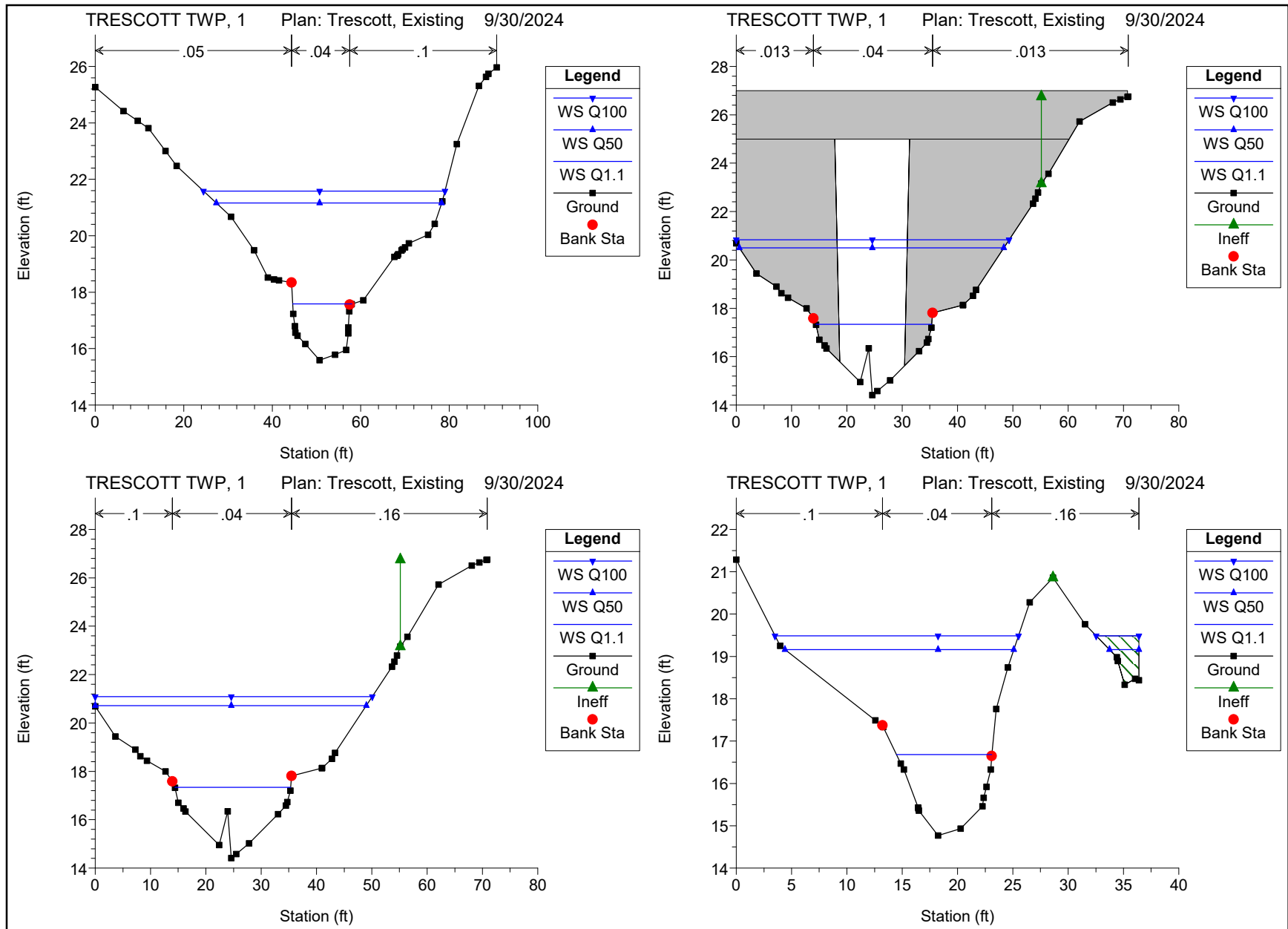


Existing Bridge Cross Sections

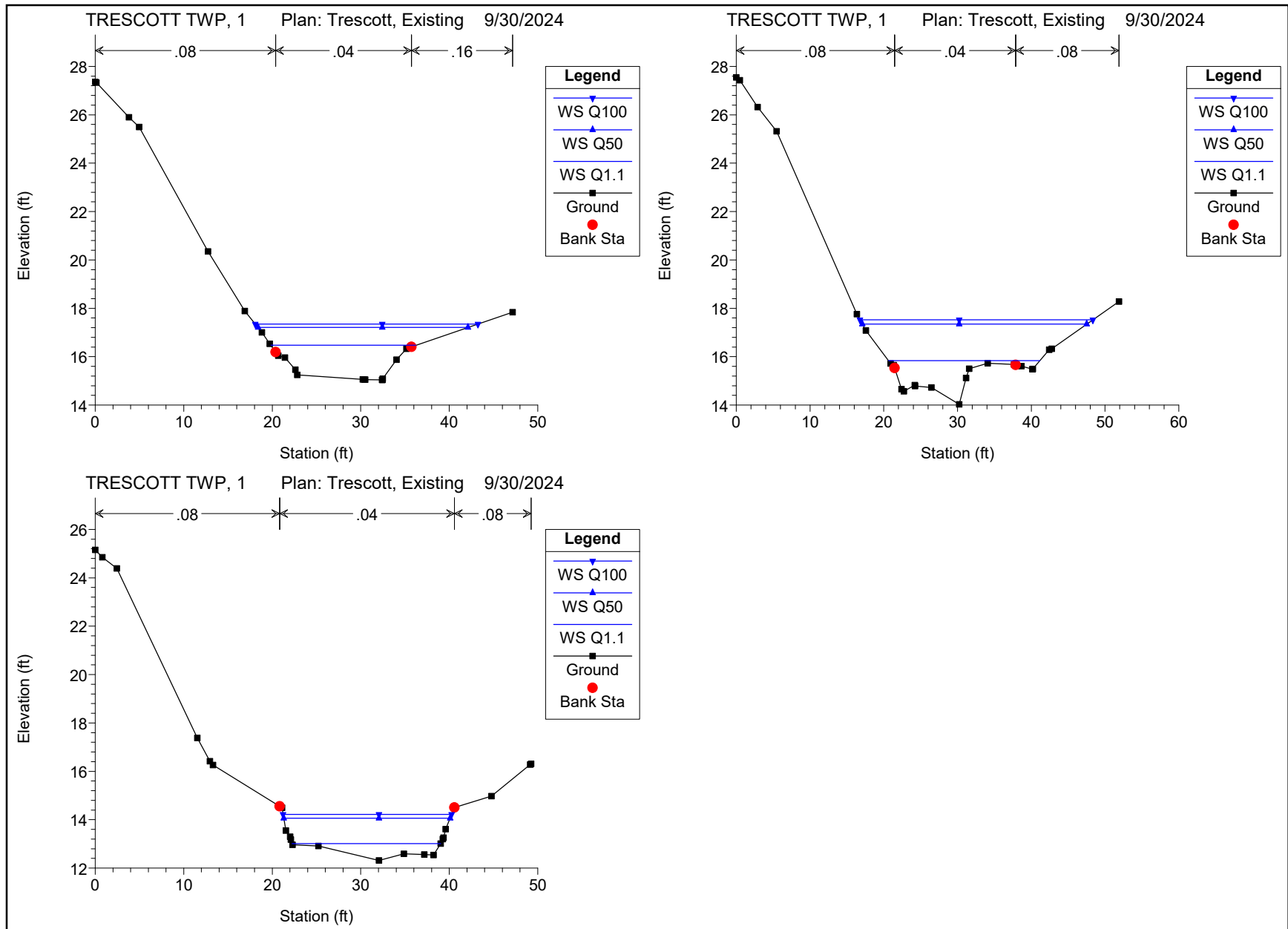
No Data for Plot



Existing Bridge Cross Sections



Existing Bridge Cross Sections



HEC-RAS Cross Sections

