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APPENDIX 2.7-M

Dewey-Burdock Project Flood Analysis



DEWEY-BURDOCK PROJECT FLOOD ANALYSIS

Prepared for:

Powertech (USA) Inc.

June 2011

DEWY-BURDOCK PROJECT FLOOD ANALYSIS

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Exhibit 2.7-M-1	Drainage Basins
Exhibit 2.7-M-2	HEC-RAS Location And 100-year Inundation Map
Exhibit 2.7-M-3	HEC-RAS Cross Sections (Sheet 1 of 3)
Exhibit 2.7-M-3	HEC-RAS Cross Sections (Sheet 2 of 3)
Exhibit 2.7-M-3	HEC-RAS Cross Sections (Sheet 3 of 3)



Appendix 2.7-M Dewey-Burdock Project Flood Analysis

2.7-M-1 Peak Flow Study

Powertech has conducted a flood analysis for Beaver Creek and Pass Creek within the project area, as provided in Section 2.7.1.4 of the Technical Report. Appendix 2.7-M was prepared to address the flood analysis, including peak flow and inundation resulting from the 100-year 24-hour precipitation event, for the minor tributaries to Beaver Creek and Pass Creek.

U.S. Army Corps of Engineers (USACE) HEC-HMS model was used to estimate peak flows and runoff volumes resulting from a 100-year 24-hour recurrence interval precipitation event within the project area. This program was selected due to the size of the drainage area, the watershed routing functions offered by HEC-HMS, and the universal acceptance of HEC-HMS within the hydrologic sciences community. The HEC-HMS model uses a form of the Natural Resource Conservation Service (NRCS) Triangular Hydrograph Method, and is a parametric method of estimating flood peaks and runoff volumes from site-specific data, in addition to providing watershed routing parameters. The NRCS method was utilized for the evaluation of individual watershed hydrology, while the Muskingum method was used for routing procedures. Procedures followed in applying these methods may be found in the HEC-HMS Users Manual (USACE, 2001), HEC-HMS Technical Reference Manual (USACE, 2000) and the U.S. Bureau of Reclamation publication Design of Small Dams (USBR, 1977).

The precipitation value (4.8 inches) for the 100-year 24-hour storm event was obtained from the national depth-duration-frequency maps as reported in Table 2.7-5 of the Technical Report. Curve numbers were calculated by area-weighting the drainage basin soil types according to hydrologic soil group as determined from the soil survey information obtained from the NRCS soil survey geographic database for Niobrara County, Wyoming, and Custer and Fall River Counties, South Dakota. Attachment



2.7-M-1 provides a summary of the soil type, corresponding soils hydrologic group, and curve number used for the area-weighting. The average antecedent moisture condition (AMC) of two was applied.

The input parameters and results of the HEC-HMS analyses are summarized in Table 2.7-M-1. The hydrologic elements used in the HEC-HMS analyses are shown on Exhibit 2.7-M-1. There are several reservoirs located within the project area. To obtain a conservative estimate of peak flow, the routing effects of the reservoirs were not included in the model.

2.7-M-2 Flood Inundation Study

Powertech (USA) has conducted a flood inundation study for Beaver Creek and Pass Creek within the project area, as provided in Section 2.7.1.4 of the Technical Report. This appendix addresses the 100-year 24-hour flood inundation for the minor tributaries to Beaver Creek and Pass Creek. Peak flood depths were modeled for stream channels within the project area for a peak discharge resulting from the 100-year 24-hour precipitation event. Initial cross sections were generated at 250 ft intervals on the main tributary channels within the project area using 2-foot contour interval mapping data. Additional cross sections were added near various confluence points along the tributaries as wells as embankments across the channels. Using the peak runoff values calculated from HEC-HMS, a HEC-RAS (USACE, 1997) model was used to define the area of inundation during the 100-year 24-hour storm event. The primary input parameters to the model are discharge, stream cross section (in the form of station/elevation data), and channel and overbank roughness coefficients (Manning's n). Exhibit 2.7-M-2 provides the locations of the minor tributaries that were evaluated and the 100-year 24-hour inundation area.

HEC-RAS is a hydraulic model developed by the Army Corps of Engineers Hydrologic Engineering Center. Use of the HEC-RAS model is generally accepted methodology for determining water surface profiles in natural or man-made channels. The model is used for flood insurance studies, evaluations of floodway



encroachments (bridge, levees, culverts, weirs, channelization, and other structures), and a wide variety of engineering applications.

Channel cross sections for the HEC-RAS model were developed from the 2 foot contour interval mapping of the project area. A Manning's roughness coefficient n of 0.035 was used in the evaluation. A roughness coefficient of 0.035 is reflective of a vegetated channel. Manning's n was estimated using a 2 foot contour map as well as a site investigation. Cowan's method (Chow, 1959), which accounts for channel materials, irregularity, cross section variance, obstructions, vegetation, and meandering, was used to estimate Manning's n .

The 100-year 24-hour flood inundation boundary is presented on Exhibit 2.7-M-2; the HEC-RAS sections are presented on Exhibit 2.7-M-3. The inundation boundaries were prepared based on the HEC-RAS cross sections and 100-year 24-hour water surface profiles. Throughout the project area there are several reservoirs. The flood boundaries were drawn to account for these existing reservoirs. There are several instances where the 100-year 24-hour peak flow is not contained within the channel or where the channel flows into a flat plain. In these areas professional judgment was used to estimate inundation. The individual HEC-RAS results are presented in Attachments 2.7-M-2 through 2.7-M-18.



2.7-M-3 References

Chow, V.T., 1959, Open Channel hydraulics, McGraw-Hill.

U.S. Army Corp of Engineers (USACE), 2001, Hydrologic Modeling System - HEC-HMS User's Manual (Version 2.1). Available from the website on the Internet as of October 2010: <http://www.hec.usace.army.mil/software/hec-hms/documentation/CPD-74A_2001Jan.pdf>

_____, 2000, Hydrologic Modeling System - HEC-HMS Technical Reference Manual. Available from the website on the Internet as of October 2010: <http://www.hec.usace.army.mil/software/hec-hms/documentation/CPD-74B_2000Mar.pdf>

_____, 1997, HEC-RAS River Analysis System, version 2.0 U.S. Army Corps of Engineers Hydrologic Engineering Center.

U.S. Bureau of Reclamation (USBR), 1977, Design of Small Dams, BOR Stock No. 924-00300011908, 816 p.

Table 2.7-M-1. HEC-HMS Input Parameters and Results

Drainage Basin	Hydraulic Element ¹	Drainage Area (mi ²)	Curve Number	Watershed Lag Time (hrs)	Peak Discharge (cfs)	Volume (acre-ft)
1	Subbasin-1a	3.71	75	1.68	1387.6	452.7
	Junction-1	3.71			1387.6	452.7
	Reach-1	3.71		0.61	1387.0	452.7
	Subbasin-1b	0.72	75	0.71	506.1	87.7
	Junction-2	4.43			1489.9	540.5
2	Subbasin-2a	0.69	75	0.51	679.5	92.9
	Junction-1	0.69			679.5	92.9
	Reach-1	0.69		0.29	675.2	92.9
	Subbasin-2b	0.57	75	0.83	406.3	77.7
	Junction-2	1.26			1077.4	170.6
3	Subbasin-3a	0.29	73	0.34	324.1	33.1
	Junction-1	0.29			324.1	33.1
	Reach-1	0.29		0.09	323.0	33.1
	Subbasin-3b	0.02	73	0.21	33.9	2.6
	Junction-2	0.32			341.1	35.7
4	Subbasin-4	0.34	73	0.79	210.5	38.4
	Junction-1	0.34			210.5	38.4
5	Subbasin-5a	0.20	73	0.36	212.4	23.5
	Junction-1	0.20			212.4	23.5
	Reach-1	0.20		0.22	207.8	23.5
	Subbasin-5b	0.19	71	0.31	223.5	22.8
	Junction-2	0.39			368.9	46.4
6	CLOSED BASIN					
7	Subbasin-7b	0.18	77	0.33	235.9	22.9
	Subbasin-7c	0.04	82	0.22	80.9	6.2
	Junction-1	0.22			304.8	29.1
	Reach-1	0.22		0.01	304.8	29.1
	Subbasin-7a	0.22	73	0.46	204.9	25.3
	Subbasin-7d	0.00	79	0.09	1.3	0.1
	Junction-2	0.44			485.1	54.5
	Reach-2	0.44		0.23	485.1	54.5
	Subbasin-7e	0.27	79	0.43	328.3	37.9
	Junction-3	0.71			783.5	92.3
	Reach-3	0.71		0.02	783.5	92.3
	Subbasin-7f	0.13	79	0.32	189.1	18.0
	Junction-4	0.13			189.1	18.0
	Reach-4	0.13		0.07	189.1	18.0
	Subbasin-7g	0.01	80	0.20	21.9	1.6
	Junction-5	0.85			941.0	111.9
	Reach-5	0.85		0.20	941.0	111.9
Subbasin-7h	0.11	81	0.37	161.2	16.8	

Table 2.7-M-1. HEC-HMS Input Parameters and Results

Drainage Basin	Hydraulic Element ¹	Drainage Area (mi ²)	Curve Number	Watershed Lag Time (hrs)	Peak Discharge (cfs)	Volume (acre-ft)
7	Junction-6	0.96			1022.4	128.7
8	CLOSED BASIN					
9	Subbasin-9c	0.43	78	0.47	478.9	58.9
	Junction-2	0.43			478.9	58.9
	Reach-2	0.43		0.07	478.9	58.9
	Subbasin-9a	0.28	78	0.48	307.7	38.4
	Junction-1	0.28			307.7	38.4
	Reach-1	0.28		0.12	307.7	38.4
	Subbasin-9b	0.08	80	0.45	95.2	11.3
	Subbasin-9d	0.02	80	0.23	40.8	3.2
	Junction-3	0.82			885.8	111.7
	Reach-3	0.82		0.14	885.8	111.7
	Subbasin-9f	0.09	80	0.30	146.3	13.3
	Junction-4	0.91			942.9	125.1
	Reach-4	0.91		0.26	942.9	125.1
	Subbasin-9i	0.34	79	0.43	408.6	47.1
	Junction-5	0.34			408.6	47.1
	Reach-5	0.34		0.26	408.6	47.1
	Subbasin-9h	0.30	80	0.39	404.9	43.7
	Subbasin-9k	0.04	80	0.42	56.3	6.4
	Junction-6	1.59			1463.4	222.2
	Reach-6	1.59		0.29	1463.4	222.2
	Subbasin-9j	0.04	80	0.29	68.2	6.1
	Junction-7	0.04			68.2	6.1
	Reach-7	0.04		0.32	68.2	6.1
	Subbasin-9l	0.31	80	0.46	376.3	45.4
	Subbasin-9o	0.10	79	0.70	84.3	13.7
	Junction-8	2.04			1678.3	287.5
	Reach-8	2.04		0.13	1678.3	287.5
	Subbasin-9m	0.30	80	0.45	371.0	44.1
	Junction-9	0.30			371.0	44.1
	Reach-9	0.30		0.03	371.0	44.1
	Subbasin-9n	0.02	80	0.29	37.4	3.3
	Junction-10	2.37			1794.7	334.9
Reach-10	2.37		0.22	1794.7	334.9	
Subbasin-9e	0.40	79	0.58	392.4	55.8	
Subbasin-9g	0.03	80	0.30	54.1	4.9	
Junction-11	0.43			420.8	60.8	
Reach-11	0.43		0.56	420.8	60.8	
Subbasin-9q	0.38	76	1.21	195.6	48.6	
Subbasin-9p	0.11	70	0.68	63.5	10.6	

Table 2.7-M-1. HEC-HMS Input Parameters and Results

Drainage Basin	Hydraulic Element ¹	Drainage Area (mi ²)	Curve Number	Watershed Lag Time (hrs)	Peak Discharge (cfs)	Volume (acre-ft)
9	Junction-12	3.29			2395.7	454.8
	Reach-12	3.29		0.16	2395.7	454.8
	Subbasin-9r	0.04	70	0.30	46.1	4.3
	Junction-13	3.33			2401.6	459.1
10	Subbasin-10a	0.11	80	0.32	162.1	15.4
	Junction-1	0.11			162.1	15.4
	Reach-1	0.11		0.20	162.1	15.4
	Junction-2	0.41			524.2	56.2
	Subbasin-10b	0.30	78	0.37	390.9	40.8
	Reach-2	0.41		0.32	524.2	56.2
	Subbasin-10c	0.07	78	0.57	69.3	9.8
	Junction-3	0.48			587.6	66.0
11	Subbasin-11a	0.22	80	0.36	314.8	32.2
	Junction-1	0.22			314.8	32.2
	Reach-1	0.22		0.11	314.8	32.2
	Subbasin-11b	0.03	80	0.25	58.5	4.8
	Junction-2	0.03			58.5	4.8
	Reach-2	0.03		0.18	58.5	4.8
	Subbasin-11c	0.10	80	0.37	137.9	14.4
	Subbasin-11d	0.02	80	0.24	27.2	2.2
	Junction-3	0.37			520.3	53.5
	Reach-3	0.37		0.07	520.3	53.5
	Subbasin-11e	0.01	80	0.26	15.6	1.3
Junction-4	0.38			528.9	54.8	
12	Subbasin-12a	0.06	79	0.24	103.3	8.3
	Junction-1	0.06			103.3	8.3
	Reach-1	0.06		0.13	103.3	8.3
	Subbasin-12b	0.23	79	0.37	309.5	32.3
	Junction-2	0.29			412.7	40.5
	Reach-2	0.29		0.17	412.7	40.5
	Subbasin-12c	0.16	80	0.48	190.2	23.6
	Junction-3	0.45			600.6	64.2
	Reach-3	0.45		0.15	600.6	64.2
	Subbasin-12d	0.08	80	0.32	114.7	10.9
Junction-4	0.53			651.1	75.1	
13	Subbasin-13a	0.10	77	0.37	126.4	13.2
	Junction-1	0.10			126.4	13.2
14	Subbasin-14c	1.74	72	0.86	971.6	190.1
	Subbasin-14b	0.70	73	0.68	486.3	79.4
	Junction-1	2.44			1427.9	269.5
	Reach-1	2.44		0.14	1427.9	269.5

Table 2.7-M-1. HEC-HMS Input Parameters and Results

Drainage Basin	Hydraulic Element ¹	Drainage Area (mi ²)	Curve Number	Watershed Lag Time (hrs)	Peak Discharge (cfs)	Volume (acre-ft)
14	Subbasin-14a	2.32	69	1.51	730.5	224.4
	Subbasin-14d	0.05	63	0.40	28.9	3.5
	Junction-2	4.81			1969.0	497.5
	Reach-2	4.81		0.18	1969.0	497.5
	Subbasin-14e	0.32	66	0.44	217.6	27.4
	Junction-3	5.14			2032.3	524.9
15	Subbasin-15a	0.09	70	0.33	92.7	9.3
	Junction-1	0.09			92.7	9.3
	Reach-1	0.09		0.04	92.7	9.3
	Subbasin-15b	0.03	68	0.25	36.0	3.1
	Junction-2	0.13			124.1	12.3
	Reach-2	0.13		0.38	124.1	12.3
	Subbasin-15c	0.59	71	0.61	402.5	61.5
Junction-3	0.71			523.1	73.8	
16	Subbasin-16a	0.02	71	0.22	29.7	2.3
	Junction-1	0.02			29.7	2.3
17	Subbasin-17a	0.13	69	0.30	132.8	12.6
	Junction-1	0.13			132.8	12.6

1) See Exhibit 2.7-M-1 for hydrologic element locations.

Attachment 2.7-M-1

Dewey-Burdock Hydrologic Soil Groups

Soil Identification ²	Hydrologic Soil Group ²	Curve Number ¹					
		Noncultivated agricultural land, Pasture or range, No mechanical treatment			Forestland, Woods		
		Poor	Fair	Good	Poor	Fair	Good
118	BC	83	74	68	72	67	63
127	BC	83	74	68	72	67	63
130	D	89	84	80	83	79	77
160	D	89	84	80	83	79	77
185	CD	88	82	77	80	76	74
186	CD	88	82	77	80	76	74
189	D	89	84	80	83	79	77
196	D	89	84	80	83	79	77
204	BC	83	74	68	72	67	63
206	BCD	85	77	72	75	71	67
207	B	79	69	61	66	60	55
211	C	86	79	74	77	73	70
215	BC	83	74	68	72	67	63
Ar	D	89	84	80	83	79	77
AsA	D	89	84	80	83	79	77
AsB	B	79	69	61	66	60	55
Bc	B	79	69	61	66	60	55
BdA	B	79	69	61	66	60	55
BeB	B	79	69	61	66	60	55
BoB	B	79	69	61	66	60	55
BpB	B	79	69	61	66	60	55
BrB	B	79	69	61	66	60	55
BrD	D	89	84	80	83	79	77
BsB	B	79	69	61	66	60	55
BvD	BD	84	77	71	75	70	66
BwE	D	89	84	80	83	79	77
CdF	D	89	84	80	83	79	77
CnD	B	79	69	61	66	60	55
DgB	D	89	84	80	83	79	77
DwB	A	68	49	39	45	36	25
EaC	B	79	69	61	66	60	55
GrD	D	89	84	80	83	79	77
GrE	D	89	84	80	83	79	77
GrF	D	89	84	80	83	79	77
GsD	CD	88	82	77	80	76	74
GuC	BD	84	77	71	75	70	66
Ha	B	79	69	61	66	60	55
HaA	B	79	69	61	66	60	55

Soil Identification ²	Hydrologic Soil Group ²	Curve Number ¹					
		Noncultivated agricultural land, Pasture or range, No mechanical treatment			Forestland, Woods		
		Poor	Fair	Good	Poor	Fair	Good
He	D	89	84	80	83	79	77
KyA	D	89	84	80	83	79	77
KyB	D	89	84	80	83	79	77
Lo	C	86	79	74	77	73	70
MbA	C	86	79	74	77	73	70
MbB	C	86	79	74	77	73	70
MmE	BD	84	77	71	75	70	66
MpE	CD	88	82	77	80	76	74
NfE	B	79	69	61	66	60	55
NoB	B	79	69	61	66	60	55
NuA	C	86	79	74	77	73	70
NuB	C	86	79	74	77	73	70
PeB	D	89	84	80	83	79	77
PgC	D	89	84	80	83	79	77
PgE	D	89	84	80	83	79	77
PsE	D	89	84	80	83	79	77
Pt	D	89	84	80	83	79	77
Pu	D	89	84	80	83	79	77
RhD	D	89	84	80	83	79	77
RoF	BD	84	77	71	75	70	66
RpC	B	79	69	61	66	60	55
RrE	BD	84	77	71	75	70	66
RsF	BD	84	77	71	75	70	66
ScB	B	79	69	61	66	60	55
SmE	AB	74	59	50	56	48	40
SnE	D	89	84	80	83	79	77
TaA	B	79	69	61	66	60	55
TaB	B	79	69	61	66	60	55
TfB	B	79	69	61	66	60	55
W	WATER						
ZcC	BD	84	77	71	75	70	66
ZnE	B	79	69	61	66	60	55

1) From Hydrologic Analysis and Design, Richard H. McCuen, 1941

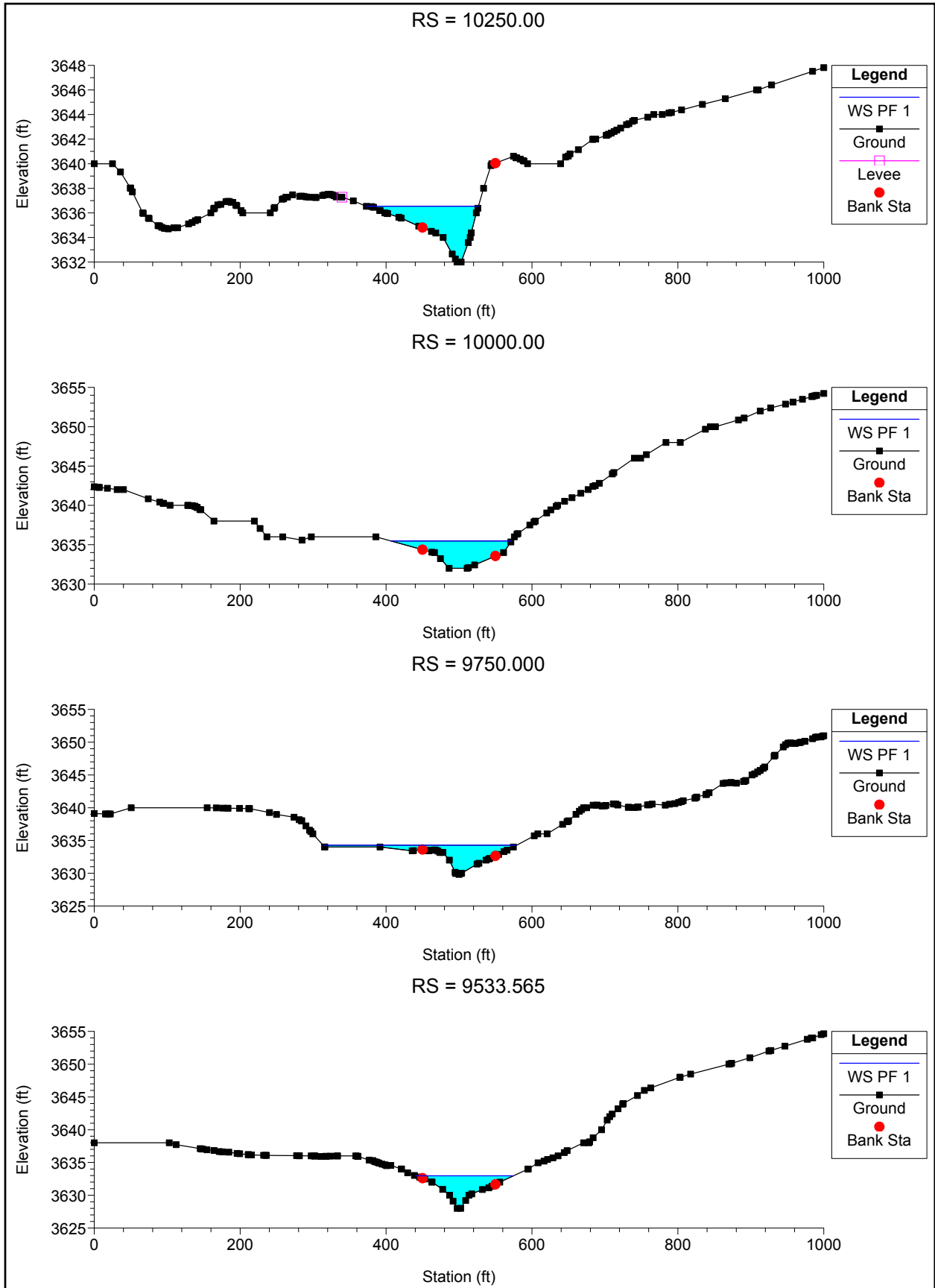
2) NRCS Soil Survey geographic data (Niobrara County, WY; Custer County, and Fall River County, SD)

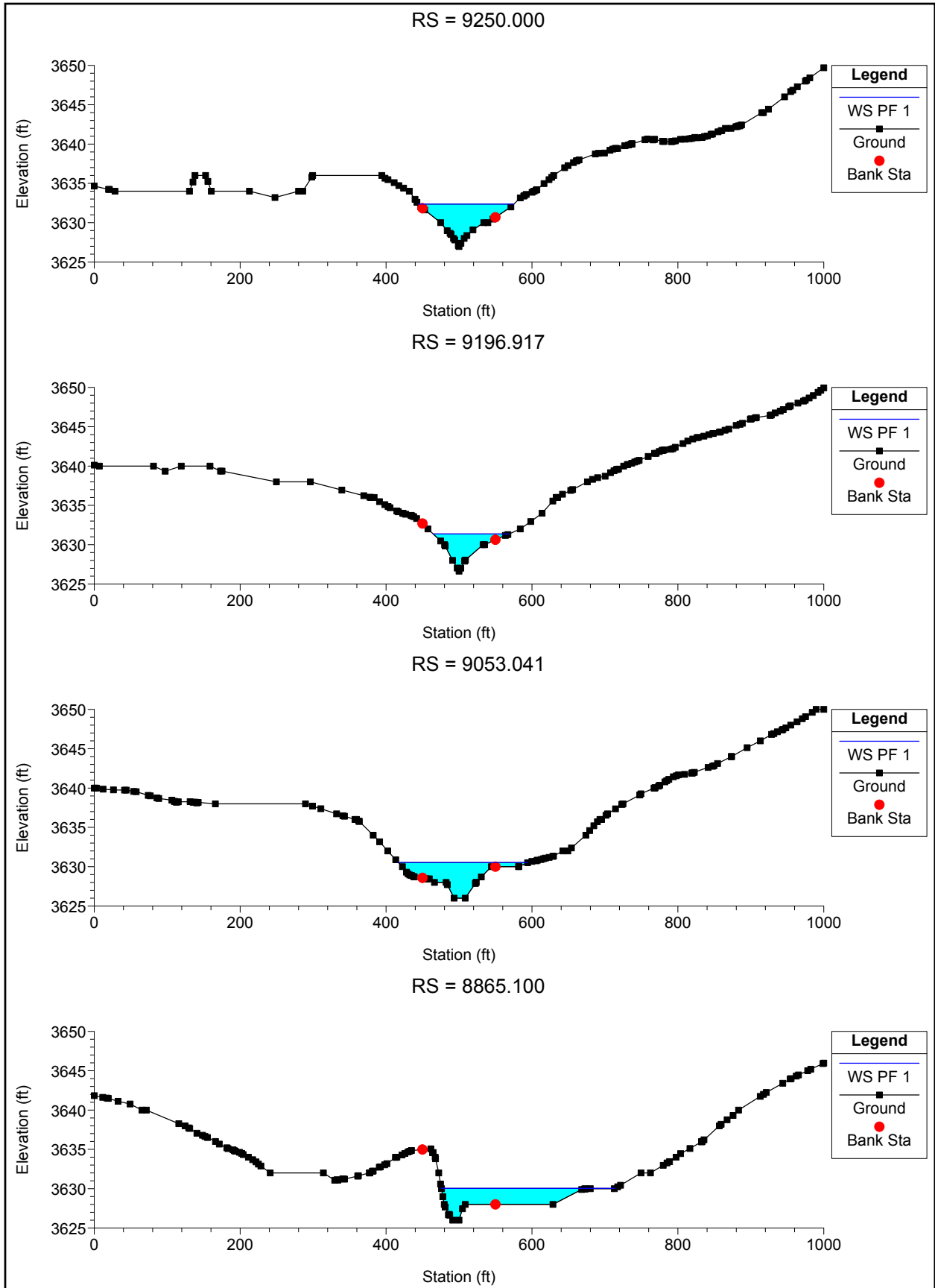
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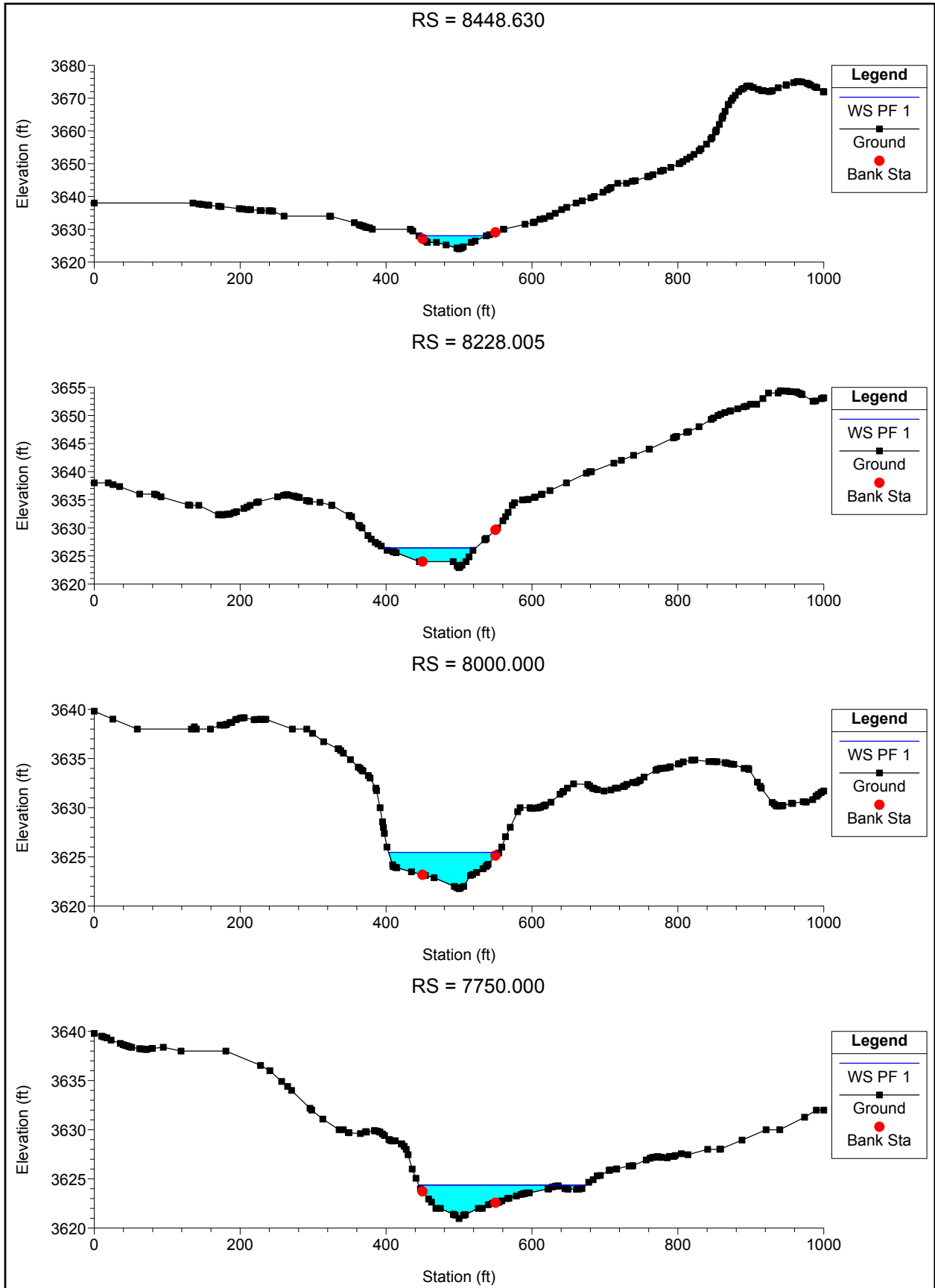
HEC-RAS Channel 01

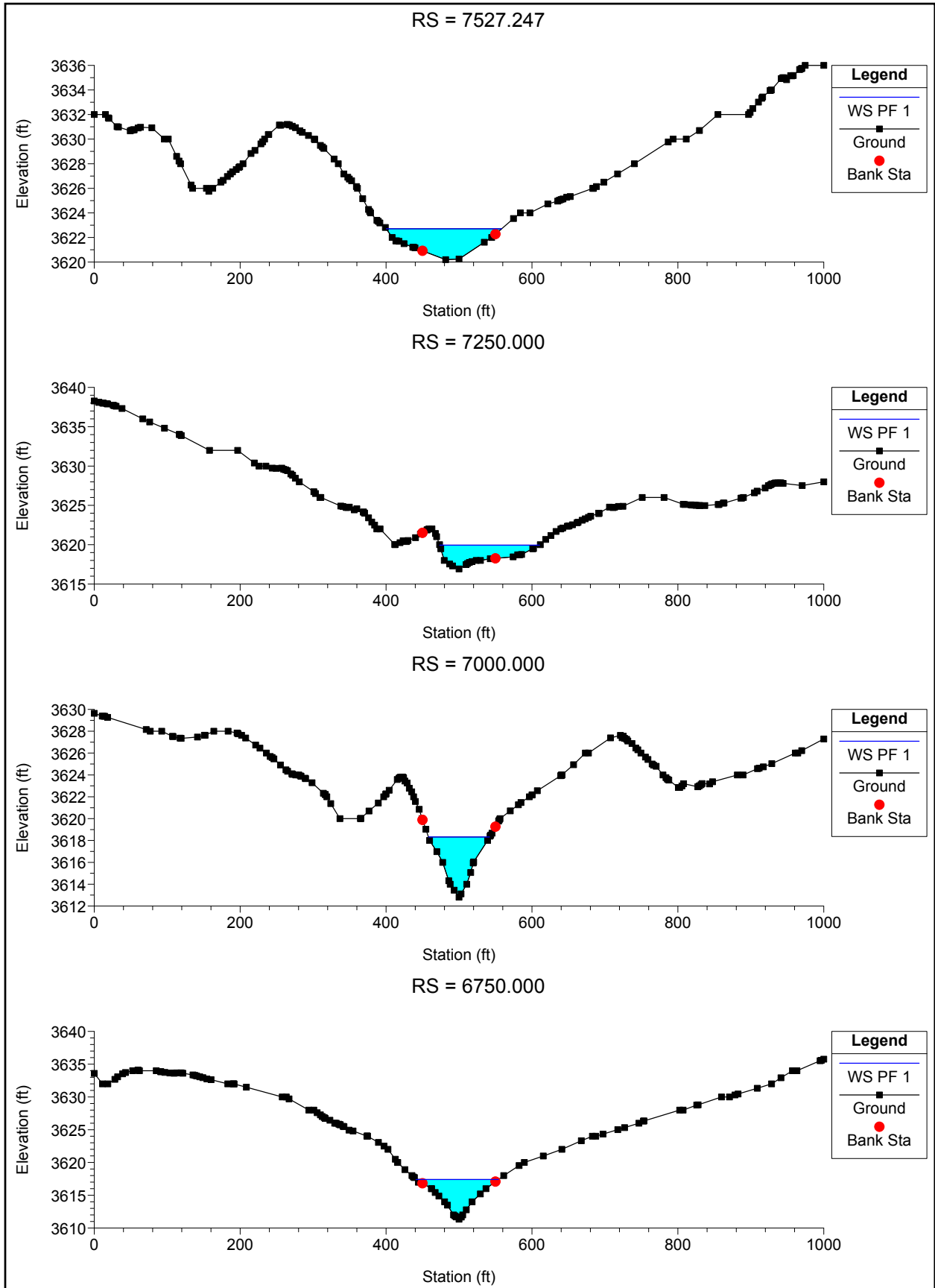


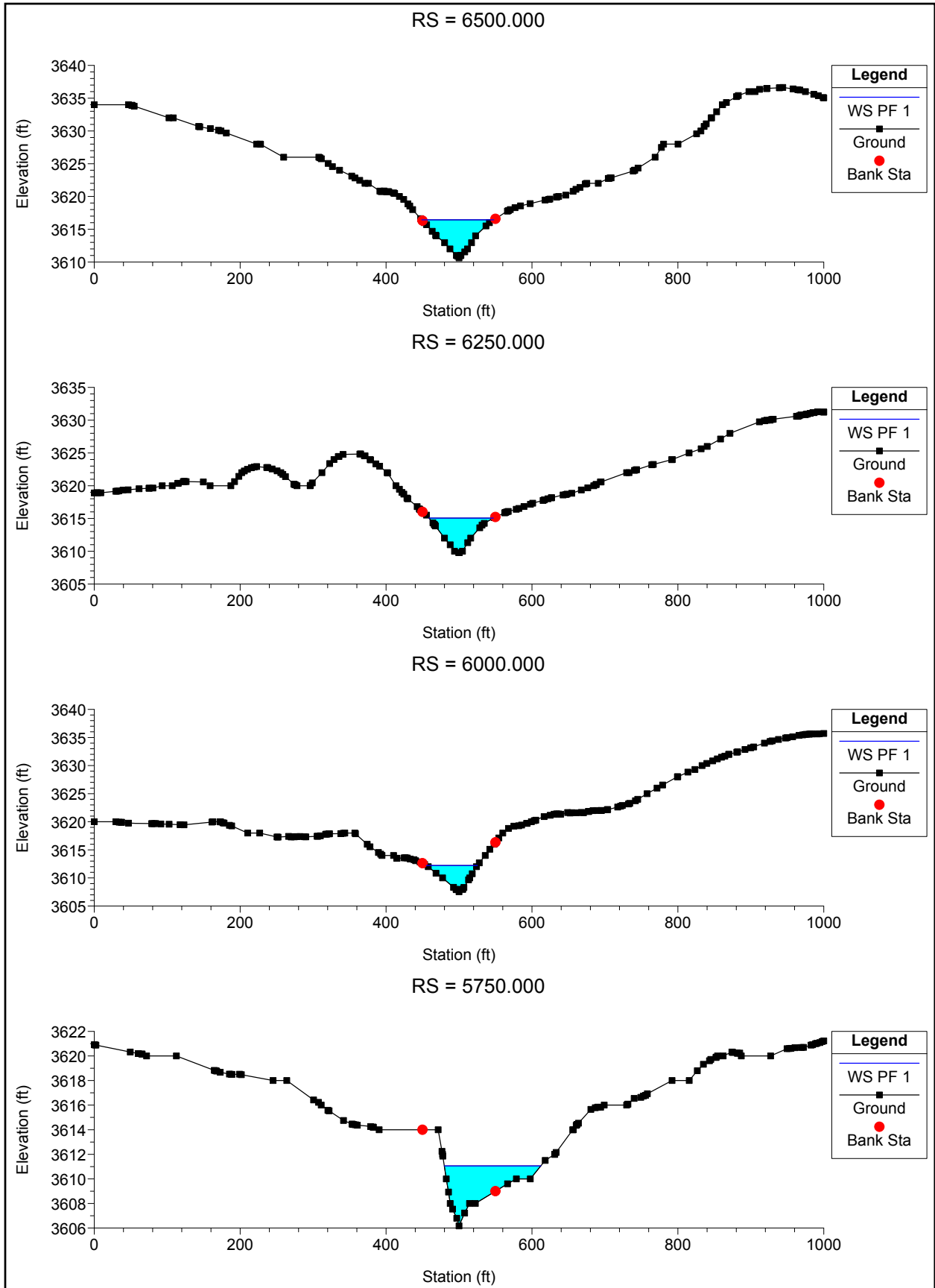
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	10250	PF 1	1490	3632	3636.54	3636.13	3637.09	0.005756	6.28	271.61	153.86	0.67
1	10000	PF 1	1490	3632	3635.47		3635.87	0.004225	5.22	311.3	165.14	0.57
1	9750	PF 1	1490	3629.82	3634.27		3634.72	0.005681	5.64	314.54	265.19	0.65
1	9533.565	PF 1	1490	3628	3632.97		3633.51	0.006128	5.98	259.87	134.23	0.68
1	9250	PF 1	1490	3626.97	3632.36		3632.74	0.003418	5	311.26	130.66	0.52
1	9196.917	PF 1	1490	3626.64	3631.37	3631.37	3632.36	0.013013	8.03	190.42	104.44	0.97
1	9053.041	PF 1	1490	3626	3630.53	3629.63	3630.87	0.003531	4.89	335.44	177.71	0.52
1	8865.1	PF 1	1490	3626	3630.05		3630.3	0.003659	4.69	392.29	237.98	0.52
1	8448.63	PF 1	1490	3624	3628	3627.79	3628.87	0.010589	7.51	199.98	92.42	0.88
1	8228.005	PF 1	1490	3622.91	3626.43		3627.07	0.00842	6.81	240.67	126.15	0.79
1	8000	PF 1	1490	3621.77	3625.46		3625.79	0.003841	4.81	327.97	151.44	0.54
1	7750	PF 1	1490	3620.96	3624.36		3624.76	0.005057	5.37	326.95	228.57	0.61
1	7527.247	PF 1	1490	3620.19	3622.71		3623.3	0.010058	6.48	247.25	158.25	0.83
1	7250	PF 1	1490	3616.93	3619.95	3619.82	3620.65	0.010608	7.19	230.44	136.96	0.87
1	7000	PF 1	1490	3612.81	3618.32		3618.99	0.006466	6.58	226.31	83.69	0.71
1	6750	PF 1	1490	3611.34	3617.4		3617.8	0.003409	5.06	297.7	112.95	0.52
1	6500	PF 1	1490	3610.64	3616.43		3616.89	0.004078	5.39	276.38	98.82	0.57
1	6250	PF 1	1490	3609.79	3615.06	3614.31	3615.72	0.006659	6.51	229.02	88.28	0.71
1	6000	PF 1	1490	3607.54	3612.22	3612.22	3613.44	0.013751	8.86	168.13	70.09	1.01
1	5750	PF 1	1490	3606.17	3611.06	3610.51	3611.55	0.004632	5.97	283.01	132.26	0.61
1	5500	PF 1	1490	3603.53	3610.01	3609.26	3610.58	0.004671	6.2	260.68	108.71	0.61
1	5250	PF 1	1490	3602.57	3608.42	3608.07	3609.21	0.007818	7.22	218.19	109.99	0.77
1	5047.68	PF 1	1490	3601.8	3607.43	3607.13	3607.82	0.005887	5.72	317.96	201.1	0.65
1	4750	PF 1	1490	3600.71	3606.37		3606.57	0.003232	4.1	440.69	293.41	0.48
1	4569.208	PF 1	1490	3600.04	3605.95		3606.11	0.002122	3.75	470.61	238.57	0.4
1	4250	PF 1	1490	3598.11	3604.24	3604.09	3605.05	0.008723	7.44	217.41	112.76	0.81
1	4000	PF 1	1490	3596.59	3602.55	3602.05	3603.16	0.006481	6.38	247.99	119.98	0.7
1	3750	PF 1	1490	3594.69	3600.81	3600.81	3601.52	0.011977	7.04	236.23	183.54	0.9
1	3431.53	PF 1	1490	3592.93	3597.96	3597.96	3598.1	0.00348	3.25	489.07	368.94	0.47
1	3250	PF 1	1490	3592.11	3594.91	3595.35	3596.49	0.106241	11.74	152.97	272.98	2.33
1	3066.49	PF 1	1490	3591.3	3594.96	3594.7	3595.2	0.007074	4.41	386.99	356.32	0.66
1	2750	PF 1	1490	3590	3592.88	3592.82	3593.55	0.010313	6.94	239.95	158.3	0.85
1	2500	PF 1	1490	3588.13	3590.45	3590.45	3590.91	0.012119	6.12	294.23	303.8	0.88
1	2250	PF 1	1490	3584.6	3586.02	3585.35	3586.29	0.004074	0.97	370.81	253.37	0.37
1	2103.108	PF 1	1490	3584	3585.95		3586	0.000843	1.92	789.05	416.09	0.24
1	1951.923	PF 1	1490	3584	3585.09	3585.09	3585.63	0.018315	5.52	253.56	245.61	1
1	1750	PF 1	1490	3579.24	3580.01	3580.01	3580.01	0.000056	0.17	2809.01	1328.6	0.05
1	1500	PF 1	1490	3577.76	3578.54	3578.01	3578.57	0.000797	0.96	1219.04	1296.87	0.2
1	1250	PF 1	1490	3576.75	3578.4	3578.01	3578.42	0.000498	1.09	1439.29	1284.67	0.17
1	1000	PF 1	1490	3576	3577.97	3577.2	3578.17	0.00296	3.55	422.62	231.29	0.45
1	774.841	PF 1	1490	3573.26	3576.18	3576.1	3576.91	0.012682	6.84	217.95	128.14	0.92
1	500	PF 1	1490	3570	3573.81	3573.22	3574.48	0.007109	6.57	226.8	90.58	0.73
1	250	PF 1	1490	3568	3570.92	3570.92	3572.04	0.013773	8.5	175.22	78.09	1
1	0	PF 1	1490	3560.62	3561.75	3562.41	3564.26	0.136829	12.72	117.14	160.62	2.62

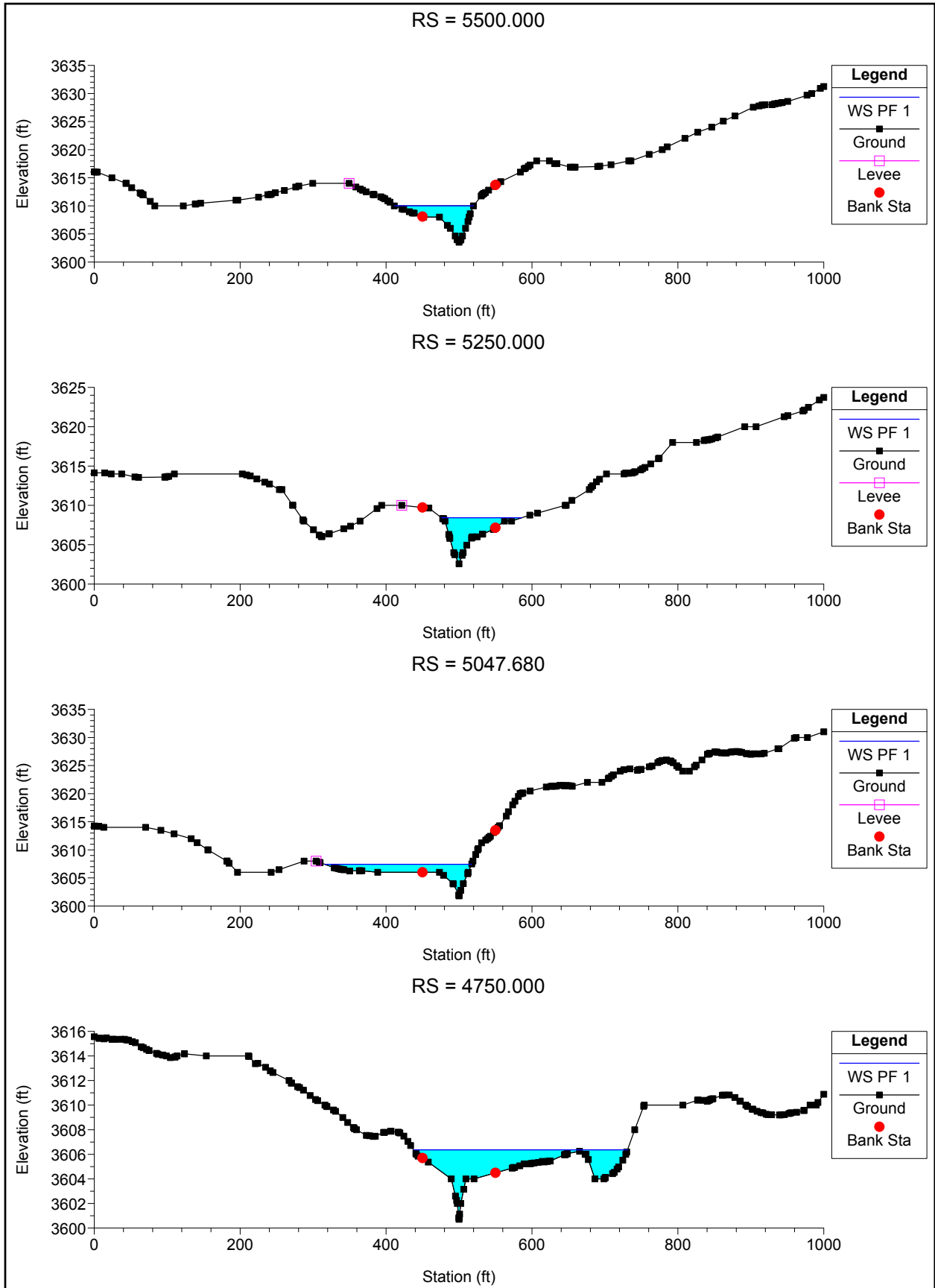


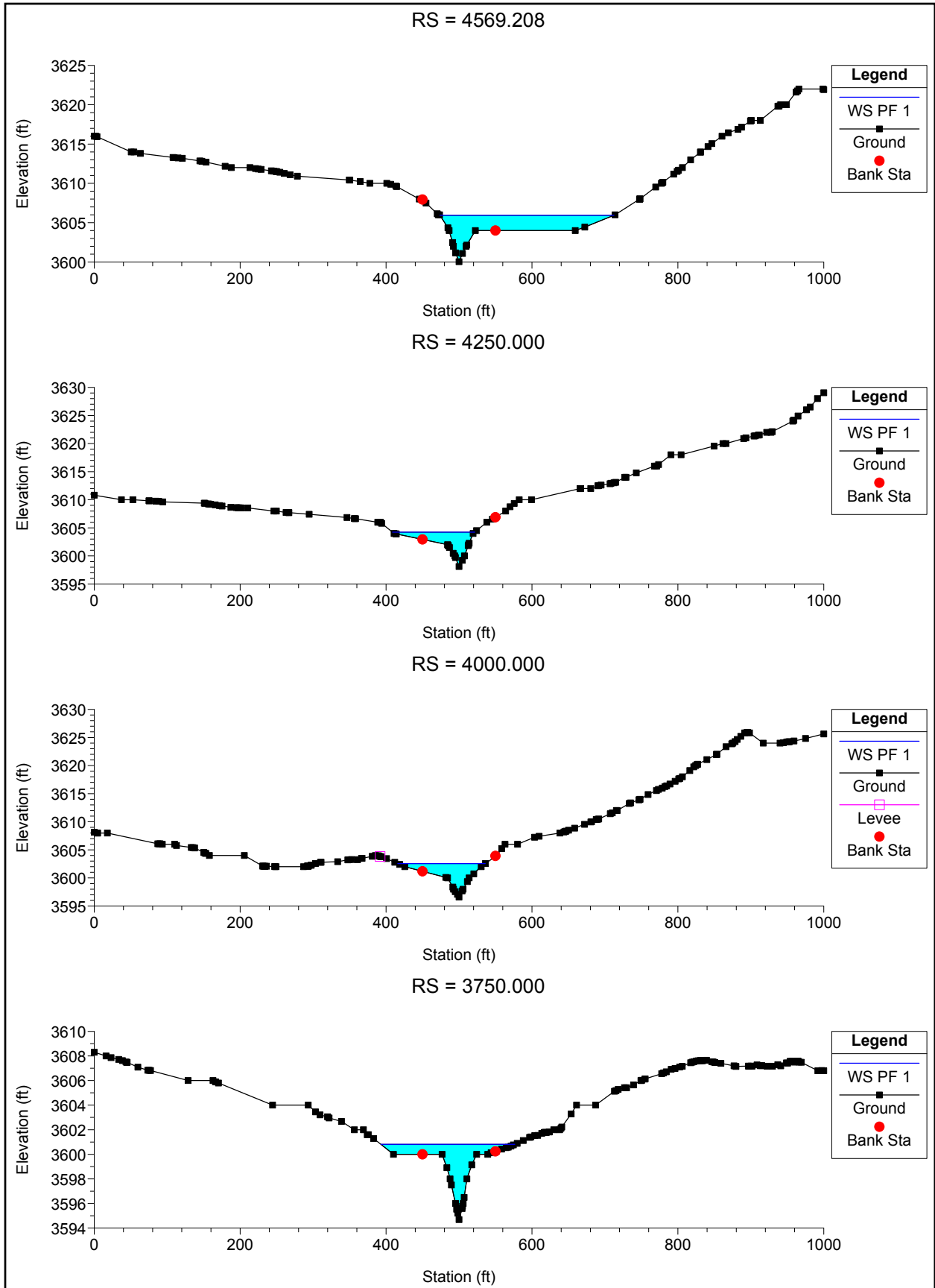


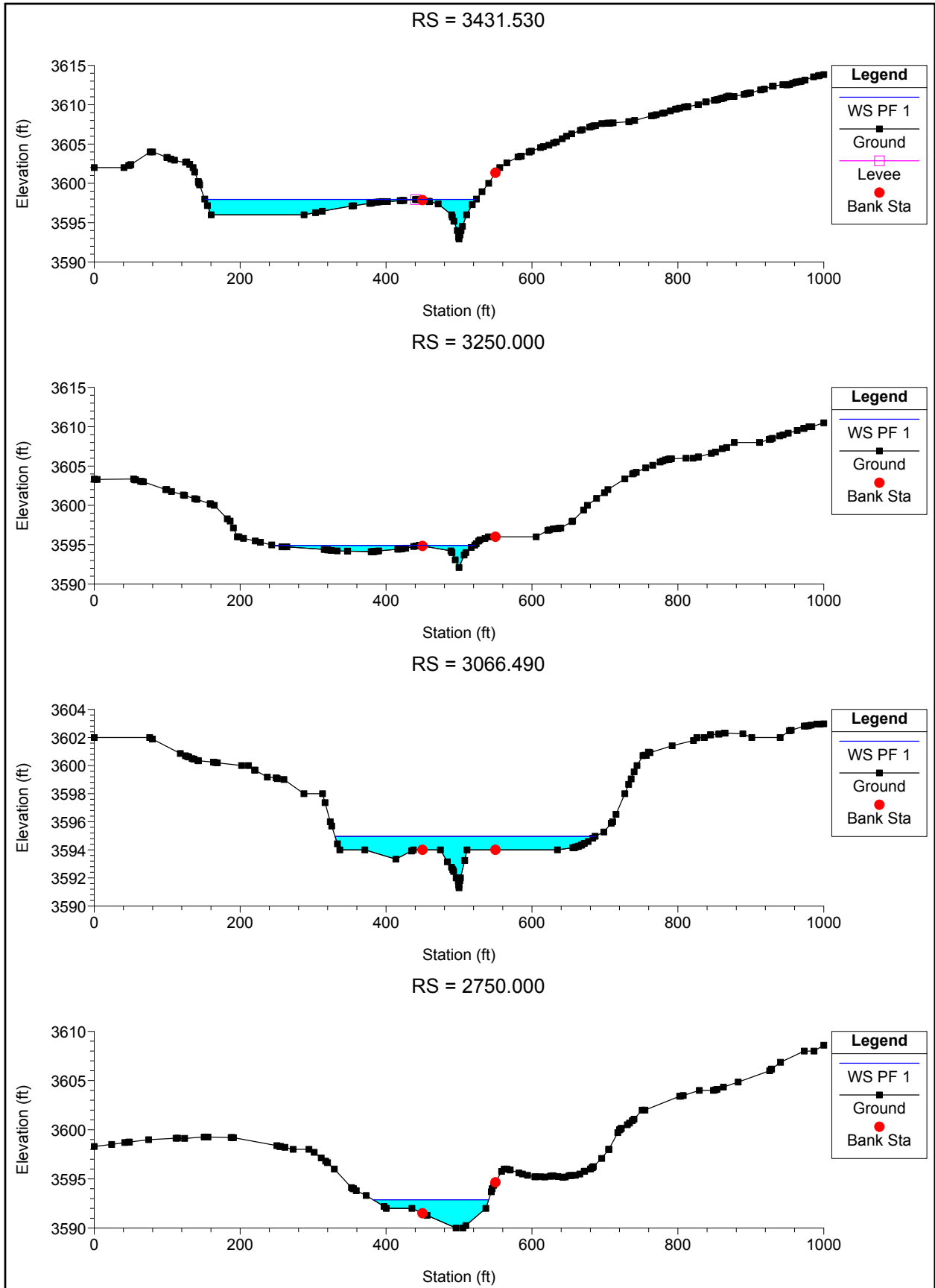


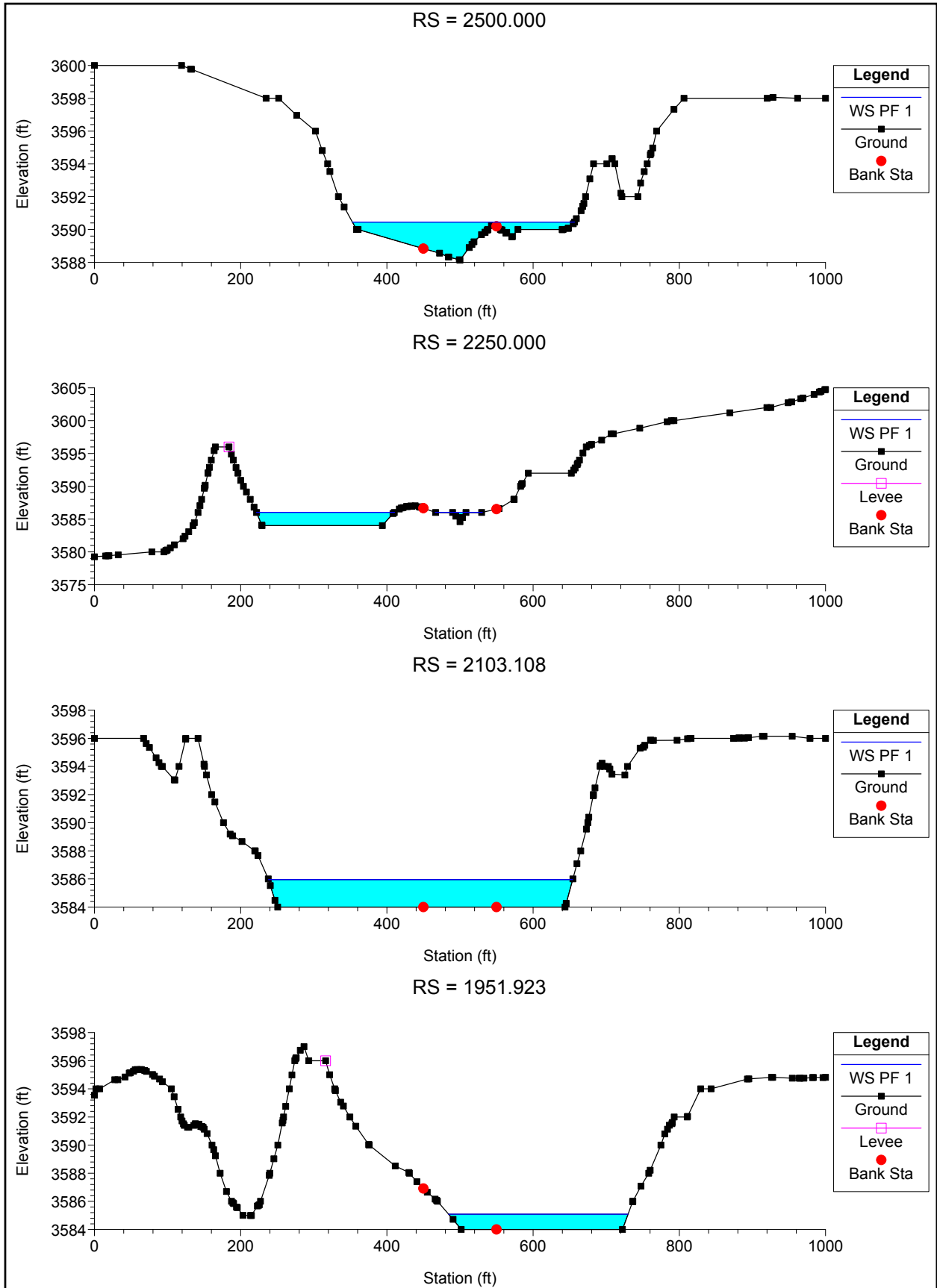


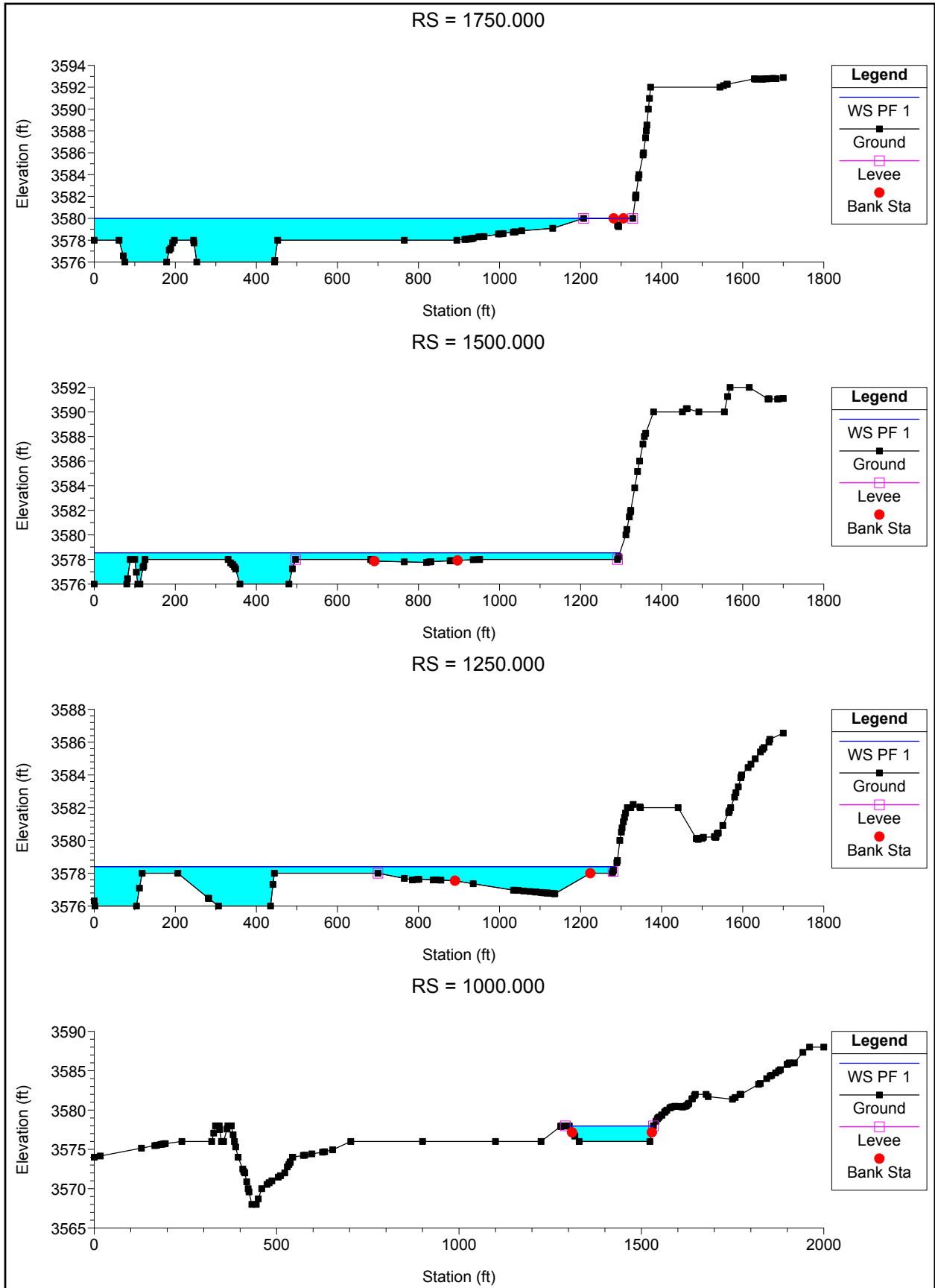


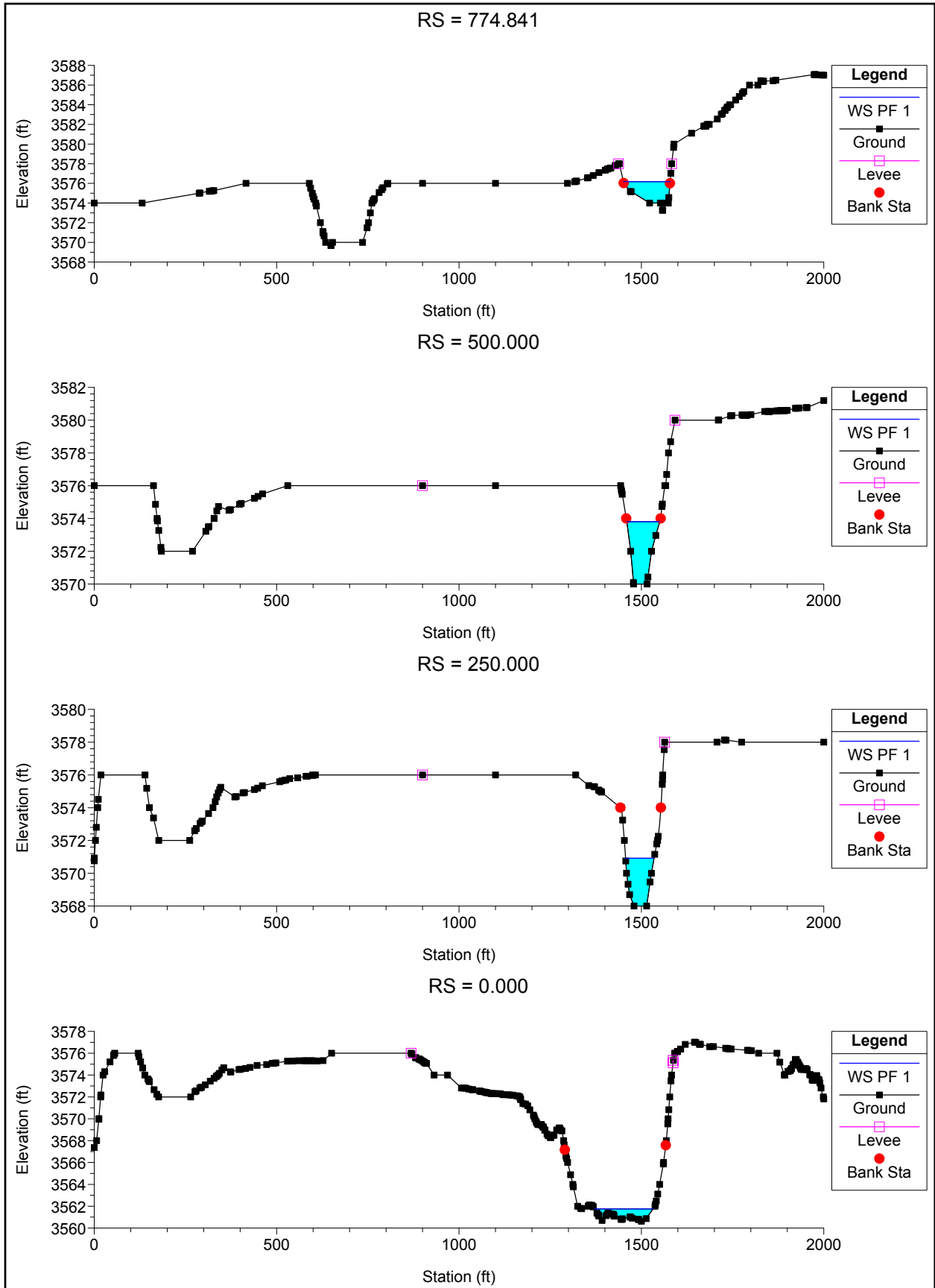










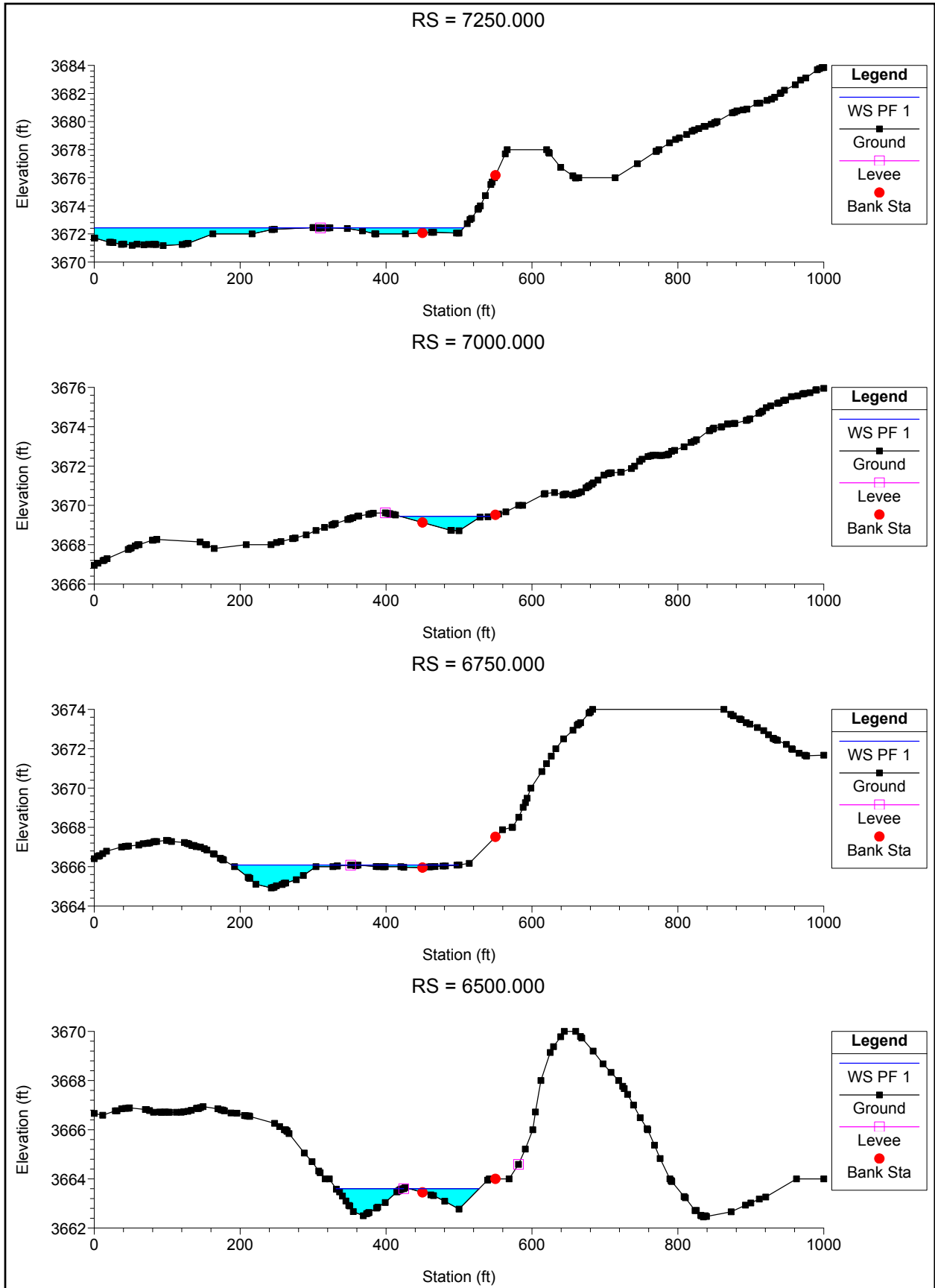


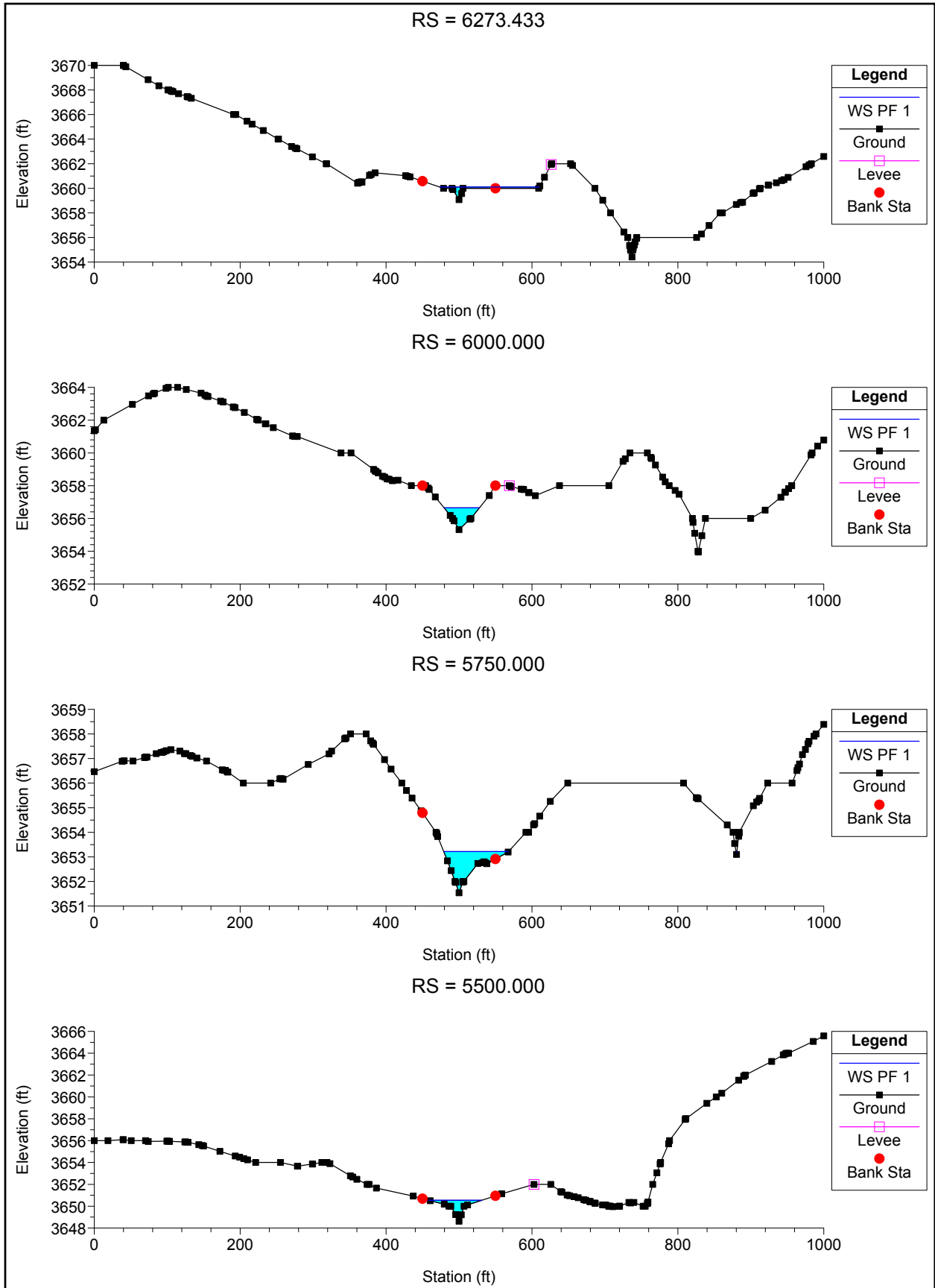
Attachment 2.7-M-3

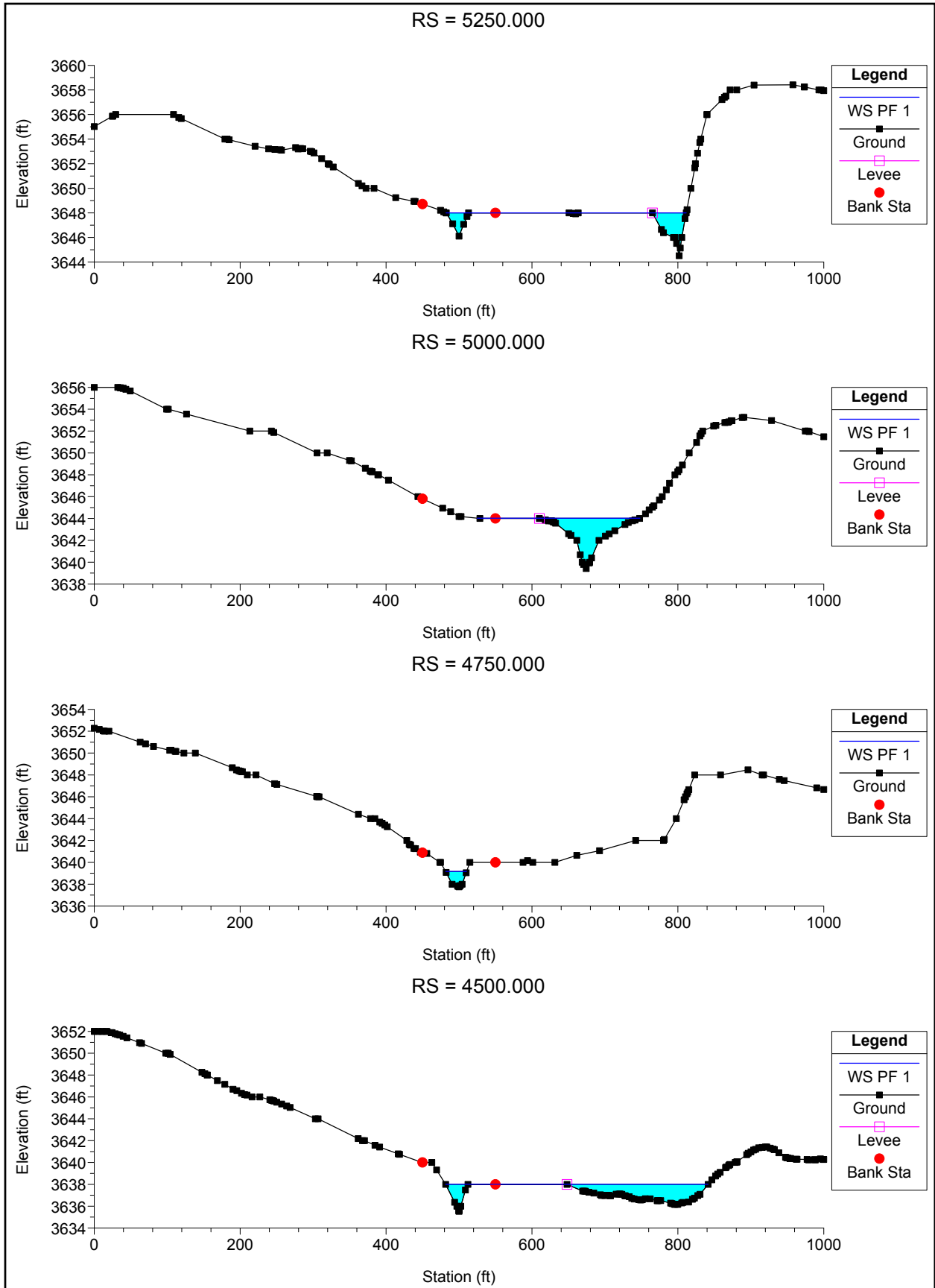
HEC-RAS Channel 02

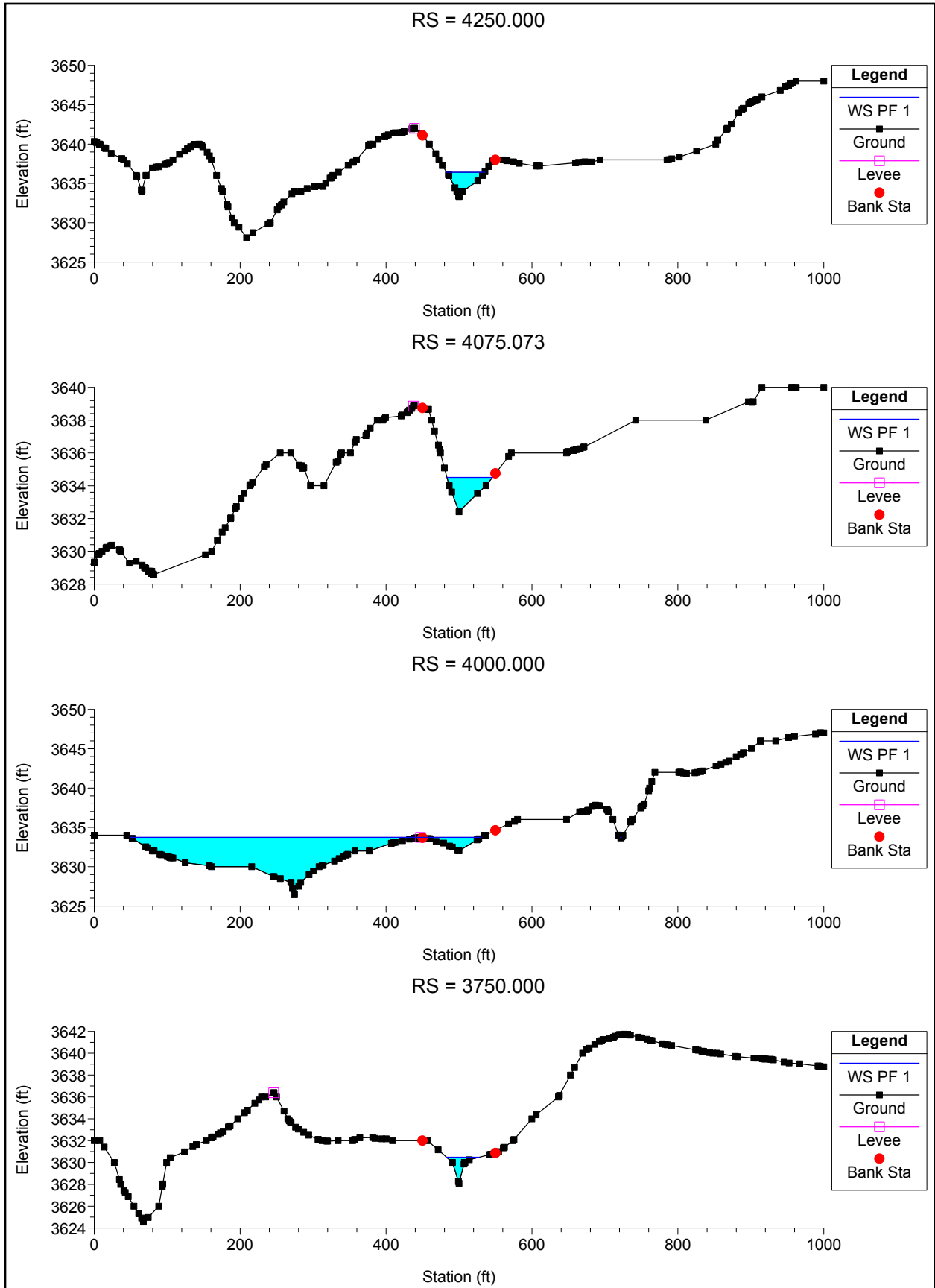


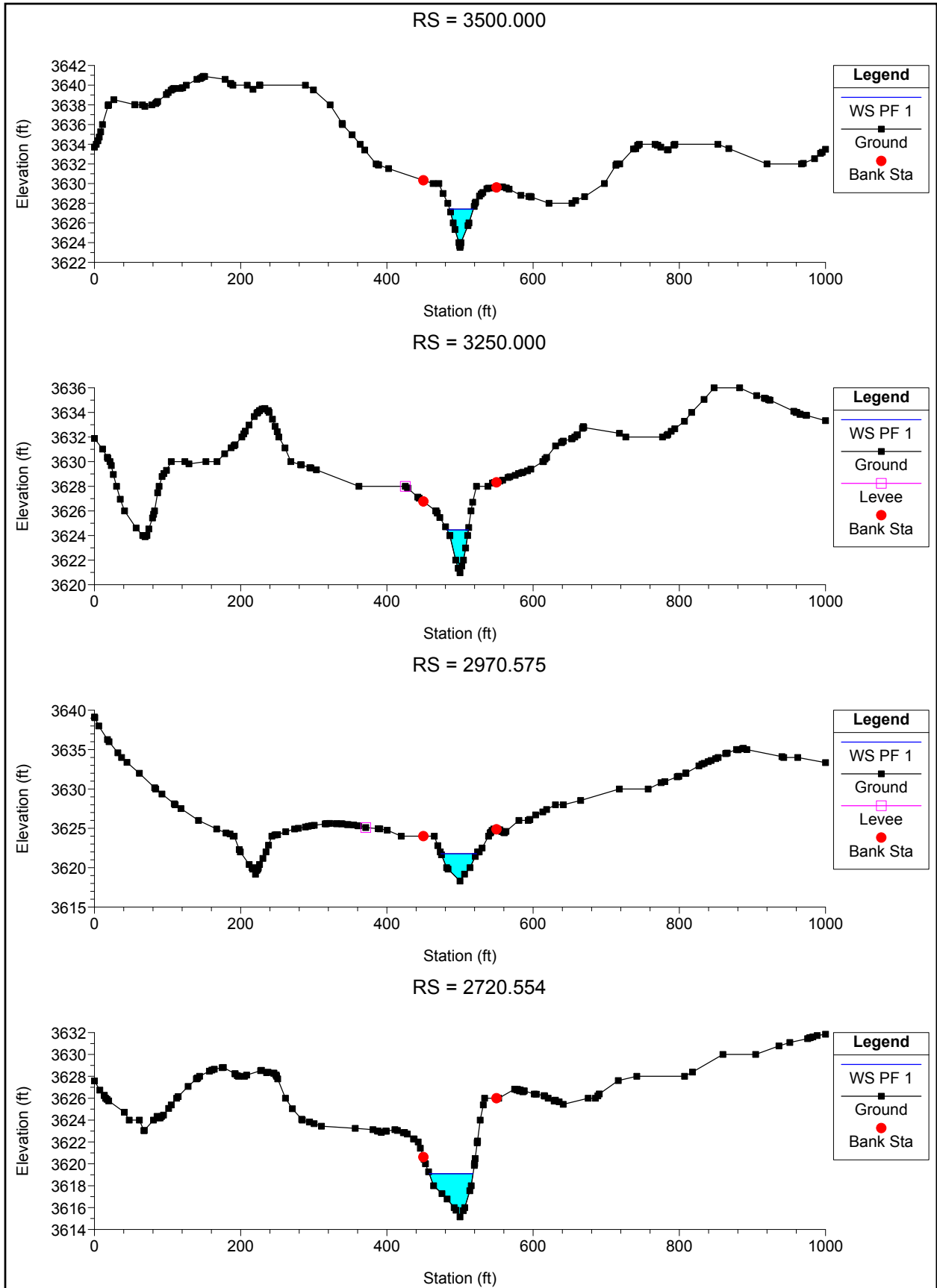
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
2	7250	PF 1	150	3672.06	3672.44	3672.4	3672.44	0.000354	0.38	261.81	493.24	0.12
2	7000	PF 1	150	3668.71	3669.45	3669.45	3669.63	0.021234	3.53	44.84	123.45	0.95
2	6750	PF 1	150	3665.95	3666.09	3666.09	3666.13	0.005618	0.51	96.1	310.88	0.35
2	6500	PF 1	150	3662.77	3663.6	3663.6	3663.64	0.00358	1.46	90.68	188.4	0.39
2	6273.433	PF 1	150	3659.07	3660.1	3660.29	3661.02	0.344273	8.21	20.35	136.09	3.32
2	6000	PF 1	150	3655.32	3656.65	3656.65	3656.98	0.0206	4.64	32.32	48.53	1
2	5750	PF 1	150	3651.54	3653.22	3652.97	3653.33	0.006274	2.77	55.96	89.74	0.56
2	5500	PF 1	150	3648.62	3650.55	3650.55	3650.8	0.02262	4.04	37.11	73.46	1
2	5250	PF 1	150	3646.11	3648	3648	3648.04	0.005725	1.78	101.14	329.21	0.49
2	5000	PF 1	150	3644	3644.03	3644.03	3644.04	0.000313	0.06	199.82	223.2	0.07
2	4750	PF 1	406	3637.76	3639.17	3640.28	3642.9	0.152285	15.5	26.19	28.75	2.86
2	4500	PF 1	406	3635.53	3638.01	3638.01	3638.05	0.002277	1.35	252.4	359.85	0.32
2	4250	PF 1	406	3633.32	3636.42	3636.07	3636.82	0.008186	5.09	79.76	51.84	0.72
2	4075.073	PF 1	406	3632.41	3634.51	3634.51	3635.06	0.017502	5.95	68.24	62.41	1
2	4000	PF 1	406	3632.02	3633.73	3633.73	3633.73	0.000016	0.14	1214.22	482.1	0.03
2	3750	PF 1	406	3628.09	3630.48	3631.15	3633.43	0.185071	13.78	29.47	44.5	2.98
2	3500	PF 1	406	3623.51	3627.41	3627.07	3628.05	0.009732	6.42	63.2	32.3	0.81
2	3250	PF 1	406	3620.97	3624.46	3624.46	3625.38	0.01545	7.69	52.8	29.1	1.01
2	2970.575	PF 1	406	3618.3	3621.78	3620.91	3622.05	0.00378	4.13	98.2	48.7	0.51
2	2720.554	PF 1	1077	3615.15	3619.1	3619.05	3620.14	0.013156	8.17	131.75	59.85	0.97
2	2500	PF 1	1077	3611.91	3616.33	3616.33	3617.6	0.013688	9.04	119.13	47.41	1.01
2	2250	PF 1	1077	3610.51	3614.71	3614	3615.24	0.005821	5.86	183.81	74.89	0.66
2	2000	PF 1	1077	3610	3613.56	3612.72	3614.1	0.005337	5.91	182.32	68.58	0.64
2	1750	PF 1	1077	3607.51	3610.9	3610.9	3612.07	0.013431	8.67	124.28	52.43	0.99
2	1500	PF 1	1077	3602.07	3606.01	3606.57	3608.07	0.02613	11.51	93.57	42.22	1.36
2	1250	PF 1	1077	3599.31	3603.73	3603.63	3604.82	0.012308	8.36	128.88	53.78	0.95
2	1000	PF 1	1077	3597.97	3601.16	3601.05	3601.91	0.010459	7.22	161.46	92	0.86
2	750	PF 1	1077	3595.26	3600.08	3599.16	3600.41	0.004925	4.81	244.08	150.77	0.59
2	500	PF 1	1077	3593.19	3597.7	3597.7	3598.83	0.014289	8.51	126.55	57.36	1.01
2	250	PF 1	1077	3588.35	3592.47	3593.13	3594.7	0.031698	11.98	89.93	43.86	1.47
2	0	PF 1	1077	3582.43	3584.42	3585	3586.28	0.041353	11.02	99.5	72.97	1.62

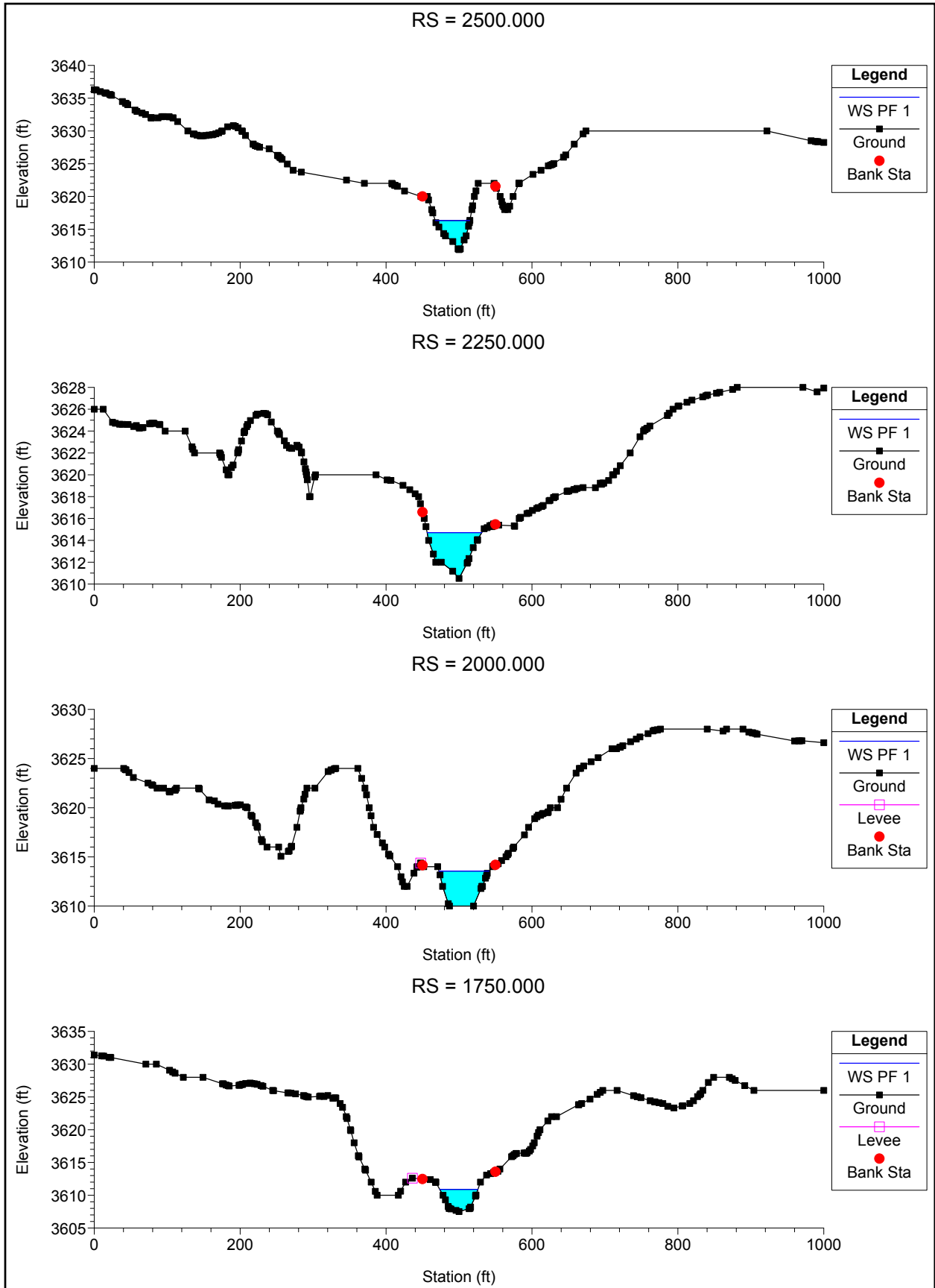


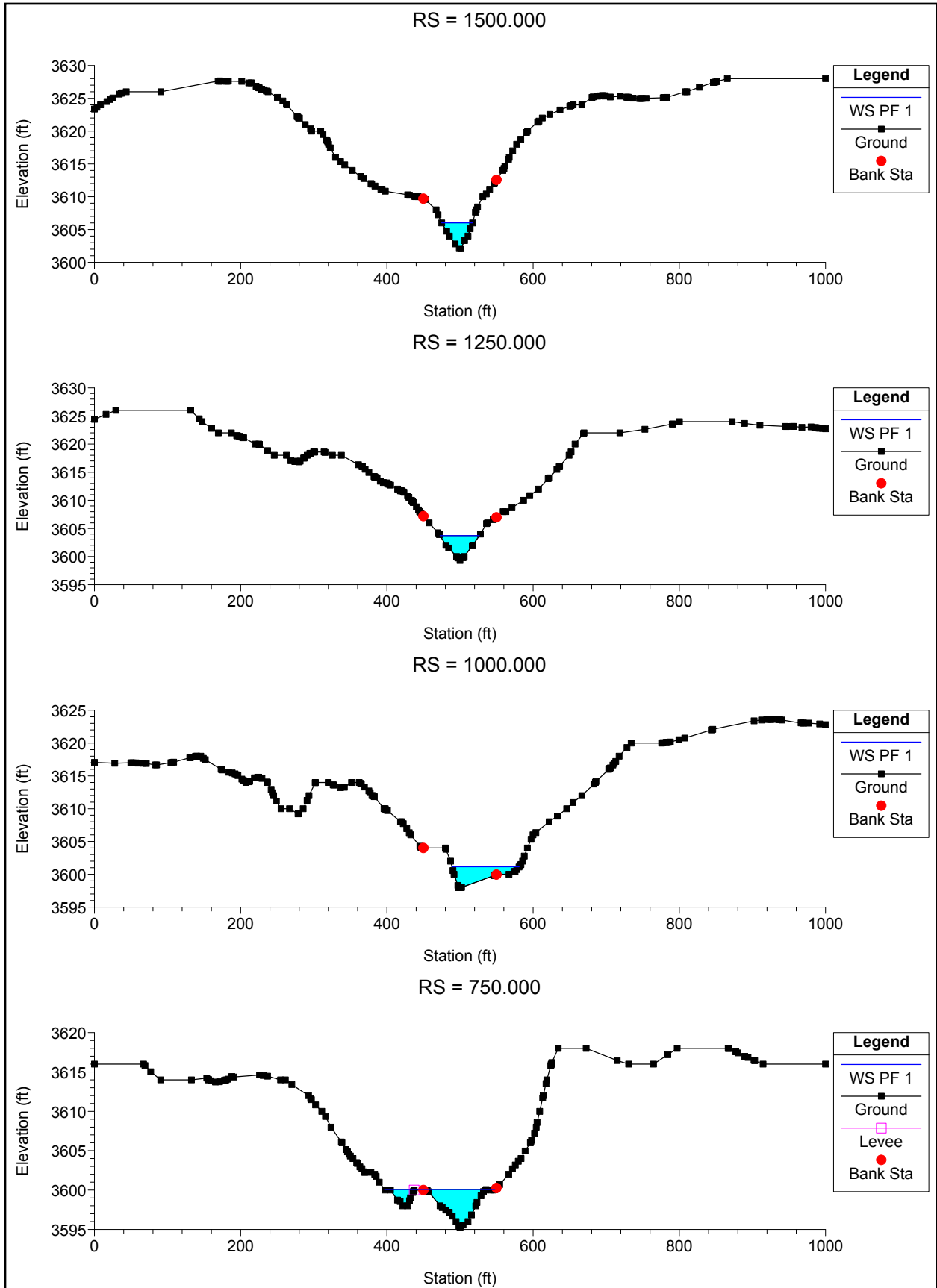


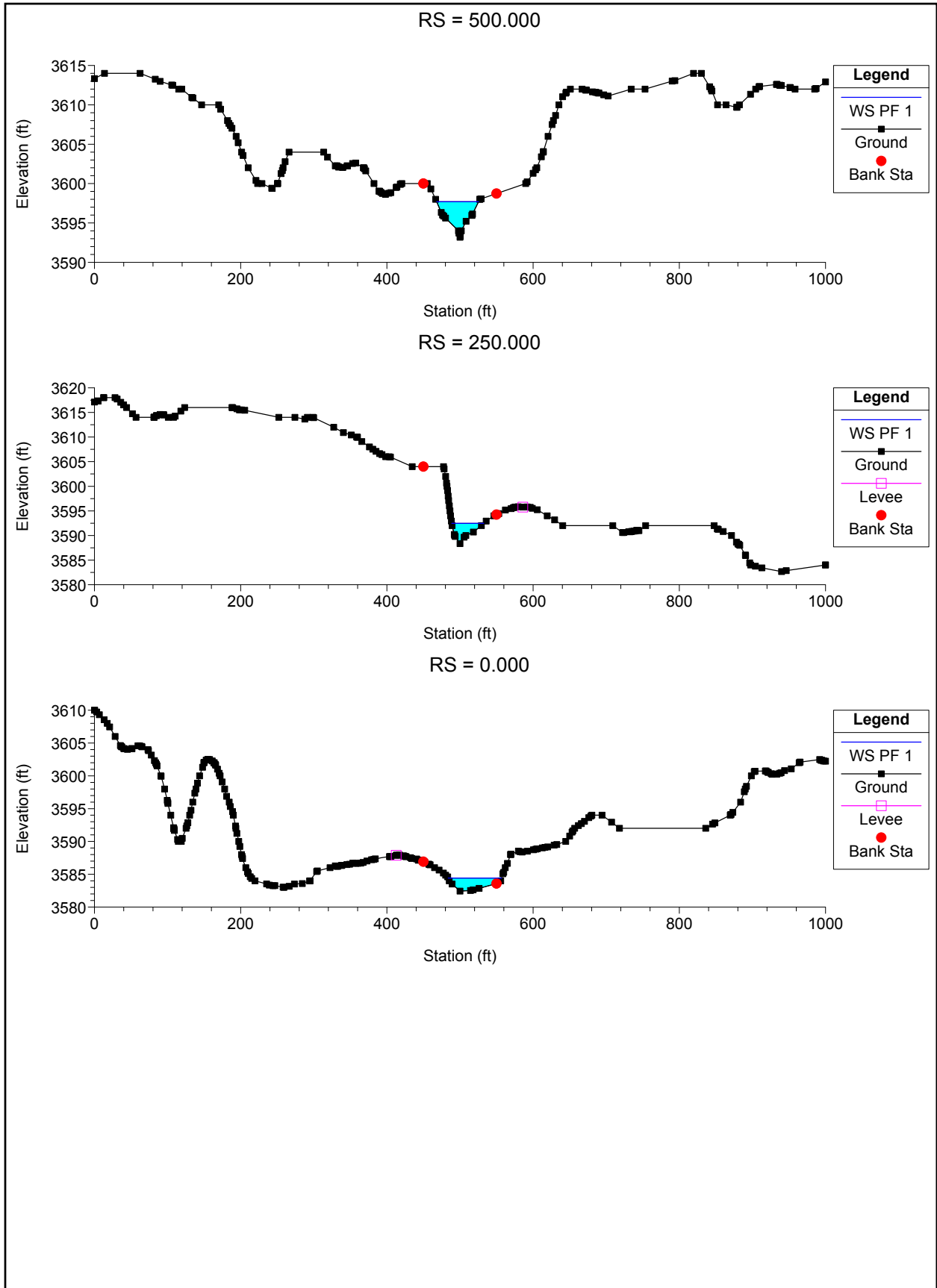










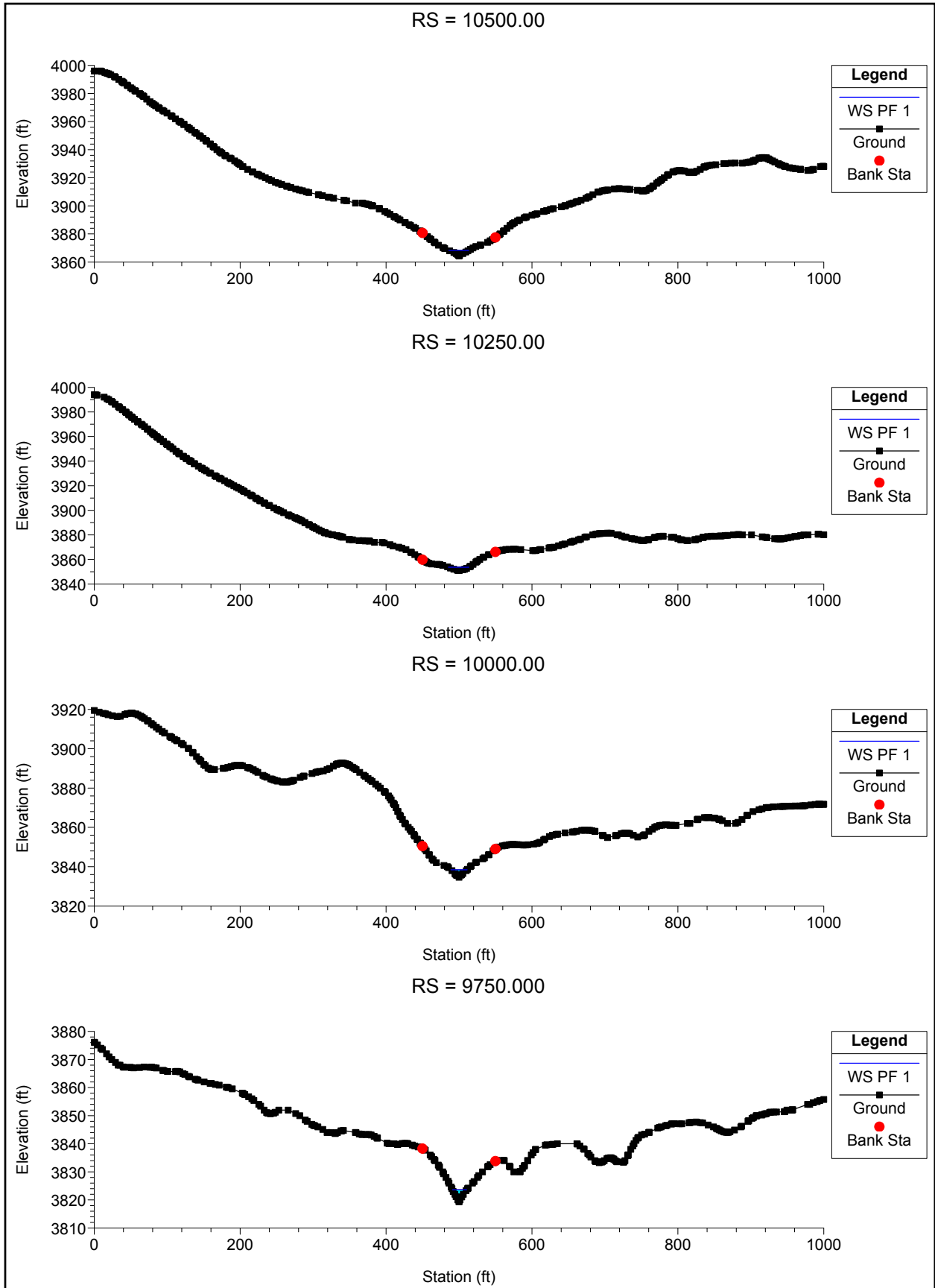


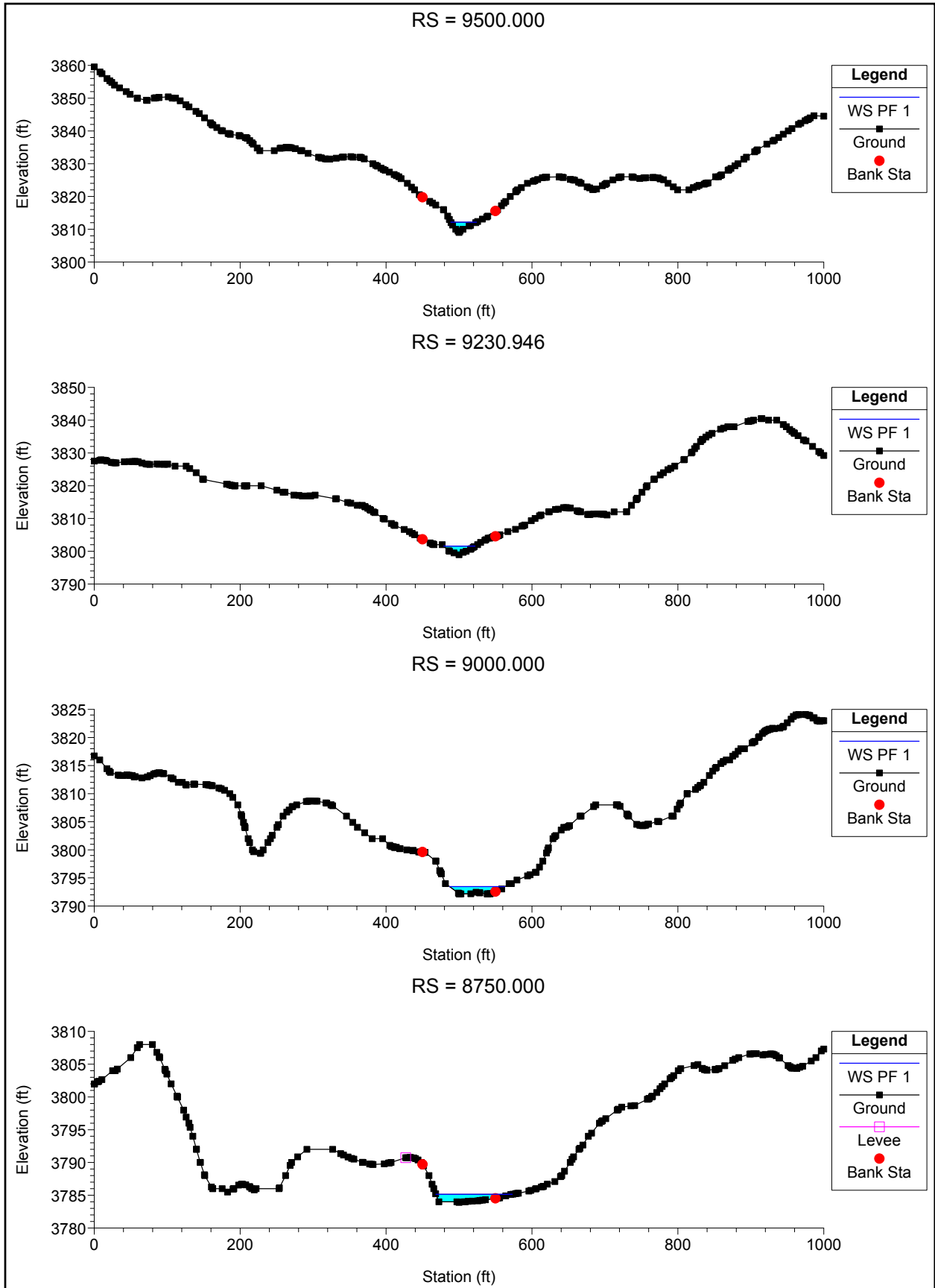
Attachment 2.7-M-4

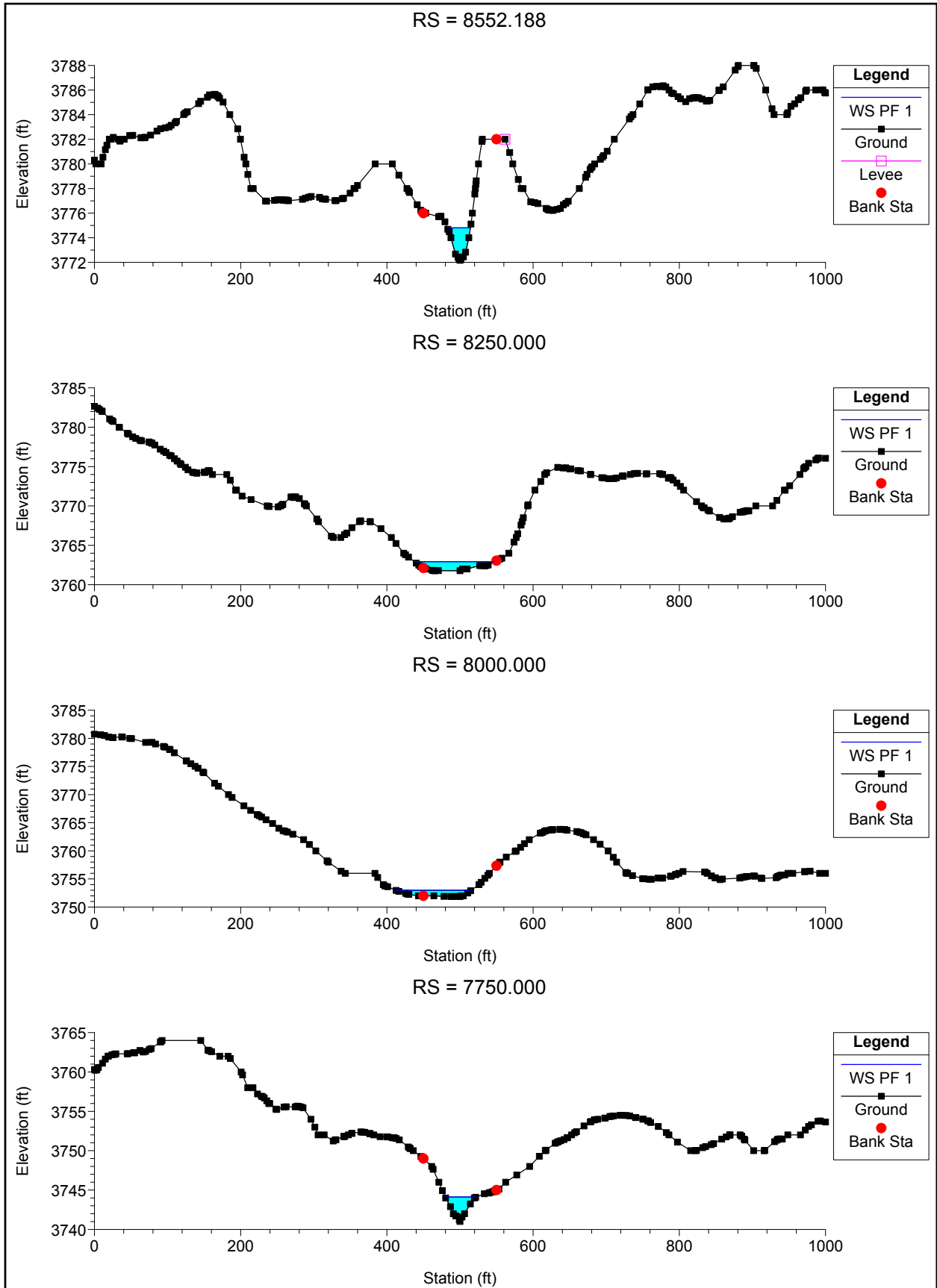
HEC-RAS Channel 02A

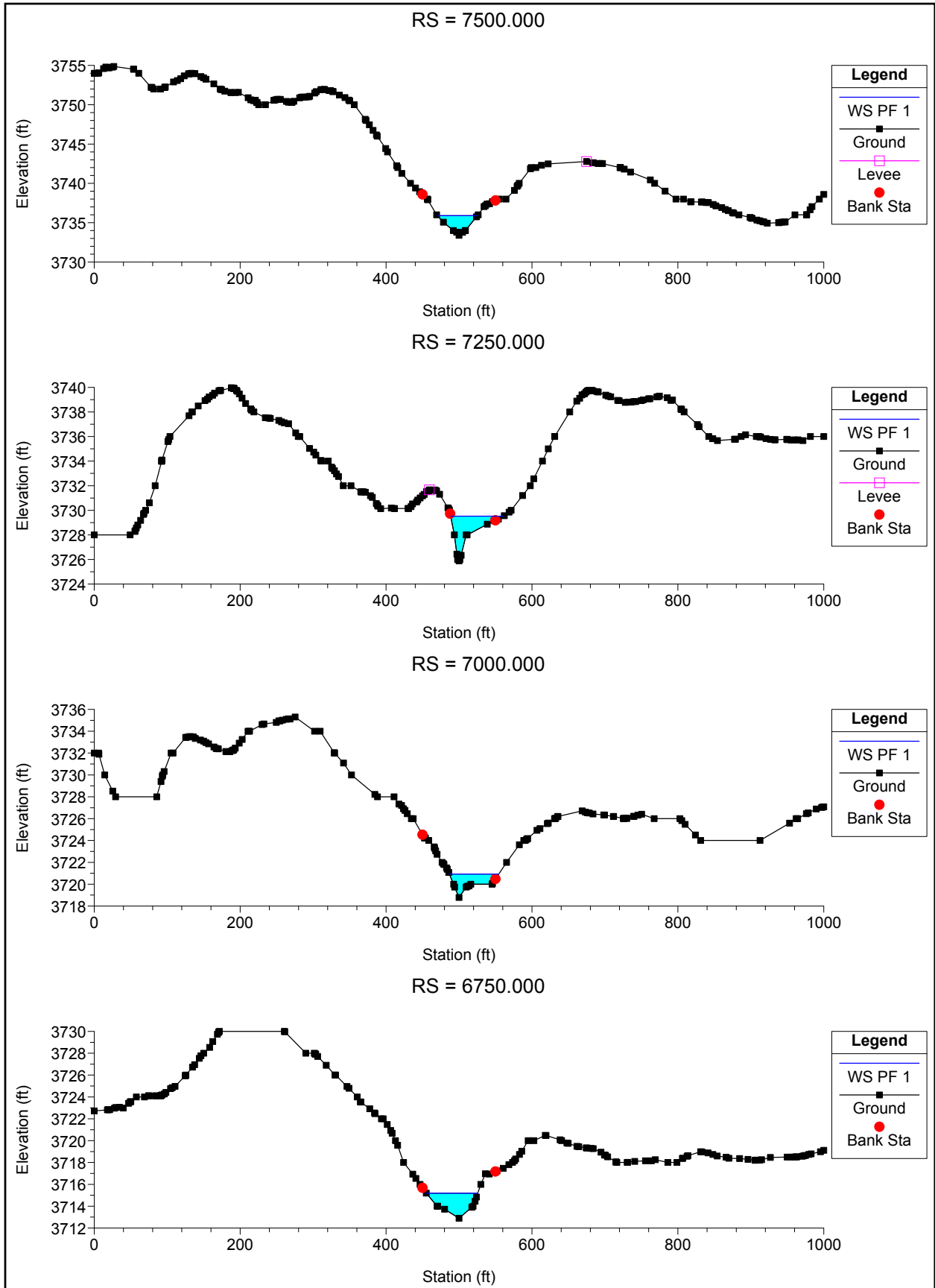


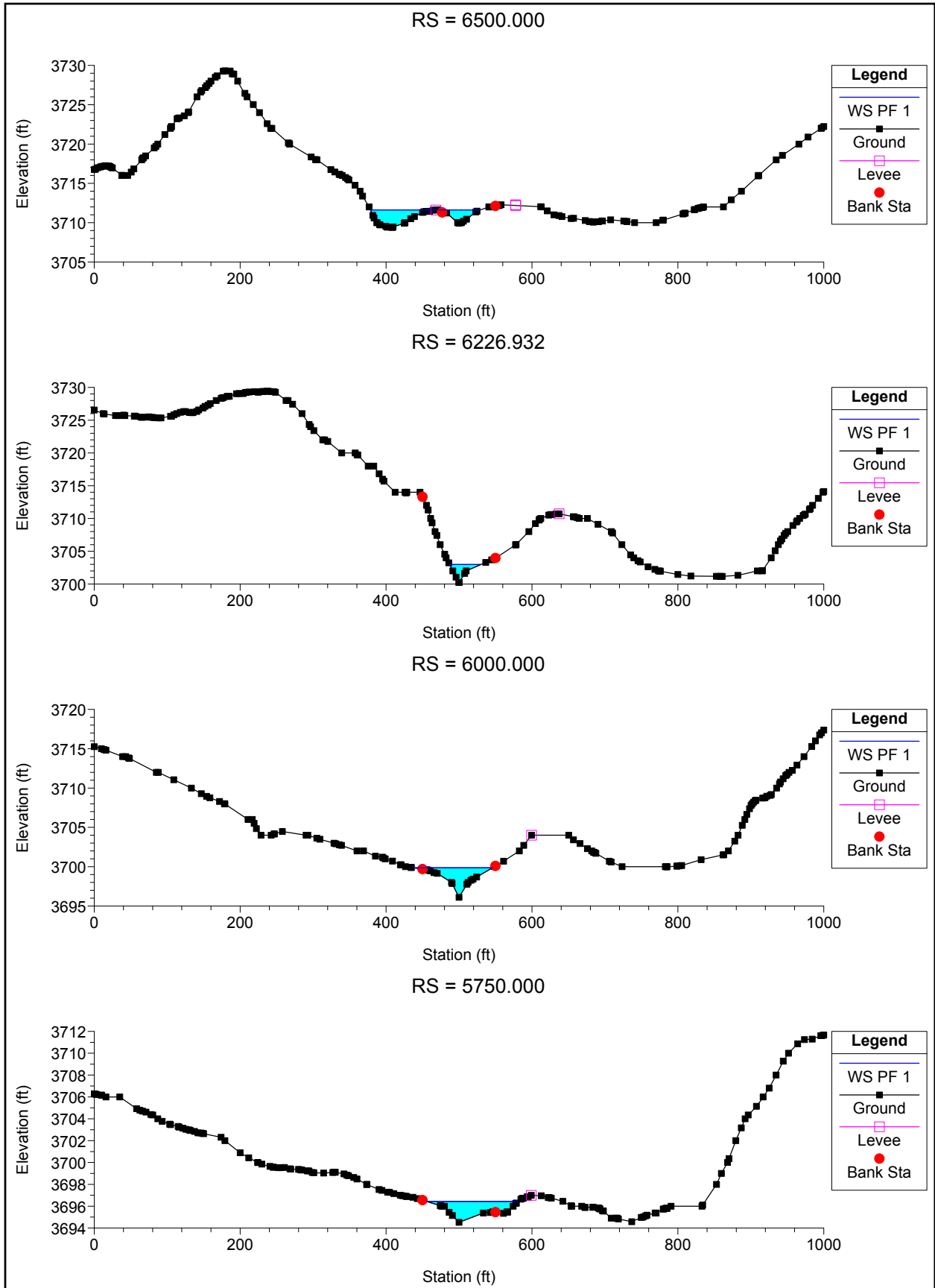
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
O2A	10500	PF 1	680	3864.58	3868.28	3869.3	3871.44	0.056098	14.26	47.68	27.2	1.9
O2A	10250	PF 1	680	3850.99	3853.72	3854.82	3857.28	0.070066	15.14	44.91	28.13	2.11
O2A	10000	PF 1	680	3834.6	3838.44	3839.71	3842.46	0.065384	16.09	42.27	22.13	2.05
O2A	9750	PF 1	680	3819.37	3823.61	3825.01	3828	0.066561	16.83	40.4	19.4	2.06
O2A	9500	PF 1	680	3809.04	3812.15	3812.98	3814.7	0.053934	12.79	53.15	35.29	1.84
O2A	9230.946	PF 1	680	3798.95	3801.56	3802.21	3803.32	0.037613	10.65	63.84	43.03	1.54
O2A	9000	PF 1	680	3792.16	3793.46	3793.89	3794.81	0.045839	9.52	74.03	75.84	1.62
O2A	8750	PF 1	680	3783.92	3785.16	3785.44	3786.09	0.034386	7.9	90.04	104.82	1.39
O2A	8552.188	PF 1	680	3772.17	3774.8	3775.94	3777.59	0.054147	13.38	50.81	31.66	1.86
O2A	8250	PF 1	680	3761.76	3762.93	3763.18	3763.84	0.040336	7.74	89.84	110.01	1.47
O2A	8000	PF 1	680	3751.88	3753	3753.27	3753.95	0.039408	8.22	88.23	103.21	1.48
O2A	7750	PF 1	680	3741.01	3744.12	3744.73	3745.82	0.03493	10.46	65.01	42.46	1.49
O2A	7500	PF 1	680	3733.39	3735.89	3736.29	3737.25	0.033442	9.35	72.75	54.83	1.43
O2A	7250	PF 1	680	3725.88	3729.52	3729.74	3730.48	0.022685	7.89	87.64	72.51	1.18
O2A	7000	PF 1	680	3718.79	3720.93	3721.41	3722.47	0.050596	9.98	68.78	67.65	1.7
O2A	6750	PF 1	680	3712.89	3715.19	3715.23	3715.95	0.017891	7.01	96.99	70.5	1.05
O2A	6500	PF 1	680	3709.94	3711.62	3711.62	3711.93	0.009683	3.78	153.92	147.59	0.72
O2A	6226.932	PF 1	680	3700.24	3702.98	3703.94	3706.29	0.107916	14.6	46.56	42.97	2.47
O2A	6000	PF 1	680	3696.1	3699.87	3699.66	3700.31	0.010564	5.28	129.66	109.25	0.8
O2A	5750	PF 1	680	3694.52	3696.43	3696.43	3696.94	0.018433	5.85	120.47	125.64	1.02
O2A	5500	PF 1	680	3691.47	3692.14	3692.19	3692.47	0.017817	2.39	160.32	315.26	0.8
O2A	5356.327	PF 1	680	3689.12	3689.76	3689.76	3690.19	0.016025	2	135.78	183.07	0.74
O2A	4970.513	PF 1	680	3683.12	3685.03	3685.08	3685.57	0.019953	6.05	118.23	136.94	1.06
O2A	4750	PF 1	680	3680	3681.72	3681.72	3682.13	0.014451	5.43	139.98	183.38	0.91
O2A	4645.596	PF 1	680	3680	3680.02	3680.02	3680.05	0.000927	0.11	496.49	522.27	0.12
O2A	4500	PF 1	680	3675.54	3678.49	3678.78	3679.62	0.026622	8.5	80.04	58.56	1.28
O2A	4250	PF 1	680	3673.83	3677.55	3676.43	3677.75	0.002409	3.6	188.67	82.41	0.42
O2A	4000	PF 1	680	3672.92	3676.32	3675.65	3676.8	0.006482	5.57	121.99	57.87	0.68
O2A	3750	PF 1	680	3672	3675.13	3674.34	3675.43	0.004374	4.45	152.73	76.11	0.55
O2A	3500	PF 1	680	3668.88	3673.63	3672.91	3674.14	0.006055	5.75	118.24	50.51	0.66
O2A	3250	PF 1	680	3665.9	3670.64	3670.64	3671.86	0.014251	8.86	76.75	31.74	1
O2A	3000	PF 1	680	3665	3669.13	3667.54	3669.24	0.001109	2.81	275.42	148.95	0.3
O2A	2750	PF 1	680	3664	3667.53	3667.35	3668.52	0.011269	7.96	85.38	35.18	0.9
O2A	2500	PF 1	680	3659.19	3665.46	3664.71	3666.24	0.007194	7.08	96.02	32.36	0.72
O2A	2301.8	PF 1	680	3658	3663.17	3663.17	3664.5	0.014349	9.26	73.43	27.85	1.01
O2A	2250	PF 1	680	3652	3655.88	3657.78	3662.42	0.099239	20.52	33.14	15.18	2.45
O2A	2000	PF 1	680	3645.26	3647.93	3648.32	3649.35	0.028907	9.55	71.17	46.21	1.36
O2A	1750	PF 1	680	3641.86	3645.36	3645.36	3646.4	0.014662	8.18	83.17	40.67	1.01
O2A	1500	PF 1	680	3638.41	3640.9	3641.06	3641.76	0.02437	7.47	91.04	75.86	1.2
O2A	1199.521	PF 1	680	3634.59	3638.1	3638.1	3638.74	0.01498	6.4	107.2	89.39	0.96
O2A	1000	PF 1	680	3629.46	3633.07	3633.61	3634.62	0.032688	10	67.98	44.66	1.43
O2A	750	PF 1	680	3625.83	3628.79	3628.74	3629.57	0.013814	7.06	96.29	56.63	0.95
O2A	500	PF 1	680	3622.84	3626.09	3625.9	3626.8	0.010862	6.76	100.6	52.74	0.86
O2A	250	PF 1	680	3619.65	3622.85	3622.85	3623.87	0.014156	8.14	83.59	40.16	0.99
O2A	0	PF 1	680	3615.82	3617.5	3617.5	3617.51	0.000088	0.41	985.75	448.44	0.07

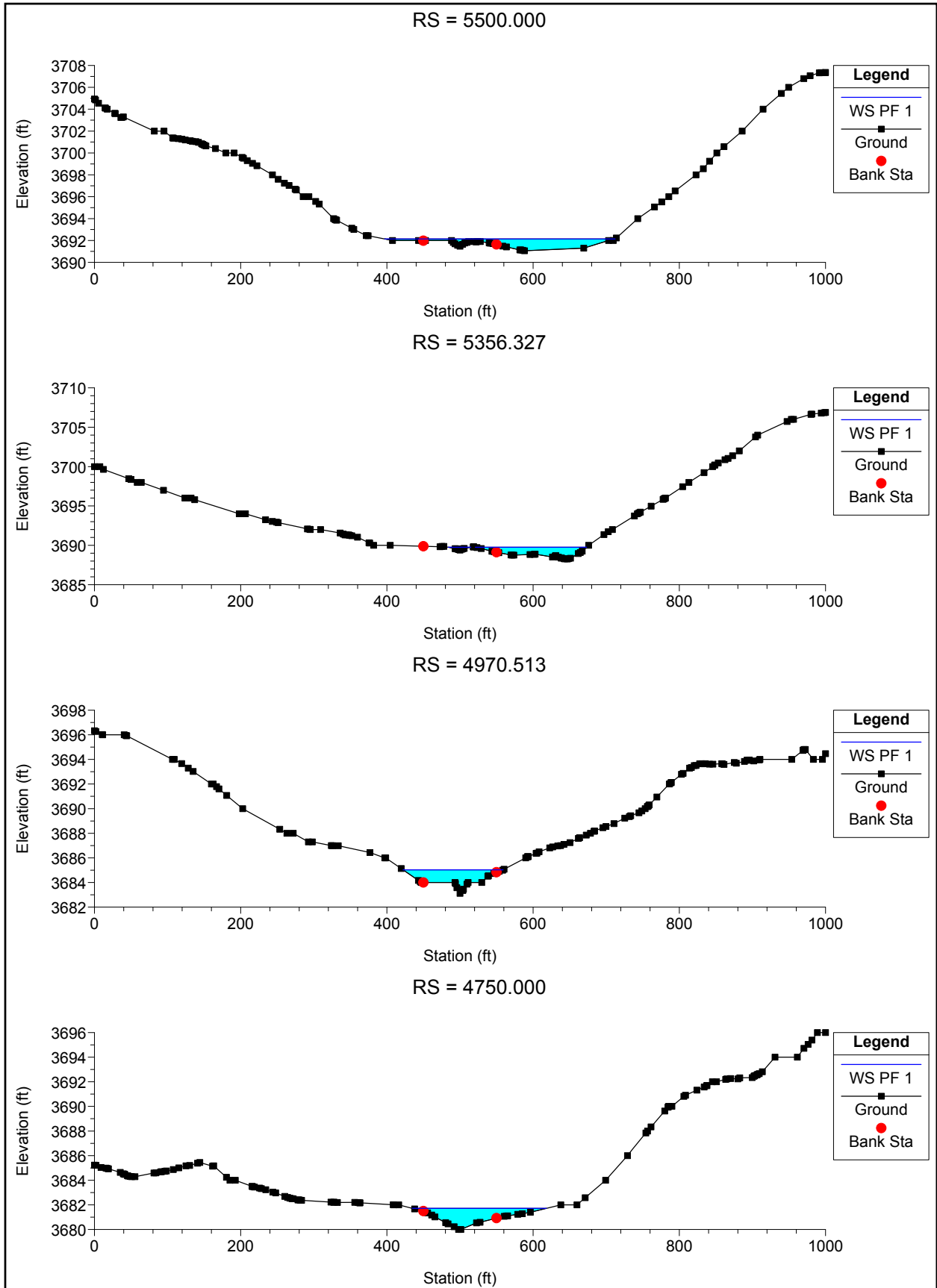


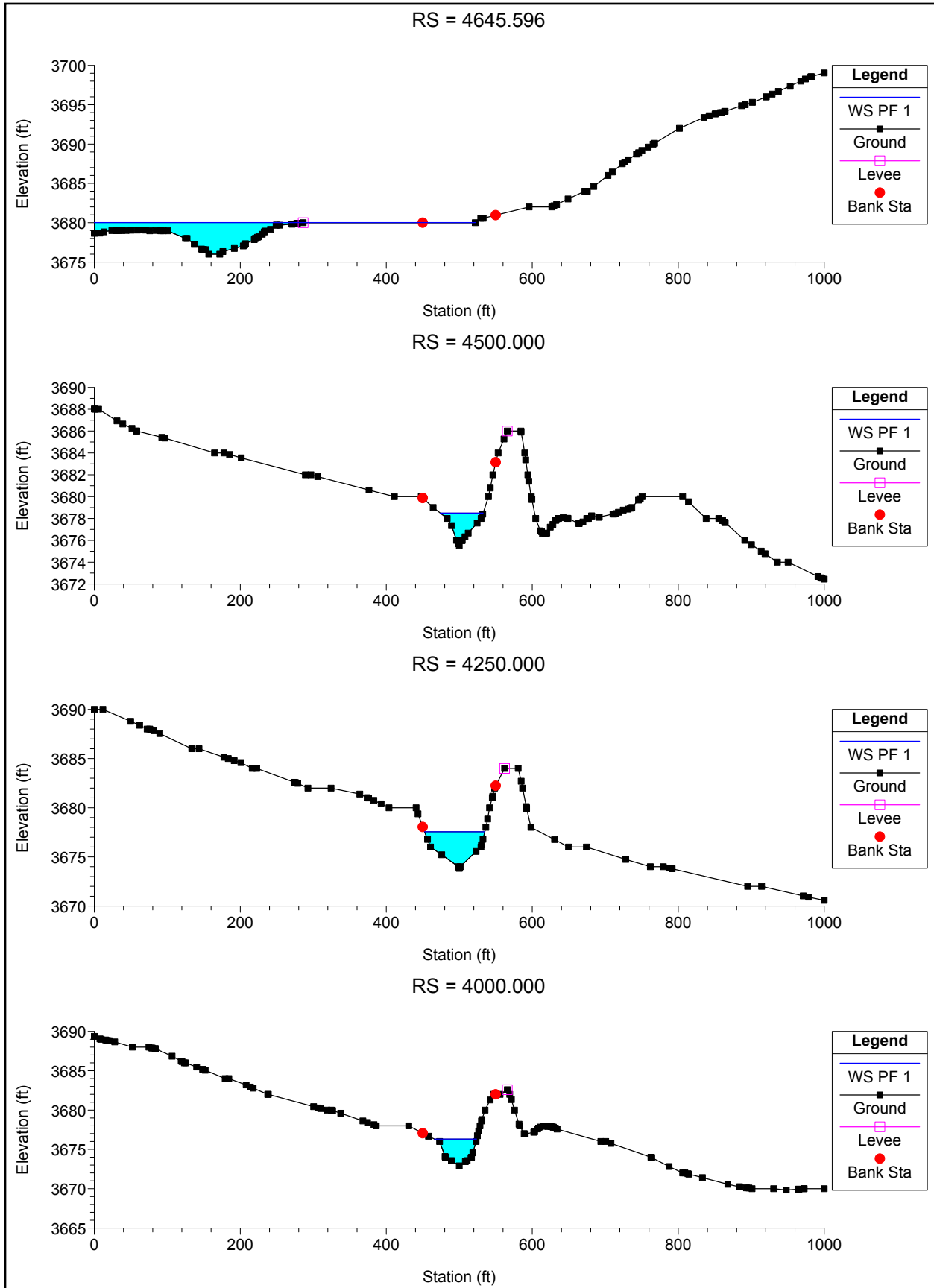


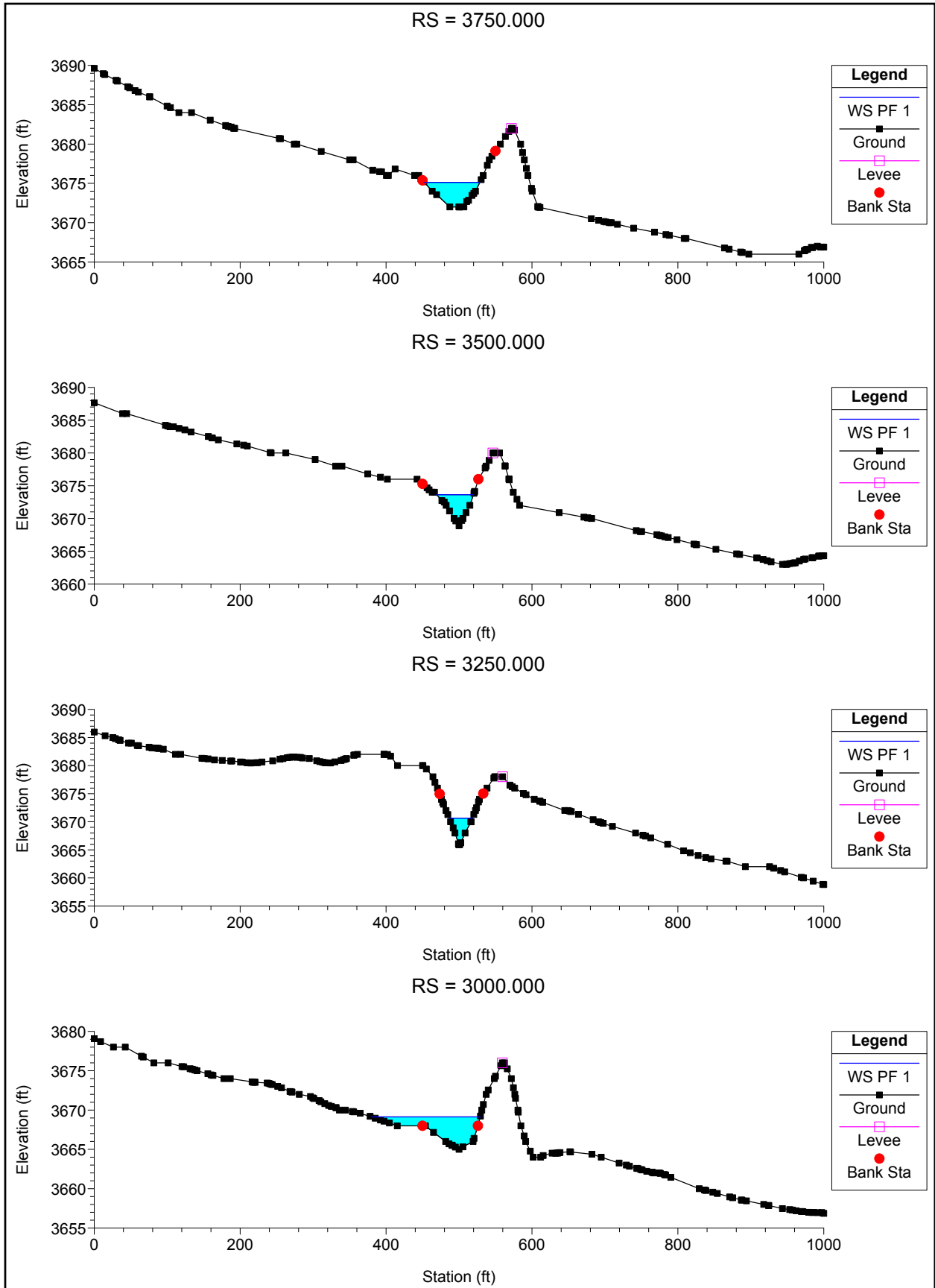


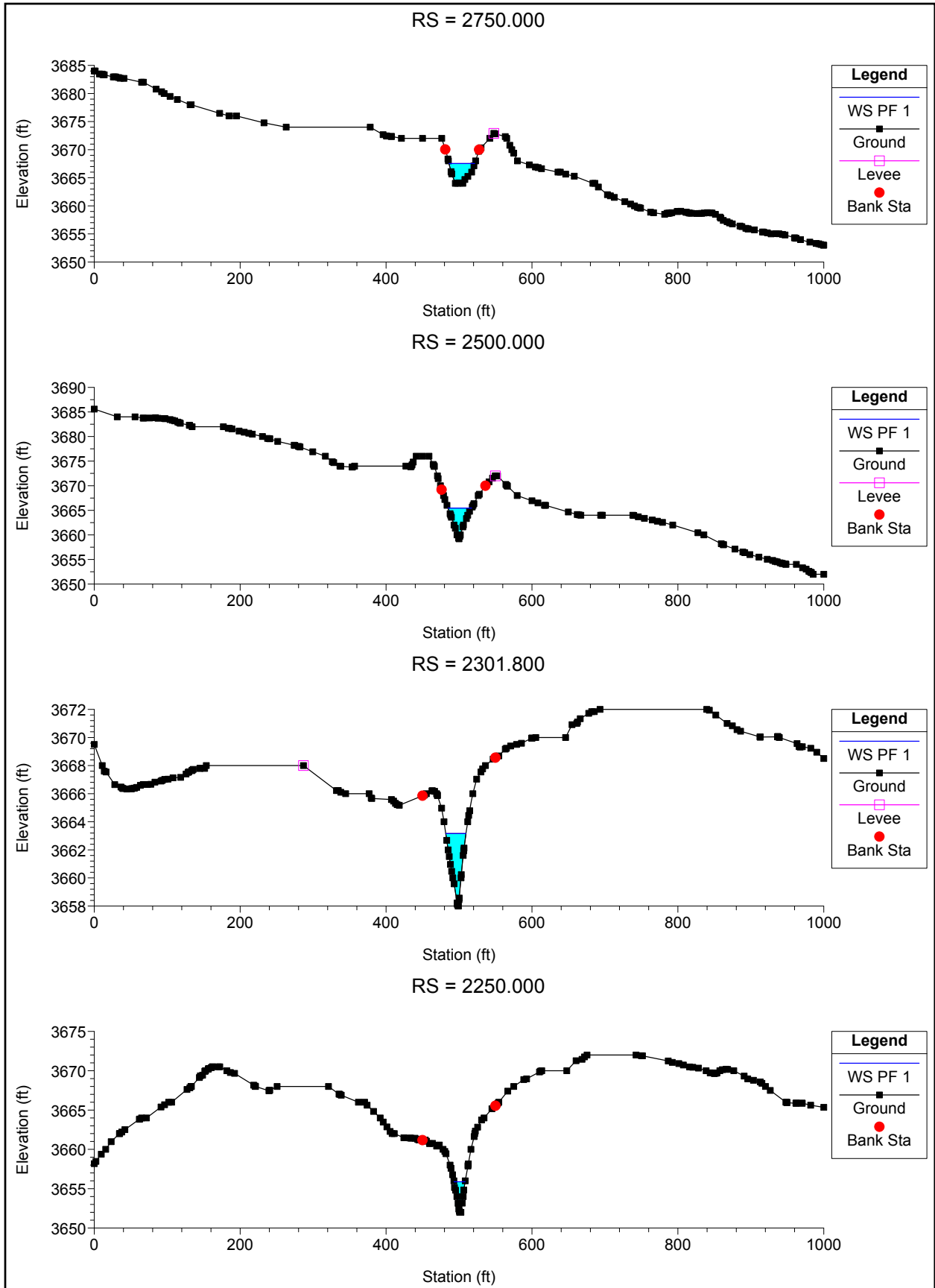


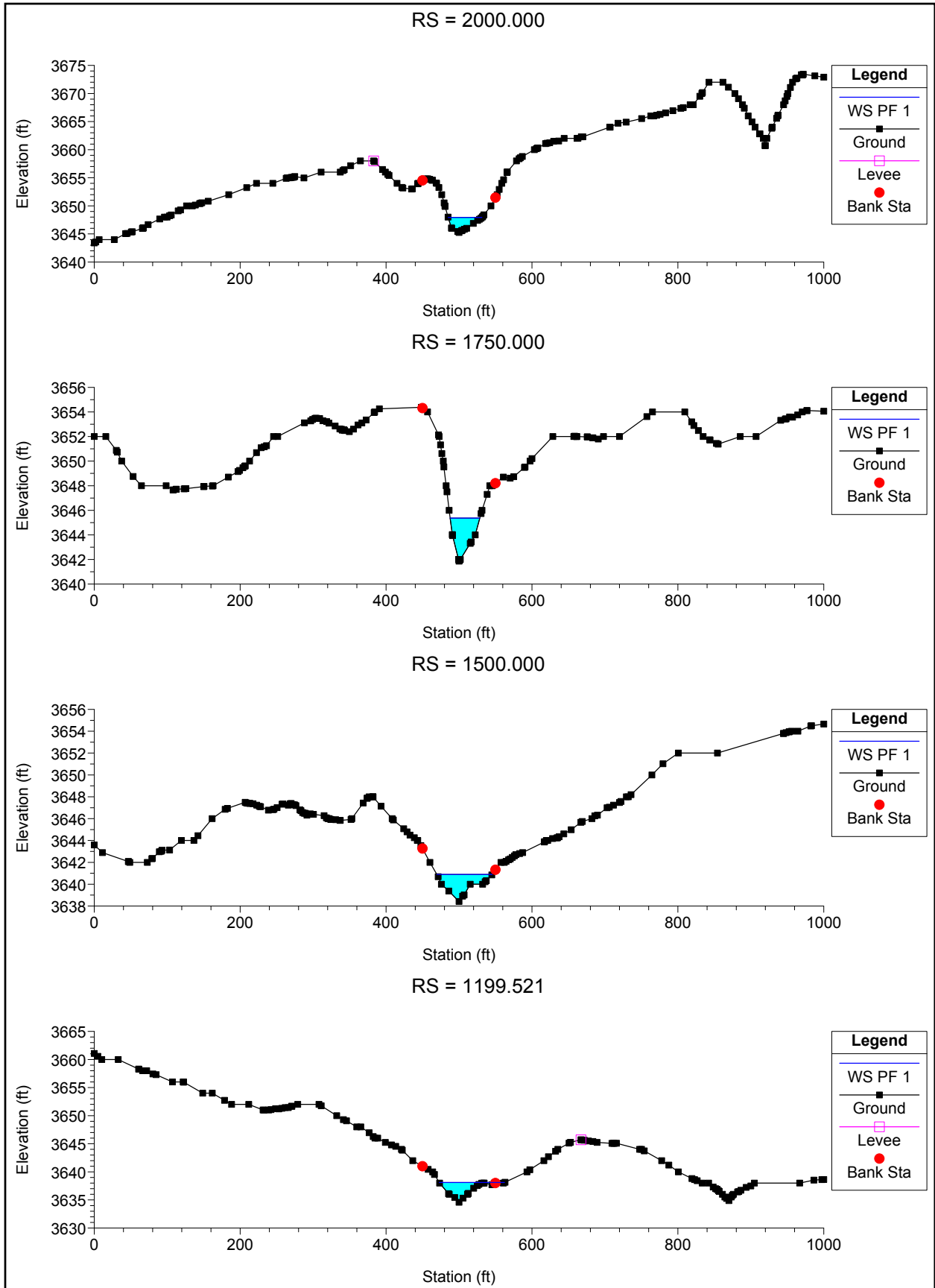


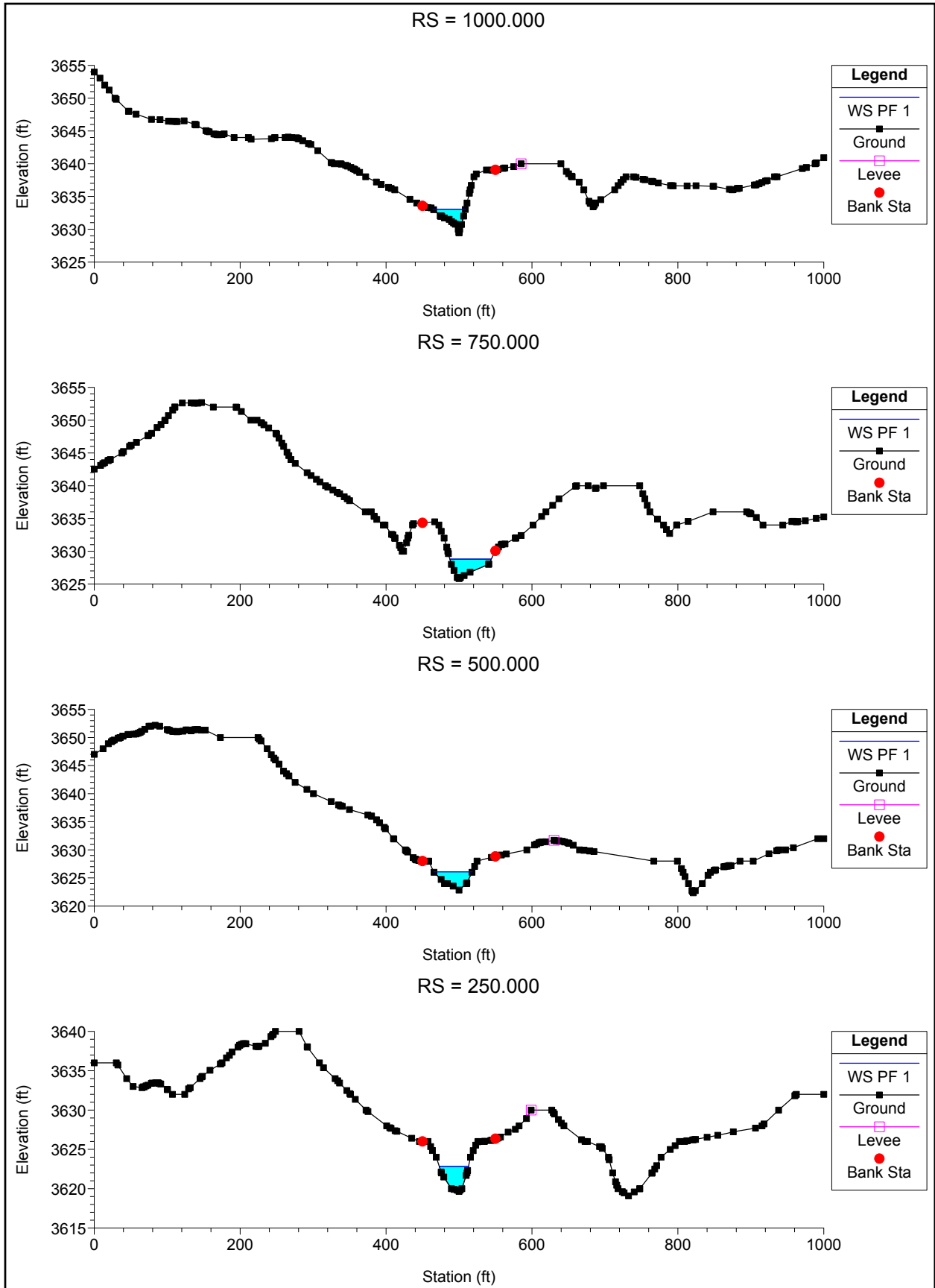


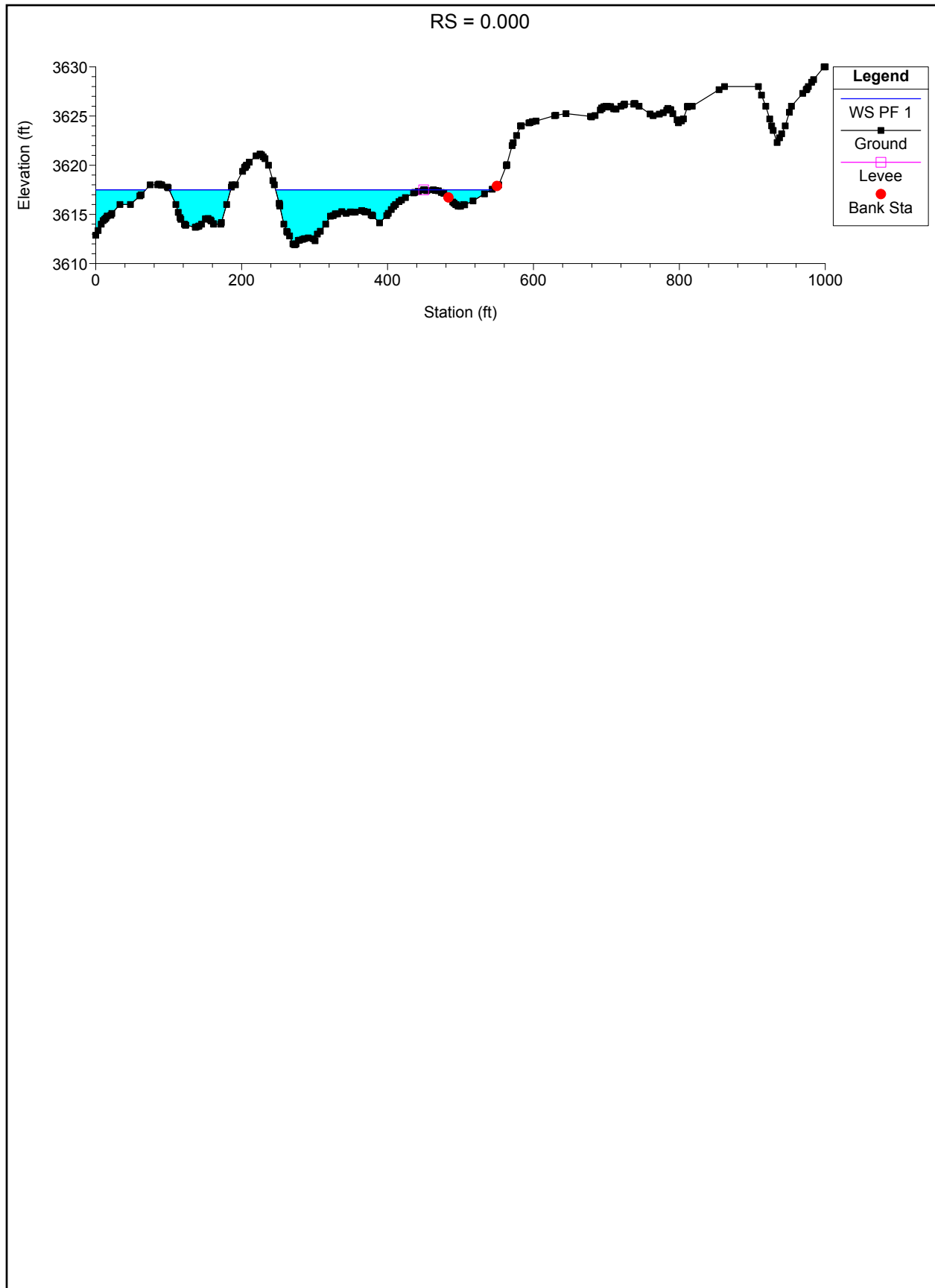










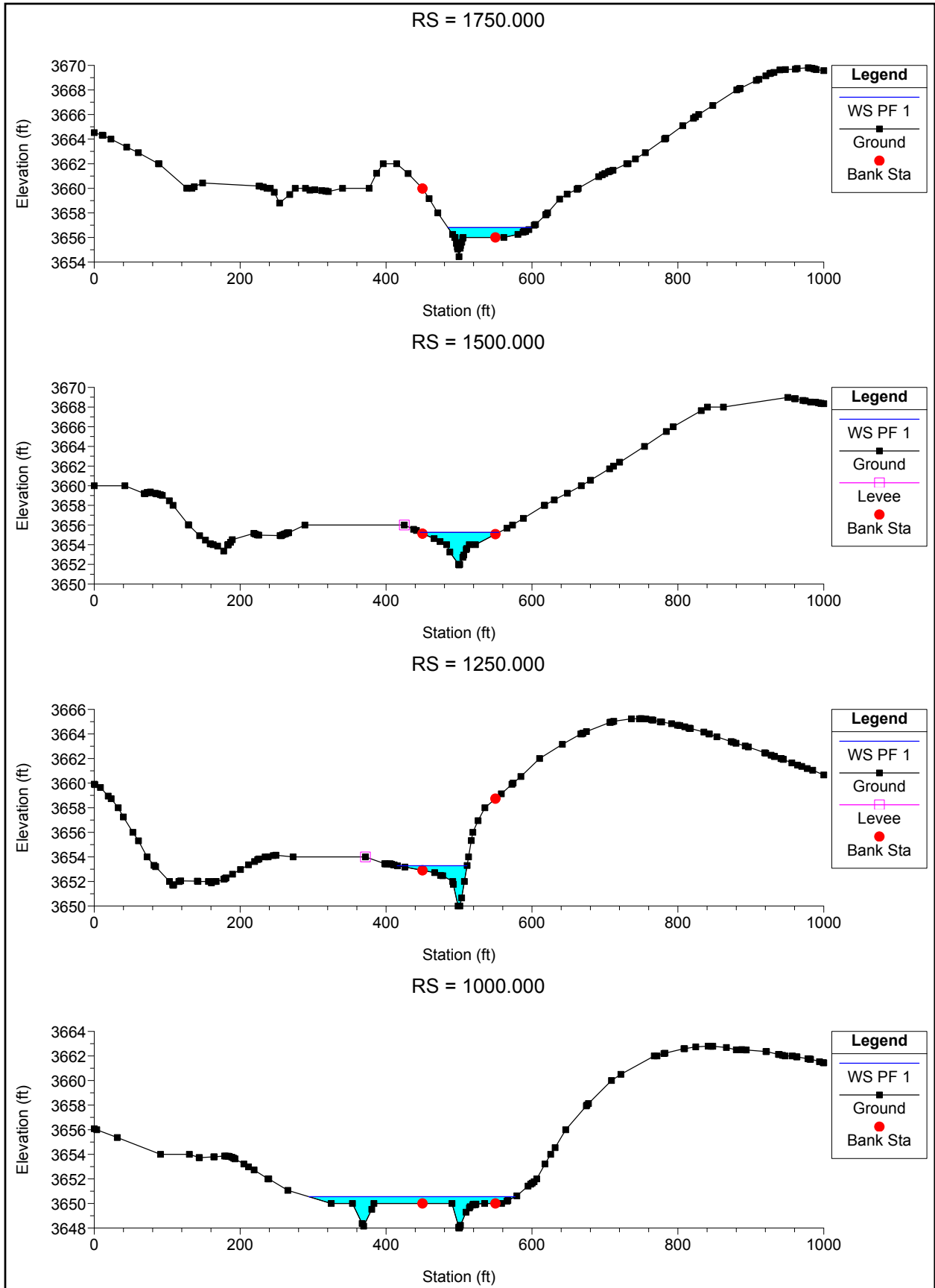


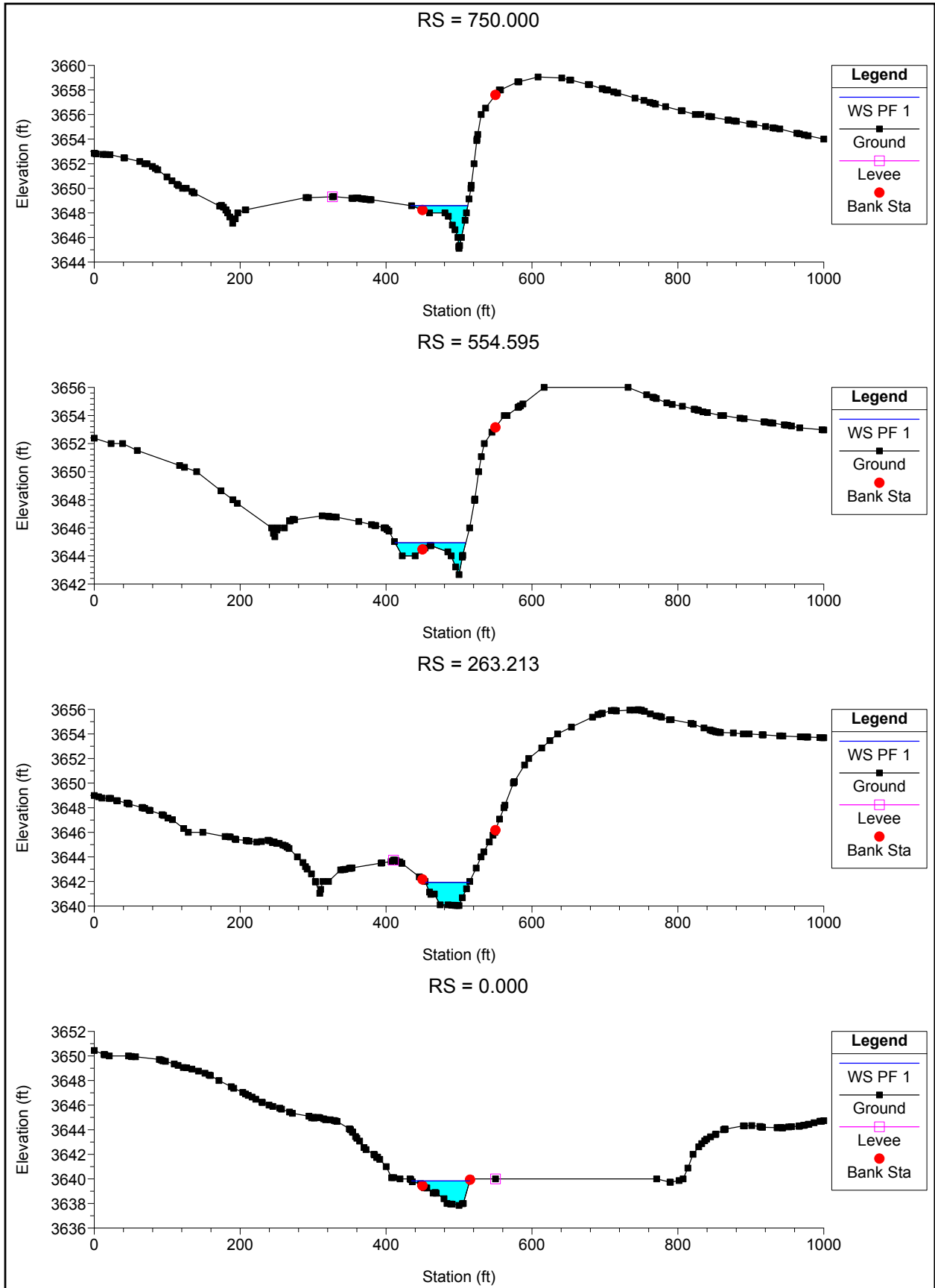
Attachment 2.7-M-5

HEC-RAS Channel 02B



Reach	River Sta	Profile	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)	
02B	1750	PF 1	406	3654.44	3656.8	3656.81	3657.18	0.018994	5.25	83.83	114.22	1
02B	1500	PF 1	406	3651.94	3655.25	3654.7	3655.41	0.004433	3.26	124.99	107.88	0.52
02B	1250	PF 1	406	3650	3653.28	3653.28	3653.74	0.013808	5.51	78.26	95.8	0.9
02B	1000	PF 1	406	3648	3650.55	3650.21	3650.62	0.003642	2.24	197.75	282.85	0.44
02B	750	PF 1	406	3645.12	3648.59	3648.59	3649.11	0.016605	5.82	71.77	78.2	0.97
02B	554.595	PF 1	406	3642.67	3644.94	3645	3645.42	0.025804	5.58	72.51	97.04	1.14
02B	263.213	PF 1	406	3640.04	3641.93	3641.69	3642.32	0.009713	5.06	80.26	60.14	0.77
02B	0	PF 1	406	3637.84	3639.83	3639.59	3640.18	0.009007	4.79	86.61	79.54	0.74



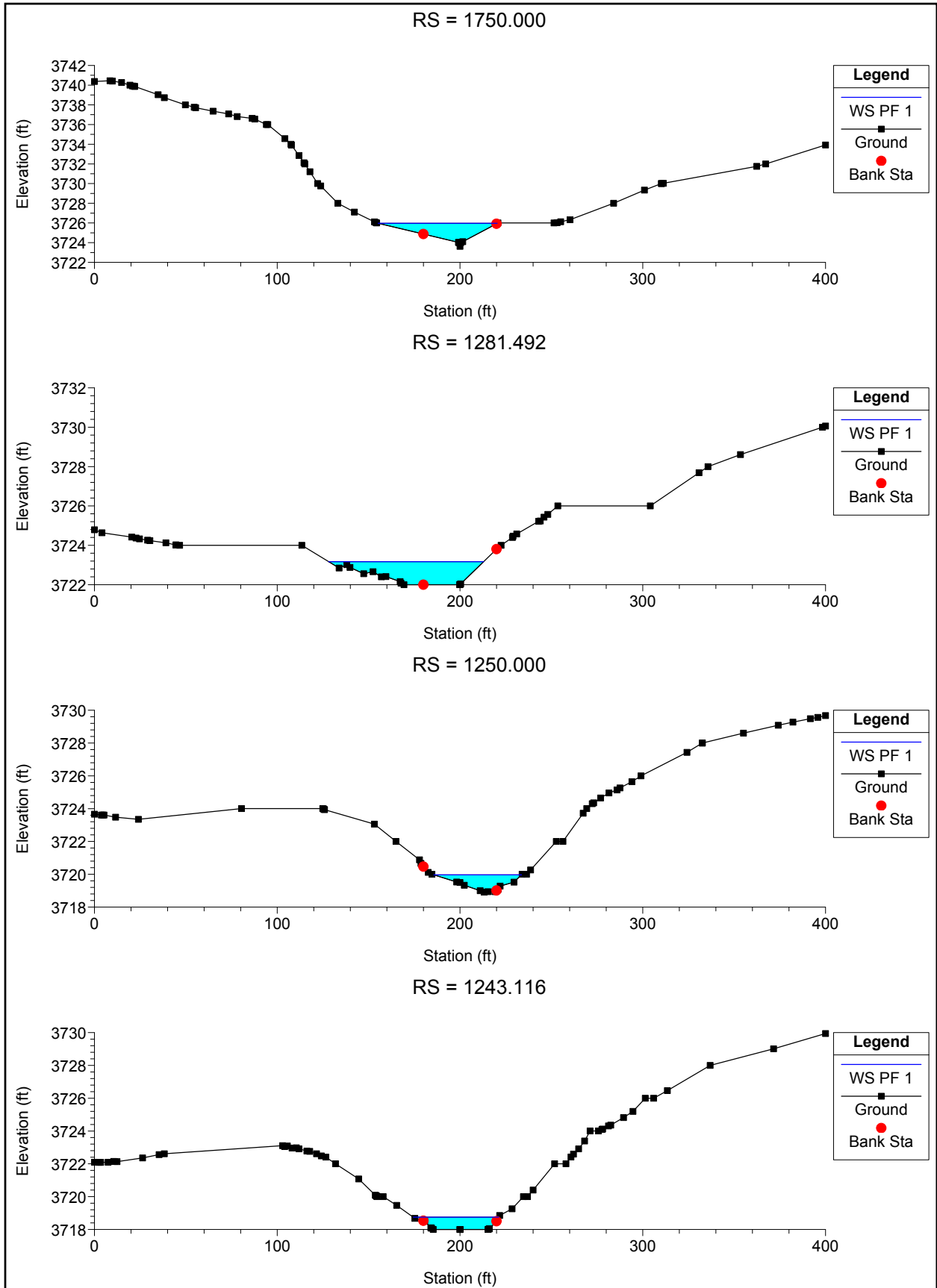


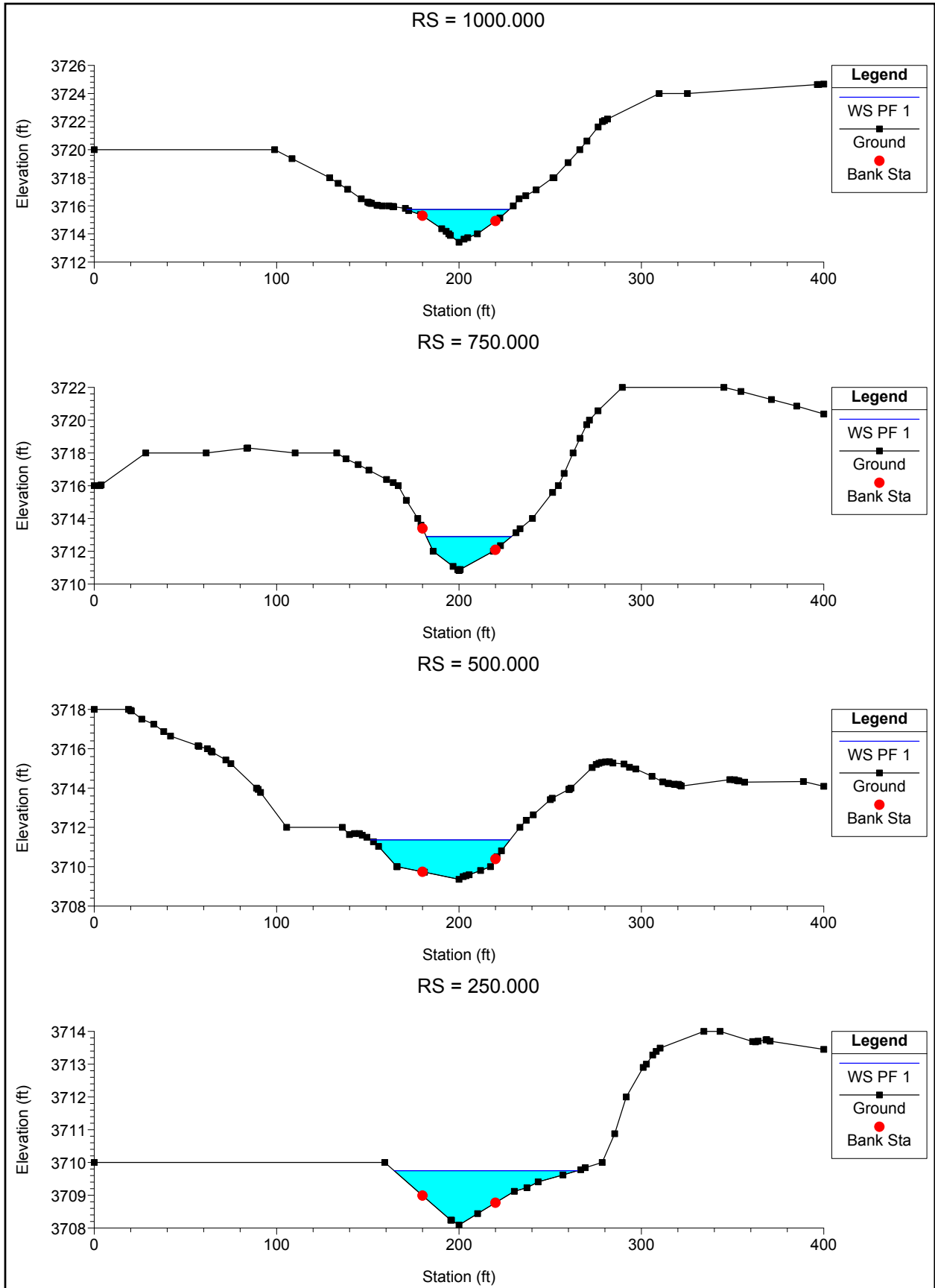
Attachment 2.7-M-6

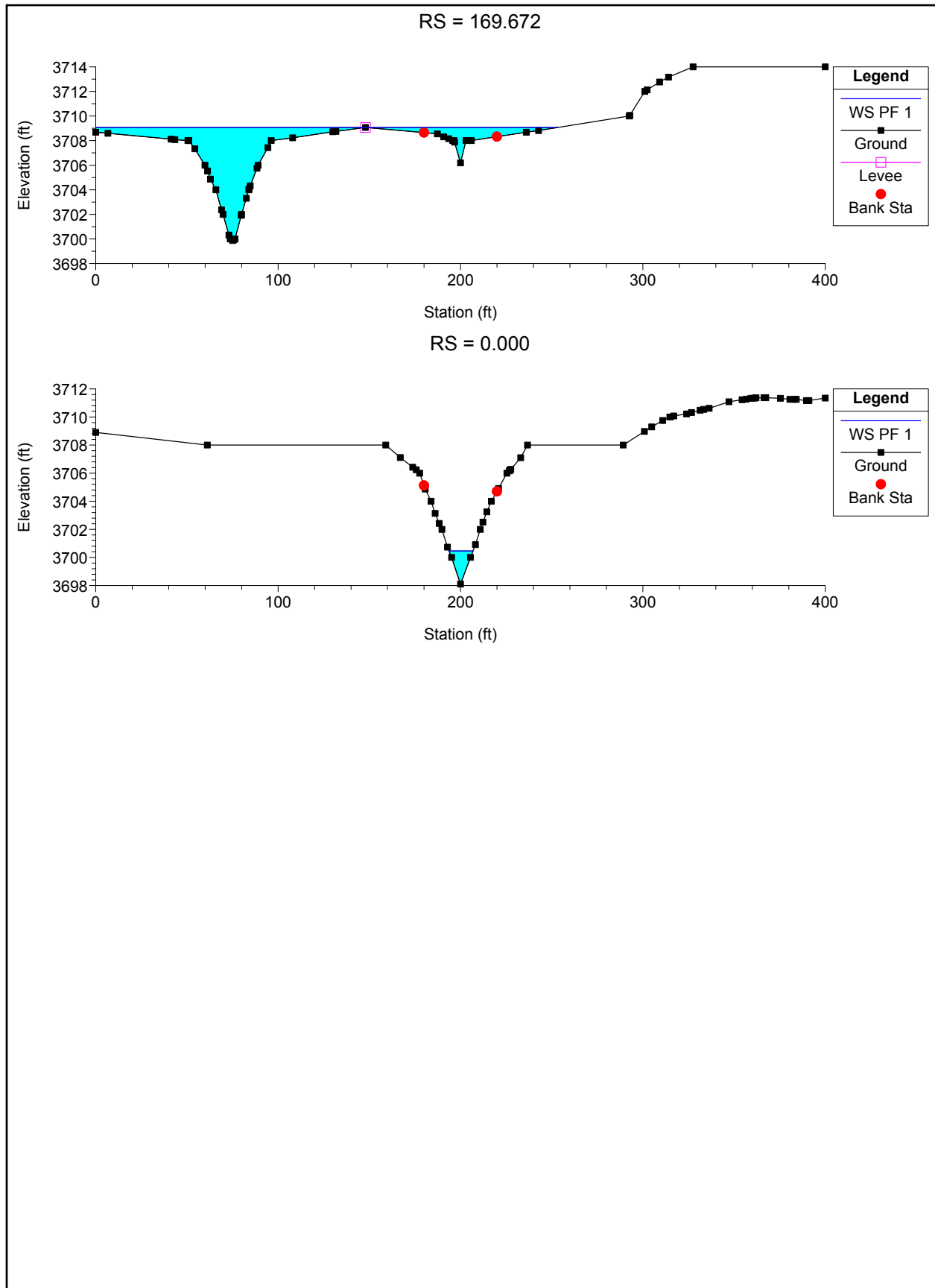
HEC-RAS Channel 03



Reach	River Sta	Profile	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)	
3	1750	PF 1	324	3723.62	3725.96	3725.89	3726.39	0.012086	5.48	64.96	65.19	0.85
3	1281.492	PF 1	324	3722	3723.17	3723.17	3723.56	0.018033	5.47	66.14	84.82	0.99
3	1250	PF 1	324	3718.91	3719.96	3720.5	3722.11	0.156986	12.07	27.69	47.94	2.73
3	1243.116	PF 1	341	3718	3718.75	3719.37	3721.08	0.138808	12.3	28.32	46.8	2.62
3	1000	PF 1	341	3713.41	3715.75	3715.58	3716.2	0.00974	5.49	65.42	56.16	0.79
3	750	PF 1	341	3710.82	3712.9	3712.9	3713.52	0.015204	6.41	55.19	46.68	0.97
3	500	PF 1	341	3709.36	3711.37	3710.79	3711.55	0.003729	3.7	102.51	76.48	0.5
3	250	PF 1	341	3708.09	3709.75	3709.75	3710.15	0.011915	5.45	75.65	100.47	0.85
3	169.672	PF 1	341	3706.19	3709.07	3709.07	3709.09	0.00036	0.79	335.41	253.36	0.14
3	0	PF 1	341	3698.1	3700.47	3702.03	3708.12	0.241067	22.2	15.36	13.16	3.62





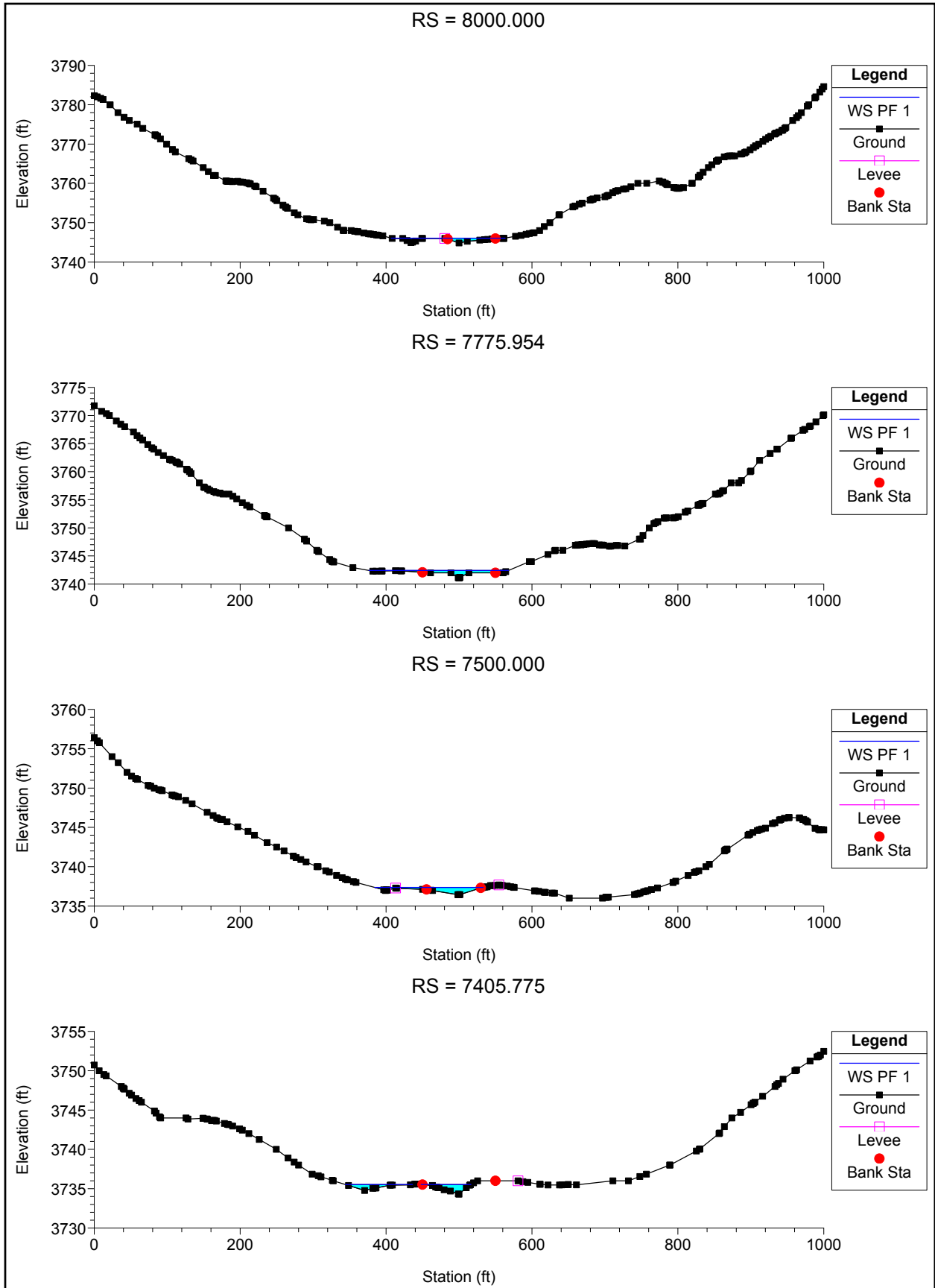


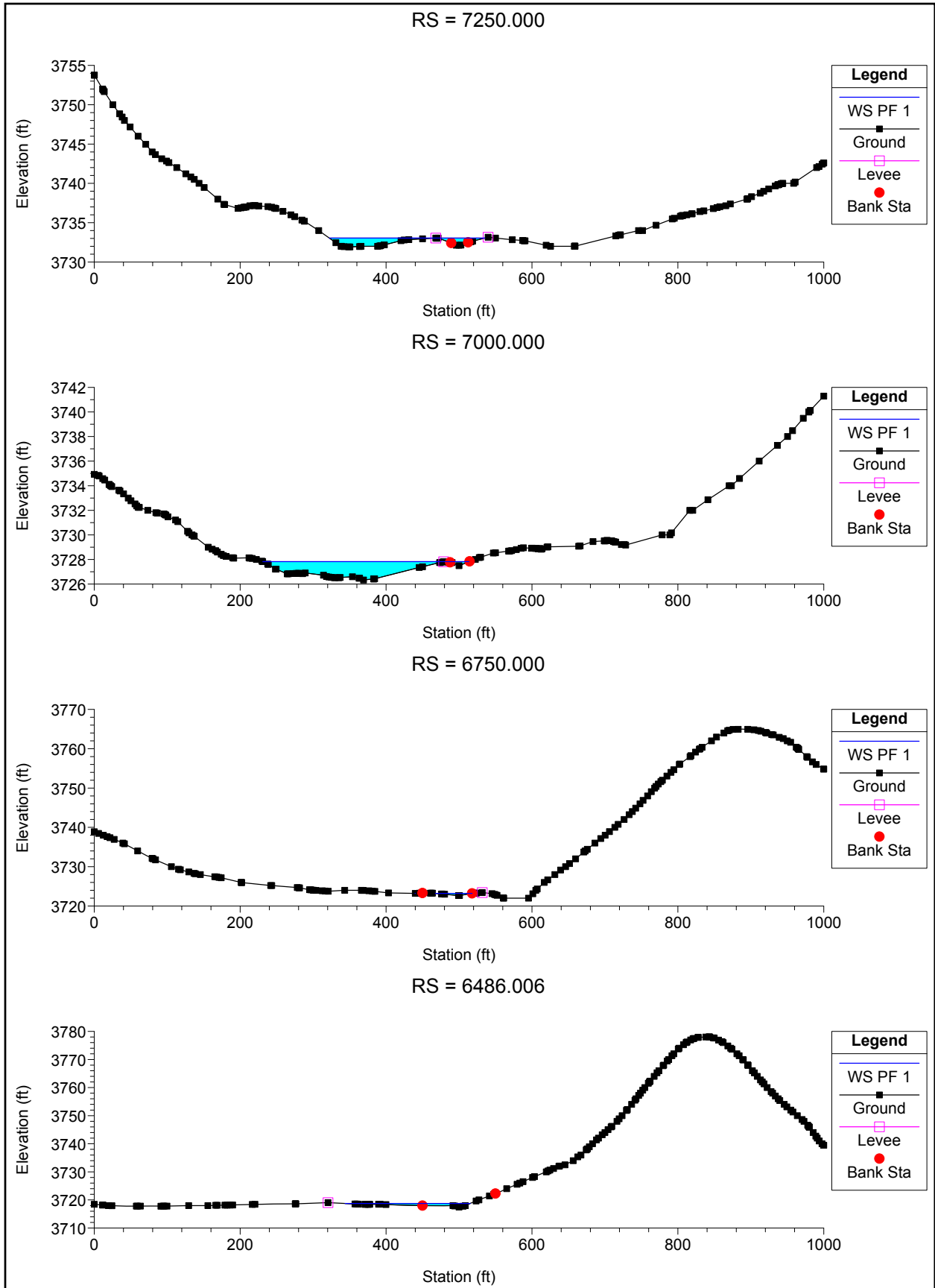
Attachment 2.7-M-7

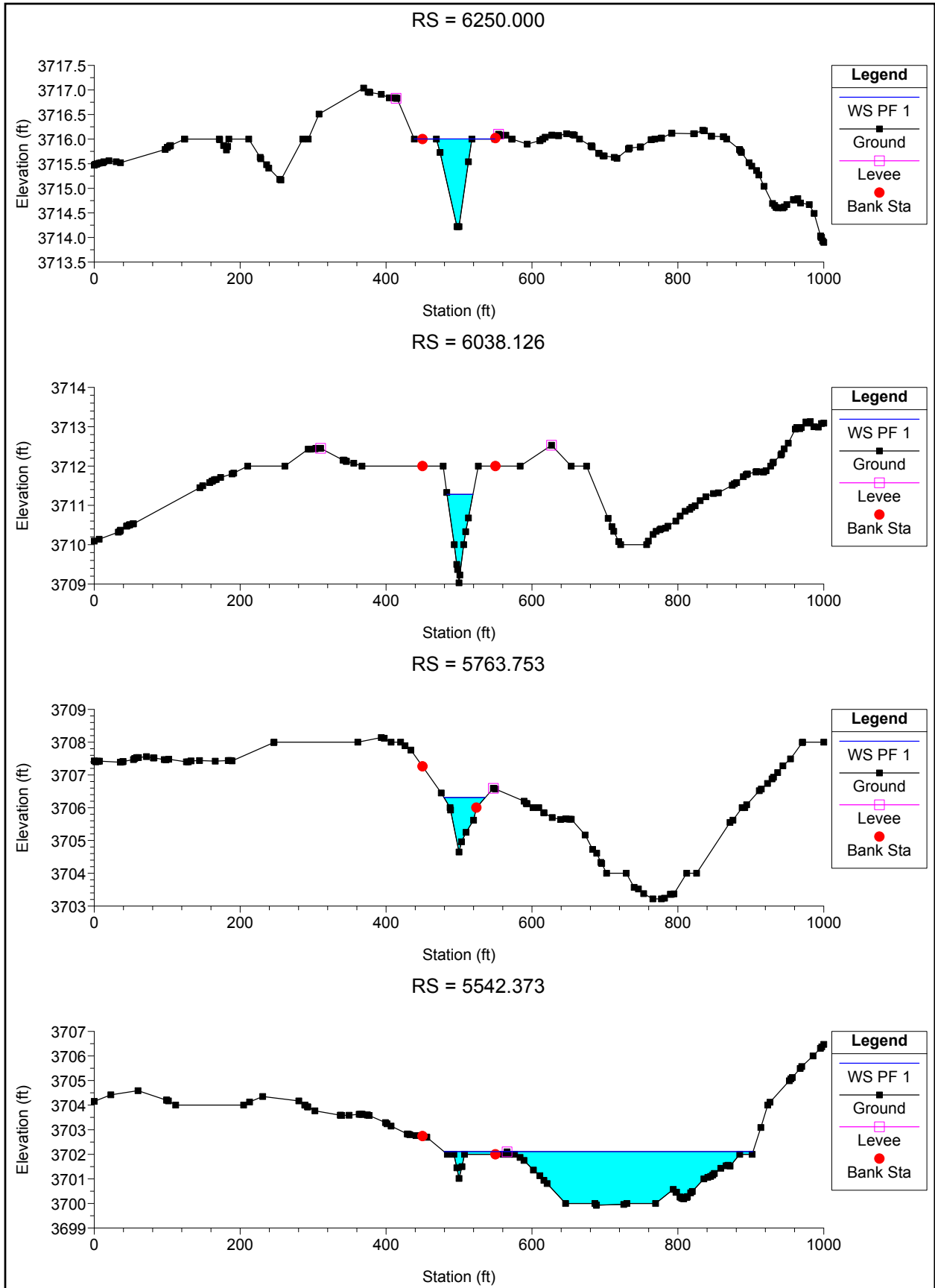
HEC-RAS Channel 04

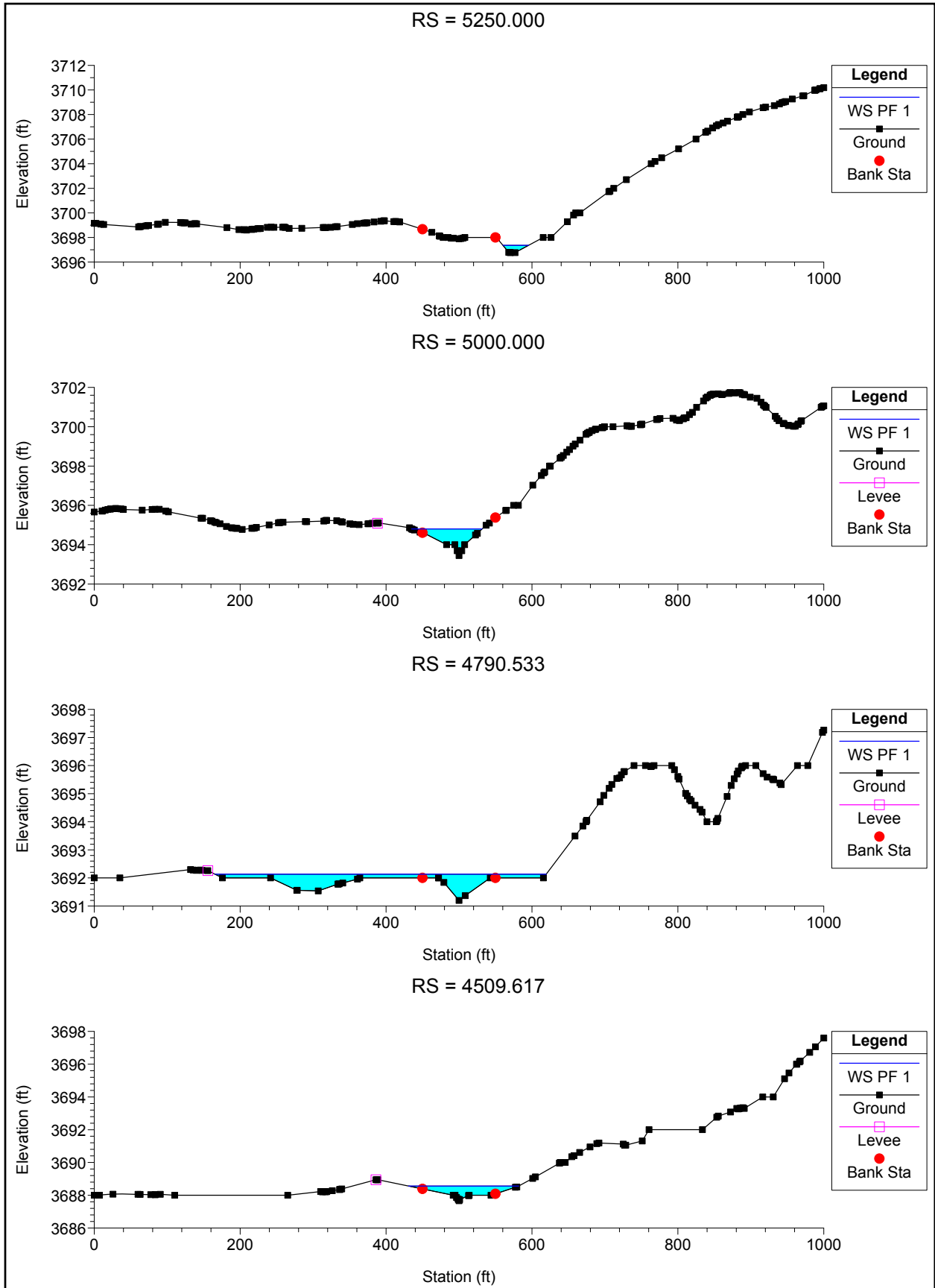


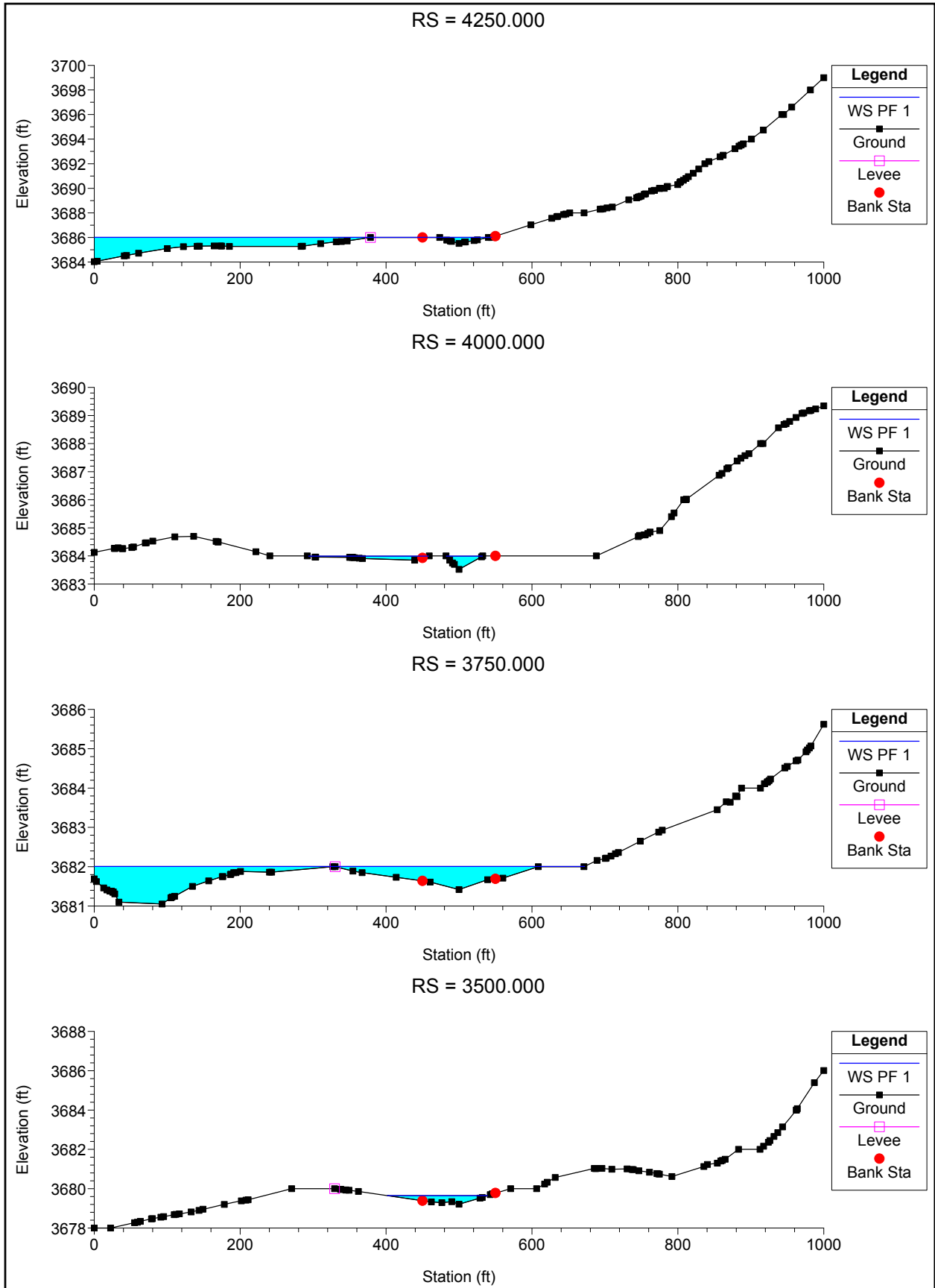
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4	8000	PF 1	211	3744.86	3746.08	3746.1	3746.29	0.01702	4.02	62.18	156.24	0.9
4	7775.954	PF 1	211	3741.07	3742.41	3742.42	3742.59	0.016193	3.5	67.51	191.25	0.85
4	7500	PF 1	211	3736.44	3737.36	3737.41	3737.63	0.022327	4.34	55.72	148.67	1.02
4	7405.775	PF 1	211	3734.31	3735.54	3735.54	3735.74	0.020686	4.02	61.49	160.43	0.97
4	7250	PF 1	211	3732.14	3733.05	3733.05	3733.1	0.003412	2.08	121.05	213.18	0.42
4	7000	PF 1	211	3727.49	3727.82	3727.82	3727.83	0.000584	0.31	228.31	282.76	0.13
4	6750	PF 1	211	3722.66	3723.2	3723.44	3726.94	0.768553	15.52	13.6	50.9	5.27
4	6486.006	PF 1	211	3717.49	3718.76	3718.59	3718.85	0.005511	2.69	93.95	171.59	0.53
4	6250	PF 1	211	3714.22	3716	3715.9	3716.34	0.03427	4.66	45.35	110.65	1.21
4	6038.126	PF 1	211	3709.03	3711.28	3711.28	3711.79	0.017368	5.71	36.96	35.58	0.99
4	5763.753	PF 1	211	3704.65	3706.31	3706.41	3706.79	0.022271	5.6	38.93	56.56	1.08
4	5542.373	PF 1	211	3701.02	3702.11	3702.11	3702.11	0.000068	0.12	499.06	423.31	0.05
4	5250	PF 1	211	3697.89	3697.36	3698.1	3701.62	0.586289		12.74	35.03	0
4	5000	PF 1	211	3693.45	3694.8	3694.8	3695.08	0.019751	4.25	50.66	96.71	0.97
4	4790.533	PF 1	211	3691.2	3692.13	3692.07	3692.19	0.008847	2.19	120.75	454.09	0.61
4	4509.617	PF 1	211	3687.67	3688.56	3688.56	3688.77	0.019398	3.77	60.19	150.88	0.93
4	4250	PF 1	211	3685.51	3686.01	3686.01	3686.01	0.000385	0.27	332.51	544.6	0.11
4	4000	PF 1	211	3683.52	3683.99	3684.13	3685.51	0.577836	11.4	24.4	214.12	4.38
4	3750	PF 1	211	3681.42	3682.01	3682.01	3682.02	0.001994	1.12	218.81	672.17	0.29
4	3500	PF 1	211	3679.21	3679.65	3679.85	3680.4	0.155772	7.26	31.62	137.3	2.4
4	3238.929	PF 1	211	3677.14	3678.01	3677.82	3678.01	0.000215	0.48	433.09	824.19	0.1
4	3000	PF 1	211	3675.59	3675.96	3675.96	3676.09	0.028645	3.01	75.11	308.17	1.02
4	2750	PF 1	211	3673.56	3674.01	3674.01	3674.01	0.000052	0.08	608.92	619.86	0.04
4	2500	PF 1	211	3671.48	3672.01	3672.01	3672.01	0.000039	0.1	660.67	523.57	0.04
4	2250	PF 1	211	3669.41	3670.01	3670.01	3670.01	0.000235	0.27	394.41	565.51	0.09
4	2000	PF 1	211	3667.38	3667.93	3668.13	3669.64	0.399467	10.5	20.09	82.06	3.74
4	1750	PF 1	211	3665.64	3665.74	3665.74	3666.02	0.022525	0.83	48.97	89.32	0.67
4	1500	PF 1	211	3664	3664.58	3664.21	3664.58	0.000376	0.56	386.92	725.64	0.13
4	1250	PF 1	211	3662	3663.83	3663.83	3664.27	0.016547	5.34	40.64	49.11	0.96
4	1000	PF 1	211	3661.53	3662.01	3662.01	3662.02	0.000627	0.41	212.26	255.8	0.15
4	750	PF 1	211	3660	3660.36	3660.64	3661.4	0.18586	7.86	25.87	87.3	2.61
4	500	PF 1	211	3659.35	3660.01	3660.01	3660.01	0.000074	0.22	553.4	994.9	0.06
4	250	PF 1	211	3657.83	3658.01	3658.01	3658.02	0.001728	0.09	206.34	721.24	0.15
4	0	PF 1	211	3648.81	3649.65	3650.46	3656.27	0.772095	20.89	10.31	25.78	5.67

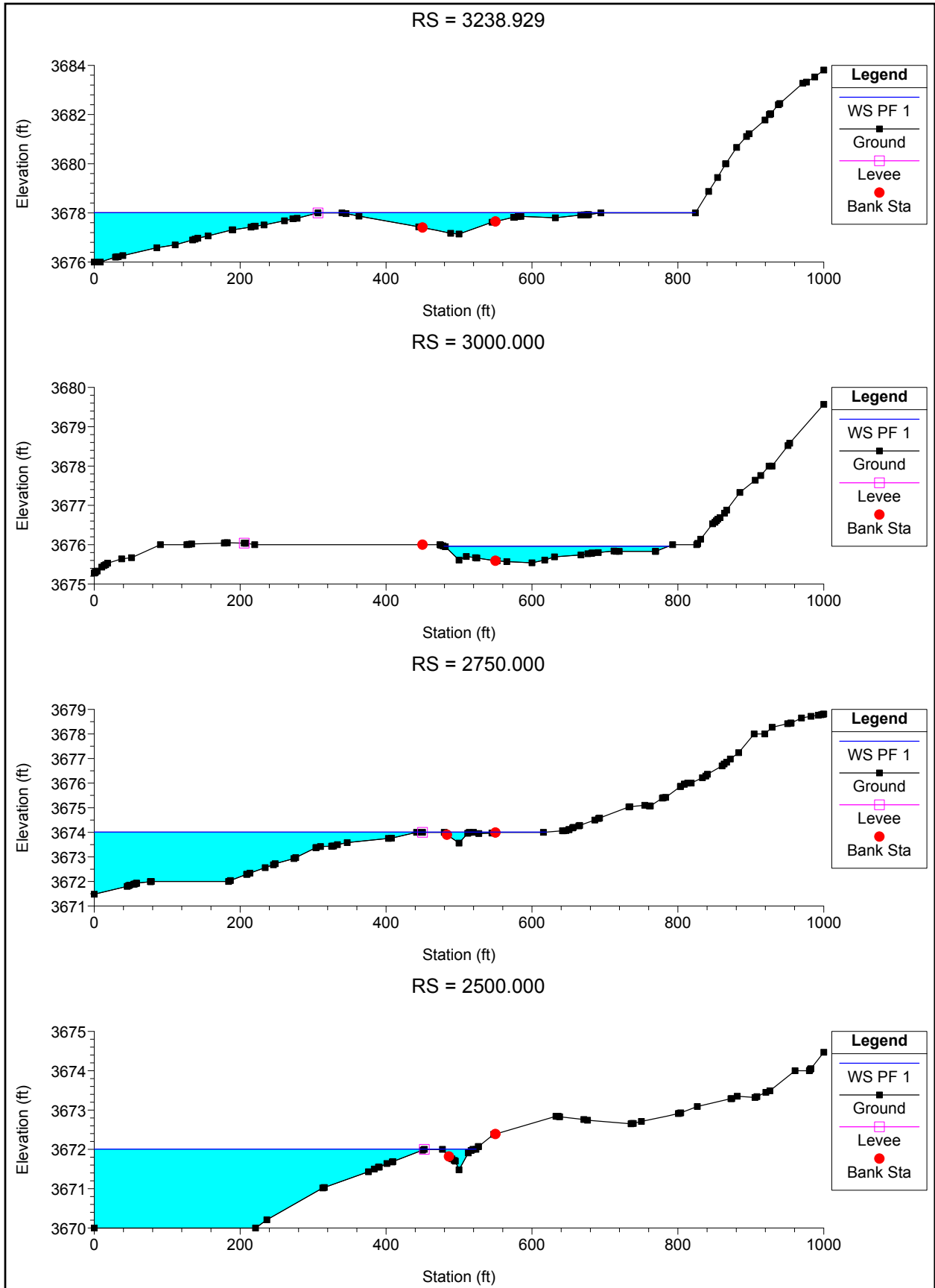


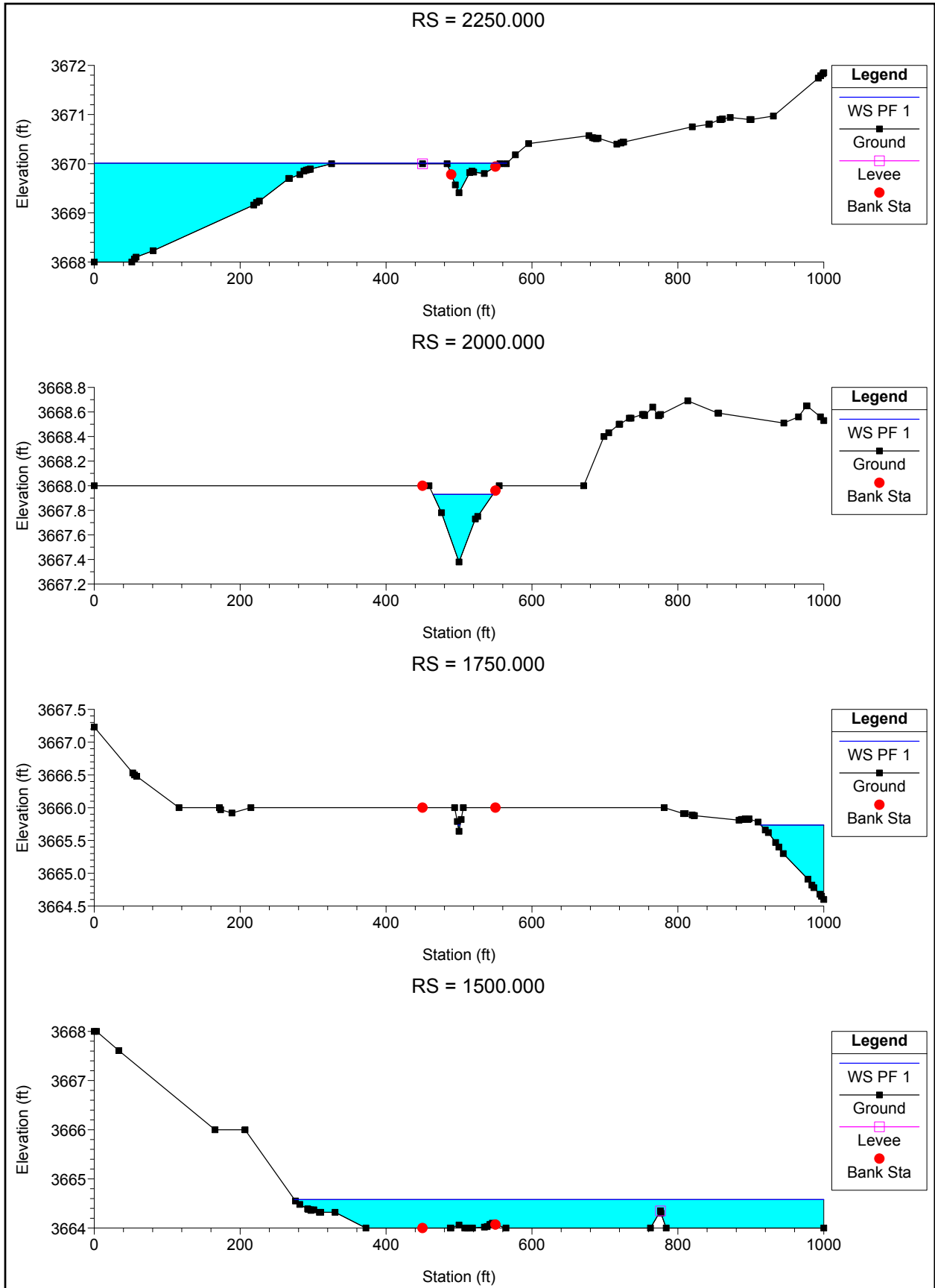


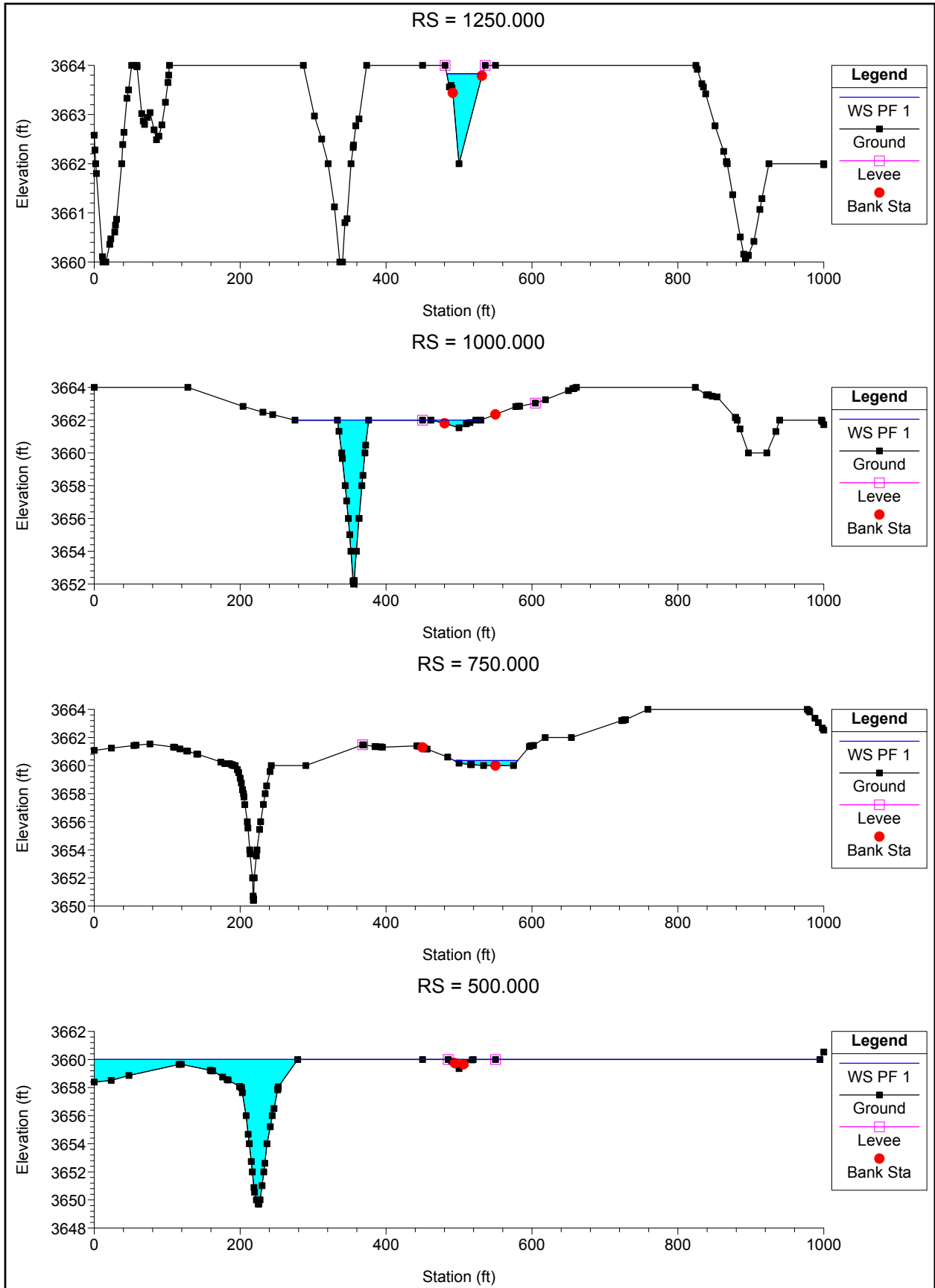


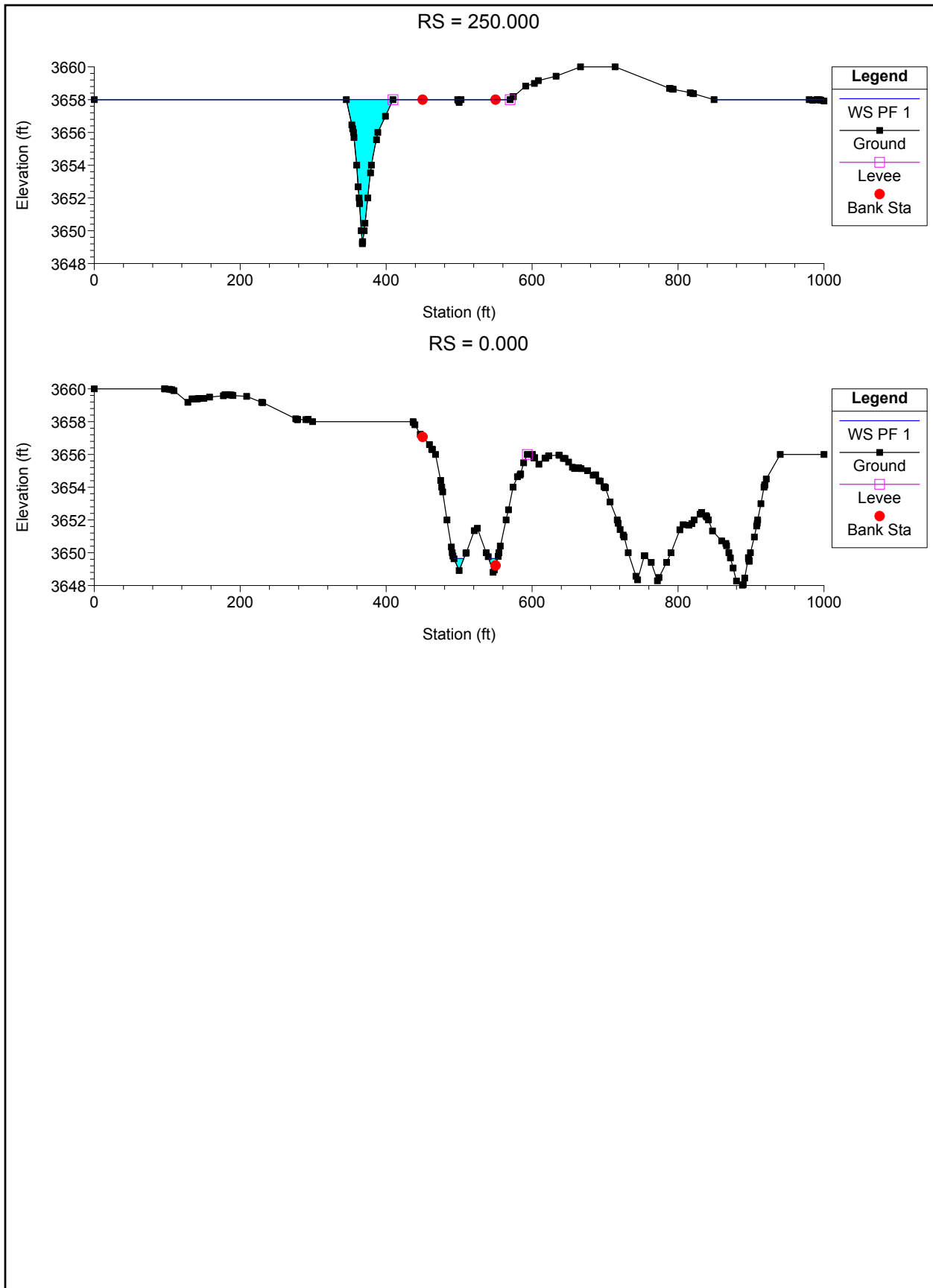










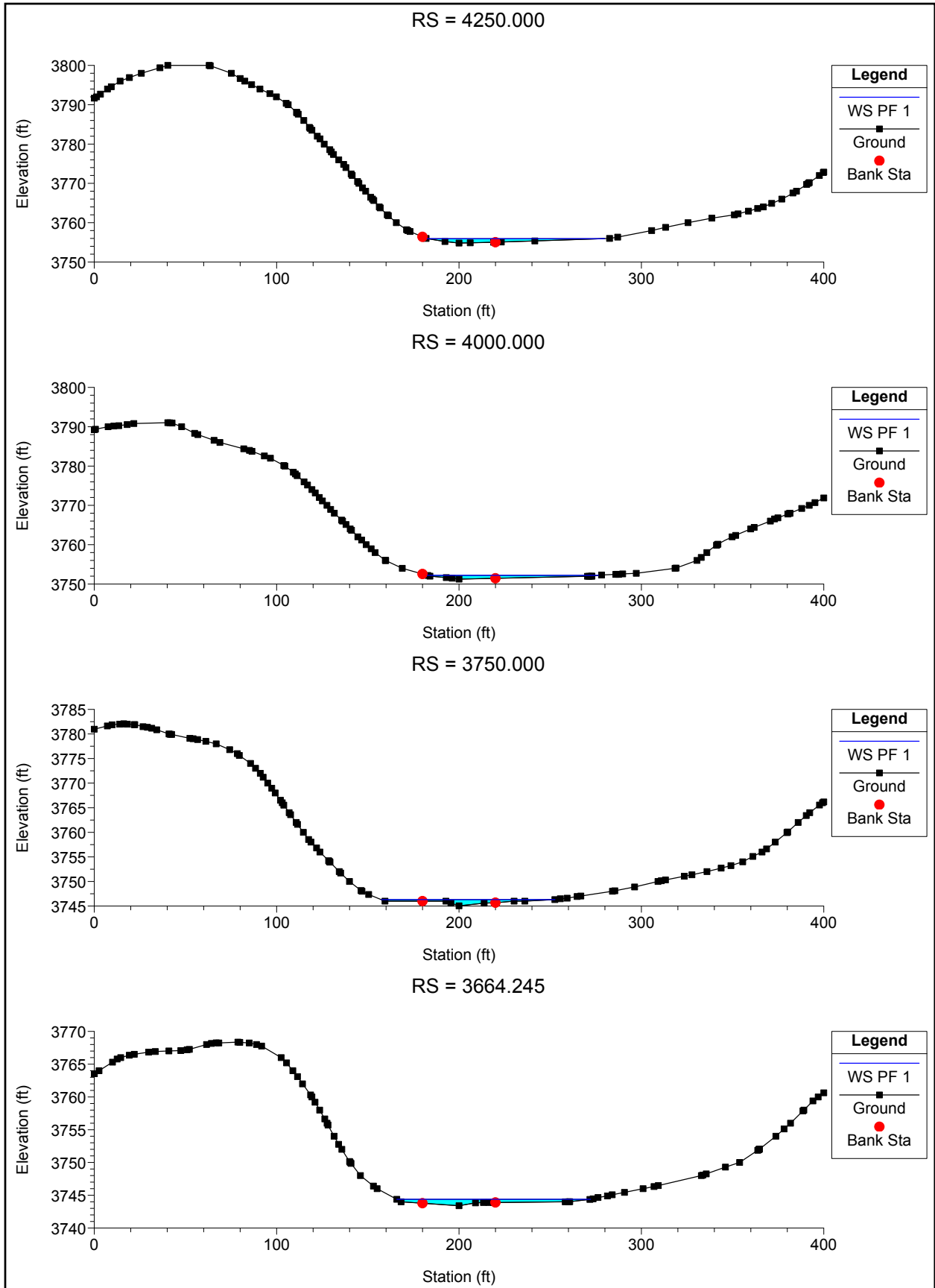


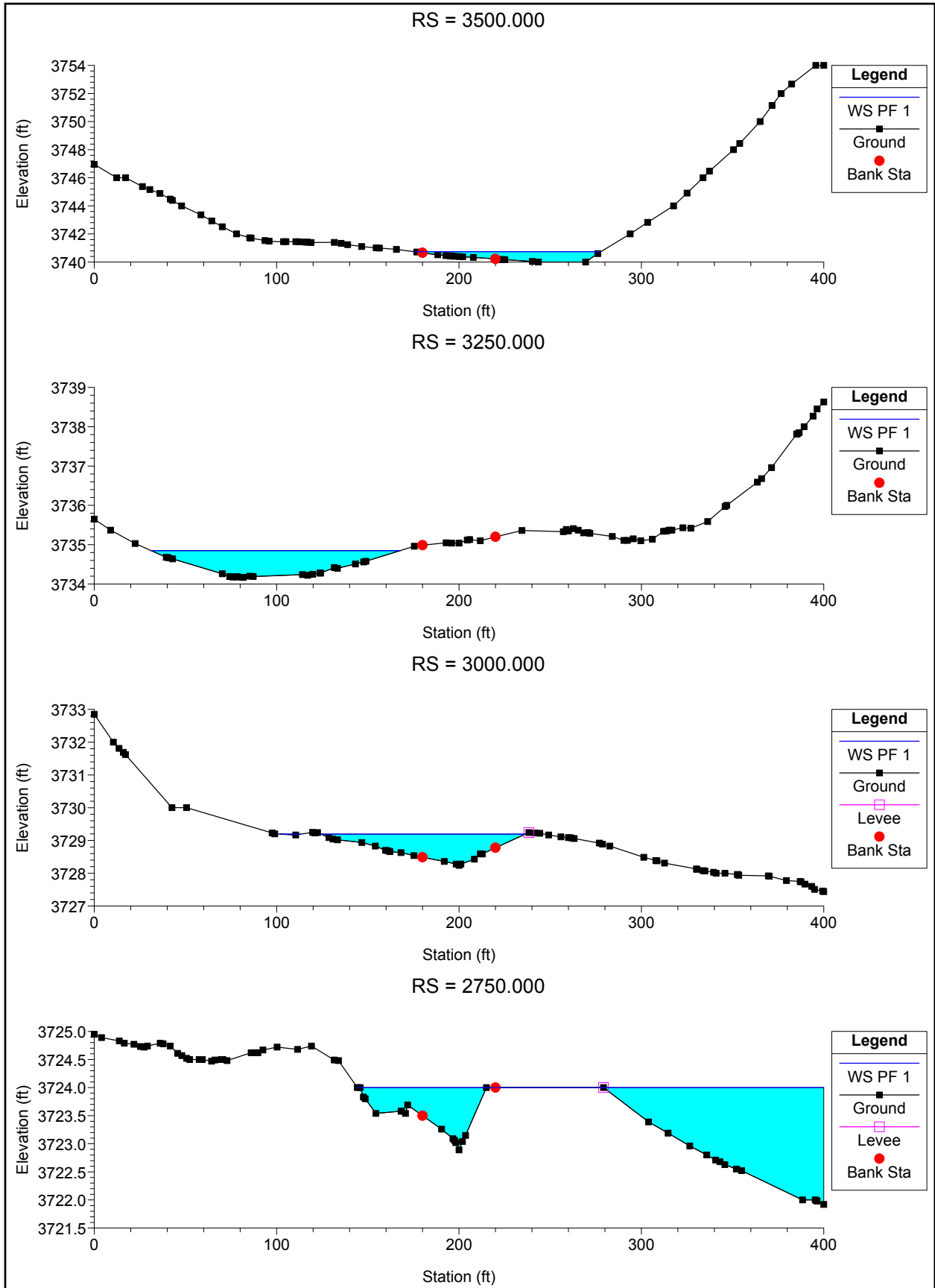
Attachment 2.7-M-8

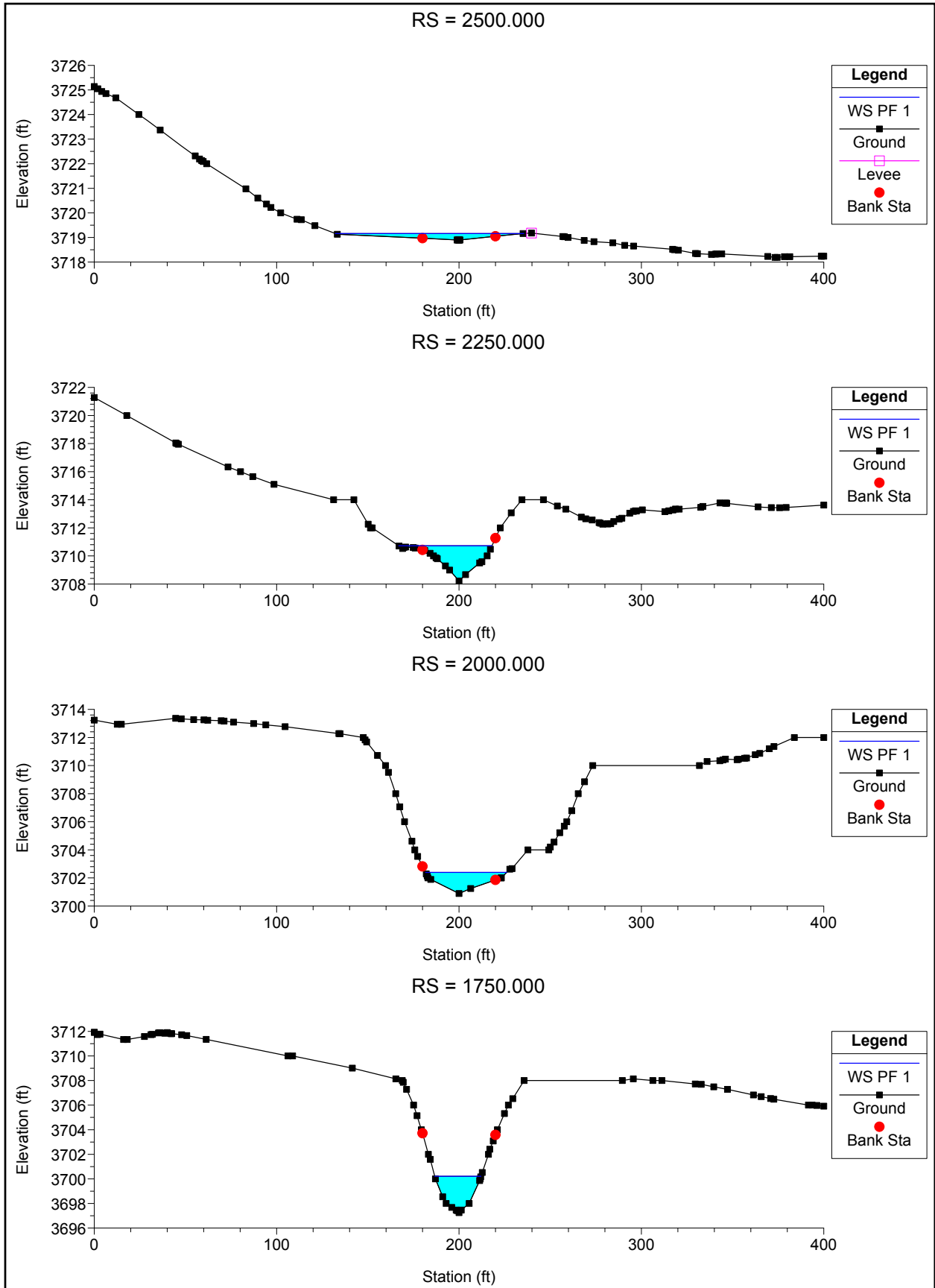
HEC-RAS Channel 05

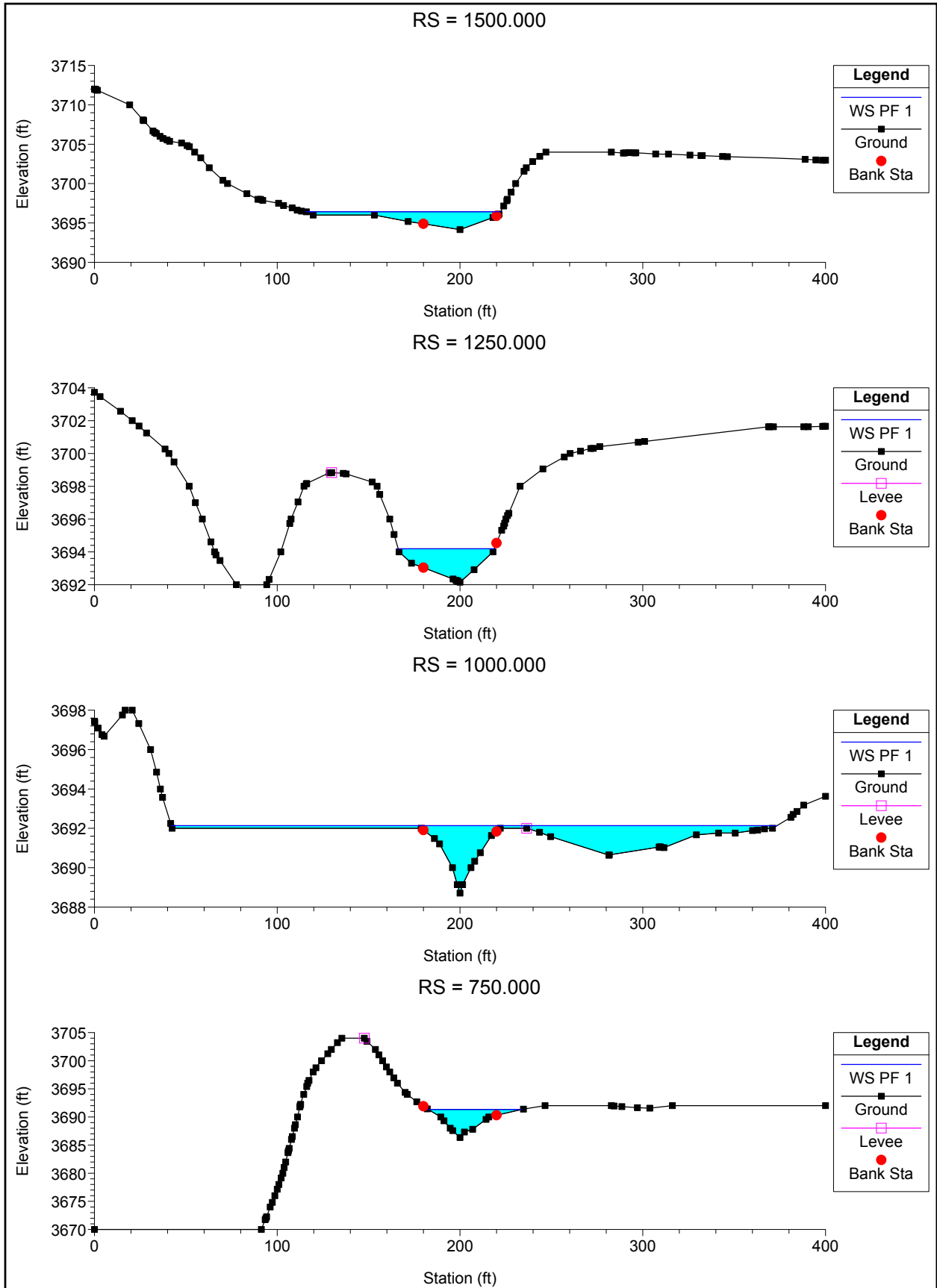


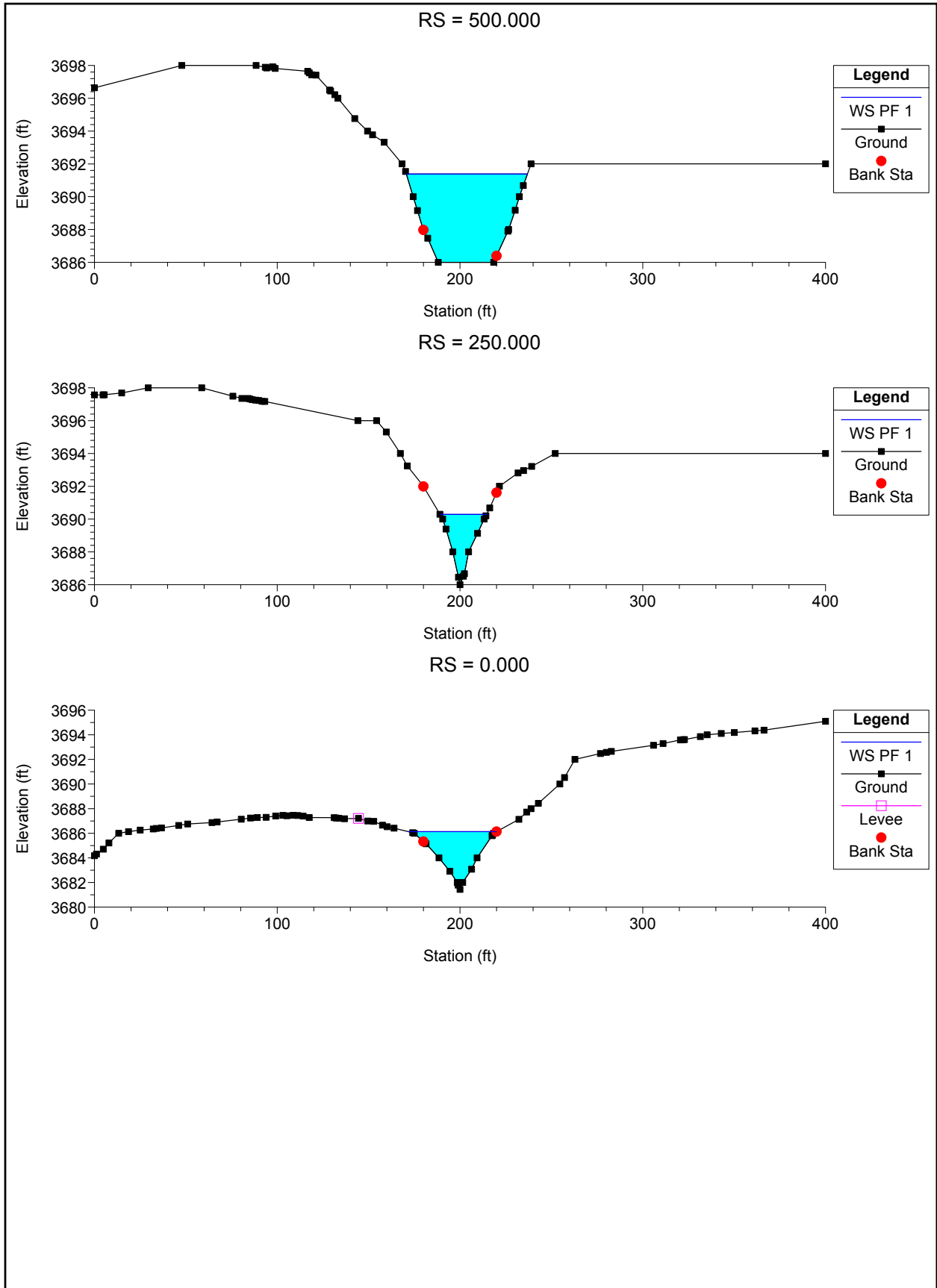
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
5	4250	PF 1	212	3754.83	3755.96	3755.88	3756.18	0.012612	4.23	59.12	97.33	0.82
5	4000	PF 1	212	3751.25	3752.21	3752.21	3752.48	0.018876	4.59	52.41	93.94	0.97
5	3750	PF 1	212	3745.06	3746.31	3746.41	3746.75	0.030981	5.83	43.39	95.23	1.24
5	3664.245	PF 1	212	3743.41	3744.38	3744.39	3744.65	0.019445	4.66	53.77	106.2	0.98
5	3500	PF 1	224	3740.22	3740.74	3740.8	3741.08	0.024974	3.19	50.02	102.48	0.98
5	3250	PF 1	224	3734.99	3734.85	3734.85	3735.07	0.024274		59.15	136.52	0
5	3000	PF 1	224	3728.24	3729.19	3729.24	3729.51	0.020954	5.07	53.97	123.35	1.03
5	2750	PF 1	224	3722.89	3724	3724	3724.03	0.0013	1.07	180.59	255.78	0.25
5	2500	PF 1	224	3718.9	3719.16	3719.19	3723.47	1.529111	18.48	14.46	103.39	7.13
5	2250	PF 1	369	3708.22	3710.73	3710.88	3711.54	0.020319	7.25	52.39	51.13	1.11
5	2000	PF 1	369	3700.89	3702.4	3702.85	3703.87	0.057601	9.83	38.57	44.56	1.78
5	1750	PF 1	369	3697.25	3700.22	3700.22	3701.16	0.015296	7.79	47.34	25.31	1
5	1500	PF 1	369	3694.16	3696.43	3696.17	3696.64	0.004835	4.13	109.2	106.38	0.57
5	1250	PF 1	369	3692.15	3694.19	3694.19	3694.76	0.014747	6.26	62.33	52.58	0.95
5	1000	PF 1	369	3688.71	3692.14	3692.01	3692.22	0.002815	2.9	183.83	331.37	0.42
5	750	PF 1	369	3686.34	3691.33	3689.97	3691.55	0.002539	3.85	100.3	51.16	0.43
5	500	PF 1	369	3686	3691.39		3691.42	0.000145	1.52	267.89	66.3	0.12
5	250	PF 1	369	3686	3690.29	3690.29	3691.22	0.015749	7.75	47.61	25.56	1
5	0	PF 1	369	3681.44	3686.13	3685	3686.38	0.003004	3.99	94.44	48.34	0.46









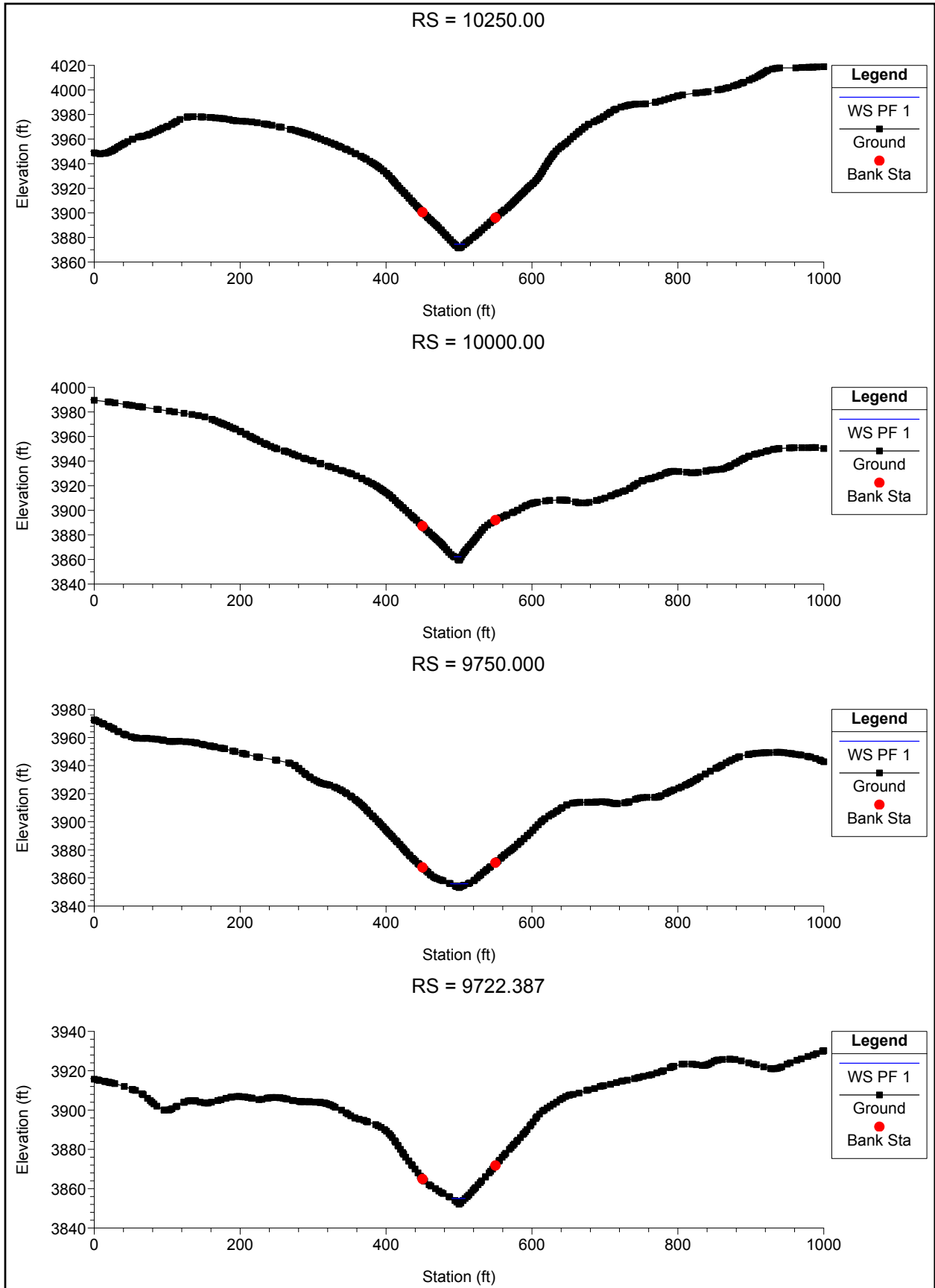


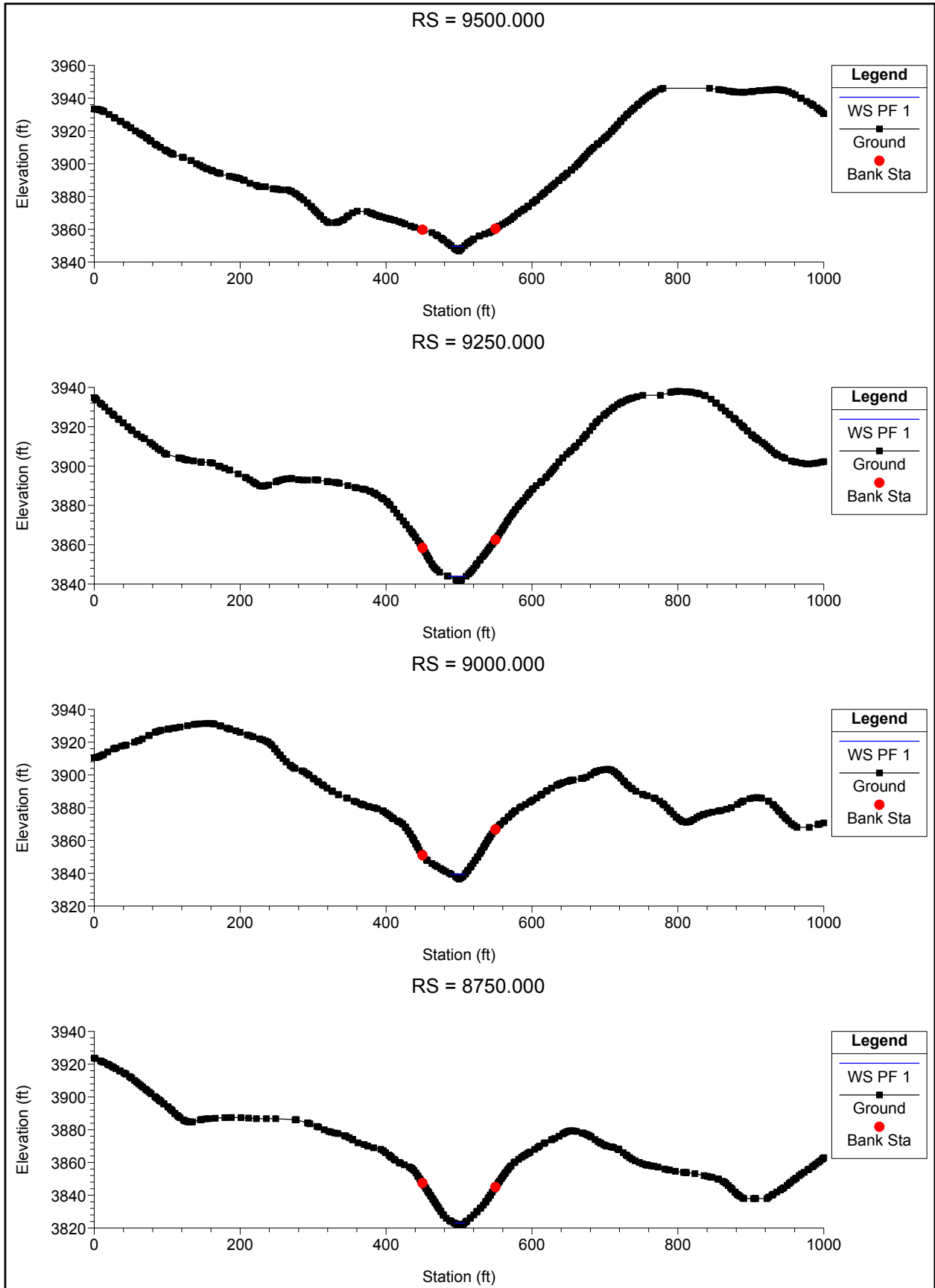
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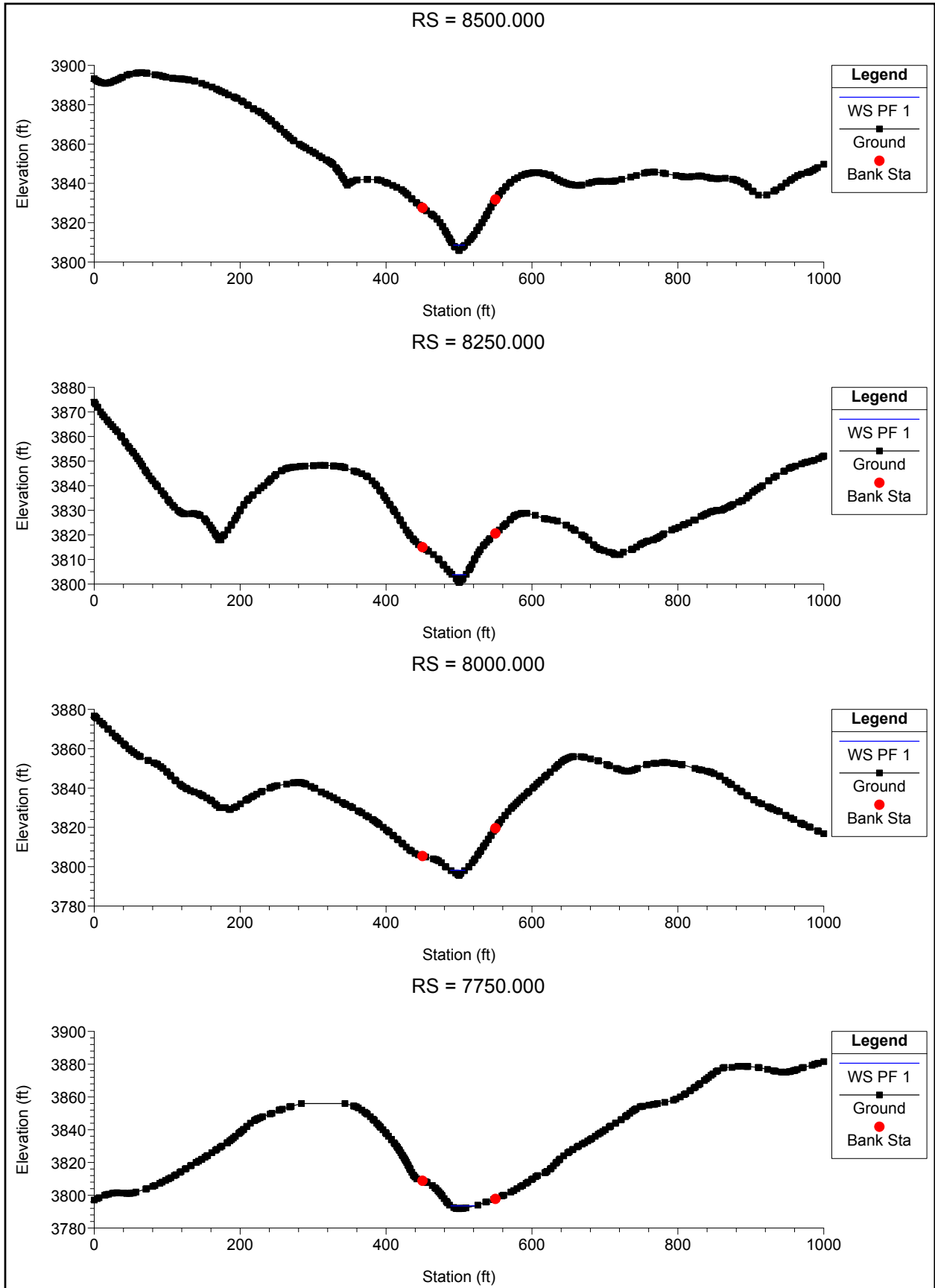
HEC-RAS Channel 07

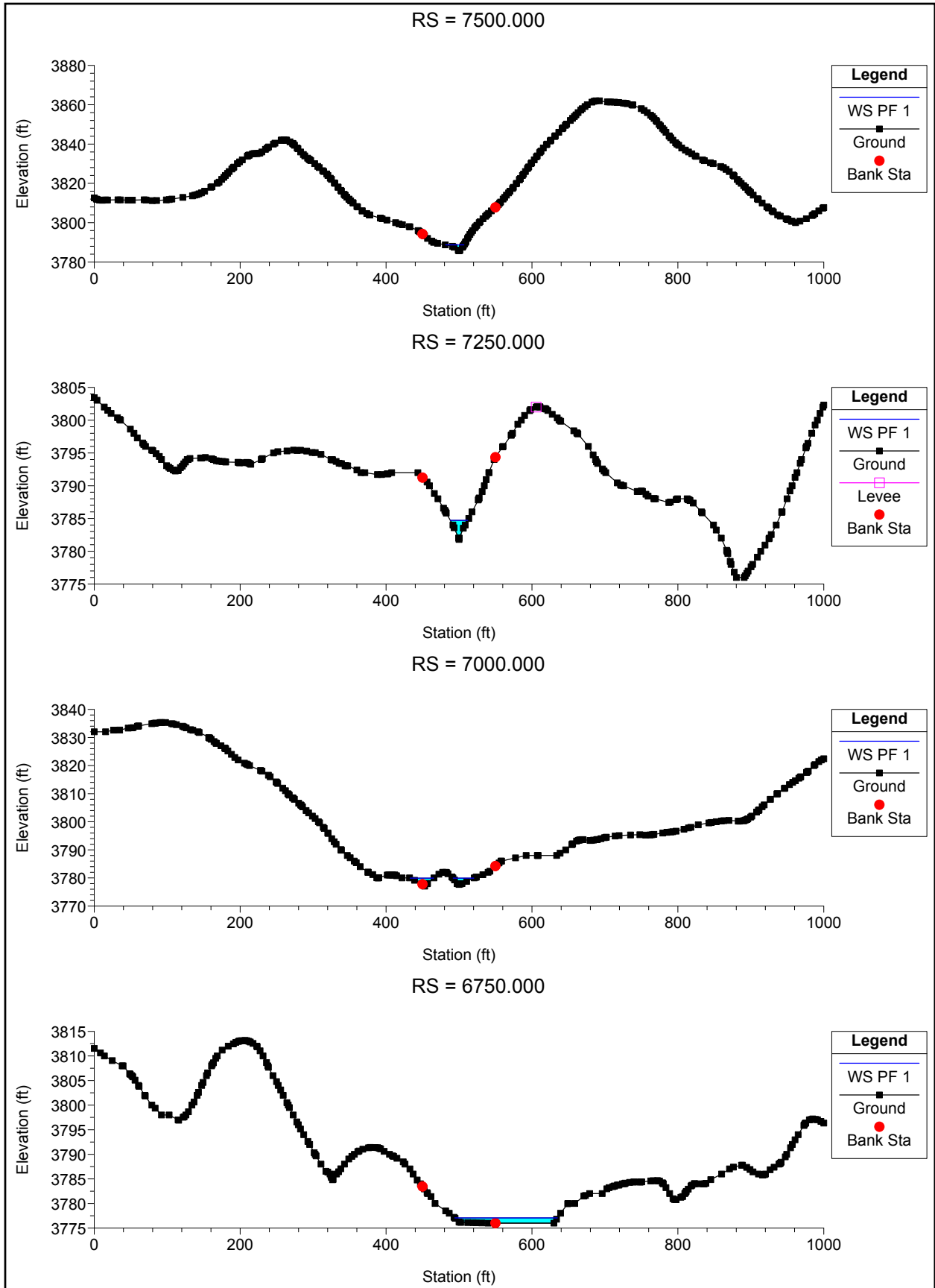


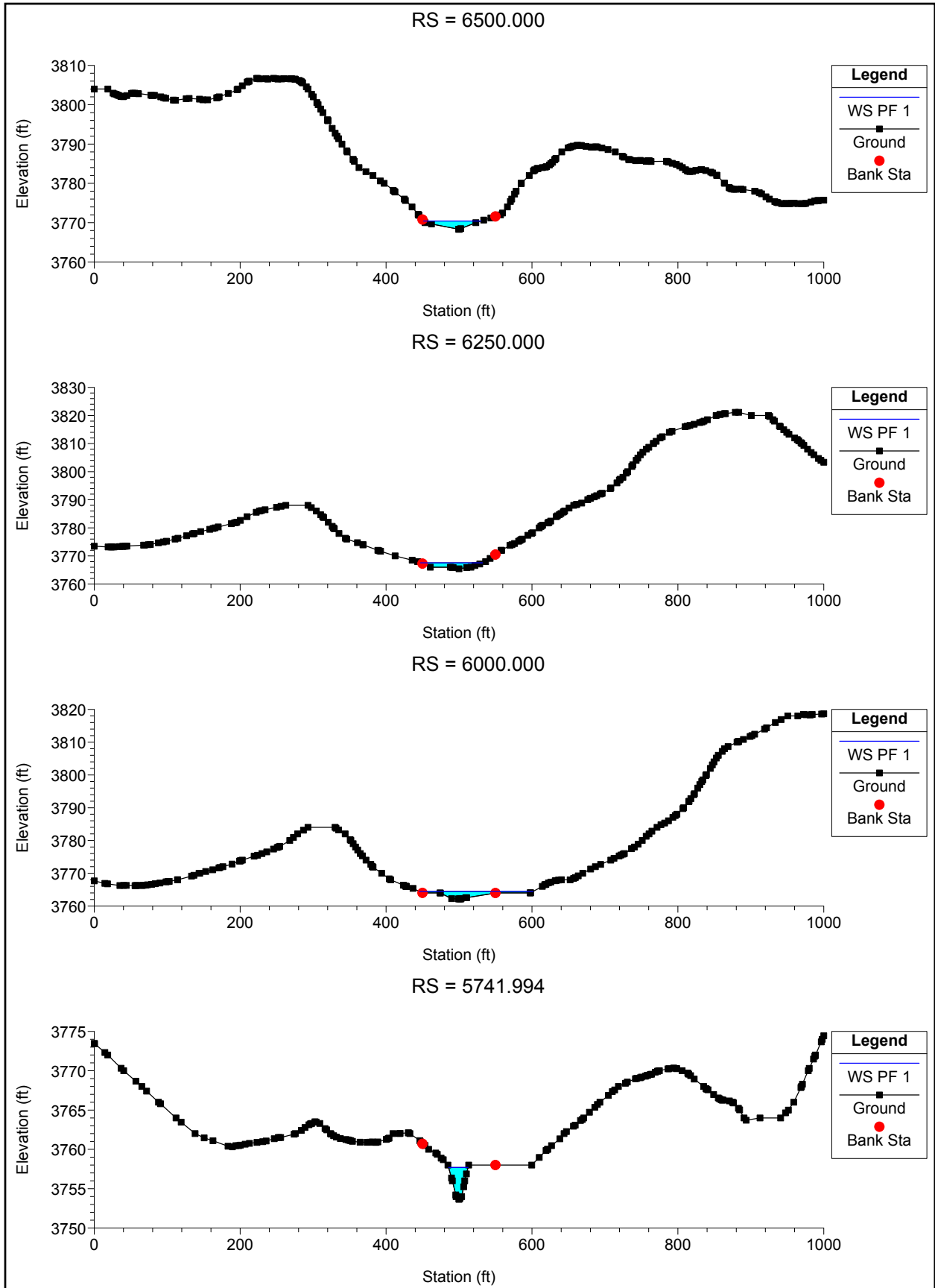
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
7	10250	PF 1	205	3871.43	3874.6	3874.71	3875.64	0.020013	8.22	24.94	14.14	1.09
7	10000	PF 1	205	3859.4	3862.24	3863.31	3865.82	0.103019	15.18	13.5	9.75	2.27
7	9750	PF 1	205	3853.15	3855.89	3855.93	3856.58	0.018285	6.66	30.79	23.99	1.04
7	9722.387	PF 1	205	3852.11	3855.05	3855.2	3856	0.022491	7.86	26.1	18.09	1.15
7	9500	PF 1	205	3846.68	3849.62	3849.86	3850.71	0.025291	8.39	24.43	16.57	1.22
7	9250	PF 1	205	3841.92	3843.94	3844.05	3844.71	0.022435	7.07	29.01	24.32	1.14
7	9000	PF 1	205	3836.42	3839.43	3839.43	3840.19	0.016705	6.96	29.45	19.64	1
7	8750	PF 1	205	3821.9	3823.01	3824.13	3828.91	0.318479	19.49	10.52	14.07	3.97
7	8500	PF 1	205	3805.94	3808.59	3808.98	3809.95	0.032593	9.35	21.93	15.35	1.38
7	8250	PF 1	205	3800.63	3803.81	3803.81	3804.58	0.016654	7.09	28.93	18.58	1
7	8000	PF 1	205	3795.55	3798.21	3798.54	3799.38	0.035	8.67	23.63	19.82	1.4
7	7750	PF 1	205	3791.78	3793.55	3793.55	3794.09	0.018034	5.9	34.72	32.69	1.01
7	7500	PF 1	205	3785.7	3788.71	3788.77	3789.41	0.020281	6.74	30.42	24.85	1.07
7	7250	PF 1	205	3781.81	3784.71	3784.71	3785.37	0.01683	6.5	31.56	23.87	1
7	7000	PF 1	205	3777.07	3779.92	3779.19	3780.03	0.003028	2.8	75.89	60.57	0.43
7	6750	PF 1	784	3776	3777.06	3777.06	3777.55	0.017997	5.42	138.84	140.73	0.99
7	6500	PF 1	784	3768.35	3770.43	3770.76	3771.61	0.035067	8.7	90.09	78.51	1.43
7	6250	PF 1	784	3765.44	3767.55	3767.55	3768.26	0.016065	6.76	116.33	84.91	1
7	6000	PF 1	784	3762.19	3764.47	3764.47	3764.94	0.013614	5.73	148.84	155.89	0.9
7	5741.994	PF 1	784	3753.65	3757.71	3758.57	3760.12	0.029507	12.46	62.92	26.72	1.43
7	5500	PF 1	784	3748.37	3752.45	3752.7	3753.69	0.022469	8.93	87.76	51.74	1.21
7	5250	PF 1	784	3745.07	3748.48	3748.53	3749.1	0.016678	5.16	127.66	111.03	0.94
7	5000	PF 1	784	3741.86	3744.48	3744.29	3744.97	0.009811	5.68	143.08	104.78	0.8
7	4750	PF 1	784	3738.86	3741.93	3741.67	3742.62	0.009886	6.68	117.45	58.61	0.83
7	4500	PF 1	784	3736.52	3738.97	3738.97	3739.53	0.017776	6.13	131.43	123.57	1.02
7	4250	PF 1	784	3733.33	3736	3736	3736.03	0.000742	1.27	628.84	609.67	0.21
7	4000	PF 1	784	3730	3730.51	3731.24	3734.97	0.472037	16.86	46.28	104.58	4.48
7	3750	PF 1	784	3724.5	3726.75	3726.59	3727.21	0.010557	5.55	147	112.25	0.82
7	3500	PF 1	784	3724.89	3726.61		3726.65	0.0007	1.28	476.29	278.83	0.2
7	3263.561	PF 1	784	3724	3725.73	3725.73	3726.17	0.014092	5.63	154.09	168.15	0.91
7	3219.486	PF 1	784	3719.48	3719.59	3720.32	3724.06	0.349619	4.53	46.42	100.29	2.88
7	3000	PF 1	784	3714.7	3716.36	3716.26	3716.75	0.011507	5.25	162.82	162.28	0.83
7	2813.1	PF 1	1022	3711.59	3713.57	3713.57	3714.28	0.014738	6.93	154.03	110.62	0.98
7	2539.204	PF 1	1022	3707.85	3709.35	3709.51	3710.09	0.025109	7.61	152.04	158.15	1.22
7	2250	PF 1	1022	3701.34	3703.65	3703.69	3704.45	0.016426	7.22	144.06	100.53	1.03
7	2000	PF 1	1022	3696.66	3699.86	3699.86	3700.85	0.014522	7.96	128.33	65.55	1
7	1750	PF 1	1022	3693.43	3695.99	3696.25	3697.27	0.021425	9.08	113.46	67.58	1.2
7	1500	PF 1	1022	3689.66	3692.19	3692.33	3693.07	0.016956	7.55	138.41	109.65	1.05
7	1250	PF 1	1022	3687.09	3689.84	3689.83	3690.65	0.013564	7.27	143.85	92.39	0.96
7	1000	PF 1	1022	3685.63	3689.07		3689.31	0.002513	4.11	265.4	116.17	0.44
7	750	PF 1	1022	3684.81	3687.95		3688.42	0.005818	5.83	195.72	105.83	0.66
7	500	PF 1	1022	3683.97	3687.03		3687.28	0.003427	4.18	259.89	138.97	0.5
7	250	PF 1	1022	3682.35	3685.03	3685.03	3685.69	0.015286	6.74	158.82	119.27	0.98
7	0	PF 1	1022	3673.48	3674.55	3675.21	3677.3	0.165894	12.9	78.86	133.64	2.83

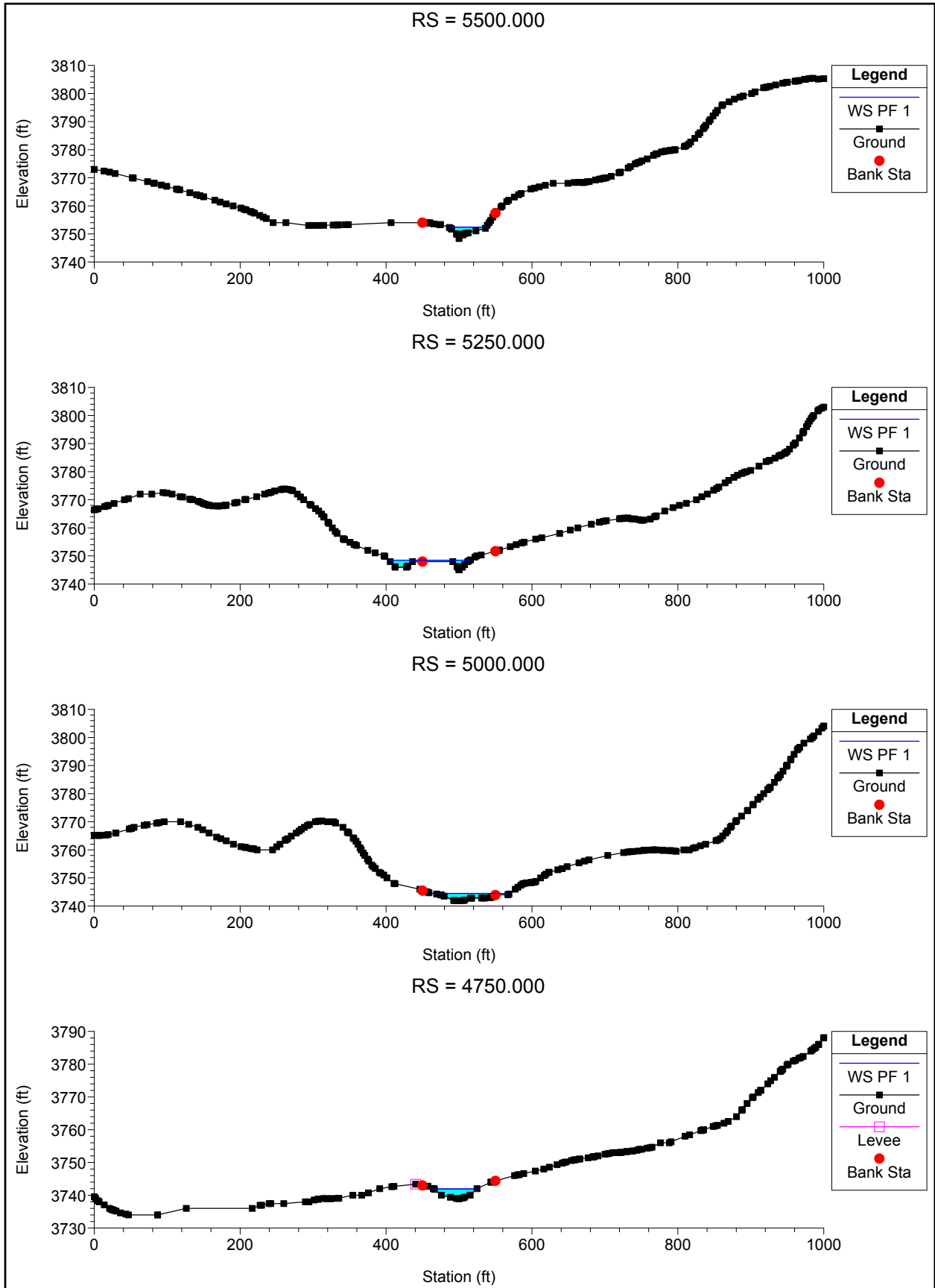


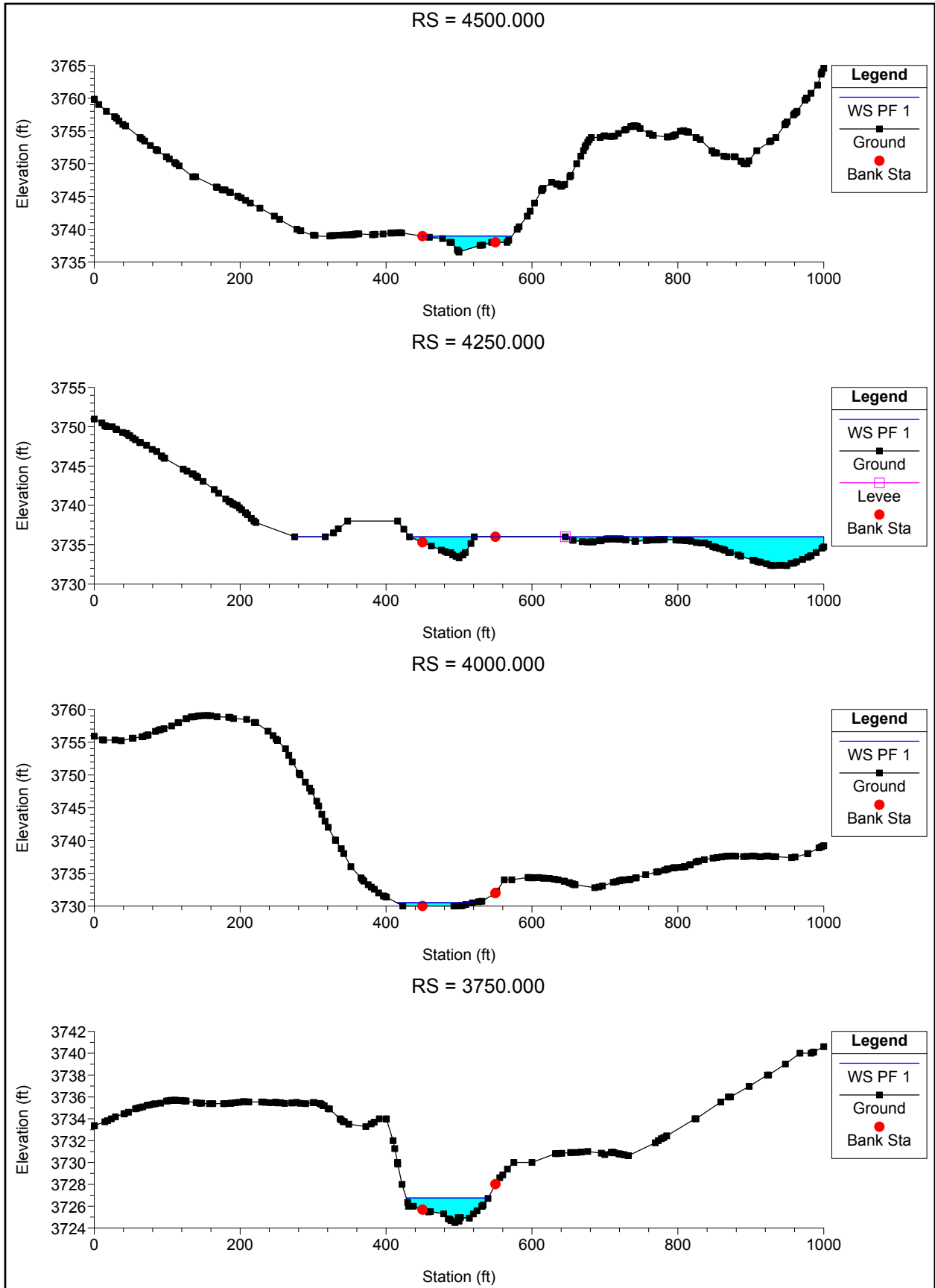


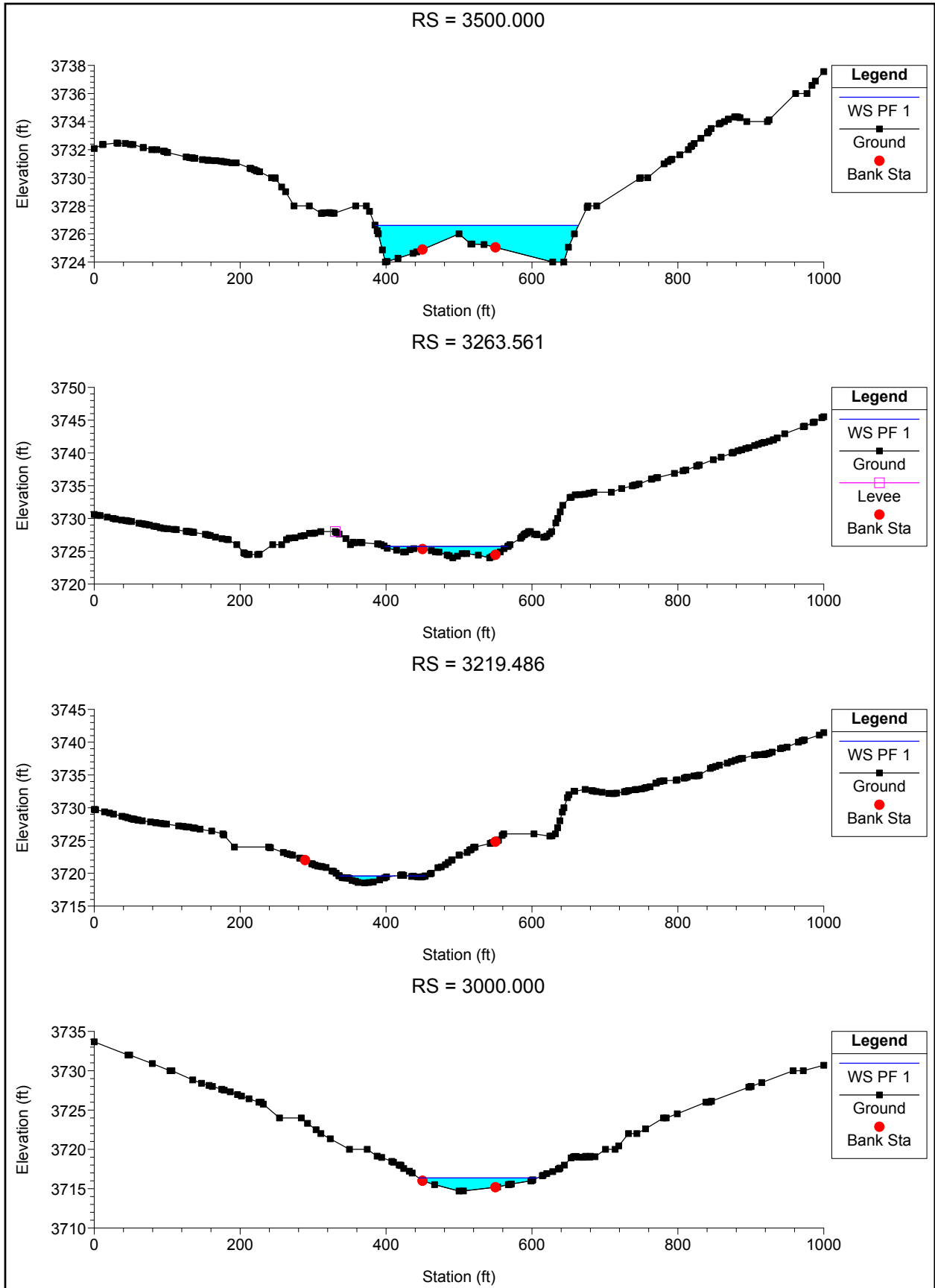


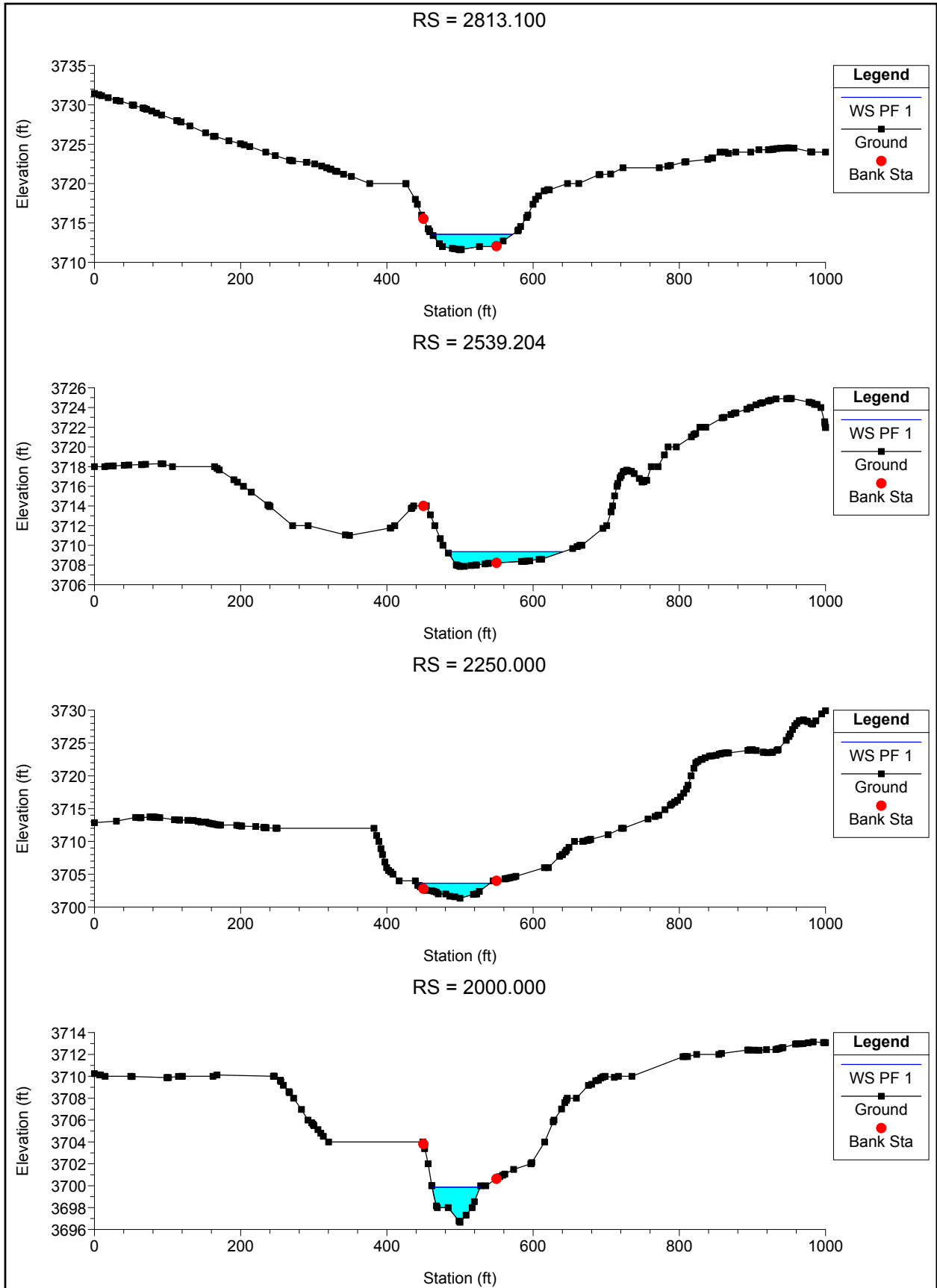


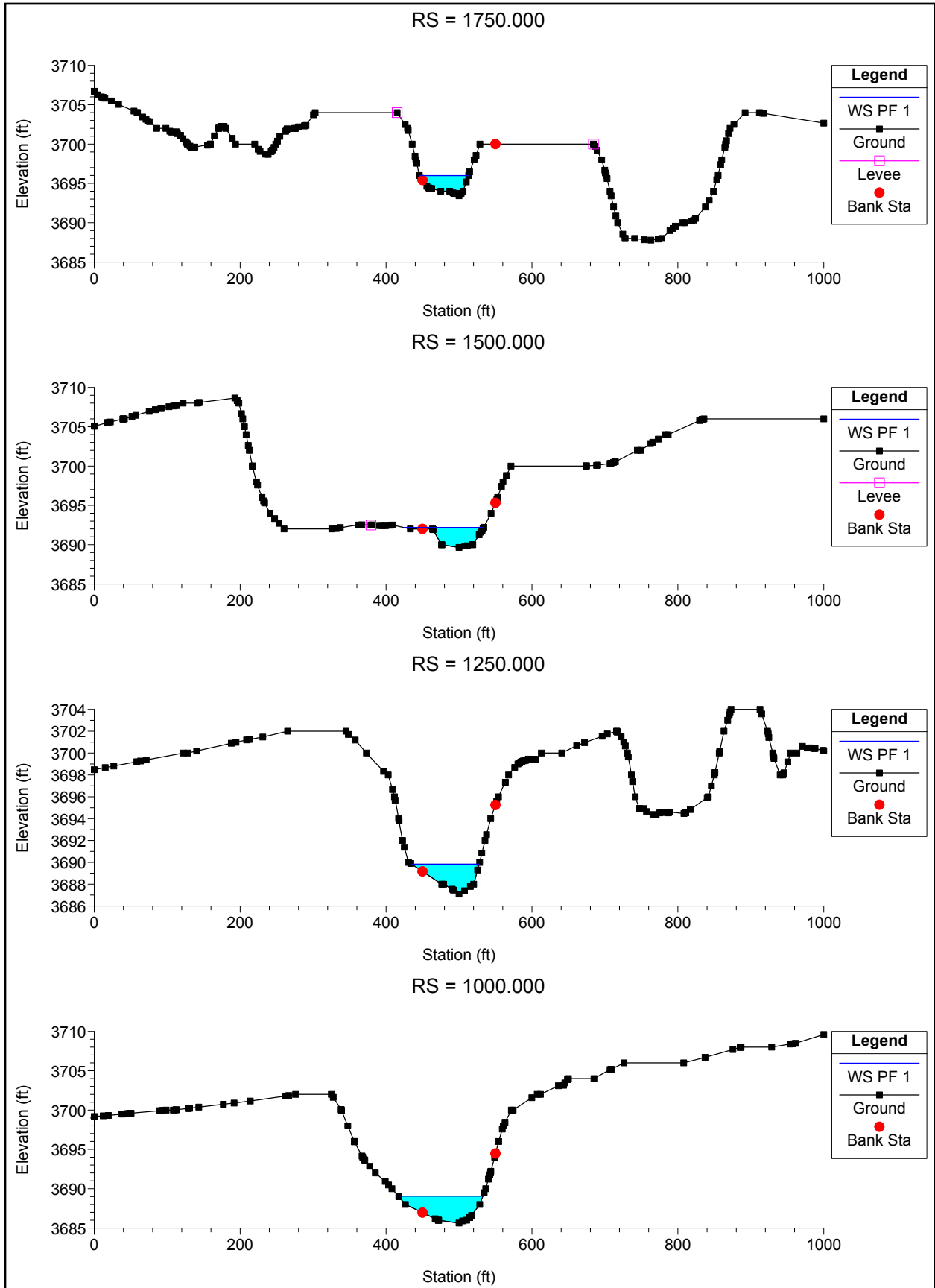


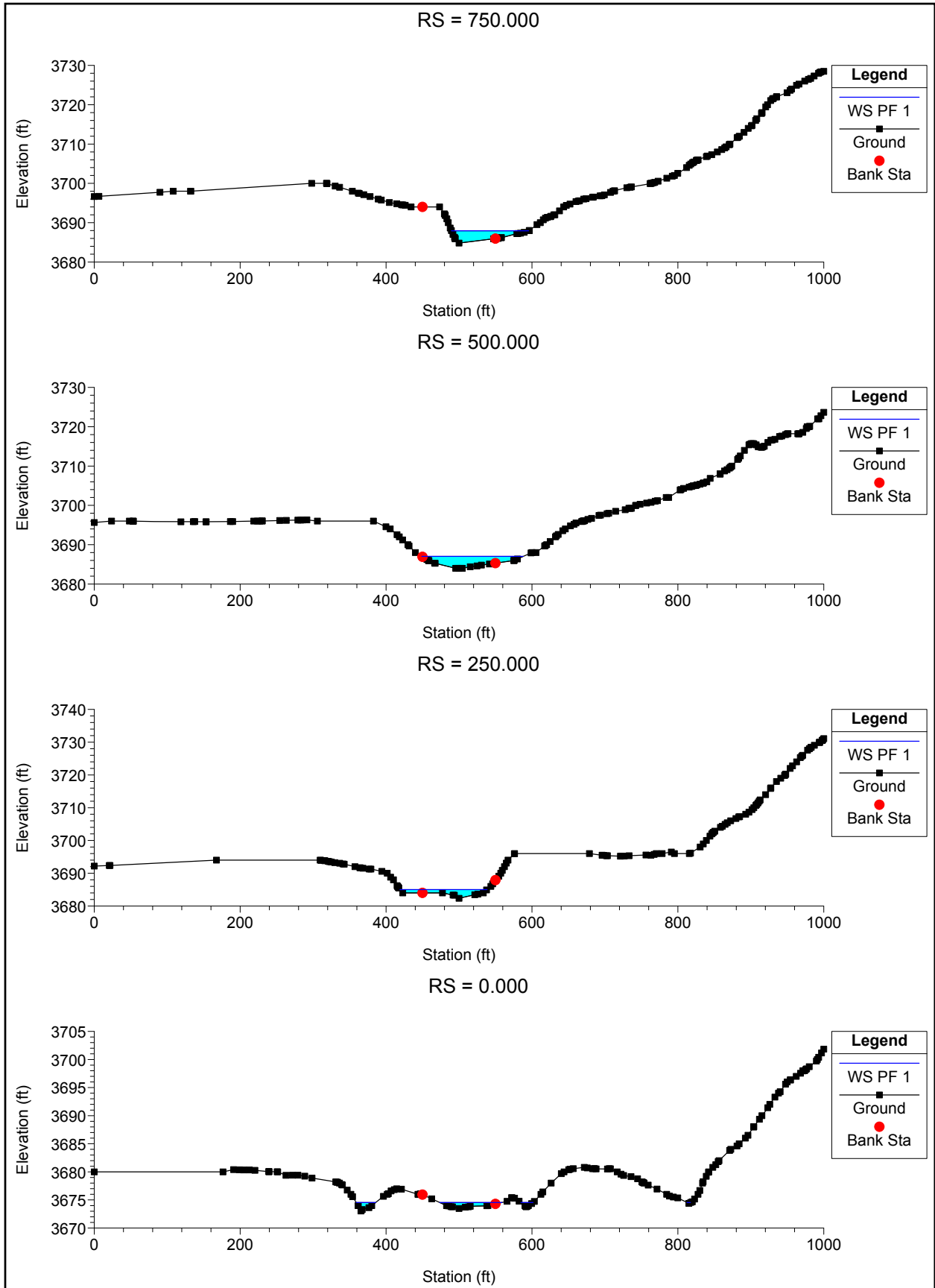










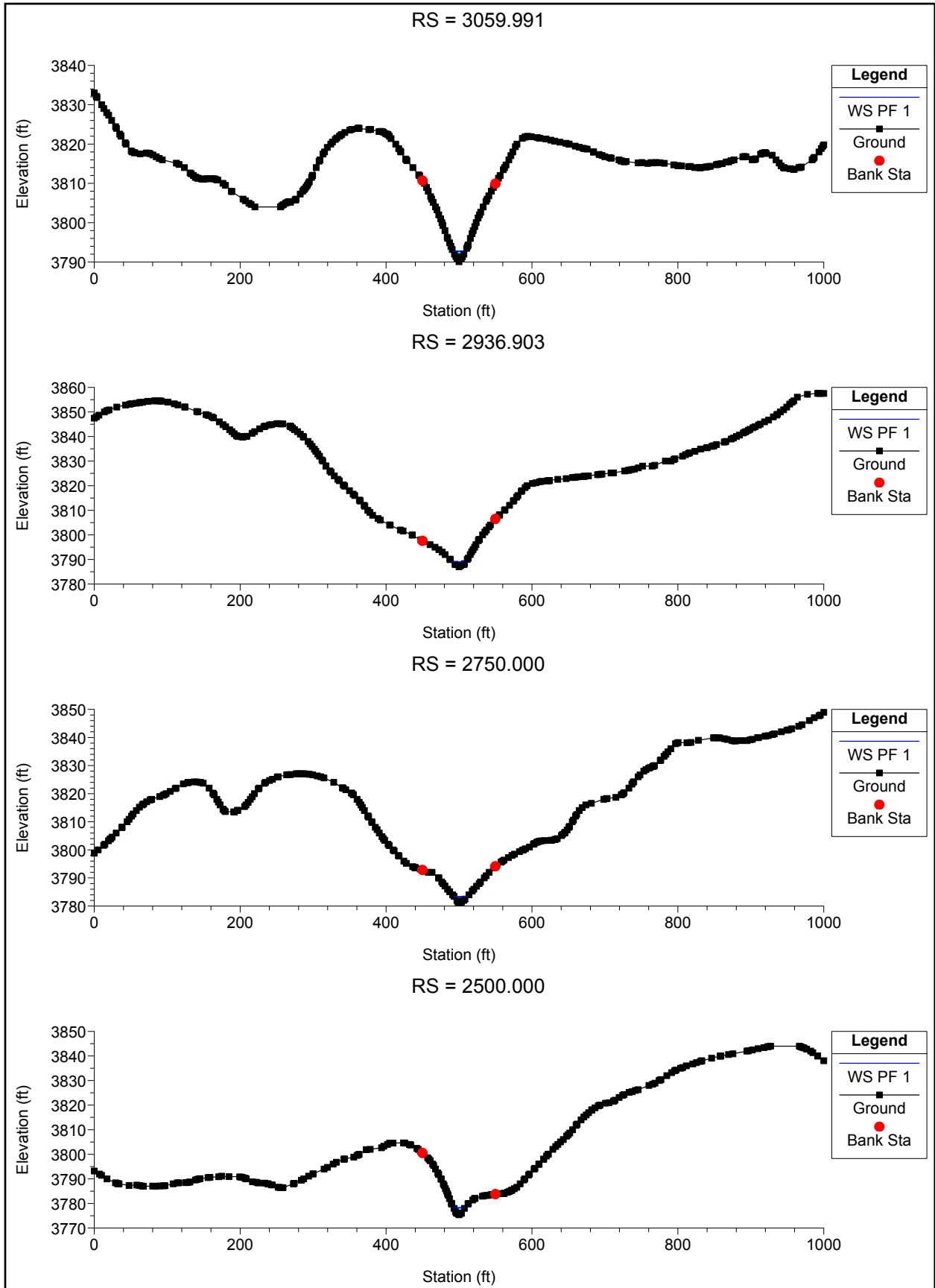


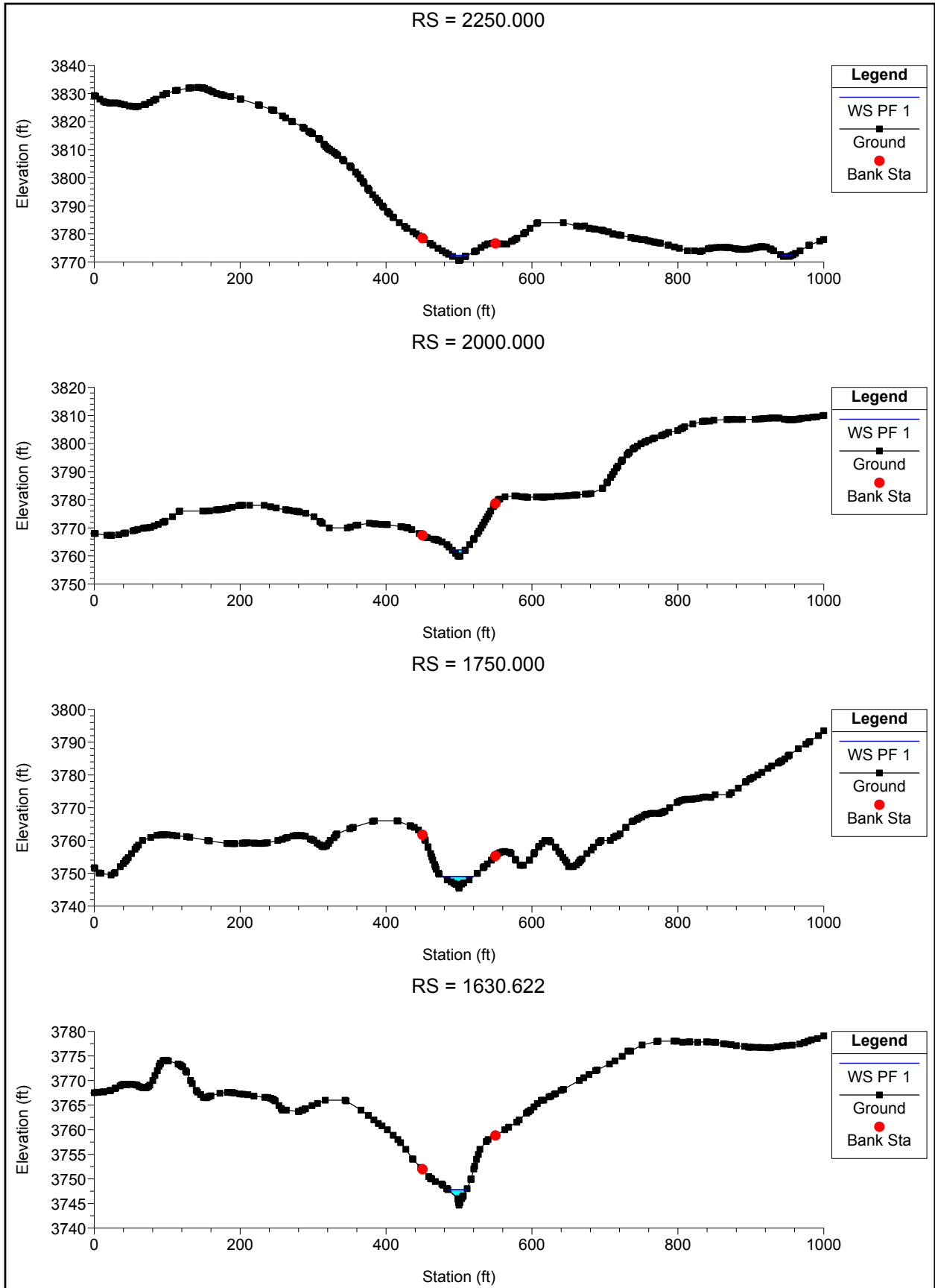
Attachment 2.7-M-10

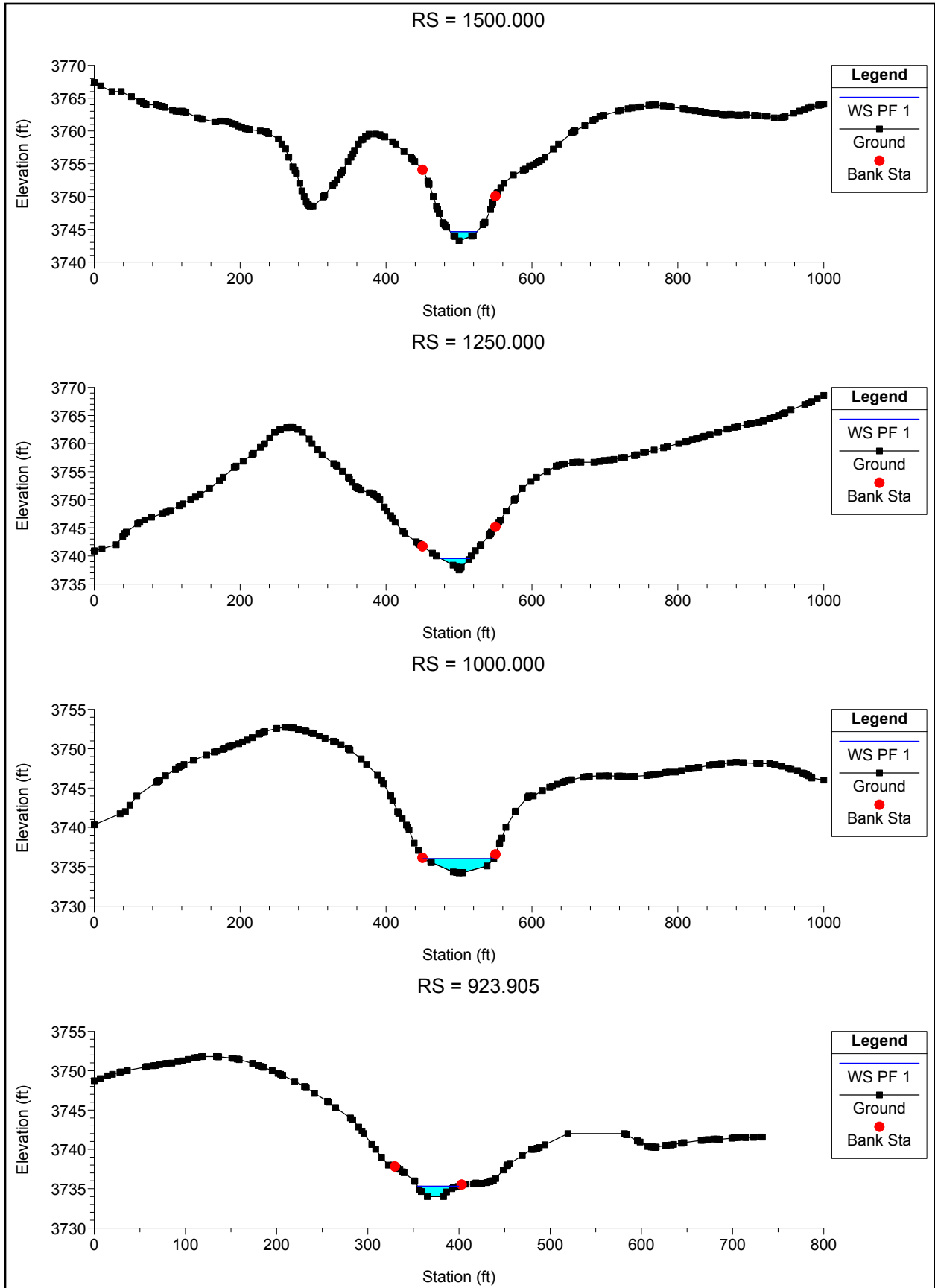
HEC-RAS Channel 07A

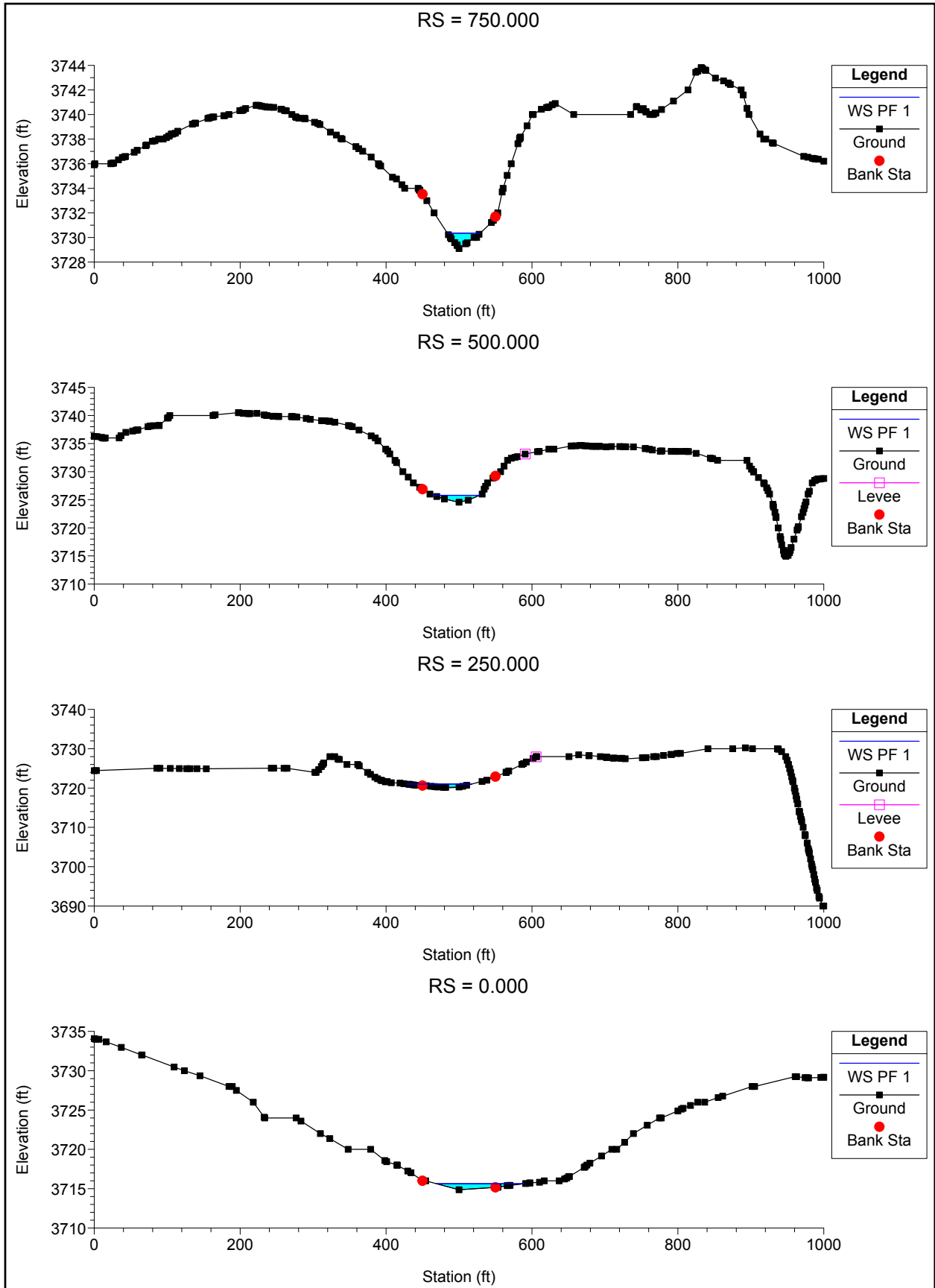


Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
07A	3059.991	PF 1	205	3790.08	3792.77	3793.04	3793.9	0.02671	8.52	24.07	16.84	1.26
07A	2936.903	PF 1	205	3787.05	3789.09	3789.48	3790.43	0.038441	9.26	22.13	18.3	1.48
07A	2750	PF 1	205	3781.17	3783.43	3783.7	3784.52	0.028061	8.4	24.41	18.38	1.28
07A	2500	PF 1	205	3775.39	3778.29	3778.32	3779.2	0.017711	7.69	26.67	15.57	1.03
07A	2250	PF 1	205	3770.6	3772.43	3772.79	3773.56	0.052992	8.89	25.31	37.77	1.67
07A	2000	PF 1	205	3759.88	3762.15	3762.53	3763.45	0.037292	9.14	22.44	18.48	1.46
07A	1750	PF 1	205	3745.42	3749.01	3748.23	3749.17	0.003288	3.17	64.6	42.24	0.45
07A	1630.622	PF 1	205	3744.66	3747.82	3747.82	3748.47	0.018262	6.44	31.84	25.71	1.02
07A	1500	PF 1	205	3743.24	3744.64	3744.82	3745.37	0.034325	6.86	29.86	36.48	1.34
07A	1250	PF 1	205	3737.51	3739.55	3739.55	3740.03	0.018938	5.57	36.82	39.33	1.01
07A	1000	PF 1	205	3734.25	3736.03	3735.29	3736.08	0.001723	1.89	108.3	97.17	0.32
07A	923.905	PF 1	205	3734	3735.32	3735.32	3735.75	0.019201	5.29	38.74	45.24	1.01
07A	750	PF 1	205	3729.1	3730.35	3730.59	3731.14	0.050921	7.1	28.86	45.13	1.57
07A	500	PF 1	205	3724.56	3725.79	3725.79	3726.13	0.019754	4.67	43.85	63.18	0.99
07A	250	PF 1	205	3720.17	3721.03	3721.05	3721.33	0.021385	4.56	47.43	89.16	1.01
07A	0	PF 1	205	3714.87	3715.64	3715.67	3715.9	0.023862	4.29	51.67	120.33	1.04







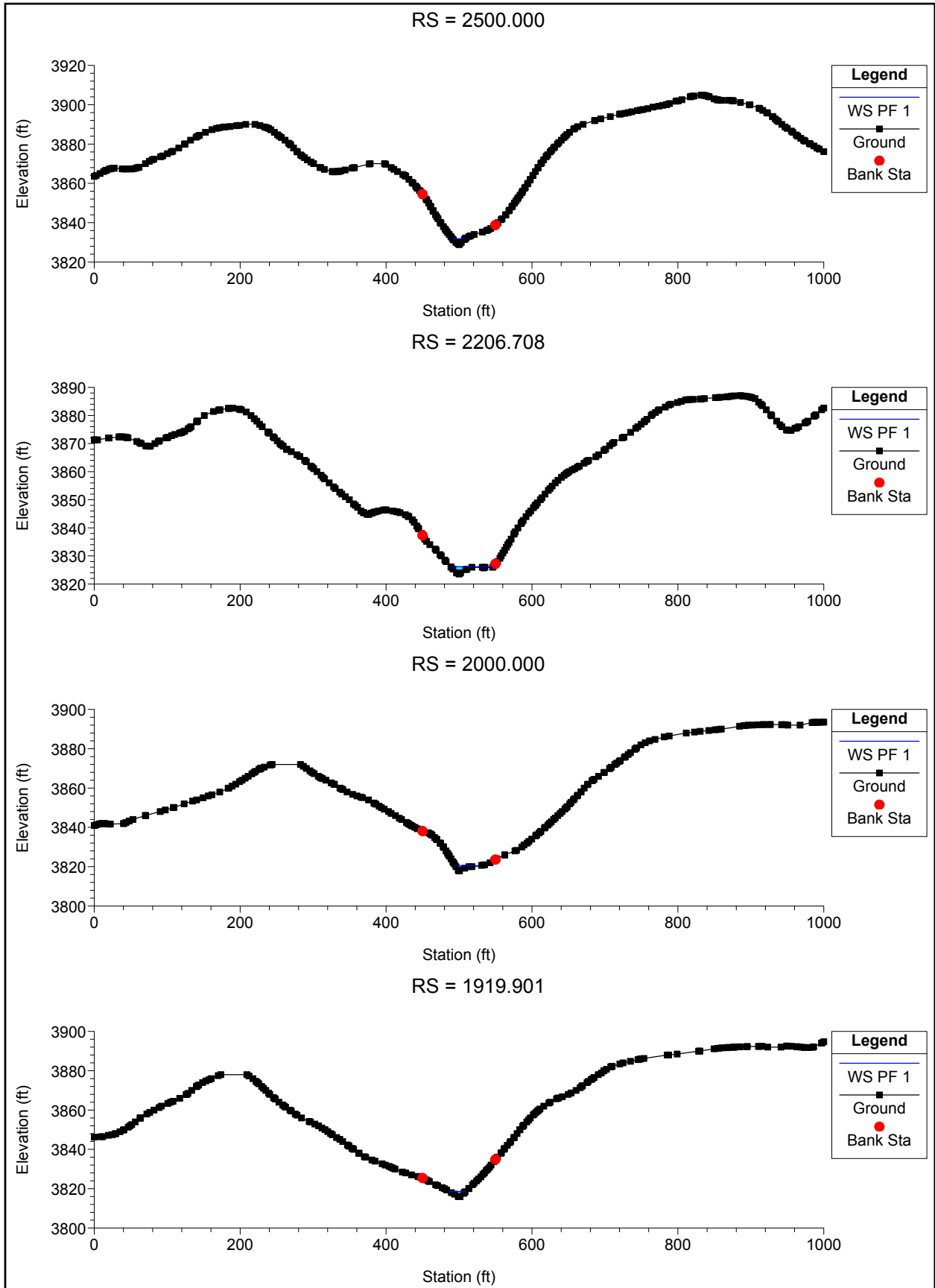


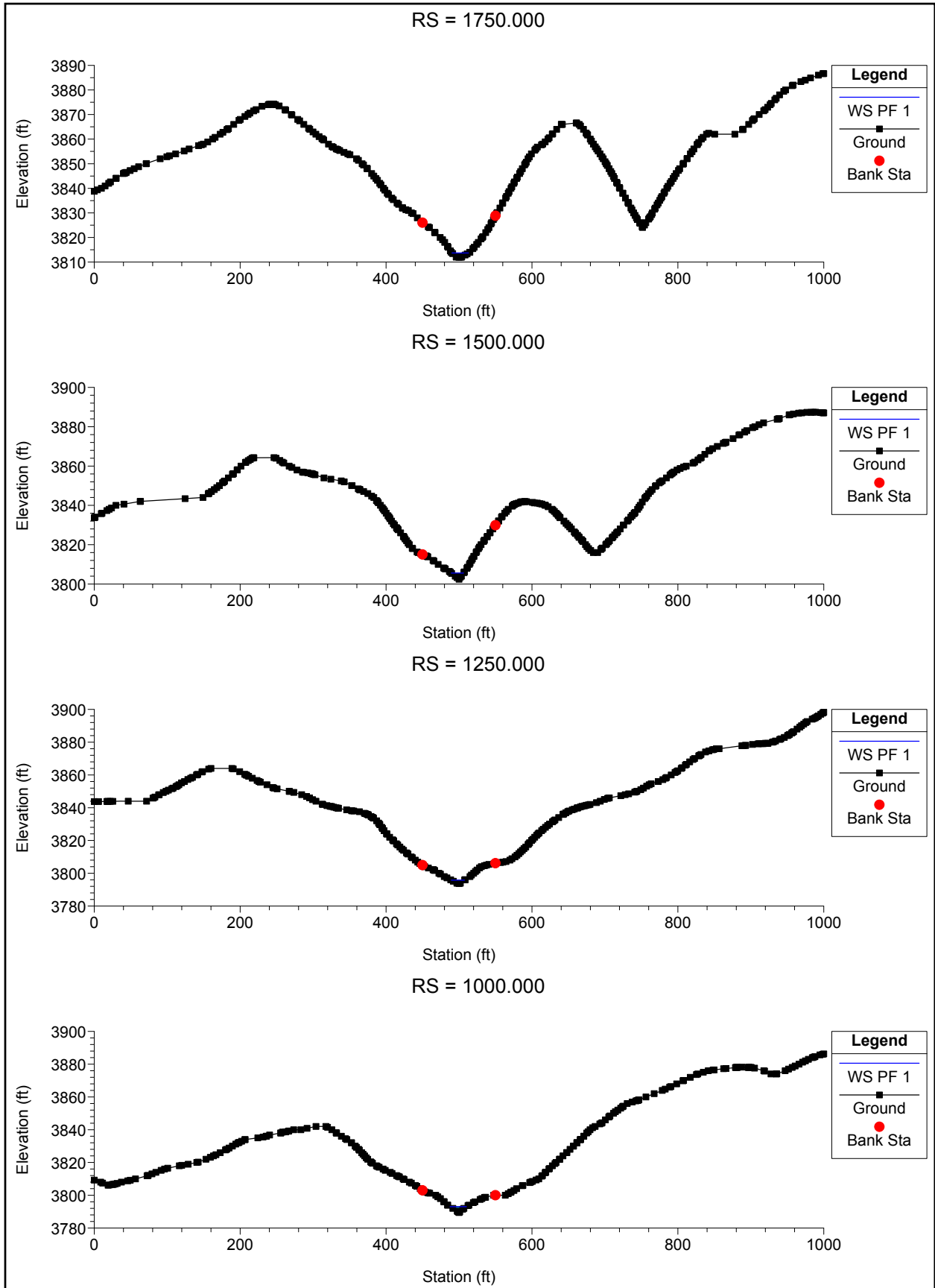
Attachment 2.7-M-11

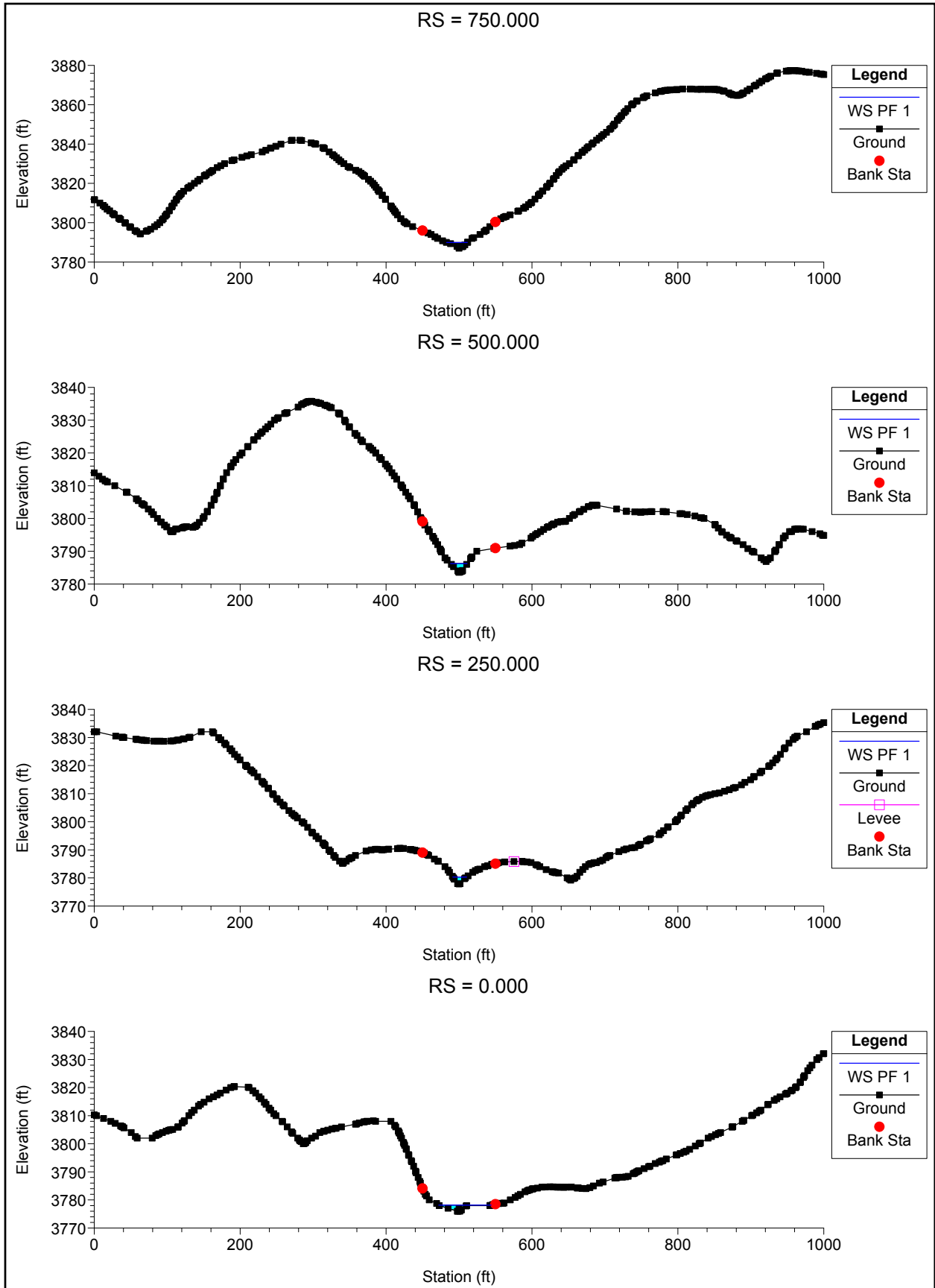
HEC-RAS Channel 07B



Reach	River Sta	Profile	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)	
07B	2500	PF 1	236	3828.85	3831.85	3832.1	3833.02	0.025009	8.68	27.19	17.48	1.23
07B	2206.708	PF 1	236	3823.55	3826.17	3826.21	3826.62	0.02415	5.42	43.57	58	1.1
07B	2000	PF 1	236	3817.92	3820.52	3820.7	3821.32	0.030202	7.19	32.81	33.22	1.28
07B	1919.901	PF 1	236	3815.94	3818.59	3818.69	3819.46	0.020161	7.47	31.59	22.17	1.1
07B	1750	PF 1	236	3811.98	3813.71	3814.1	3815.03	0.041184	9.22	25.58	22.69	1.53
07B	1500	PF 1	236	3802.44	3805.58	3805.88	3806.85	0.027454	9.03	26.13	16.73	1.27
07B	1250	PF 1	236	3793.73	3795.81	3796.42	3797.72	0.057737	11.1	21.27	18.21	1.81
07B	1000	PF 1	236	3789.53	3793.04	3792.84	3793.66	0.011862	6.31	37.39	22.34	0.86
07B	750	PF 1	236	3787.06	3789.96	3789.84	3790.52	0.013429	6.01	39.29	28.44	0.9
07B	500	PF 1	236	3783.58	3786.25	3786.25	3787.01	0.016618	6.98	33.81	22.77	1.01
07B	250	PF 1	236	3777.89	3780.33	3780.74	3781.66	0.033574	9.26	25.49	18.93	1.41
07B	0	PF 1	236	3776	3778.15	3778.14	3778.49	0.019996	4.69	50.33	71.94	0.99





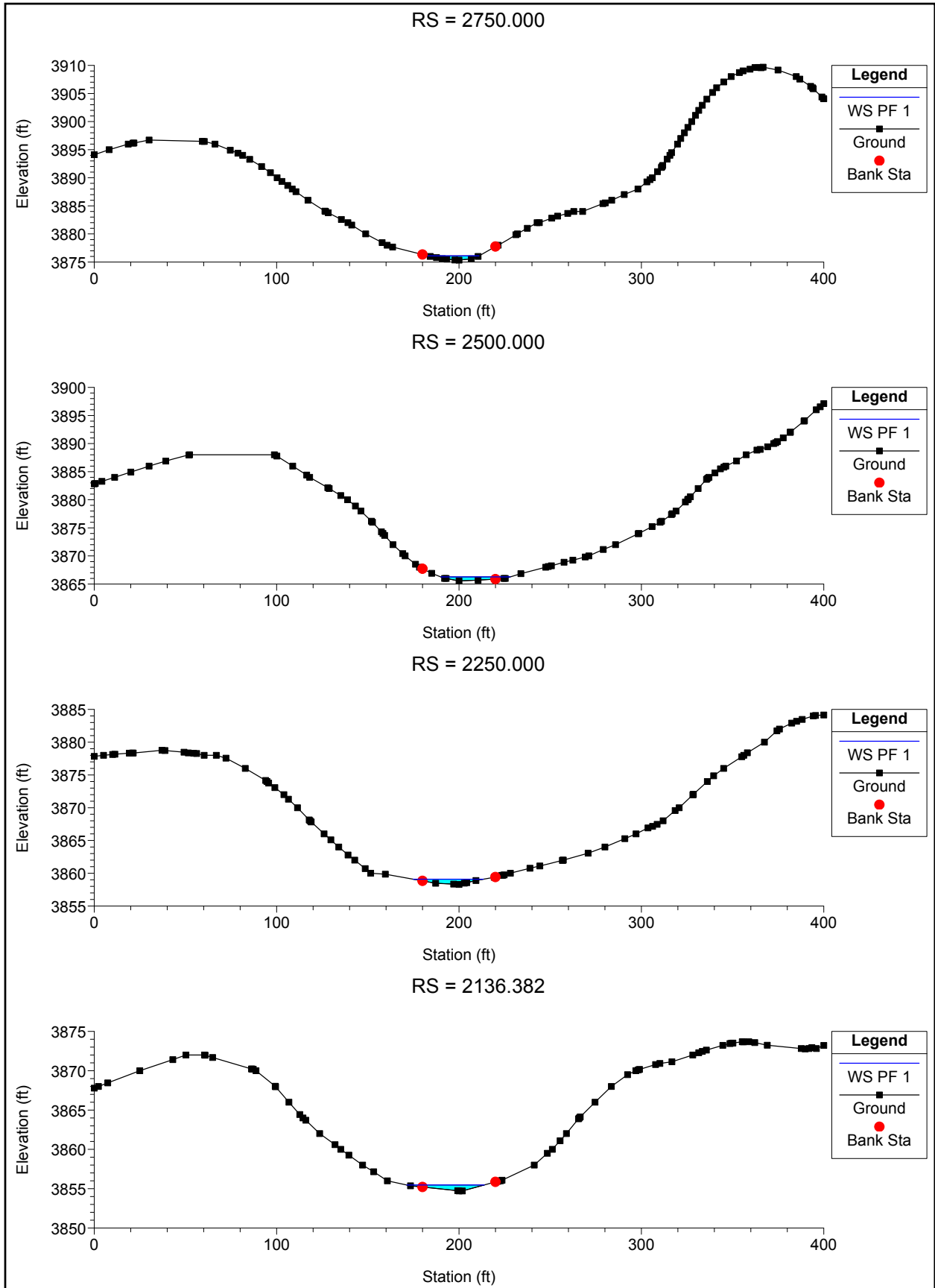


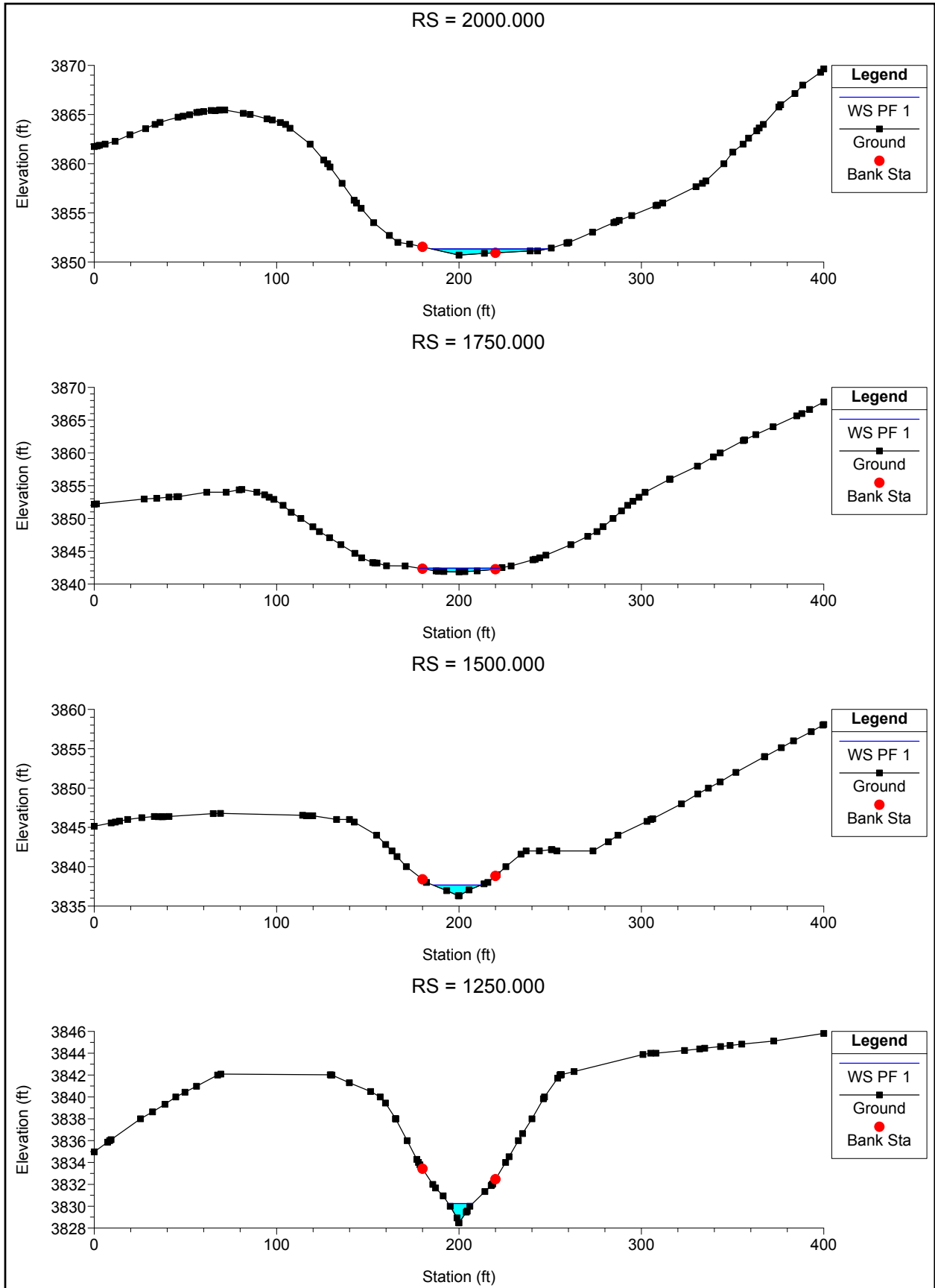
Attachment 2.7-M-12

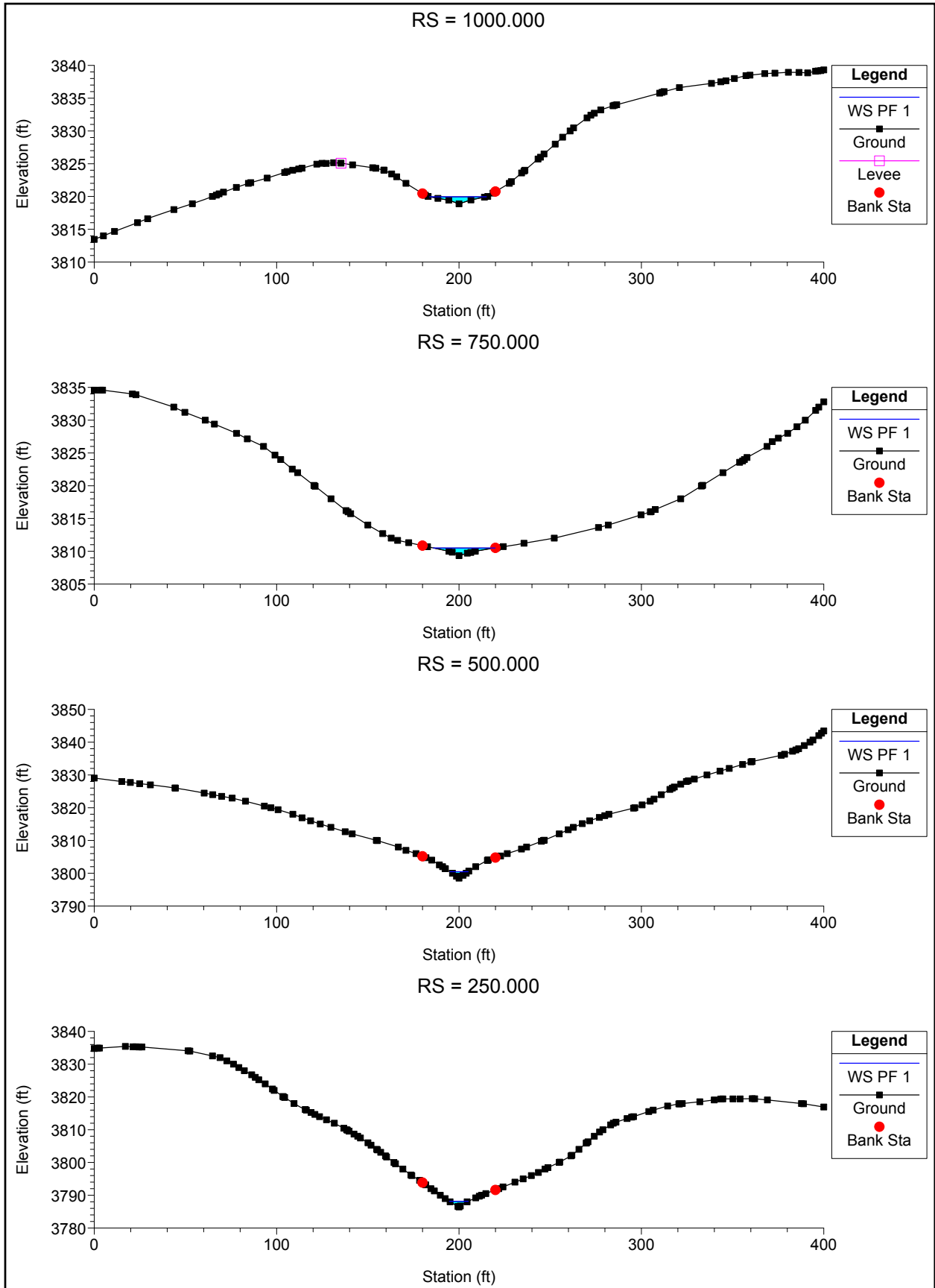
HEC-RAS Channel 07C

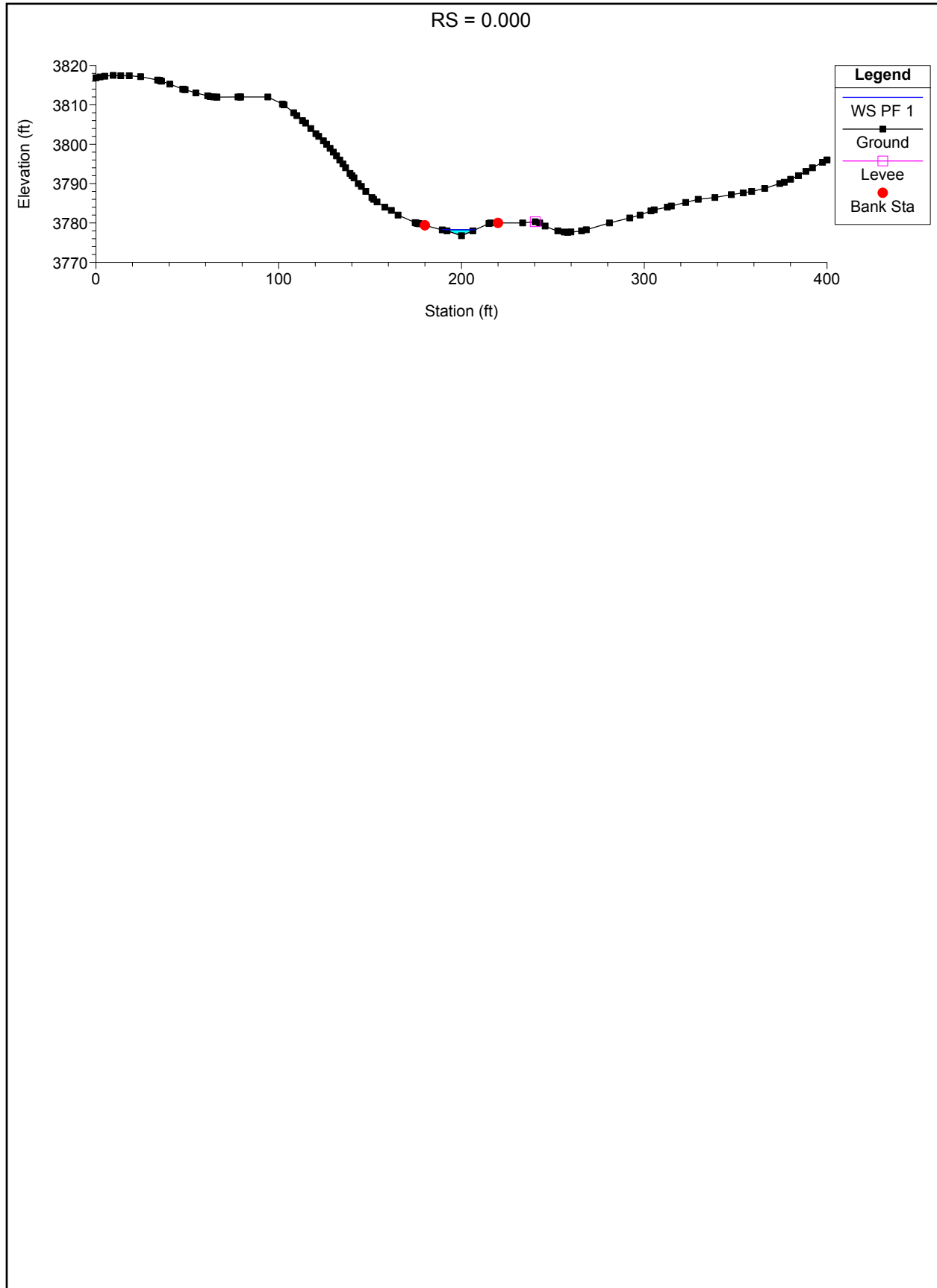


Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
07C	2750	PF 1	81	3875.33	3876.1	3876.26	3876.65	0.051057	5.93	13.66	28.07	1.5
07C	2500	PF 1	81	3865.56	3866.26	3866.34	3866.62	0.033474	4.92	17.21	38.02	1.22
07C	2250	PF 1	81	3858.29	3859.09	3859.15	3859.42	0.029353	4.66	17.77	38.46	1.15
07C	2136.382	PF 1	81	3854.71	3855.47	3855.56	3855.83	0.036413	4.9	17.22	42.45	1.26
07C	2000	PF 1	81	3850.7	3851.33	3851.37	3851.56	0.029417	4.11	21.83	63.32	1.11
07C	1750	PF 1	81	3841.86	3842.41	3842.52	3842.81	0.049611	5.1	16.06	43.97	1.43
07C	1500	PF 1	81	3836.3	3837.67	3837.67	3838	0.021148	4.66	17.4	26.42	1.01
07C	1250	PF 1	81	3828.47	3830.25	3830.49	3831.05	0.037662	7.17	11.29	13.39	1.38
07C	1000	PF 1	81	3818.88	3819.96	3820.1	3820.45	0.048771	5.61	14.45	31.17	1.45
07C	750	PF 1	81	3809.33	3810.5	3810.57	3810.87	0.034379	4.88	16.59	33.87	1.23
07C	500	PF 1	81	3798.5	3800.49	3800.81	3801.55	0.042623	8.26	9.81	9.96	1.47
07C	250	PF 1	81	3786.44	3788.16	3788.58	3789.46	0.061866	9.16	8.84	10.38	1.75
07C	0	PF 1	81	3776.76	3778.29	3778.43	3778.85	0.030654	6	13.5	18.36	1.23









Attachment 2.7-M-13

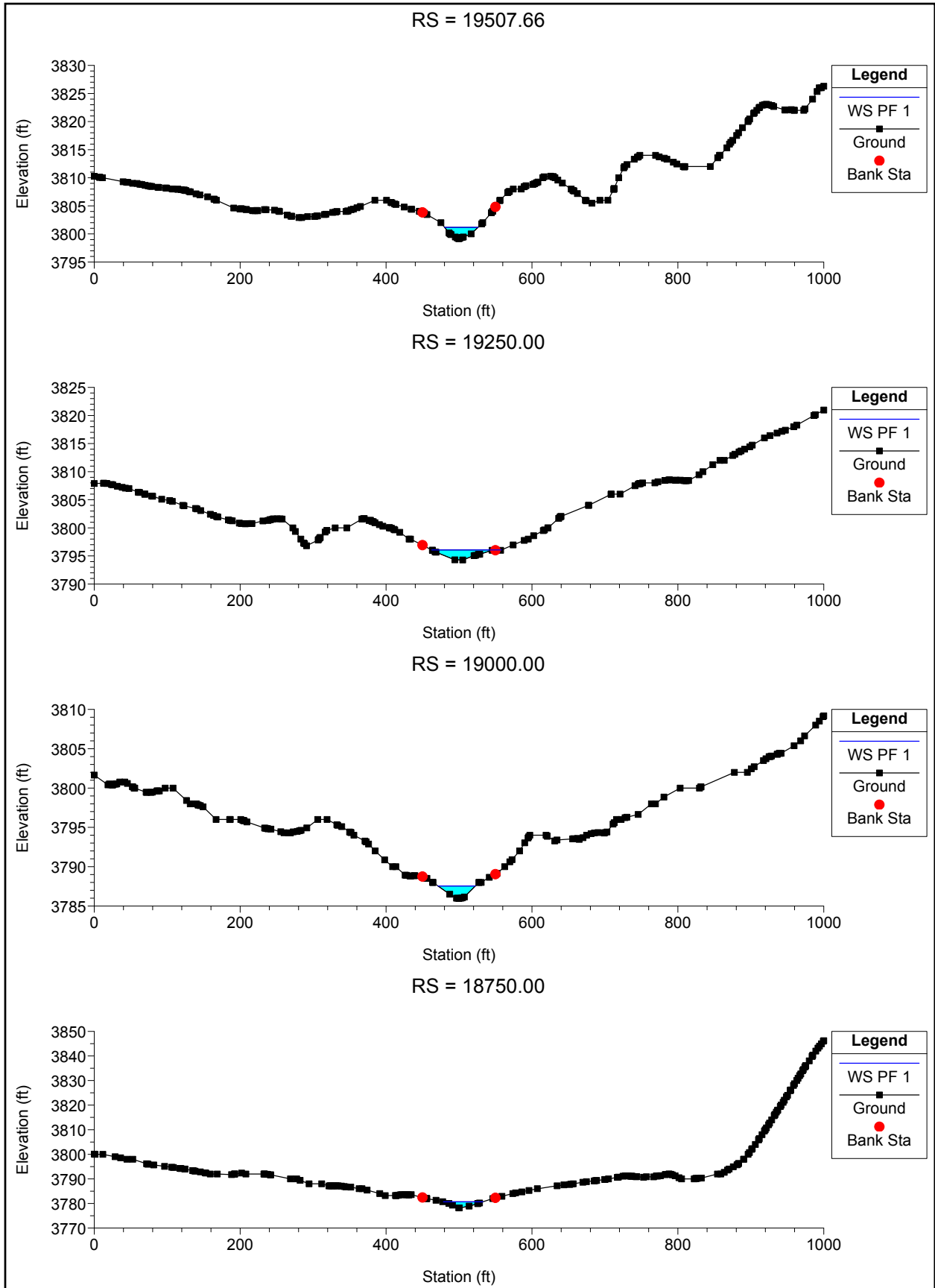
HEC-RAS Channel 09

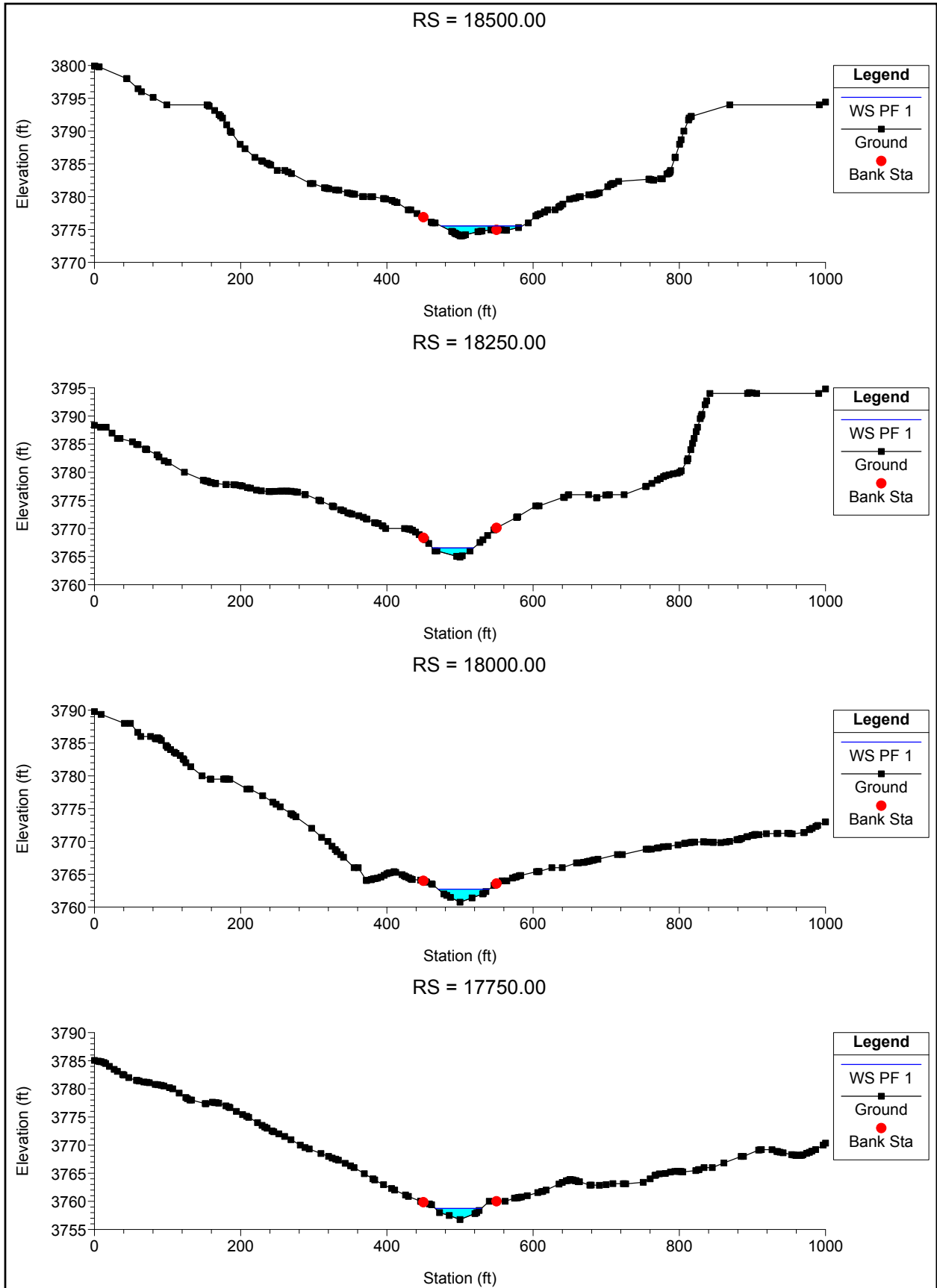


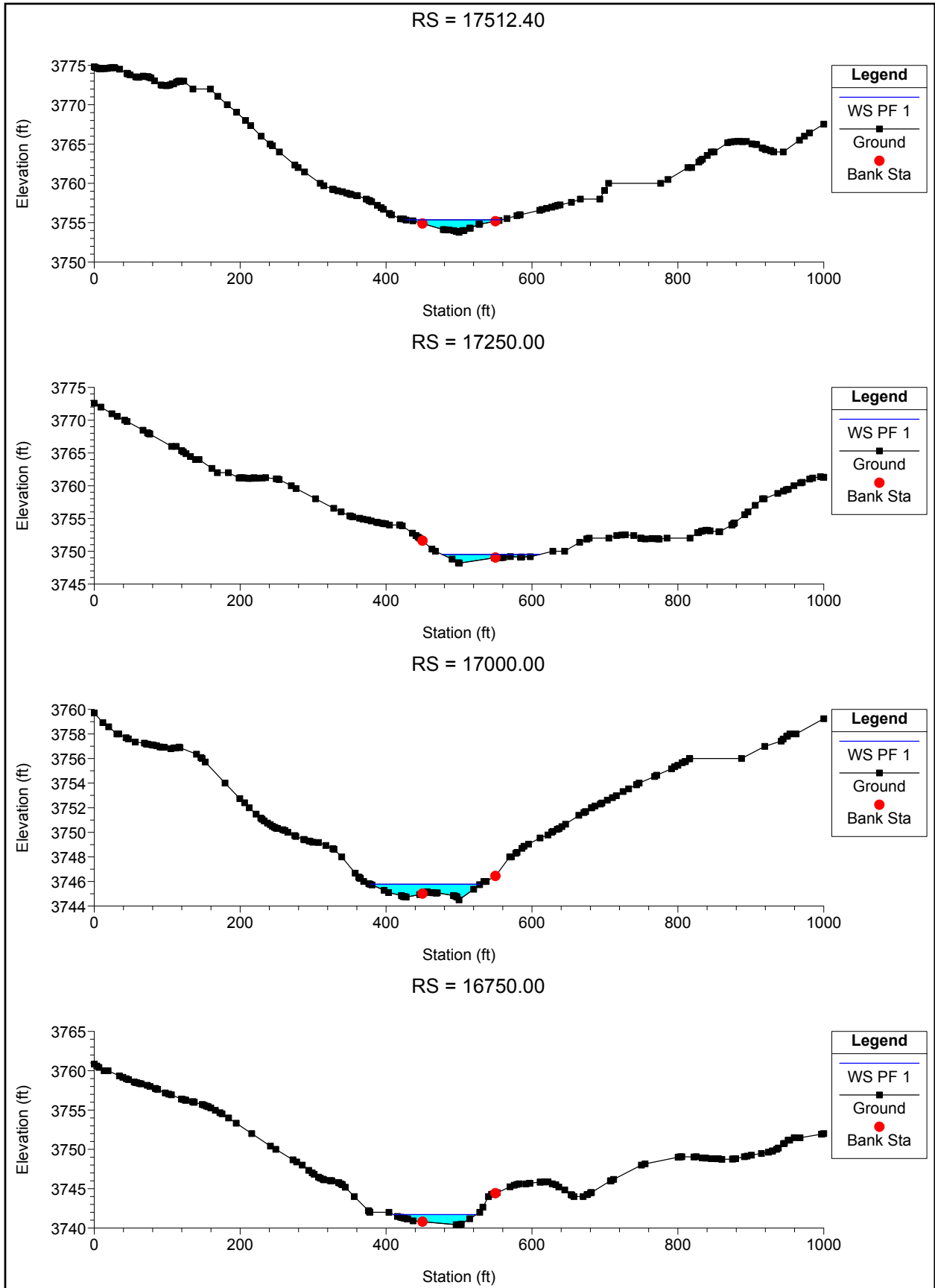
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
9	19507.66	PF 1	479	3799.17	3801.18	3801.47	3802.29	0.030016	8.44	56.73	45.9	1.34
9	19250	PF 1	479	3794.28	3796.07	3796.09	3796.57	0.018825	5.68	84.81	95.72	1.02
9	19000	PF 1	479	3785.96	3787.54	3788.07	3789.14	0.063803	10.15	47.21	51.18	1.86
9	18750	PF 1	479	3778.22	3780.66	3780.72	3781.38	0.018494	6.84	70.07	54.14	1.06
9	18500	PF 1	479	3774.03	3775.55	3775.64	3776.09	0.024668	6.13	83.74	110.87	1.15
9	18250	PF 1	479	3764.91	3766.53	3766.93	3767.82	0.050512	9.13	52.48	55.95	1.66
9	18000	PF 1	479	3760.74	3762.74	3762.74	3763.31	0.017416	6.07	78.95	69.93	1.01
9	17750	PF 1	479	3756.77	3758.74	3758.79	3759.41	0.020116	6.61	72.49	62.91	1.08
9	17512.4	PF 1	479	3753.77	3755.36	3755.36	3755.76	0.016396	5.13	97	131.58	0.94
9	17250	PF 1	479	3748.18	3749.51	3749.68	3750.13	0.032695	6.71	80.56	133.72	1.31
9	17000	PF 1	479	3744.5	3745.77	3745.73	3746.08	0.017266	4.55	107.46	150.53	0.93
9	16750	PF 1	479	3740.38	3741.72	3741.72	3742.14	0.016727	5.43	95.11	113.53	0.96
9	16500	PF 1	479	3737.21	3738.68	3738.56	3738.92	0.010497	4.14	125.45	163.71	0.76
9	16238.6	PF 1	479	3733.87	3735.22	3735.22	3735.76	0.01721	5.94	82.6	79.37	1
9	16000	PF 1	479	3729.18	3731.13	3731.16	3731.8	0.017504	6.6	72.53	56.87	1.03
9	15750	PF 1	479	3725.62	3728.12	3727.72	3728.39	0.006331	4.28	116.48	90.84	0.63
9	15449.96	PF 1	479	3723.16	3725.81	3725.81	3726.47	0.016611	6.54	73.27	55.78	1.01
9	15250	PF 1	479	3721.15	3723.17	3723.05	3723.69	0.01279	5.77	83.02	62.81	0.88
9	15000	PF 1	479	3718	3721.01	3720.55	3721.36	0.007074	4.76	100.56	64.29	0.67
9	14750	PF 1	479	3718	3719.31	3719.31	3719.47	0.010586	3.55	154.28	268.78	0.73
9	14500	PF 1	479	3714	3715.44	3715.59	3716.15	0.028594	6.75	70.93	76.63	1.24
9	14250	PF 1	479	3712	3713.98	3712.81	3714	0.000476	1.25	436.48	349.59	0.18
9	14162.7	PF 1	479	3712	3713.43	3713.43	3713.84	0.015416	5.52	97.3	116.3	0.93
9	14066.2	PF 1	479	3703.98	3705.14	3706.19	3709.79	0.197319	17.3	27.69	31.35	3.24
9	14000	PF 1	479	3703.43	3706.52	3705.67	3706.83	0.004203	4.51	106.29	50.15	0.55
9	13750	PF 1	479	3701.26	3704.51	3704.44	3705.21	0.014022	6.69	71.64	46.23	0.95
9	13470.66	PF 1	479	3699.16	3702.19	3701.79	3702.53	0.010069	4.74	101.14	86	0.77
9	13250	PF 1	943	3701	3700.58	3700.26	3700.81	0.007338		246.31	227.74	0
9	13048.33	PF 1	943	3699.08	3699.18	3698.82	3699.41	0.006727	0.48	242.11	212.58	0.37
9	12500	PF 1	943	3693.64	3694.64	3694.54	3694.92	0.013241	3.71	225.76	287.39	0.8
9	12250	PF 1	943	3690	3690.94	3690.94	3691.23	0.016622	4.78	231.59	394.15	0.93
9	12034.36	PF 1	943	3688.02	3689.56	3688.75	3689.6	0.001028	1.68	613.16	519.45	0.25
9	11875.18	PF 1	943	3688	3688.83	3688.83	3689.15	0.018223	3.62	212.07	320.66	0.9
9	11804.22	PF 1	943	3681.97	3683.5	3684.32	3686.25	0.11928	13.61	73.66	100.9	2.53
9	11750	PF 1	943	3681.08	3683.76	3683.76	3684.33	0.011328	6.32	167.91	147.91	0.87
9	11481.11	PF 1	943	3677.2	3680.55	3680.6	3681.06	0.015008	6.14	178.29	209.32	0.95
9	11250	PF 1	943	3671.84	3676.95	3676.77	3677.91	0.0114	7.84	120.22	51.55	0.91
9	10972.12	PF 1	943	3668.34	3674.72	3674.53	3675.34	0.009187	6.48	154.37	94.01	0.79
9	10750	PF 1	943	3666.52	3672.74		3673.26	0.009927	5.79	164.18	115.03	0.8
9	10500	PF 1	943	3664.92	3670.89		3671.19	0.006733	4.81	228.79	197.78	0.66
9	10250	PF 1	943	3663.39	3668.94		3669.45	0.008039	5.86	171.38	123.04	0.74
9	10000	PF 1	943	3661.76	3666.76	3666.51	3667.33	0.010197	6.07	156.78	105.96	0.82
9	9750	PF 1	943	3659.95	3665.17	3665.17	3665.68	0.00958	6	183.89	200.92	0.8
9	9500	PF 1	943	3657.97	3662.58	3662.6	3662.95	0.013835	5.5	211.93	295.79	0.9
9	9250	PF 1	943	3656.4	3660.46	3660.36	3660.55	0.003782	2.85	417.8	536.34	0.47

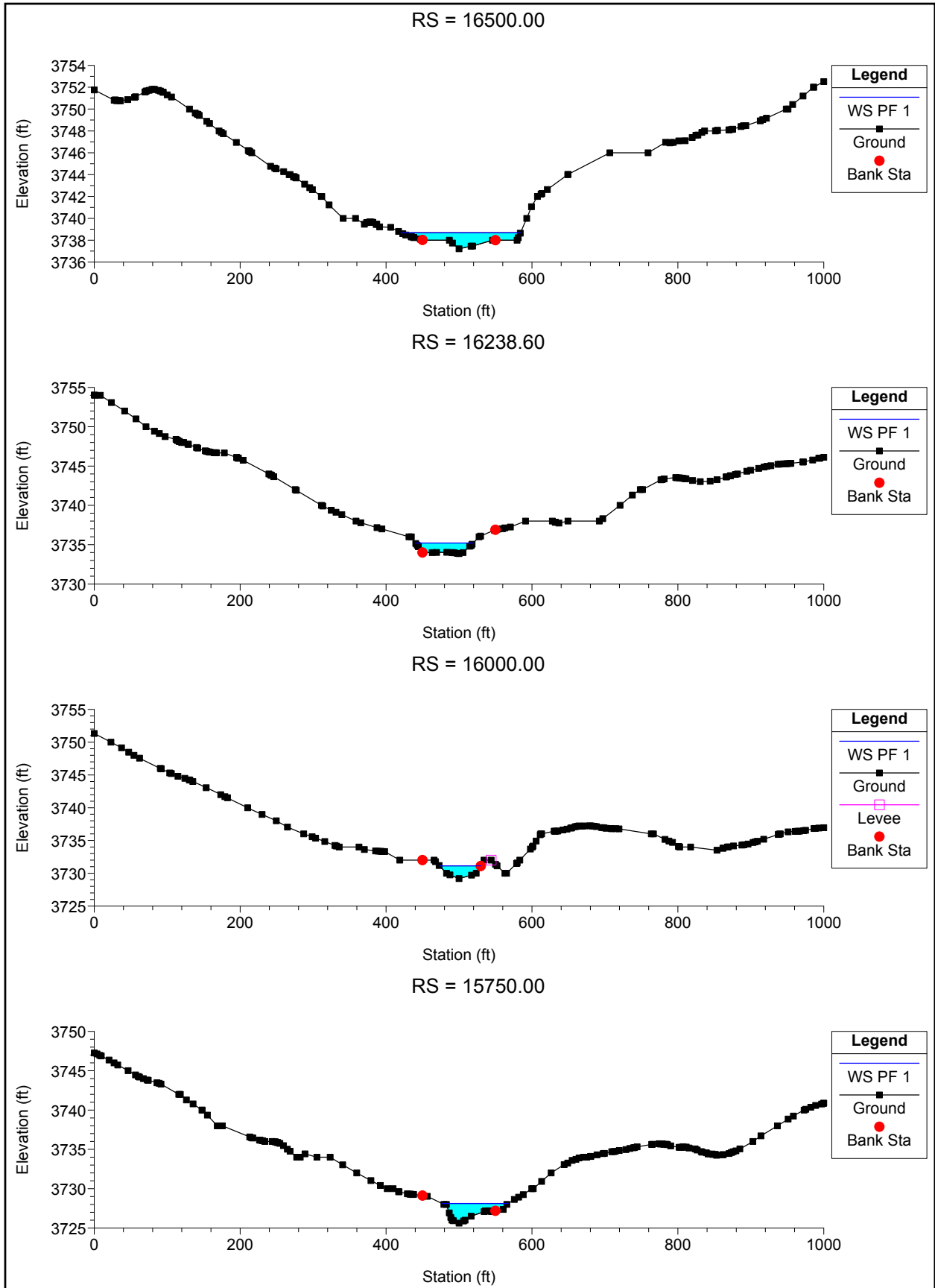


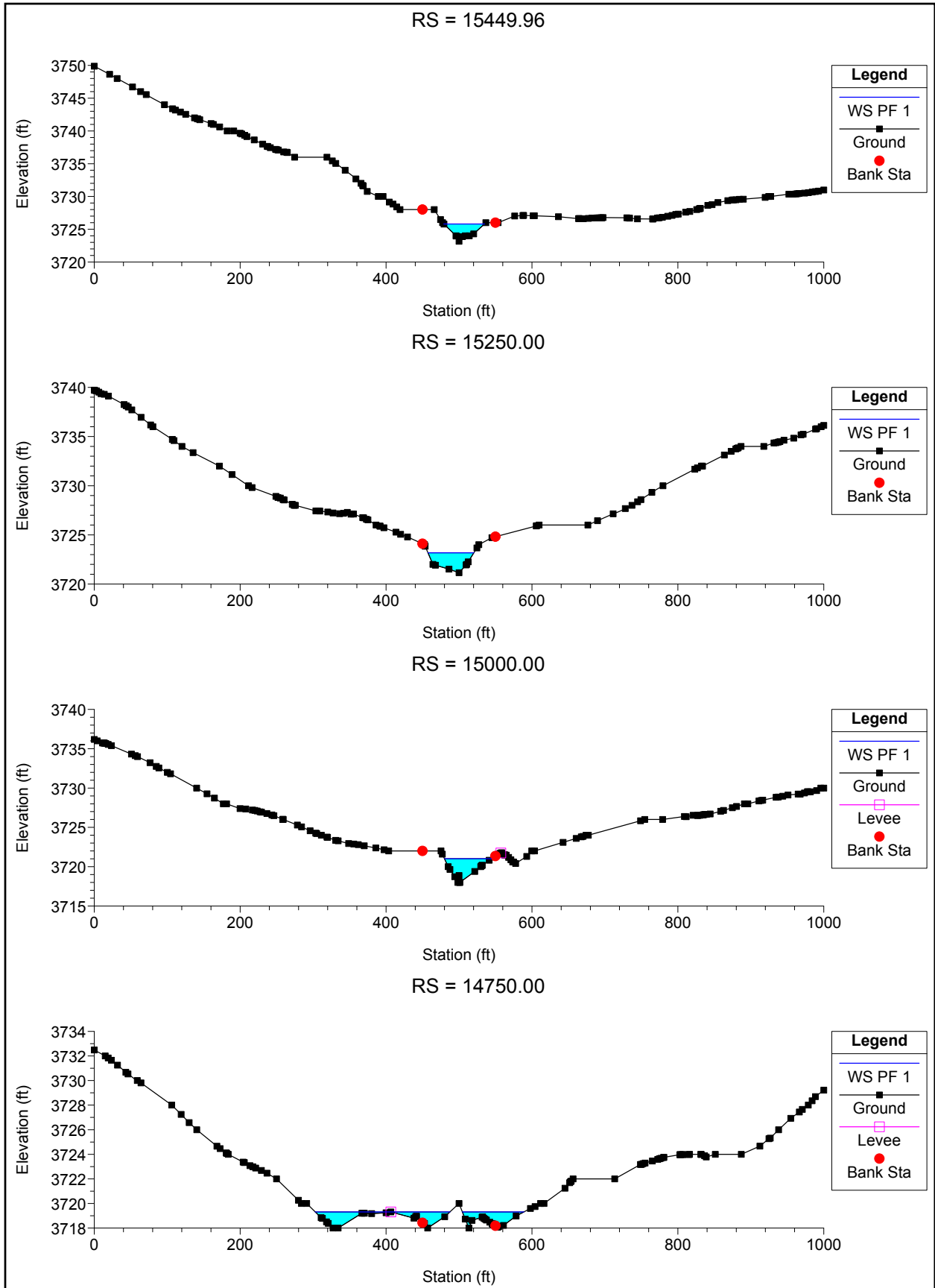
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
9	9000	PF 1	943	3653.98	3657.72	3657.72	3658.87	0.014158	8.62	109.45	48.44	1.01
9	8750	PF 1	943	3651.79	3656.09	3656.16	3656.44	0.005997	6.85	295.61	467.83	0.68
9	8500	PF 1	943	3650.32	3653.14	3653.14	3653.34	0.007315	4.24	284.25	367.89	0.66
9	8277.232	PF 1	943	3650	3652.17	3651.41	3652.21	0.00143	1.87	573.88	564.84	0.29
9	8000	PF 1	1463	3648	3650.79	3650.79	3651.19	0.016797	5.86	299.89	375.38	0.98
9	7787.415	PF 1	1463	3647.19	3649.6	3649.6	3649.66	0.001844	2	732.63	652.48	0.32
9	7500	PF 1	1463	3644.23	3646.57	3646.97	3648.01	0.123164	9.89	152.81	303.1	2.36
9	7221.018	PF 1	1463	3641.5	3646.36	3645.86	3646.53	0.00402	3.86	515.29	684.94	0.52
9	7000	PF 1	1463	3640.53	3644.77	3644.77	3645.15	0.014517	5.81	310.01	370.74	0.93
9	6750	PF 1	1463	3639.11	3643.22	3643.15	3643.38	0.005972	3.88	486.38	607.01	0.6
9	6401.949	PF 1	1463	3637.05	3641.93	3641.43	3642.26	0.00571	4.77	322.46	204.1	0.62
9	6250	PF 1	1463	3636.26	3640.62	3640.62	3640.91	0.016215	5.4	355.39	564.41	0.95
9	6000	PF 1	1463	3635.5	3639.69	3638.88	3639.77	0.001809	2.81	669.46	514.67	0.35
9	5672.625	PF 1	1463	3634	3638.35	3638.3	3638.92	0.009096	6.38	264.57	230.73	0.8
9	5500	PF 1	1463	3634	3636.76	3636.74	3637.13	0.014182	5.61	313.98	372.91	0.91
9	5250	PF 1	1463	3632	3635.22		3635.36	0.004094	3.43	505.37	473.35	0.5
9	5037.191	PF 1	1463	3632	3634.42	3633.98	3634.6	0.003643	4.07	483.83	463.12	0.51
9	4750	PF 1	1795	3629.75	3632.32	3632.32	3632.88	0.0134	6.73	313.62	271.55	0.94
9	4422.17	PF 1	1795	3627.86	3629.89	3629.42	3630.16	0.004983	4.39	449.72	321.14	0.58
9	4208.772	PF 1	1795	3627.29	3629.18		3629.29	0.003232	3.1	669.38	578.17	0.45
9	3764.471	PF 1	1795	3626	3628.09		3628.35	0.005108	4.14	440.85	315.68	0.58
9	3519.649	PF 1	1795	3623.09	3627.12		3627.48	0.004041	5.24	407.47	232.97	0.56
9	3250	PF 1	1795	3621.37	3625.1	3625.1	3625.88	0.013092	7.51	264.98	175.15	0.95
9	3044.341	PF 1	1795	3616.45	3622.69	3622.72	3623.55	0.012145	8.04	257.6	159.61	0.94
9	2750	PF 1	1795	3614	3620.6	3620.62	3621.22	0.008703	6.75	323.42	267.77	0.79
9	2534.643	PF 1	1795	3612	3616.72	3617.19	3618.56	0.021353	11.01	169.62	82.26	1.25
9	2250	PF 1	1795	3612	3616.33	3615.85	3616.44	0.001355	2.63	667.05	293.96	0.31
9	1933.837	PF 1	1795	3610	3615.68	3614.69	3615.95	0.002455	4.51	466.6	243.88	0.45
9	1750	PF 1	1795	3609.69	3614.09	3614.09	3615.14	0.012652	8.28	222.7	105.54	0.96
9	1500	PF 1	1795	3608	3614.58	3613.18	3614.59	0.00007	0.89	2046.95	516.44	0.08
9	1250	PF 1	2402	3605.41	3612.7	3612.7	3614.36	0.011193	10.34	235.54	76.27	0.96
9	1067.803	PF 1	2402	3604.82	3612.74	3610.99	3612.77	0.000188	1.49	1928.8	626.29	0.13
9	750	PF 1	2402	3603.62	3611.6	3611.13	3612.56	0.007401	7.92	310.66	106.69	0.77
9	500	PF 1	2402	3602.01	3609.29	3609.27	3610.35	0.010808	8.44	304.3	157.66	0.91
9	250	PF 1	2402	3602	3607.16	3607.16	3607.69	0.011102	7.33	443.68	363.2	0.88
9	0	PF 1	2402	3598.41	3605.42	3604.27	3605.88	0.004007	5.45	441.58	154.89	0.56

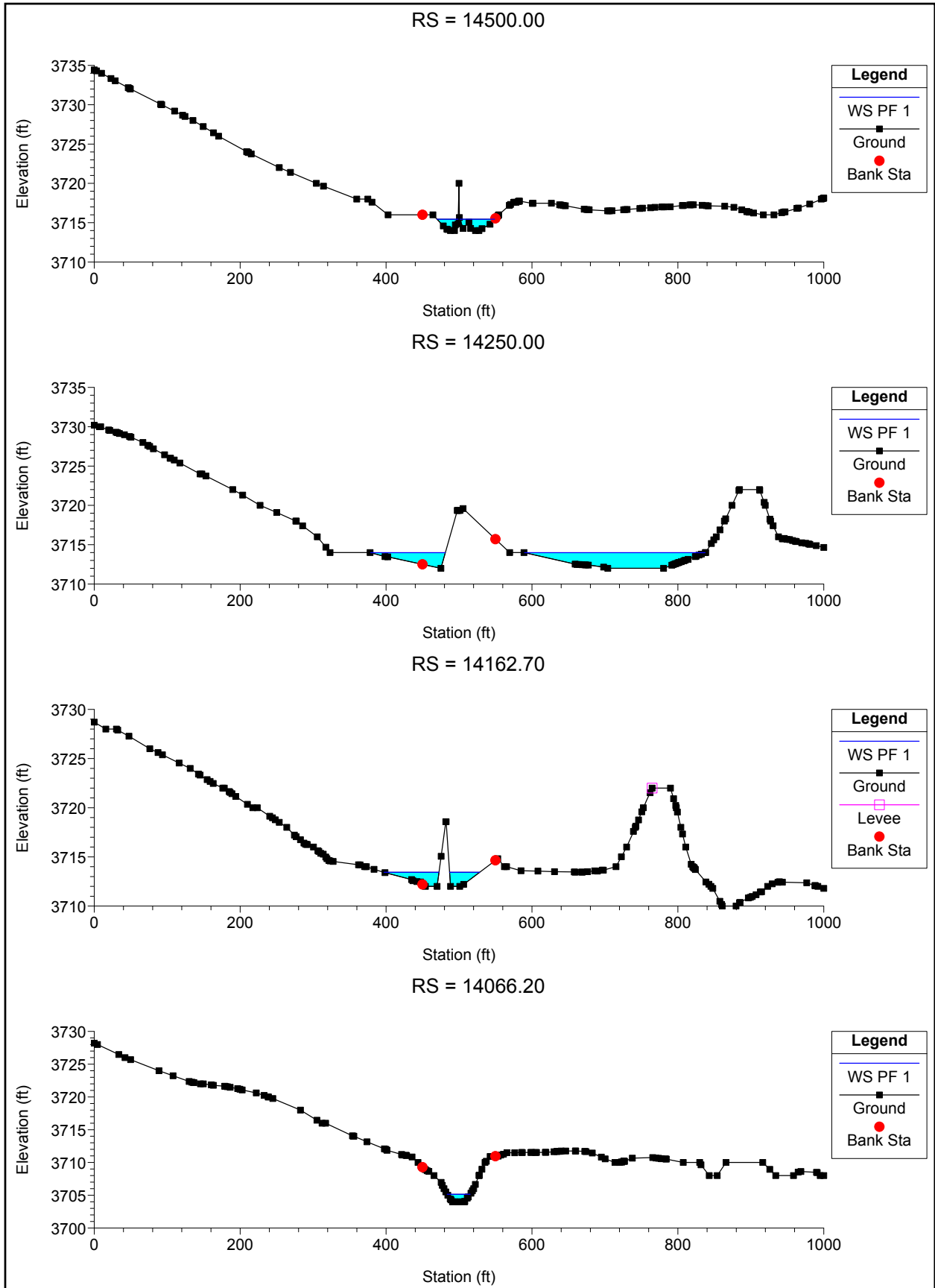


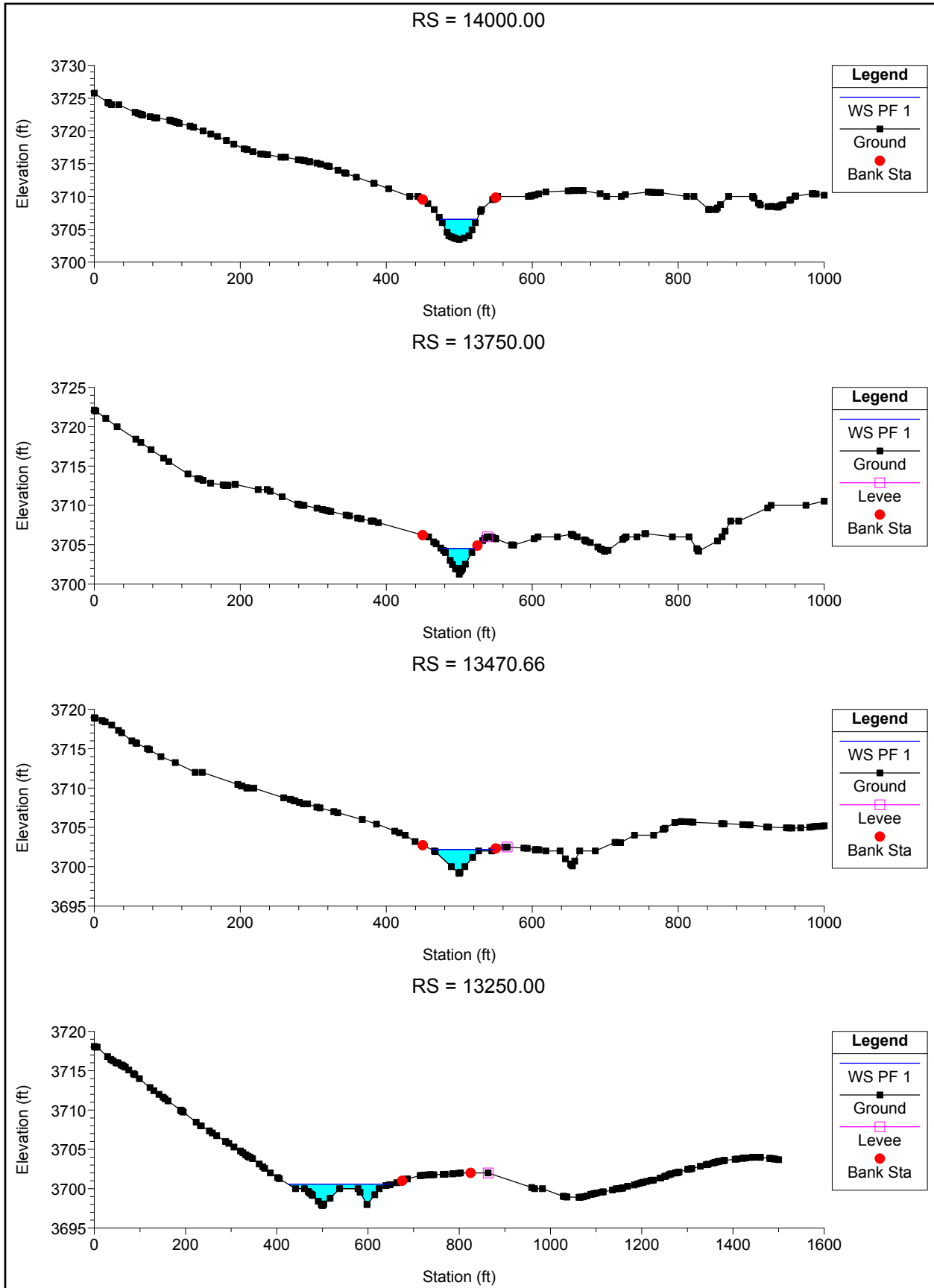


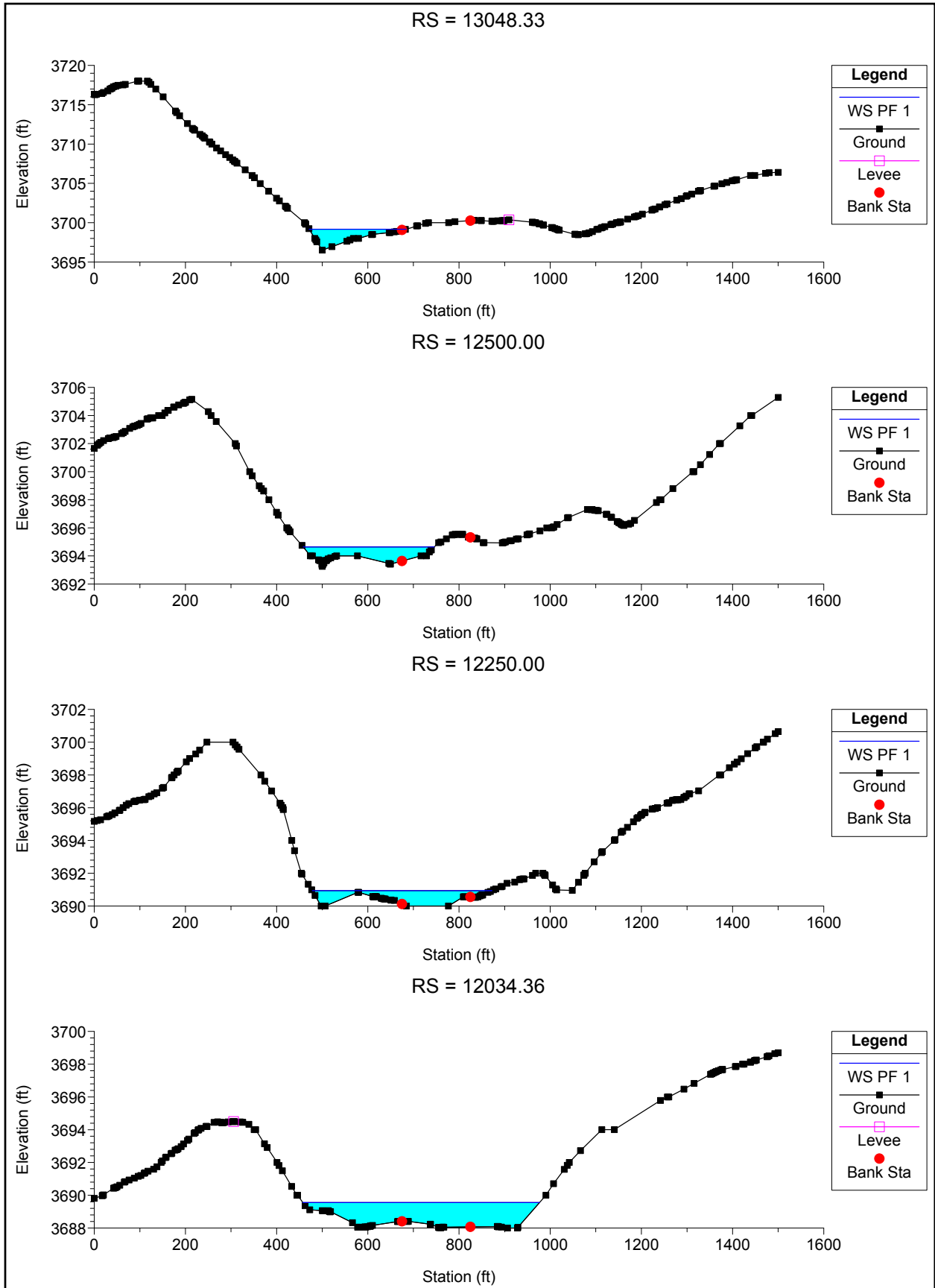


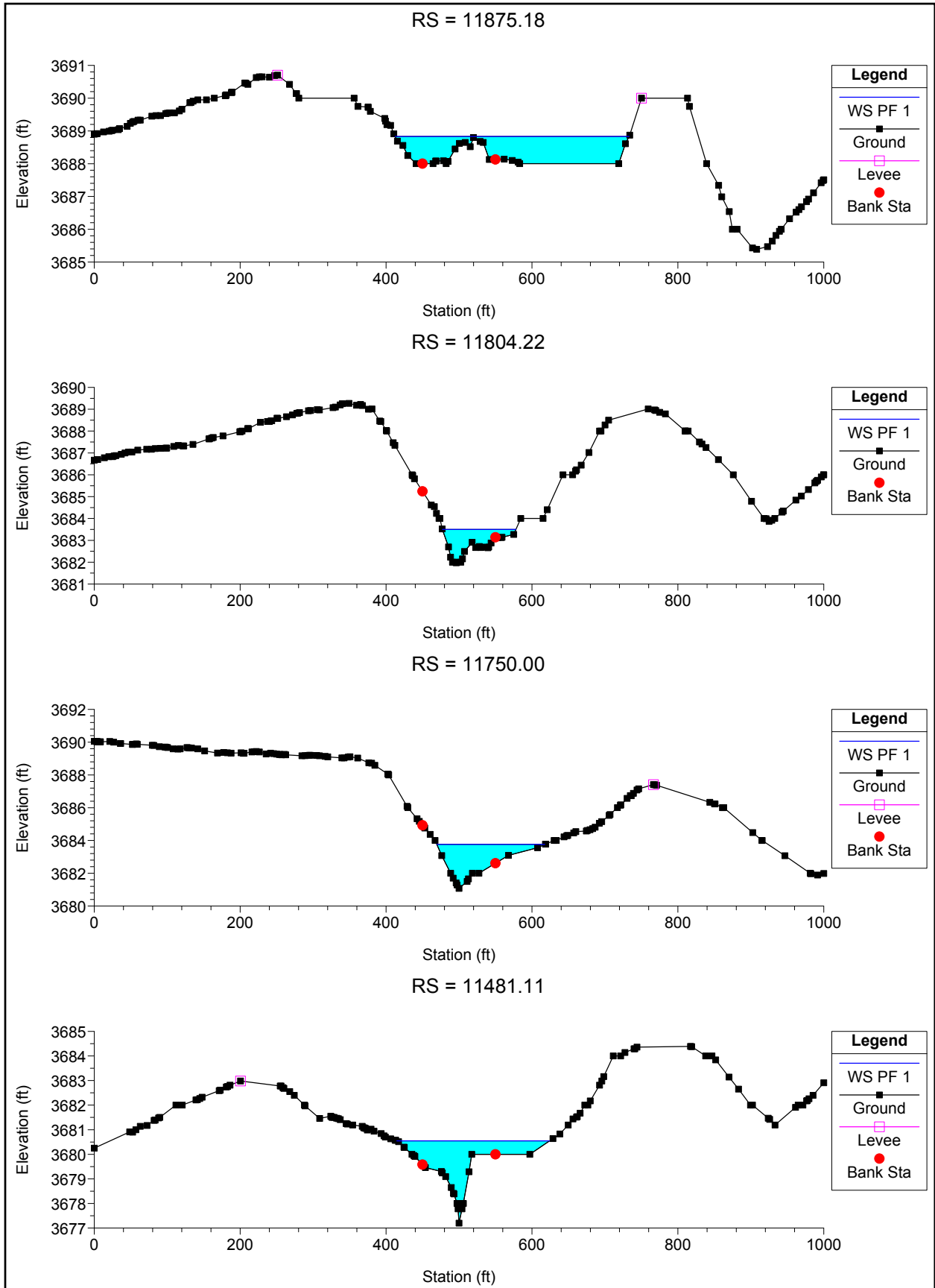


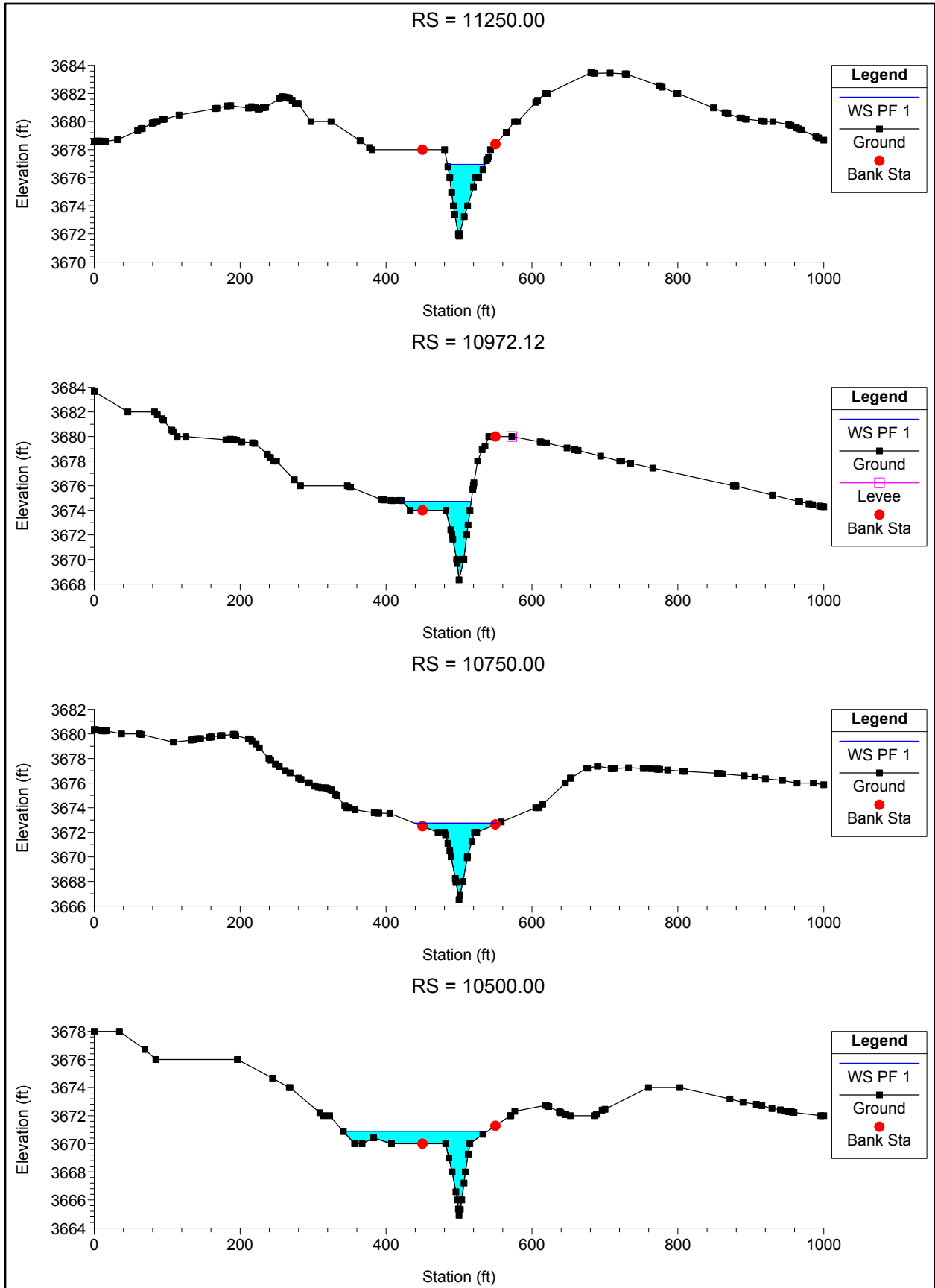


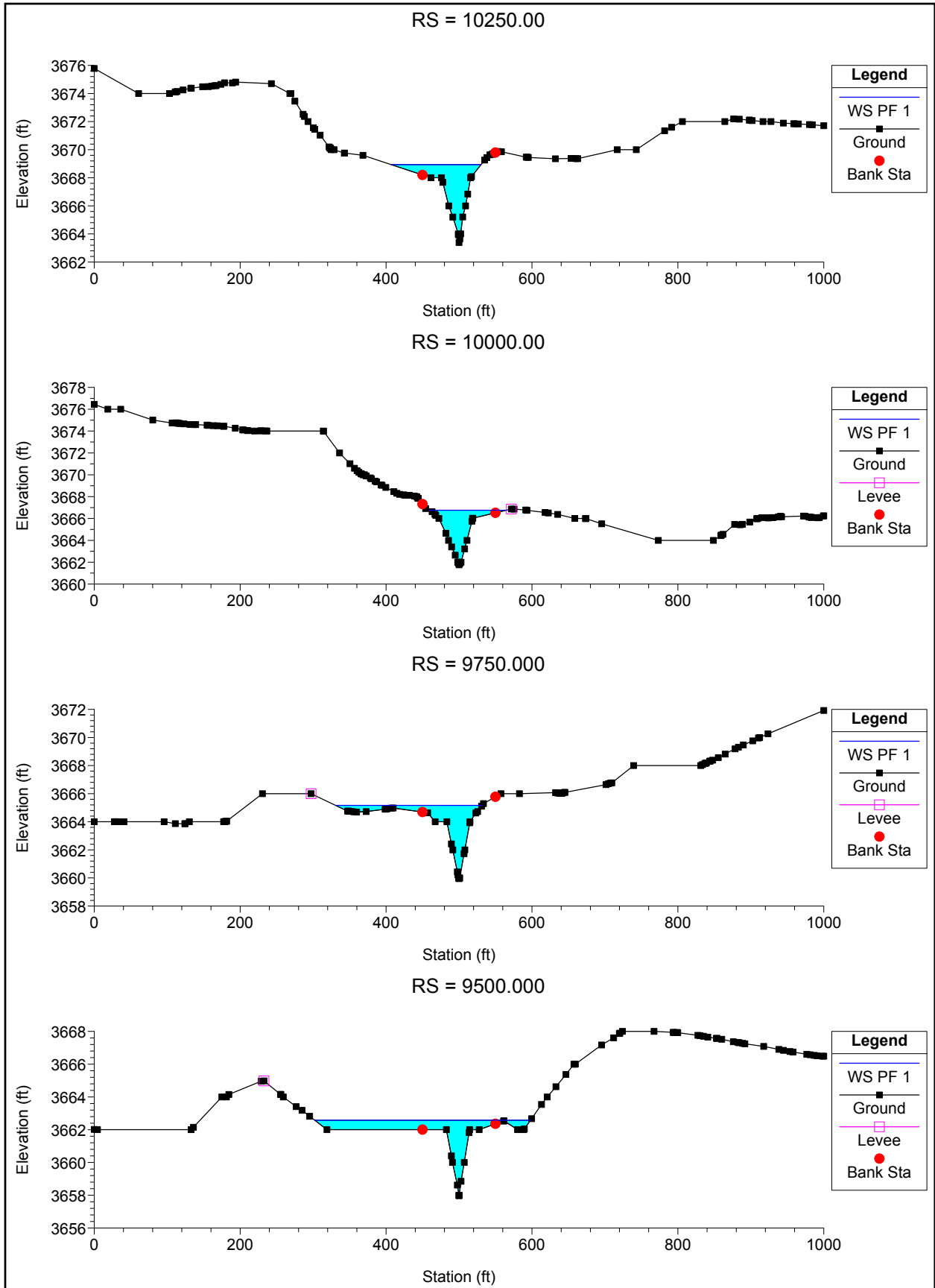


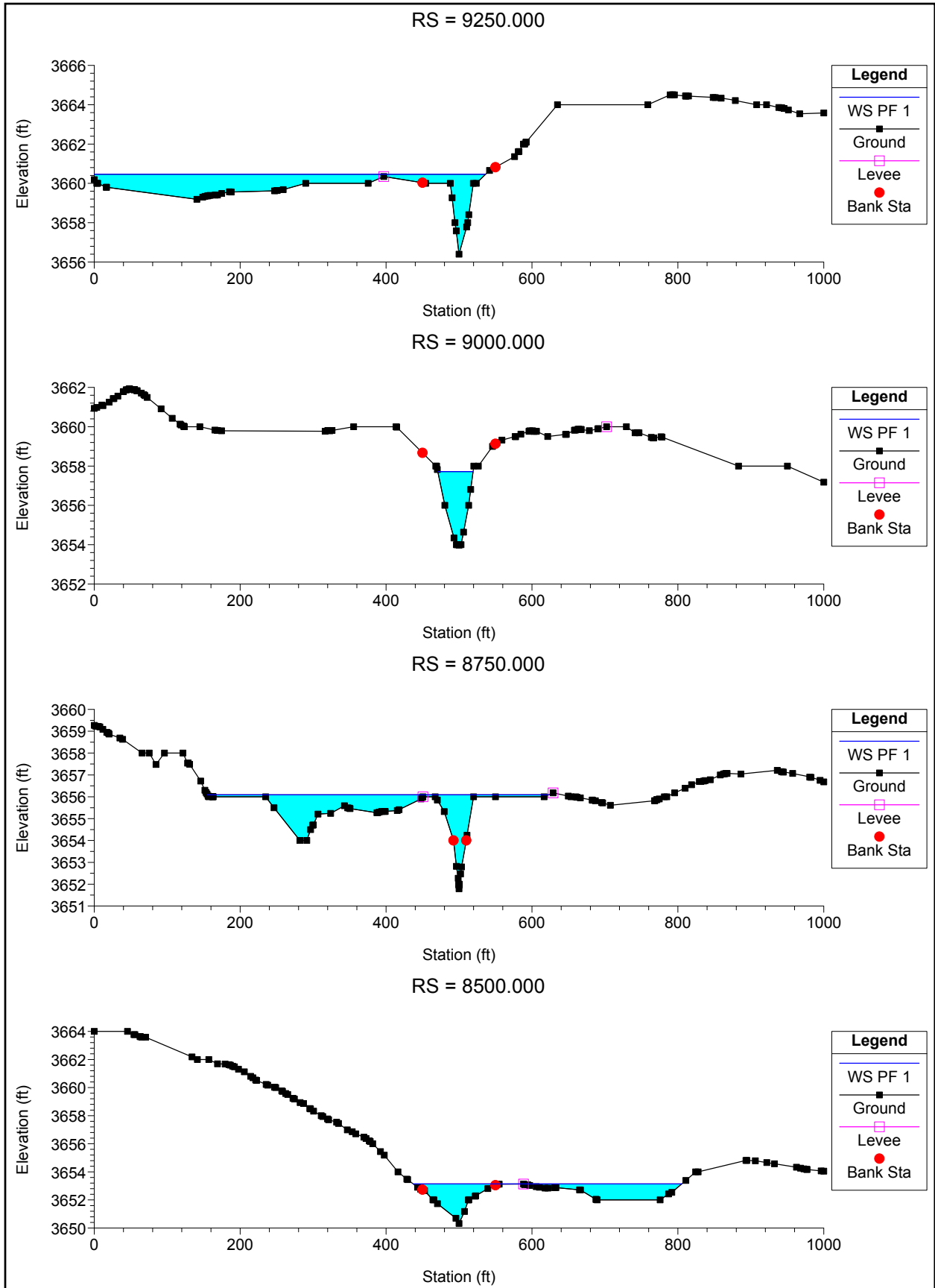


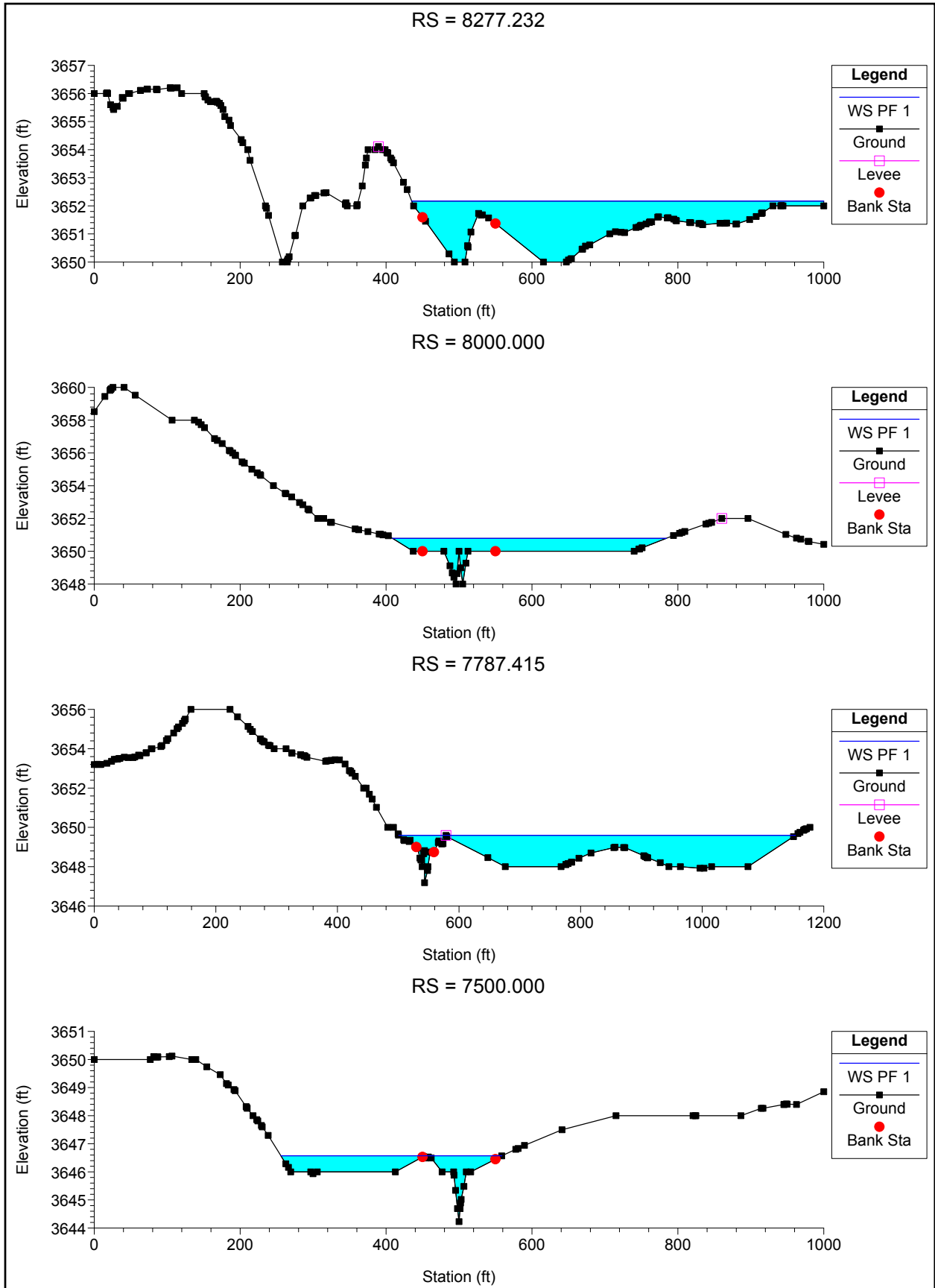


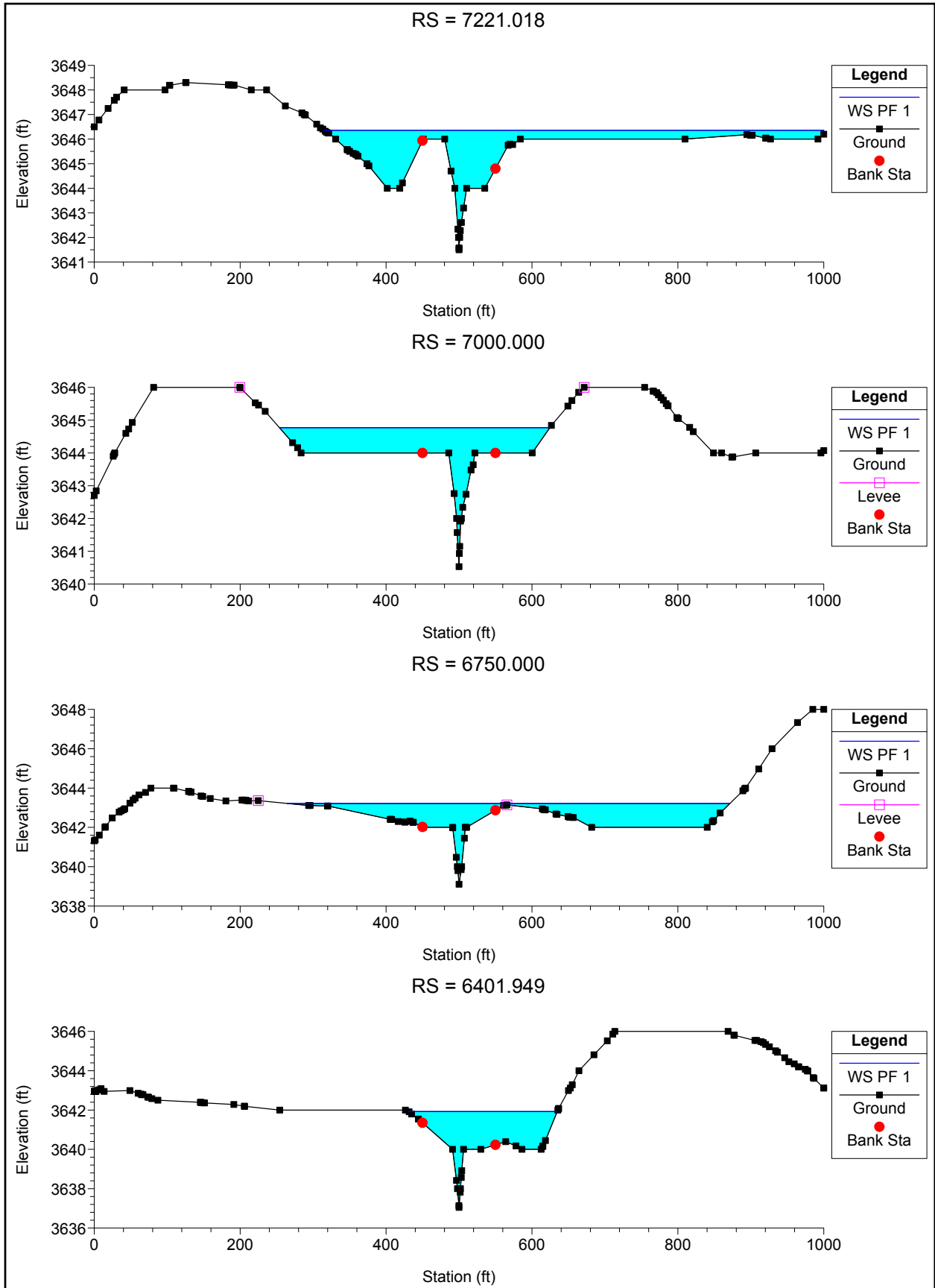


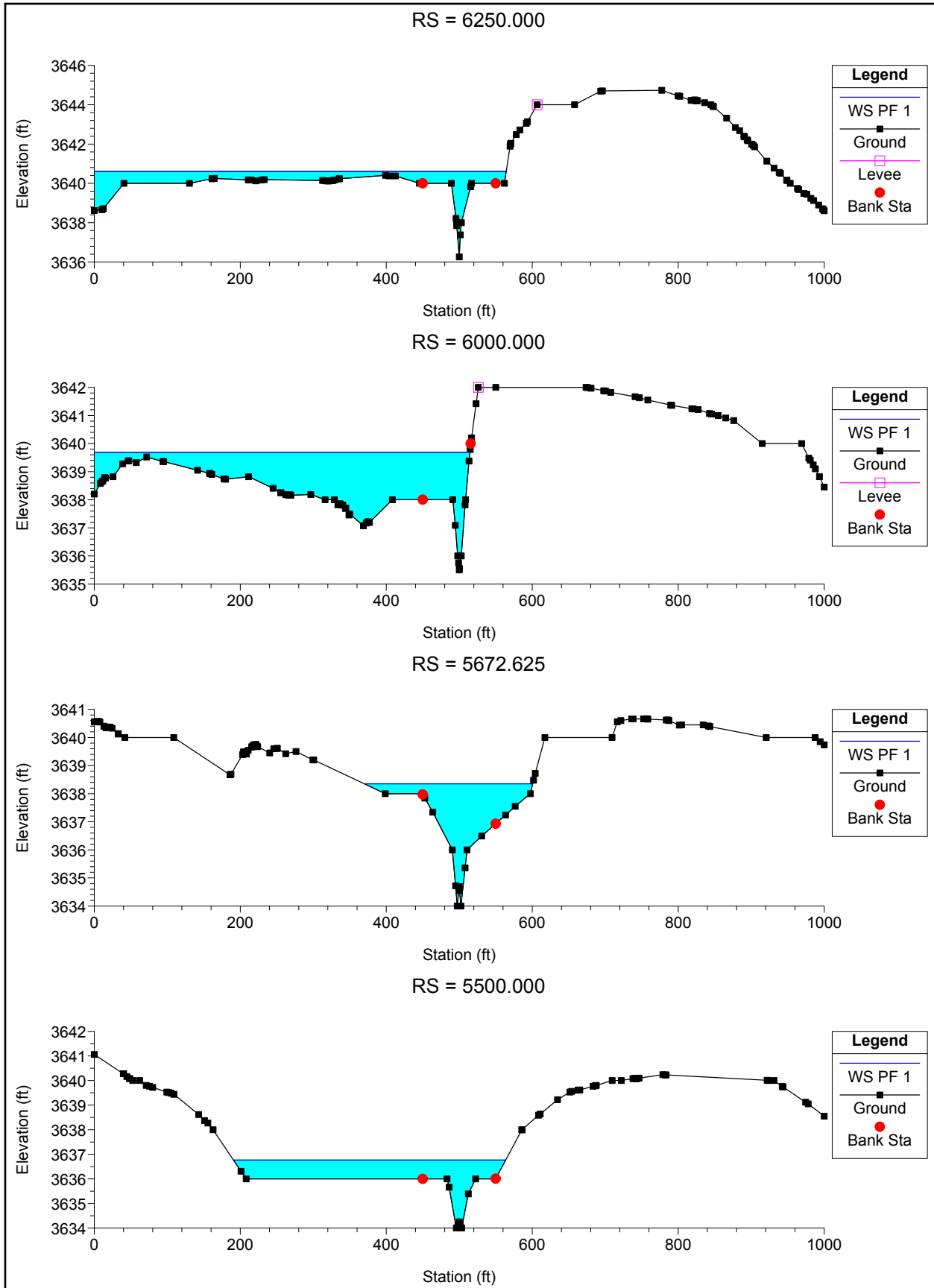


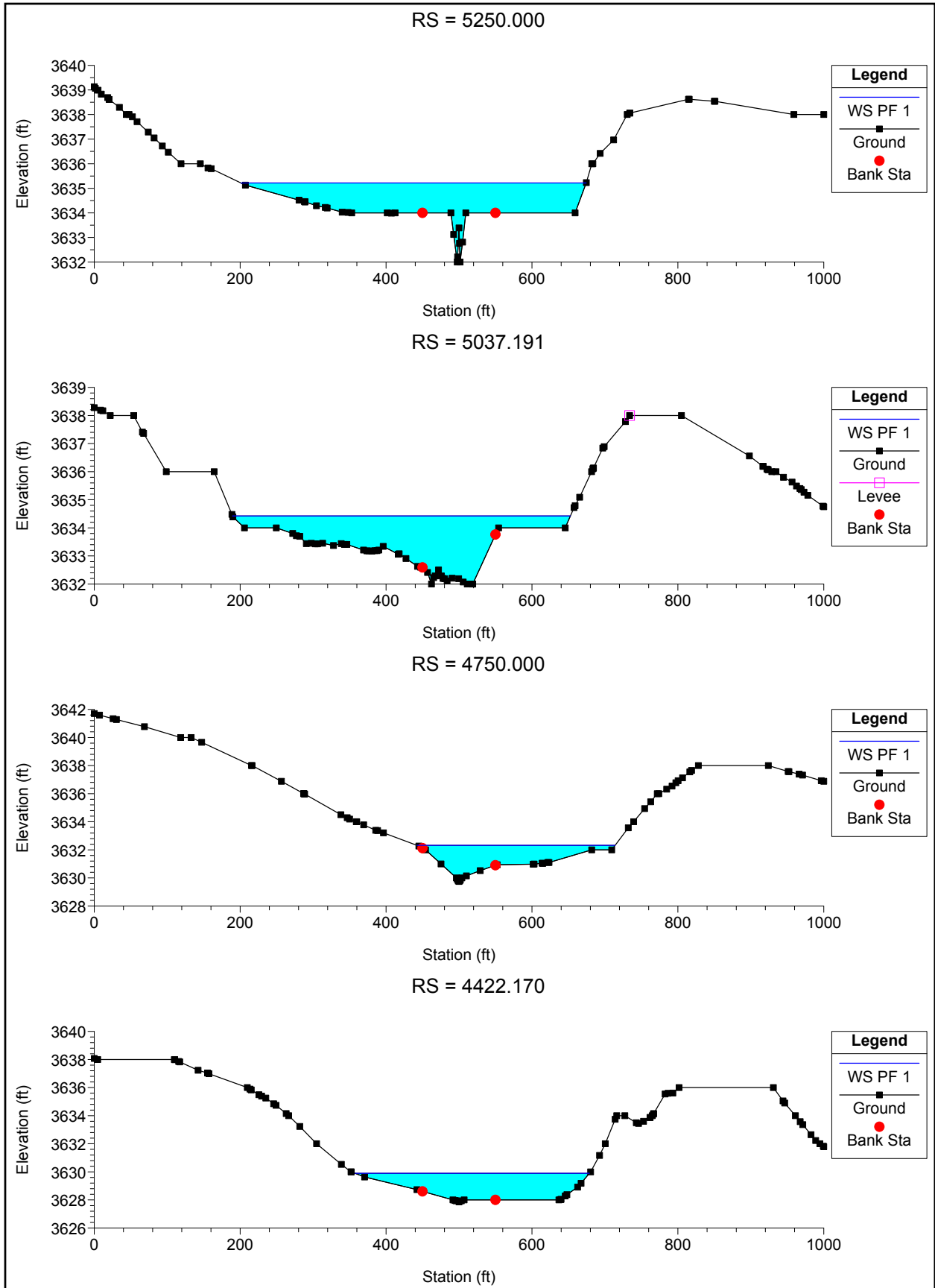


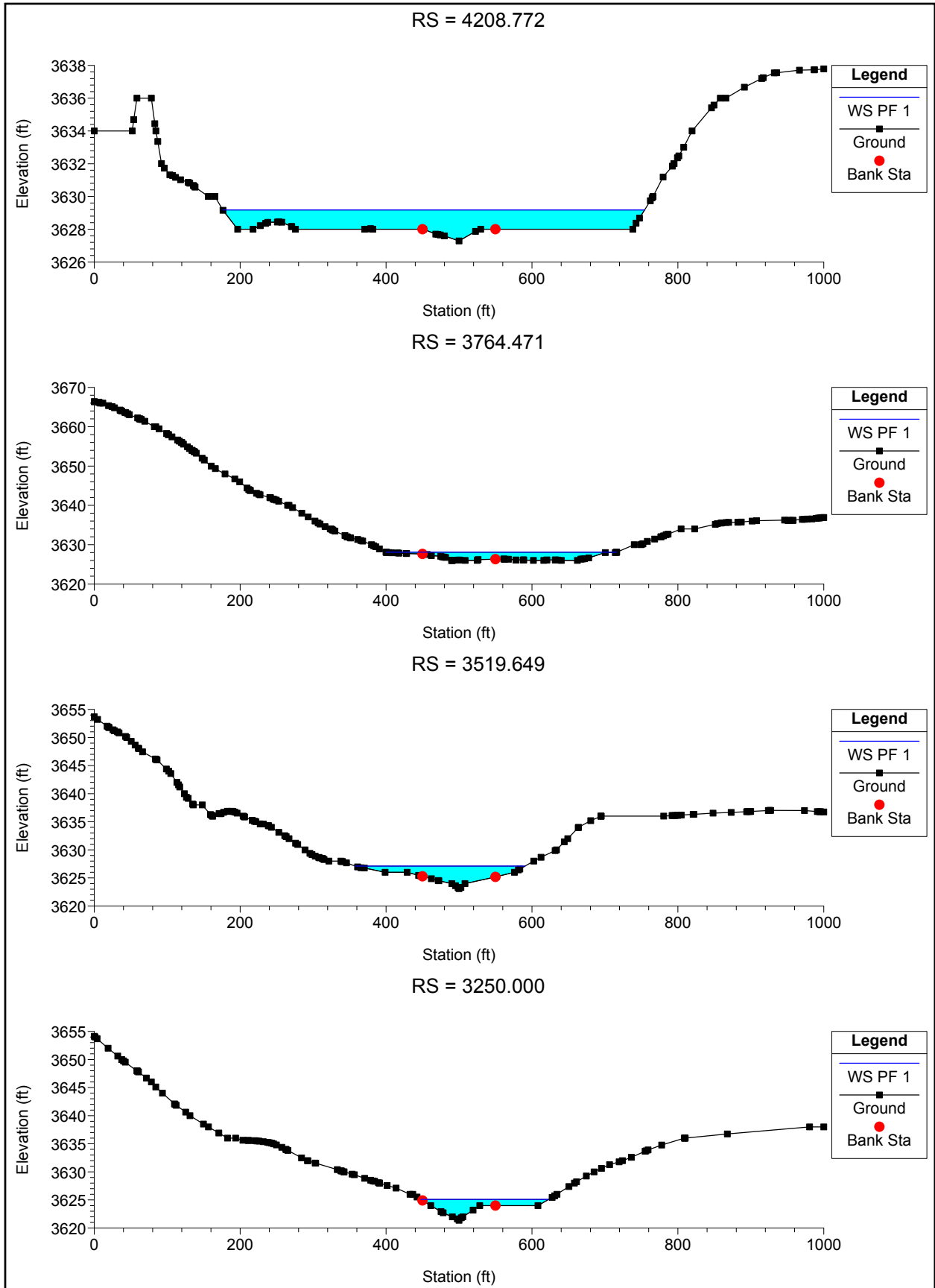


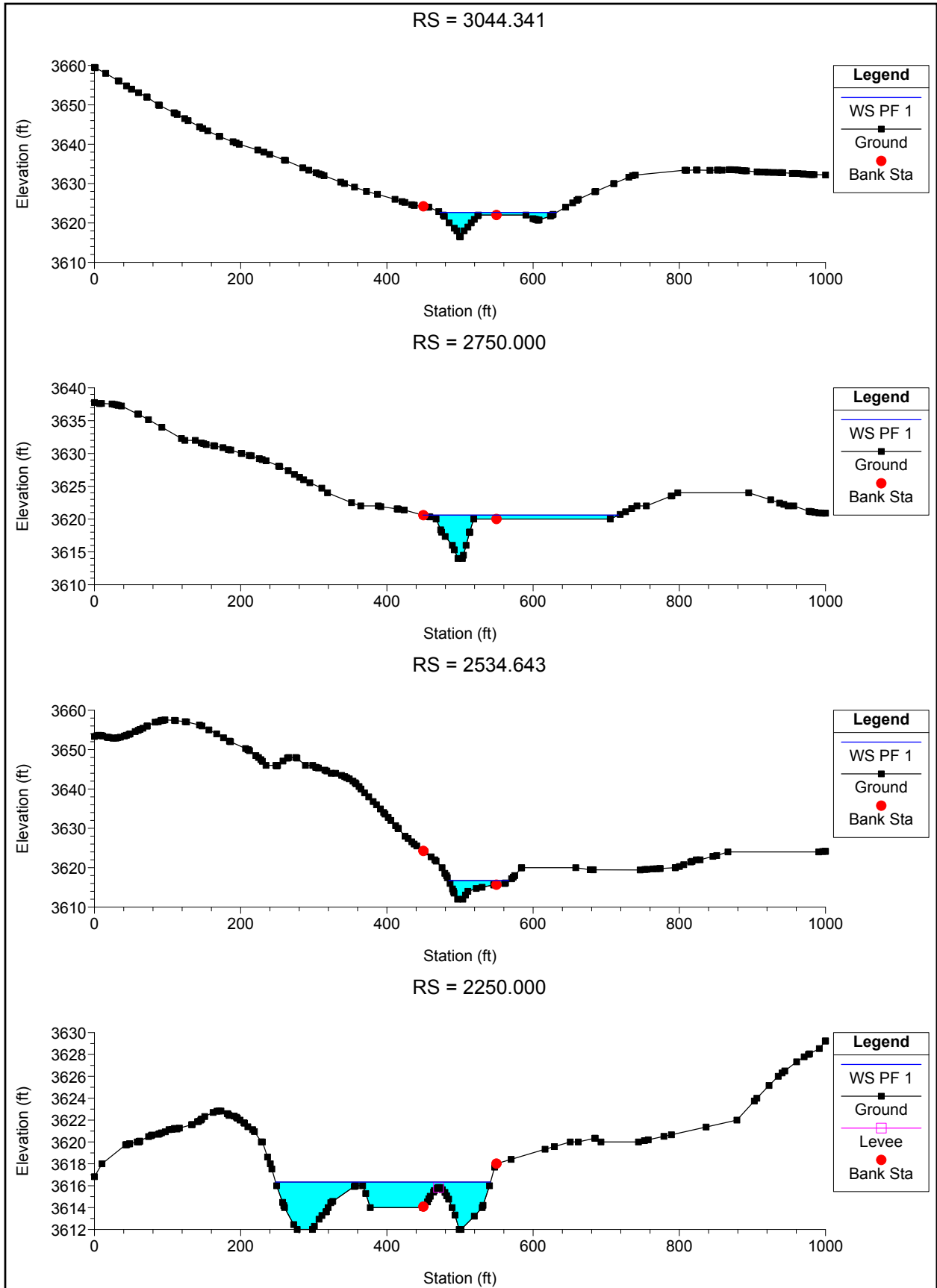


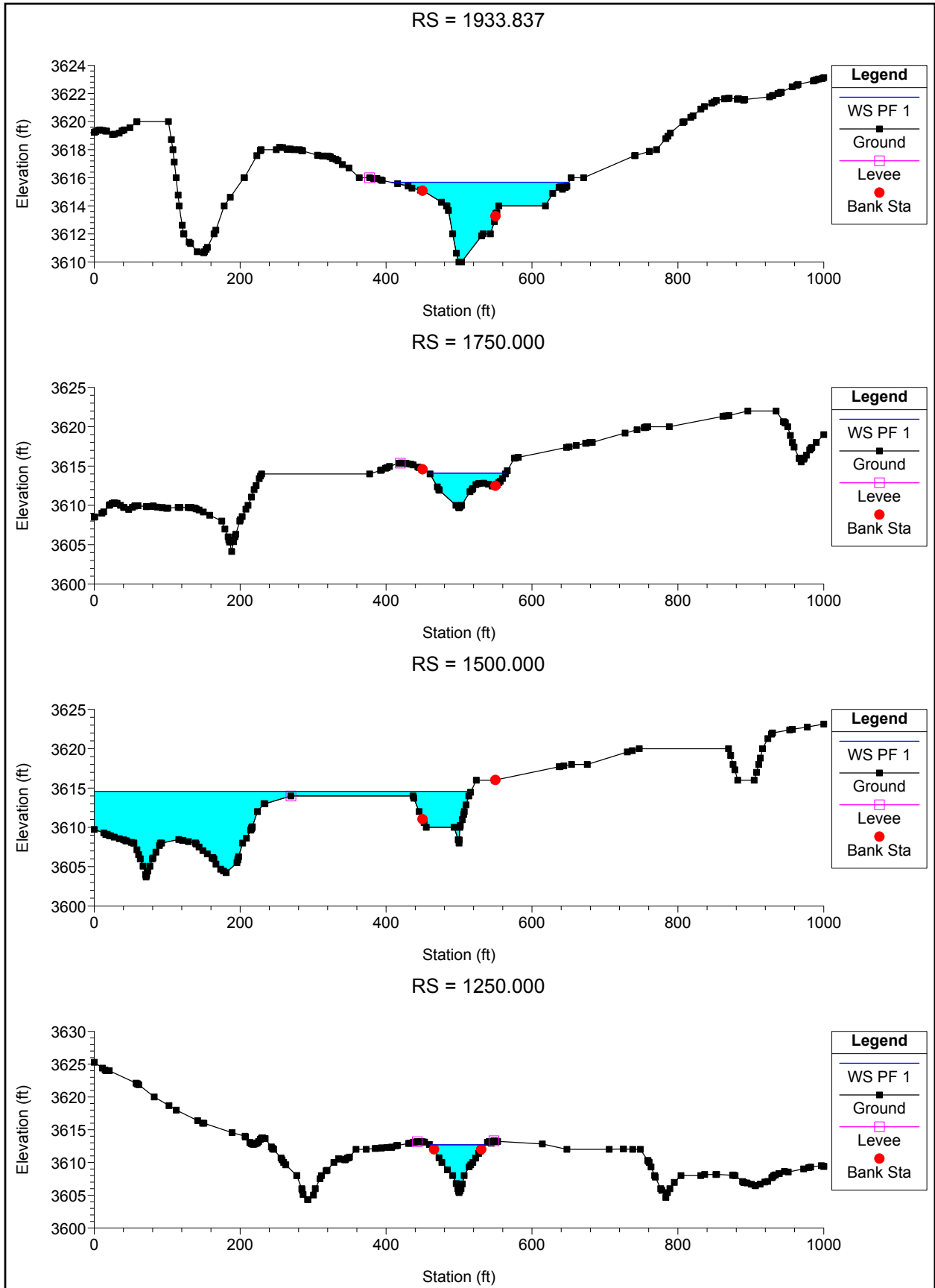


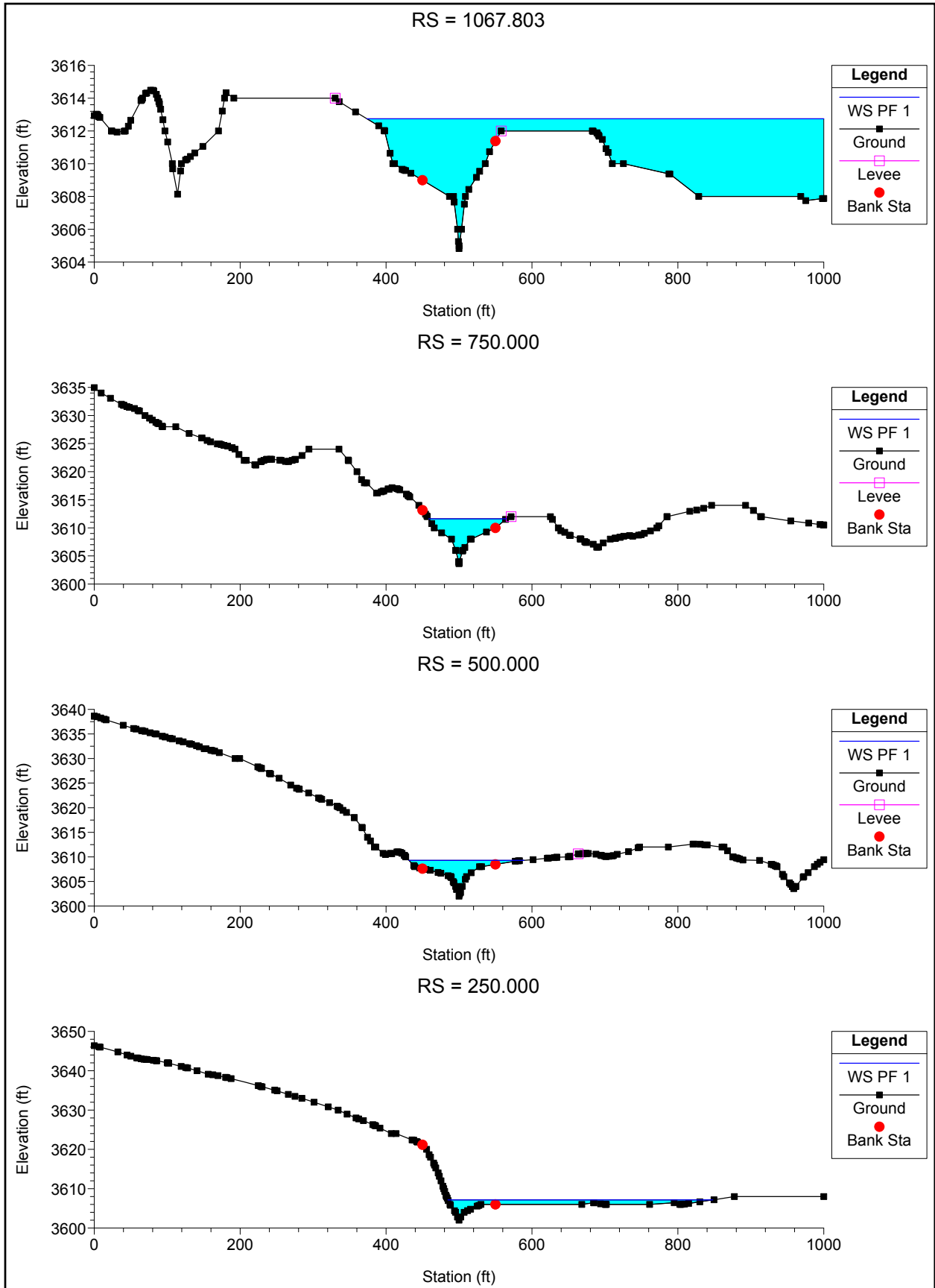


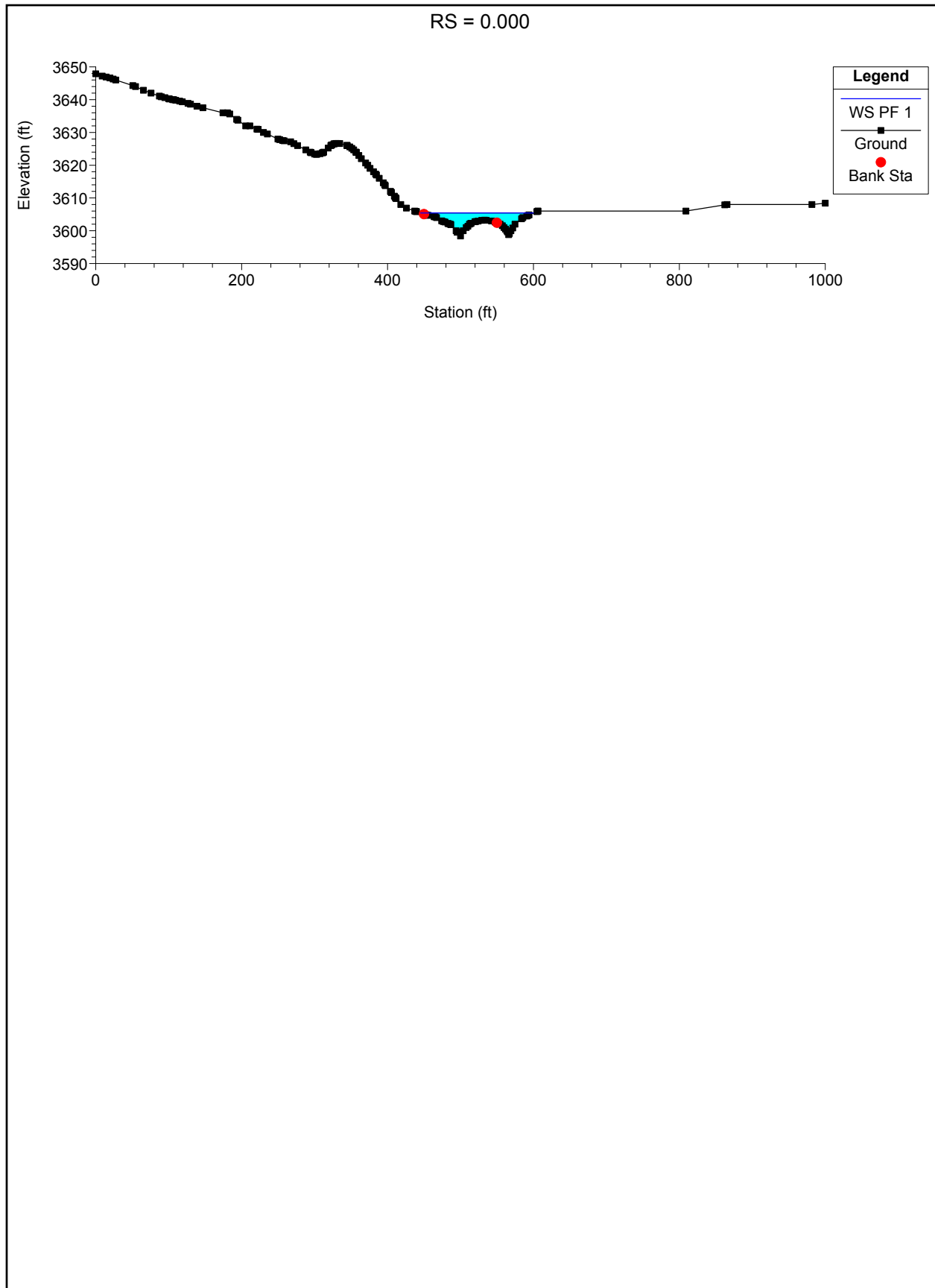












Attachment 2.7-M-14

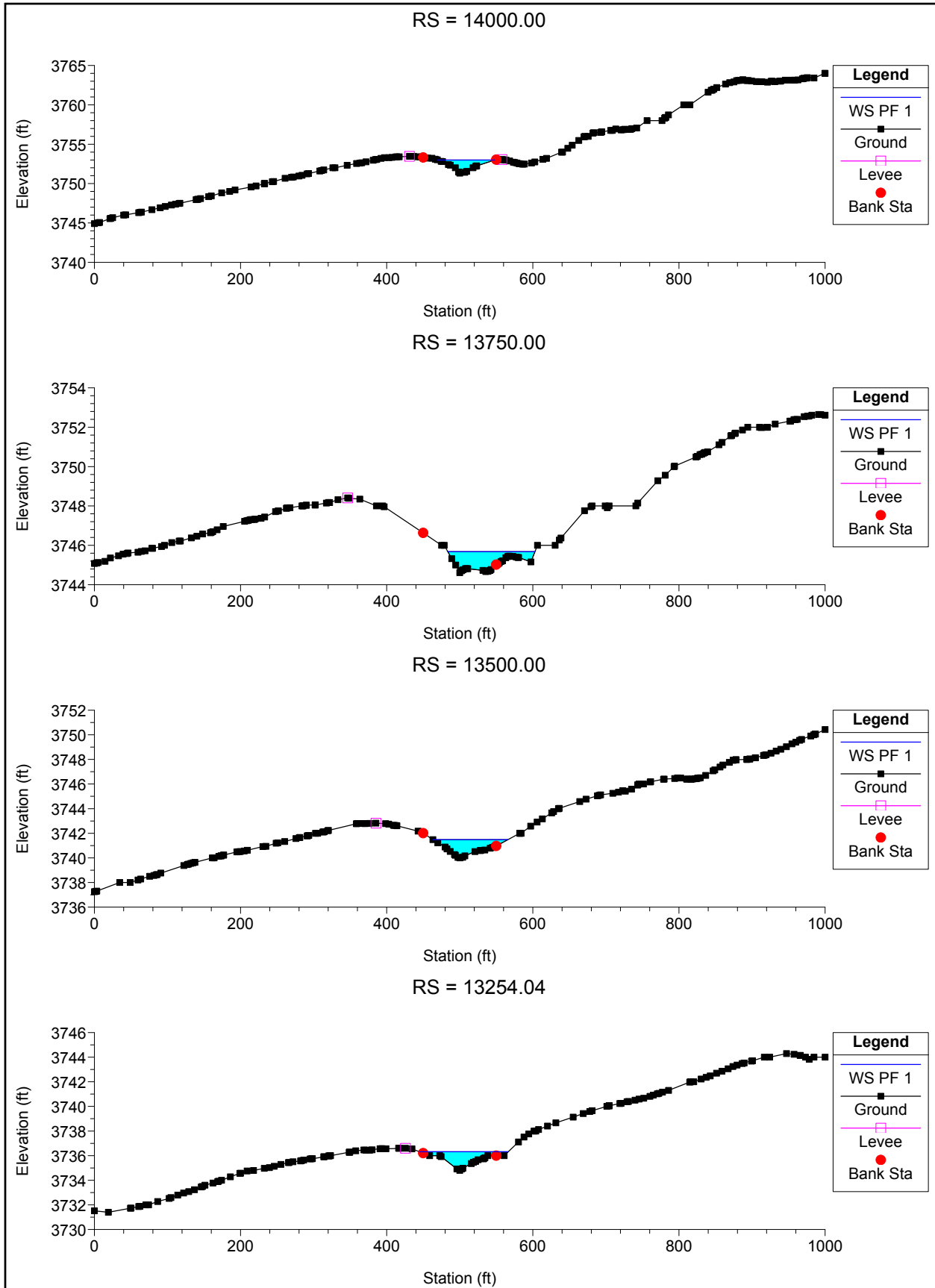
HEC-RAS Channel 09A

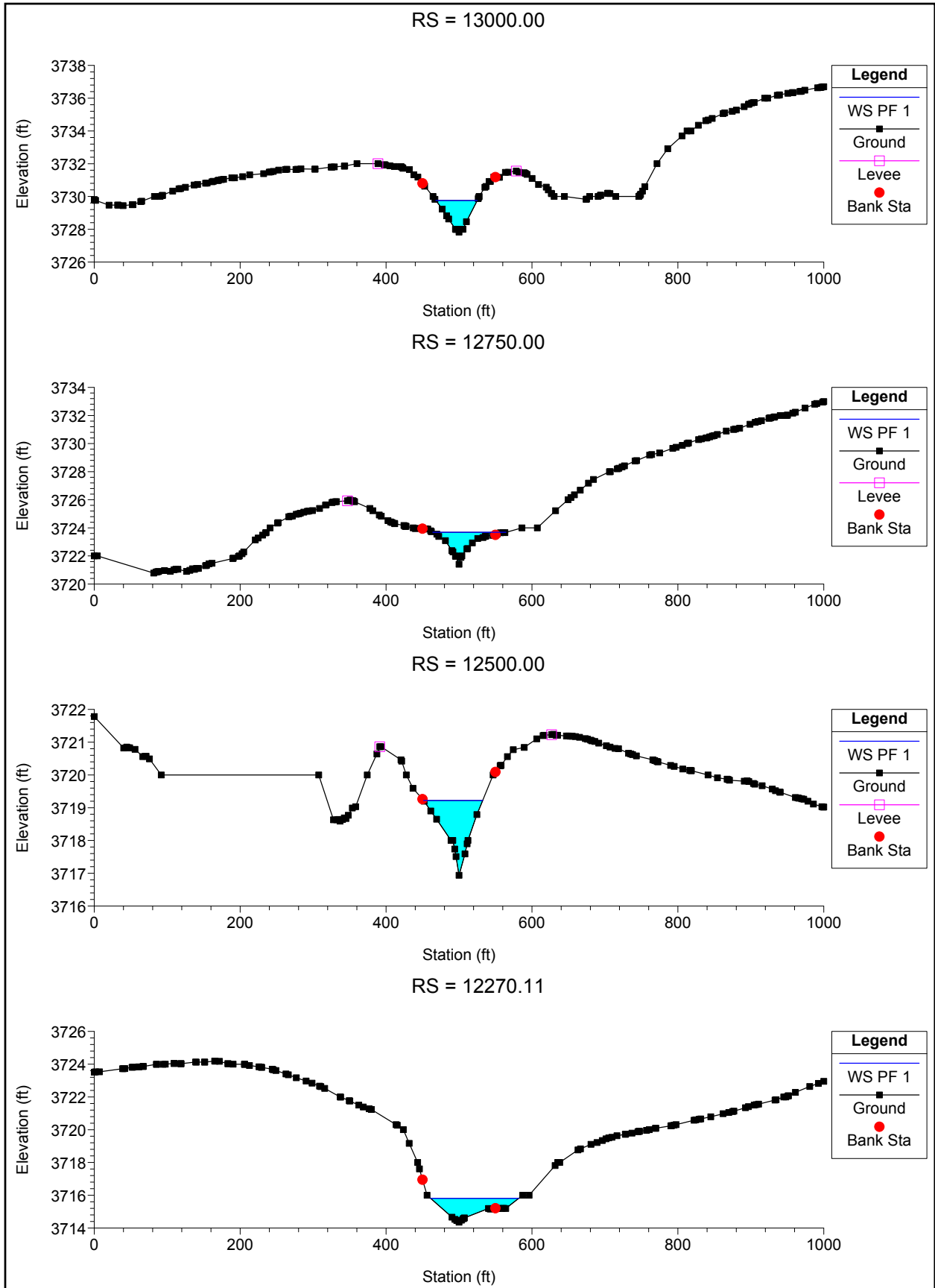


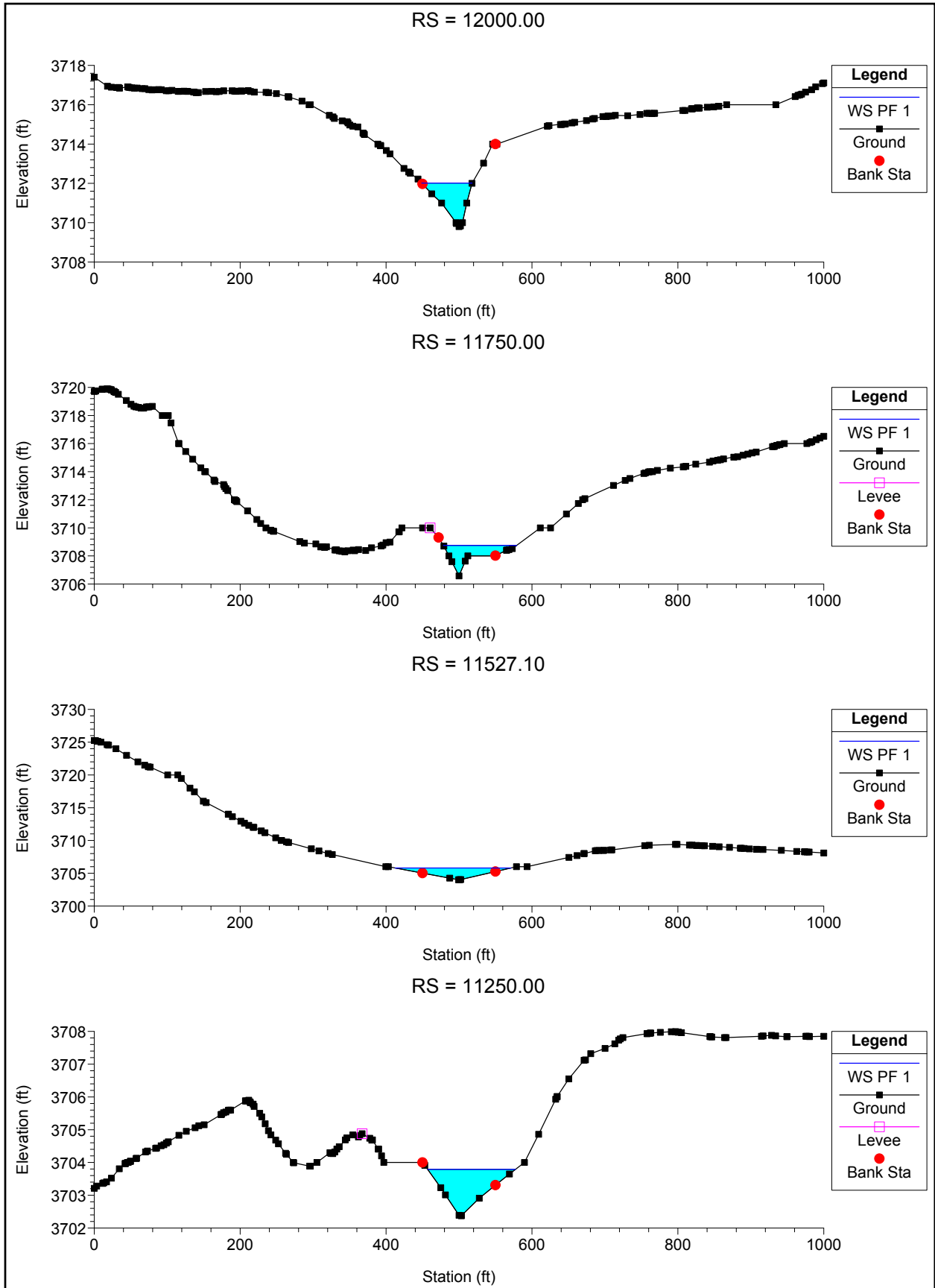
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
09A	14000	PF 1	392	3751.33	3753	3753.14	3753.69	0.036045	6.66	58.84	78.22	1.35
09A	13750	PF 1	392	3744.61	3745.68	3745.8	3746.17	0.026354	6	73.3	119.25	1.17
09A	13500	PF 1	392	3740	3741.48	3741.48	3741.87	0.017055	5.06	79.75	102.69	0.95
09A	13254.04	PF 1	392	3734.8	3736.32	3736.41	3736.77	0.026615	5.44	74.31	121.51	1.15
09A	13000	PF 1	392	3727.83	3729.76	3729.89	3730.45	0.023815	6.68	58.64	56.75	1.16
09A	12750	PF 1	392	3721.41	3723.68	3723.8	3724.22	0.026913	5.87	67.45	100.25	1.17
09A	12500	PF 1	392	3716.94	3719.22	3719.2	3719.66	0.017658	5.3	73.91	80.91	0.98
09A	12270.11	PF 1	392	3714.36	3715.81	3715.76	3716.13	0.015177	4.66	88.95	120.69	0.9
09A	12000	PF 1	392	3709.8	3712.02	3711.89	3712.43	0.012981	5.18	75.67	69.11	0.87
09A	11750	PF 1	392	3706.58	3708.75	3708.75	3709.15	0.015979	5.23	80.02	100.4	0.94
09A	11527.1	PF 1	392	3704	3705.81	3705.35	3705.93	0.003615	2.95	144.51	158.76	0.47
09A	11250	PF 1	392	3702.38	3703.79	3703.79	3704.15	0.016909	4.88	83.94	120.37	0.94
09A	11000	PF 1	392	3699.64	3700.72	3700.72	3700.73	0.000324	0.54	521.98	546.49	0.12
09A	10750	PF 1	392	3696.54	3697.03	3697.41	3700.12	0.450563	14.33	28.64	95.4	4.23
09A	10500	PF 1	392	3694.17	3695.29	3695.29	3695.62	0.016606	4.87	91.21	147.55	0.94
09A	10235.98	PF 1	392	3689.85	3691.06	3691.06	3691.07	0.000202	0.47	602.27	548.41	0.1
09A	10000	PF 1	392	3686.1	3687.51	3688.15	3690.59	0.18202	14.09	27.81	40.42	2.99
09A	9750	PF 1	392	3683.54	3684.75	3684.65	3684.92	0.010823	3.64	127.27	256.2	0.74
09A	9500	PF 1	392	3680.57	3681.91	3681.91	3682.11	0.014833	4.02	121.6	306.96	0.86
09A	9250	PF 1	392	3675.57	3677.09	3676.8	3677.3	0.007066	3.83	107.35	105.78	0.64
09A	9000	PF 1	392	3674	3675.4	3675.15	3675.65	0.008208	4.1	97.75	99.53	0.69
09A	8750	PF 1	392	3671.11	3672.73	3672.68	3673.13	0.015766	5.06	77.44	83.62	0.93
09A	8500	PF 1	392	3667	3668.59	3668.59	3668.99	0.01787	5.21	78.87	102.48	0.98
09A	8250	PF 1	392	3664.44	3666.57	3666.24	3666.73	0.005092	3.27	129.07	152.15	0.54
09A	8008.953	PF 1	421	3662.13	3664.87		3665.21	0.010186	4.78	93.36	101.23	0.77
09A	7750	PF 1	421	3659.92	3663.55	3663.15	3663.81	0.006474	4.07	104.13	85.43	0.63
09A	7504.629	PF 1	421	3658.66	3661.31	3661.31	3661.83	0.019309	5.75	73.28	77.63	1.03
09A	7500	PF 1	421	3658.63	3661.58	3660.95	3661.64	0.001645	2.14	226.31	209.96	0.32
09A	7208.917	PF 1	421	3657.25	3660.91	3660.5	3661.12	0.005903	3.69	115.09	100.77	0.59
09A	7000	PF 1	421	3656.31	3658.84	3658.84	3659.33	0.018092	5.63	74.92	78.4	1
09A	6731.53	PF 1	421	3653.67	3657.28	3656.62	3657.42	0.003333	3.15	140.27	104.65	0.46
09A	6500	PF 1	421	3652.69	3656.34		3656.58	0.006248	4.02	106.52	90.79	0.62
09A	6271.982	PF 1	421	3651.64	3655.12		3655.31	0.005594	3.54	121.45	121.11	0.57
09A	5989.433	PF 1	421	3650.04	3653.55		3653.9	0.009871	4.78	88.09	72.49	0.76
09A	5750	PF 1	421	3649.38	3652.43		3652.58	0.003449	3.29	140.76	129.67	0.47
09A	5500	PF 1	421	3648.72	3650.77	3650.77	3651.15	0.017893	5.11	88.16	119.23	0.97
09A	5224.224	PF 1	421	3647.78	3649.69	3649	3649.82	0.002947	3	145.79	104.66	0.43
09A	5000	PF 1	421	3645.12	3648.5		3648.84	0.008072	4.72	93.08	85.69	0.7
09A	4750	PF 1	421	3643.93	3647.49		3647.62	0.003544	2.99	151.26	147.1	0.46
09A	4500	PF 1	421	3642.81	3646.13	3646.13	3646.38	0.010472	4.16	120.05	304.99	0.75
09A	4187.531	PF 1	421	3641.52	3643.3	3642.87	3643.46	0.004835	3.4	130.52	115.46	0.54
09A	4000	PF 1	421	3640.68	3642.84		3642.92	0.001956	2.43	185.85	143.86	0.35
09A	3750	PF 1	617	3639.7	3641.46	3641.4	3641.91	0.014083	5.44	116.29	114.34	0.91
09A	3500	PF 1	617	3634.62	3637.79	3637.79	3638.41	0.015353	6.34	98.92	84.87	0.97
09A	3260.511	PF 1	617	3629.6	3633.16	3632.76	3633.47	0.006399	4.42	140.99	104.94	0.64

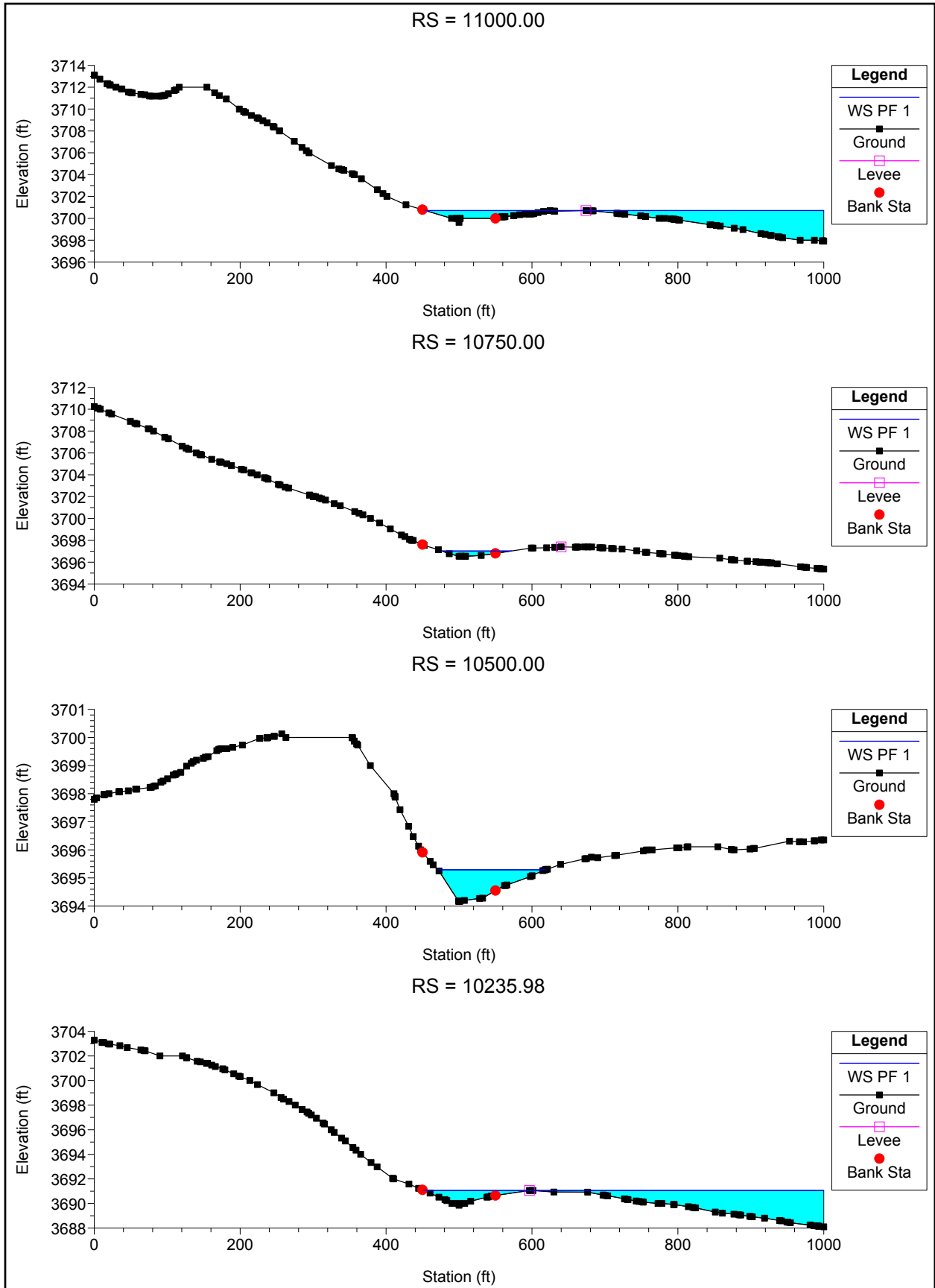


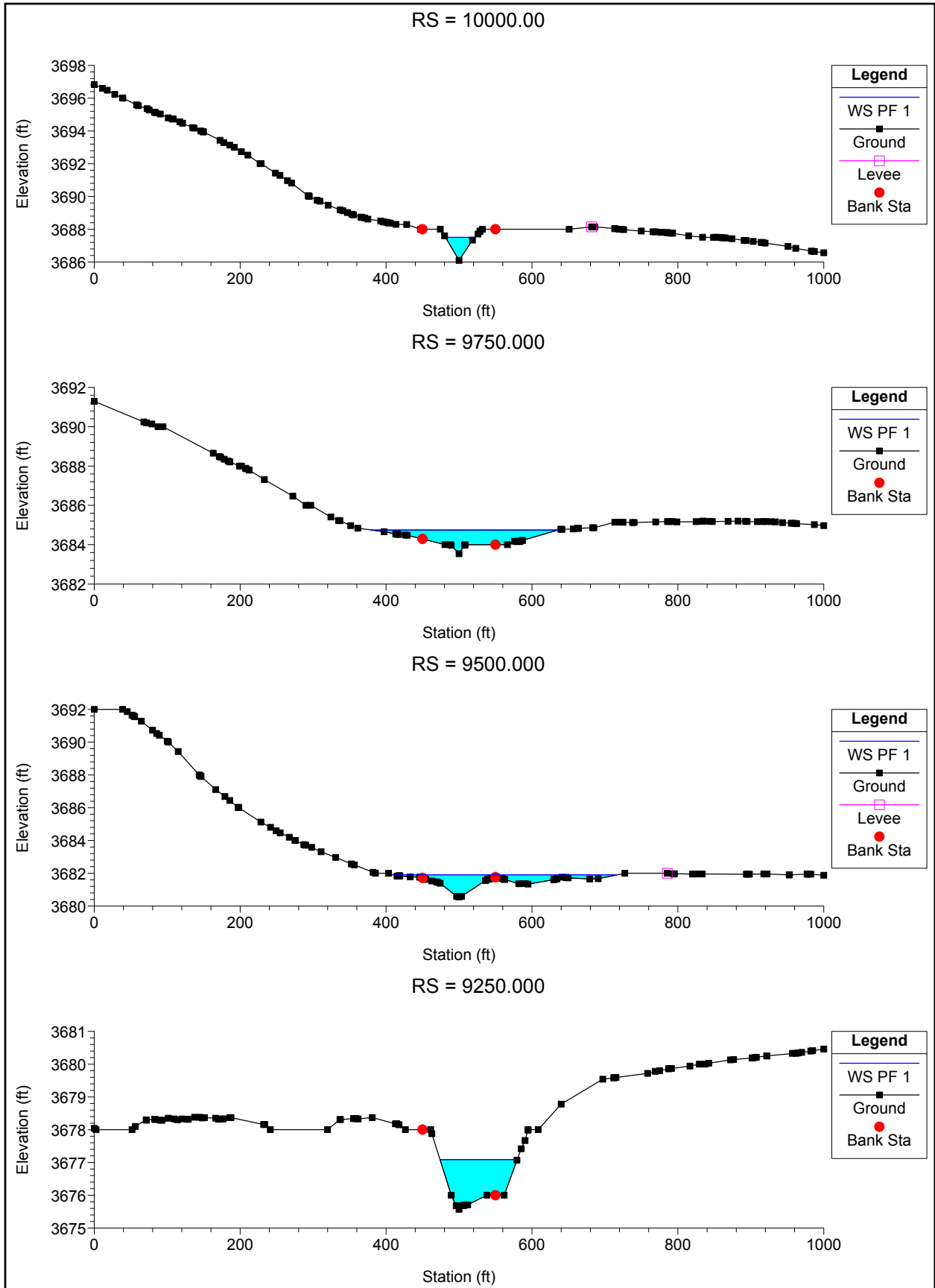
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
09A	3034.916	PF 1	617	3628.08	3630.57	3630.57	3631.39	0.015719	7.29	84.61	52.18	1.01
09A	2750	PF 1	617	3627.49	3630.06	3629.87	3630.08	0.000808	1.51	525.86	568.56	0.22
09A	2500	PF 1	617	3627.02	3629.63	3629.09	3629.74	0.003427	2.98	239.72	242.43	0.46
09A	2250	PF 1	617	3626	3628.31	3628.31	3628.61	0.007443	4.79	169.65	273.14	0.69
09A	1979.219	PF 1	617	3626.05	3626.95	3626.17	3626.97	0.000569	0.89	565.62	507.15	0.17
09A	1744.467	PF 1	617	3621.99	3625.81	3625.81	3626.58	0.016185	7.07	87.32	57.65	1.01
09A	1500	PF 1	617	3619.68	3623.74	3622.52	3623.93	0.002345	3.53	174.74	77.15	0.41
09A	1250	PF 1	617	3618.83	3623.15	3622.5	3623.29	0.002722	3.18	217.86	160.48	0.43
09A	1000	PF 1	617	3617.94	3621.53	3621.22	3622.1	0.00947	6.04	102.15	57.29	0.8
09A	750	PF 1	617	3615.18	3619.14	3619.14	3620.1	0.014552	7.86	78.53	40.46	0.99
09A	500	PF 1	617	3611.9	3616.12	3615.77	3616.86	0.009249	6.91	89.32	39.62	0.81
09A	250	PF 1	617	3610.92	3613.72	3613.64	3614.3	0.01354	6.12	100.87	72.94	0.92
09A	0	PF 1	617	3608	3611.26	3611.09	3611.68	0.011004	5.51	118.83	94.43	0.82

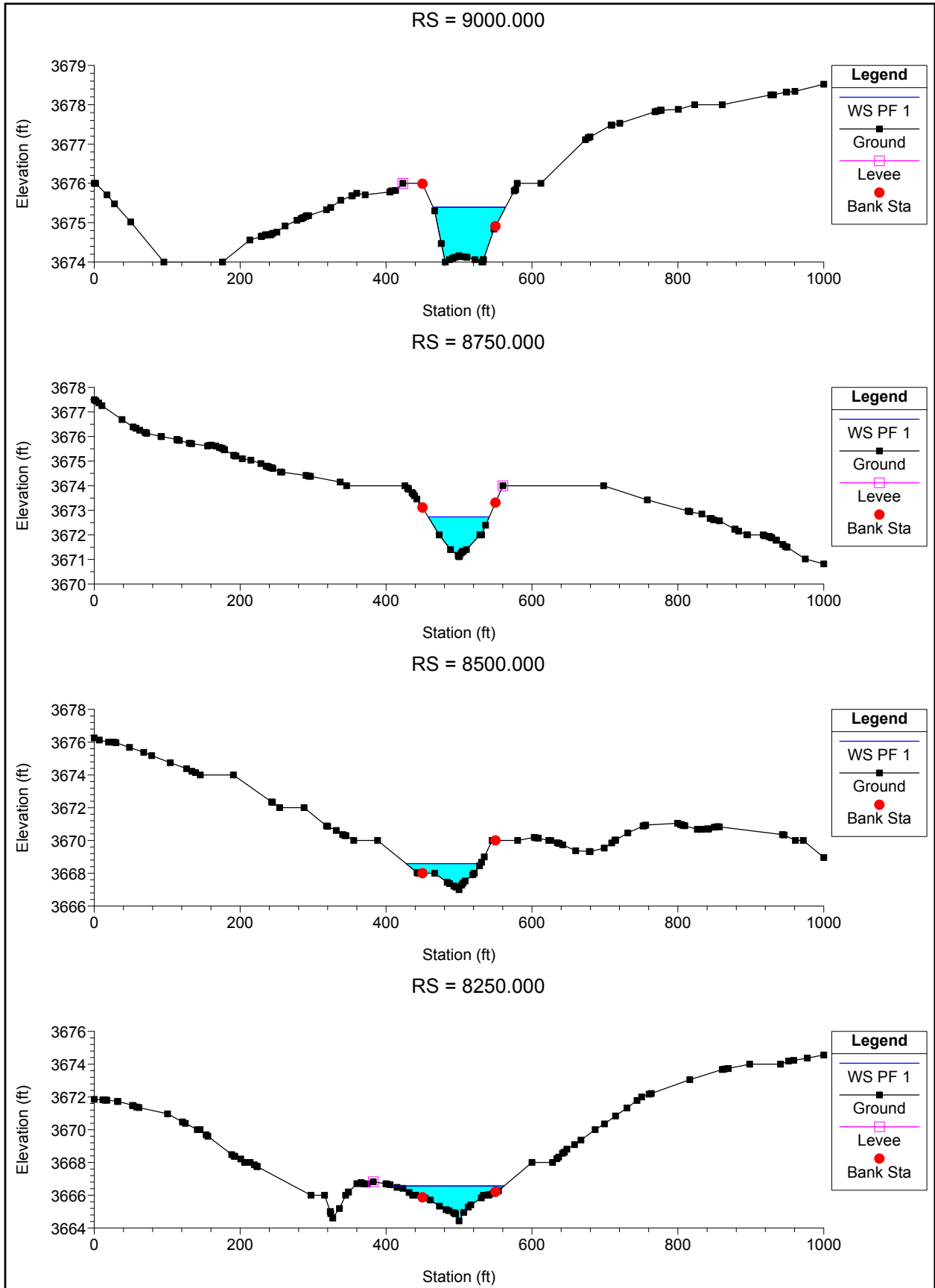


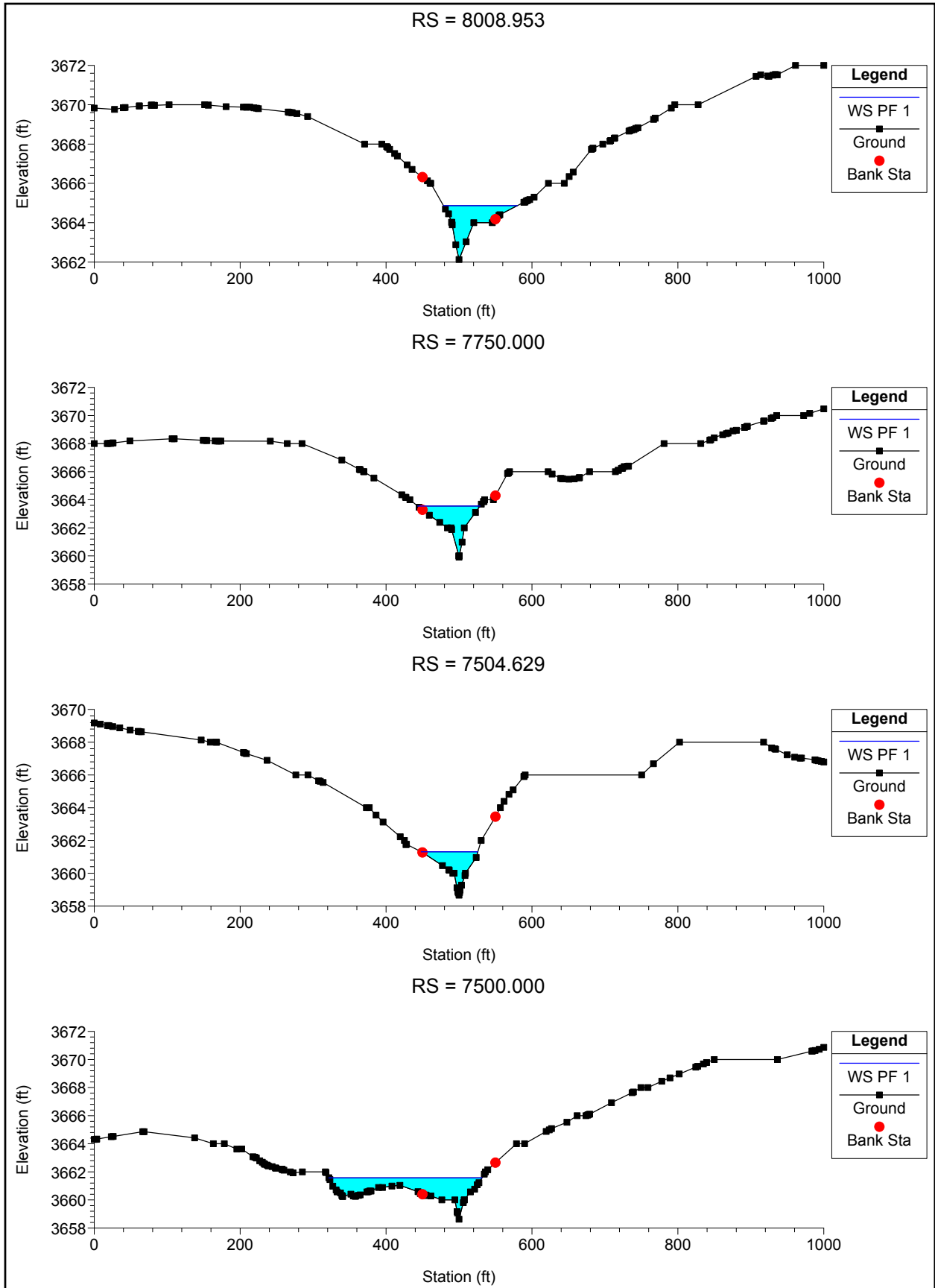


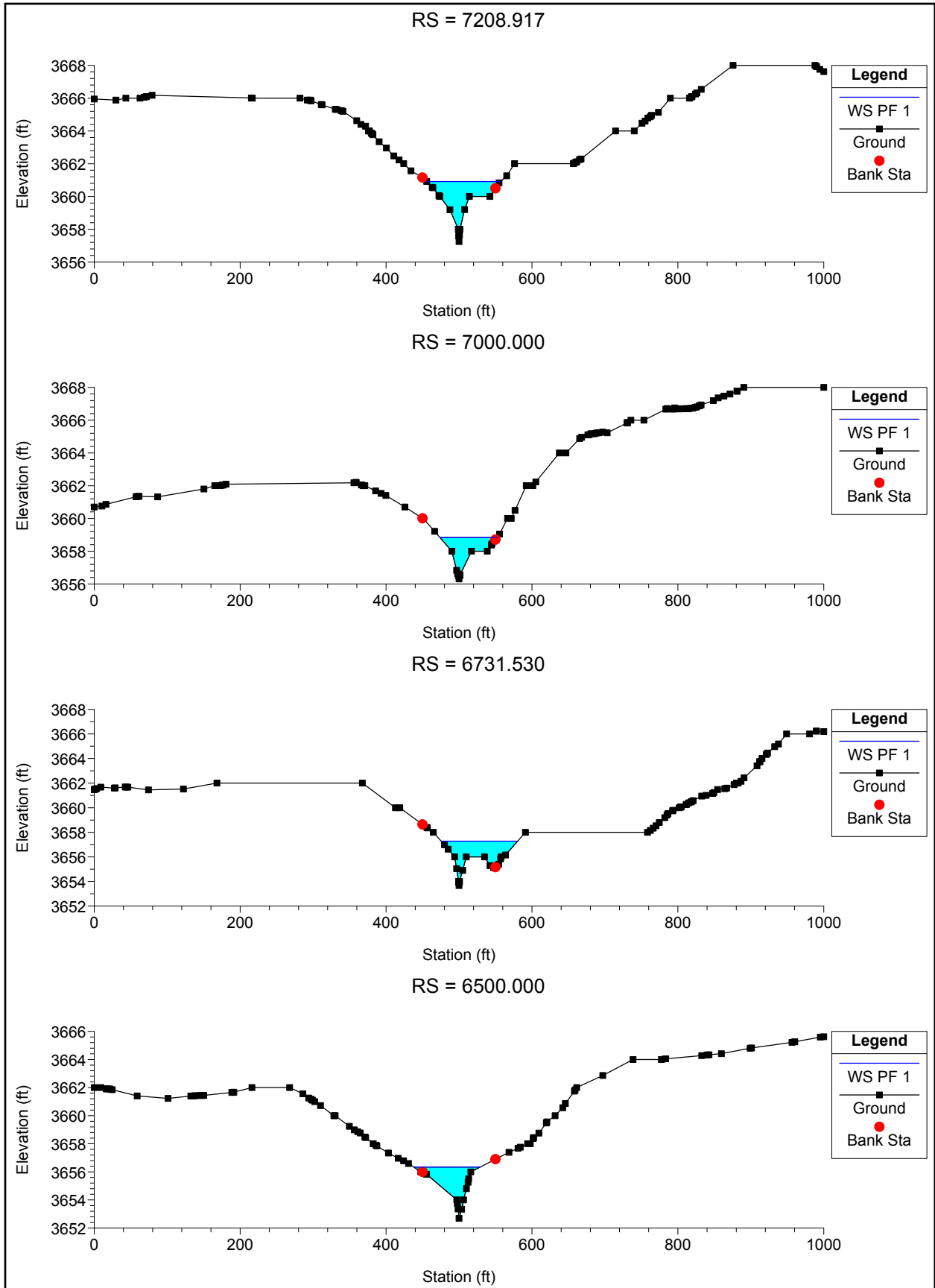


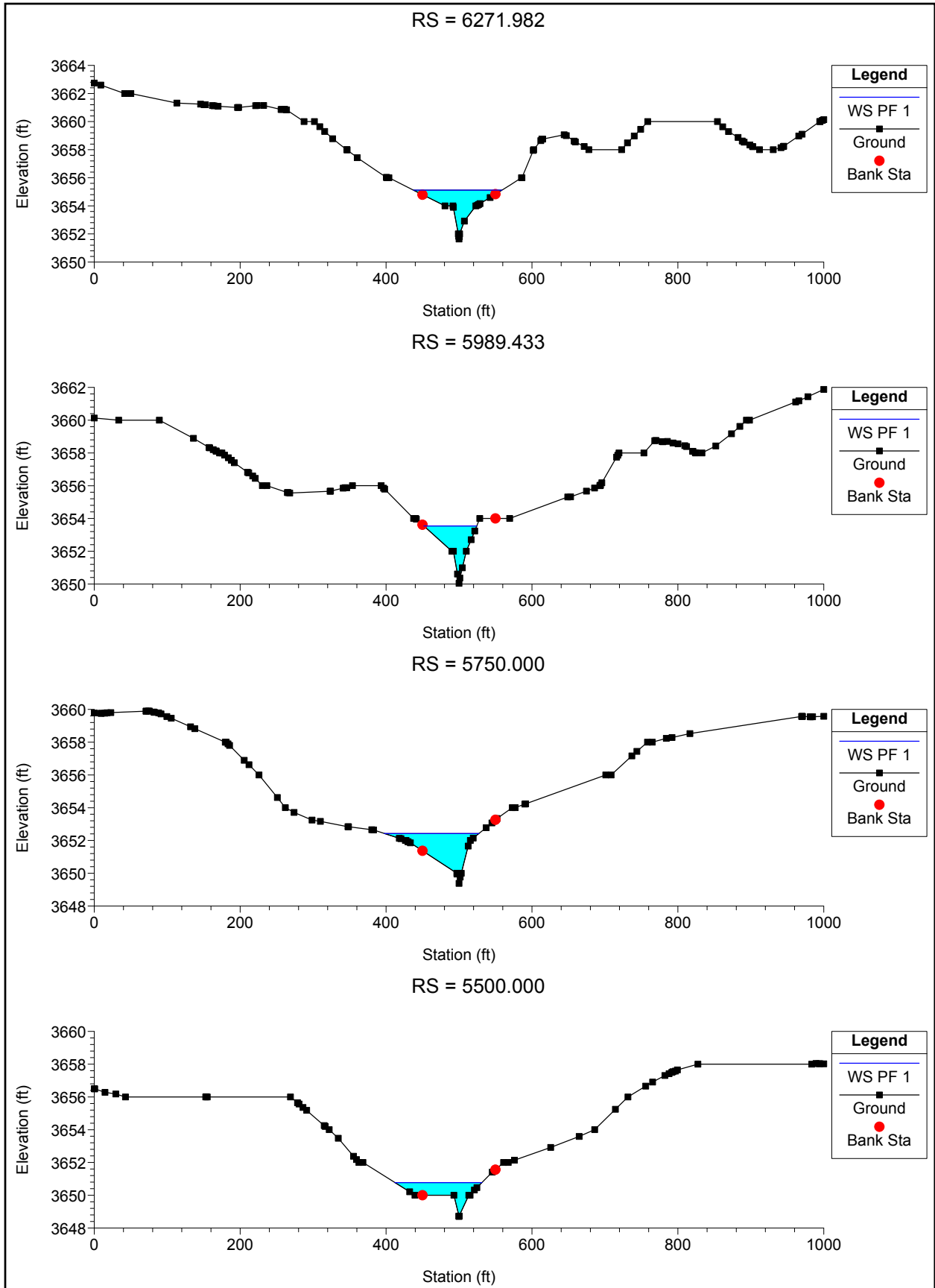


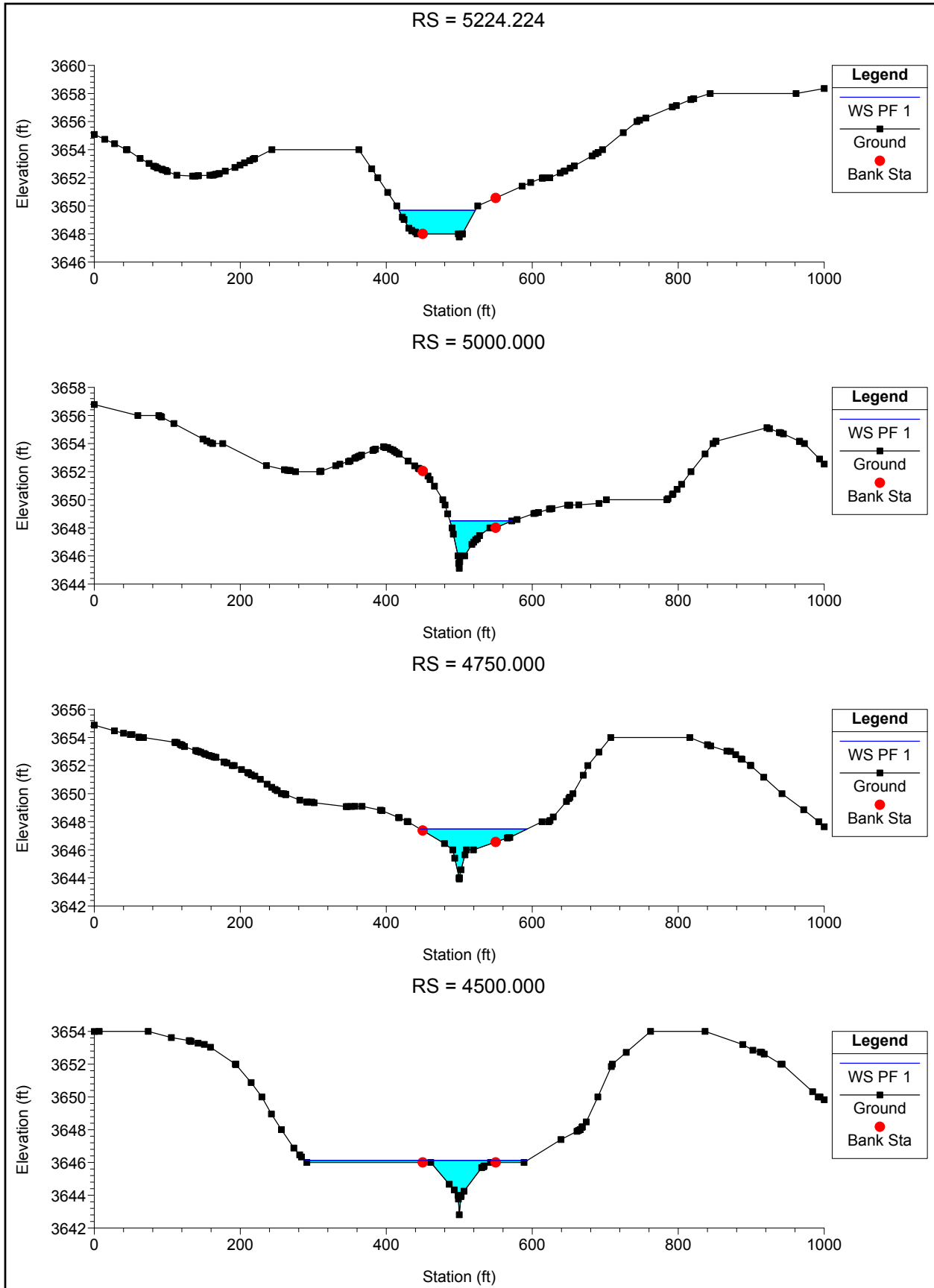


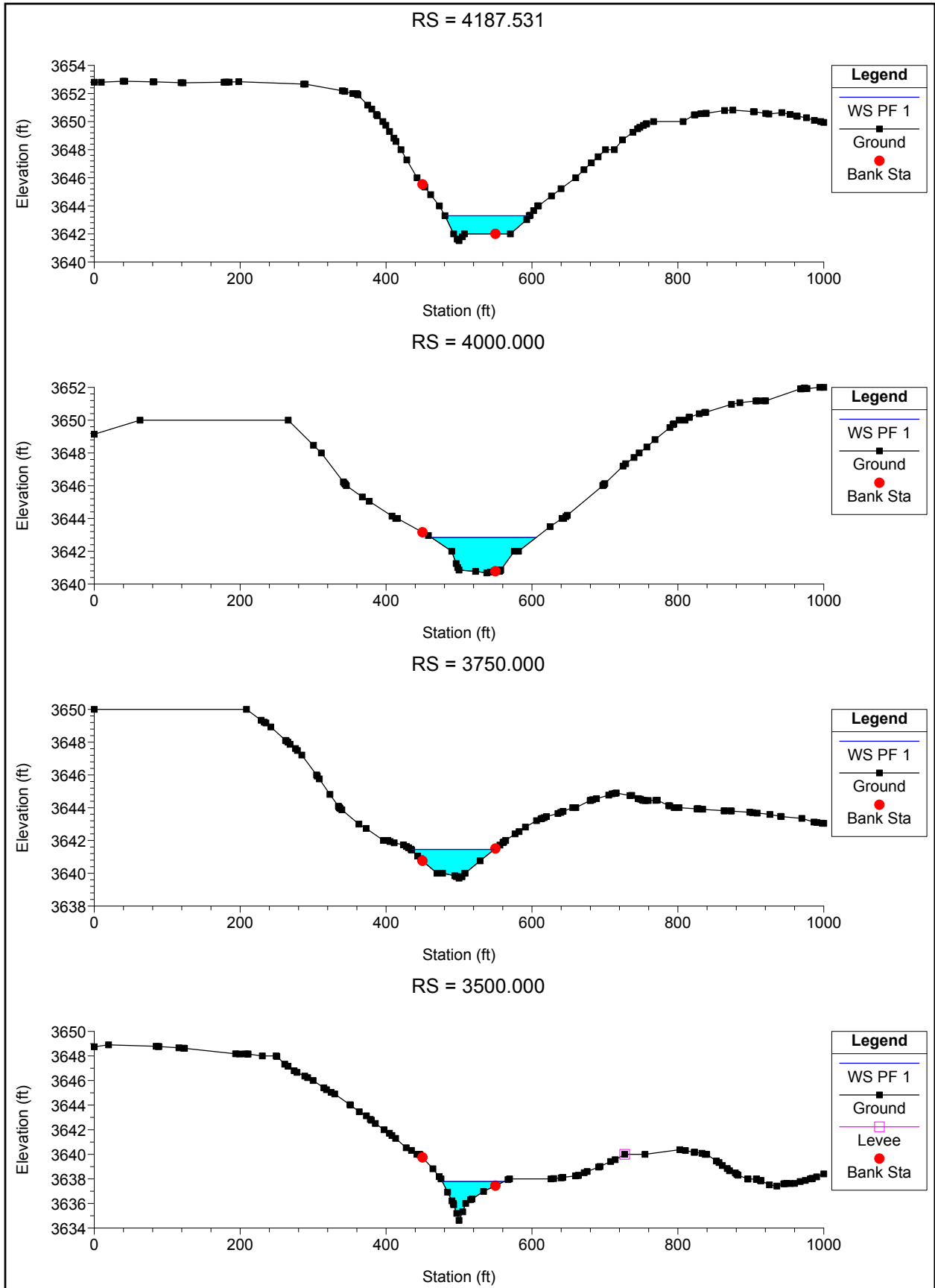


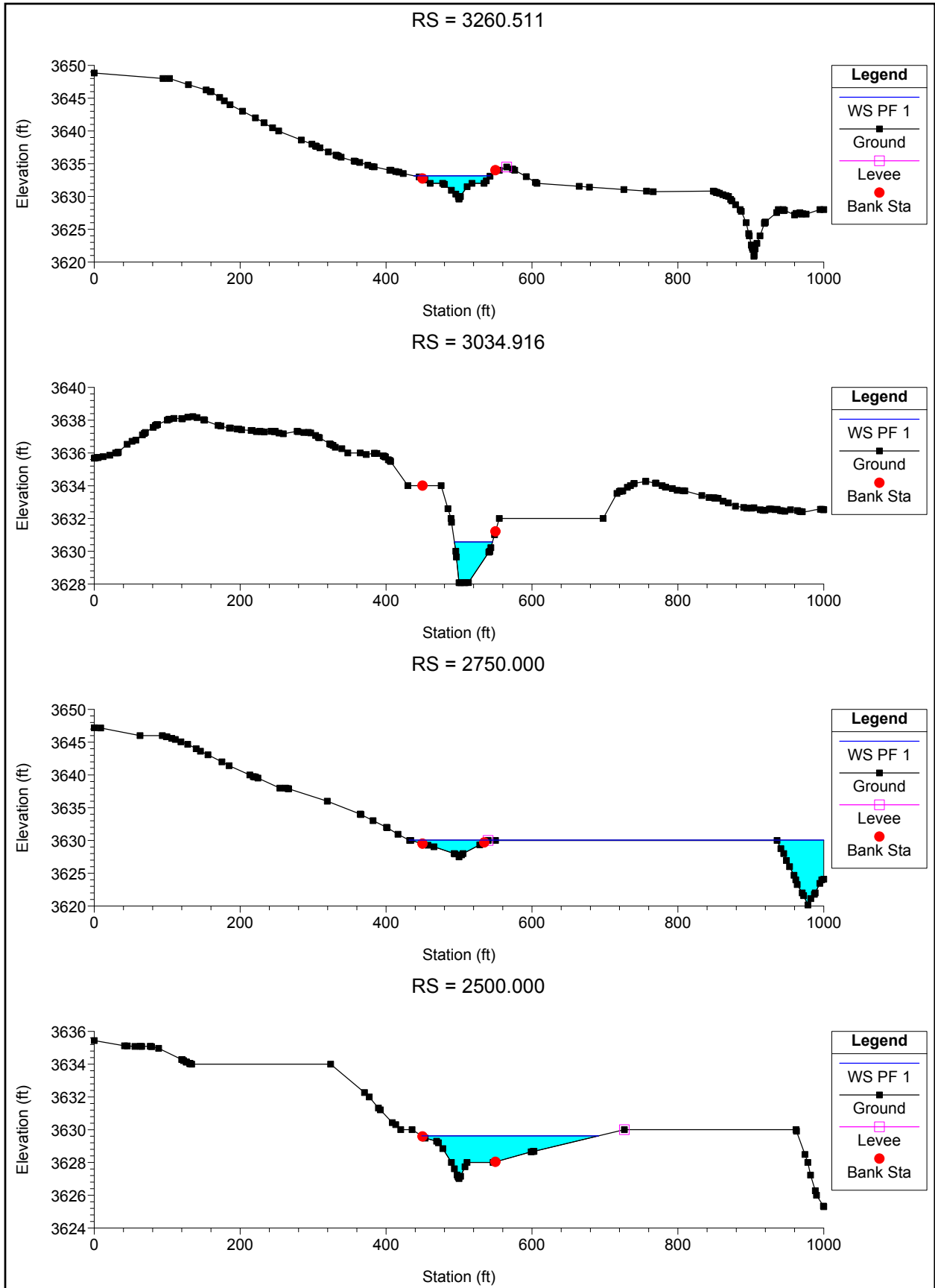


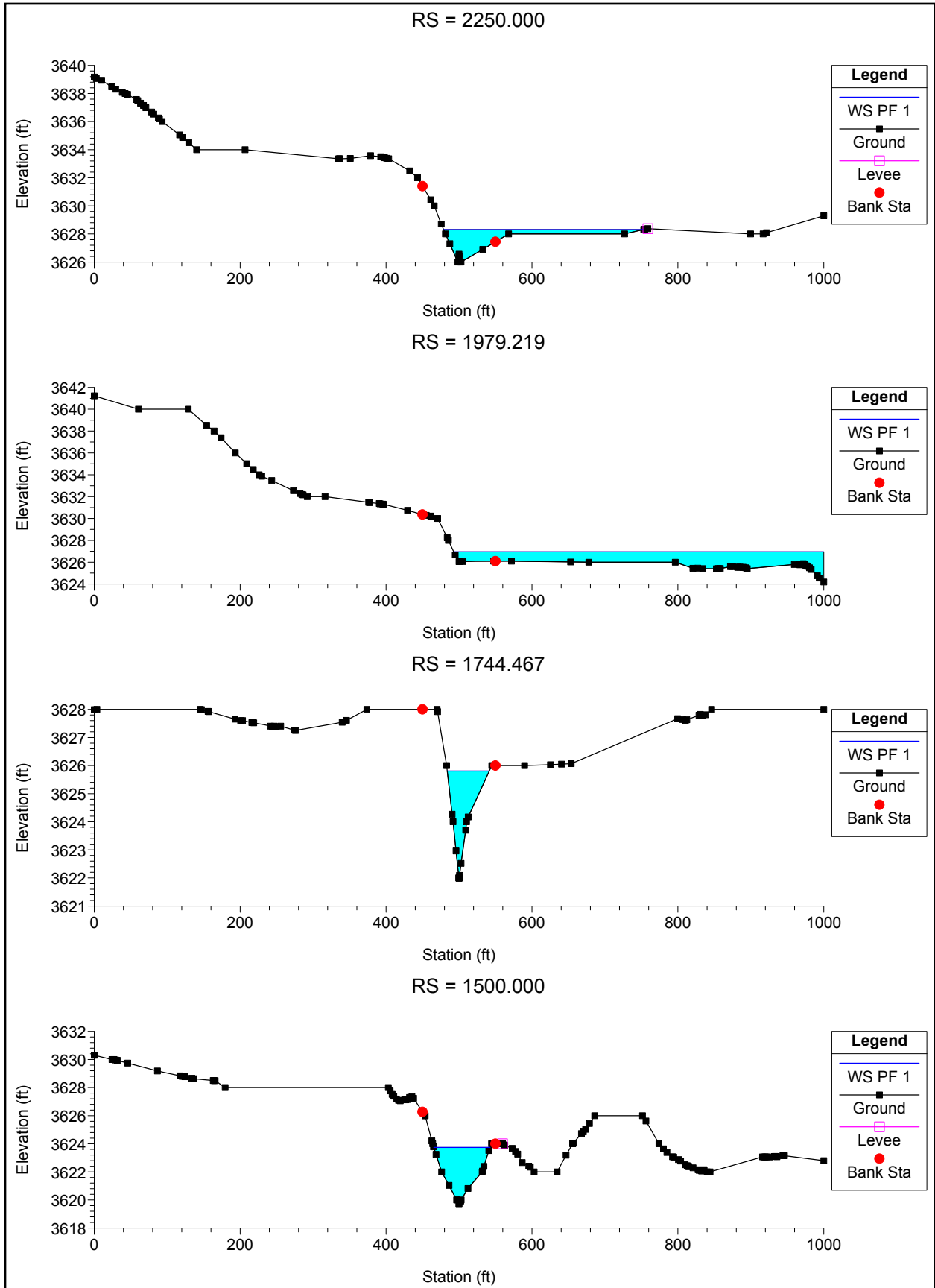


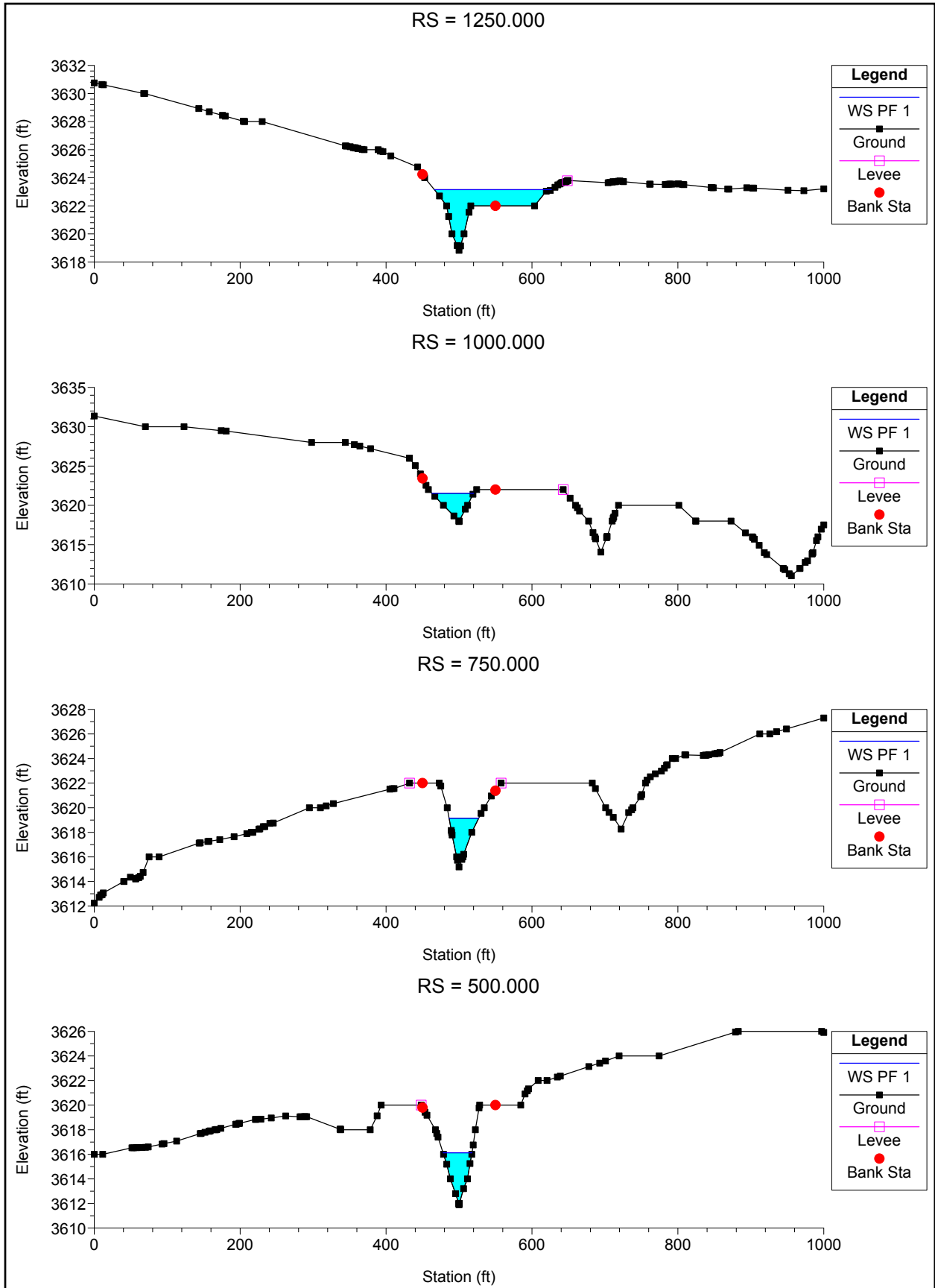


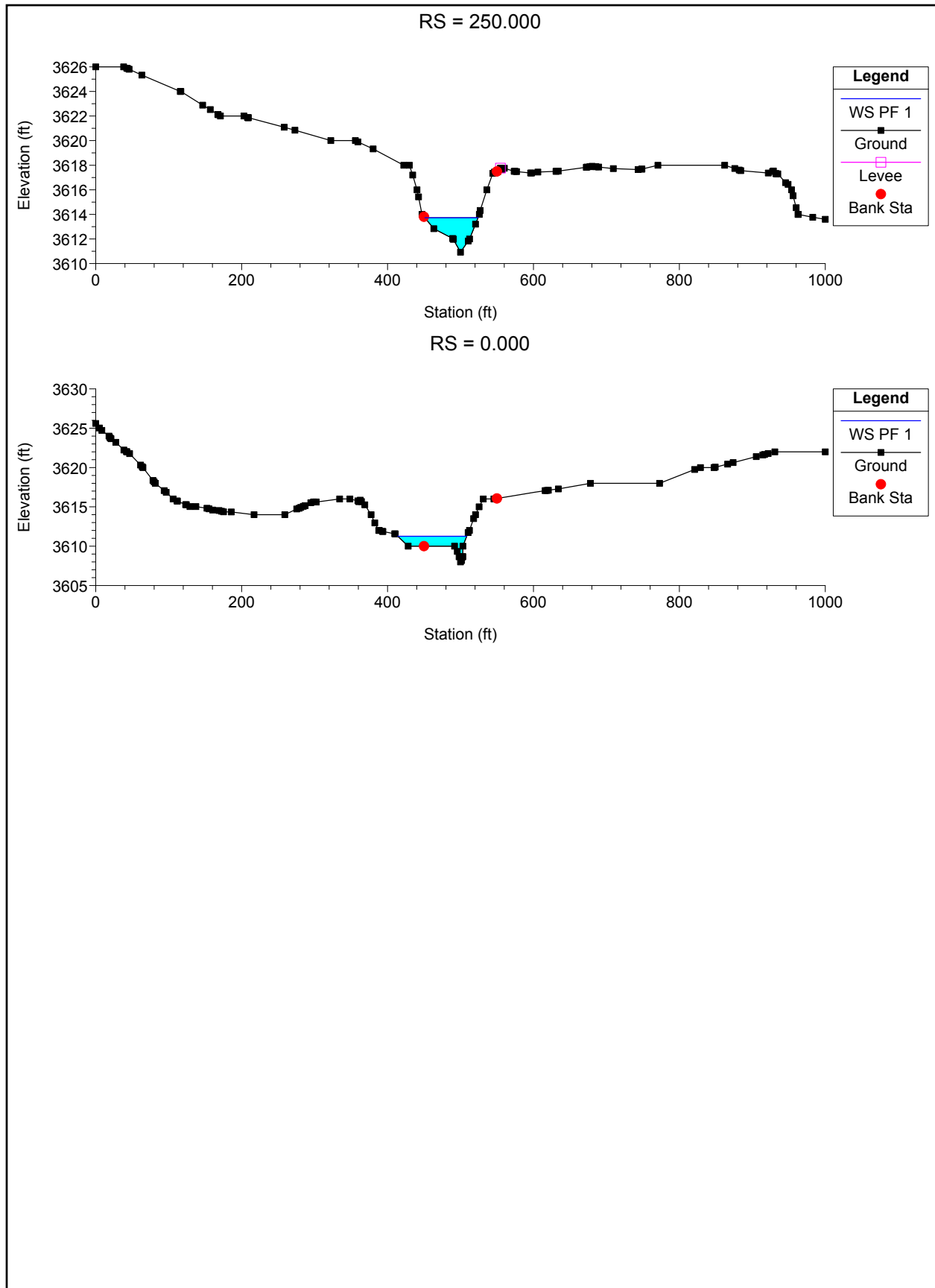










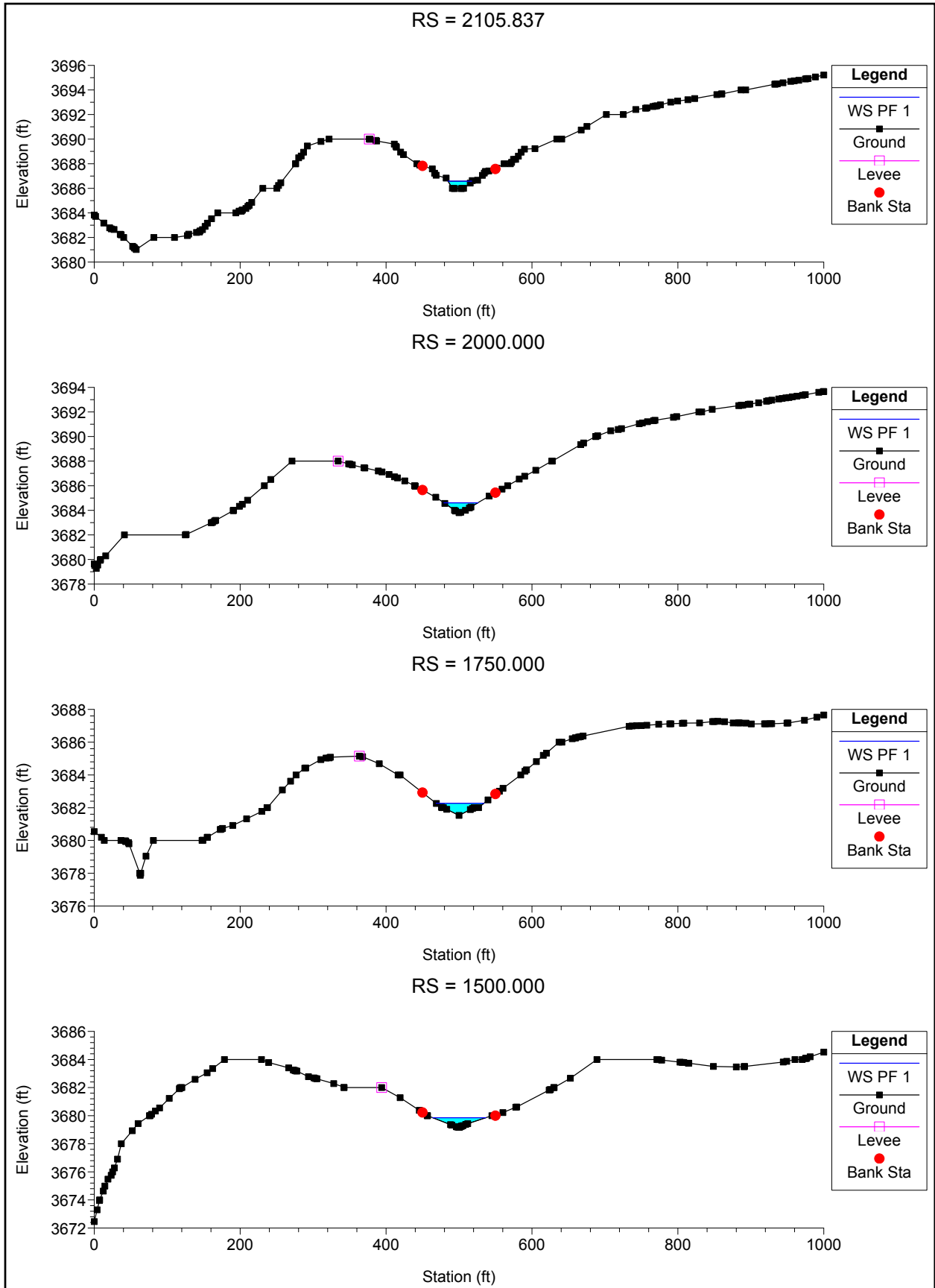


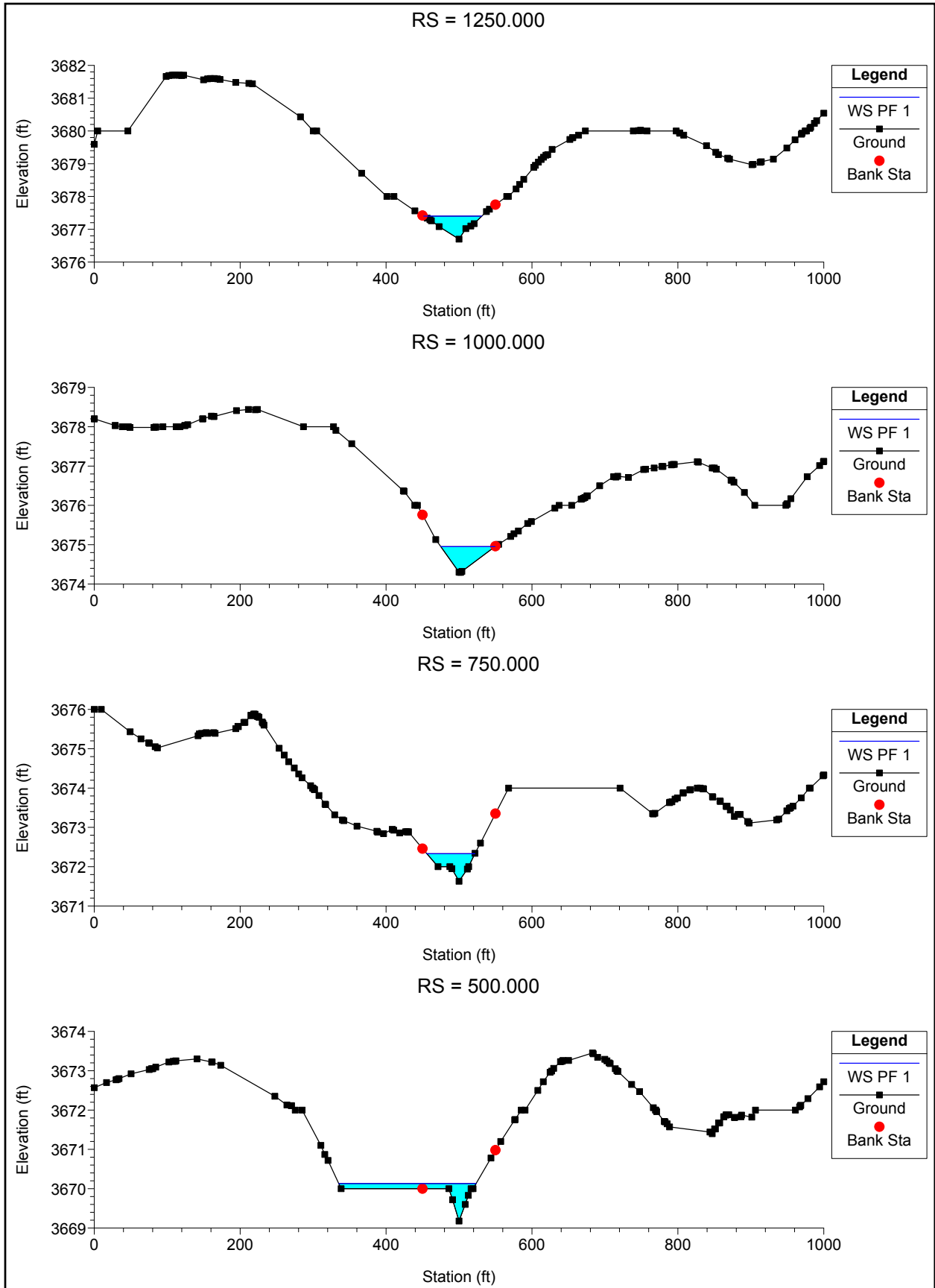
Attachment 2.7-M-15

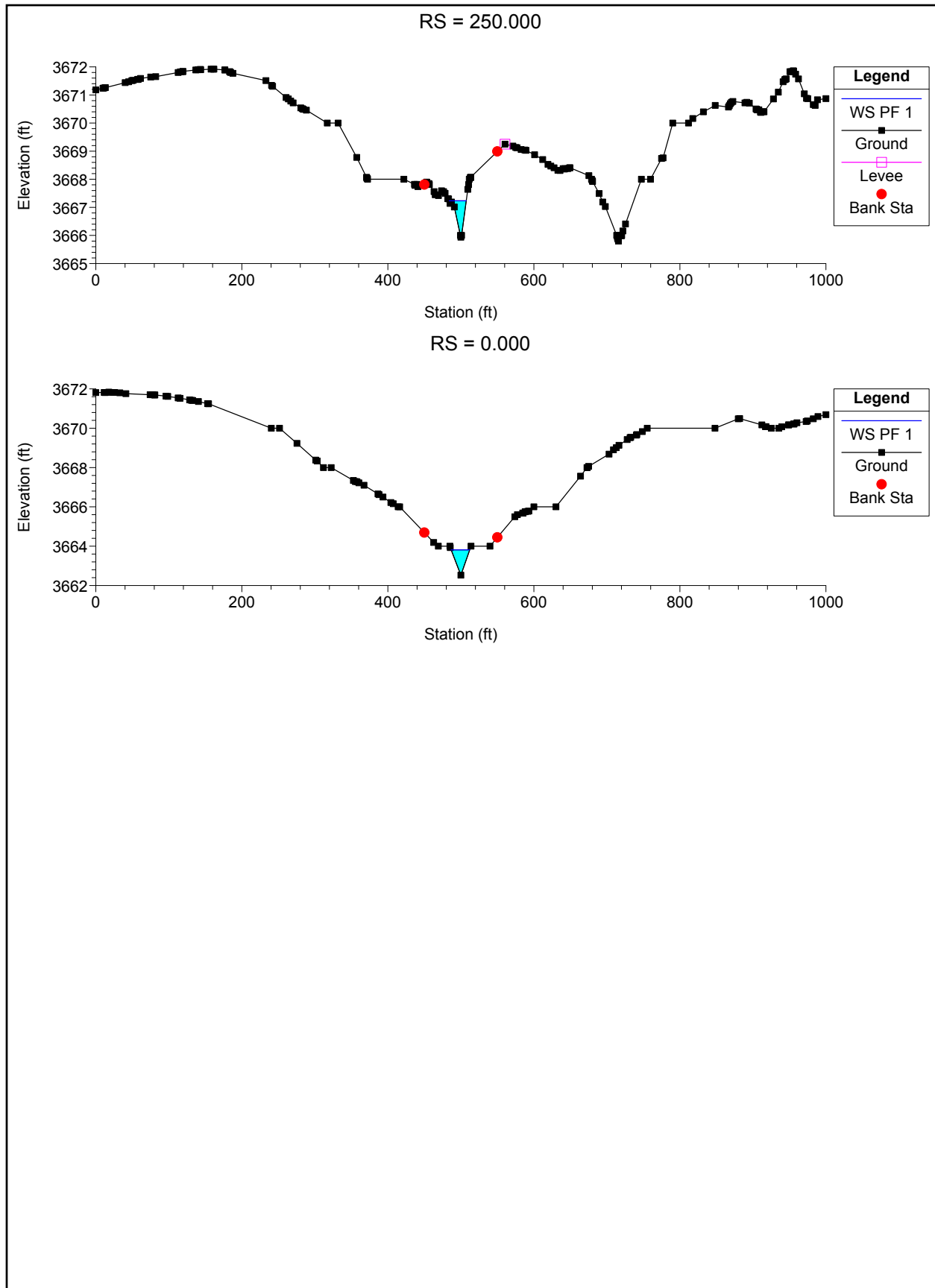
HEC-RAS Channel 09B



Reach	River Sta	Profile	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)	
09B	2105.837	PF 1	54	3685.98	3686.58	3686.58	3686.8	0.023943	3.79	14.24	32.45	1.01
09B	2000	PF 1	54	3683.8	3684.61	3684.5	3684.72	0.011641	2.64	20.45	46.7	0.7
09B	1750	PF 1	54	3681.53	3682.27	3682.14	3682.34	0.008691	2.11	25.57	65.56	0.6
09B	1500	PF 1	54	3679.17	3679.86	3679.75	3679.93	0.010872	2.17	24.94	72.88	0.65
09B	1250	PF 1	54	3676.7	3677.4	3677.27	3677.46	0.009593	2.01	26.82	79.57	0.61
09B	1000	PF 1	54	3674.3	3674.95		3675.02	0.011032	2.16	25.03	74.37	0.66
09B	750	PF 1	54	3671.63	3672.33	3672.25	3672.42	0.013353	2.4	22.51	65.79	0.72
09B	500	PF 1	54	3669.18	3670.13	3670.09	3670.17	0.008989	1.78	36.56	188.39	0.58
09B	250	PF 1	54	3665.94	3667.23	3667.23	3667.51	0.021981	4.2	12.85	23.38	1
09B	0	PF 1	54	3662.53	3663.82	3663.66	3663.98	0.011002	3.3	16.34	25.45	0.73





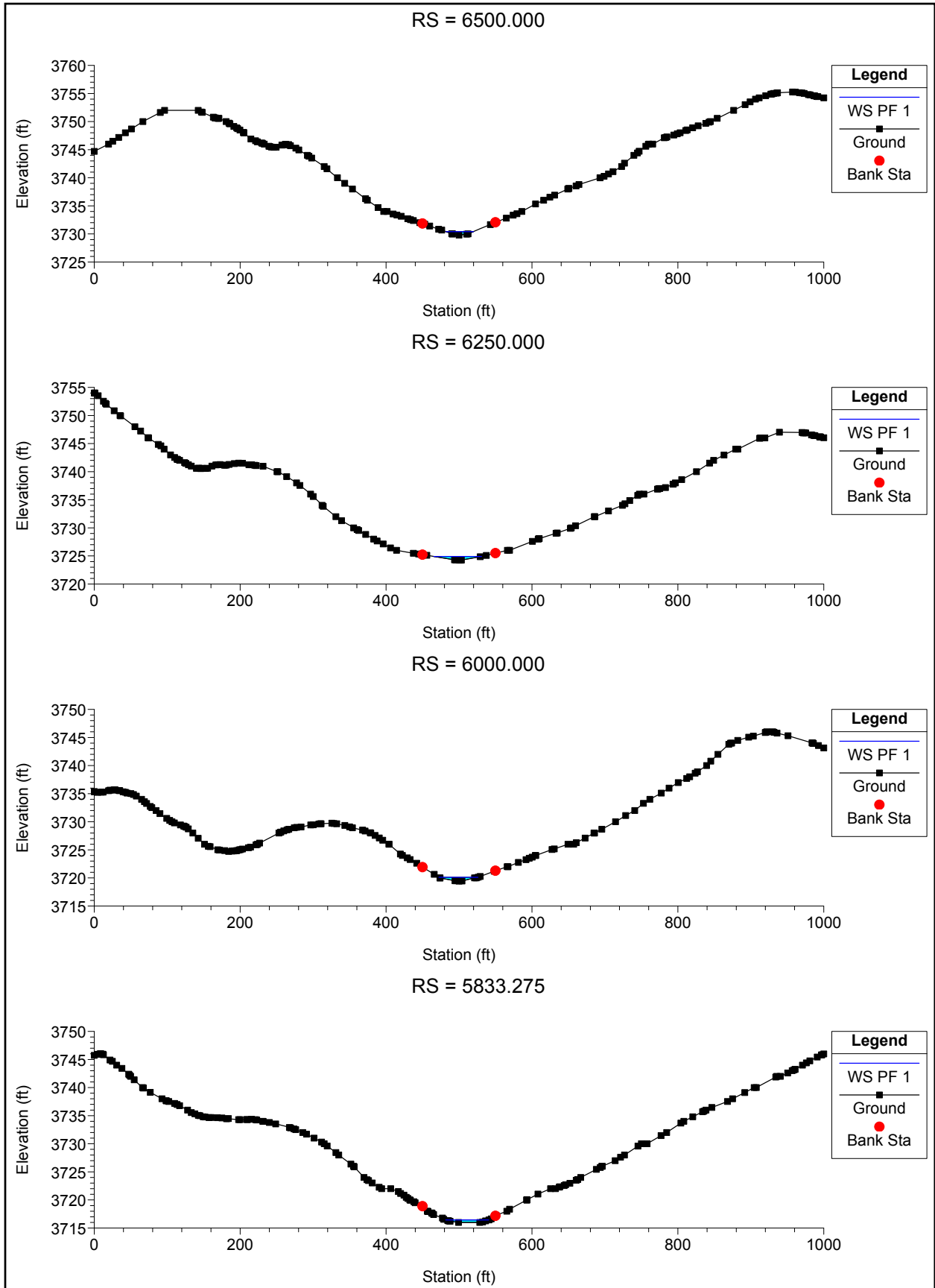


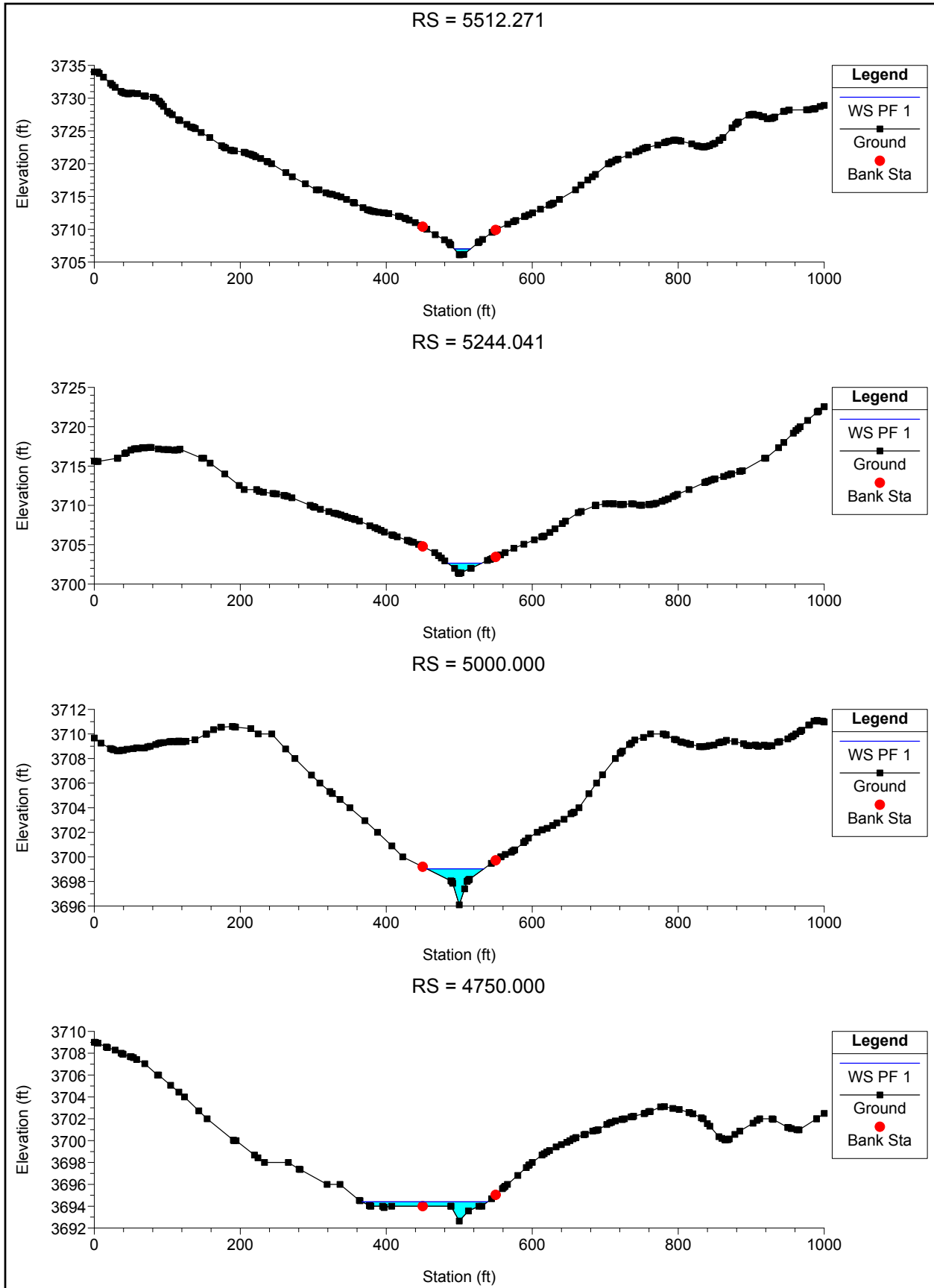
Attachment 2.7-M-16

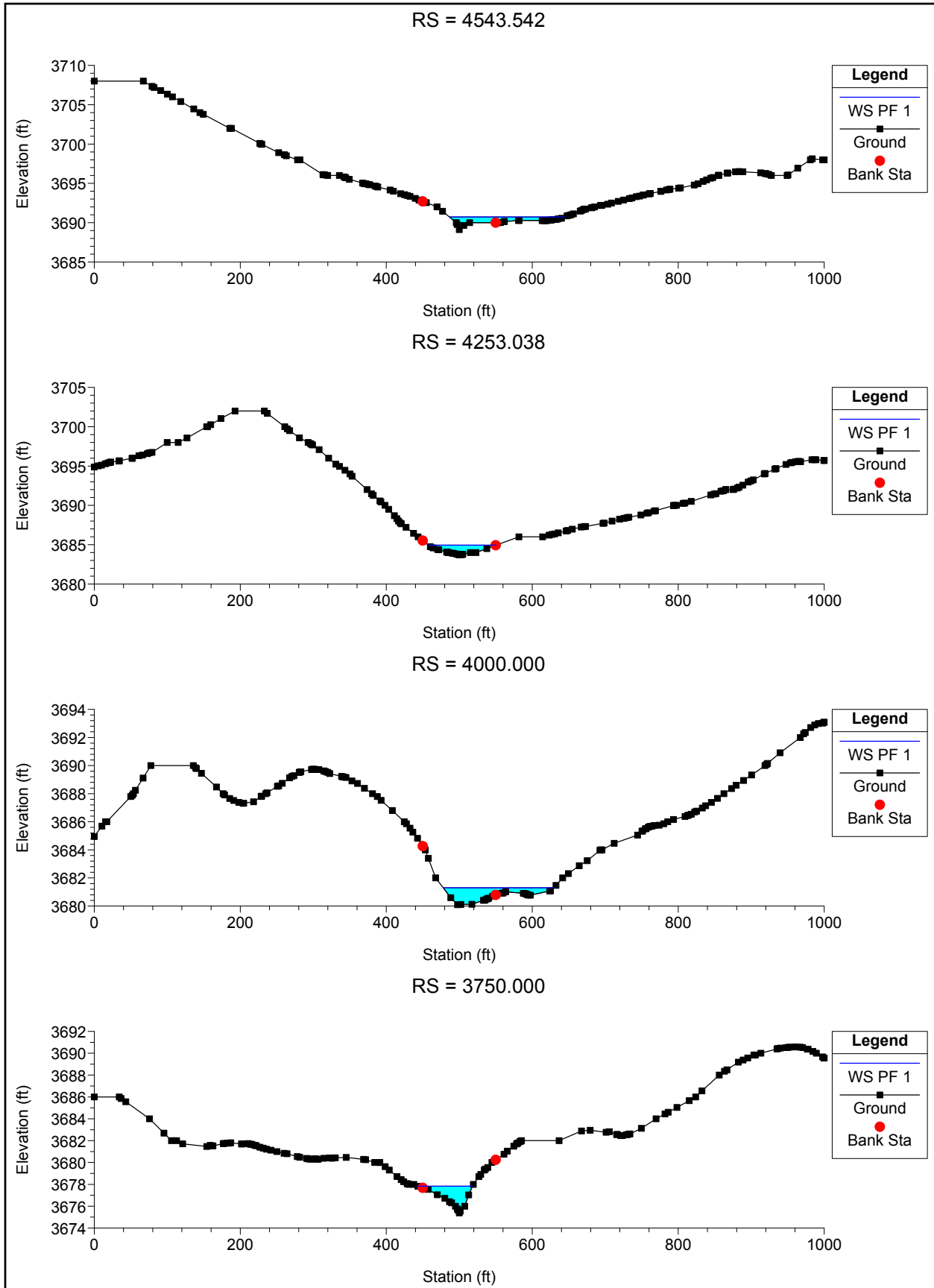
HEC-RAS Channel 09C

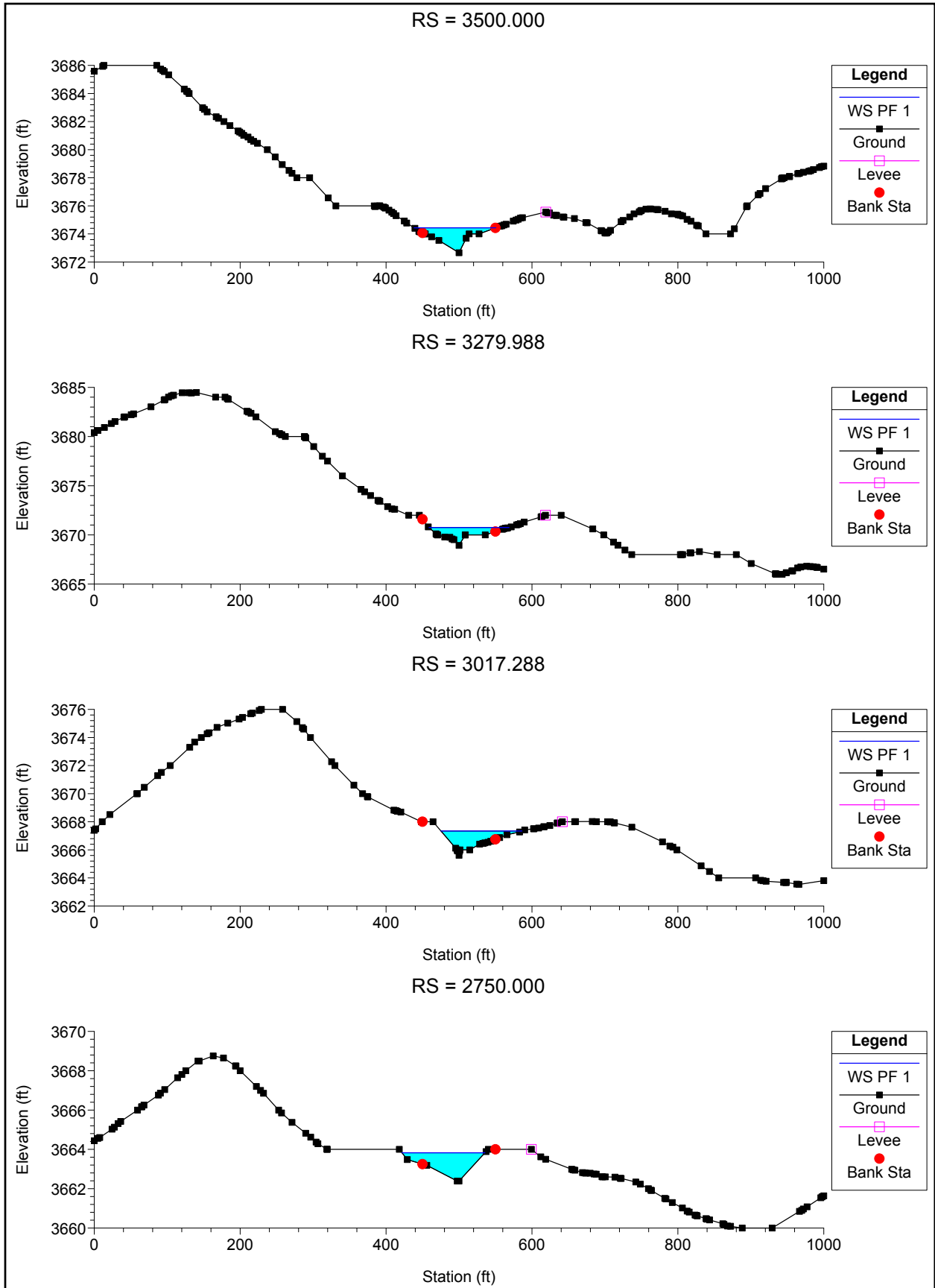


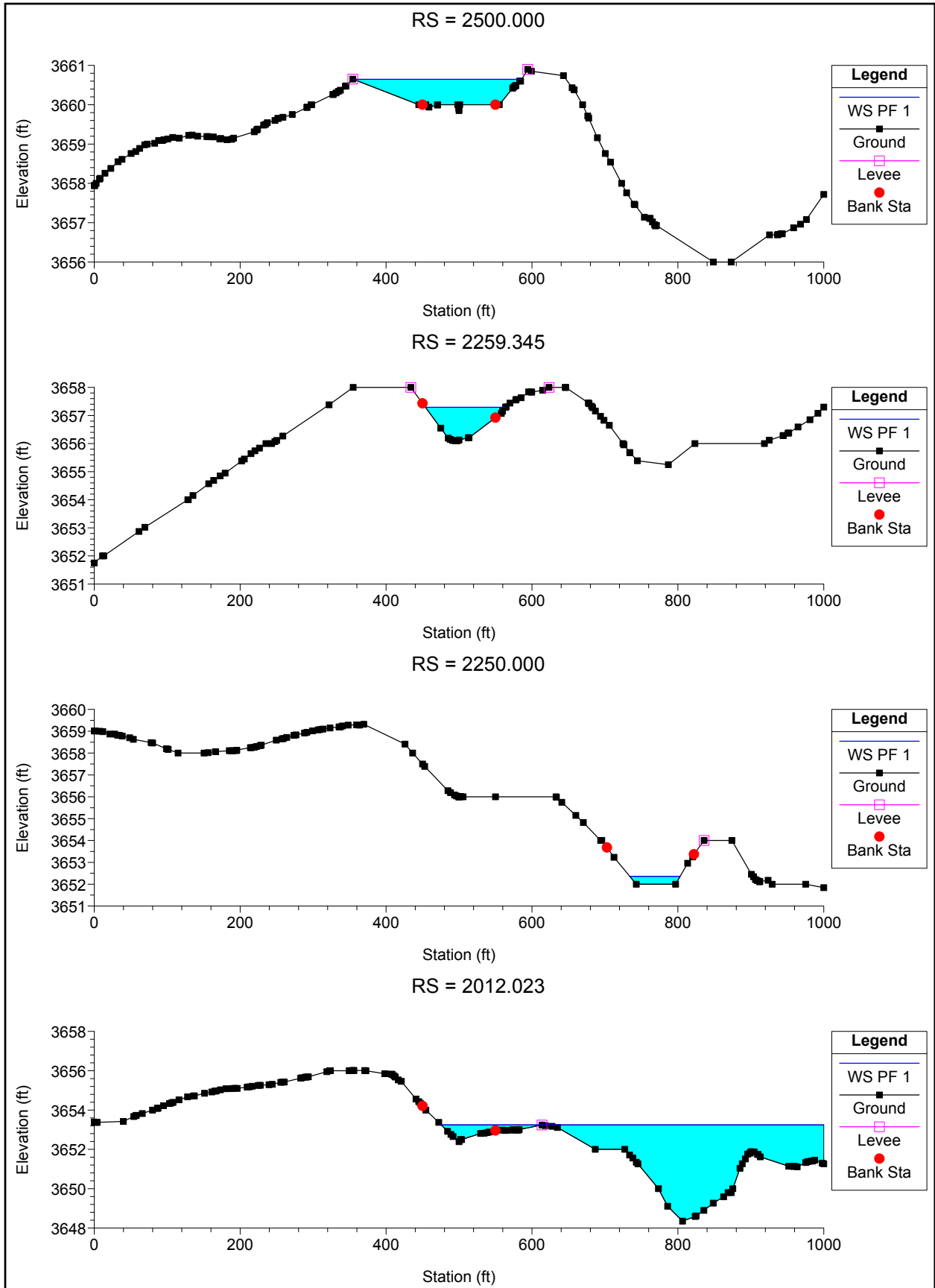
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
09C	6500	PF 1	68	3729.8	3730.42	3730.5	3730.76	0.043992	4.69	14.51	37.98	1.34
09C	6250	PF 1	68	3724.25	3724.91	3724.85	3725.03	0.017589	2.86	23.76	65.56	0.84
09C	6000	PF 1	68	3719.43	3720.11	3720.09	3720.28	0.021069	3.28	20.75	53.47	0.93
09C	5833.275	PF 1	68	3716	3716.44	3716.44	3716.61	0.025206	3.32	20.45	59.02	1
09C	5512.271	PF 1	68	3706.11	3707.01	3707.13	3707.48	0.037027	5.49	12.39	22.41	1.3
09C	5244.041	PF 1	68	3701.33	3702.65	3702.33	3702.73	0.005111	2.26	30.03	46.51	0.5
09C	5000	PF 1	376	3696.1	3699.03	3699.03	3699.48	0.018864	5.38	69.83	78.3	1
09C	4750	PF 1	376	3692.64	3694.41	3694.44	3694.7	0.022604	4.72	88.75	172.18	1.04
09C	4543.542	PF 1	376	3689.13	3690.72	3690.72	3691.01	0.017944	4.81	91.26	157.66	0.96
09C	4253.038	PF 1	376	3683.7	3684.94	3685	3685.42	0.025948	5.56	67.66	92.82	1.14
09C	4000	PF 1	376	3680.09	3681.3	3681.3	3681.59	0.014522	4.72	92.53	151.02	0.88
09C	3750	PF 1	376	3675.39	3677.83	3677.69	3678.22	0.012006	4.97	76.1	75.21	0.83
09C	3500	PF 1	376	3672.66	3674.44	3674.44	3674.8	0.018396	4.83	79.26	112.14	0.97
09C	3279.988	PF 1	376	3668.93	3670.75	3670.73	3671.11	0.016354	4.83	80.09	109.79	0.93
09C	3017.288	PF 1	376	3665.61	3667.34	3667.34	3667.71	0.014791	4.99	80.83	110.98	0.9
09C	2750	PF 1	376	3662.39	3663.83	3663.78	3664.14	0.013746	4.59	86.57	113.64	0.86
09C	2500	PF 1	376	3659.85	3660.64	3660.61	3660.85	0.015591	3.98	110.02	230.73	0.87
09C	2259.345	PF 1	376	3656.1	3657.29	3657.29	3657.65	0.017879	4.86	79.07	109.82	0.96
09C	2250	PF 1	376	3652	3652.36	3653	3656.84	0.729111	16.98	22.15	69.08	5.28
09C	2012.023	PF 1	376	3652.39	3653.25	3653.25	3653.25	0.000042	0.17	905.63	524.56	0.04
09C	1756.216	PF 1	376	3647.22	3648.36	3649.03	3652.77	0.608047	16.84	22.32	61.41	4.92
09C	1500	PF 1	376	3643.7	3645.9	3645.9	3646.25	0.012105	4.88	85.01	139.62	0.83
09C	1250	PF 1	376	3641.43	3642.72	3642.47	3642.82	0.006083	2.52	147.59	218.64	0.54
09C	1000	PF 1	376	3639.47	3640.5	3640.44	3640.68	0.014168	3.61	112.53	211.62	0.82
09C	750	PF 1	376	3637.19	3638.5		3638.65	0.006248	3.29	123.89	148.69	0.59
09C	560.628	PF 1	376	3635.63	3636.48	3636.48	3636.74	0.020006	4.33	94.56	184.01	0.97
09C	250	PF 1	376	3633.55	3634.93	3634.22	3634.96	0.000857	1.35	310.25	336.04	0.22
09C	0	PF 1	376	3632	3633.93	3633.93	3634.41	0.016656	5.61	68.4	73.15	0.97

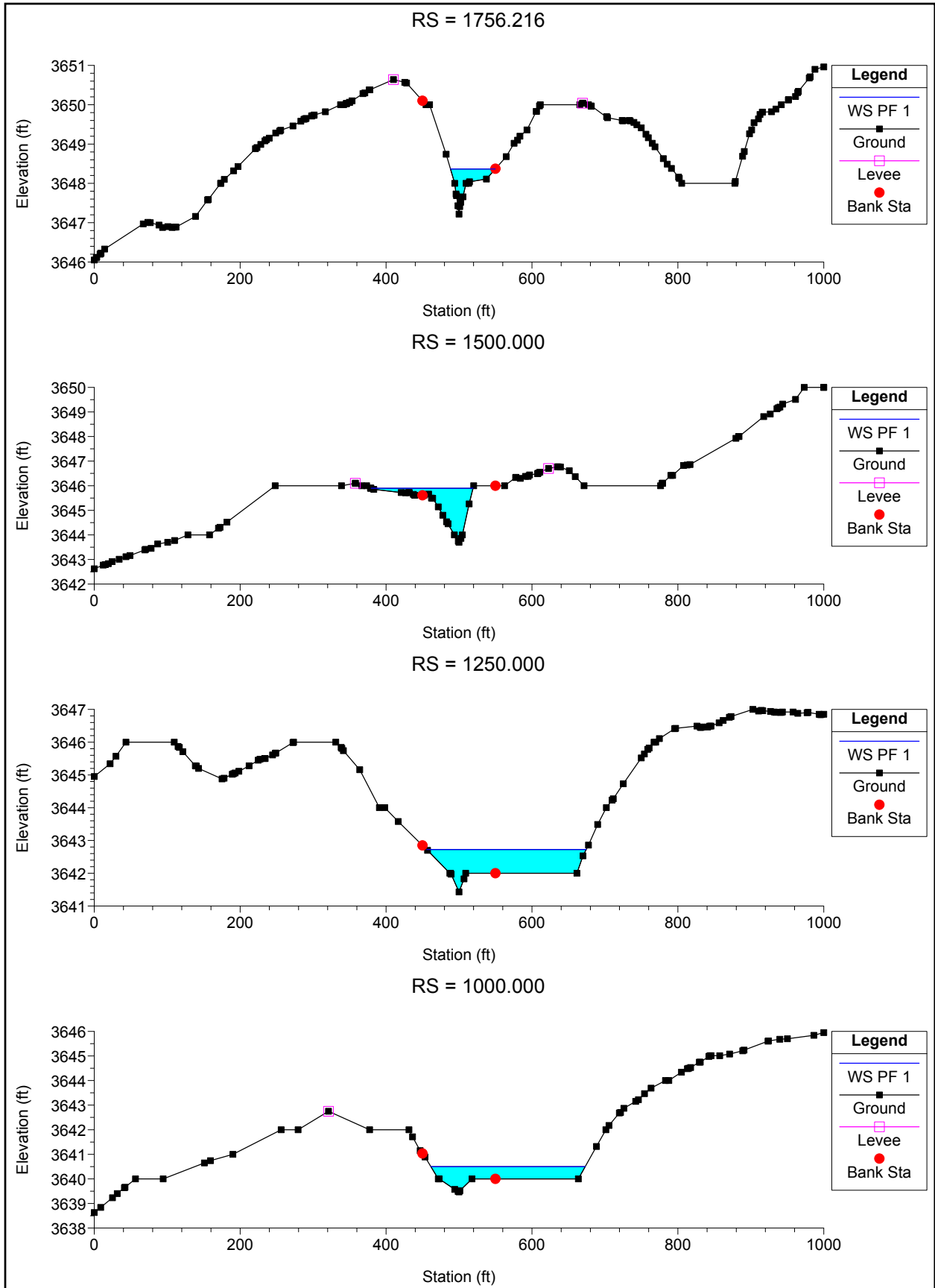


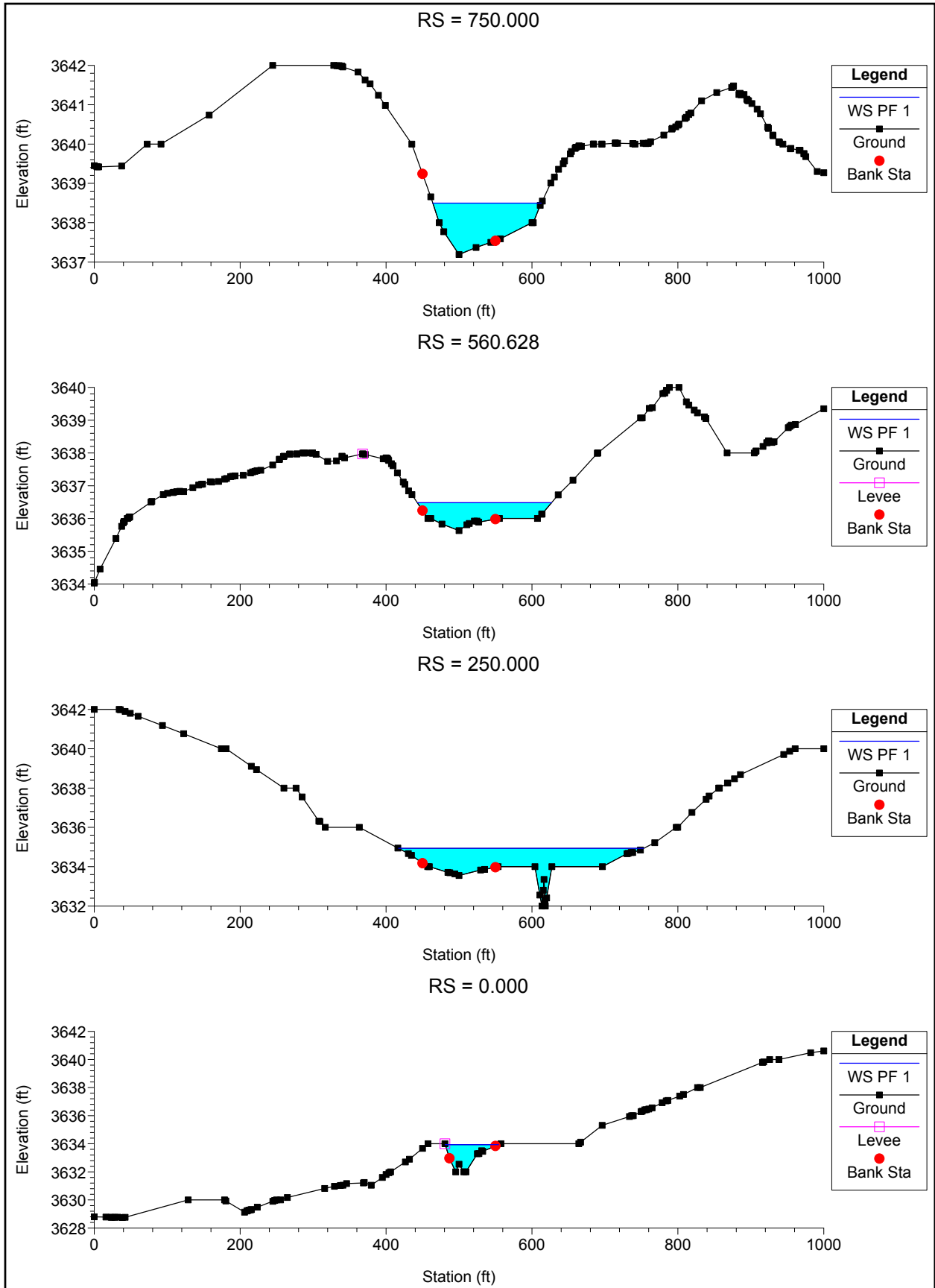










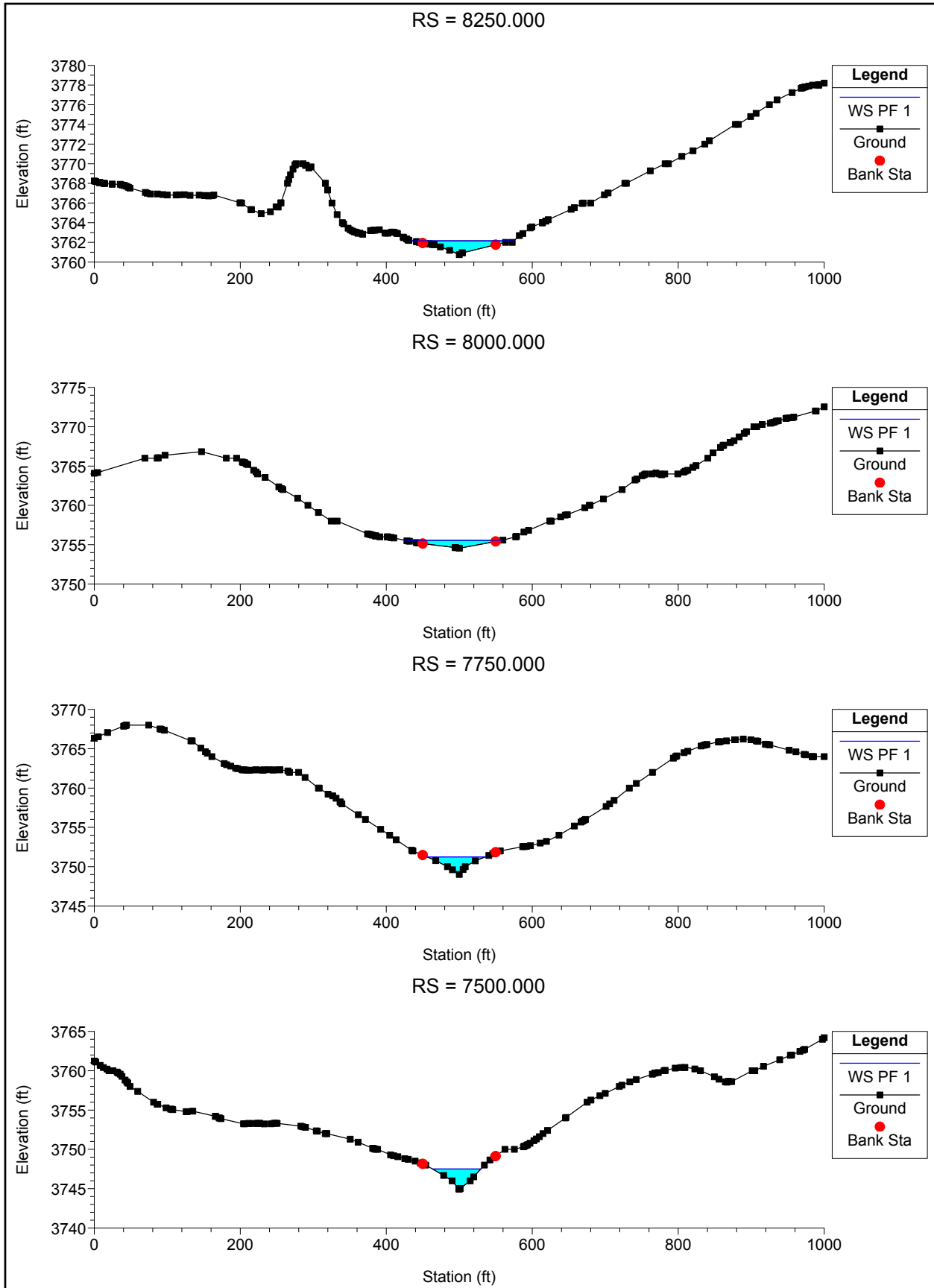


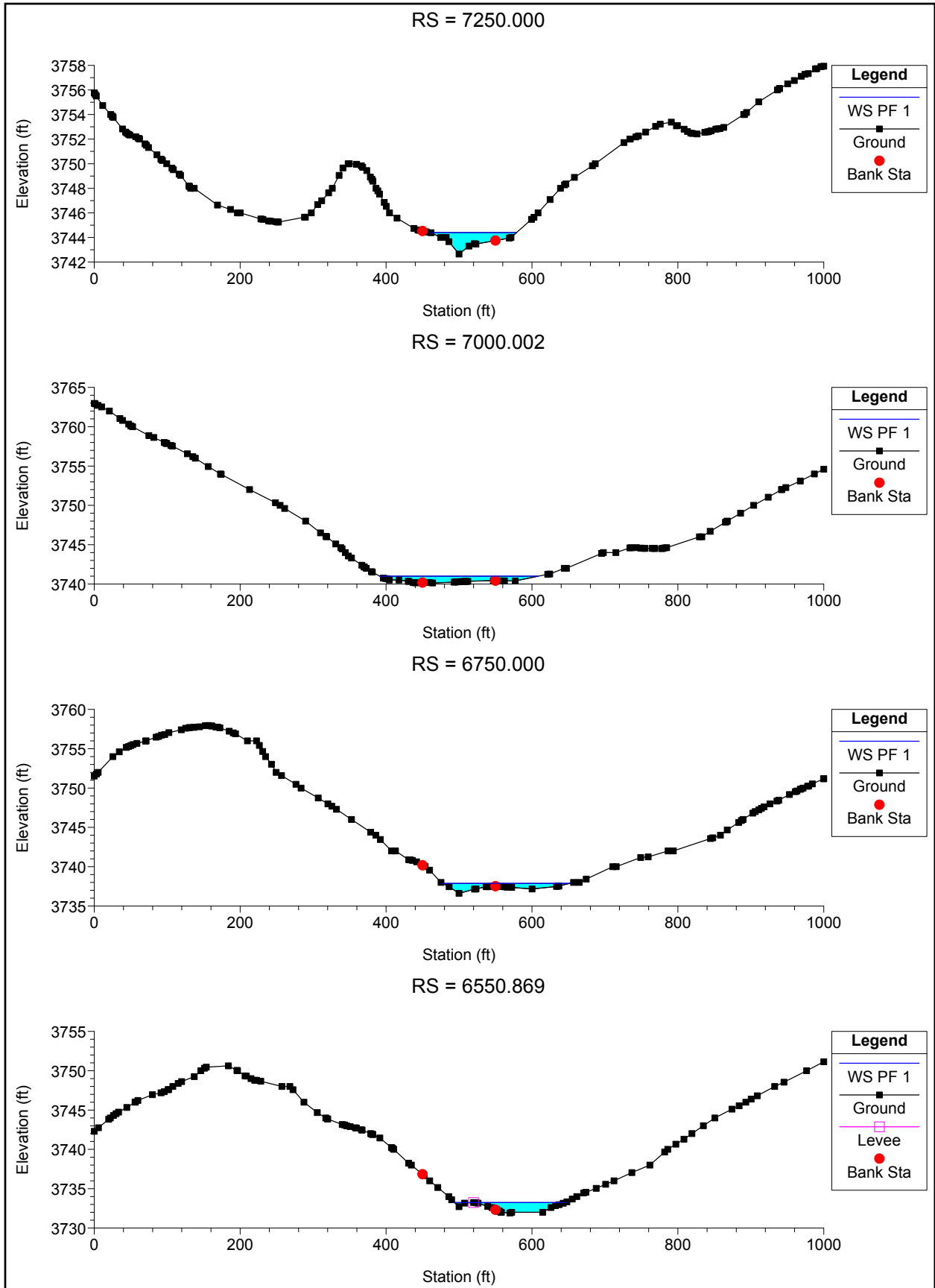
Attachment 2.7-M-17

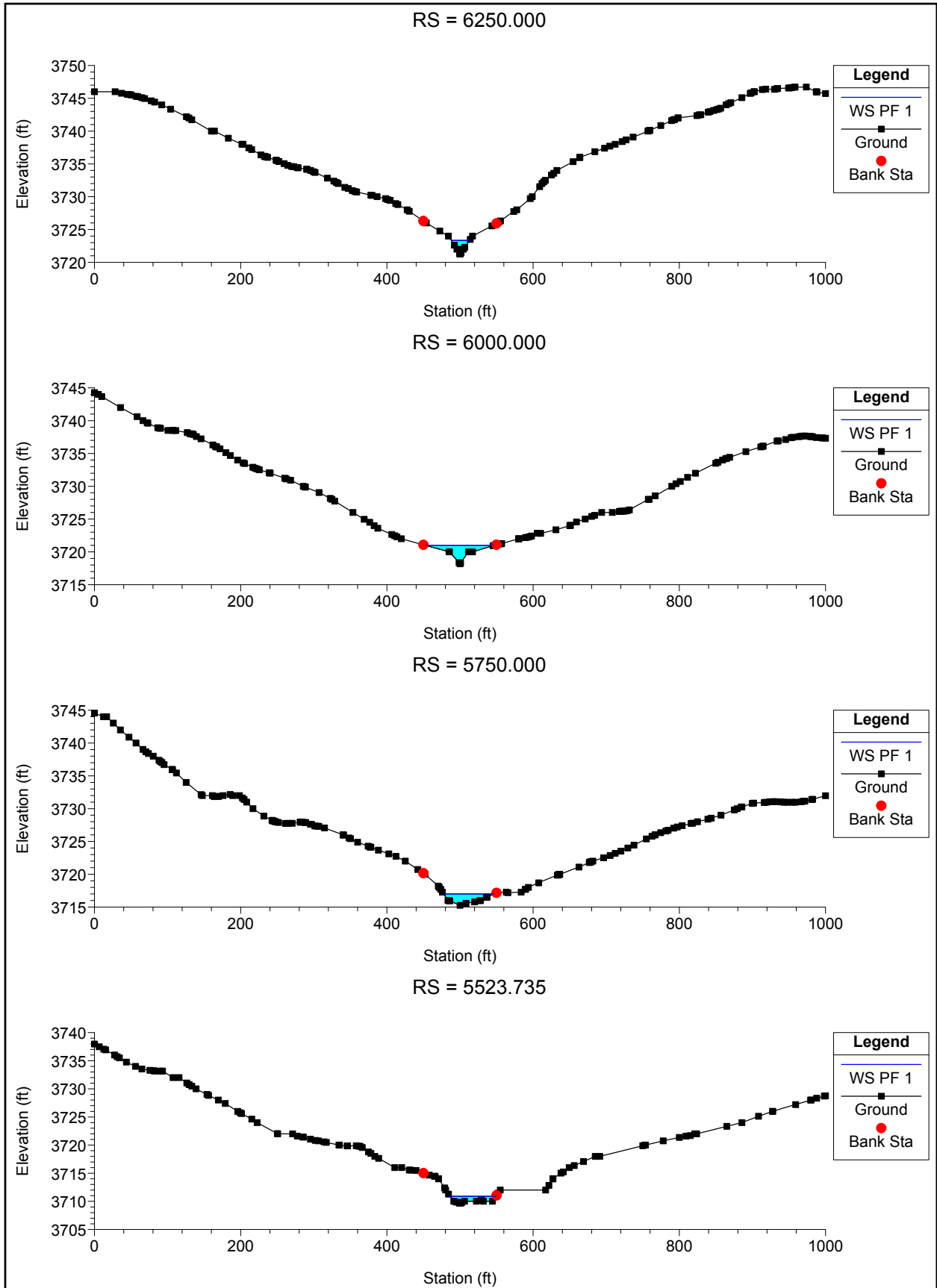
HEC-RAS Channel 09D

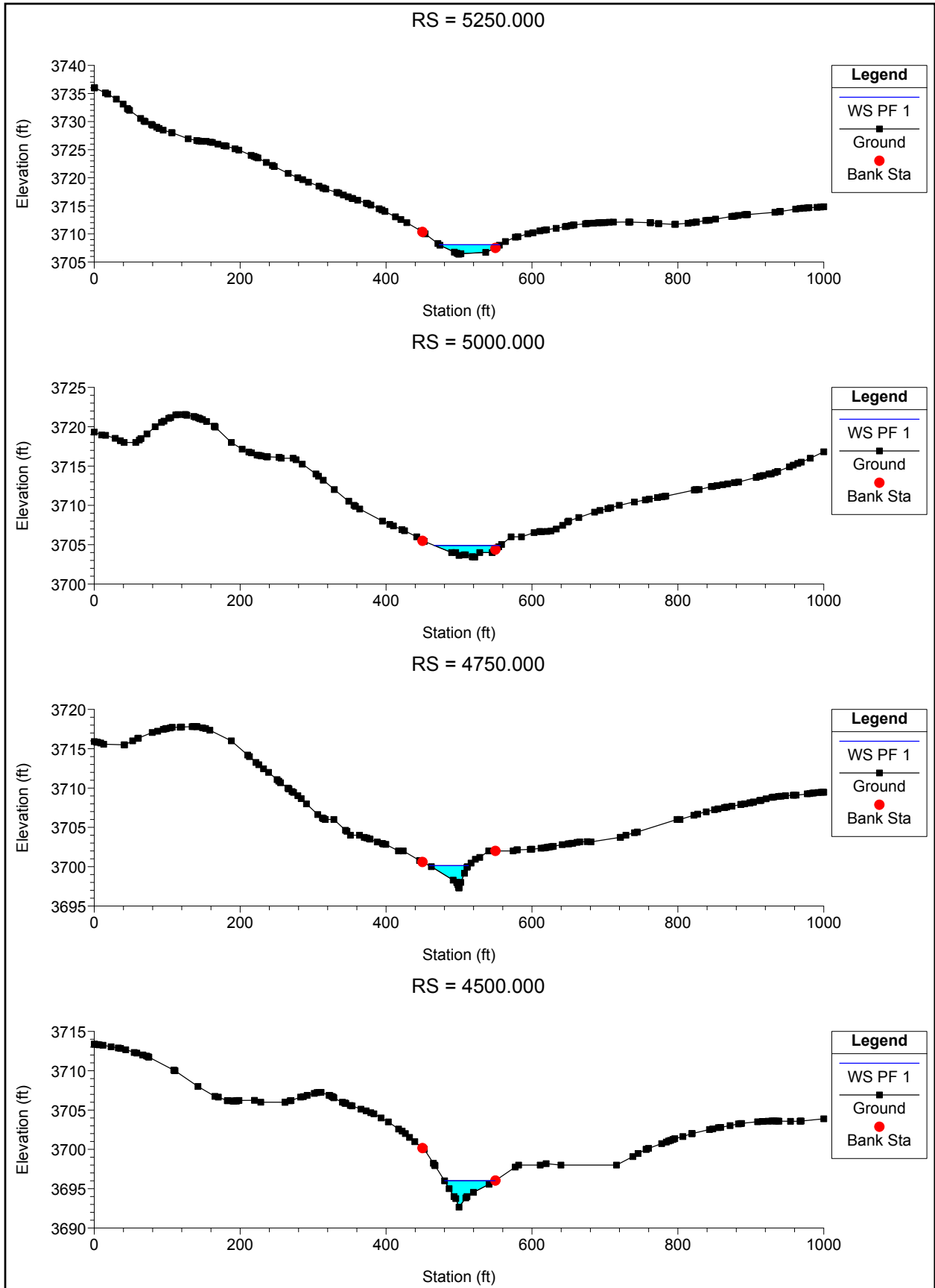


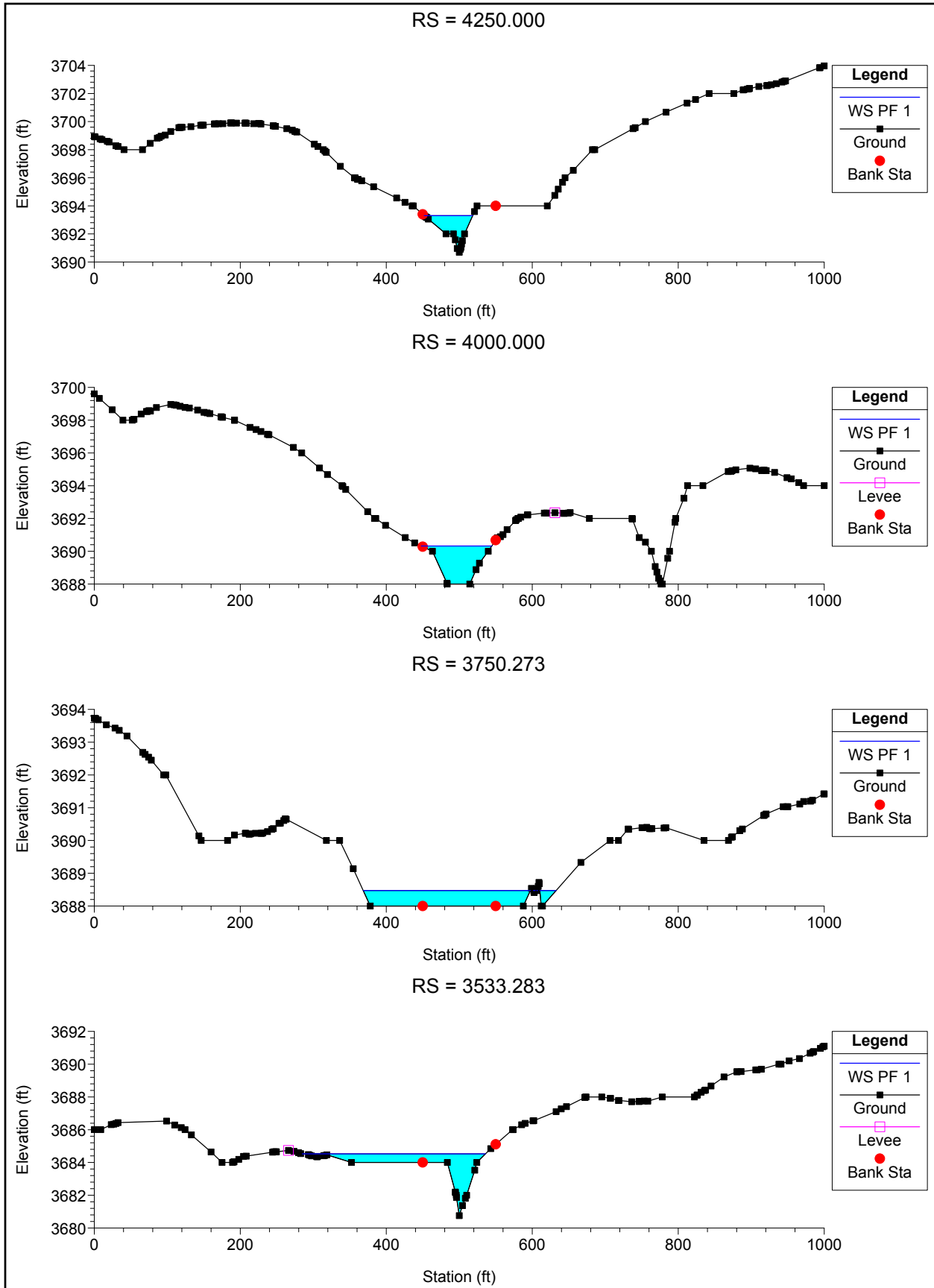
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
09D	8250	PF 1	409	3760.75	3762.16	3762.2	3762.55	0.020022	5.08	84.86	140.47	1.02
09D	8000	PF 1	409	3754.55	3755.56	3755.72	3756.12	0.036943	6.08	70.63	134.07	1.34
09D	7750	PF 1	409	3749.02	3751.24	3751.24	3751.72	0.01899	5.55	73.67	79.56	1.02
09D	7500	PF 1	409	3744.92	3747.51	3747.28	3747.9	0.010552	5	81.81	66.42	0.79
09D	7250	PF 1	409	3742.65	3744.39	3744.39	3744.75	0.017122	4.94	87.21	117.5	0.95
09D	7000.002	PF 1	409	3740.14	3741	3740.88	3741.16	0.01074	3.5	128.88	216.97	0.73
09D	6750	PF 1	409	3736.61	3737.88	3737.88	3738.16	0.01997	4.64	98.24	174.11	0.99
09D	6550.869	PF 1	409	3732.32	3733.25	3733.25	3733.48	0.008591	1.68	112.22	151.68	0.56
09D	6250	PF 1	409	3721.25	3723.35	3724.42	3727.12	0.129936	15.59	26.23	25.14	2.69
09D	6000	PF 1	409	3718.18	3721	3720.9	3721.35	0.013913	4.72	86.6	94.25	0.87
09D	5750	PF 1	409	3715.27	3716.99	3716.99	3717.52	0.018072	5.81	70.38	68.35	1.01
09D	5523.735	PF 1	409	3709.69	3710.91	3711.15	3711.8	0.039093	7.57	54	62.82	1.44
09D	5250	PF 1	409	3706.4	3708.08	3707.84	3708.39	0.008863	4.46	92.8	83.26	0.72
09D	5000	PF 1	409	3703.42	3704.9	3704.9	3705.35	0.018312	5.36	77.34	90.5	0.99
09D	4750	PF 1	409	3697.29	3700.14	3700.17	3700.78	0.018774	6.46	63.35	53.68	1.05
09D	4500	PF 1	409	3692.66	3696.01	3695.5	3696.28	0.006126	4.17	98.12	69.39	0.62
09D	4250	PF 1	409	3690.7	3693.3	3693.3	3693.83	0.017781	5.84	70.02	66.46	1
09D	4000	PF 1	409	3688	3690.32	3689.49	3690.47	0.003438	3.1	131.89	96.6	0.46
09D	3750.273	PF 1	409	3688	3688.47	3688.47	3688.69	0.023016	3.91	109.49	254.03	1
09D	3533.283	PF 1	465	3680.76	3684.53	3684.31	3684.68	0.00495	3.42	170.57	250.97	0.54
09D	3500	PF 1	465	3680.45	3683.96	3683.69	3684.42	0.01031	5.45	85.34	59.51	0.8
09D	3333.751	PF 1	465	3678.59	3681.65	3681.65	3682.26	0.016729	6.25	74.4	60.83	1
09D	3056.921	PF 1	465	3674	3677.86	3677.38	3678.43	0.007894	6.06	76.73	36.43	0.74
09D	2557.588	PF 1	465	3671.54	3674.66	3674.66	3675.16	0.015652	5.76	83.16	87.01	0.95
09D	2306.763	PF 1	465	3670.09	3671.03	3671.07	3671.51	0.02198	5.84	84.67	104.79	1.09
09D	1960.609	PF 1	465	3667.88	3669.8	3669.22	3669.99	0.00406	3.74	137.34	106.2	0.52
09D	1812.084	PF 1	465	3667.16	3668.6	3668.6	3668.97	0.014972	5.35	99.53	124.62	0.92
09D	1604.585	PF 1	465	3666	3667.19	3666.83	3667.3	0.003837	2.86	181.82	202.48	0.47
09D	1500	PF 1	465	3664	3666.33	3666.33	3666.59	0.014565	4.48	122.81	228.23	0.87
09D	1250	PF 1	465	3660.83	3664.04	3663.87	3664.37	0.008468	4.78	111	125.18	0.72
09D	1000	PF 1	465	3658.31	3661.42	3661.42	3661.92	0.017076	5.68	81.93	81.98	0.98
09D	750	PF 1	465	3654.27	3657.11	3657.29	3658.18	0.019664	8.3	56.02	33.47	1.13
09D	481.154	PF 1	465	3651.14	3655.01	3654.43	3655.52	0.00676	5.72	81.27	37.86	0.69
09D	250	PF 1	465	3650	3653.53	3653.07	3653.9	0.007479	4.84	96.13	63.07	0.69
09D	0	PF 1	465	3650	3651.32	3651.32	3651.67	0.011009	4.87	107.25	163.82	0.8

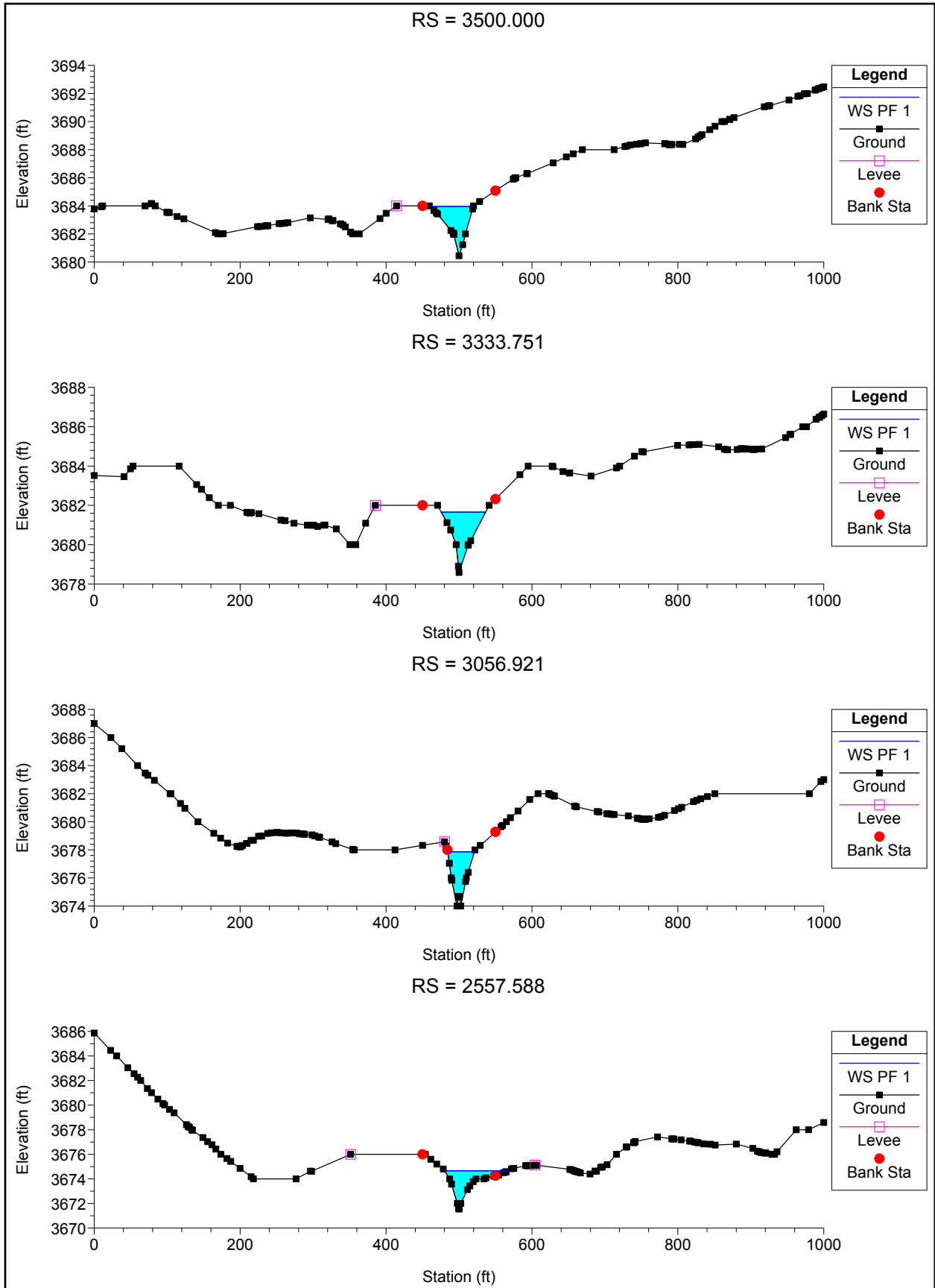


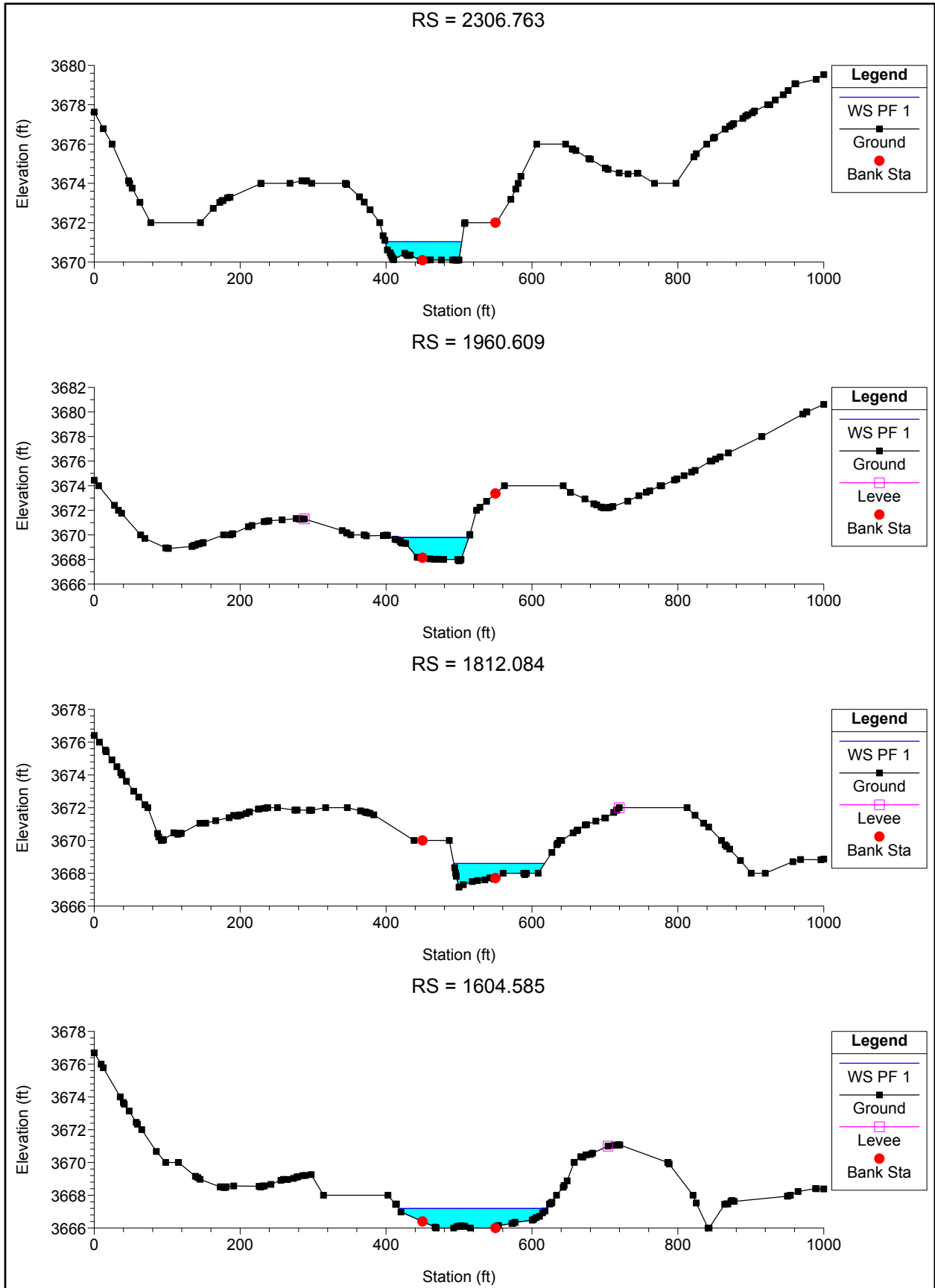


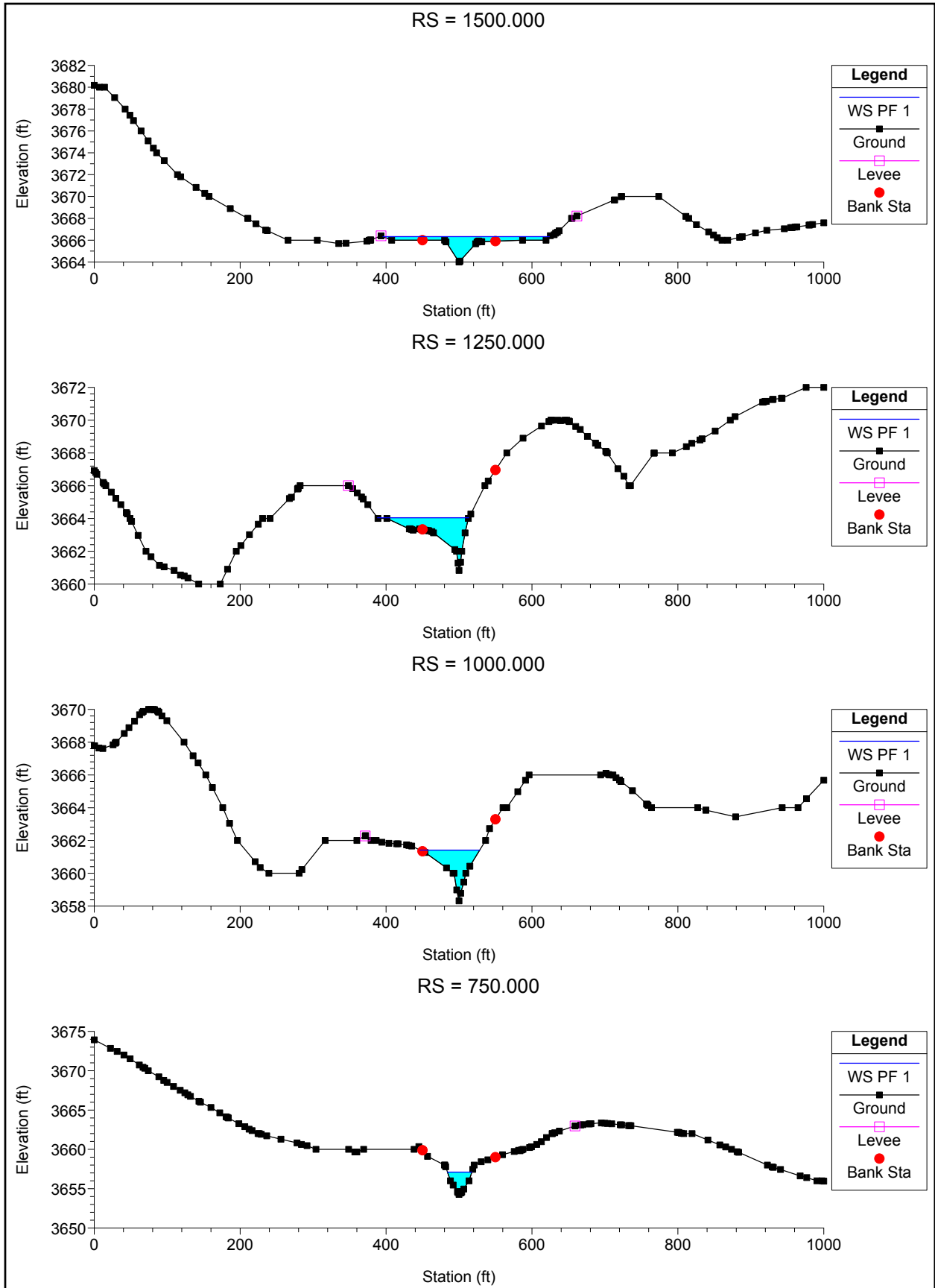


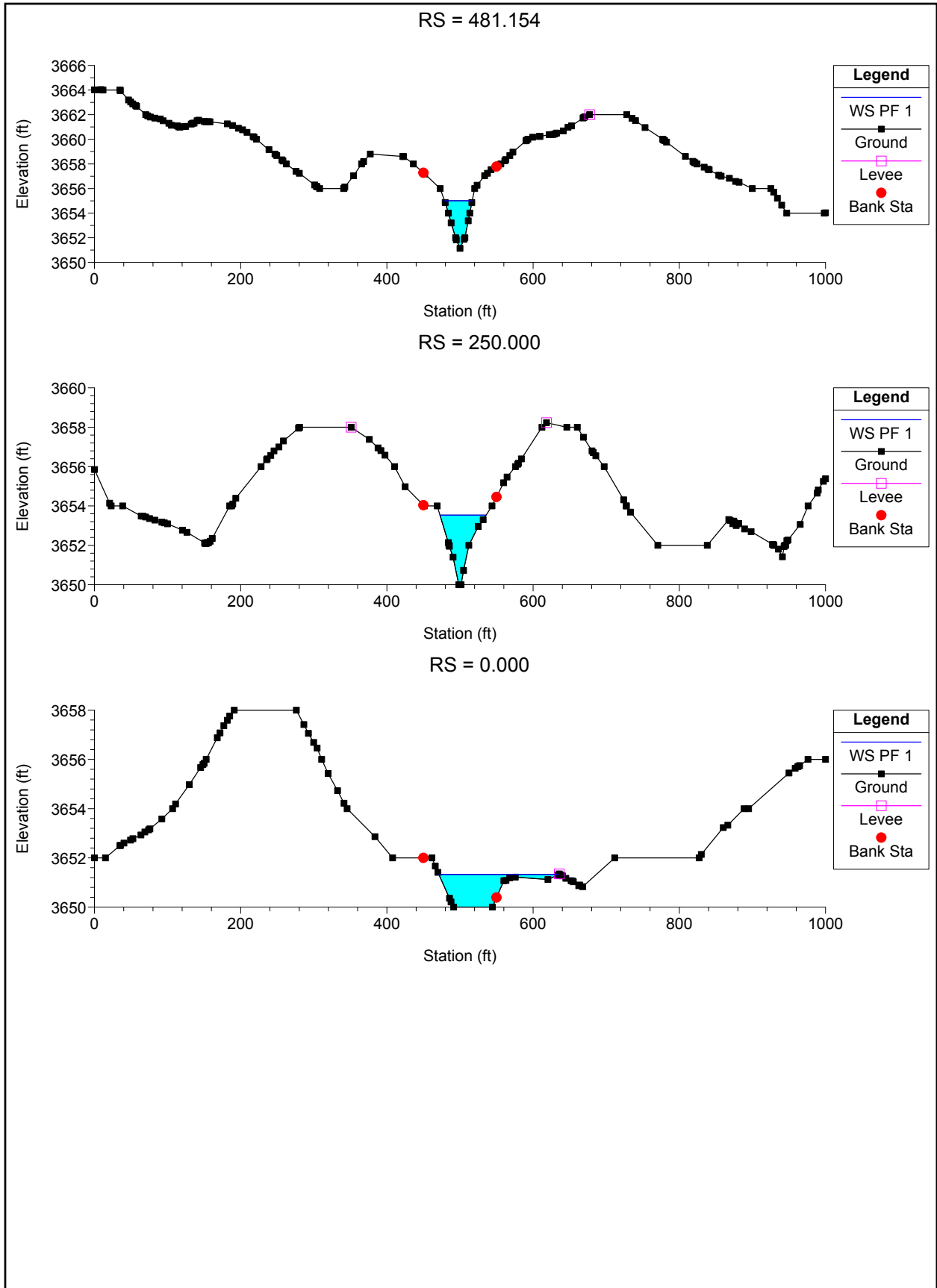










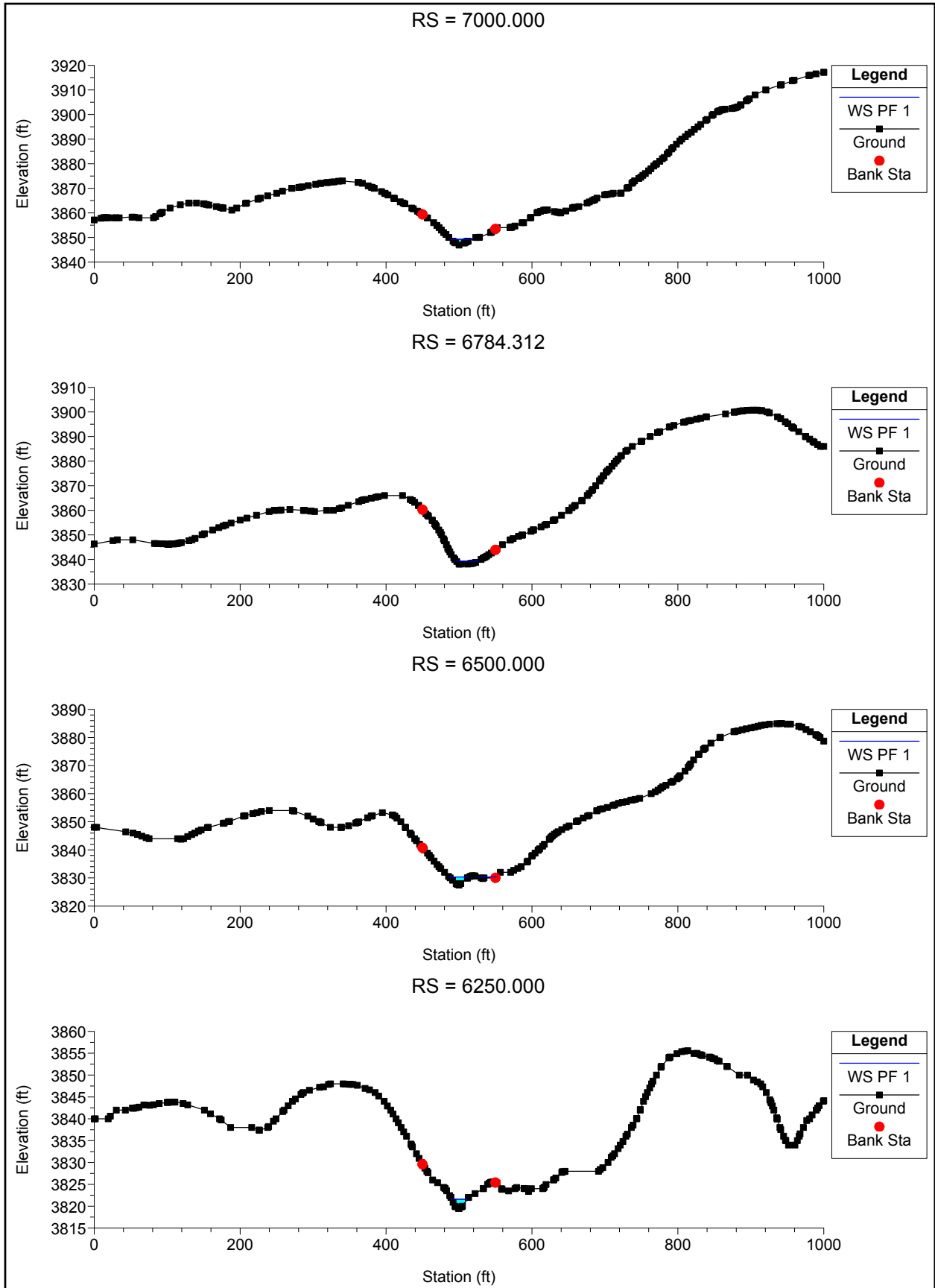


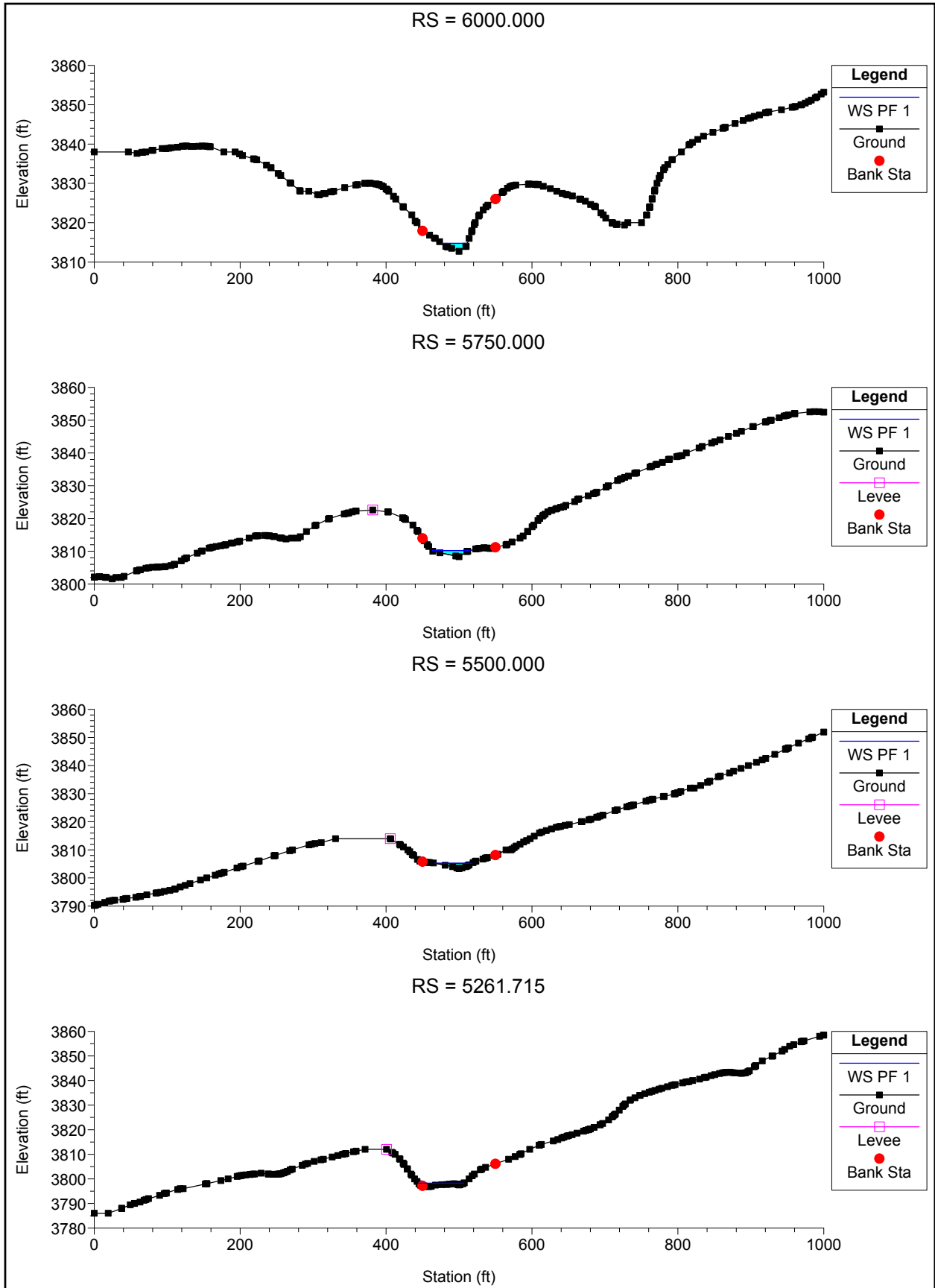
Attachment 2.7-M-18

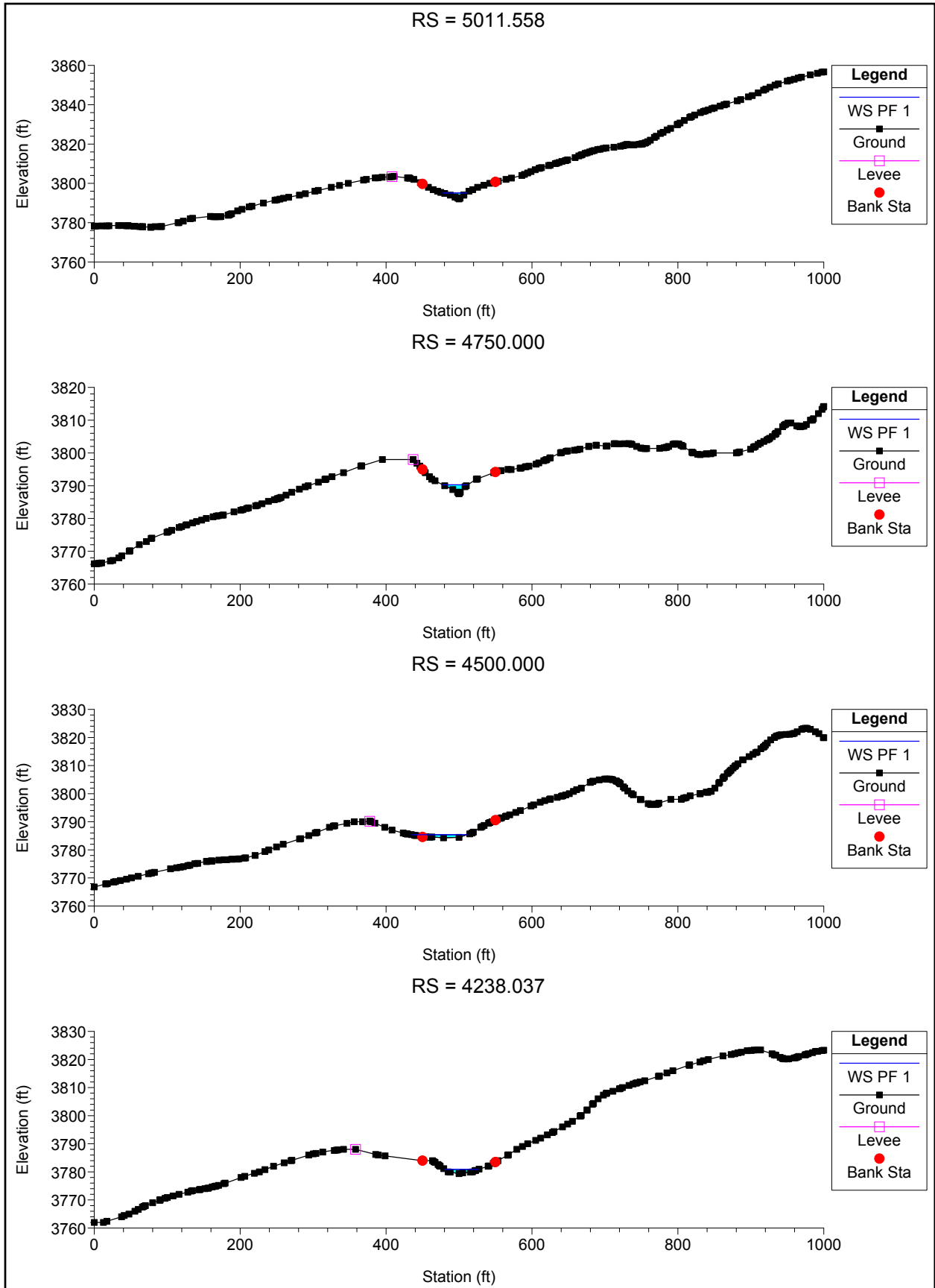
HEC-RAS Channel 09E

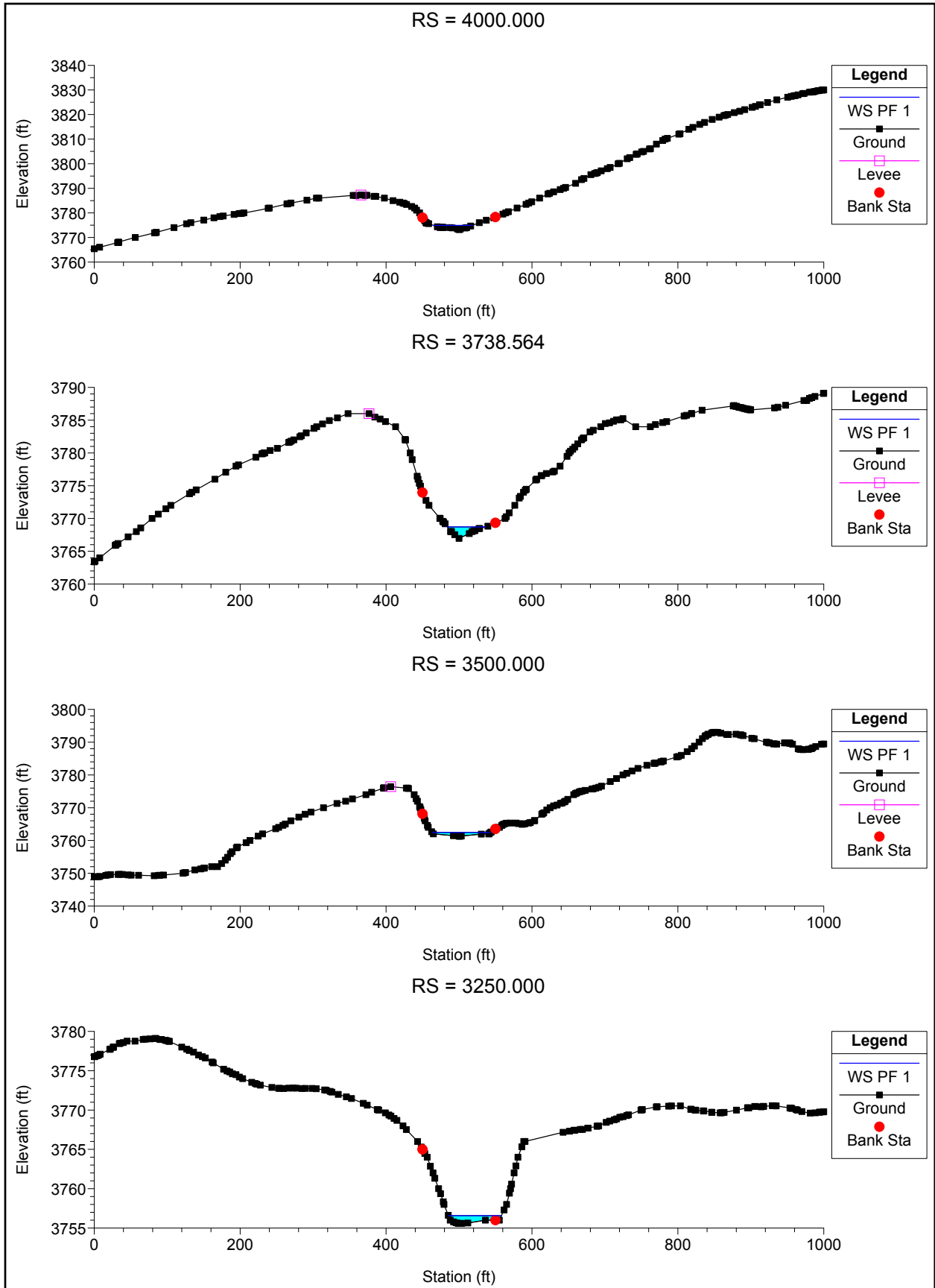


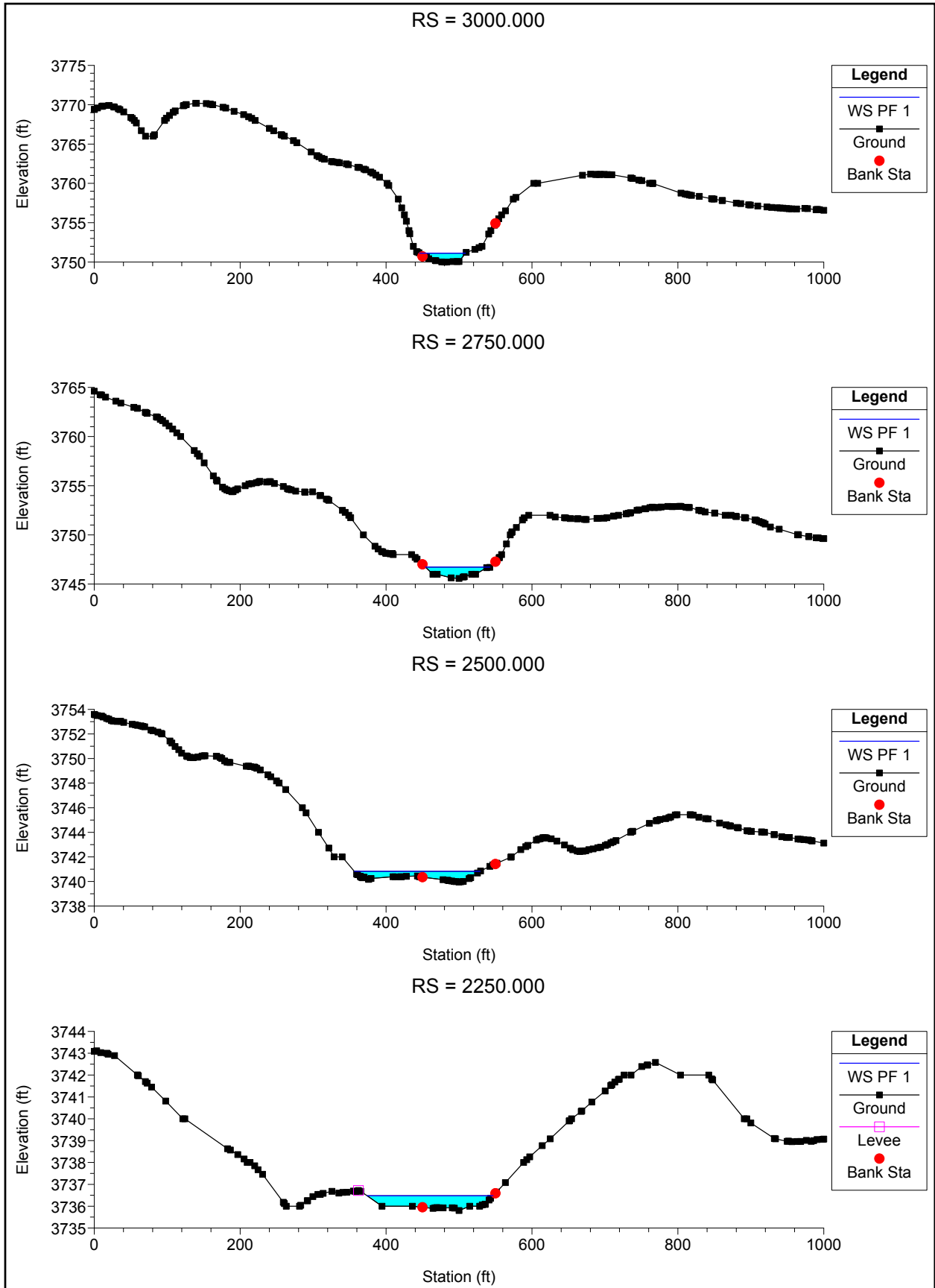
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
09E	7000	PF 1	308	3846.91	3849.26	3849.56	3850.4	0.031027	8.57	35.93	28.86	1.35
09E	6784.312	PF 1	308	3838.1	3839.35	3839.93	3841.24	0.075238	11.03	27.93	30.04	2.02
09E	6500	PF 1	308	3827.47	3830.35	3830.44	3830.96	0.023651	6.28	49.27	52.81	1.13
09E	6250	PF 1	308	3819.45	3821.62	3822.19	3823.36	0.043489	10.61	29.04	21.61	1.61
09E	6000	PF 1	308	3812.73	3814.76	3814.93	3815.63	0.025031	7.46	41.27	34.89	1.21
09E	5750	PF 1	308	3808.34	3810.21	3810.3	3810.8	0.022177	6.15	50.1	52.06	1.1
09E	5500	PF 1	308	3803.29	3805.25	3805.34	3805.85	0.02221	6.18	49.87	51.53	1.11
09E	5261.715	PF 1	308	3796.89	3798.23	3798.45	3799.03	0.046726	7.2	42.94	61.93	1.52
09E	5011.558	PF 1	308	3792.11	3795.14	3795.14	3795.85	0.016531	6.73	45.74	32.74	1
09E	4750	PF 1	308	3787.59	3790.28	3790.46	3791.13	0.023719	7.41	41.56	33.95	1.18
09E	4500	PF 1	308	3784.28	3785.37	3785.44	3785.84	0.02215	5.65	56.84	75.28	1.08
09E	4238.037	PF 1	308	3779.34	3780.88	3781.05	3781.64	0.028763	6.99	44.07	45.92	1.26
09E	4000	PF 1	308	3773.18	3774.91	3775.02	3775.53	0.025473	6.34	48.59	53.54	1.17
09E	3738.564	PF 1	308	3766.97	3768.72	3768.93	3769.47	0.033798	6.96	44.28	52.48	1.33
09E	3500	PF 1	308	3761.29	3762.43	3762.48	3762.87	0.023628	5.29	58.27	79.83	1.09
09E	3250	PF 1	308	3755.57	3756.58	3756.68	3757.12	0.028957	5.98	52.54	72.7	1.21
09E	3000	PF 1	308	3750	3751.12	3751.2	3751.68	0.024664	6.03	51.66	63.11	1.15
09E	2750	PF 1	308	3745.57	3746.72	3746.72	3747.09	0.020356	4.85	63.46	88.43	1.01
09E	2500	PF 1	308	3739.95	3740.83	3740.77	3741.01	0.014613	3.71	90.85	172.44	0.83
09E	2250	PF 1	308	3735.8	3736.48	3736.48	3736.71	0.022464	4.01	80.33	172.83	1
09E	2000	PF 1	308	3731.29	3731.42	3731.42	3731.42	0.000069	0.05	674.75	503.23	0.04
09E	1814.563	PF 1	308	3730	3727.62	3728.04	3731.04	0.626552		20.78	81.46	0
09E	1750	PF 1	403	3726	3727.23	3727.11	3727.57	0.011859	4.7	87.42	94.83	0.82
09E	1500	PF 1	403	3721.91	3724.36	3724.36	3724.7	0.014333	4.8	91.88	138.4	0.88
09E	1250	PF 1	403	3715.56	3717.89	3718.42	3719.26	0.038261	9.39	42.91	35.34	1.5
09E	1000	PF 1	403	3710.02	3712.87	3712.87	3713.64	0.015765	7.07	57	36.84	1
09E	750	PF 1	403	3705.55	3707.84	3707.25	3708.02	0.004233	3.44	117.67	88.16	0.51
09E	500	PF 1	403	3703.23	3706.45		3706.7	0.008026	4.23	115.35	180.85	0.69
09E	250	PF 1	403	3700.6	3703.32	3703.32	3703.96	0.016299	6.4	63.01	48.82	0.99
09E	0	PF 1	403	3698.48	3700.29	3700.06	3700.55	0.008007	4.17	102.14	108.06	0.69

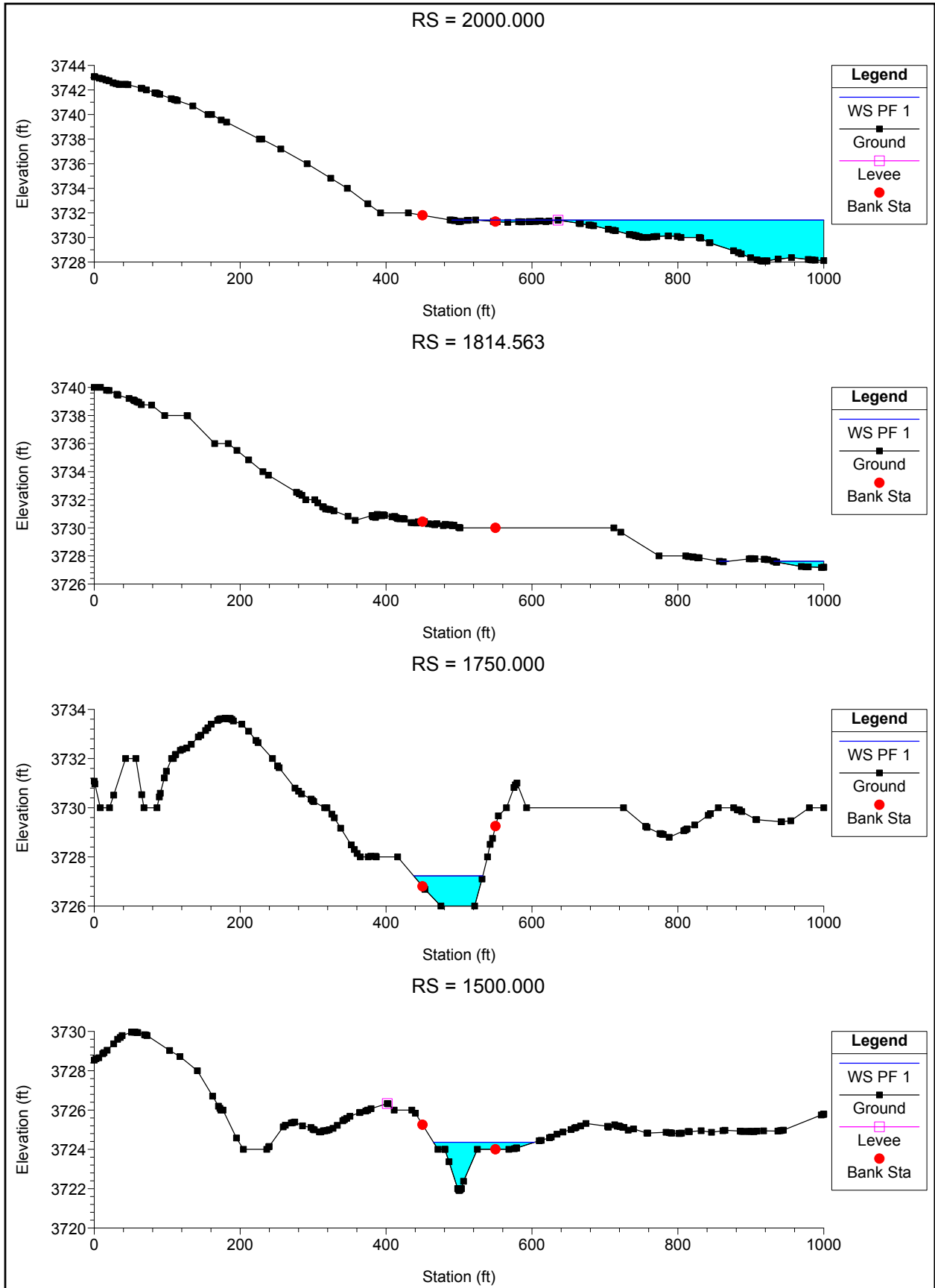


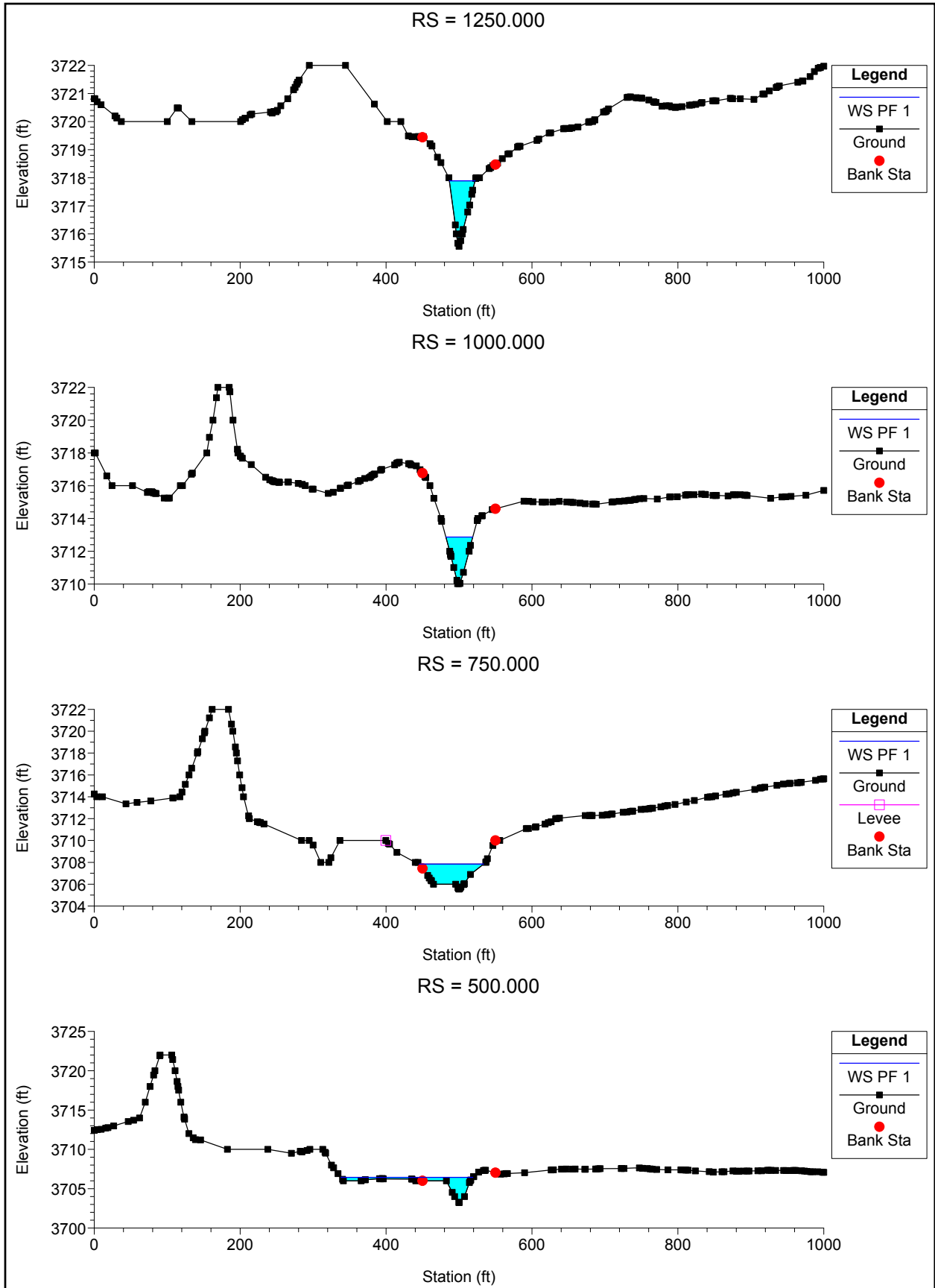


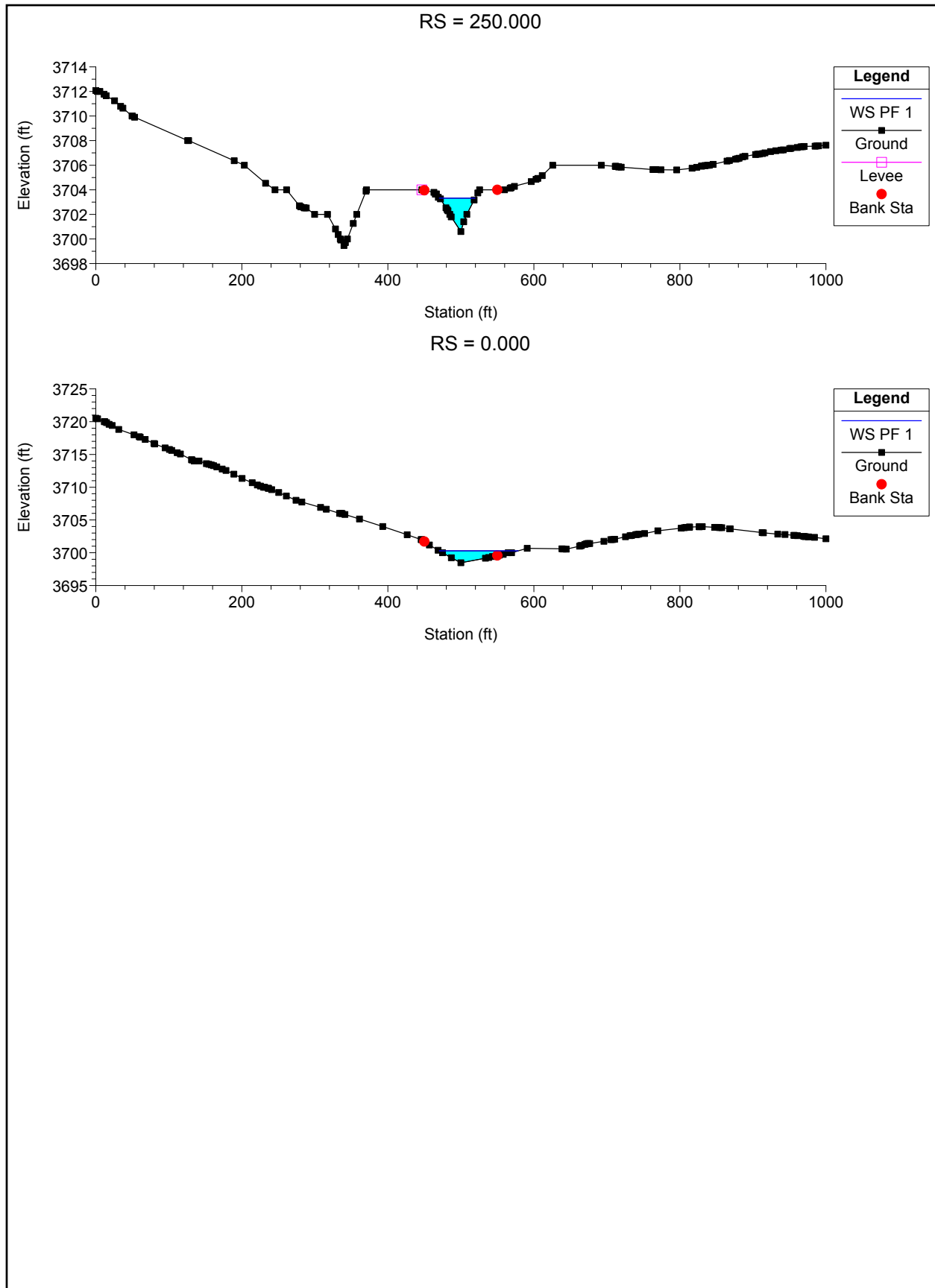










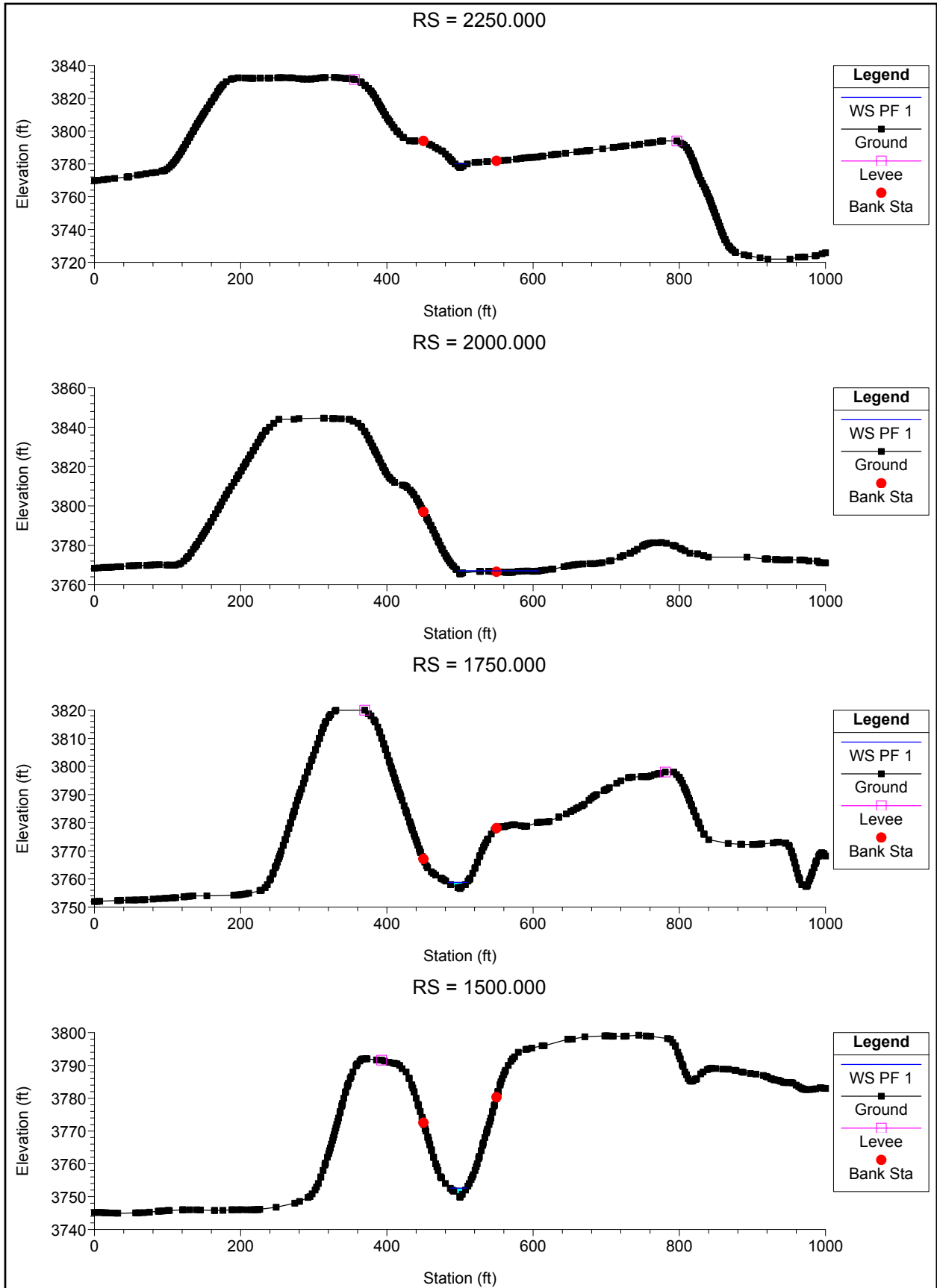


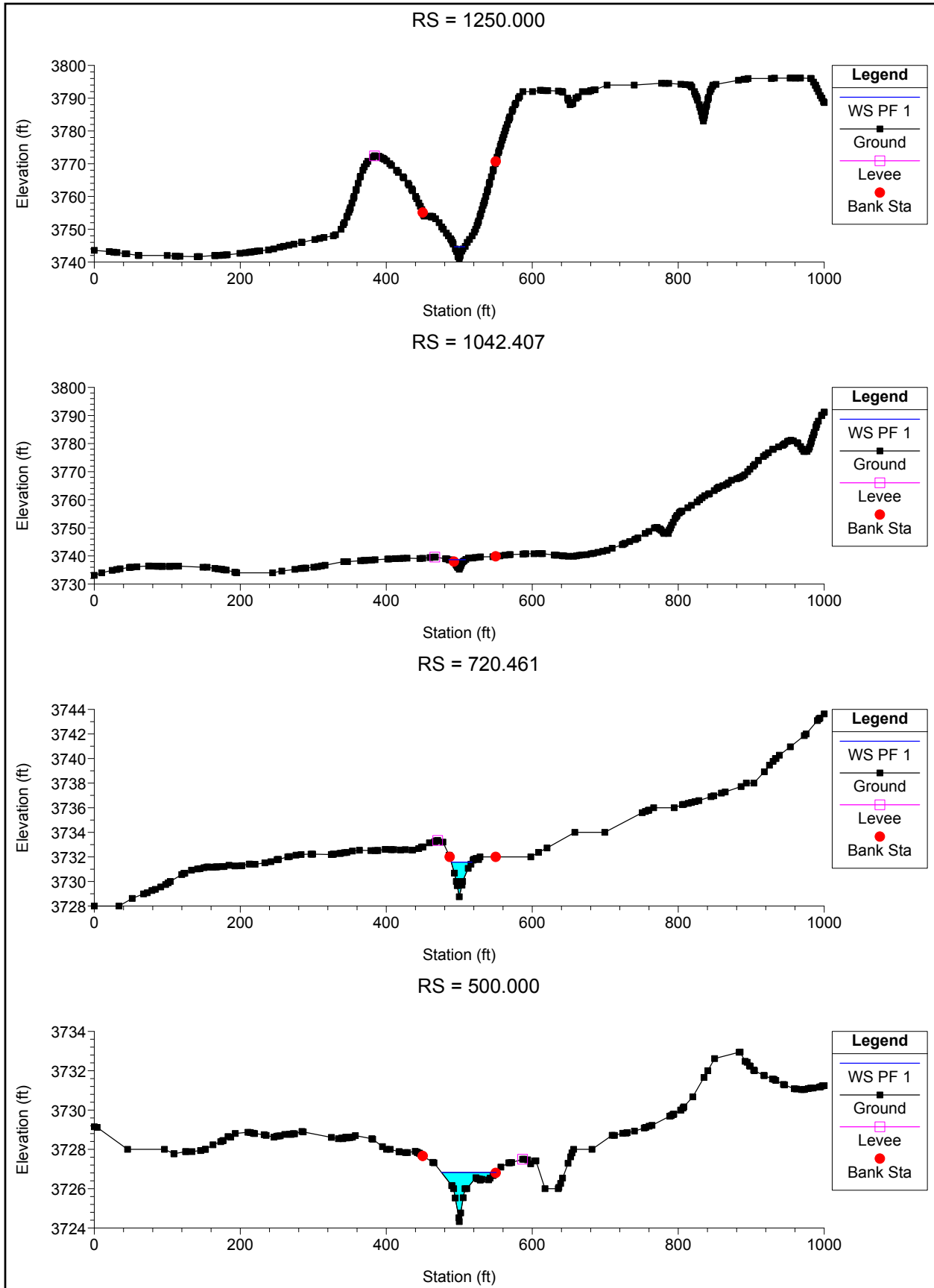
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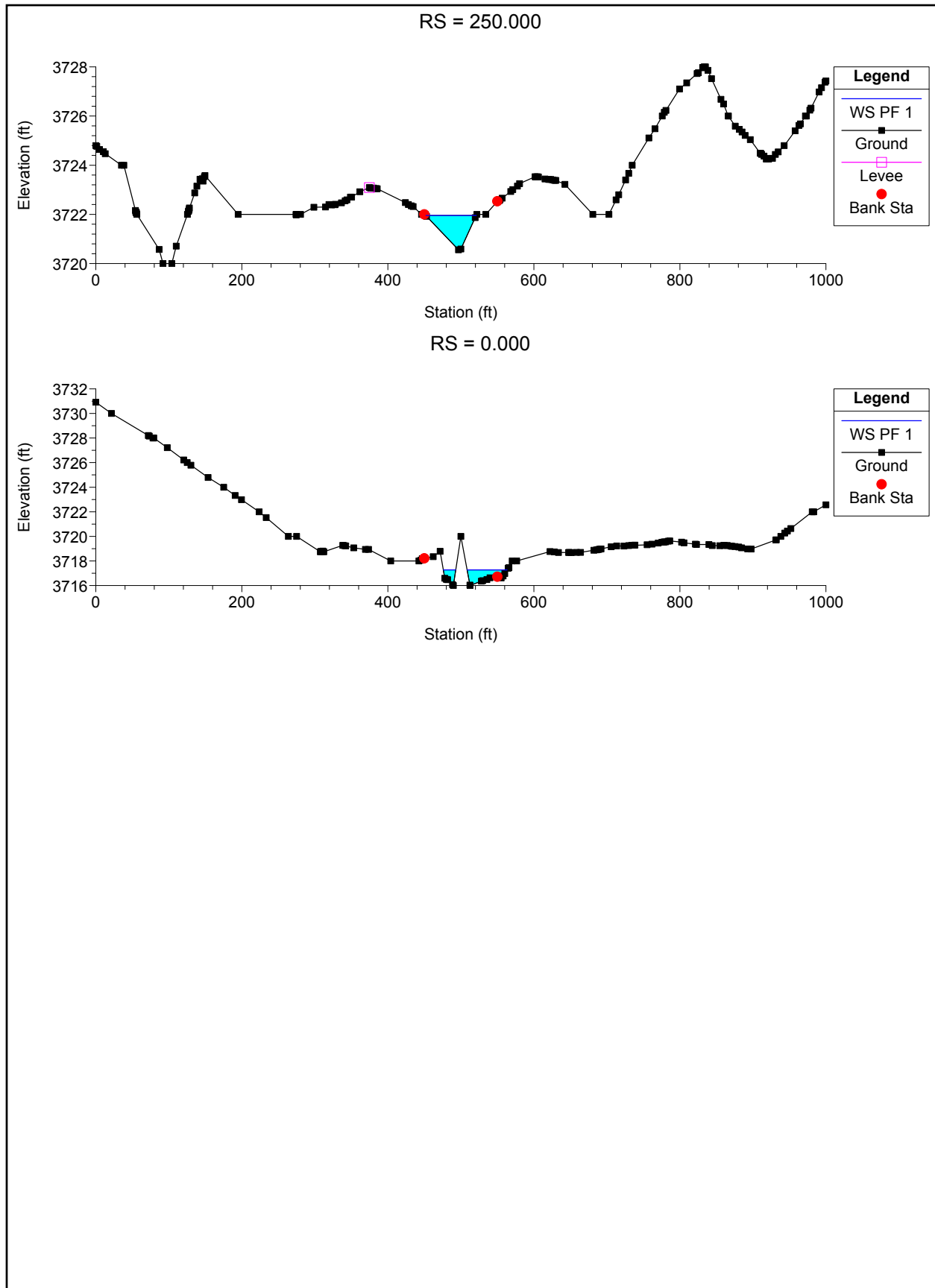
HEC-RAS Channel 09F



Reach	River Sta	Profile	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)	
09F	2250	PF 1	240	3777.75	3780.01	3780.82	3782.52	0.080034	12.71	18.89	16.72	2.11
09F	2000	PF 1	240	3765.45	3767.01	3767.1	3767.43	0.044582	5.57	47.07	111.52	1.4
09F	1750	PF 1	240	3756.6	3758.77	3758.97	3759.66	0.025537	7.57	31.69	26.45	1.22
09F	1500	PF 1	240	3749.83	3752.6	3752.81	3753.56	0.023985	7.87	30.51	22.53	1.19
09F	1250	PF 1	240	3741.17	3744.66	3745.2	3746.4	0.039258	10.59	22.66	14.28	1.48
09F	1042.407	PF 1	240	3735.25	3738.67	3739.13	3739.92	0.025979	9.05	27.79	23.1	1.24
09F	720.461	PF 1	240	3728.76	3731.57	3731.73	3732.36	0.023214	7.13	33.67	28.47	1.16
09F	500	PF 1	240	3724.33	3726.83	3726.86	3727.2	0.023558	4.91	48.88	74.91	1.07
09F	250	PF 1	240	3720.56	3721.96	3721.96	3722.31	0.019588	4.8	50.02	68.88	0.99
09F	0	PF 1	240	3716	3717.27	3717.21	3717.58	0.01502	4.57	54.5	71.61	0.88





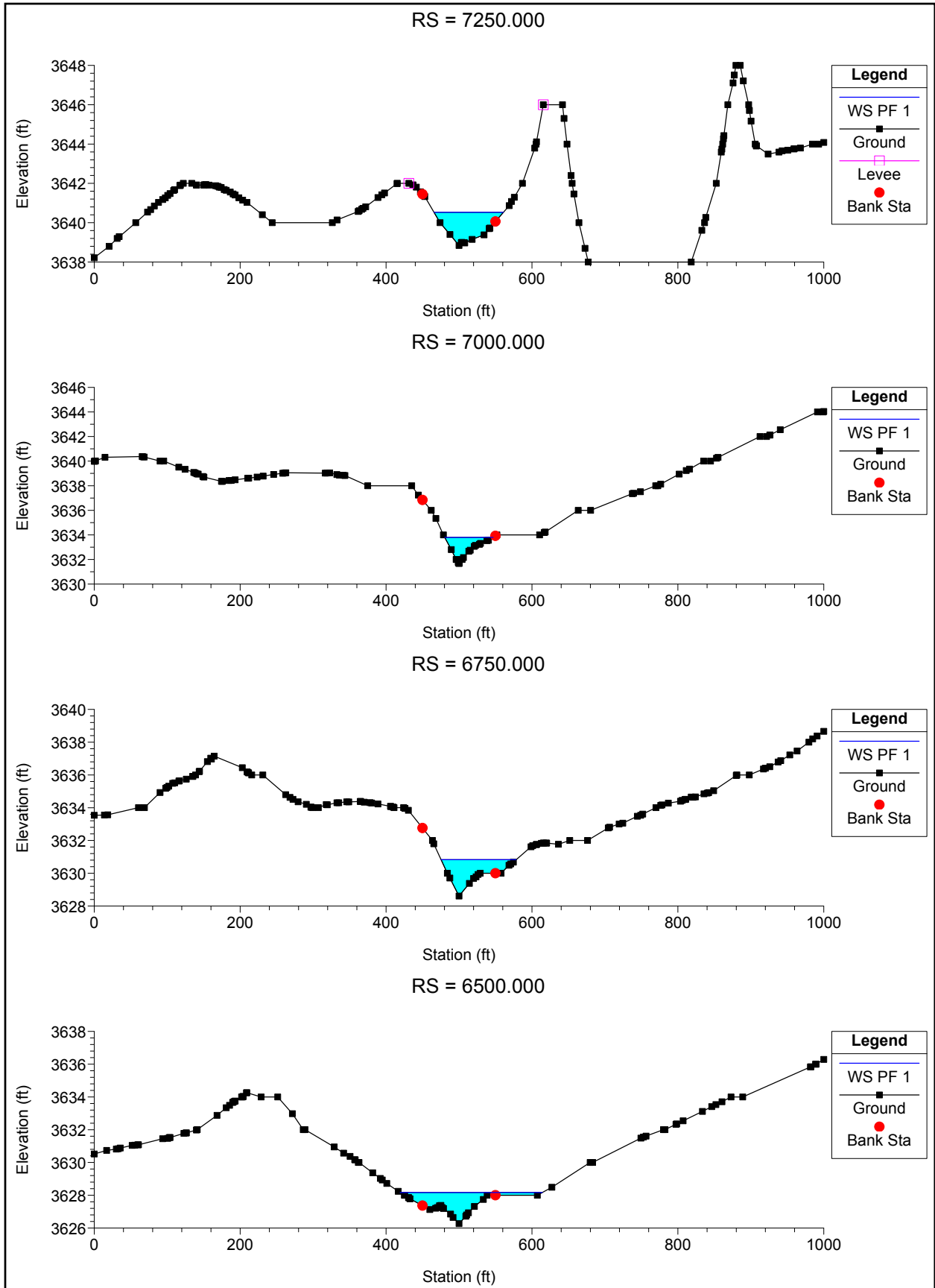


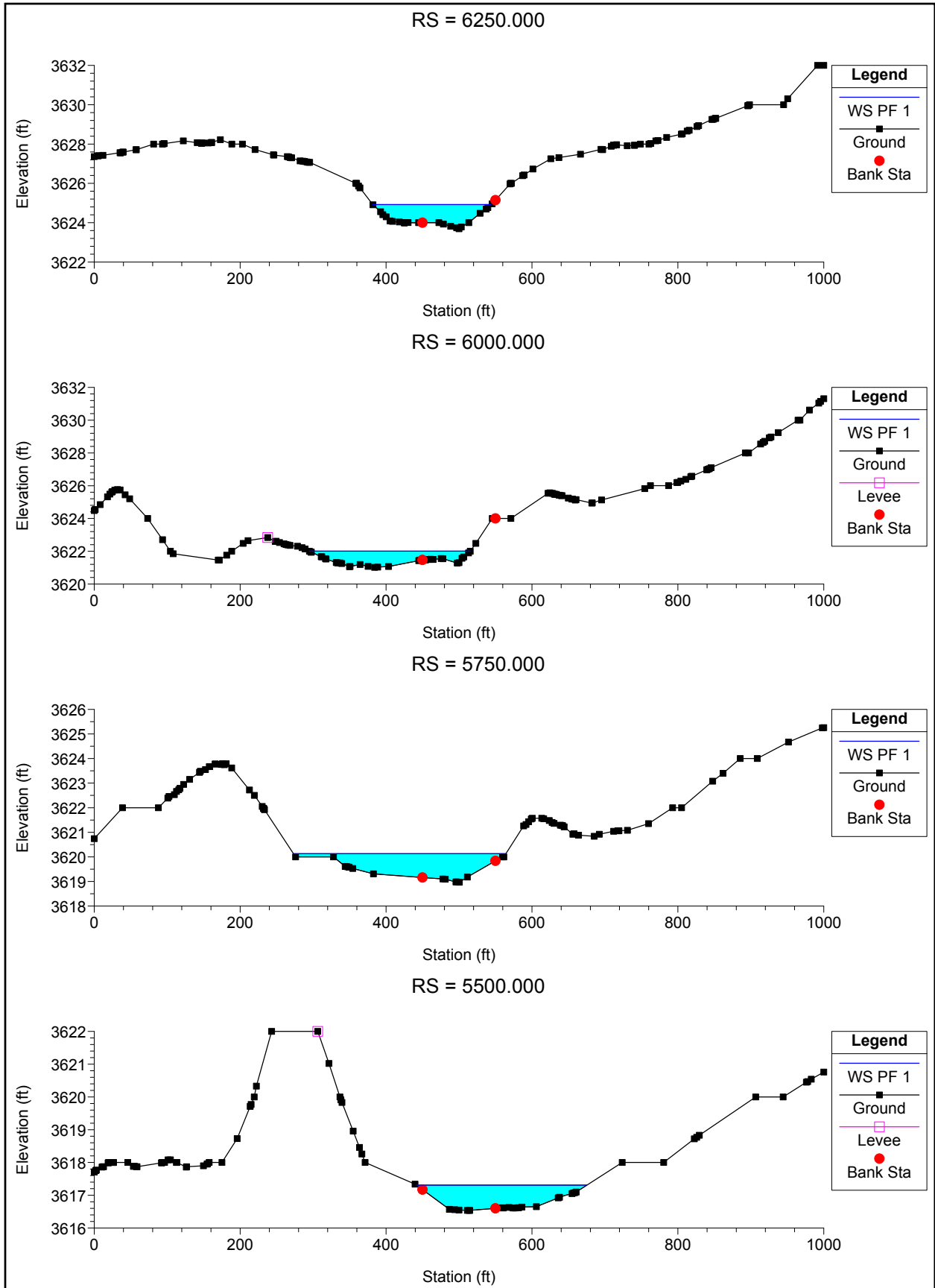
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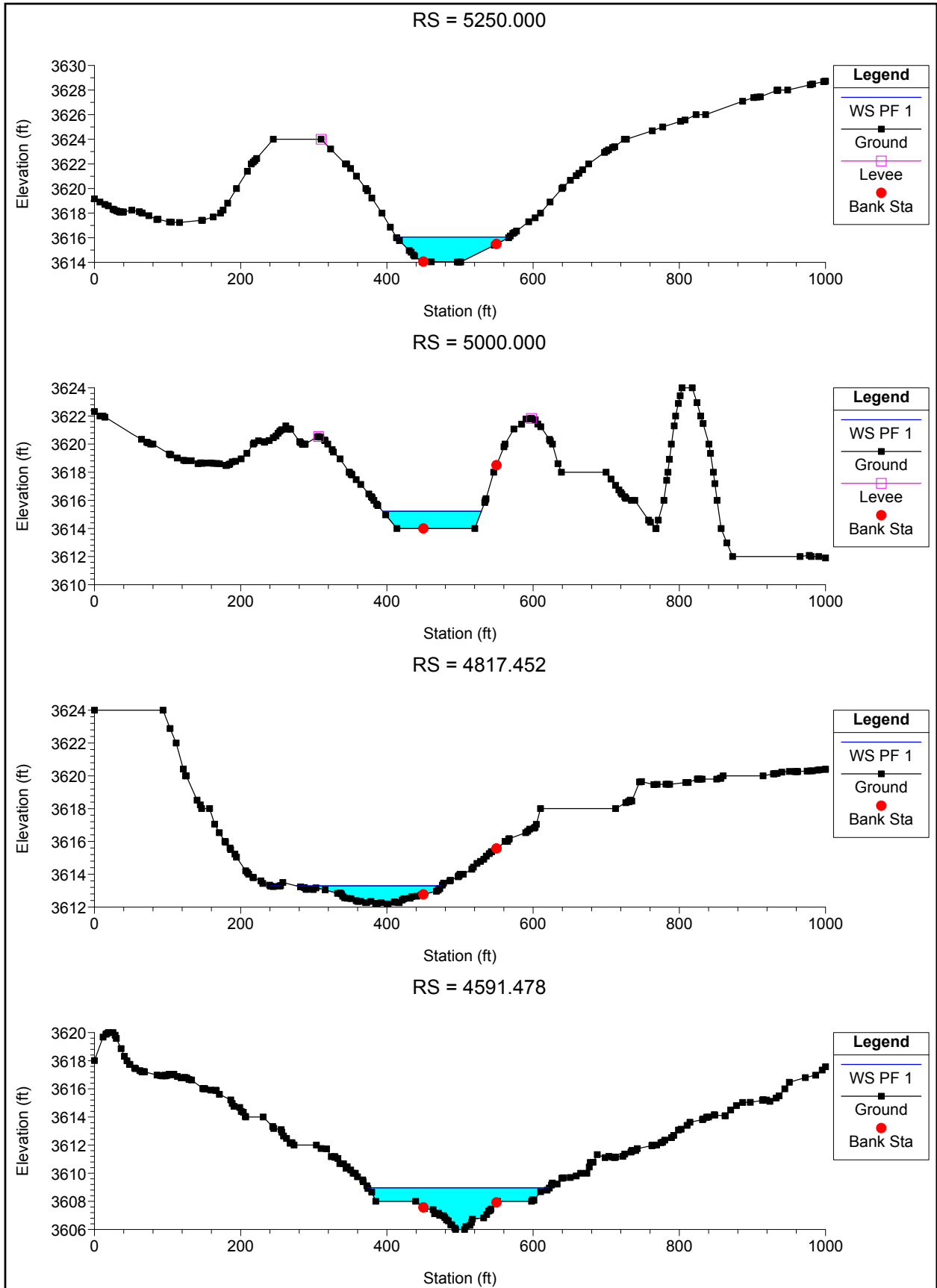
HEC-RAS Channel 10

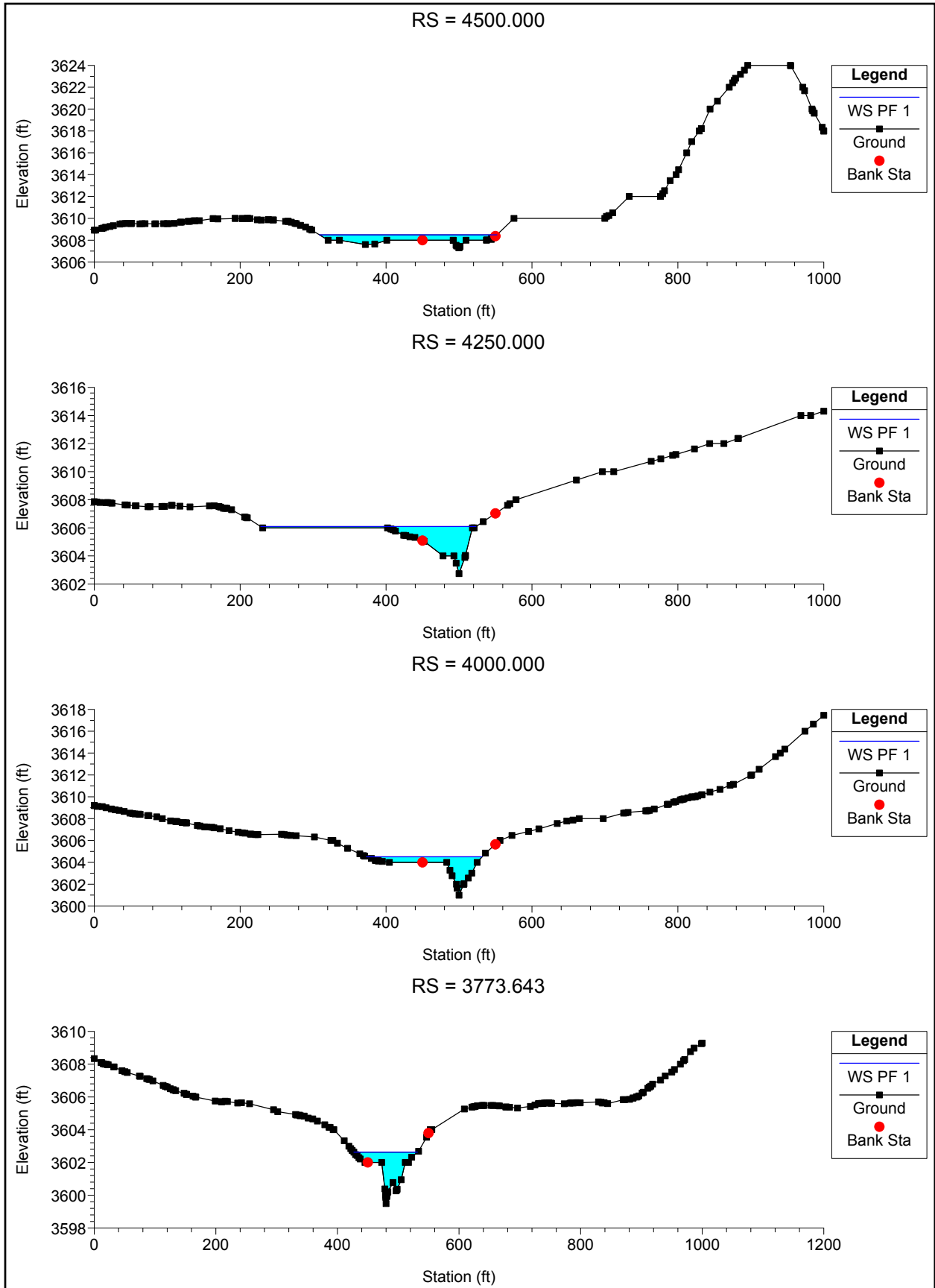


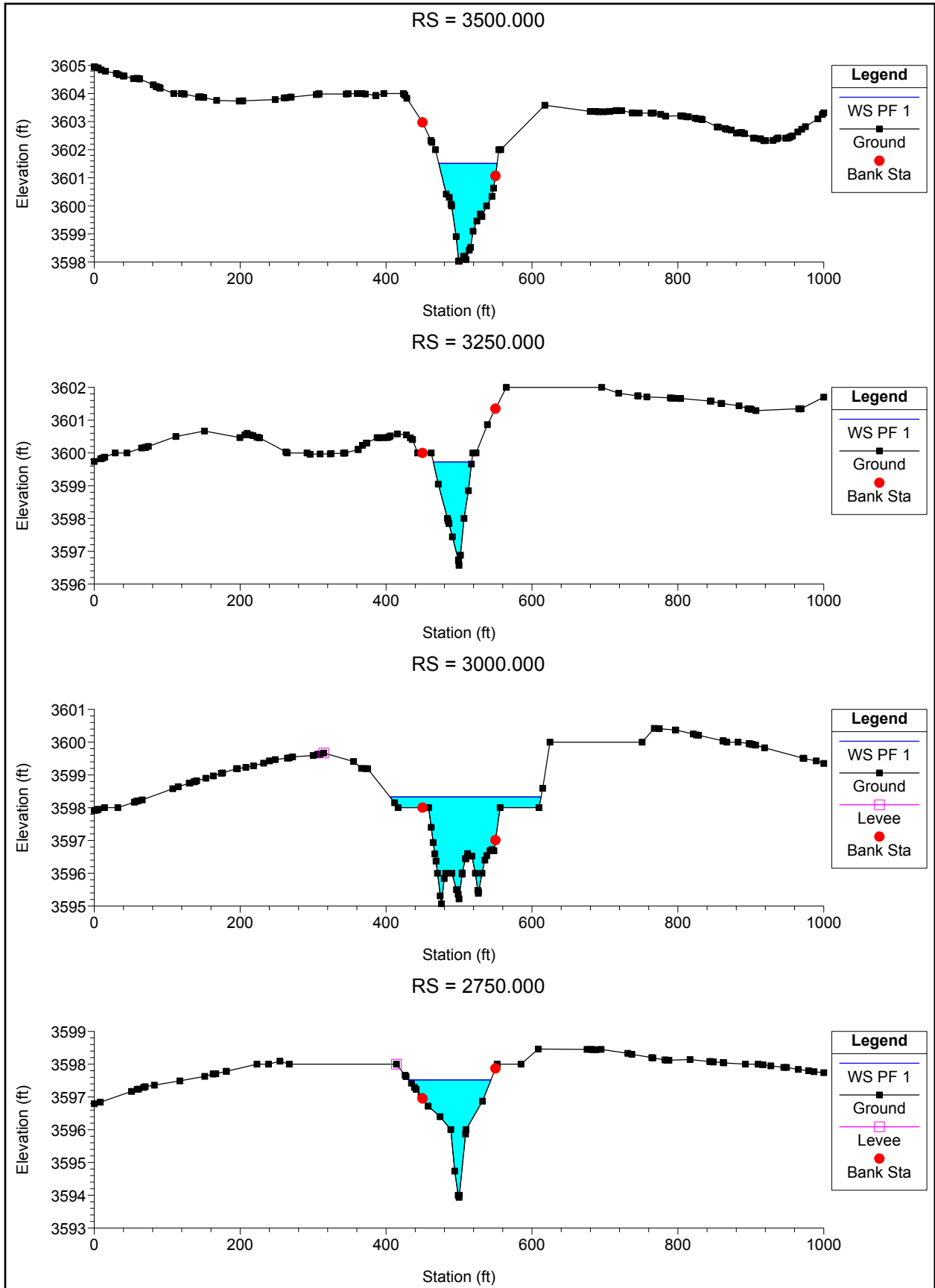
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10	7250	PF 1	524	3638.84	3640.53	3640.53	3641.03	0.016088	5.68	93.91	95.15	0.96
10	7000	PF 1	524	3631.68	3633.8	3634.25	3634.98	0.048527	8.73	59.99	66.29	1.62
10	6750	PF 1	524	3628.61	3630.83	3630.76	3631.26	0.013305	5.45	102.24	102.9	0.89
10	6500	PF 1	524	3626.27	3628.17	3628.17	3628.51	0.014041	4.91	119.29	194.91	0.88
10	6250	PF 1	524	3623.69	3624.92	3624.8	3625.18	0.012521	4.22	128.62	162.52	0.81
10	6000	PF 1	524	3621.28	3622.01	3621.91	3622.22	0.012521	2.97	144.43	220.97	0.74
10	5750	PF 1	524	3618.97	3620.13	3619.88	3620.26	0.006953	3.25	188.72	291.11	0.61
10	5500	PF 1	524	3616.54	3617.31	3617.31	3617.58	0.020215	4.46	127.07	233.9	0.99
10	5250	PF 1	524	3614	3616.06	3615.23	3616.15	0.001937	2.62	213.02	154.69	0.36
10	5000	PF 1	524	3614	3615.22	3614.88	3615.42	0.006223	3.68	147.31	134.95	0.6
10	4817.452	PF 1	524	3612.77	3613.29	3613.29	3613.58	0.019129	2.94	122.24	212.25	0.87
10	4591.478	PF 1	524	3606	3608.96	3607.76	3609	0.0007	1.86	339.25	248.64	0.22
10	4500	PF 1	588	3607.3	3608.49	3608.49	3608.79	0.022579	4.23	135.52	243.16	1.01
10	4250	PF 1	588	3602.74	3606.09	3605.58	3606.35	0.004914	4.29	169.93	294.96	0.57
10	4000	PF 1	588	3600.99	3604.5	3604.45	3604.87	0.011297	5.1	131.55	158.42	0.82
10	3773.643	PF 1	588	3599.49	3602.63	3602.63	3603.14	0.015484	5.85	105.24	104.52	0.95
10	3500	PF 1	588	3598.03	3601.51	3600.66	3601.75	0.003509	3.9	151.32	80.01	0.49
10	3250	PF 1	588	3596.57	3599.73	3599.73	3600.52	0.0159	7.16	82.12	52.64	1.01
10	3000	PF 1	588	3595.07	3598.33	3597.24	3598.45	0.001717	2.78	236.35	207.16	0.35
10	2750	PF 1	588	3593.94	3597.52	3597.24	3597.86	0.008404	4.67	129.26	112.74	0.72
10	2500	PF 1	588	3592.58	3596.14	3596.14	3596.31	0.006032	3.72	239.11	680.9	0.6
10	2250	PF 1	588	3591.31	3594.64	3594.6	3594.69	0.002502	2.25	357.45	621.99	0.38
10	2000	PF 1	588	3590.1	3592.63	3592.62	3592.9	0.013418	4.67	156.09	290.27	0.85
10	1750	PF 1	588	3589.09	3591.29	3590.99	3591.48	0.006063	3.71	174.88	187.03	0.6
10	1500	PF 1	588	3588.09	3589.89	3589.89	3590.4	0.017691	5.74	102.91	105.63	1
10	1233.811	PF 1	588	3587.03	3588.81	3588.48	3588.85	0.002783	1.51	351.24	588.76	0.36
10	940.221	PF 1	588	3585.8	3587.16	3587.16	3587.56	0.017786	5.34	117.13	142.73	0.98
10	750	PF 1	588	3584.75	3586.01	3586.01	3586.02	0.000363	0.24	612.42	531.29	0.1
10	500	PF 1	588	3583.24	3584.22	3584.24	3585.56	0.287376	10.33	65.23	278.92	3.29
10	250	PF 1	588	3581.6	3582.38	3582.19	3582.45	0.006007	1.62	275.29	534.28	0.49

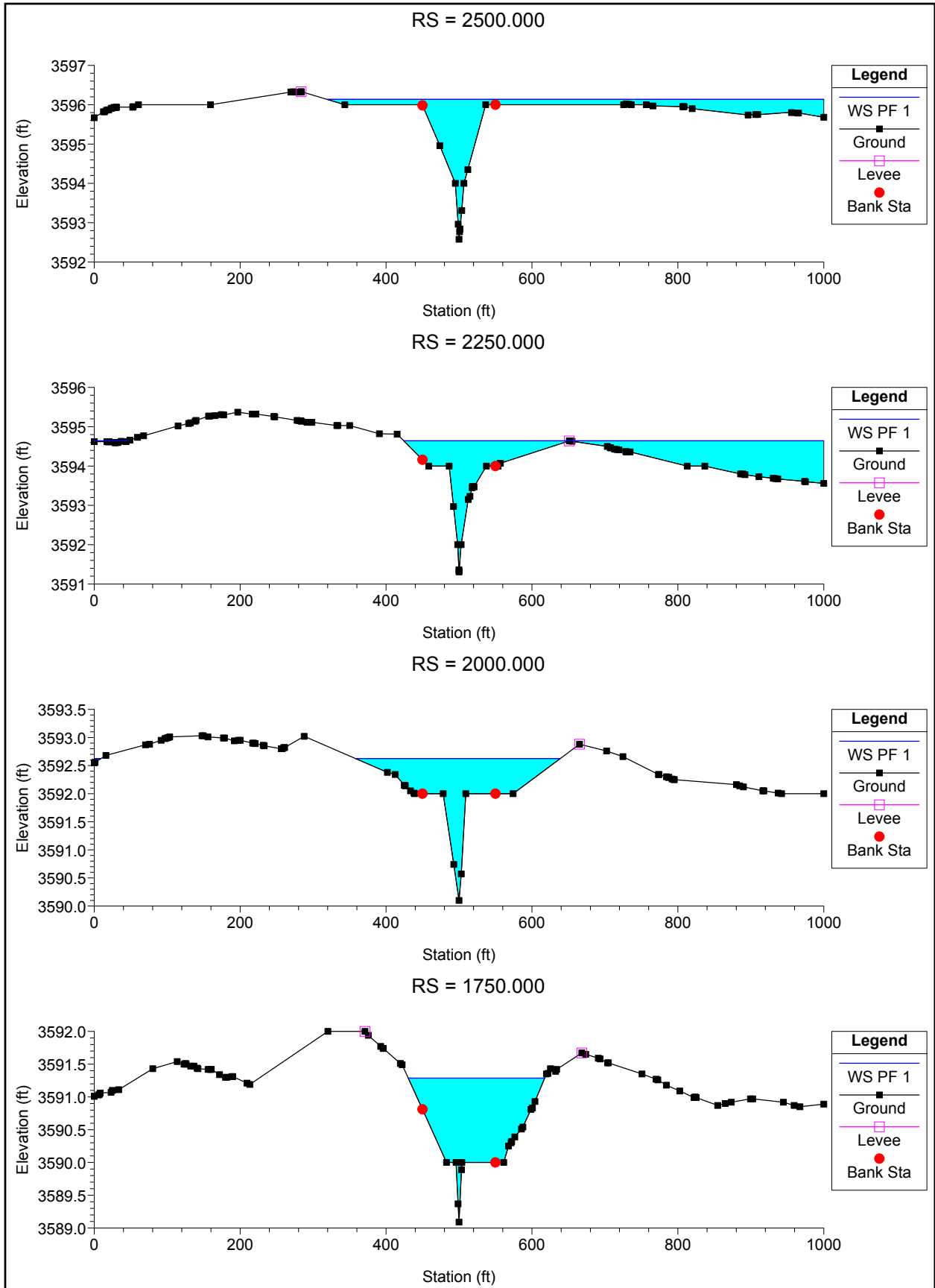


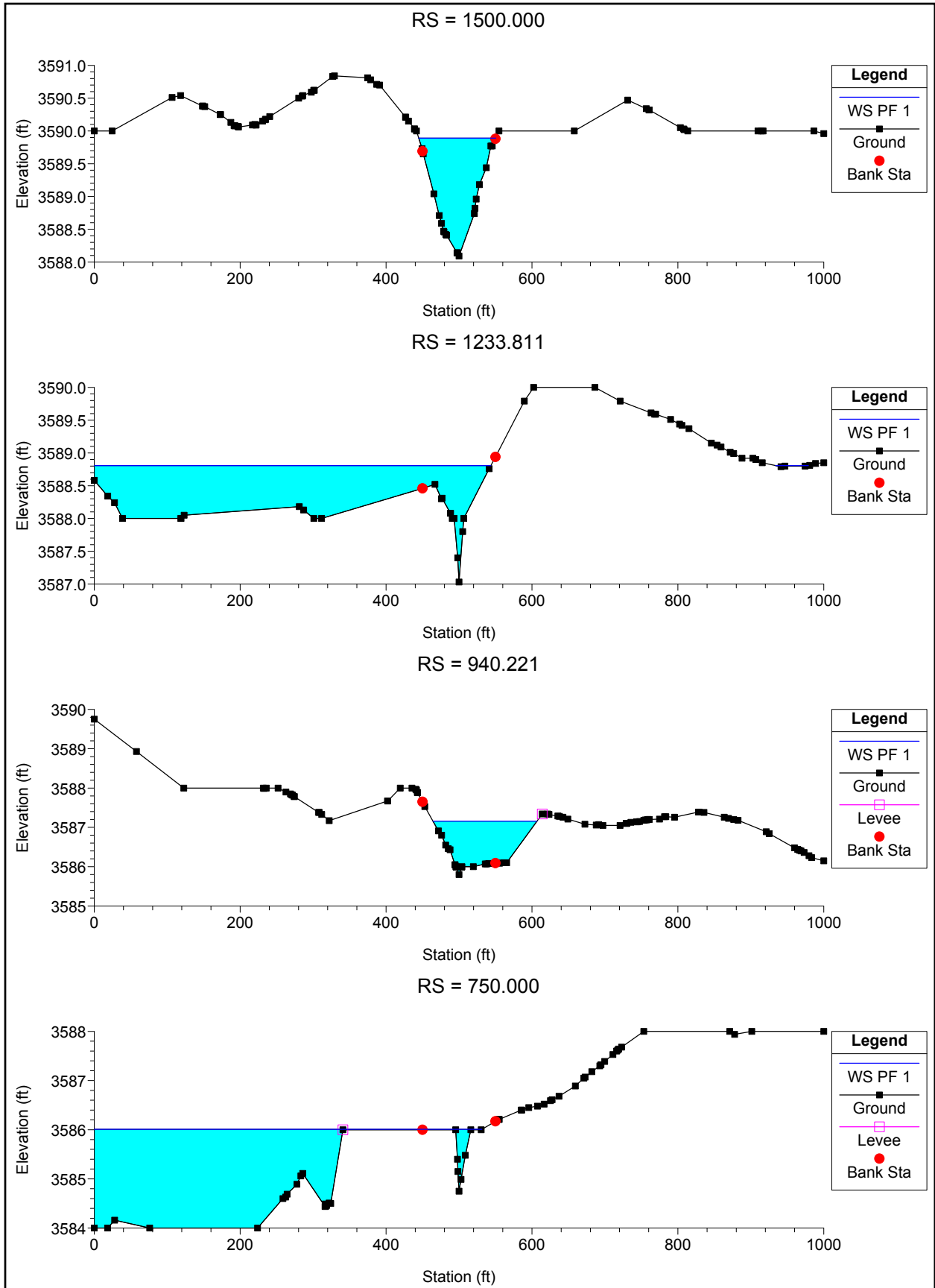


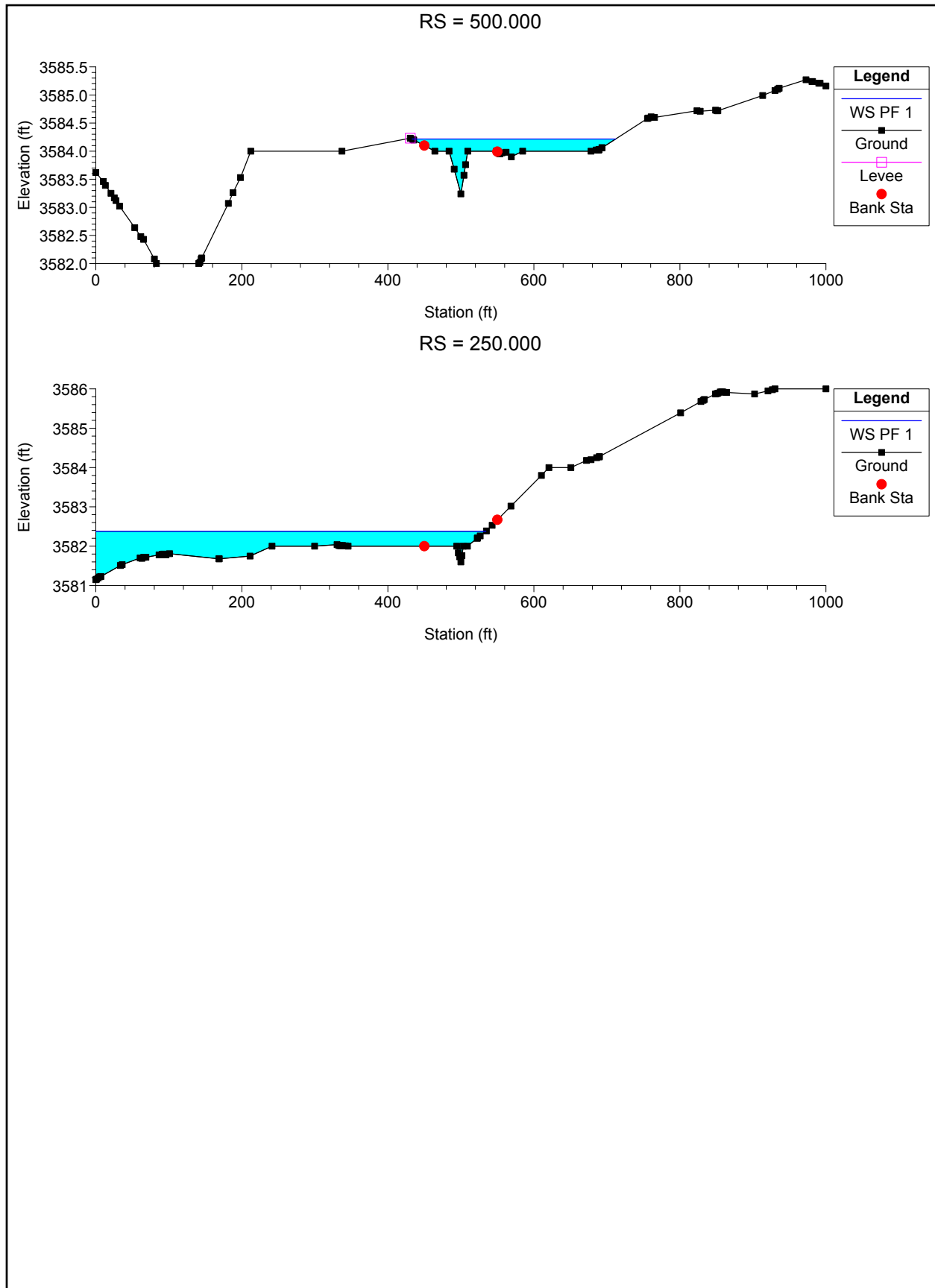










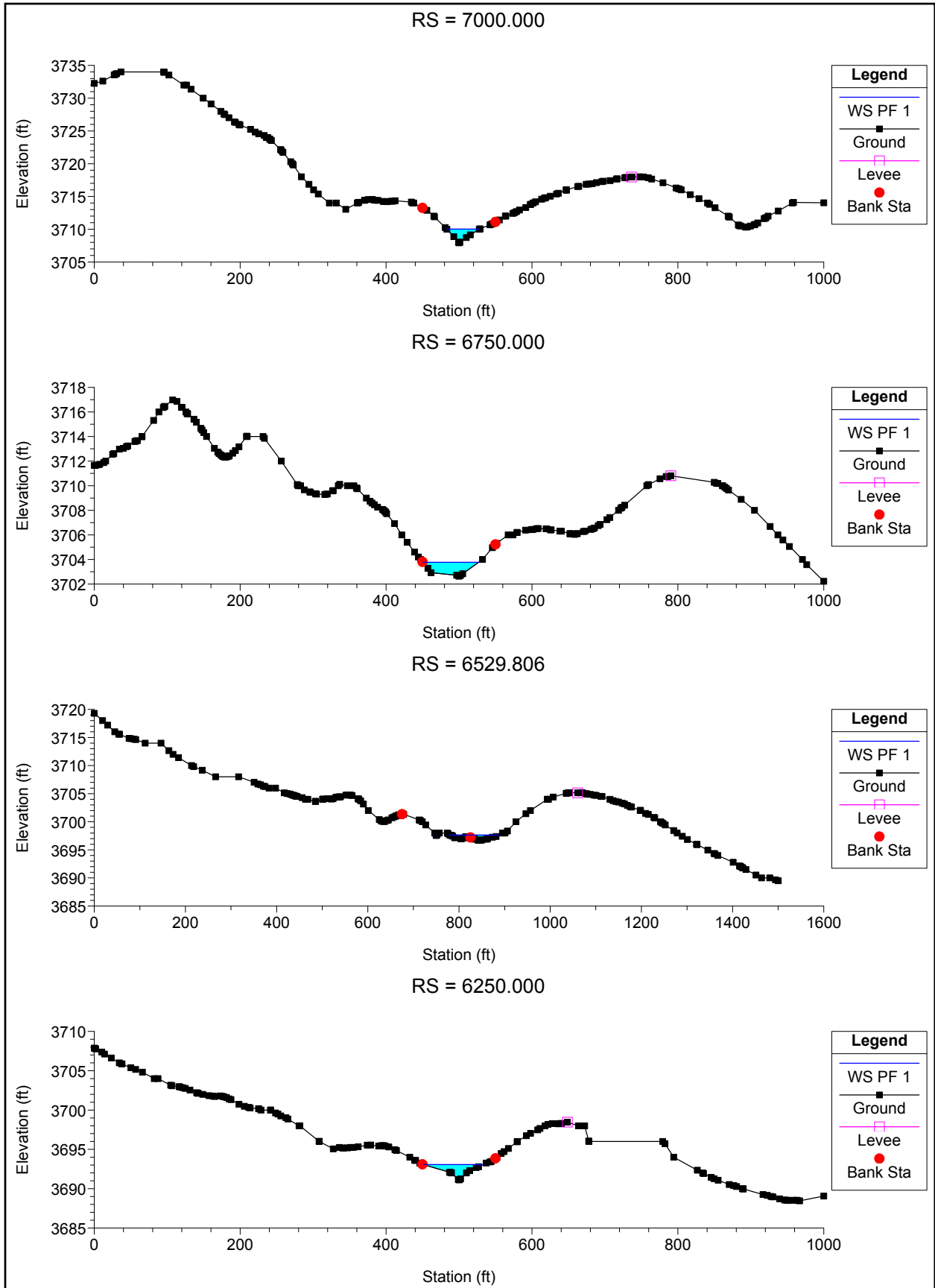


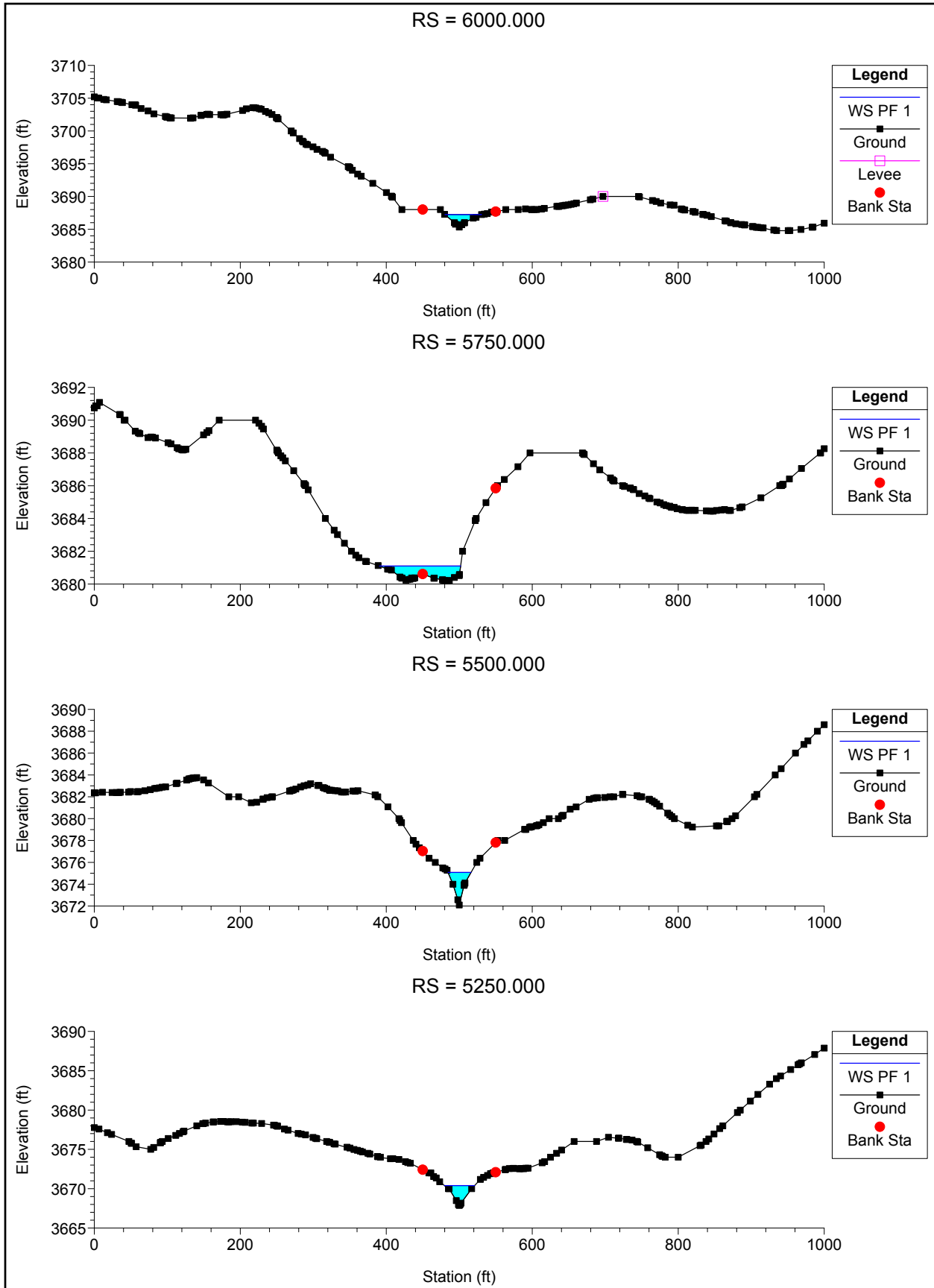
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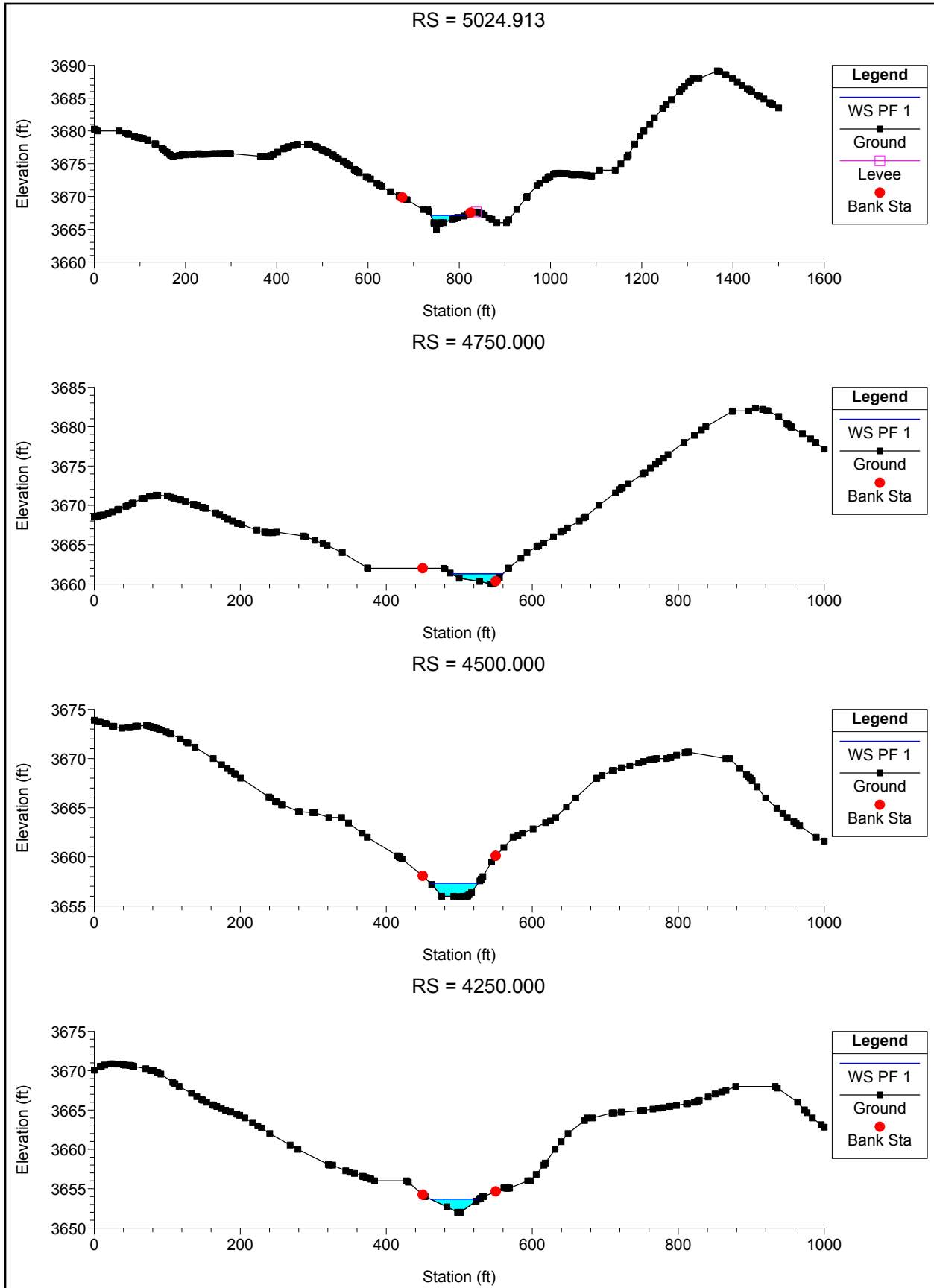
HEC-RAS Channel 11

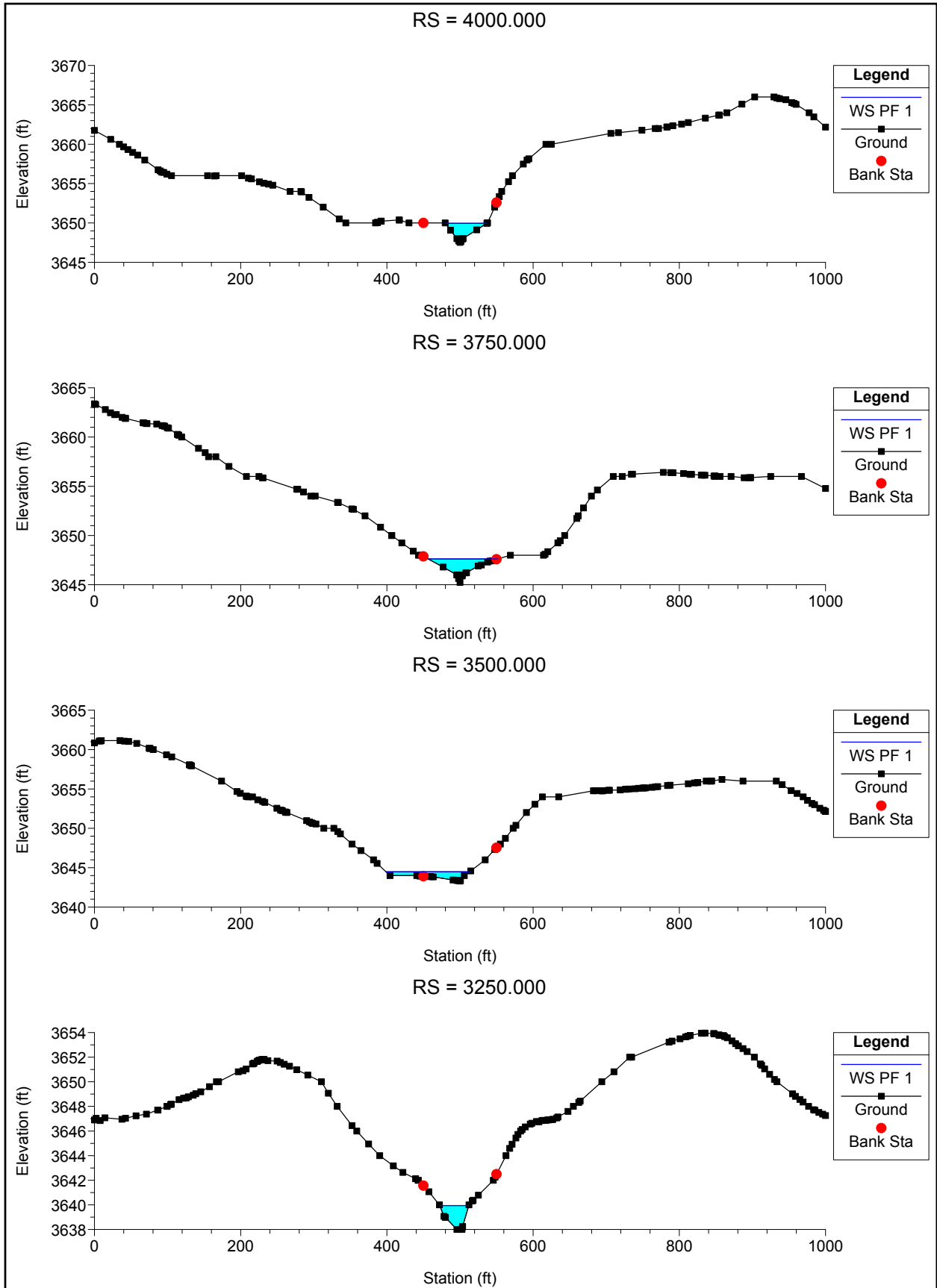


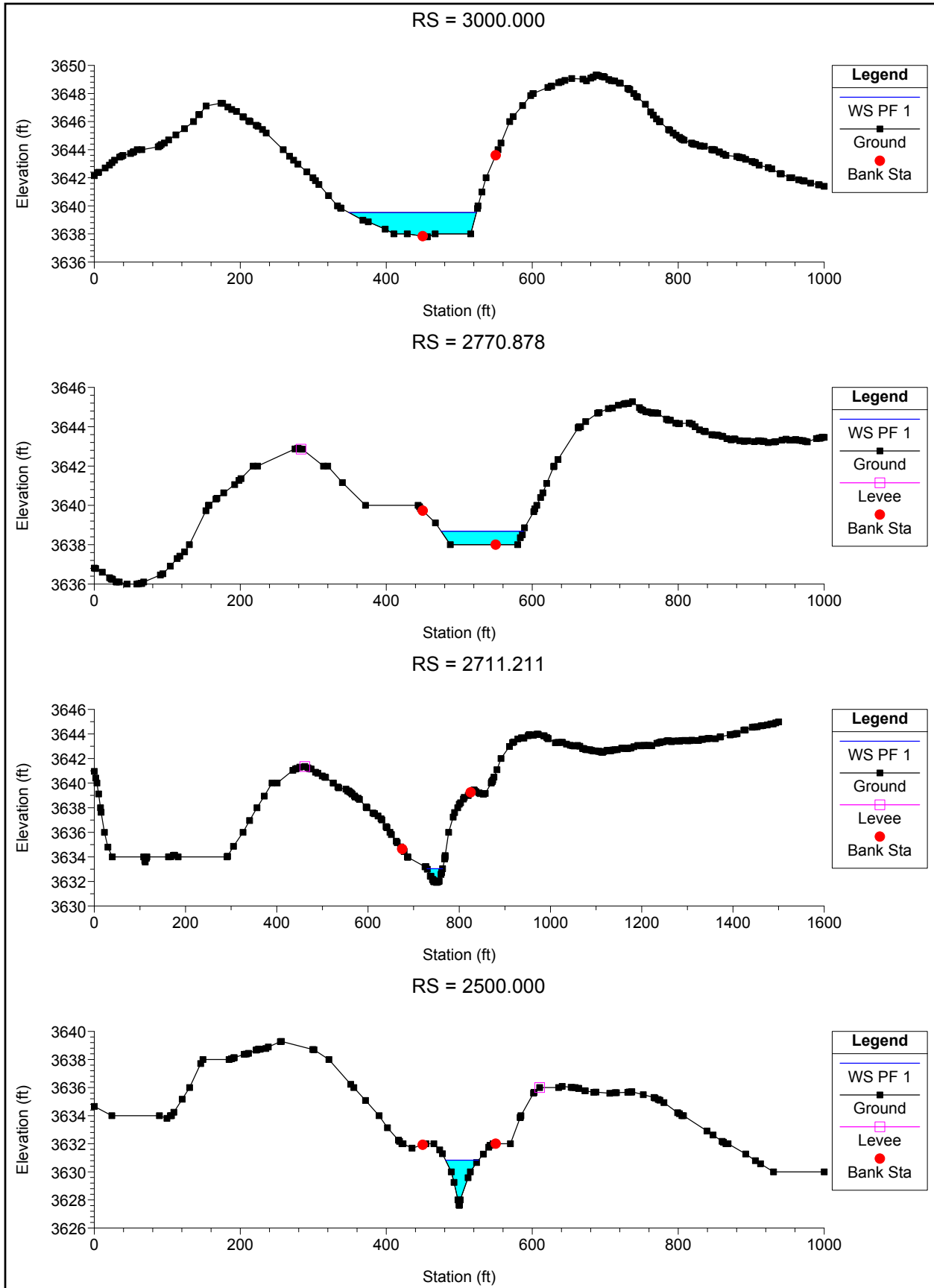
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
11	7000	PF 1	315	3707.93	3710.01	3710.19	3710.77	0.027015	6.99	45.07	44.7	1.23
11	6750	PF 1	315	3702.64	3703.77	3703.84	3704.25	0.02537	5.55	56.78	76.36	1.13
11	6529.806	PF 1	315	3696.94	3697.63	3697.78	3698.14	0.040033	4.63	56.2	108.16	1.29
11	6250	PF 1	315	3691.12	3693.07	3693.07	3693.46	0.019829	5	62.94	82.05	1.01
11	6000	PF 1	315	3685.33	3687.24	3687.48	3688.03	0.033497	7.13	44.2	50.16	1.34
11	5750	PF 1	315	3680.2	3681.1	3681.12	3681.46	0.023303	5.19	66.99	111.13	1.08
11	5500	PF 1	315	3672.1	3675.08	3675.3	3676.04	0.025746	7.88	40	31.57	1.23
11	5250	PF 1	315	3667.89	3670.4	3670.47	3671.08	0.019905	6.58	47.85	41.19	1.08
11	5024.913	PF 1	315	3664.89	3667.14	3667.14	3667.53	0.018861	5.05	62.32	76.92	0.99
11	4750	PF 1	315	3660	3661.3	3661.39	3661.83	0.025566	5.95	54.36	70.4	1.16
11	4500	PF 1	315	3655.94	3657.32	3657.16	3657.66	0.011447	4.65	67.78	65.37	0.8
11	4250	PF 1	315	3651.95	3653.68	3653.68	3654.13	0.019232	5.39	58.49	66.76	1.01
11	4000	PF 1	315	3647.53	3649.97	3649.74	3650.32	0.010529	4.79	65.82	56.92	0.78
11	3750	PF 1	315	3645.23	3647.62	3647.41	3647.86	0.010205	3.89	81.1	95.6	0.74
11	3500	PF 1	315	3643.3	3644.49	3644.49	3644.8	0.018371	4.81	72.21	114.32	0.97
11	3250	PF 1	315	3638	3639.95	3639.95	3640.57	0.016888	6.36	49.54	39.75	1
11	3000	PF 1	315	3637.8	3639.52	3638.6	3639.56	0.00085	1.6	217.23	174.61	0.23
11	2770.878	PF 1	315	3638	3638.69	3638.69	3639	0.020928	4.5	70.32	112.87	1
11	2711.211	PF 1	342	3631.92	3633.04	3633.8	3636	0.161904	13.8	24.78	34.01	2.85
11	2500	PF 1	342	3627.63	3630.83	3630.71	3631.35	0.013381	5.82	58.8	45.1	0.9
11	2250	PF 1	342	3624.98	3627.82	3627.82	3628.5	0.016405	6.62	51.64	37.99	1
11	2000	PF 1	342	3621.41	3624.23	3623.91	3624.49	0.009369	4.13	85.92	104.47	0.72
11	1750	PF 1	342	3619.03	3622.35	3622.35	3622.67	0.012918	4.84	82.13	128.88	0.85
11	1508.185	PF 1	342	3616.58	3619.51	3618.83	3619.59	0.002604	2.16	155.61	151.74	0.38
11	1250	PF 1	529	3614.16	3617.46	3617.46	3618.07	0.014415	6.31	86.76	82.62	0.94
11	1000	PF 1	529	3610.54	3614.57	3614.16	3615.17	0.009402	6.17	85.68	45.74	0.79
11	750	PF 1	529	3607.78	3611.51	3611.51	3612.53	0.014048	8.13	65.38	32.64	0.99
11	583.892	PF 1	529	3606.36	3610.56	3610.29	3610.62	0.002353	2.36	305.59	461.07	0.37
11	516.955	PF 1	529	3605.77	3609.4	3609.4	3610.23	0.015139	7.31	72.43	44.13	0.99
11	250	PF 1	529	3603.02	3606	3606.01	3606.14	0.016394	3.64	185.06	499.63	0.86
11	0	PF 1	529	3600	3603.79	3603.22	3604.18	0.006003	4.97	106.38	56.58	0.64

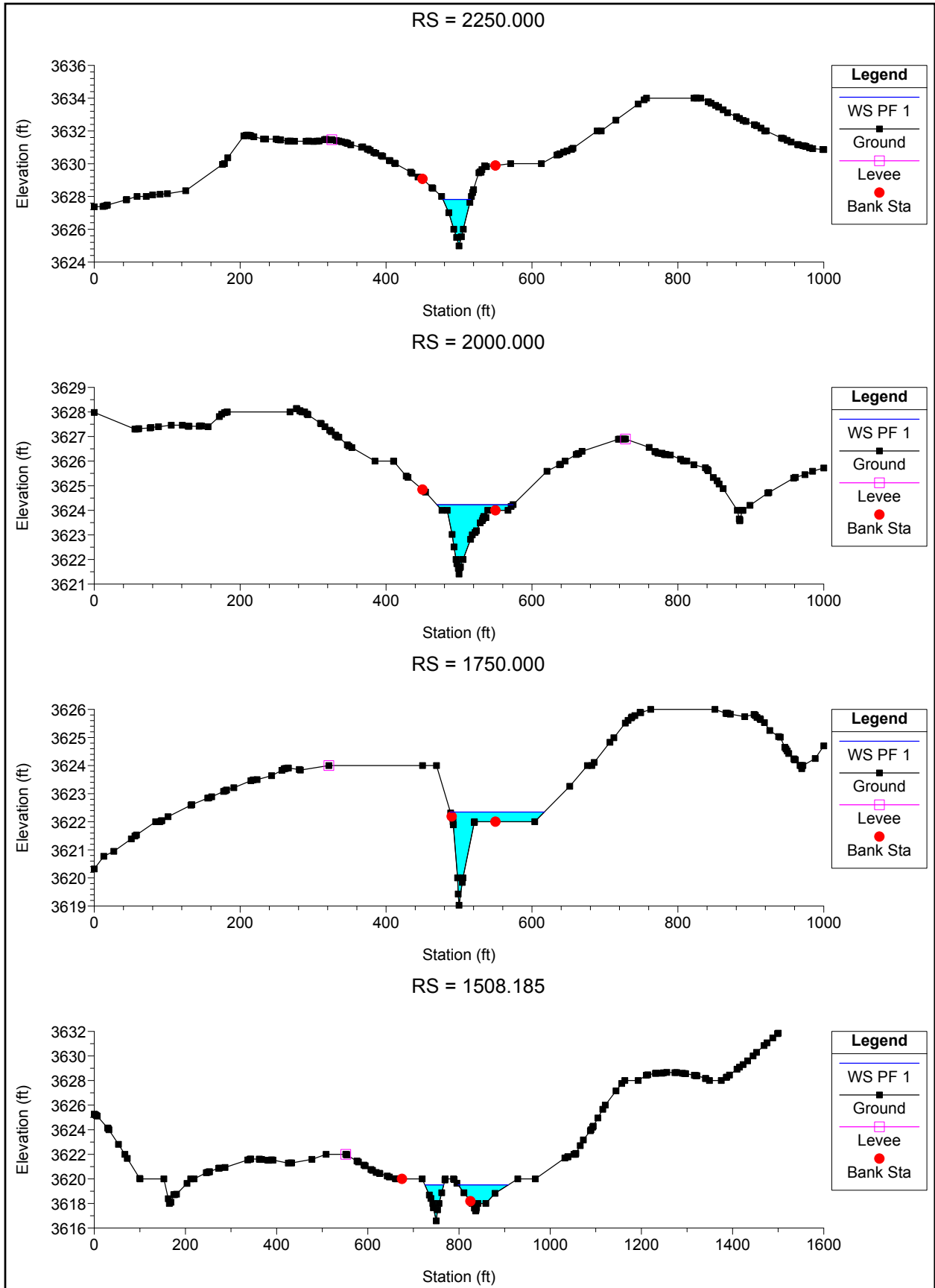


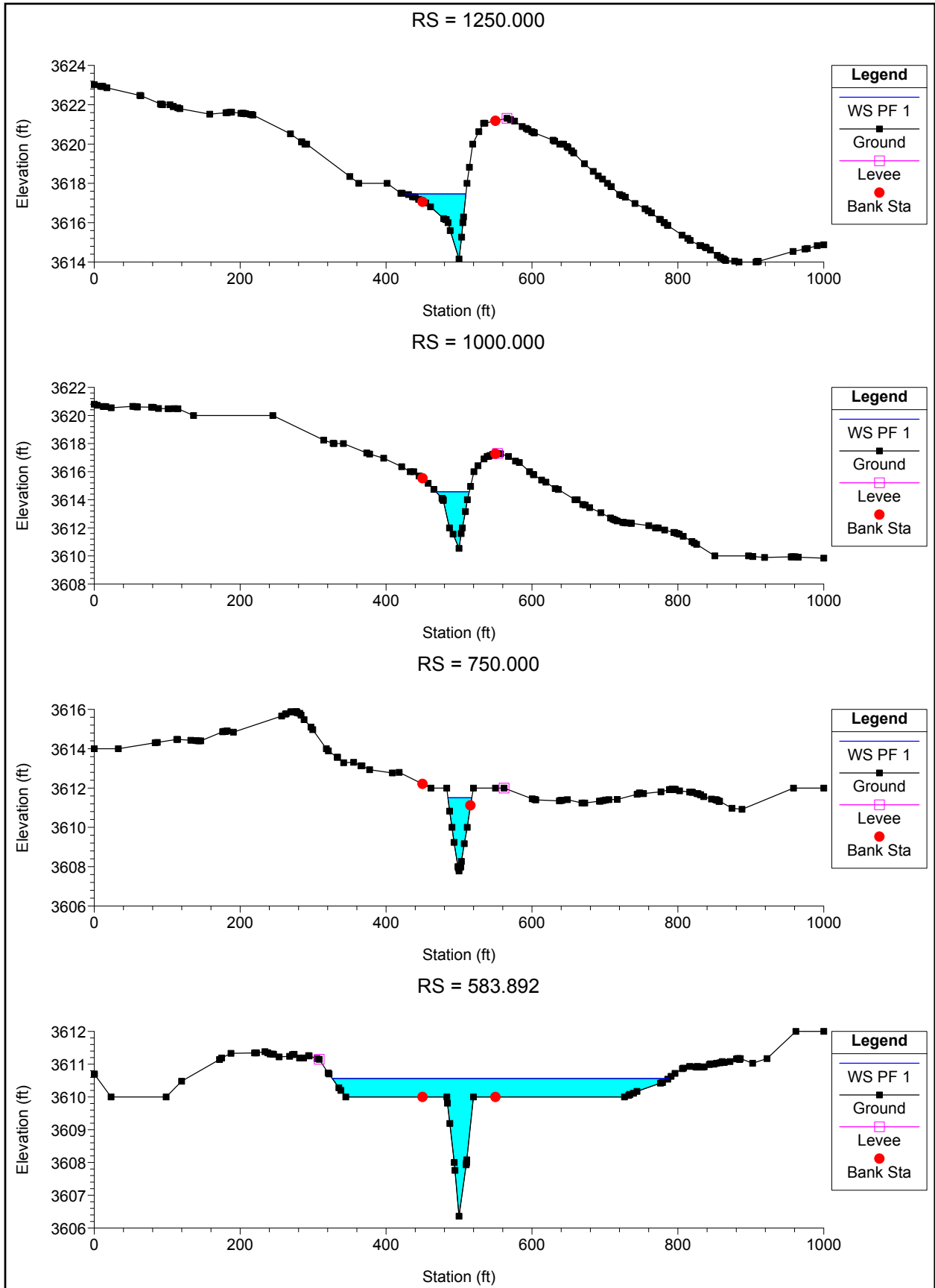


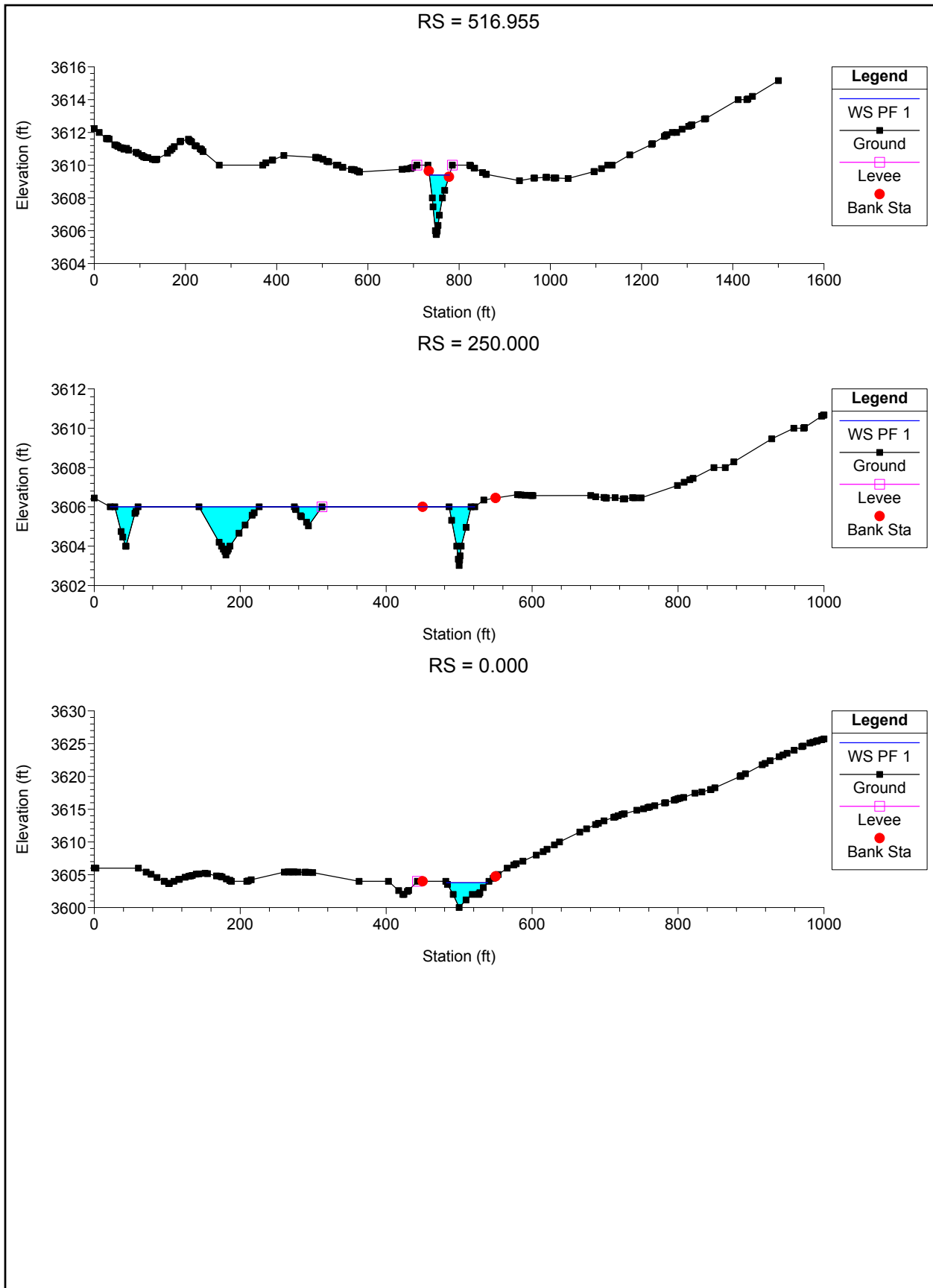










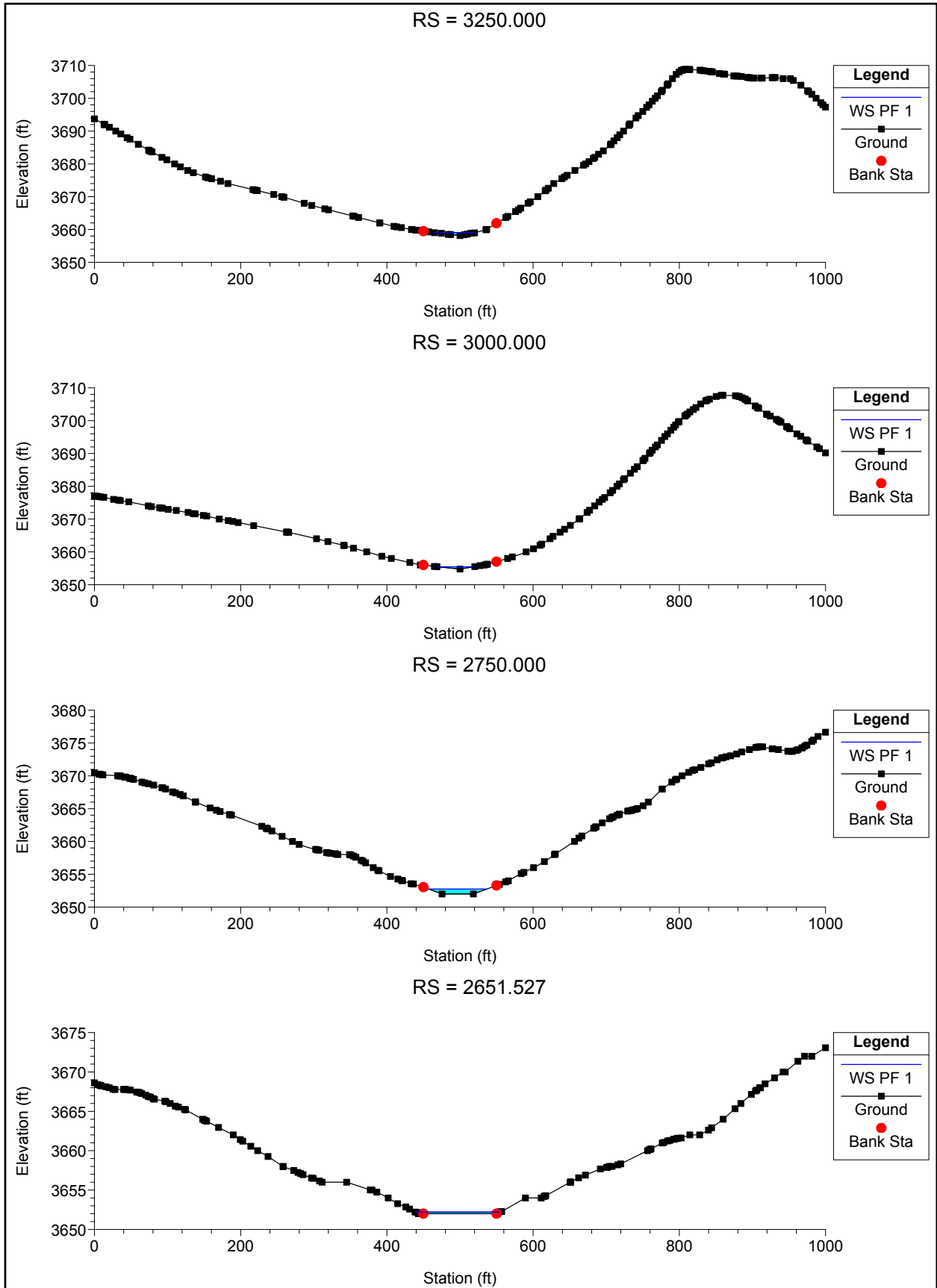


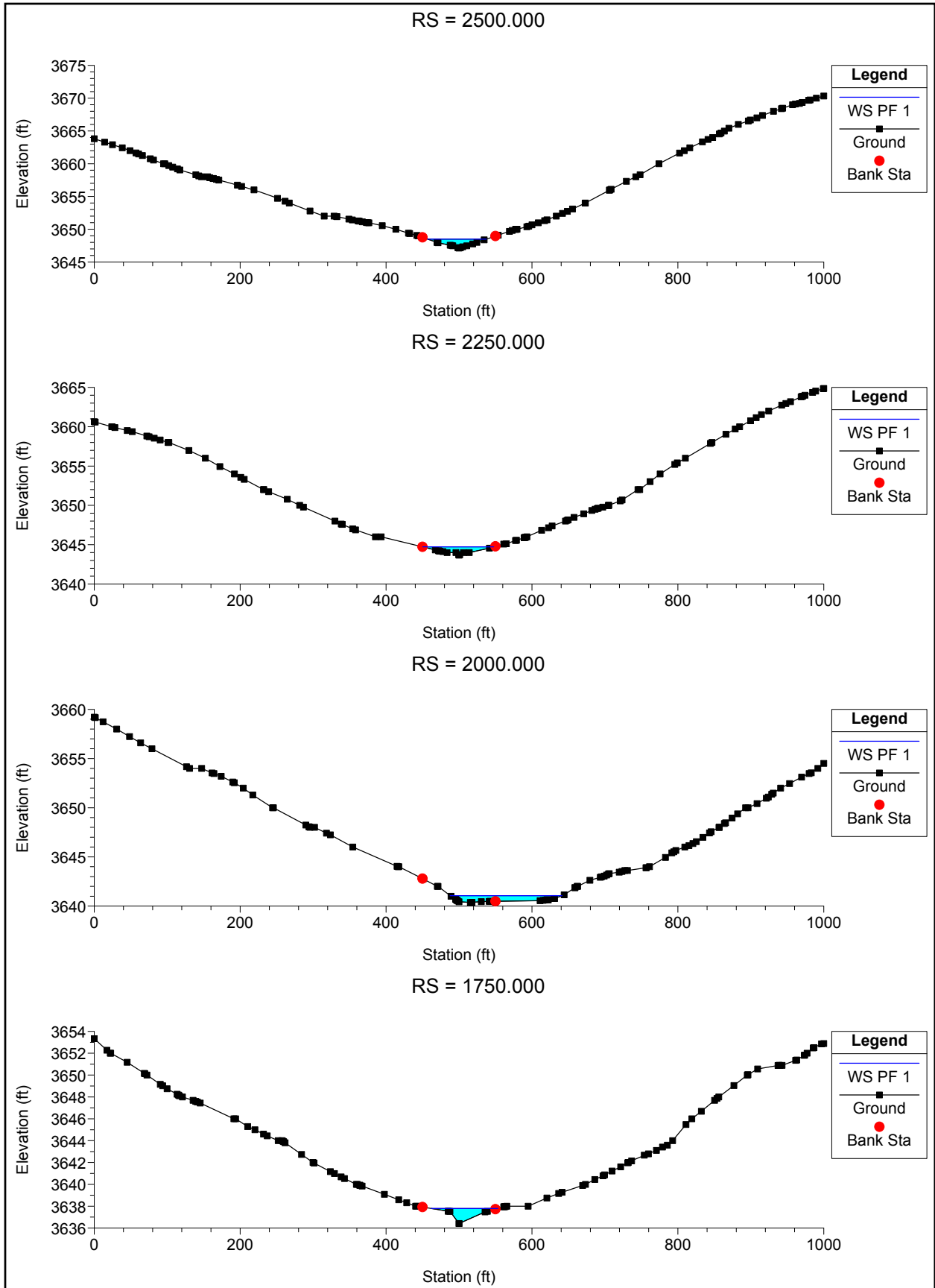
Attachment 2.7-M-22

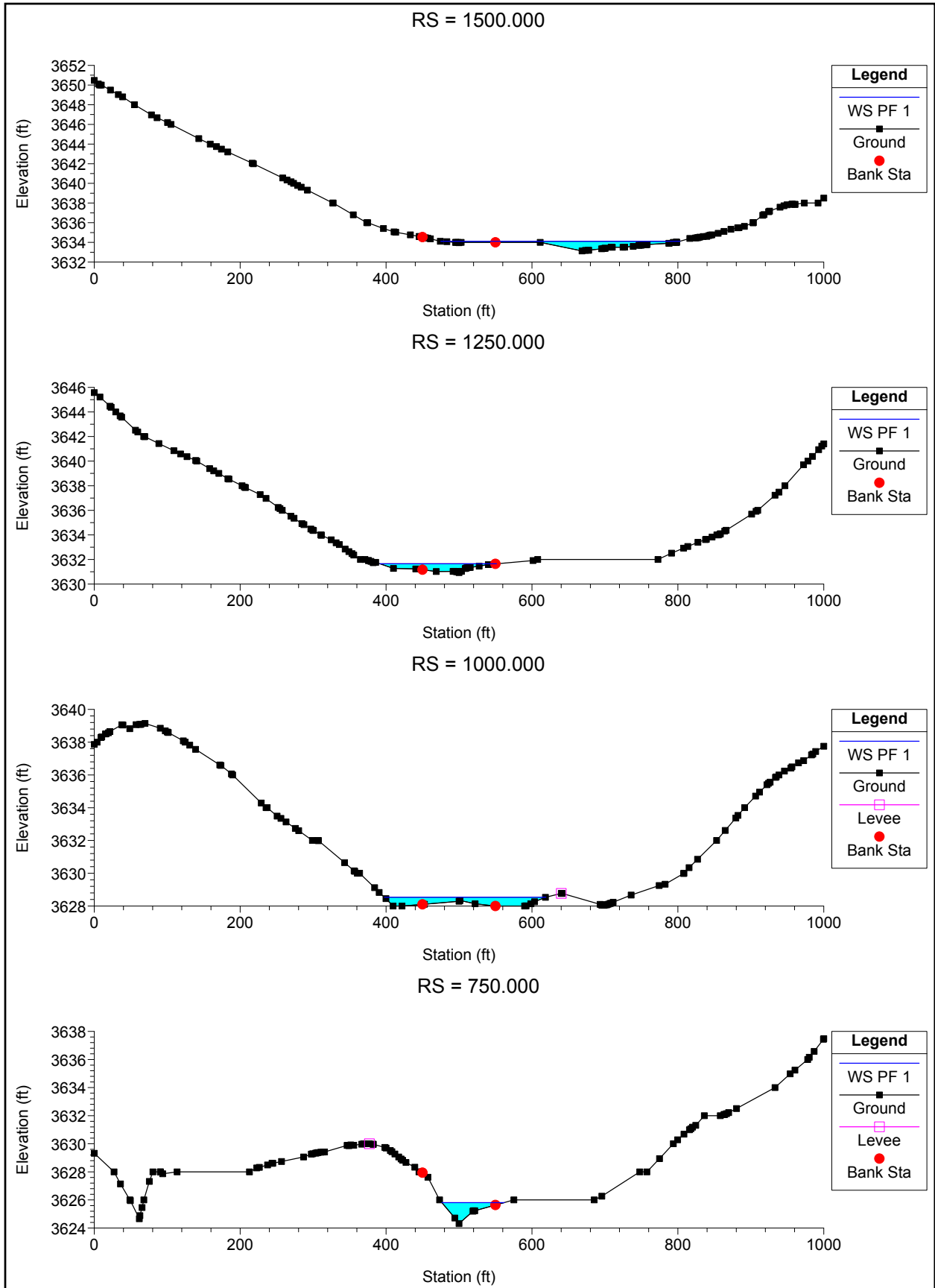
HEC-RAS Channel 11A

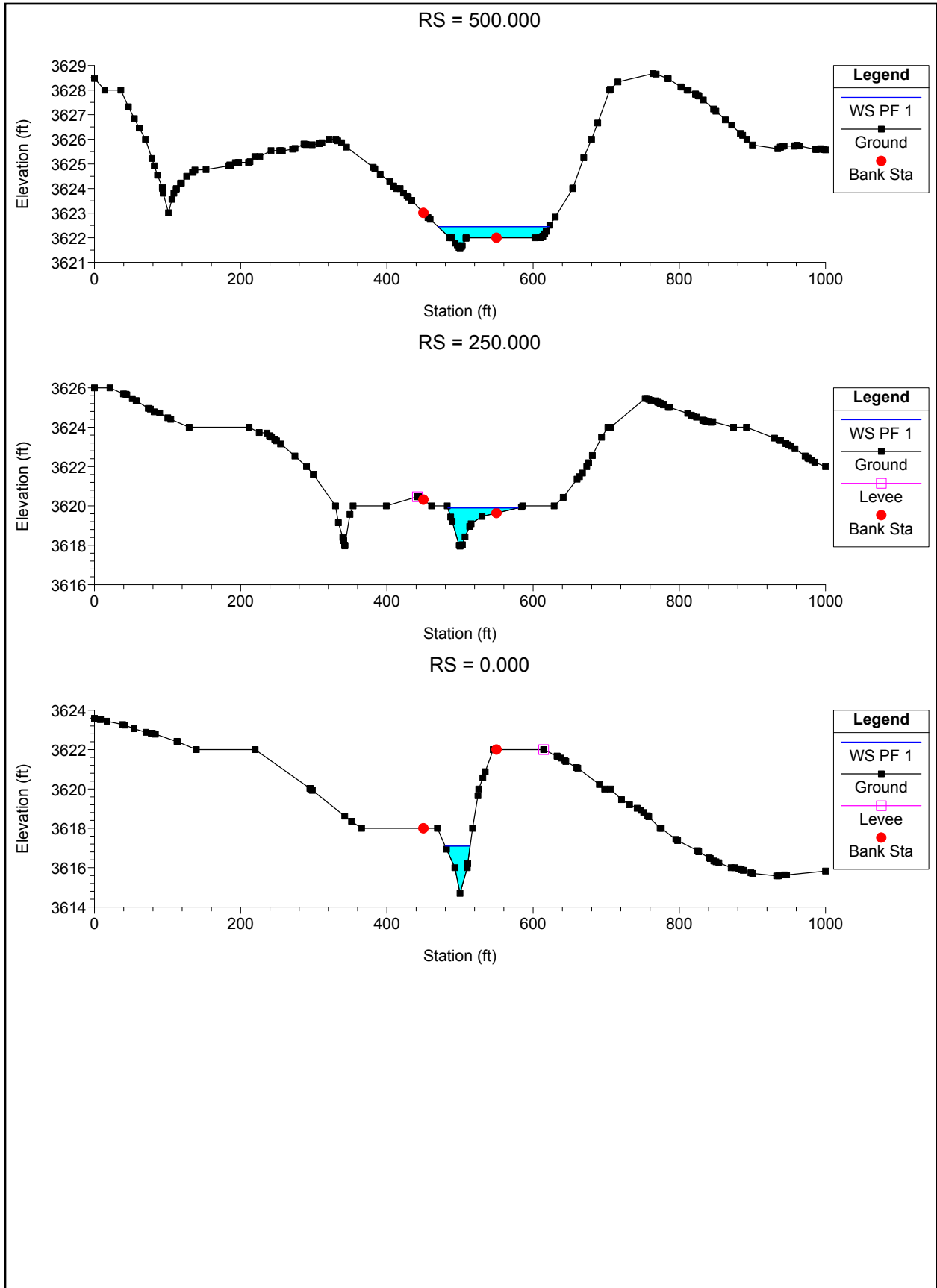


Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
11A	3250	PF 1	59	3658.15	3659.06	3658.89	3659.14	0.008604	2.31	25.59	57.11	0.61
11A	3000	PF 1	59	3654.78	3655.47	3655.47	3655.65	0.026562	3.41	17.29	49.88	1.02
11A	2750	PF 1	59	3652	3652.76	3652.36	3652.78	0.001866	1.28	46.25	79.7	0.3
11A	2651.527	PF 1	59	3652	3652.21	3652.21	3652.31	0.029825	2.59	23.27	115.34	1
11A	2500	PF 1	197	3647.13	3648.5	3648.33	3648.69	0.010901	3.49	56.38	80.52	0.74
11A	2250	PF 1	197	3643.67	3644.72	3644.72	3644.98	0.023356	4.07	48.35	97.11	1.02
11A	2000	PF 1	197	3640.36	3641.06	3640.91	3641.16	0.008442	2.68	78.59	153.58	0.63
11A	1750	PF 1	197	3636.41	3637.79	3637.79	3638.07	0.022726	4.2	46.98	91.42	1.01
11A	1500	PF 1	197	3633.96	3634.11	3633.89	3634.16	0.006014	0.68	111.93	327.78	0.39
11A	1250	PF 1	197	3630.93	3631.65	3631.62	3631.81	0.019431	3.32	61.92	159.87	0.9
11A	1000	PF 1	197	3628	3628.54	3628.42	3628.61	0.008932	2.05	89.46	221.43	0.6
11A	750	PF 1	197	3624.31	3625.81	3625.74	3626.05	0.014661	3.95	50.64	85.59	0.85
11A	500	PF 1	197	3621.56	3622.45		3622.58	0.013819	3	67.63	151.97	0.77
11A	250	PF 1	197	3617.96	3619.9	3619.74	3620.09	0.009174	3.55	58.29	96.27	0.69
11A	0	PF 1	197	3614.7	3617.1	3616.93	3617.5	0.012	5.05	39.02	34.08	0.83







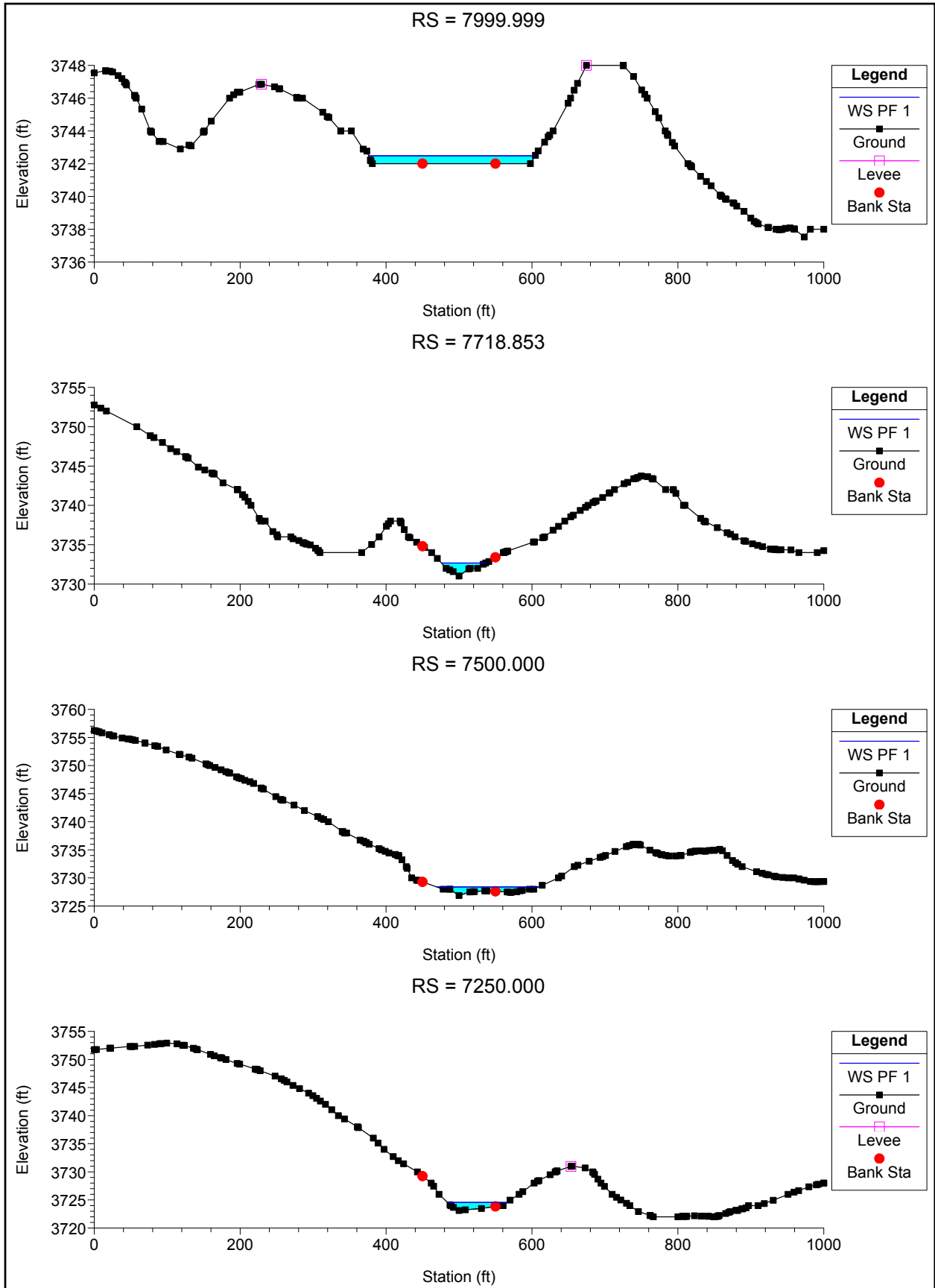


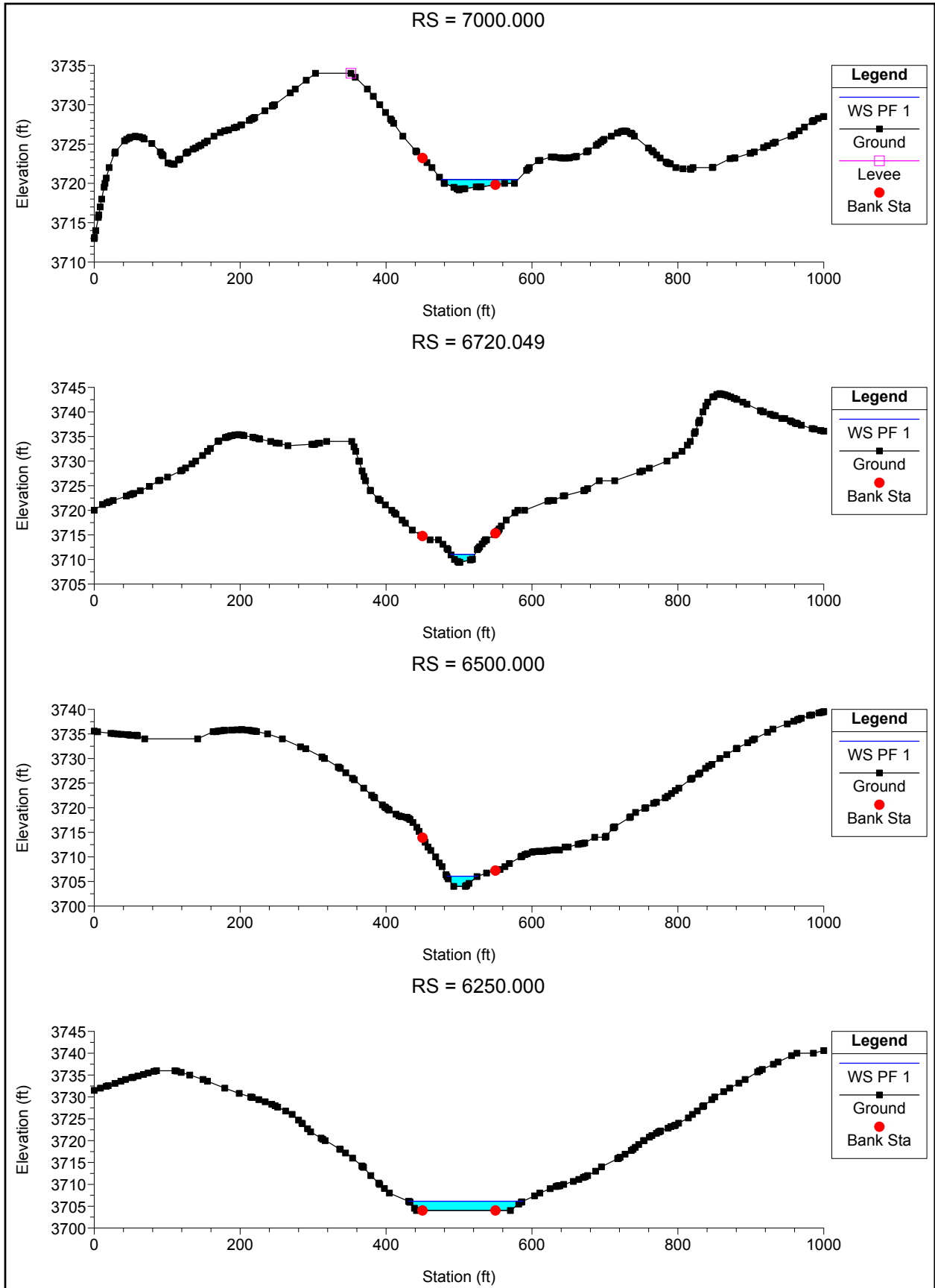
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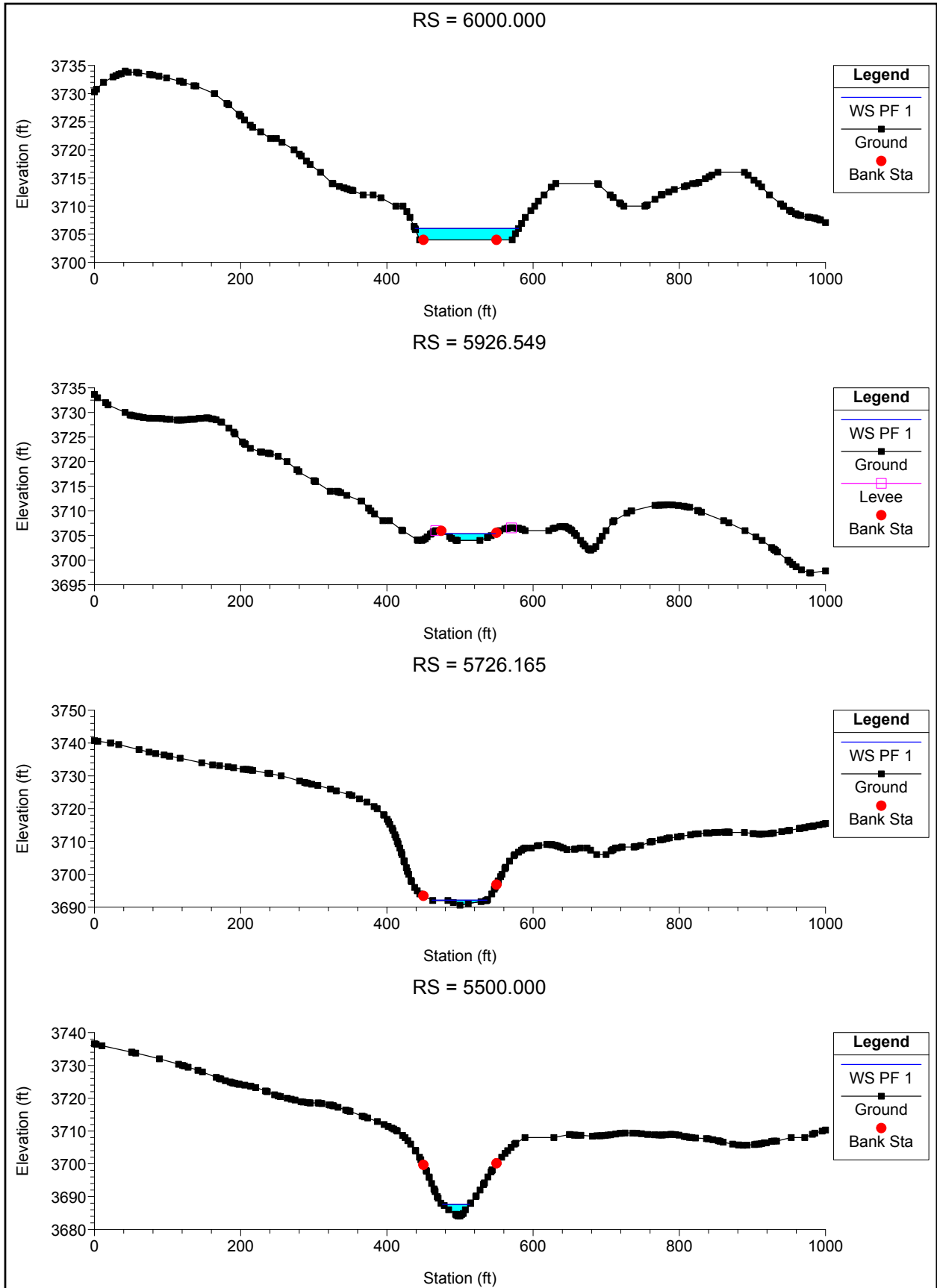
HEC-RAS Channel 12

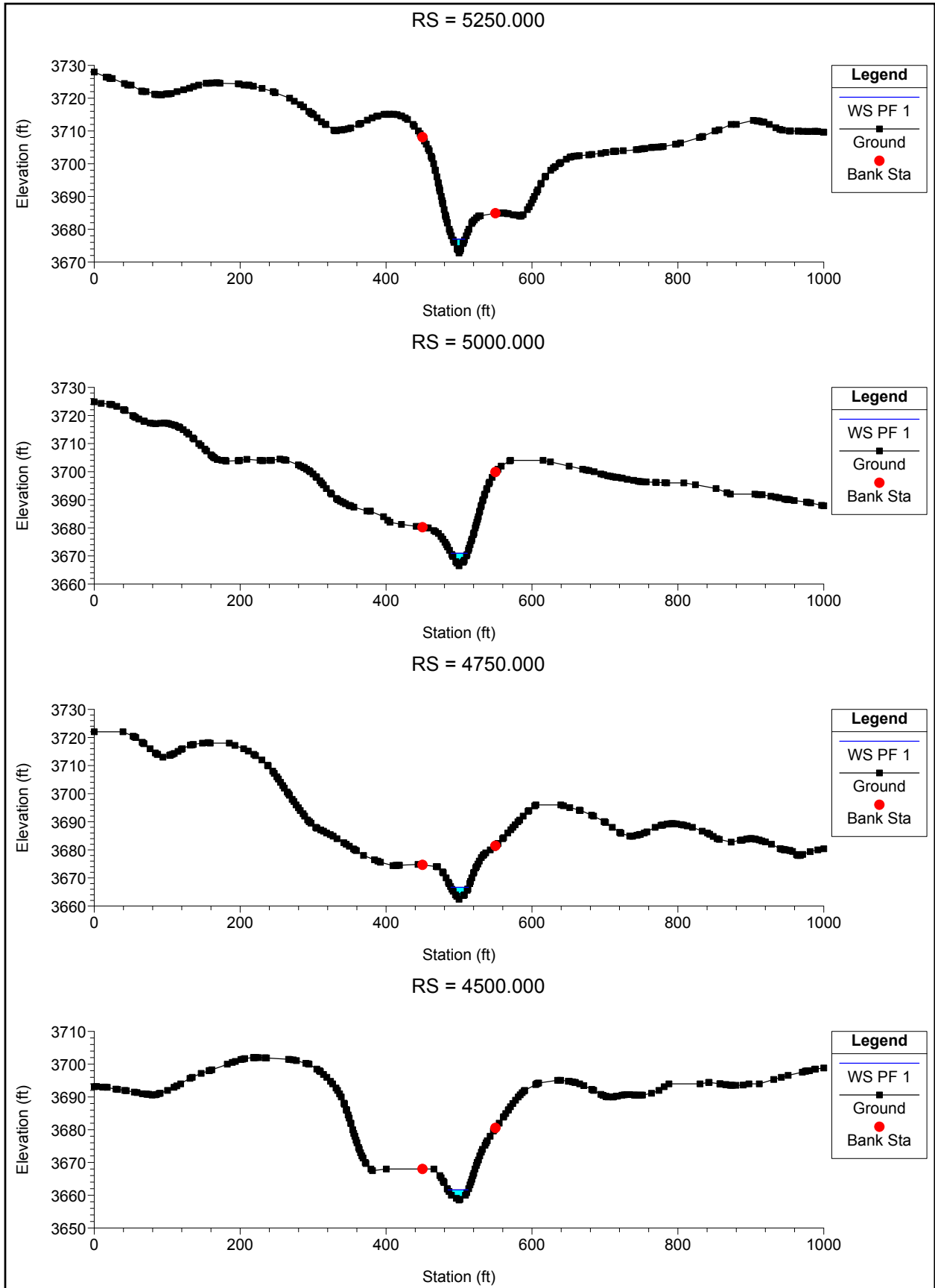


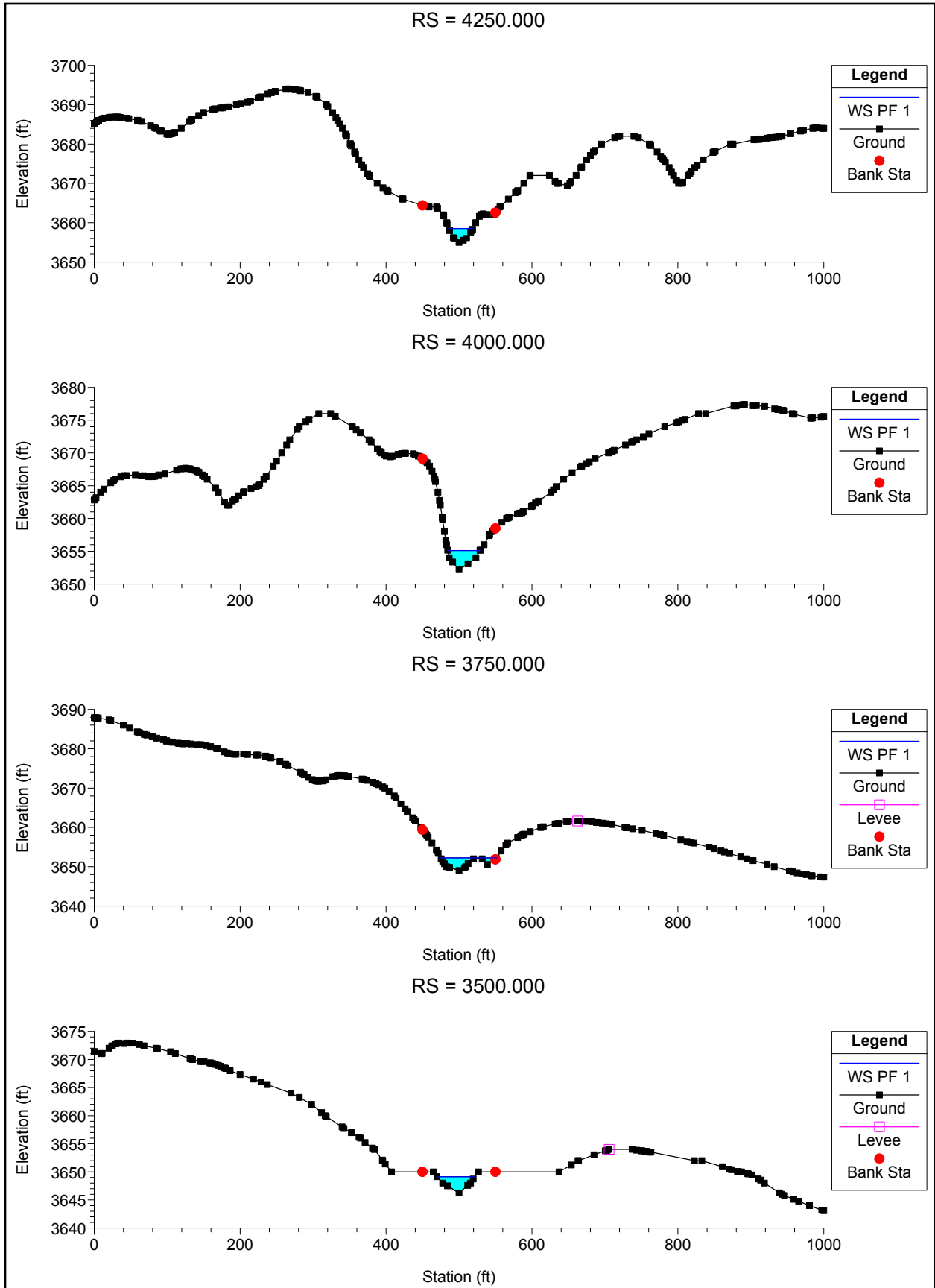
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
12	7999.999	PF 1	413	3742	3742.48	3742.48	3742.71	0.022715	3.93	106.93	228.07	1
12	7718.853	PF 1	413	3731.02	3732.66	3733.01	3733.77	0.052436	8.46	48.84	60.08	1.65
12	7500	PF 1	413	3726.86	3728.39	3728.29	3728.65	0.013987	4.23	101.34	139.15	0.85
12	7250	PF 1	413	3723.11	3724.56	3724.56	3725.03	0.016705	5.63	76.49	81.79	0.97
12	7000	PF 1	413	3719.15	3720.49	3720.5	3720.91	0.018123	5.35	82.35	105.25	0.99
12	6720.049	PF 1	413	3709.38	3711.04	3711.62	3712.92	0.057536	11.01	37.51	33.08	1.82
12	6500	PF 1	413	3704	3706.06	3706.07	3706.79	0.016657	6.87	60.14	42.51	1.02
12	6250	PF 1	413	3704	3706.14	3704.68	3706.17	0.000414	1.44	304.76	157.47	0.17
12	6000	PF 1	413	3704	3706.02		3706.06	0.000541	1.58	270.59	141.51	0.2
12	5926.549	PF 1	413	3704	3705.37	3705.37	3705.89	0.01792	5.82	70.99	68.42	1.01
12	5726.165	PF 1	601	3690.6	3692.1	3692.79	3695.1	0.224699	13.91	43.21	75.1	3.23
12	5500	PF 1	601	3684.08	3687.65	3687.65	3688.66	0.014621	8.05	74.62	37.16	1
12	5250	PF 1	601	3672.76	3677	3678.41	3681.51	0.069142	17.03	35.29	16.6	2.06
12	5000	PF 1	601	3666.5	3670.94	3671.22	3672.64	0.019017	10.44	57.55	22.3	1.15
12	4750	PF 1	601	3662.44	3666.67	3666.93	3668.29	0.019081	10.23	58.73	23.88	1.15
12	4500	PF 1	601	3658.55	3661.63	3662.24	3663.71	0.033039	11.57	51.94	27.44	1.48
12	4250	PF 1	601	3655	3658.53	3658.46	3659.57	0.013299	8.18	73.49	33.09	0.97
12	4000	PF 1	601	3652.2	3655.11	3655.11	3656.02	0.01529	7.65	78.52	44.01	1.01
12	3750	PF 1	601	3649.04	3652.24	3651.87	3652.67	0.008853	5.25	114.91	77.33	0.75
12	3500	PF 1	601	3646.24	3649.12	3649.12	3649.93	0.015309	7.19	83.55	51.78	1
12	3250	PF 1	601	3643.06	3646.16	3645.89	3646.54	0.010767	4.98	122.22	115.98	0.8
12	3000	PF 1	601	3640.32	3642.87	3642.87	3643.39	0.01661	5.76	105.97	106.62	0.98
12	2891.053	PF 1	601	3640	3641.54	3640.98	3641.68	0.00358	3.09	203.25	166.56	0.47
12	2770.872	PF 1	651	3637.53	3640.69	3640.61	3640.98	0.010486	4.93	160.51	192.19	0.79
12	2500	PF 1	651	3634.95	3636.98	3636.98	3637.45	0.018384	5.6	120.32	136.17	1.01
12	2250	PF 1	651	3631.99	3632.79	3632.66	3632.99	0.008998	2.81	186.08	249.21	0.65
12	1951.087	PF 1	651	3628.23	3628.96	3628.96	3629.32	0.017868	3.25	139.2	196.62	0.87
12	1750	PF 1	651	3625.27	3626.01	3626.01	3626.01	0.000037	0.14	1316.36	608.51	0.04
12	1500	PF 1	651	3620.11	3621.47	3622.39	3625.57	0.243728	16.25	40.06	58.62	3.46
12	1250	PF 1	651	3617.24	3619.36	3619.01	3619.53	0.004733	3.58	207.14	201.16	0.54
12	1000	PF 1	651	3615.73	3617.03	3617.03	3617.48	0.018023	5.72	123.42	141.09	1
12	750	PF 1	651	3613.3	3614	3614	3614.01	0.000128	0.3	946.36	620.63	0.07
12	500	PF 1	651	3610	3610.46	3610.93	3613.58	0.409921	13.38	46.08	123.54	4.01
12	250	PF 1	651	3605.46	3607	3606.94	3607.3	0.014962	4.4	149.94	196.07	0.88
12	0	PF 1	651	3600	3603.37	3603.37	3603.82	0.014505	5.76	123.61	120.53	0.92

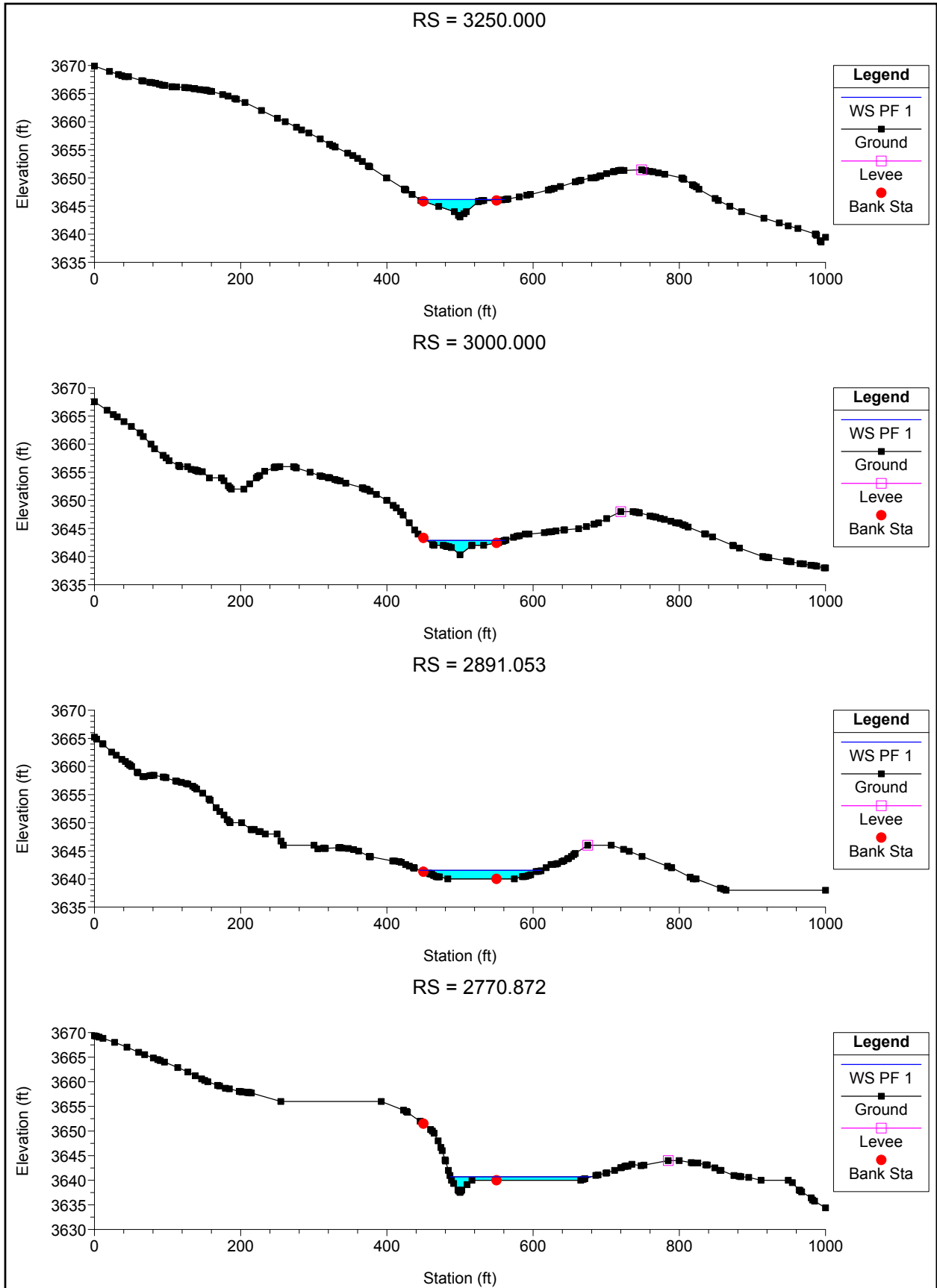


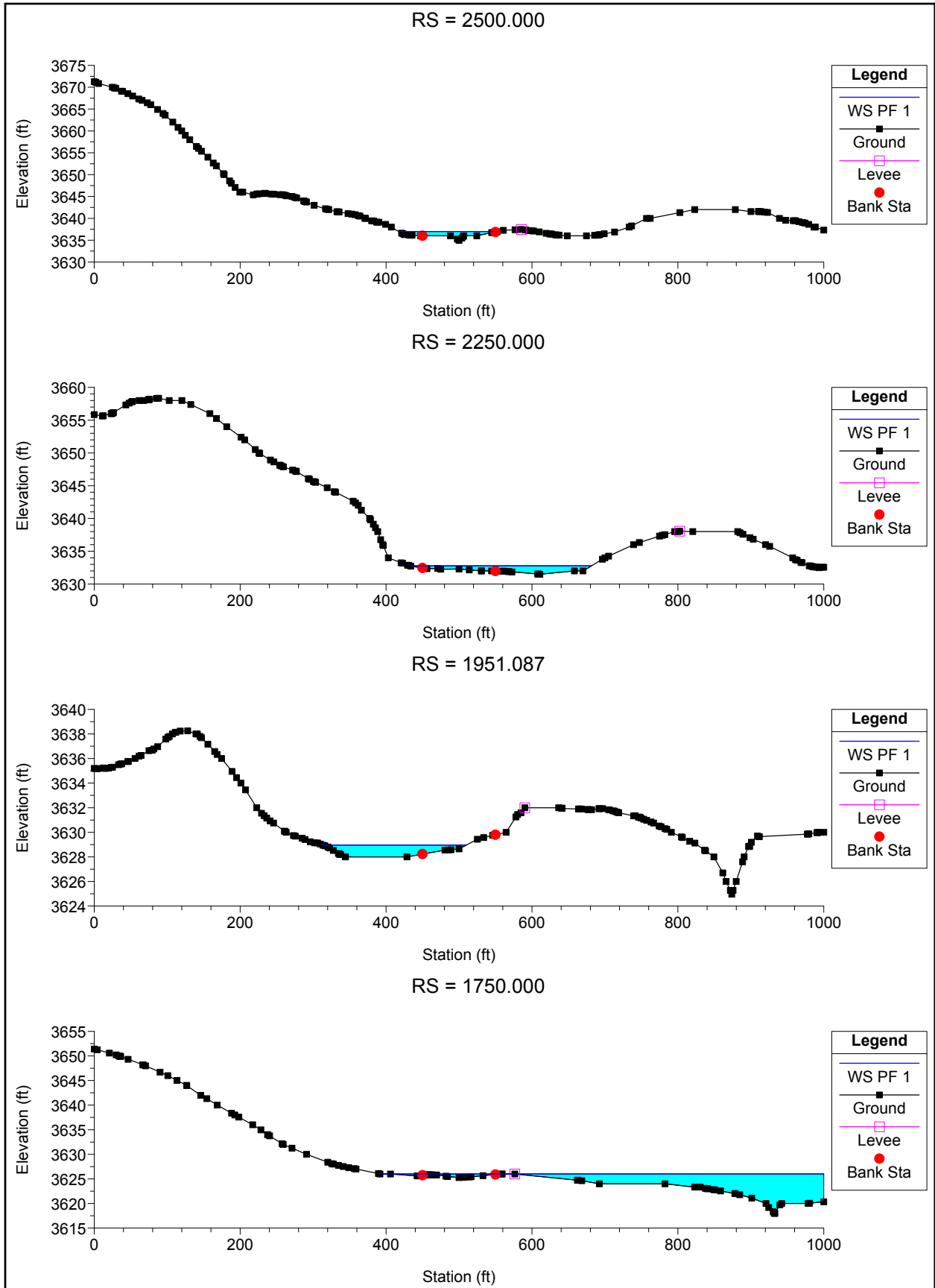


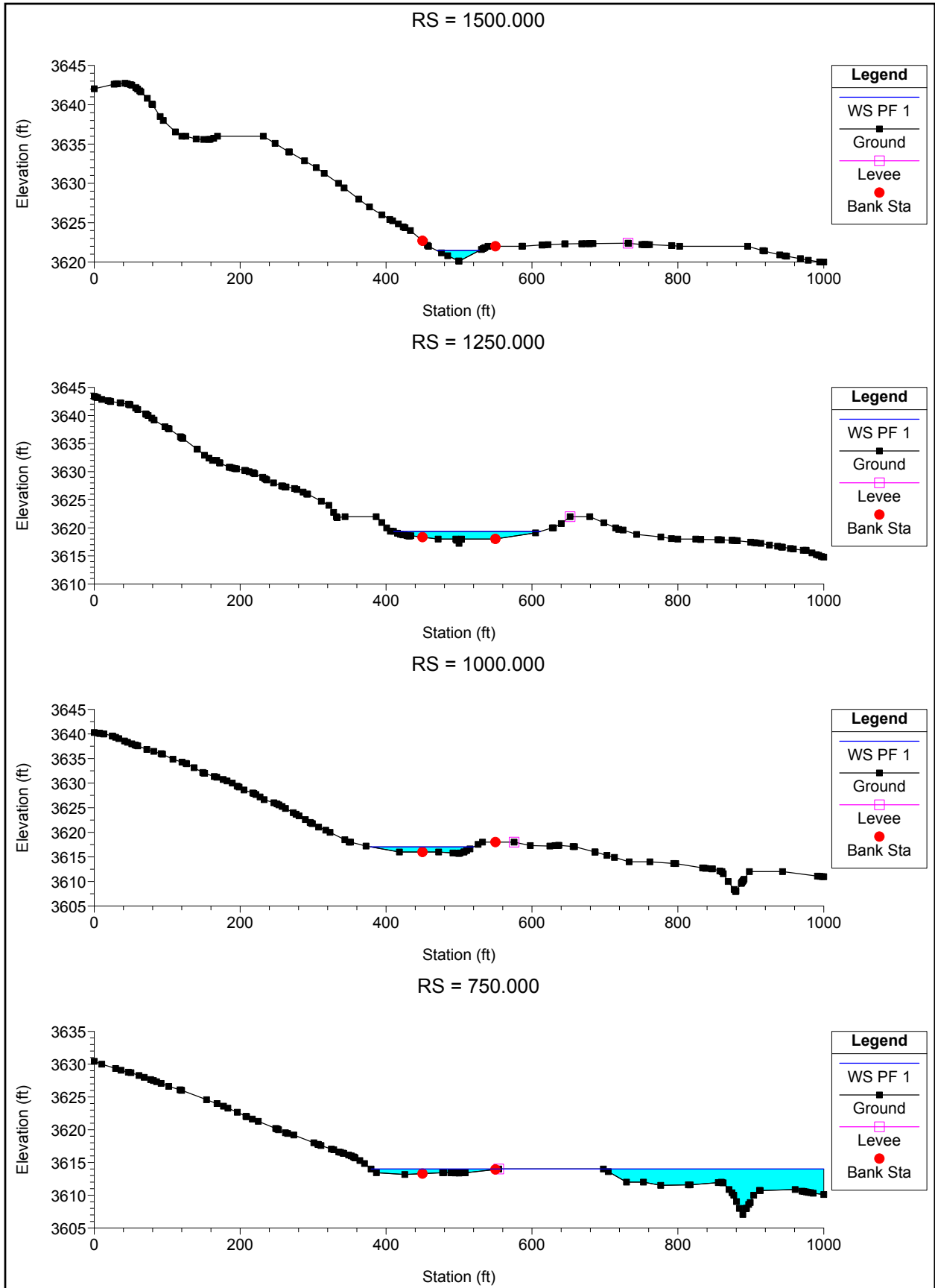


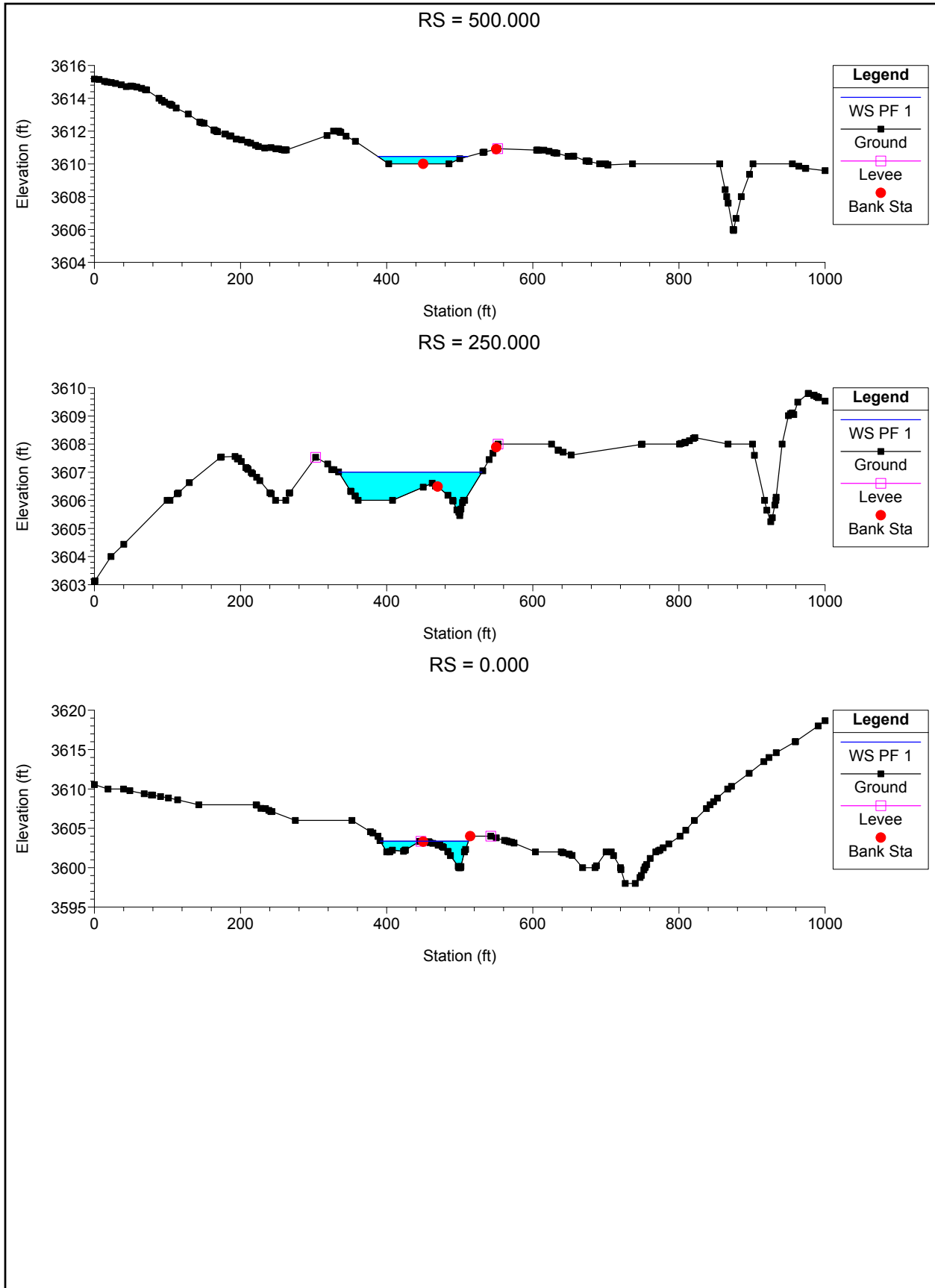










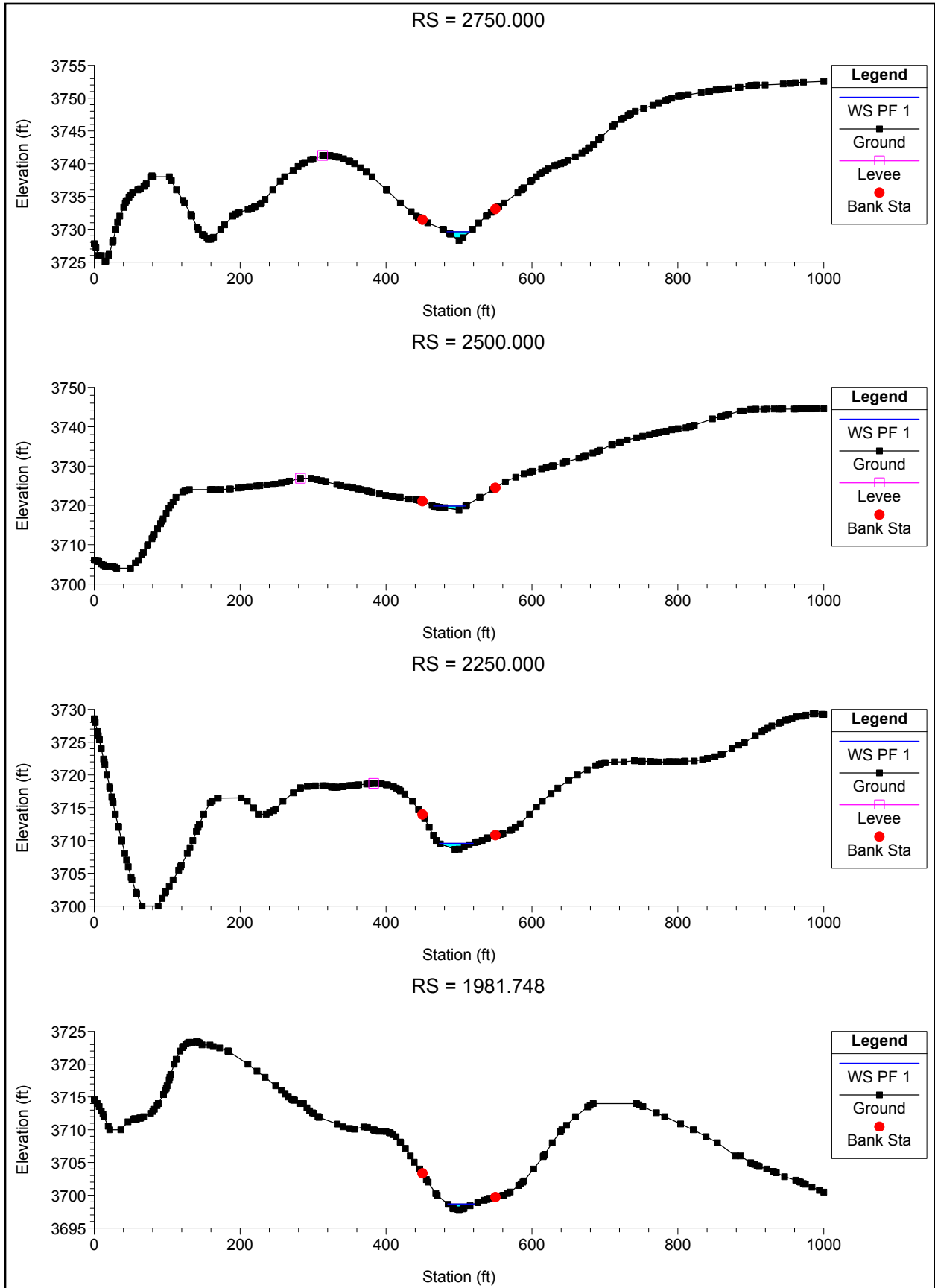


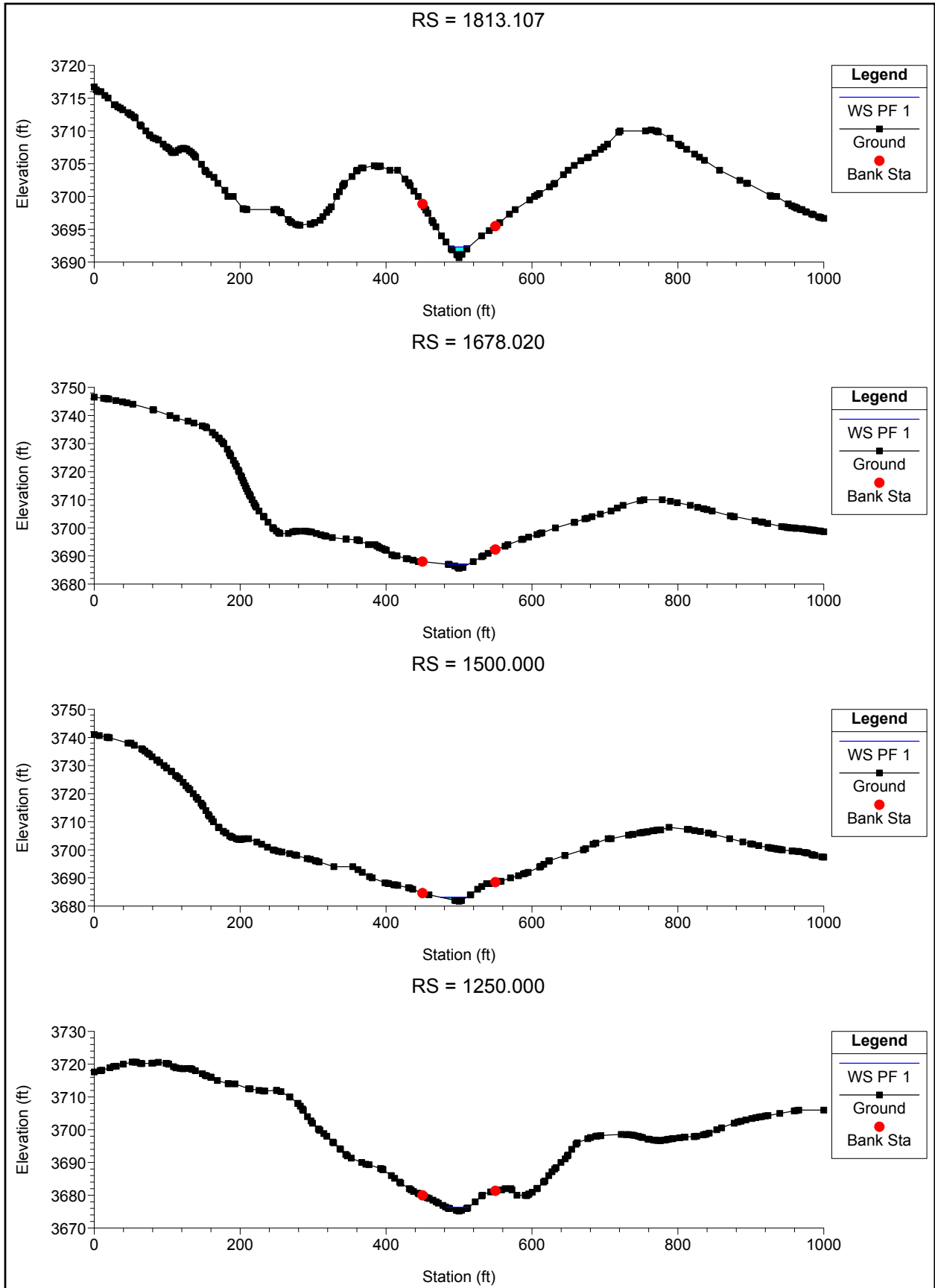
Attachment 2.7-M-24

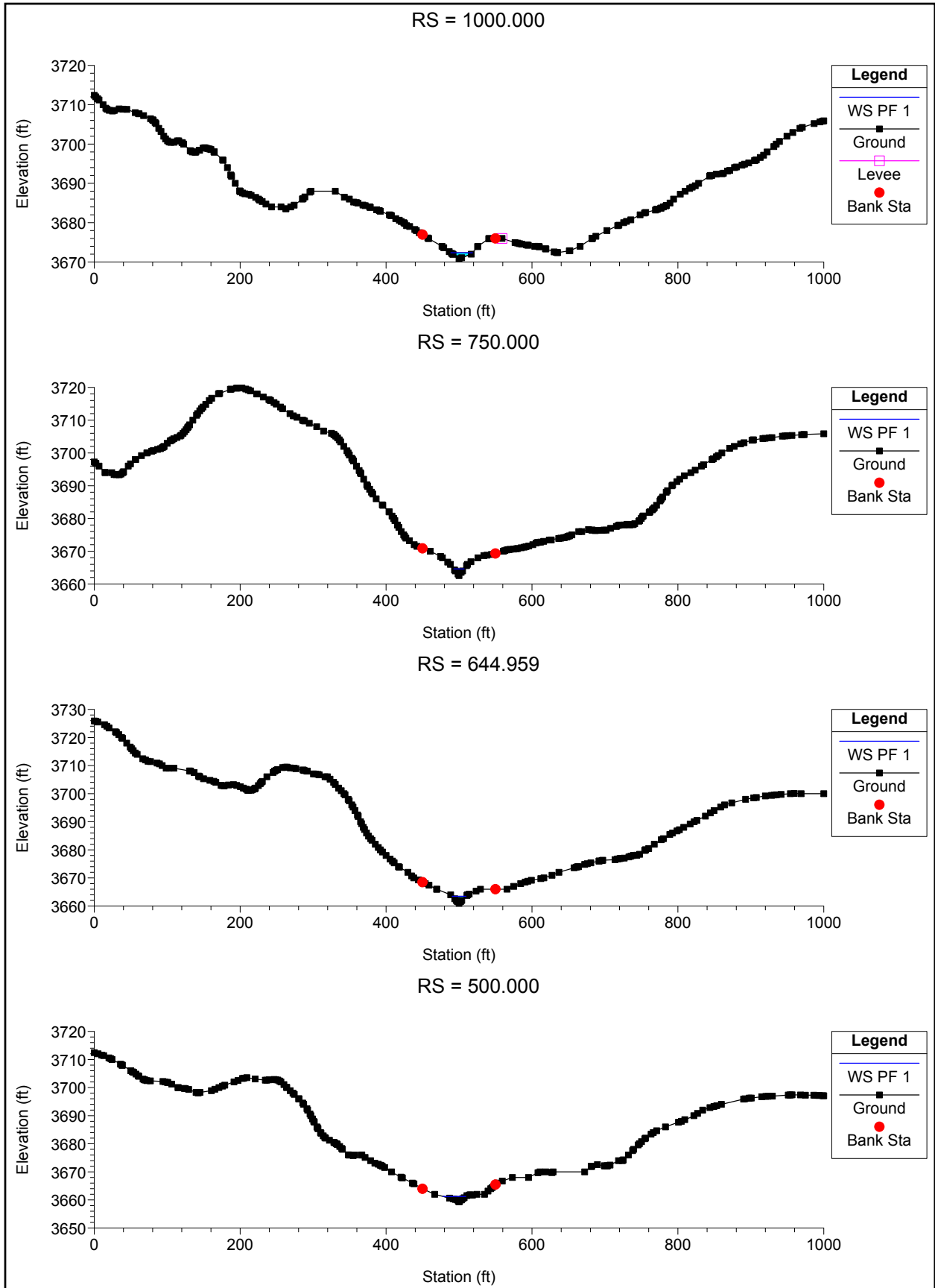
HEC-RAS Channel 13

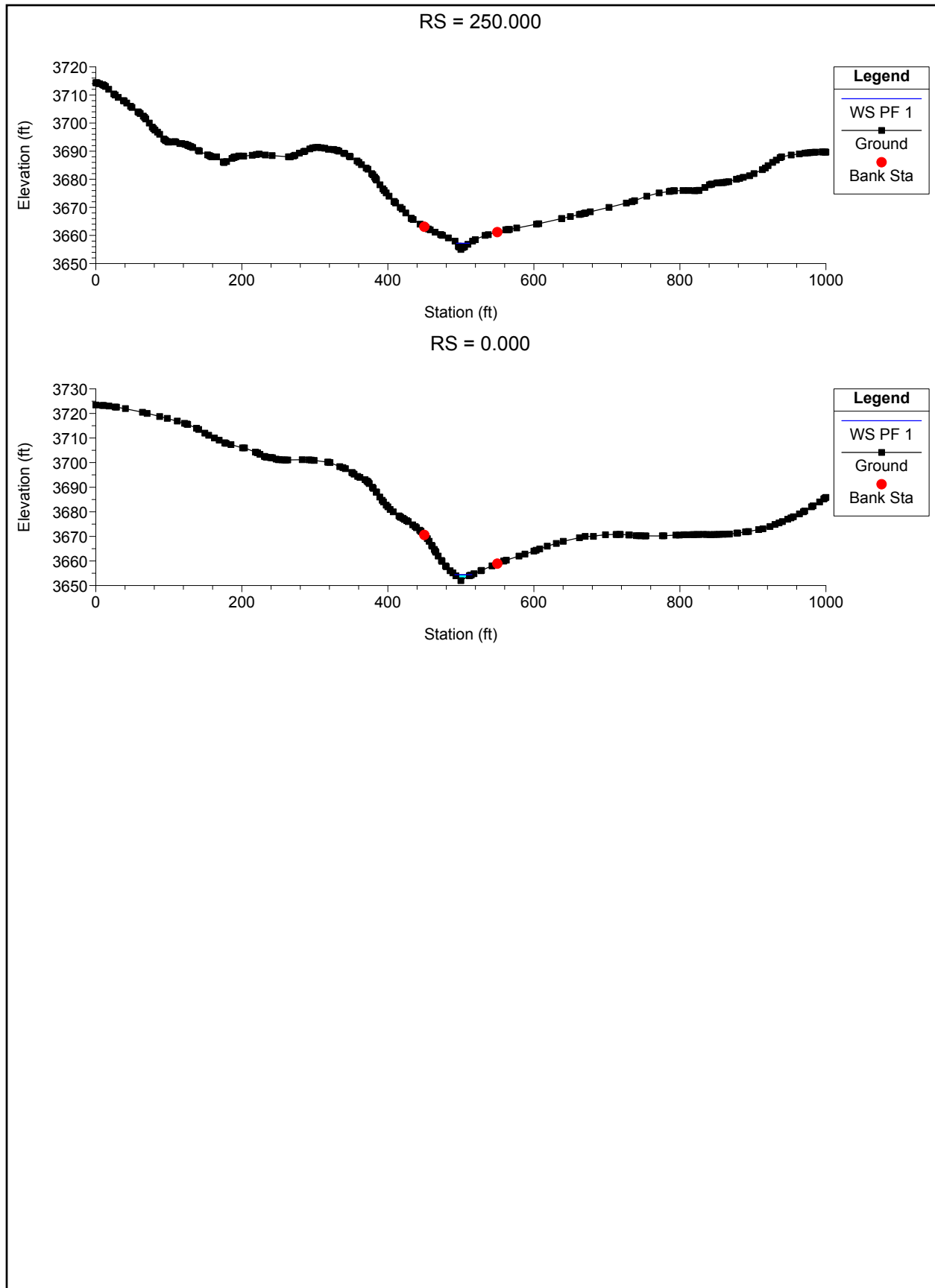


Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
13	2750	PF 1	126	3728.28	3729.62	3729.76	3730.17	0.033005	5.93	21.24	31.39	1.27
13	2500	PF 1	126	3718.87	3719.82	3719.97	3720.35	0.048909	5.85	21.55	43.78	1.47
13	2250	PF 1	126	3708.64	3709.58	3709.69	3710.01	0.037366	5.28	23.86	46.2	1.29
13	1981.748	PF 1	126	3697.7	3698.68	3698.87	3699.31	0.050598	6.33	19.9	36.79	1.52
13	1813.107	PF 1	126	3690.65	3692.29	3692.42	3692.88	0.02992	6.17	20.42	26.31	1.23
13	1678.02	PF 1	126	3685.6	3687.06	3687.29	3687.78	0.049553	6.83	18.44	29.81	1.53
13	1500	PF 1	126	3681.7	3683.12	3683.12	3683.5	0.020603	4.9	25.71	35.51	1.01
13	1250	PF 1	126	3675.16	3676.35	3676.51	3676.97	0.039212	6.31	19.96	30.55	1.38
13	1000	PF 1	126	3670.89	3672.36	3672.36	3672.77	0.019738	5.19	24.28	29.73	1.01
13	750	PF 1	126	3662.6	3664.62	3665.02	3665.89	0.049274	9.04	13.94	14.26	1.61
13	644.959	PF 1	126	3660.93	3663.48	3663.33	3663.94	0.013051	5.43	23.21	18.92	0.86
13	500	PF 1	126	3659.32	3661.25	3661.25	3661.66	0.020521	5.14	24.52	31.21	1.02
13	250	PF 1	126	3655.02	3657.2	3657.34	3657.93	0.025987	6.85	18.39	17.71	1.19
13	0	PF 1	126	3652	3654.41	3654.15	3654.75	0.010008	4.62	27.27	23.51	0.76







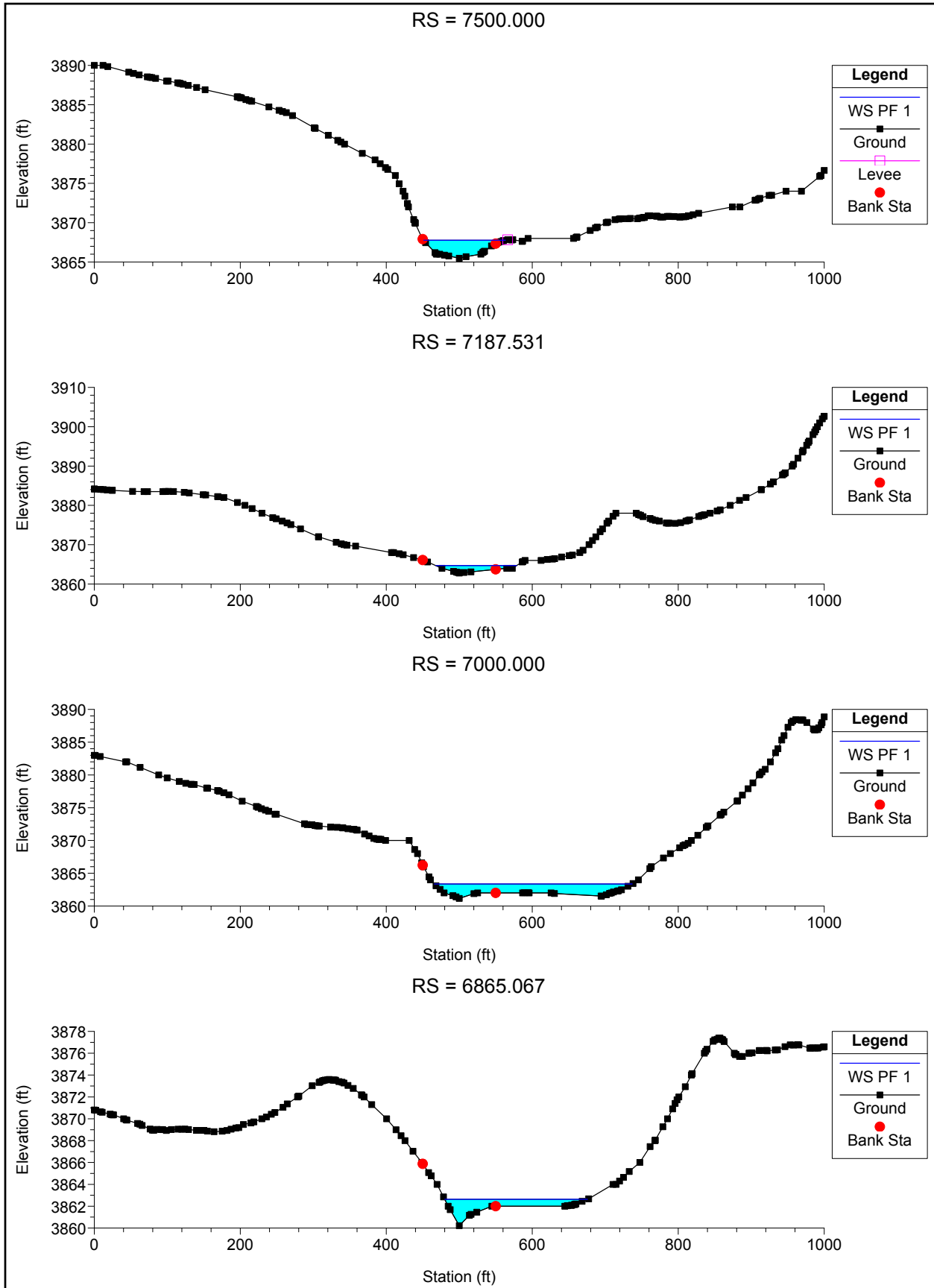


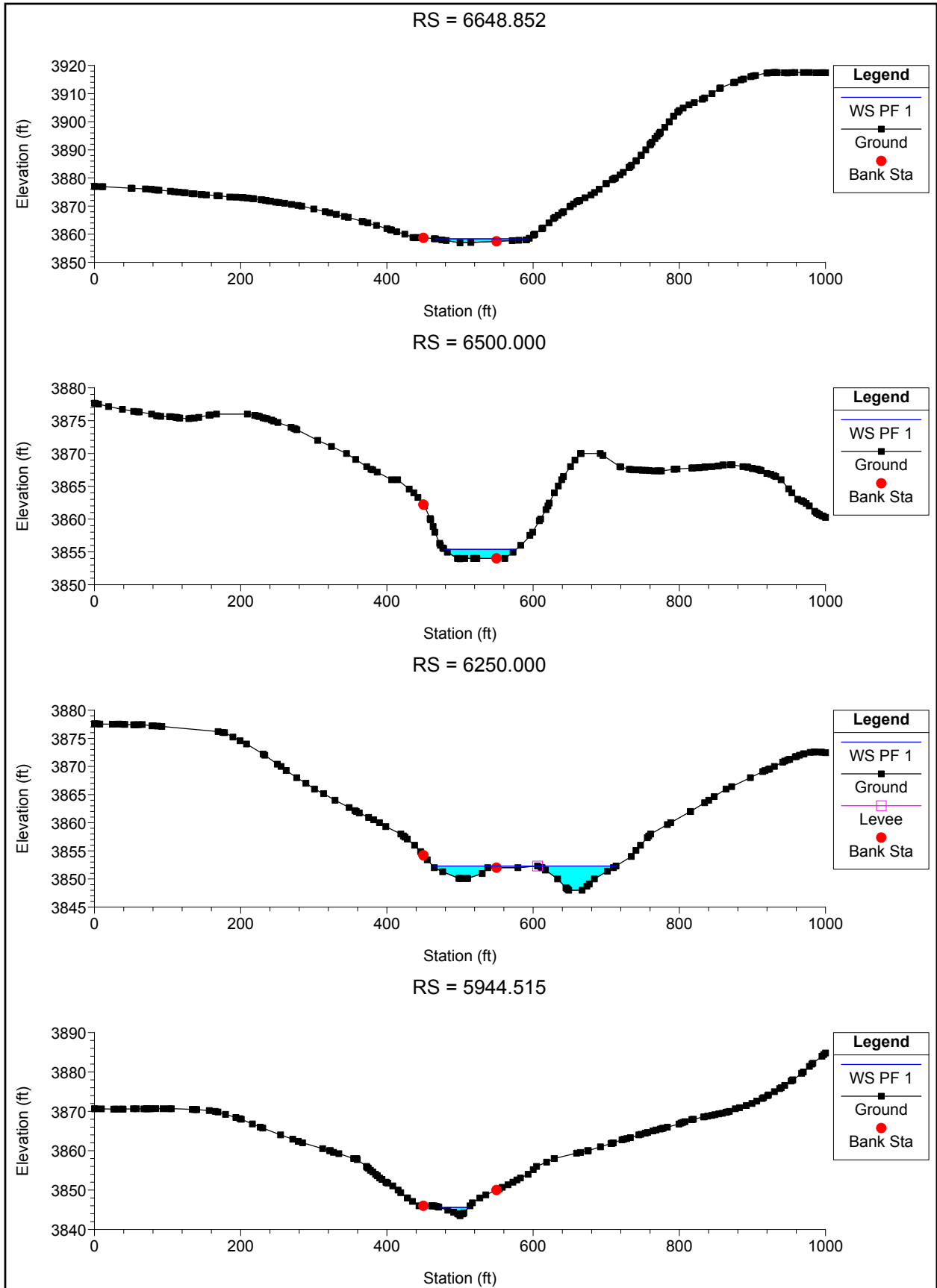
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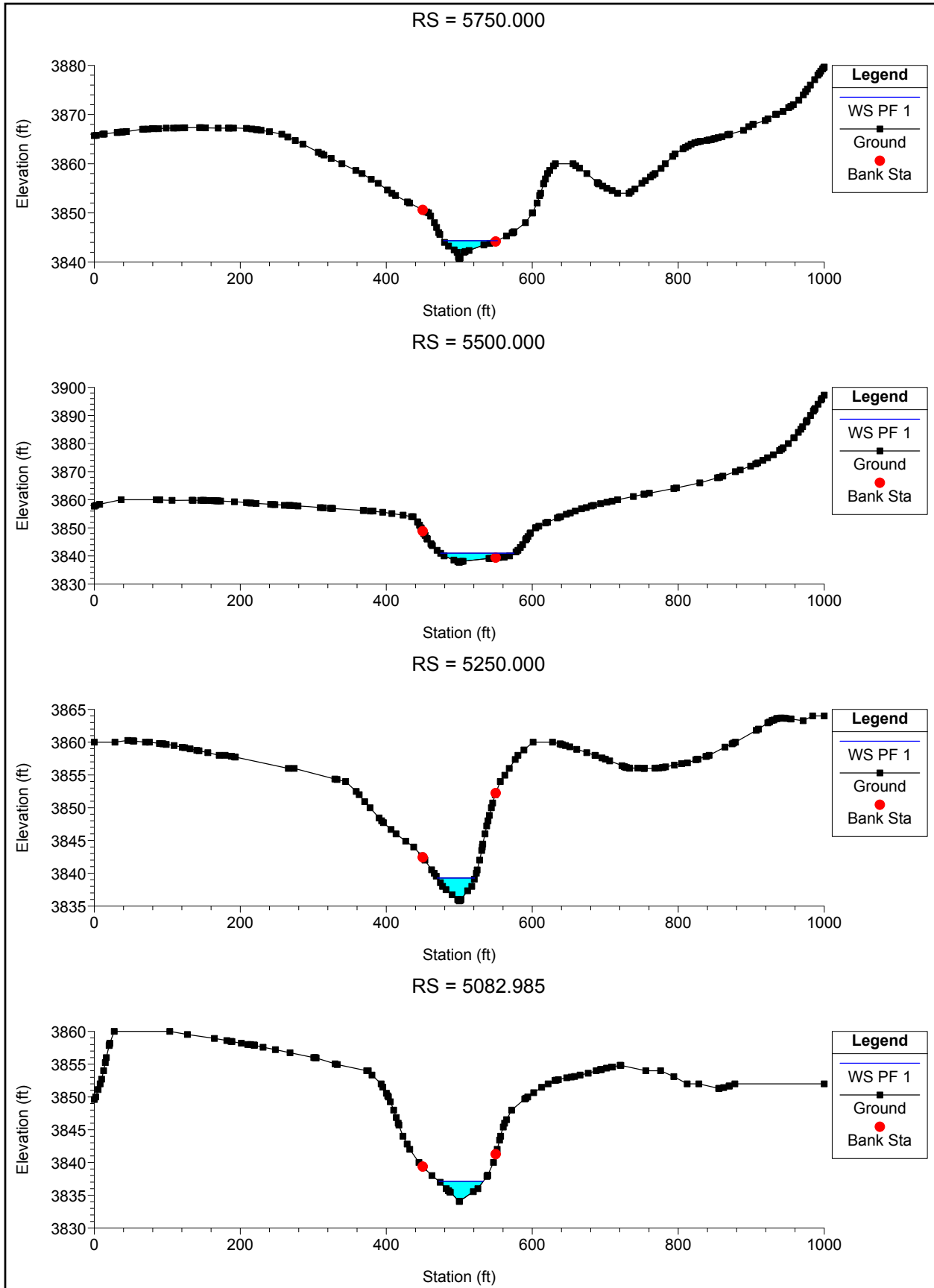
HEC-RAS Channel 14

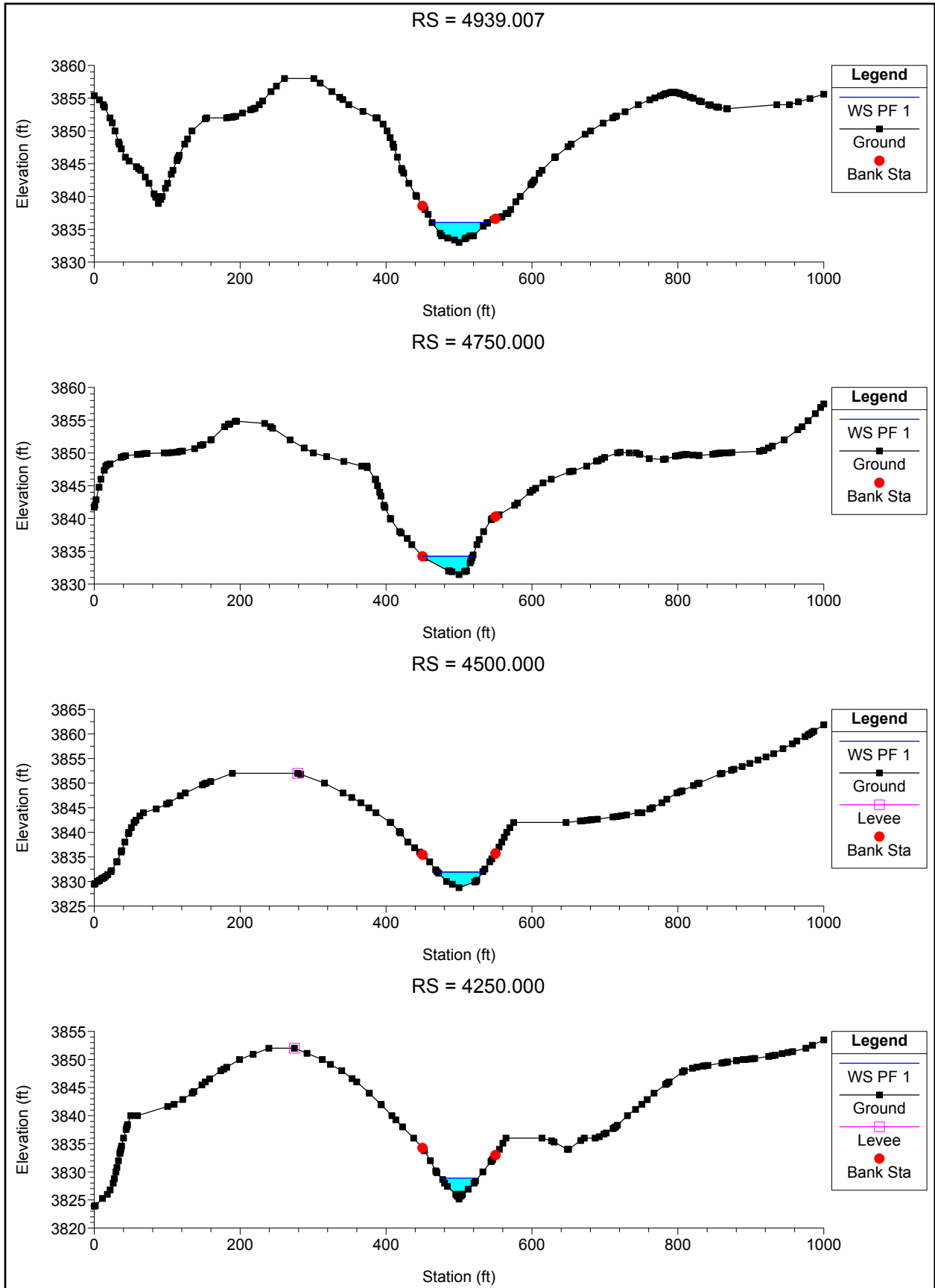


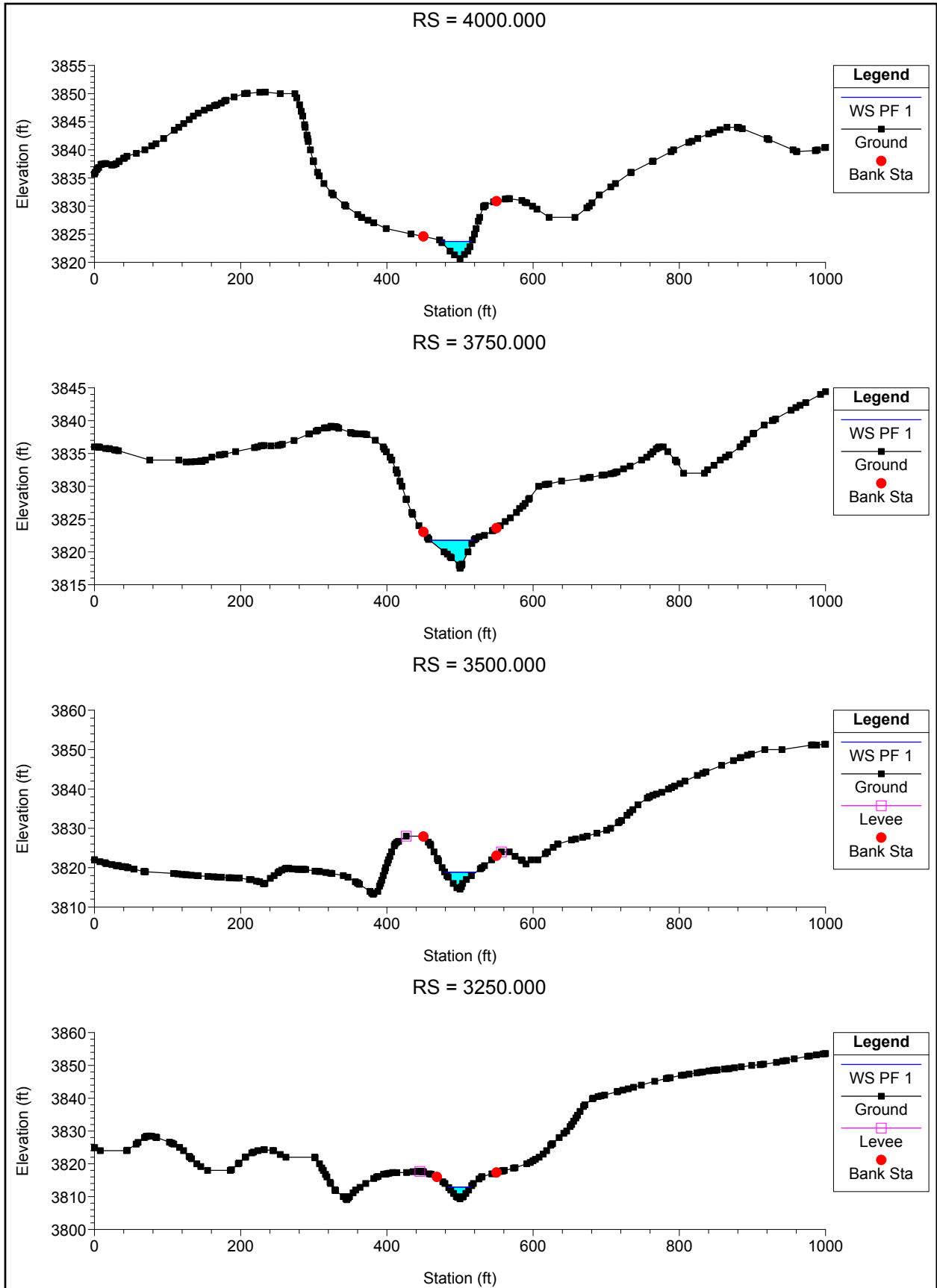
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
14	7500	PF 1	730	3865.49	3867.77	3867.33	3868.09	0.006234	4.59	160.82	111.96	0.64
14	7187.531	PF 1	730	3862.78	3864.69	3864.69	3865.25	0.015655	6.22	123.86	110.57	0.97
14	7000	PF 1	730	3861.17	3863.36	3862.52	3863.42	0.001273	1.95	382.78	270.93	0.28
14	6865.067	PF 1	730	3860.22	3862.63	3862.63	3863.02	0.013369	5.65	158.01	195.65	0.89
14	6648.852	PF 1	730	3856.93	3858.38	3858.55	3859.08	0.027492	7.03	111.19	127.78	1.24
14	6500	PF 1	730	3853.94	3855.39	3855.42	3856.02	0.01794	6.55	115.04	98.15	1.04
14	6250	PF 1	730	3850.09	3852.3	3852.3	3852.36	0.001214	1.77	375.66	250.62	0.27
14	5944.515	PF 1	730	3843.49	3845.61	3846.72	3850.92	0.192711	18.49	39.49	39.68	3.27
14	5750	PF 1	730	3840.62	3844.35	3844.35	3845.09	0.015912	6.9	105.92	73.89	1
14	5500	PF 1	730	3837.8	3841	3840.21	3841.23	0.003193	4	192.48	100.58	0.48
14	5250	PF 1	730	3835.79	3839.28	3839.08	3840.06	0.011159	7.09	102.9	51.16	0.88
14	5082.985	PF 1	730	3834.06	3837.13	3837.12	3837.96	0.015318	7.3	100.02	60.77	1
14	4939.007	PF 1	730	3833	3836.04		3836.46	0.006825	5.22	139.78	76.62	0.68
14	4750	PF 1	730	3831.44	3834.23	3834.09	3834.88	0.012111	6.48	112.7	68.74	0.89
14	4500	PF 1	730	3828.74	3831.92	3831.5	3832.46	0.007851	5.93	123.15	61.83	0.74
14	4250	PF 1	730	3825.16	3828.89	3828.89	3829.82	0.014646	7.76	94.02	50.02	1
14	4000	PF 1	730	3820.65	3823.72	3824.16	3825.2	0.025324	9.78	74.66	42.35	1.3
14	3750	PF 1	730	3817.52	3821.77	3821.4	3822.37	0.009102	6.25	116.78	60.15	0.79
14	3500	PF 1	730	3814.57	3818.87	3818.87	3819.9	0.014115	8.16	89.41	42.41	0.99
14	3250	PF 1	730	3809.36	3812.92	3813.58	3815.08	0.031349	11.78	61.96	30.69	1.46
14	3000	PF 1	2032	3804	3811.34	3811.08	3812.79	0.010023	9.64	210.75	59.58	0.9
14	2750	PF 1	2032	3802.2	3808.99	3808.73	3810.25	0.010107	9.01	225.61	72.26	0.9
14	2500	PF 1	2032	3800.13	3807.35		3808.19	0.006148	7.37	275.79	82.39	0.71
14	2250	PF 1	2032	3798.06	3805.2		3806.37	0.008627	8.65	234.92	70.66	0.84
14	2000	PF 1	2032	3795.83	3803.53		3804.35	0.006866	7.29	282.09	103.37	0.74
14	1750	PF 1	2032	3794.66	3802.24		3802.86	0.004827	6.35	320.64	104.3	0.63
14	1500	PF 1	2032	3793.45	3799.71	3799.67	3801.07	0.011662	9.36	219.58	83.7	0.96
14	1250	PF 1	2032	3791.77	3797.59	3797.35	3798.61	0.008151	8.33	265.52	111.3	0.81
14	1125.154	PF 1	2032	3790.2	3796.39	3796.25	3797.49	0.010894	8.44	243.15	100.28	0.91
14	1000	PF 1	2032	3789.44	3794.93	3794.93	3796.03	0.012457	8.44	245.97	129.65	0.96
14	750	PF 1	2032	3787.73	3792.54	3792.34	3793.35	0.008065	7.93	304.99	149.53	0.8
14	500	PF 1	2032	3785.6	3791.34		3791.93	0.005113	6.7	348.7	143.98	0.65
14	250	PF 1	2032	3784.13	3789.15	3789.06	3790.4	0.010771	9.09	231.91	91.25	0.93
14	0	PF 1	2032	3782	3787.13	3786.66	3788.04	0.00801	7.66	265.15	91.93	0.8

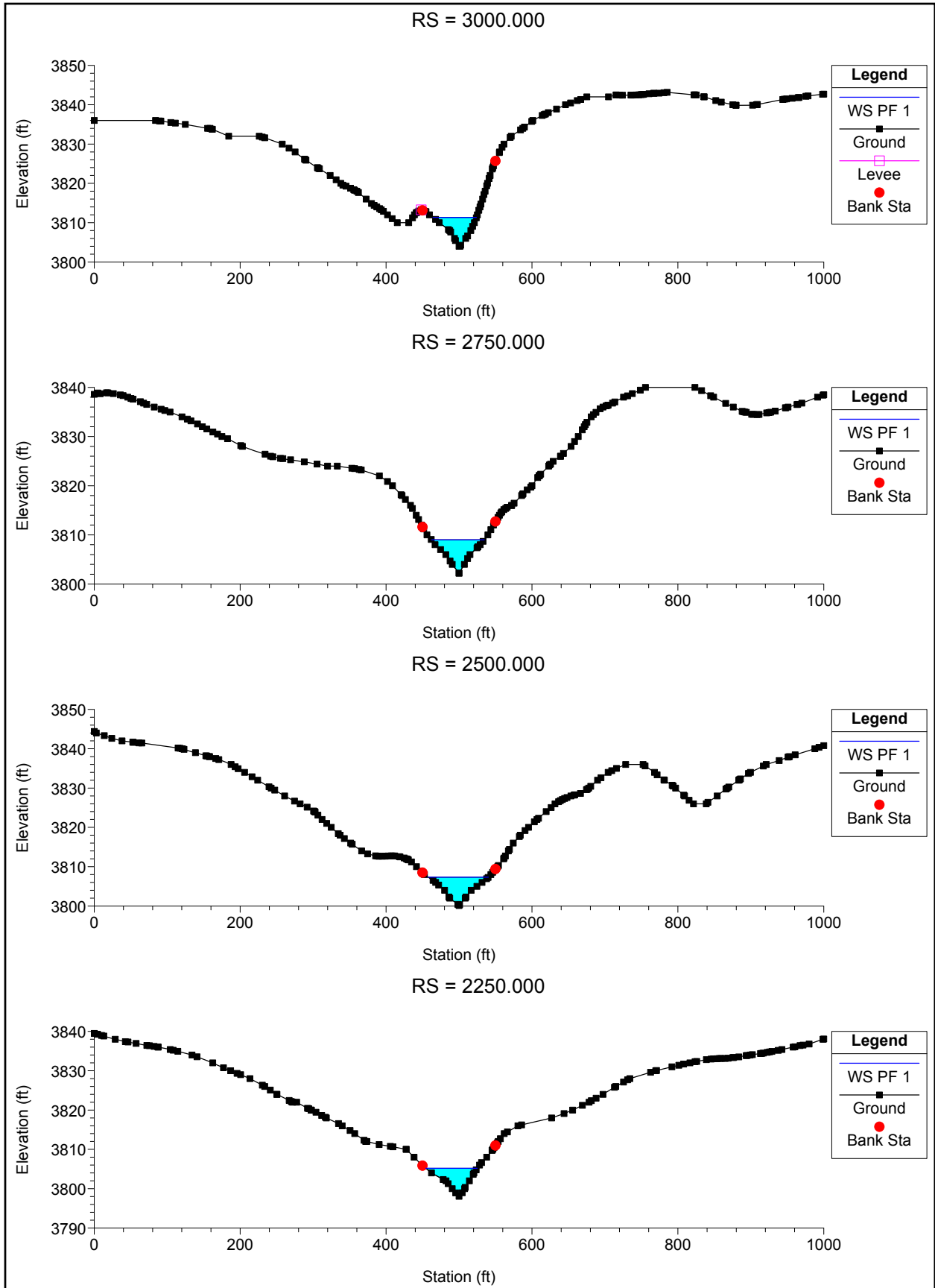


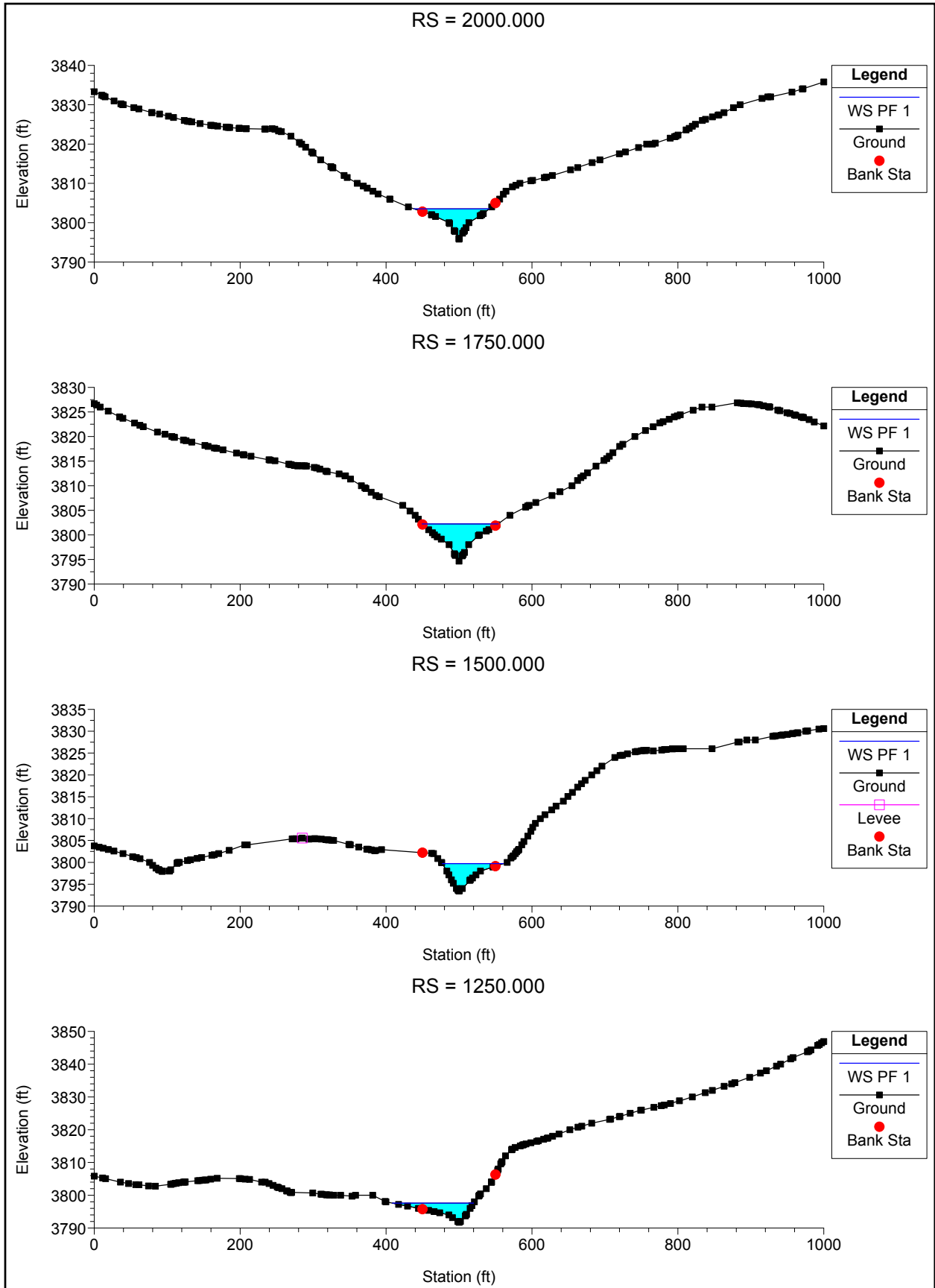


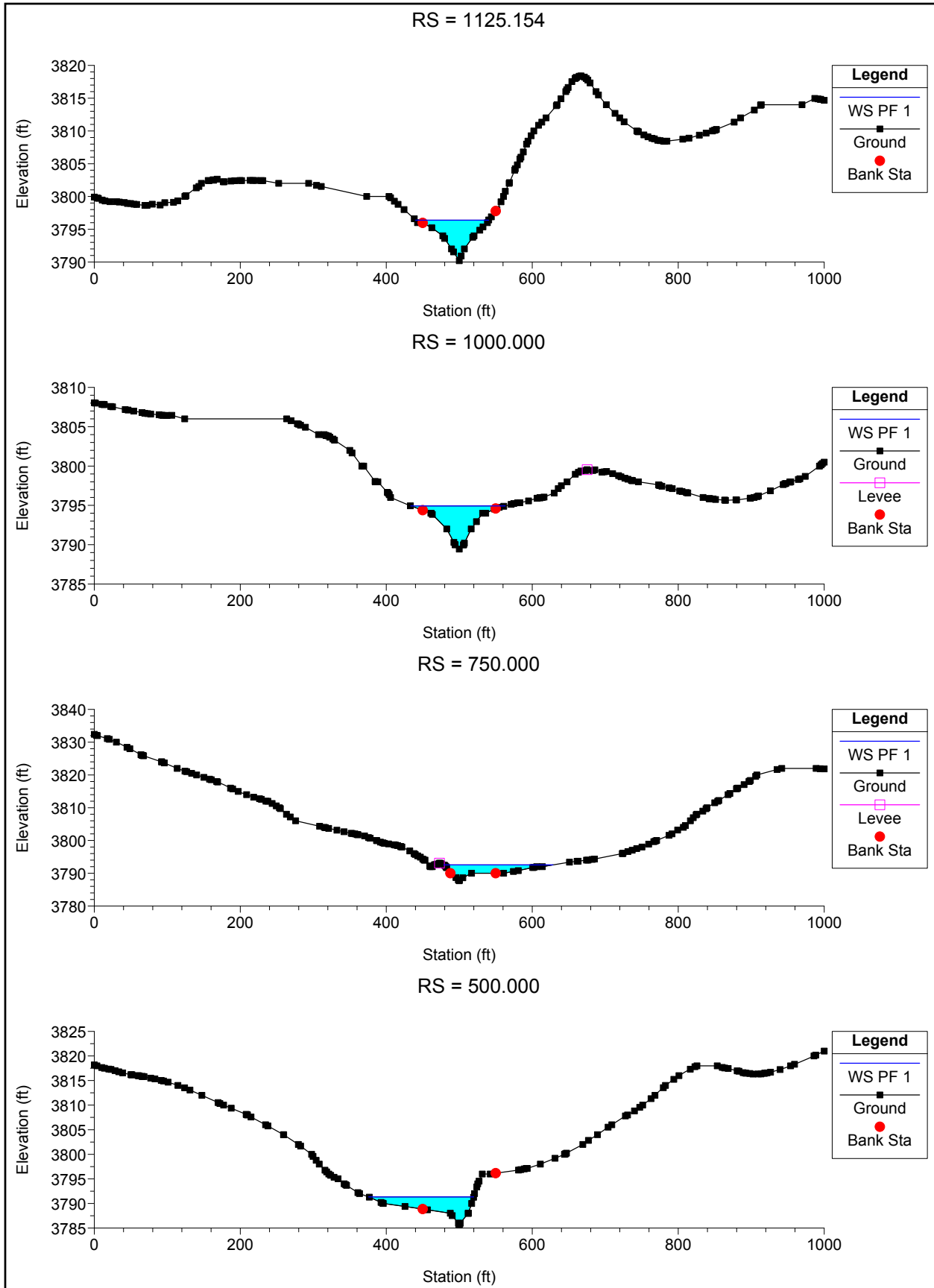


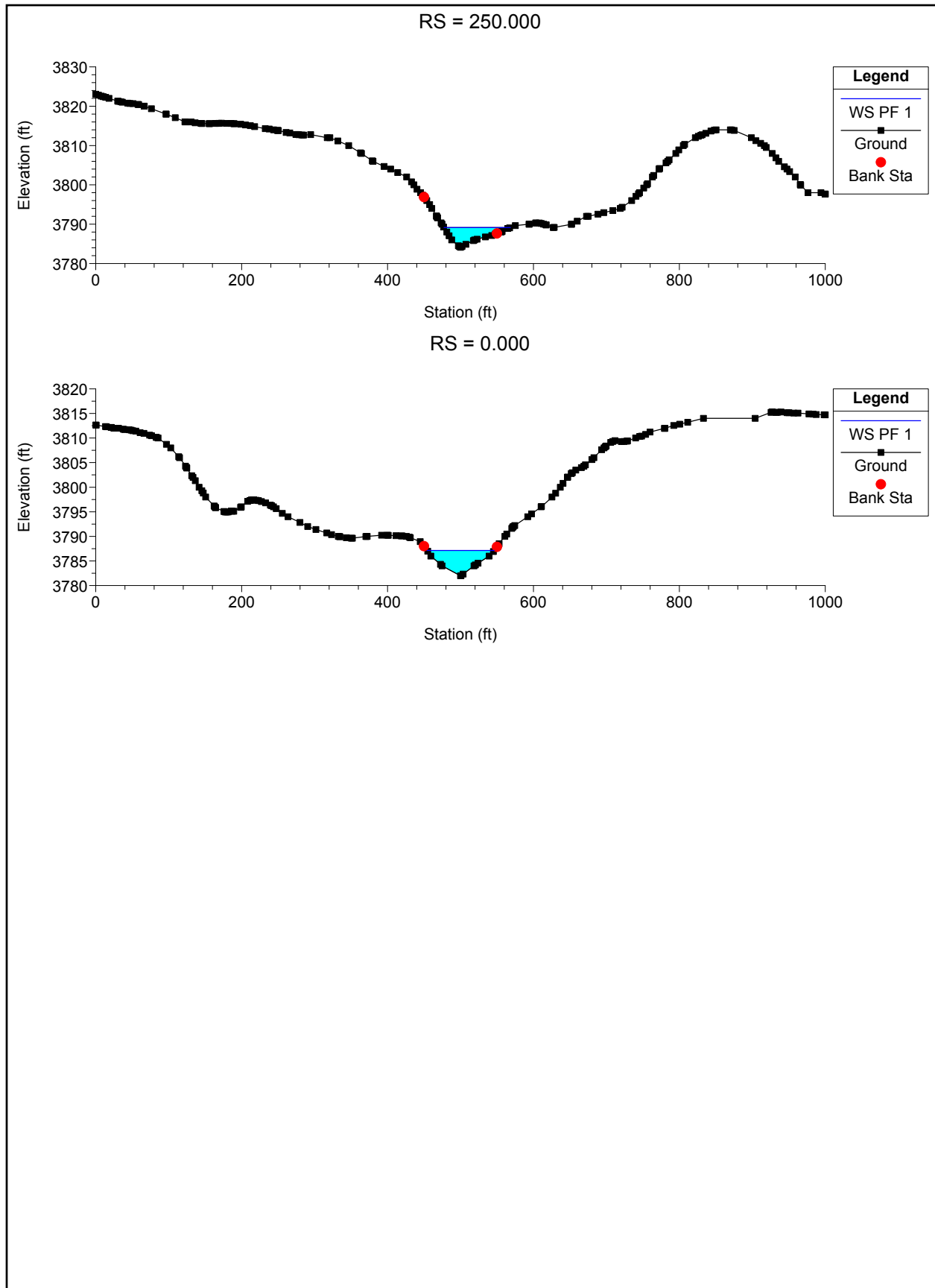










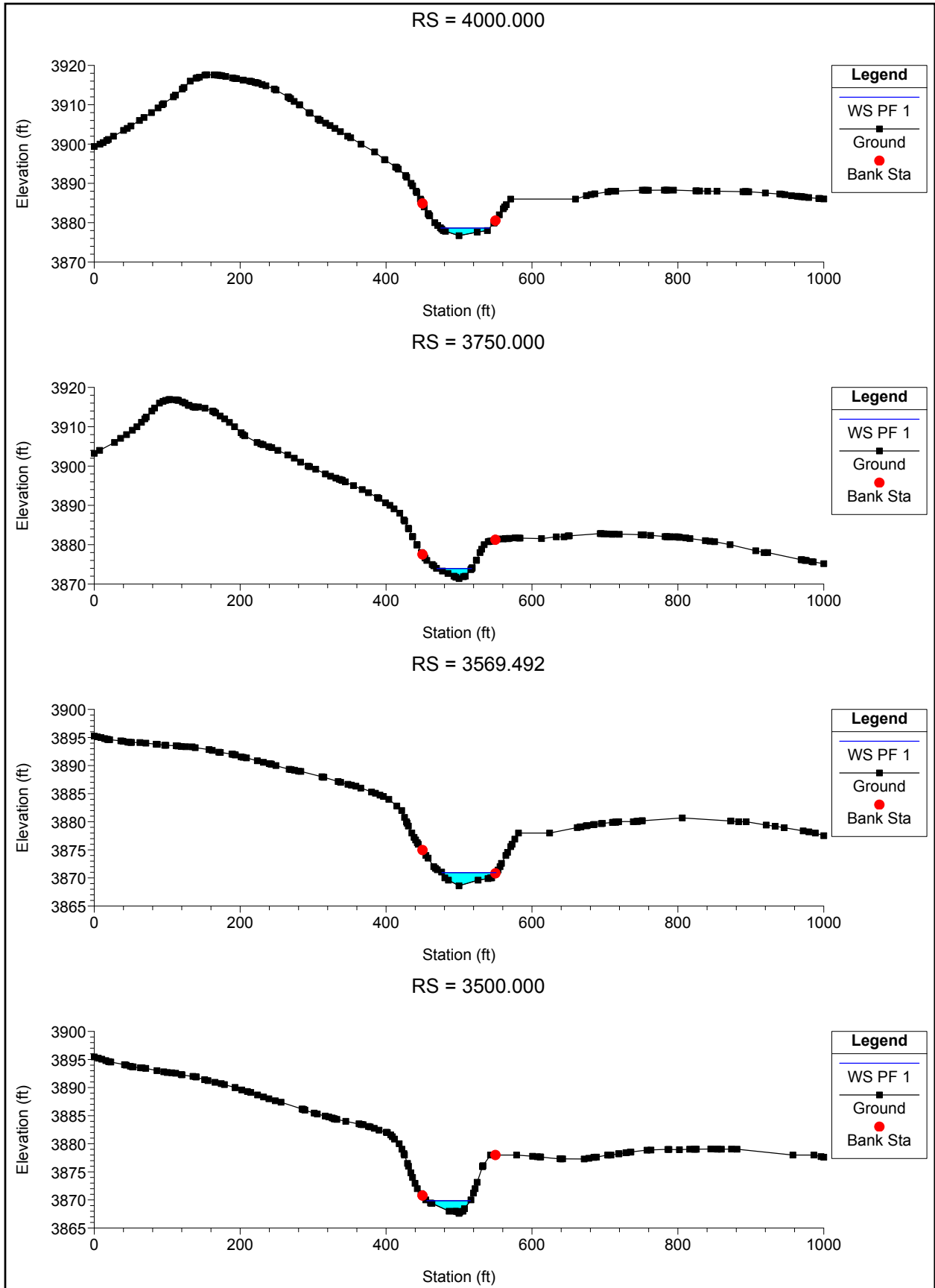


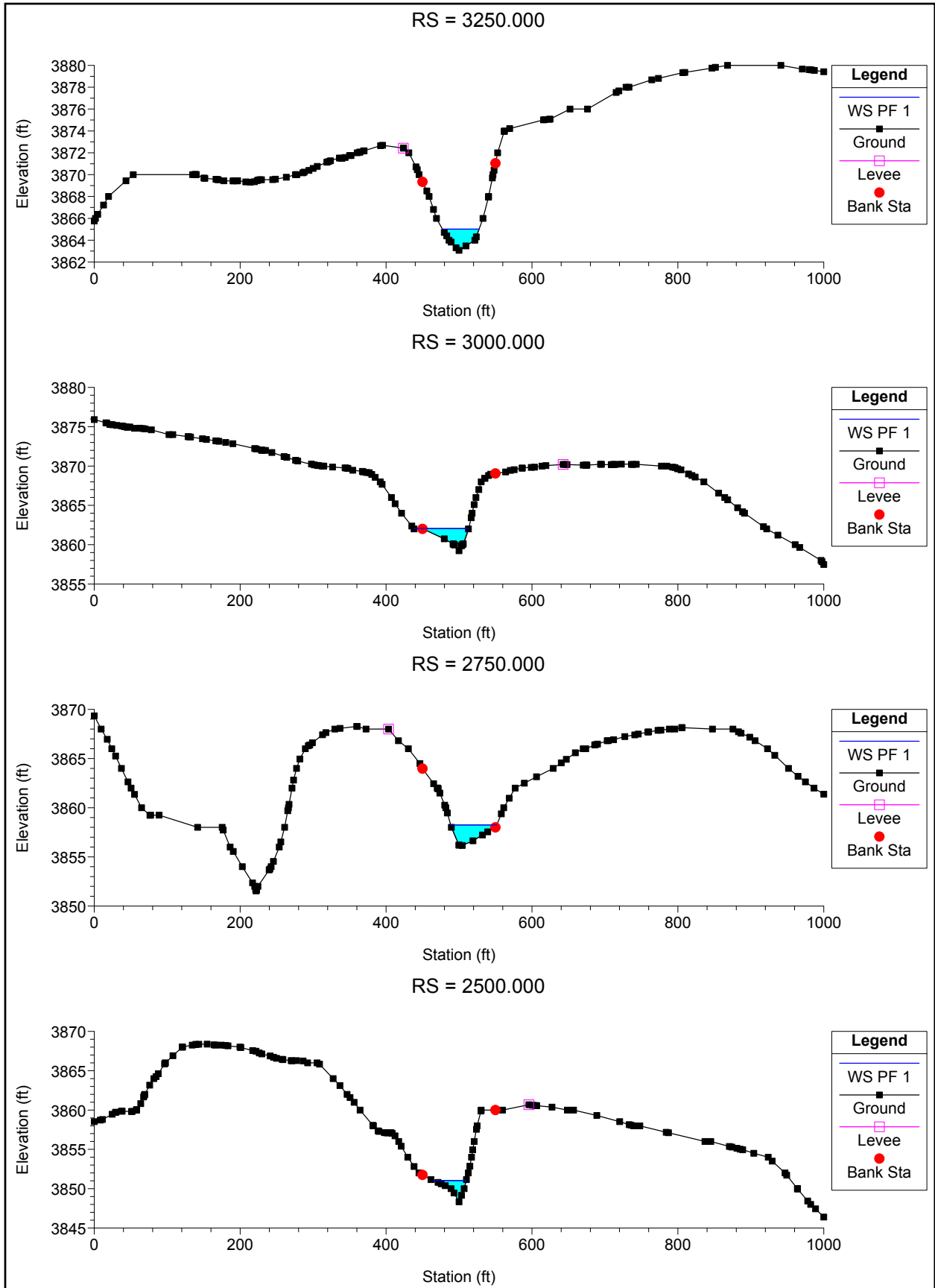
Attachment 2.7-M-26

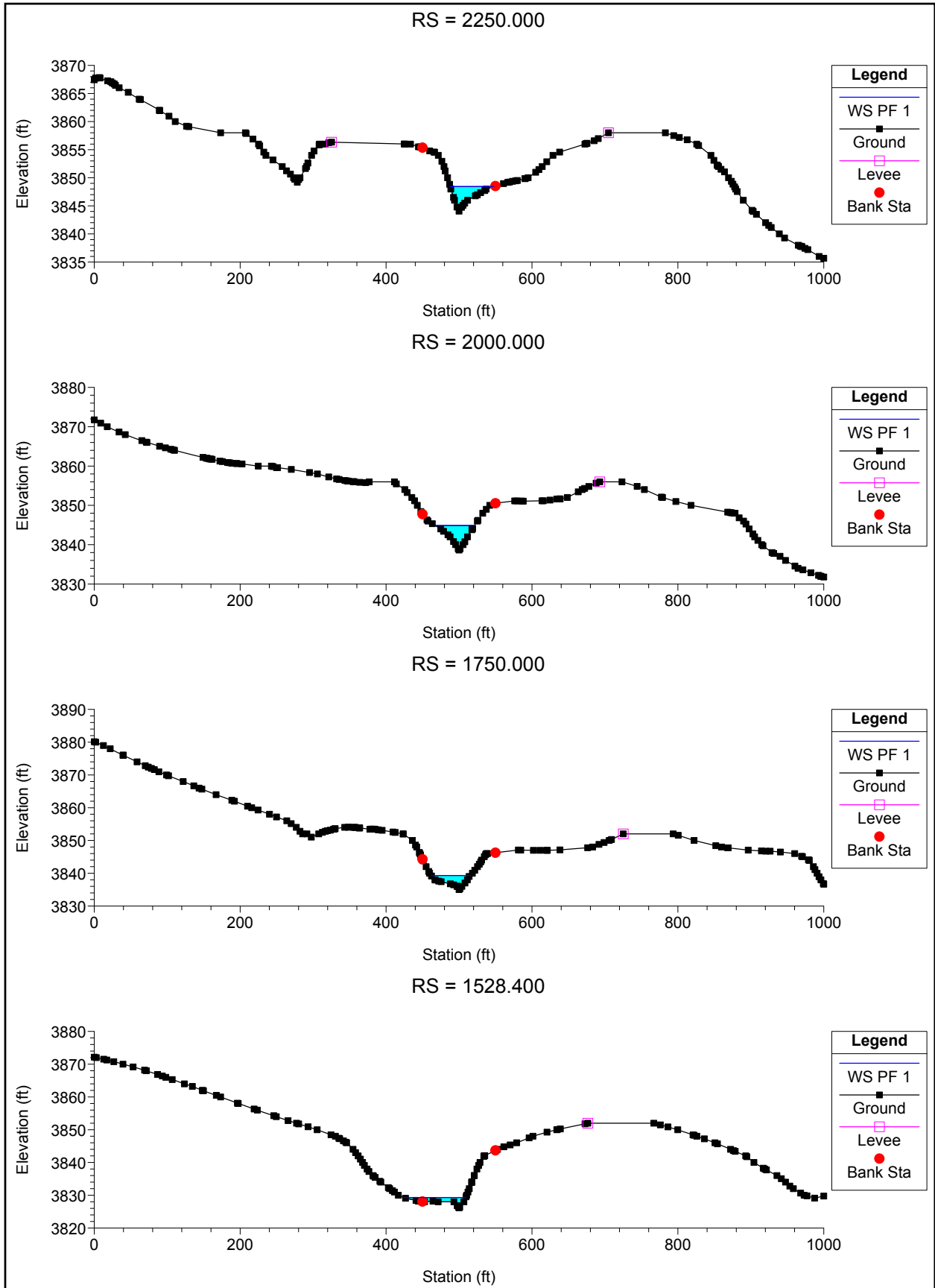
HEC-RAS Channel 14A

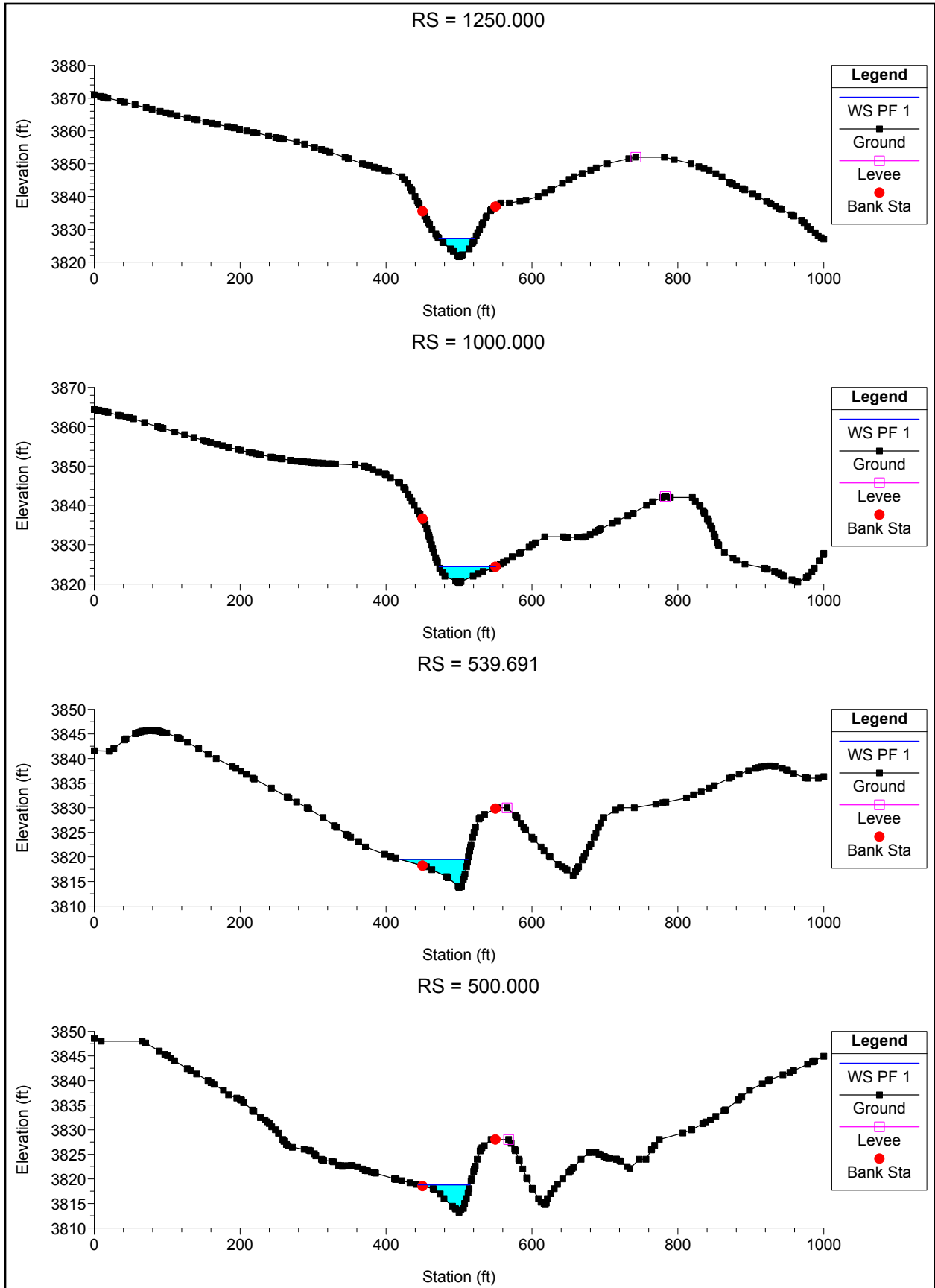


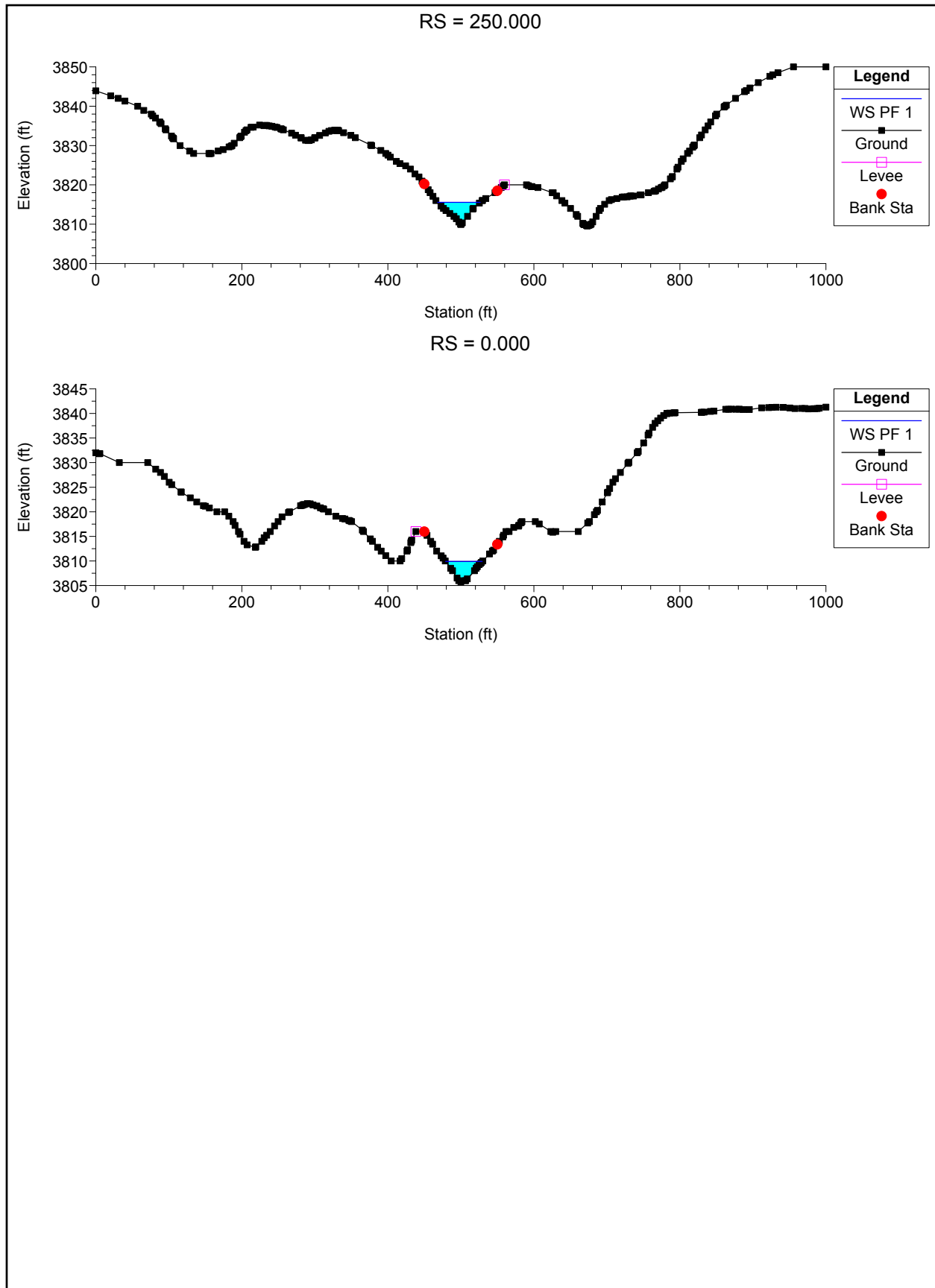
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
14A	4000	PF 1	486	3876.71	3878.63	3878.64	3879.24	0.017538	6.23	78.07	66.82	1.01
14A	3750	PF 1	486	3871.4	3873.94	3874.03	3874.78	0.019636	7.37	65.95	47.5	1.1
14A	3569.492	PF 1	486	3868.61	3870.95	3870.58	3871.27	0.007083	4.56	106.51	74.26	0.67
14A	3500	PF 1	486	3867.62	3869.87	3869.87	3870.51	0.017001	6.45	75.37	59.66	1.01
14A	3250	PF 1	486	3863.07	3865.01	3865.27	3866.03	0.029115	8.12	59.86	50.25	1.31
14A	3000	PF 1	486	3859.23	3862.07	3862.05	3862.64	0.015007	6.07	80.78	75.14	0.95
14A	2750	PF 1	486	3856.16	3858.25	3858.25	3858.86	0.01634	6.3	77.28	62.95	0.99
14A	2500	PF 1	486	3848.34	3851.04	3851.6	3852.74	0.059203	10.48	46.38	44.87	1.82
14A	2250	PF 1	486	3844.06	3848.43	3847.68	3848.74	0.00532	4.52	107.42	59.79	0.59
14A	2000	PF 1	1428	3838.63	3844.89	3844.89	3846.27	0.01295	9.42	151.65	54.16	0.99
14A	1750	PF 1	1428	3835.03	3839.33	3840	3841.62	0.02955	12.16	117.41	53.53	1.45
14A	1528.4	PF 1	1428	3826.16	3829.31	3830.23	3832.45	0.074781	14.75	103.65	84.87	2.16
14A	1250	PF 1	1428	3821.59	3827.23	3827.03	3828.55	0.010668	9.21	155.01	49.48	0.92
14A	1000	PF 1	1428	3820.37	3824.39	3824.39	3825.48	0.013745	8.39	170.3	77.57	1
14A	539.691	PF 1	1428	3813.73	3819.49	3818.89	3820.21	0.005845	6.92	219.24	93.18	0.68
14A	500	PF 1	1428	3813.21	3818.77	3818.63	3819.86	0.011181	8.38	170.89	71.07	0.91
14A	250	PF 1	1428	3809.98	3815.55	3815.55	3816.85	0.01295	9.17	155.66	58.39	0.99
14A	0	PF 1	1428	3805.77	3809.89	3810.64	3812.27	0.028592	12.38	115.33	50.15	1.44









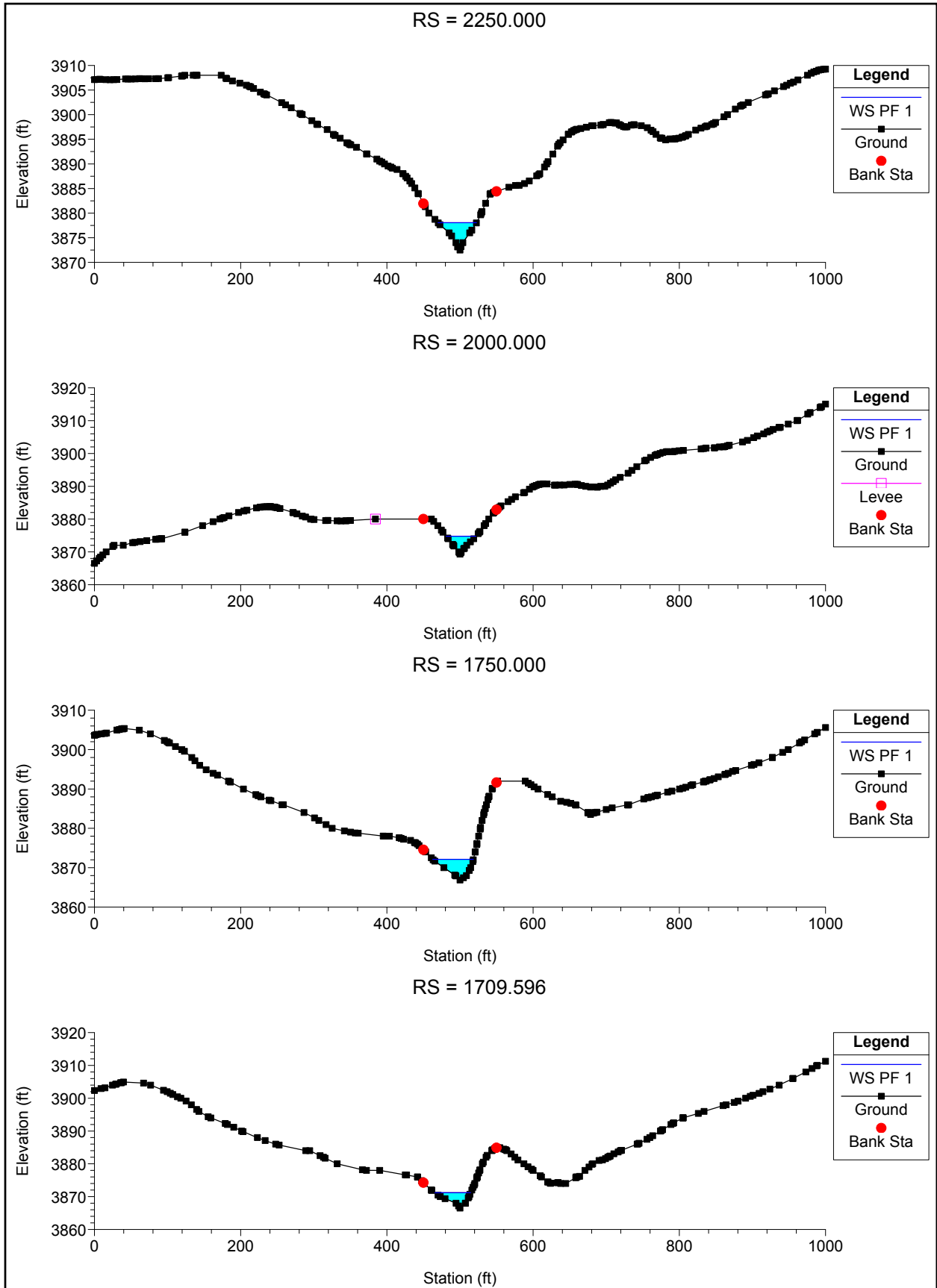


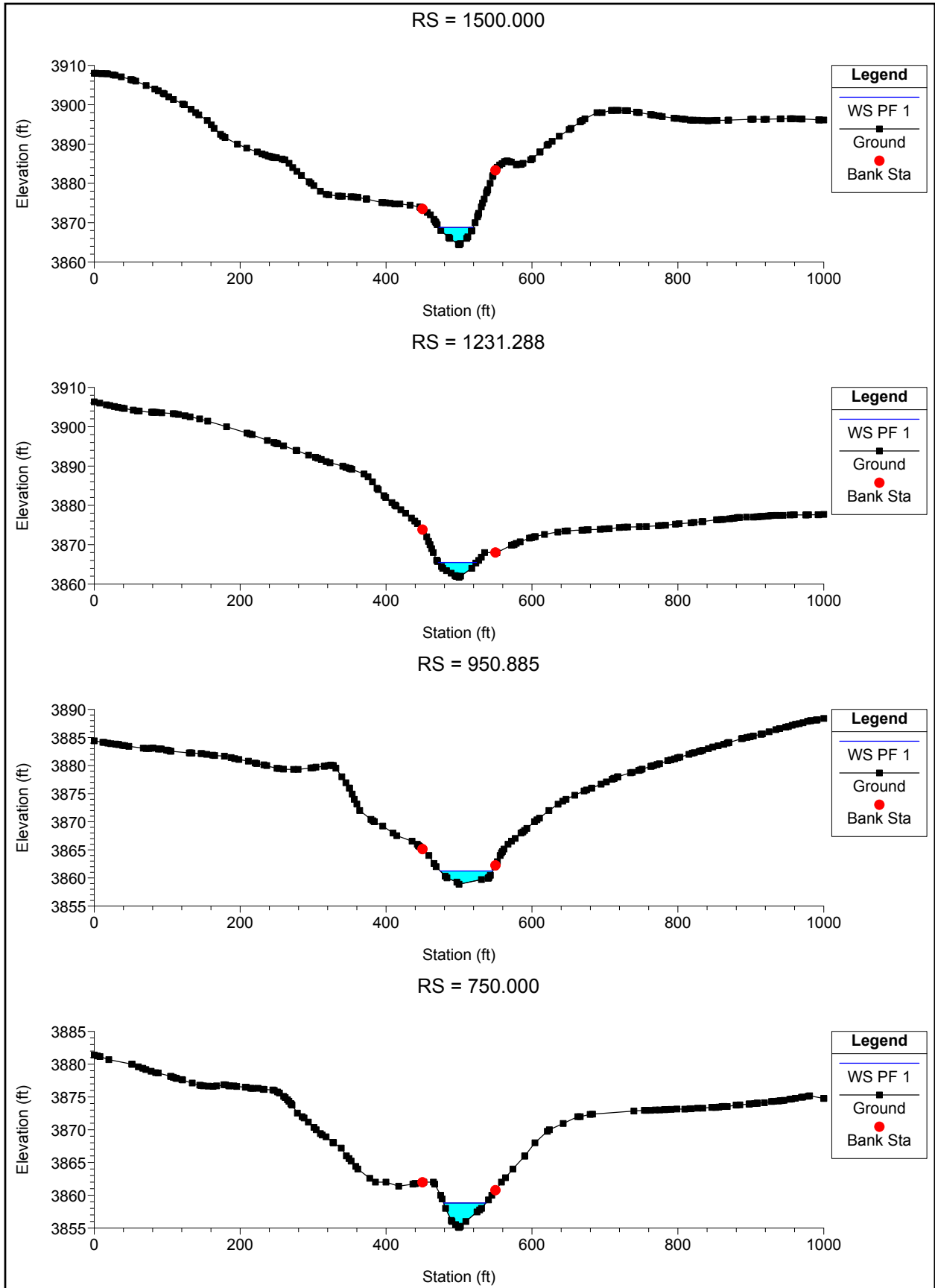
Attachment 2.7-M-27

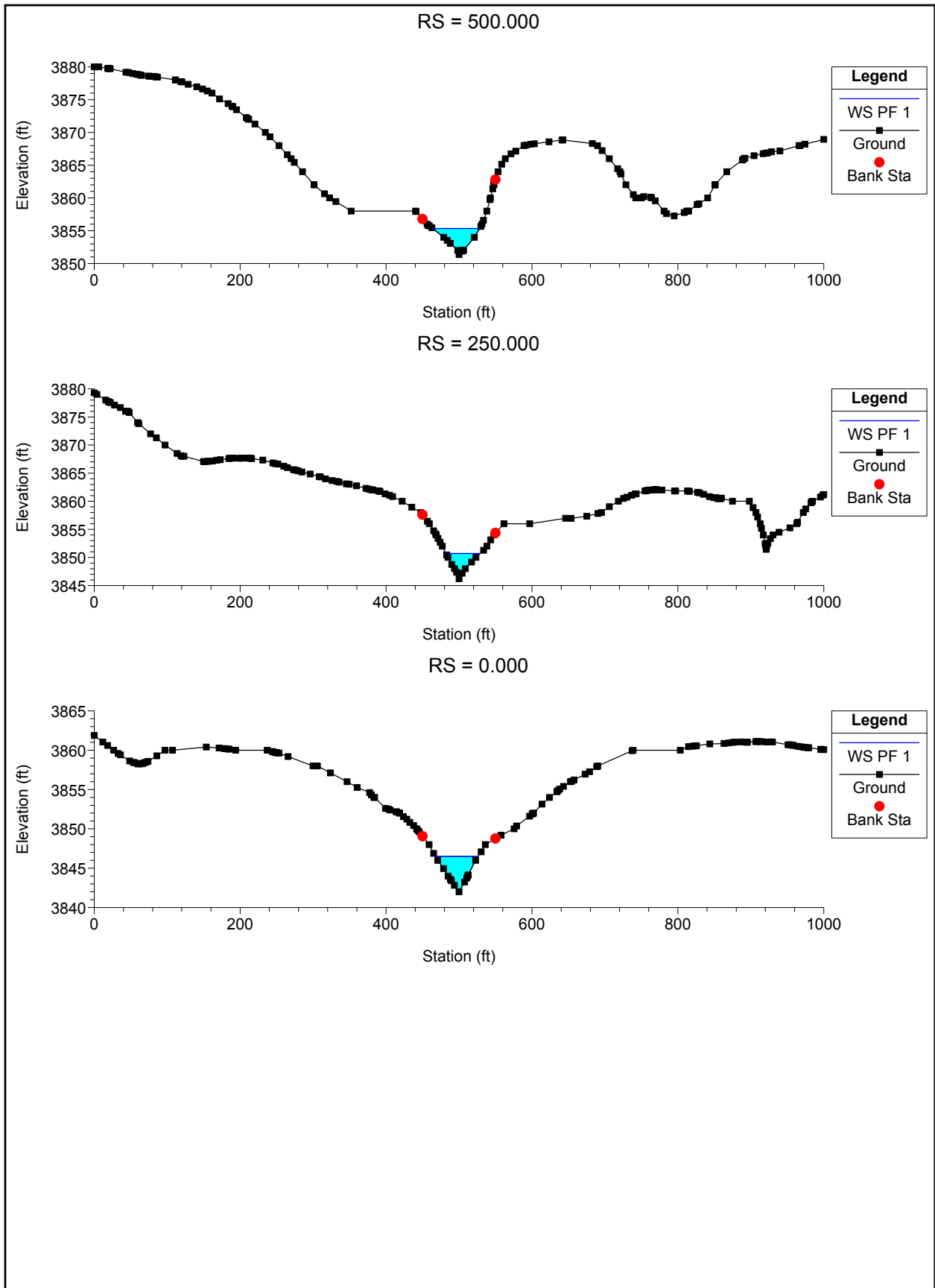
HEC-RAS Channel 14B



Reach	River Sta	Profile	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)	
14B	2250	PF 1	972	3872.5	3878.06	3877.75	3878.95	0.009944	7.55	128.7	52.71	0.85
14B	2000	PF 1	972	3869.32	3874.79	3874.79	3876.1	0.013853	9.2	105.69	40.82	1.01
14B	1750	PF 1	972	3866.89	3872.13	3871.23	3872.71	0.005297	6.12	158.9	55.7	0.64
14B	1709.596	PF 1	972	3866.52	3871.21	3871.16	3872.34	0.013384	8.5	114.34	48.98	0.98
14B	1500	PF 1	972	3864.41	3868.79	3868.58	3869.82	0.010785	8.12	119.64	46.88	0.9
14B	1231.288	PF 1	972	3861.74	3865.5	3865.5	3866.6	0.013988	8.43	115.32	52.4	1
14B	950.885	PF 1	972	3858.88	3861.24	3861.48	3862.43	0.023974	8.76	110.96	71.84	1.24
14B	750	PF 1	972	3855.09	3858.82	3858.79	3859.82	0.013709	8.05	120.69	57.94	0.98
14B	500	PF 1	972	3851.37	3855.35	3855.35	3856.31	0.014573	7.87	123.45	64.26	1
14B	250	PF 1	972	3846.2	3850.7	3851.08	3852.3	0.022469	10.13	95.93	46.81	1.25
14B	0	PF 1	972	3842	3846.5	3846.21	3847.33	0.010007	7.29	133.39	58.65	0.85





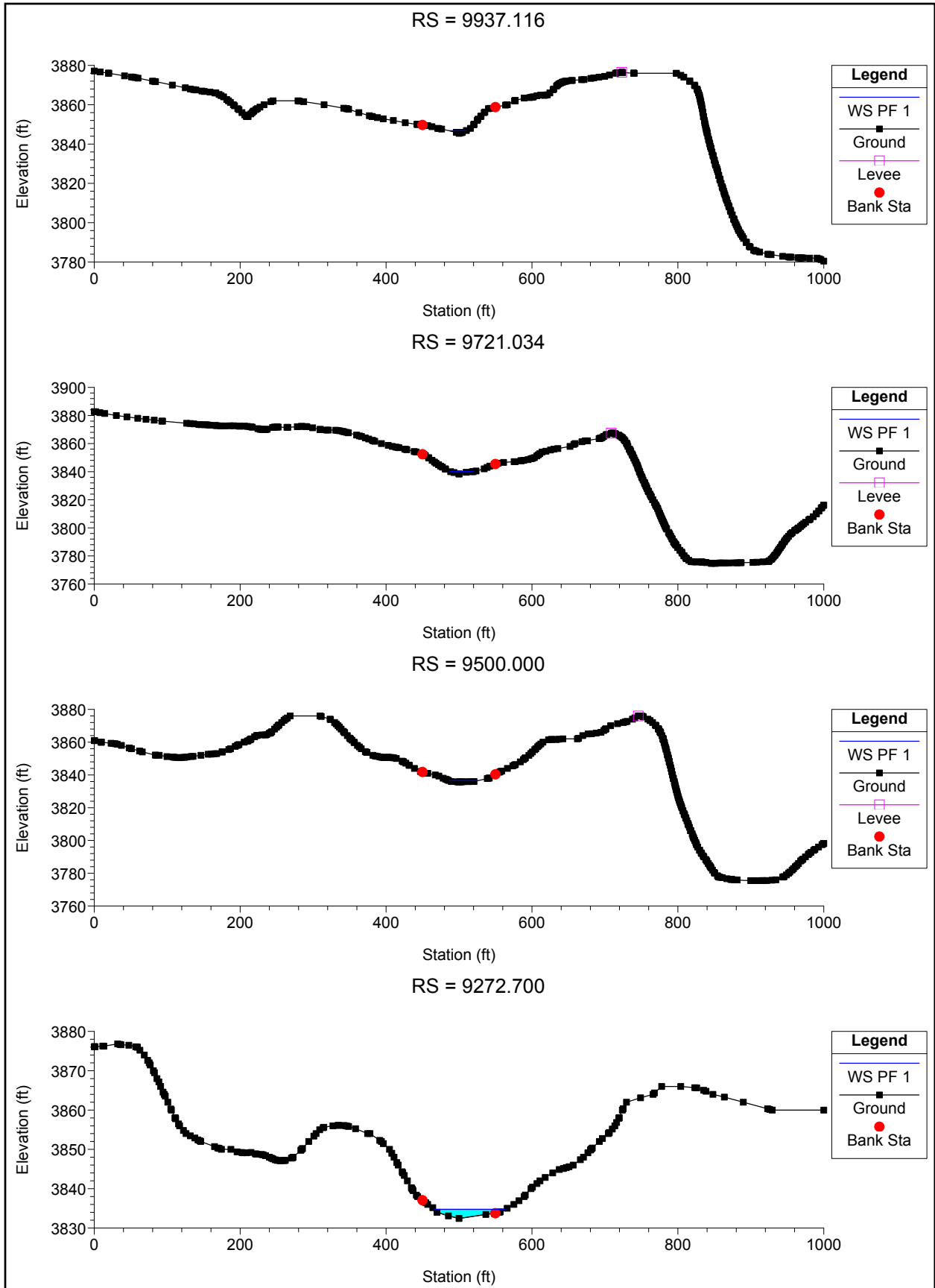


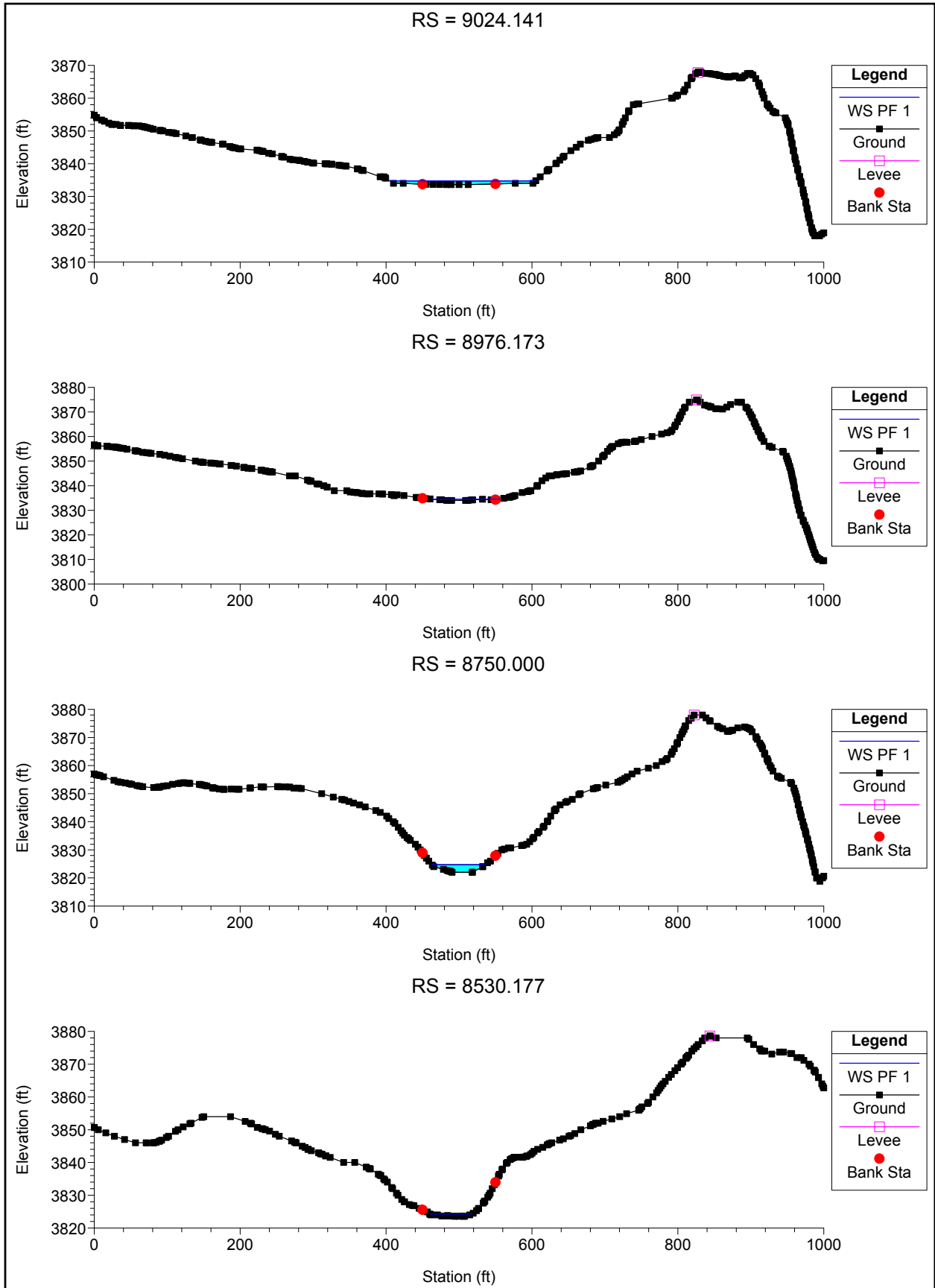
Attachment 2.7-M-28

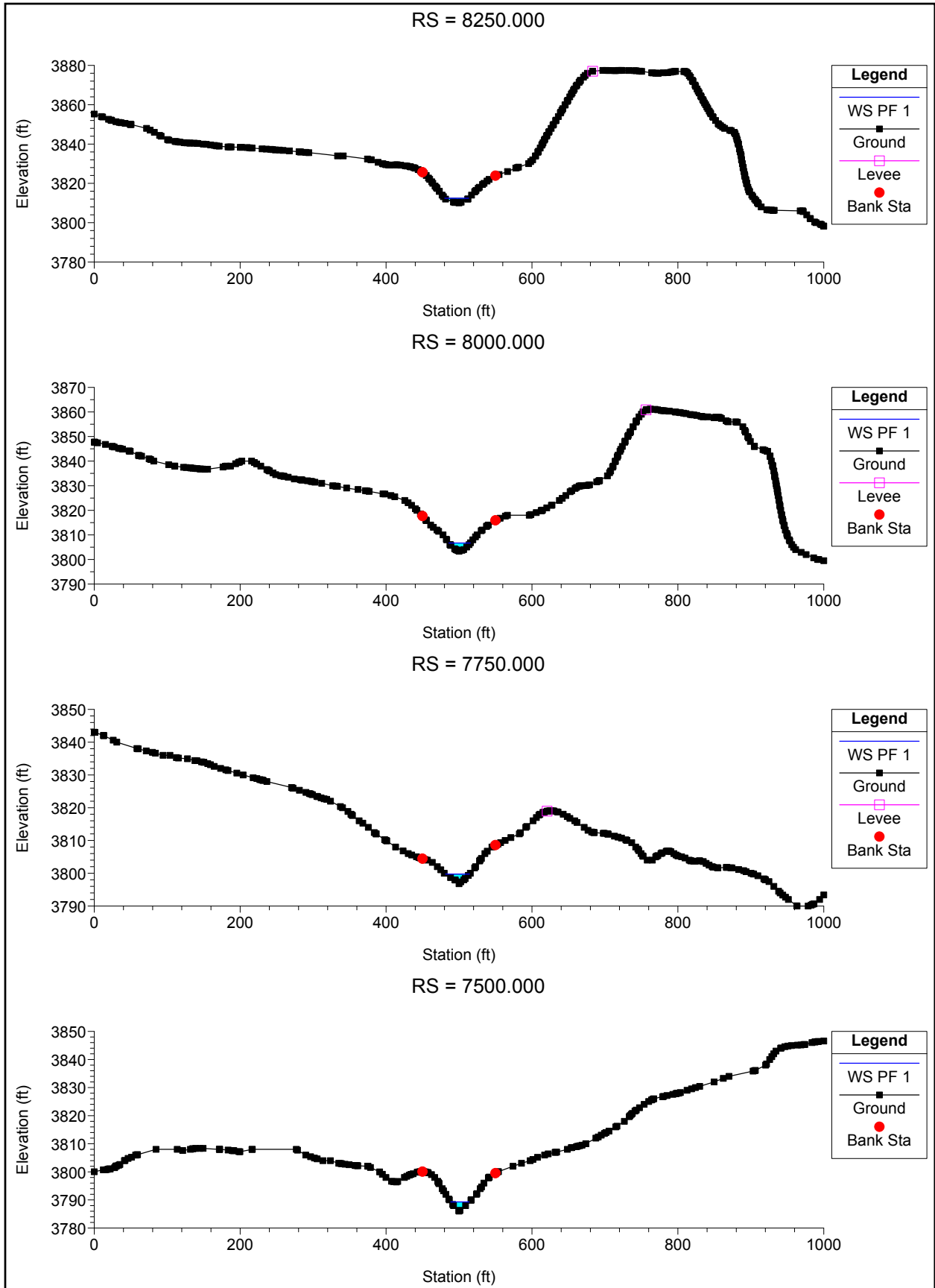
HEC-RAS Channel 15

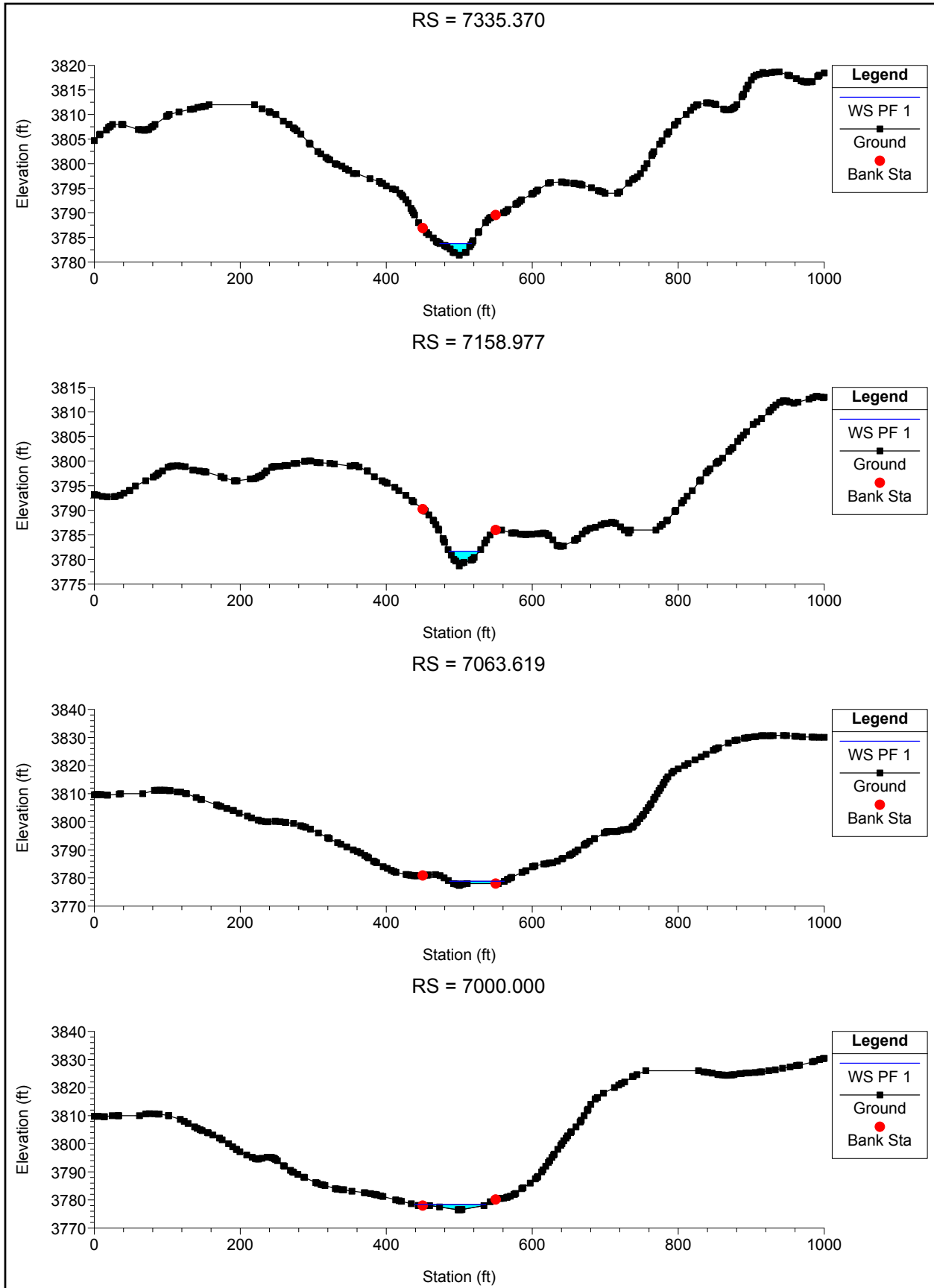


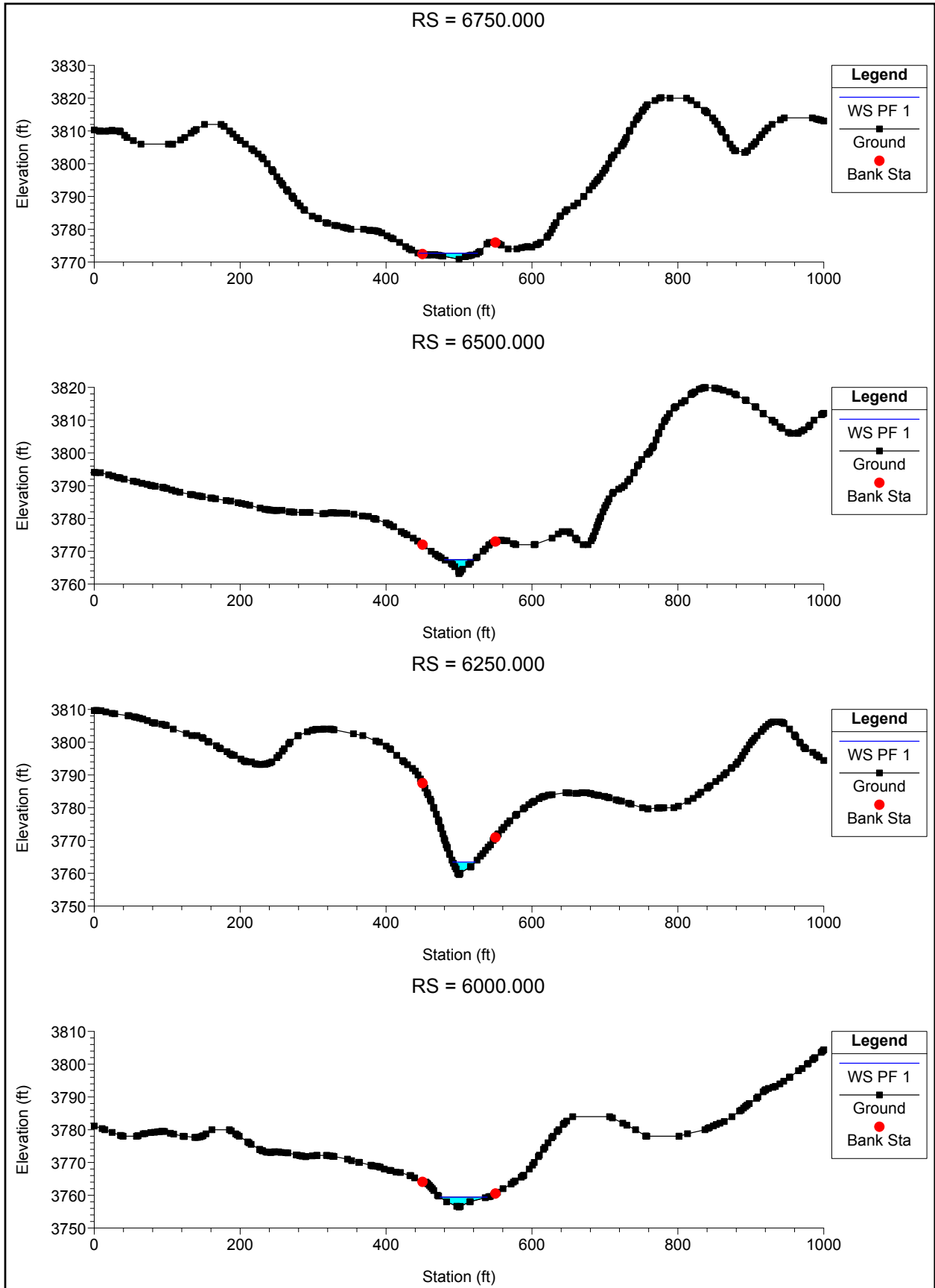
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
15	9937.116	PF 1	93	3845.42	3846.79	3846.97	3847.4	0.040061	6.27	14.82	23.19	1.38
15	9721.034	PF 1	93	3838.34	3840.08	3839.94	3840.31	0.012367	3.89	23.89	31.7	0.79
15	9500	PF 1	93	3835.75	3836.51	3836.51	3836.79	0.021918	4.25	21.9	39.36	1
15	9272.7	PF 1	93	3832.43	3834.77	3833.34	3834.78	0.000141	0.68	140.18	97.16	0.1
15	9024.141	PF 1	93	3833.61	3834.74	3833.98	3834.74	0.00016	0.56	181.51	199.6	0.1
15	8976.173	PF 1	93	3833.99	3834.54	3834.54	3834.7	0.024392	3.19	29.47	91.35	0.97
15	8750	PF 1	124	3822	3824.72	3822.8	3824.73	0.000173	0.87	142.47	72.91	0.11
15	8530.177	PF 1	124	3823.57	3824.3	3824.3	3824.57	0.024353	4.22	29.4	57.82	1.04
15	8250	PF 1	523	3810.09	3812.43	3813.03	3814.35	0.042955	11.11	47.07	32.72	1.63
15	8000	PF 1	523	3803.33	3806.7	3806.81	3807.88	0.016915	8.72	59.97	29.33	1.07
15	7750	PF 1	523	3796.82	3799.75	3800.34	3801.66	0.043507	11.12	47.05	32.9	1.64
15	7500	PF 1	523	3786.04	3789.28	3790.03	3791.61	0.042957	12.25	42.71	25.17	1.66
15	7335.37	PF 1	523	3781.41	3783.78	3784.18	3785.12	0.034549	9.31	56.18	43.5	1.44
15	7158.977	PF 1	523	3778.69	3781.67	3781.67	3782.53	0.015629	7.45	70.18	41.63	1.01
15	7063.619	PF 1	523	3777.34	3778.82	3779.18	3780.03	0.056273	9	59.8	75.03	1.72
15	7000	PF 1	523	3776.44	3778.38	3778.38	3778.88	0.01729	5.73	93.07	97.63	0.99
15	6750	PF 1	523	3770.82	3772.7	3772.94	3773.6	0.037033	7.63	69	80.42	1.41
15	6500	PF 1	523	3763.16	3767.41	3767.41	3768.3	0.016011	7.58	69.02	39.9	1.02
15	6250	PF 1	523	3759.68	3763.41	3763.46	3764.52	0.016253	8.44	61.97	30.62	1.05
15	6000	PF 1	523	3756.41	3759.42	3759.18	3759.9	0.010415	5.55	94.23	64.67	0.81
15	5750	PF 1	523	3751.98	3755.83	3755.83	3756.85	0.014681	8.08	64.73	31.87	1
15	5500	PF 1	523	3747.75	3751.45	3751.64	3752.38	0.022705	7.74	67.55	49.93	1.17
15	5250	PF 1	523	3744.35	3748.27	3748.27	3749.24	0.015193	7.89	66.33	34.94	1.01
15	5000	PF 1	523	3739.7	3742.77	3743.23	3744.34	0.028989	10.04	52.07	31.14	1.37
15	4750	PF 1	523	3735.92	3739.8	3739.72	3740.56	0.013521	7.02	74.55	42.93	0.94
15	4527.43	PF 1	523	3733.1	3737.09	3737.09	3737.93	0.015544	7.36	71.03	42.36	1
15	4190.778	PF 1	523	3727.11	3730.47	3730.84	3731.9	0.027596	9.59	54.52	33.59	1.33
15	4000	PF 1	523	3724.23	3728.15	3728.15	3729.08	0.015037	7.73	67.67	36.53	1
15	3813.78	PF 1	523	3721.34	3724.97	3725.14	3726.07	0.019013	8.4	62.24	35.41	1.12
15	3500	PF 1	523	3717.4	3721.32	3720.76	3721.75	0.006799	5.24	99.82	53.81	0.68
15	3250	PF 1	523	3715.17	3718.5	3718.5	3719.34	0.015309	7.39	70.78	41.84	1
15	2988.407	PF 1	523	3710.51	3713.37	3713.73	3714.69	0.030562	9.22	56.72	40.47	1.37
15	2750	PF 1	523	3706.6	3710.8	3710.8	3711.71	0.015765	7.67	68.18	38.37	1.01
15	2500	PF 1	523	3703.2	3708.02	3707.67	3708.78	0.009812	6.99	74.77	33.08	0.82
15	2250	PF 1	523	3700.67	3704.82	3704.82	3705.79	0.014999	7.87	66.43	34.63	1
15	2000	PF 1	523	3696.86	3701.17	3701.5	3702.66	0.022959	9.78	53.47	27.05	1.23
15	1750	PF 1	523	3693.49	3697.87	3697.85	3698.85	0.01433	7.97	65.63	32.06	0.98
15	1500	PF 1	523	3691.45	3695.08	3695.08	3696.07	0.014878	7.99	65.44	33	1
15	1250	PF 1	523	3689.43	3693.29	3692.47	3693.7	0.005377	5.14	101.8	47.22	0.62
15	967.464	PF 1	523	3686.56	3690.49	3690.49	3691.31	0.01579	7.27	71.91	44.04	1
15	750	PF 1	523	3683.27	3686.8	3686.95	3687.95	0.018216	8.62	60.69	31.99	1.1
15	573.458	PF 1	523	3680.47	3684.8	3684.76	3685.76	0.014161	7.85	66.65	33.26	0.98
15	500	PF 1	523	3679.53	3684.28		3684.86	0.00841	6.14	85.2	41.82	0.76
15	250	PF 1	523	3676.58	3681.16	3681.16	3682.19	0.015196	8.15	64.13	31.37	1.01
15	0	PF 1	523	3674	3677.86	3677.6	3678.55	0.010017	6.69	78.58	40.65	0.83

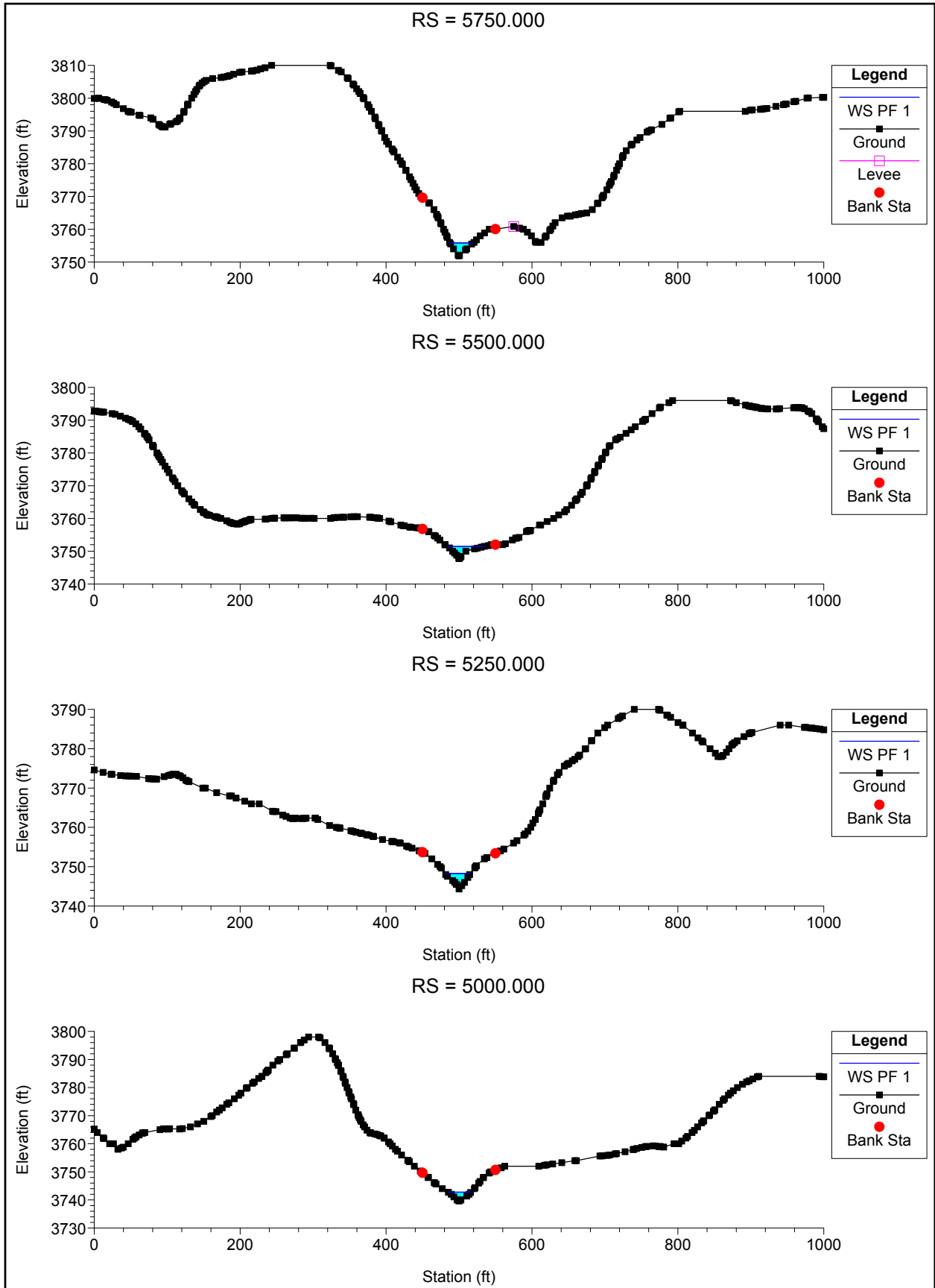


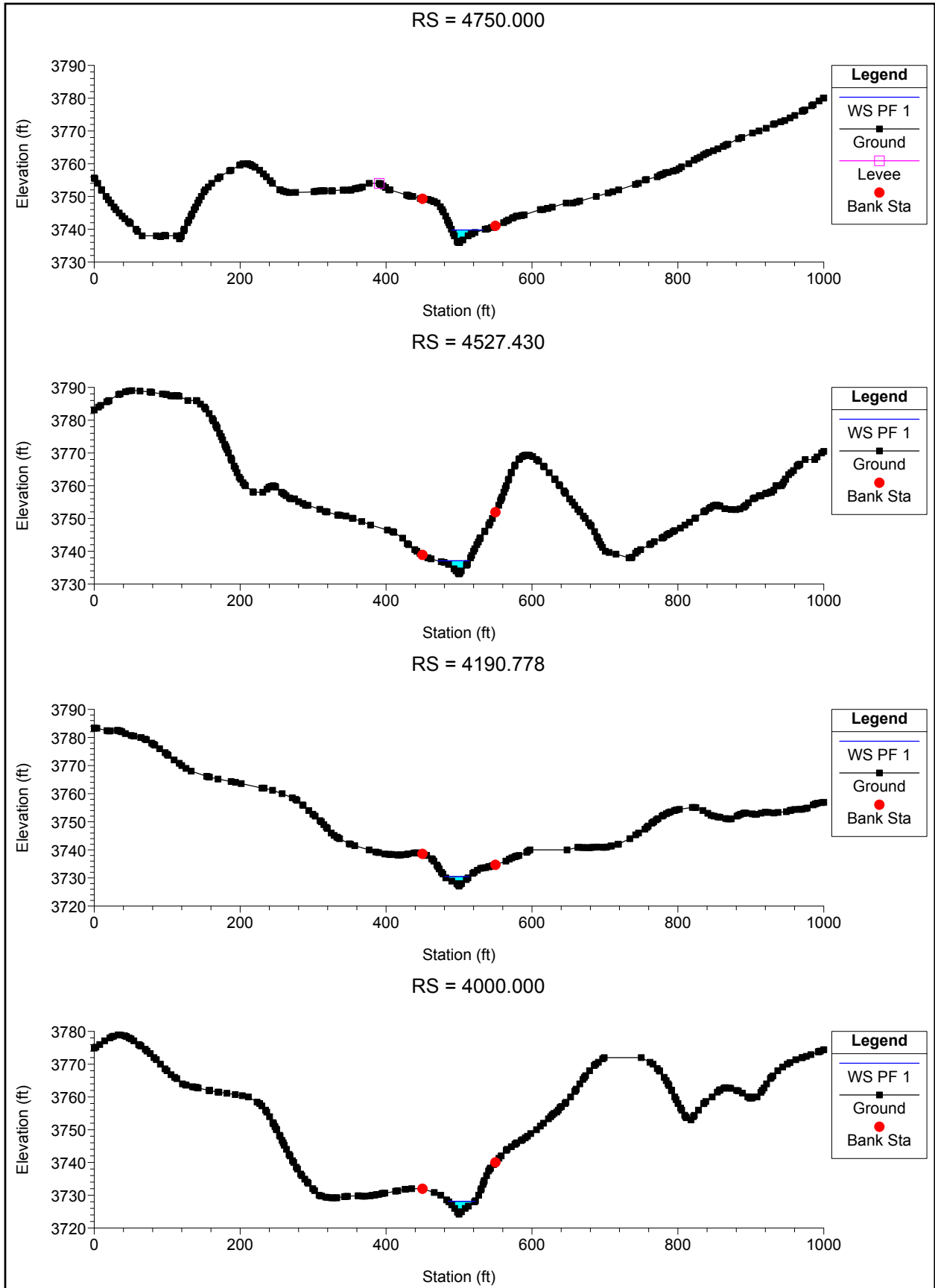


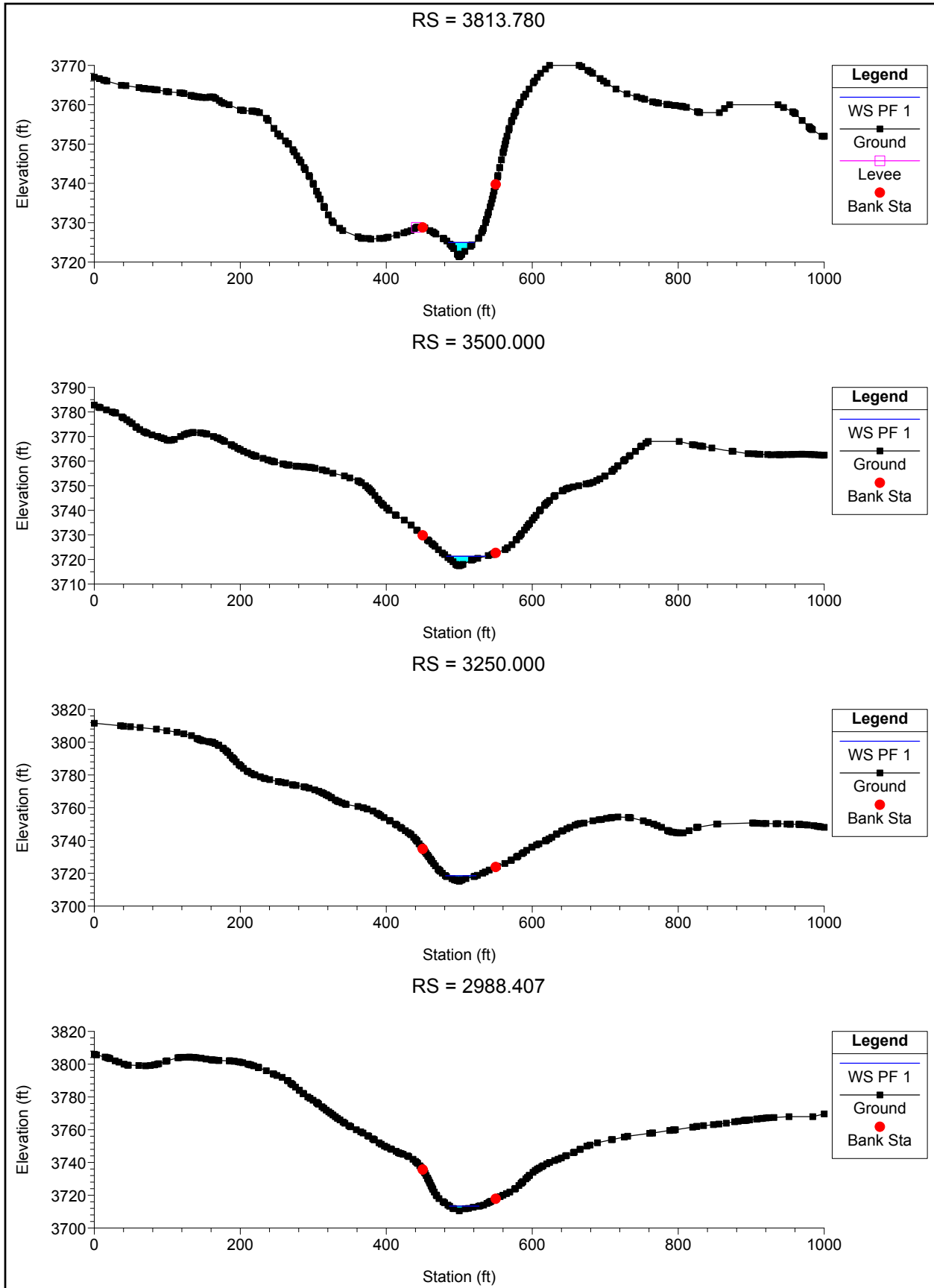


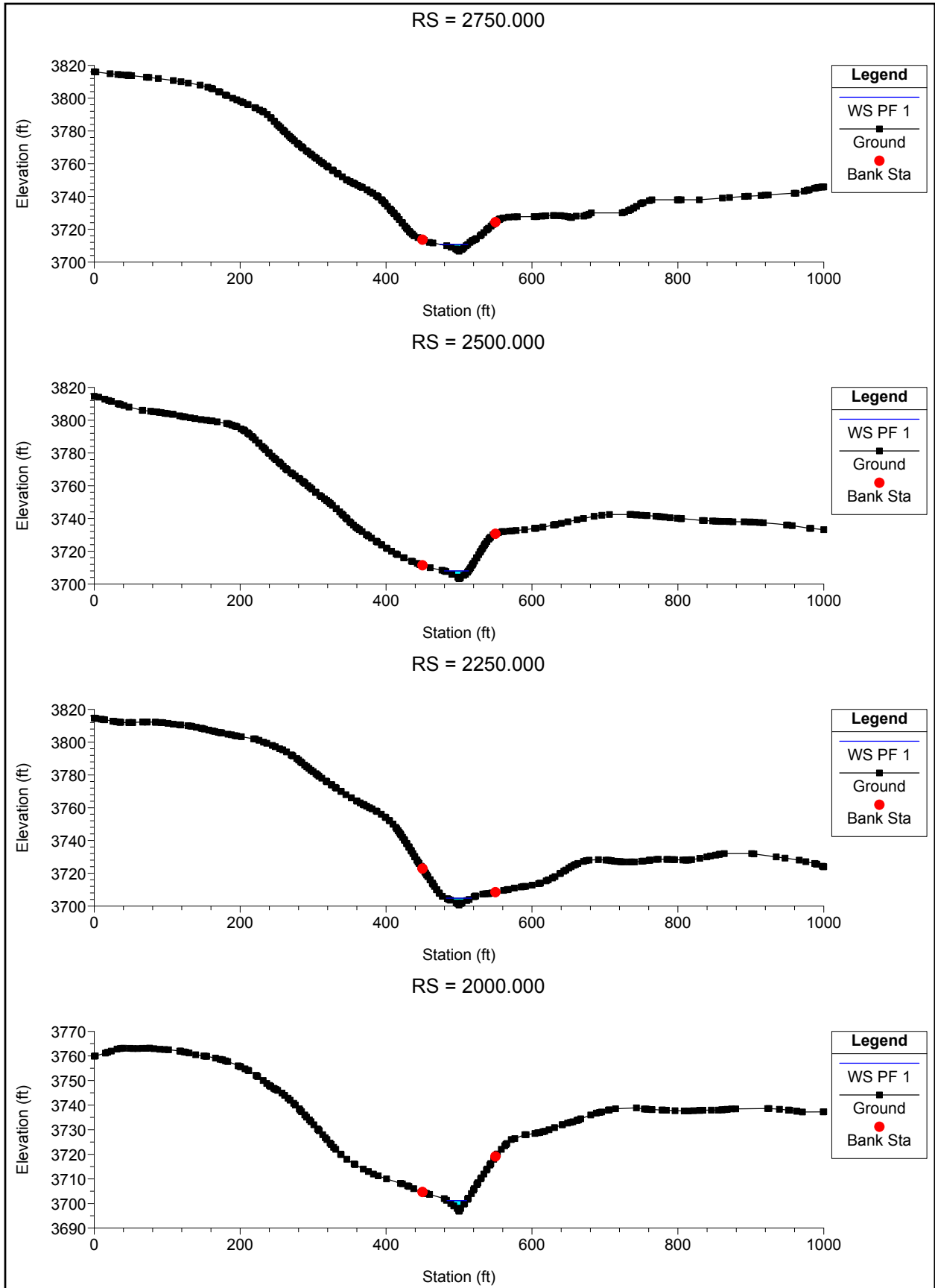


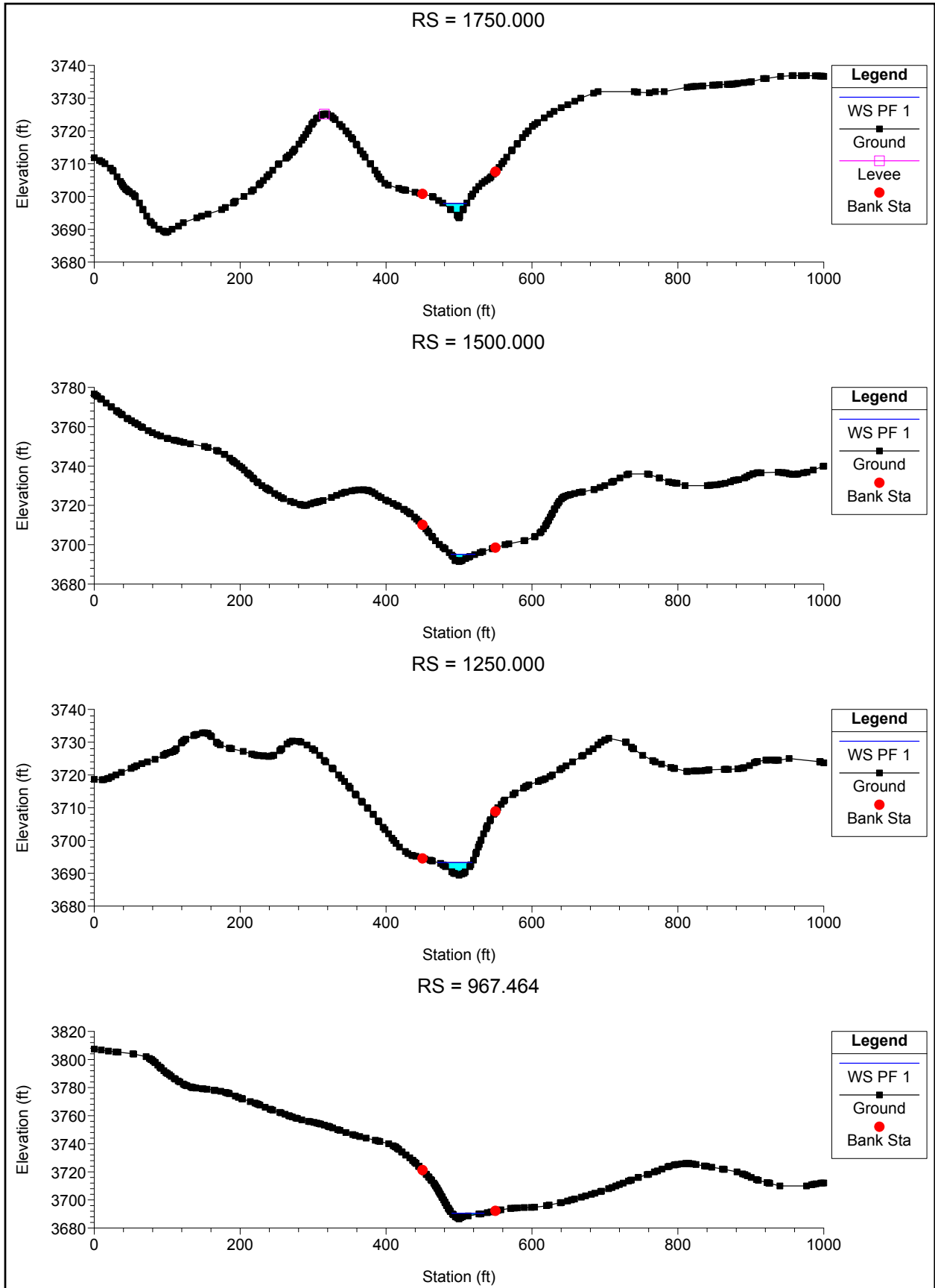


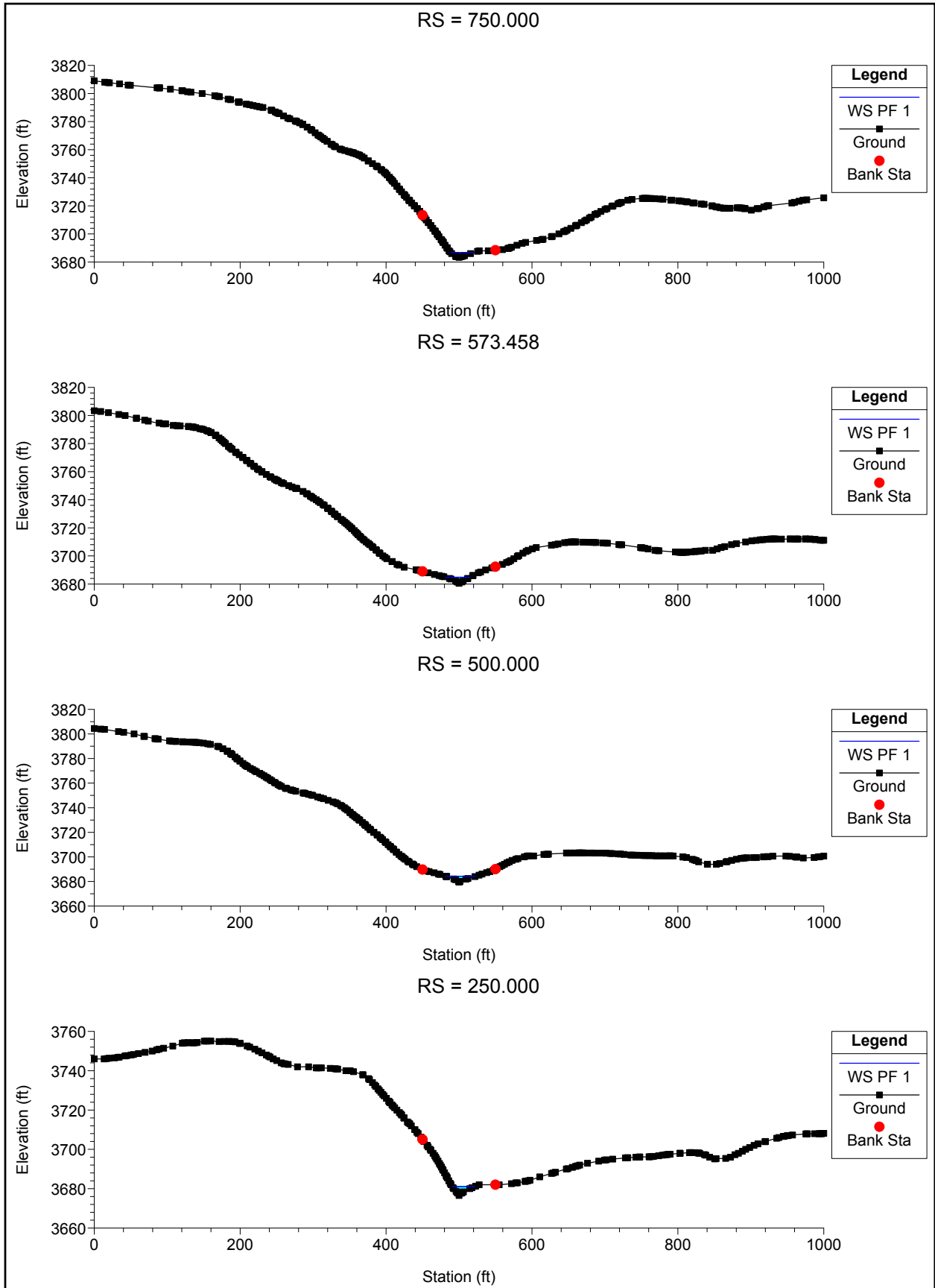


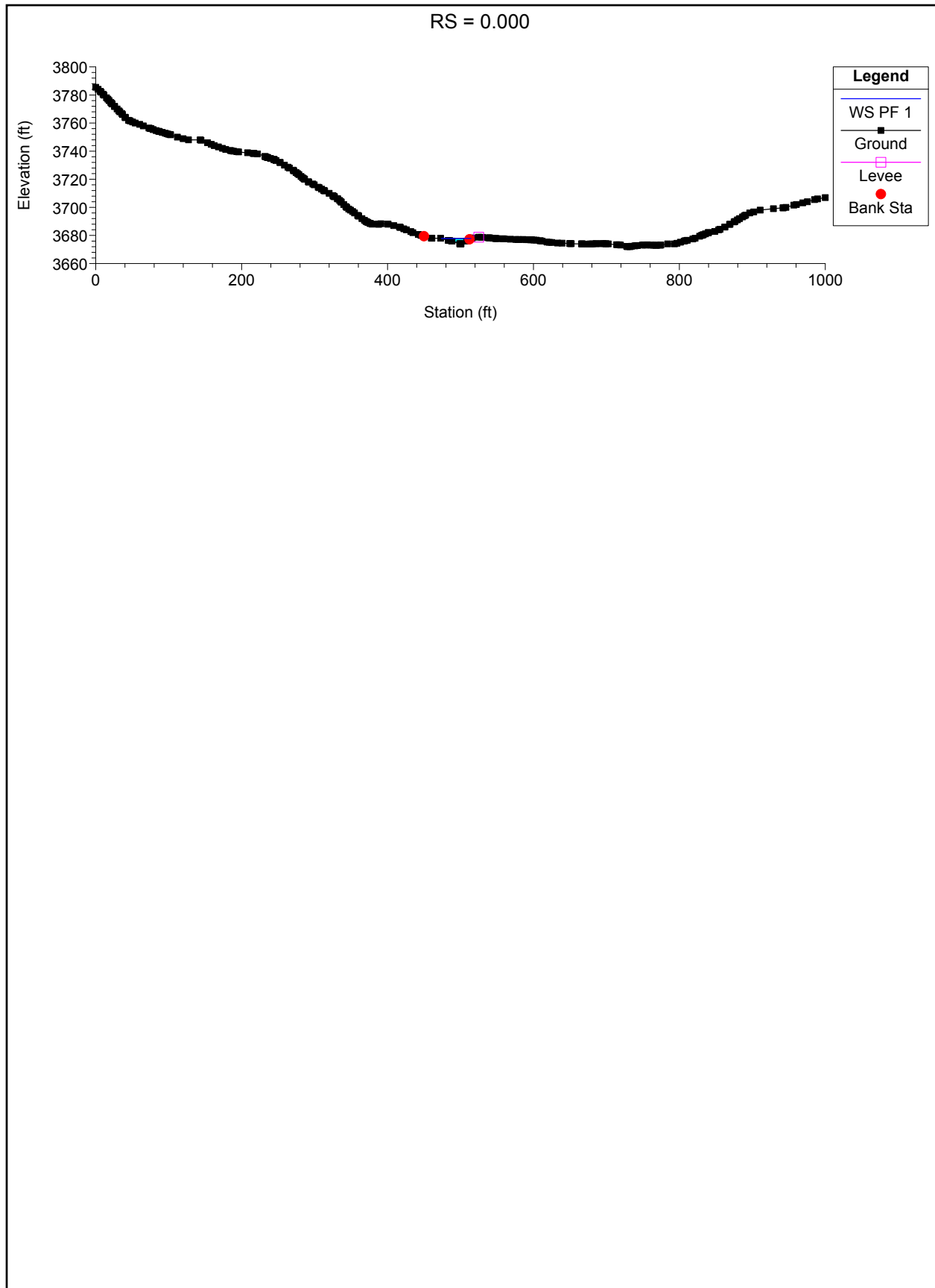










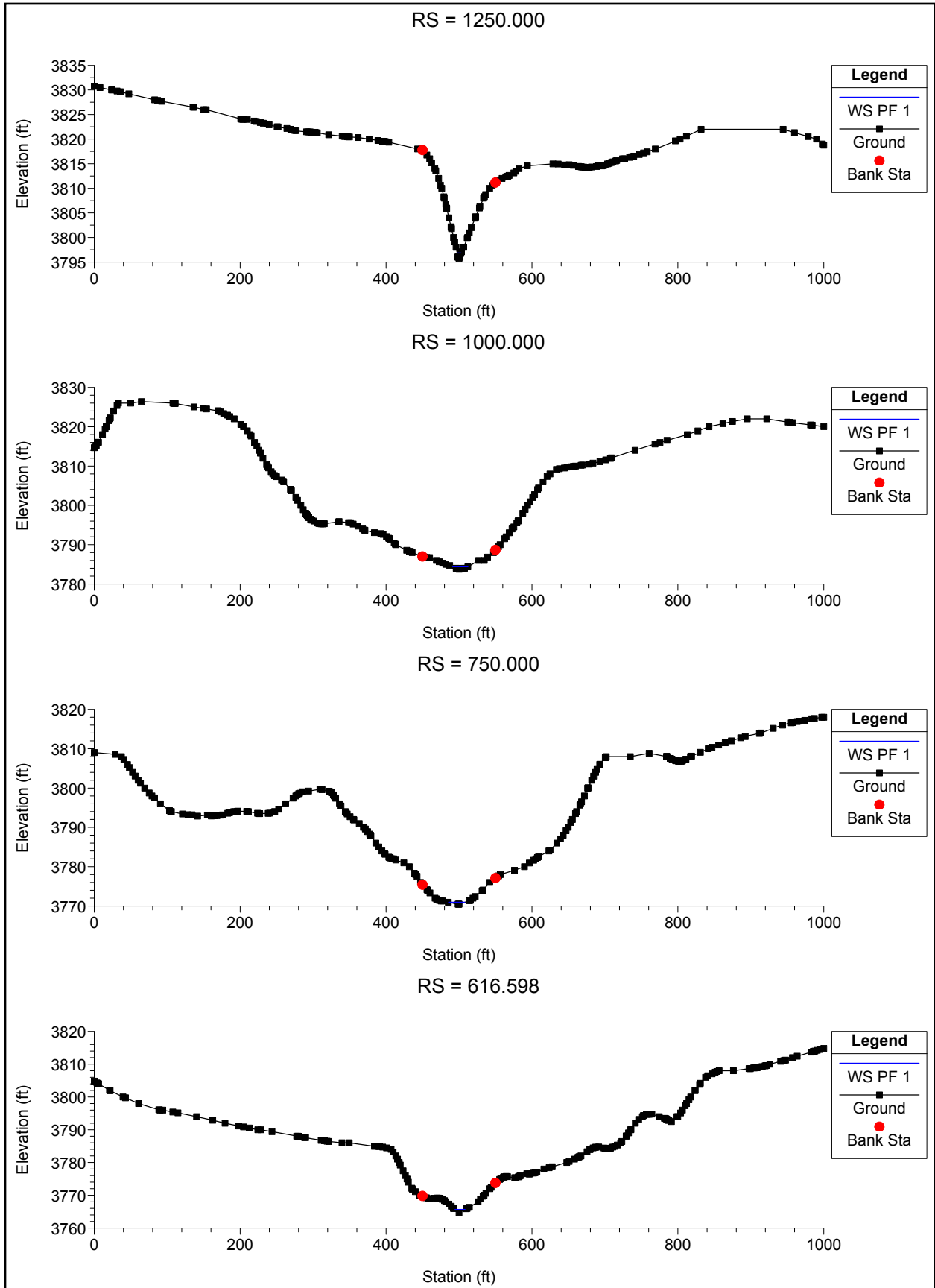


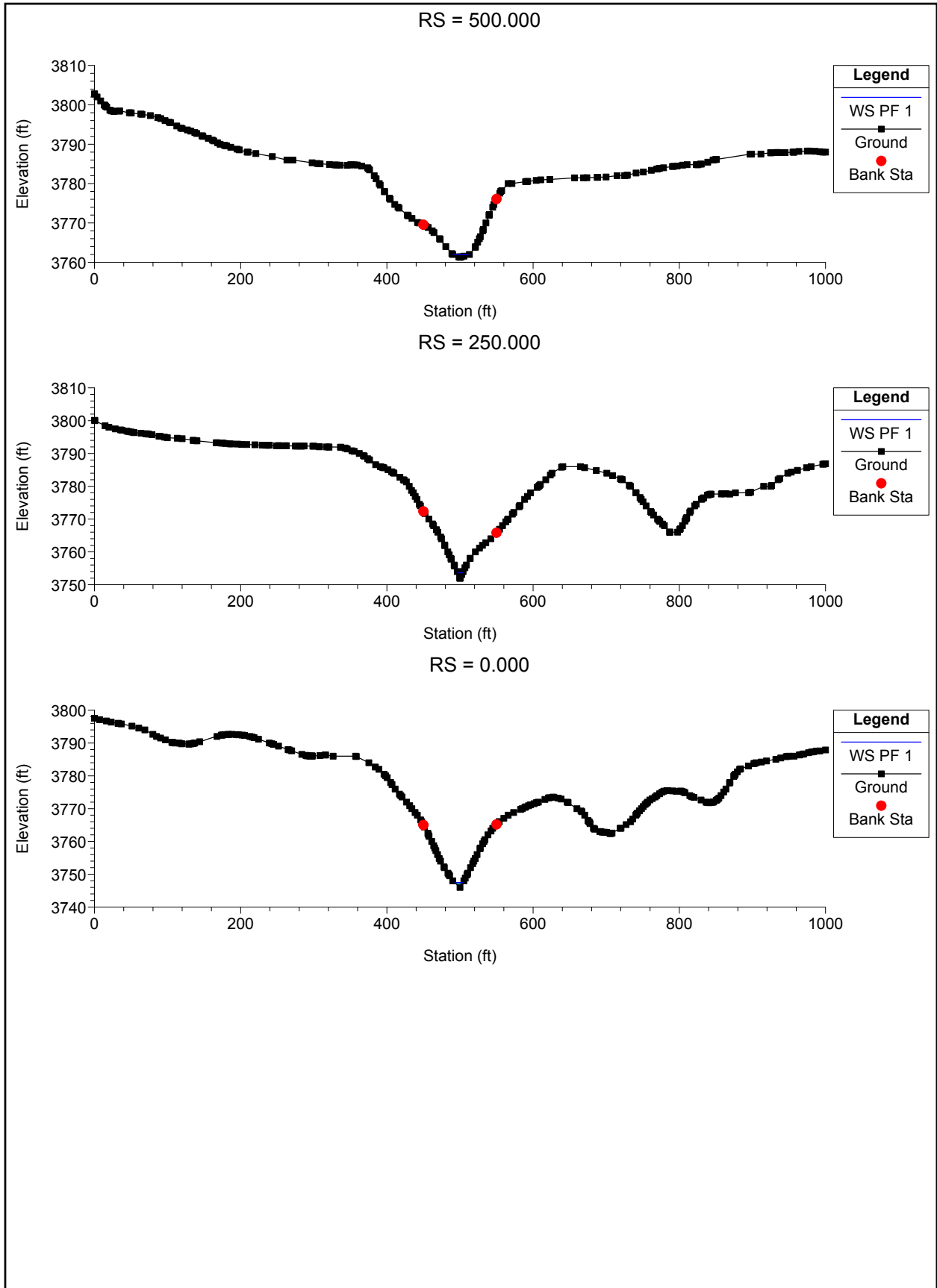
Attachment 2.7-M-29

HEC-RAS Channel 16



Reach	River Sta	Profile	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)	
16	1250	PF 1	30	3795.73	3796.84	3797.23	3798.06	0.092013	8.87	3.38	5.33	1.96
16	1000	PF 1	30	3783.76	3784.38	3784.43	3784.63	0.035834	4.02	7.45	20.98	1.19
16	750	PF 1	30	3770.48	3770.96	3771.1	3771.41	0.100246	5.36	5.59	22.18	1.88
16	616.598	PF 1	30	3764.7	3765.66	3765.71	3765.98	0.030673	4.52	6.63	13.83	1.15
16	500	PF 1	30	3761.3	3761.94	3762.02	3762.24	0.046039	4.33	6.93	21.13	1.33
16	250	PF 1	30	3751.96	3753.65	3753.68	3754.12	0.024863	5.46	5.5	6.64	1.06
16	0	PF 1	30	3746	3747.44	3747.31	3747.67	0.013009	3.8	7.89	10.93	0.79



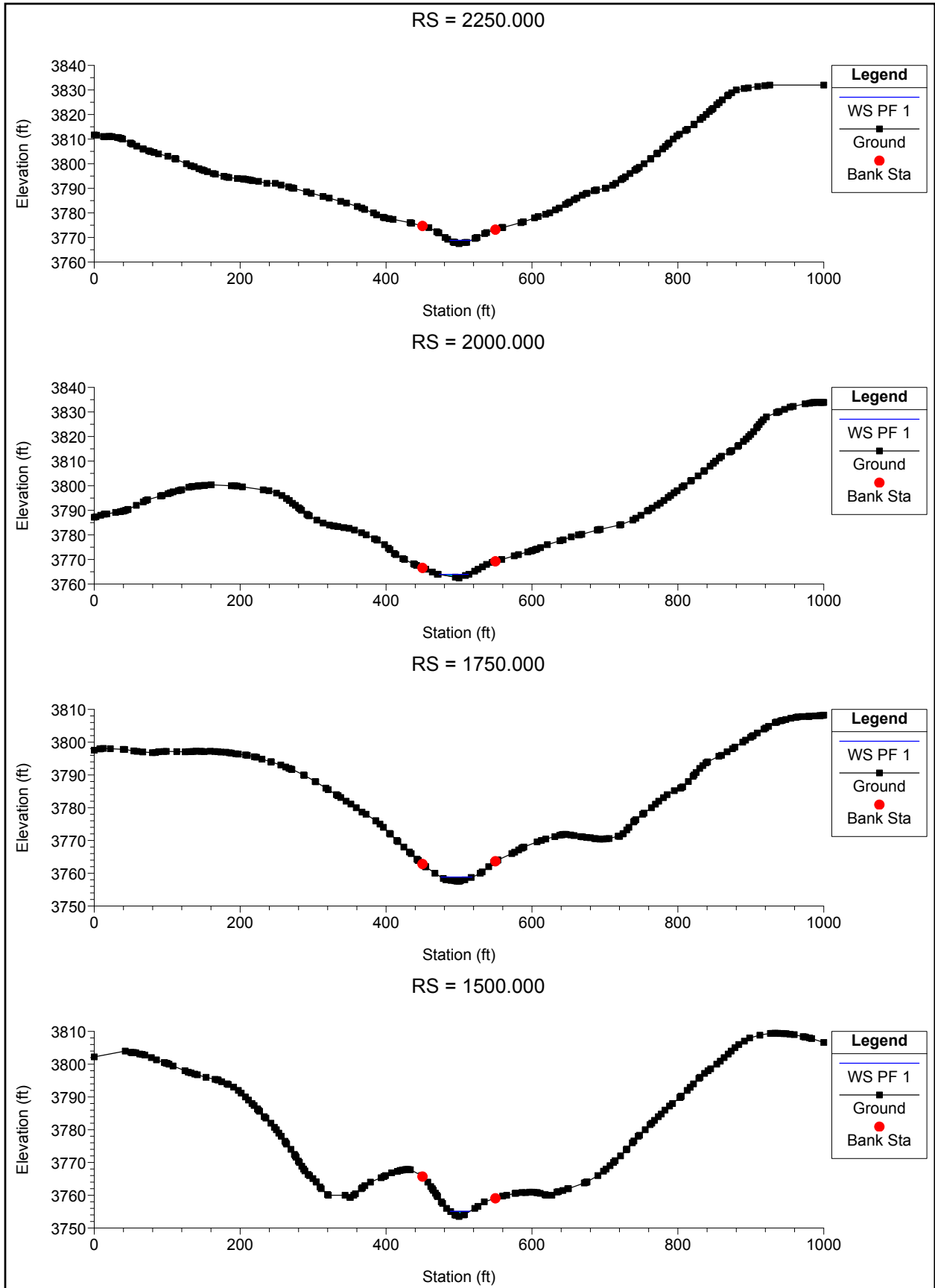


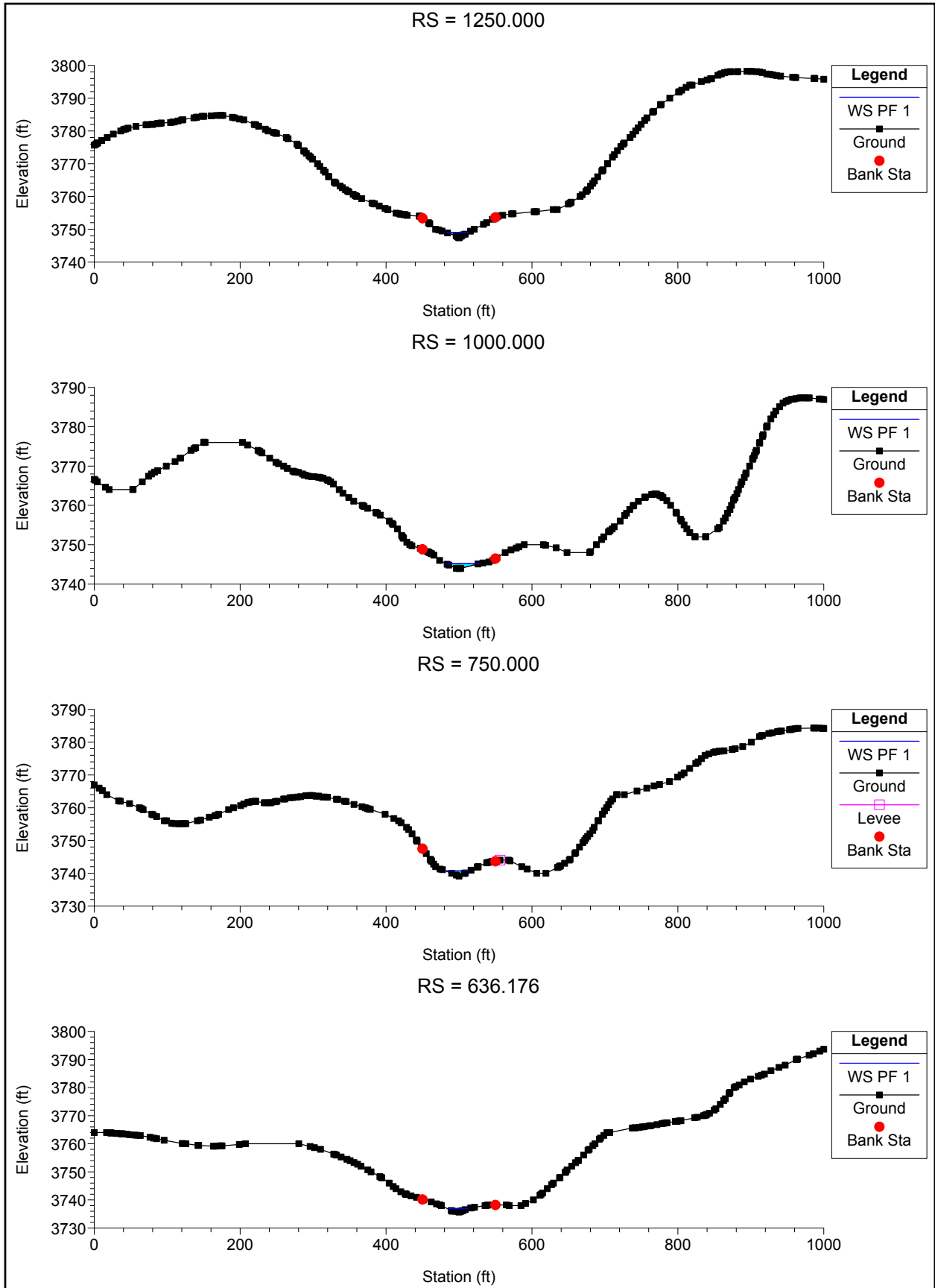
Attachment 2.7-M-30

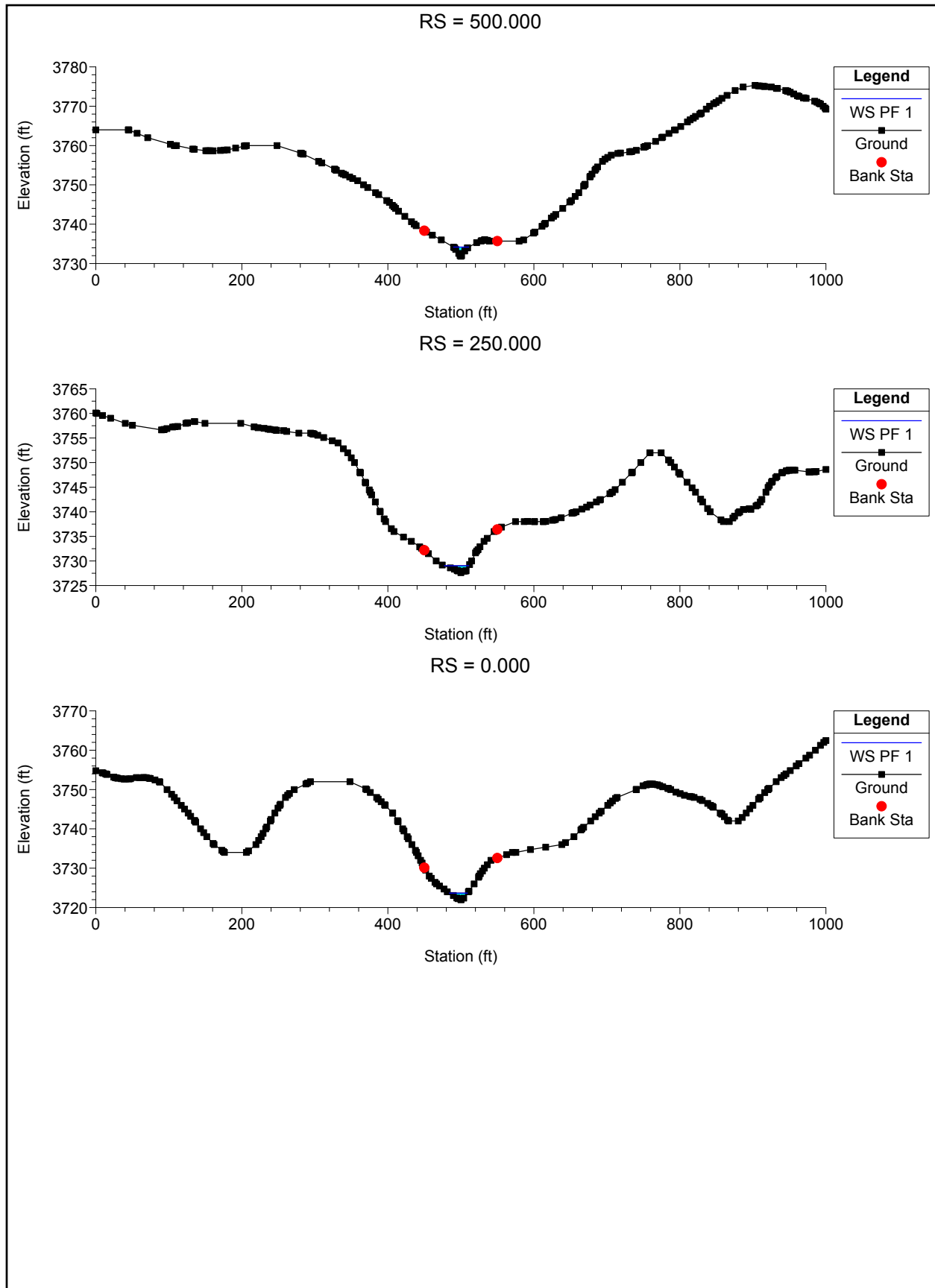
HEC-RAS Channel 17

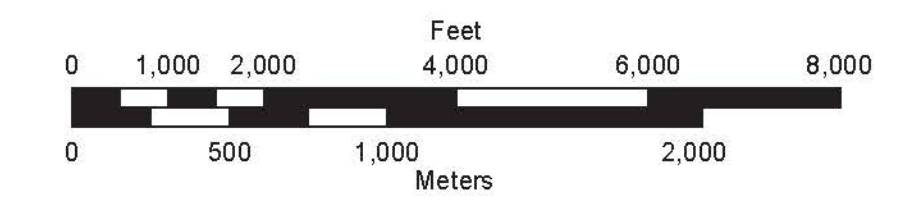
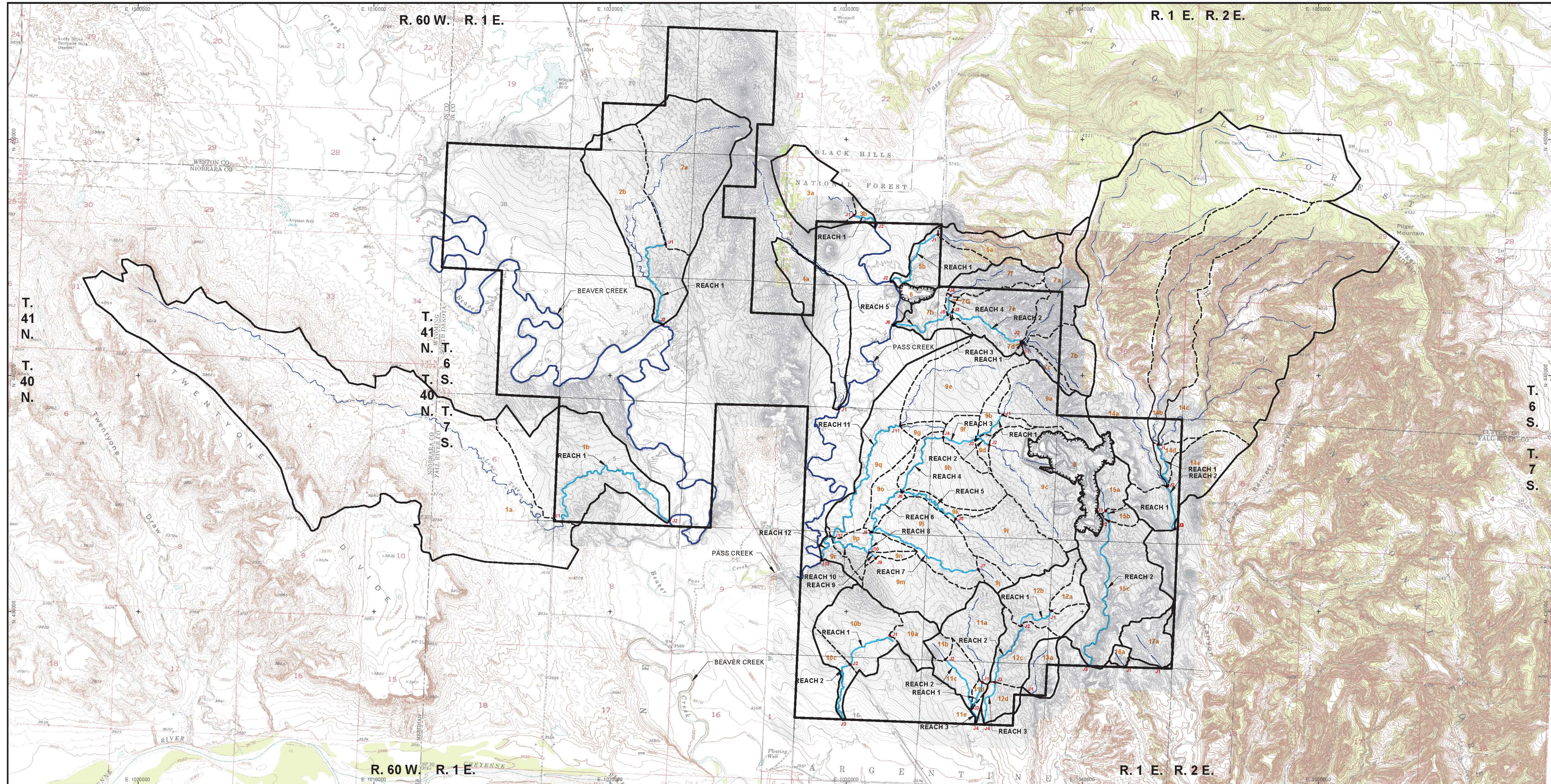


Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
17	2250	PF 1	133	3767.49	3768.84	3768.91	3769.34	0.024033	5.68	23.42	29.08	1.11
17	2000	PF 1	133	3762.49	3763.92	3763.92	3764.28	0.020727	4.79	27.74	39.82	1.01
17	1750	PF 1	133	3757.56	3758.84	3758.67	3759.07	0.010953	3.86	34.45	42.44	0.75
17	1500	PF 1	133	3753.54	3755.1	3755.1	3755.57	0.019095	5.47	24.3	26.75	1.01
17	1250	PF 1	133	3747.37	3749.05	3749.18	3749.62	0.031642	6.04	22.03	30.6	1.25
17	1000	PF 1	133	3743.91	3745.17	3745.13	3745.46	0.017706	4.32	30.75	45.84	0.93
17	750	PF 1	133	3739.14	3740.73	3740.73	3741.13	0.019475	5.07	26.22	32.94	1
17	636.176	PF 1	133	3735.7	3736.87	3737.14	3737.69	0.052677	7.27	18.29	28.25	1.59
17	500	PF 1	133	3731.86	3734.17	3734.17	3734.72	0.018403	5.93	22.43	20.93	1.01
17	250	PF 1	133	3727.63	3729.02	3729.08	3729.48	0.025155	5.43	24.51	33.68	1.12
17	0	PF 1	133	3722	3723.66	3723.68	3724.17	0.020047	5.73	23.19	24.63	1.04

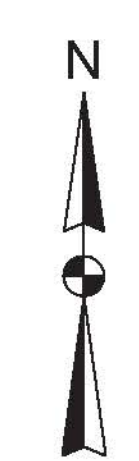








- LEGEND**
- PERMIT BOUNDARY
 - PRIMARY DRAINAGE BASIN
 - SECONDARY DRAINAGE BASIN
 - CLOSED DRAINAGE BASIN
 - PREVIOUSLY ANALYZED CHANNEL
 - EPHEMERAL STREAM CHANNEL
 - HEC-HMS REACH
 - HEC-HMS SUB BASIN IDENTIFIER
 - HEC-HMS JUNCTION LOCATION AND NUMBER



REVISIONS			
#	DRAWN	CHECKED	APPROVED DATE

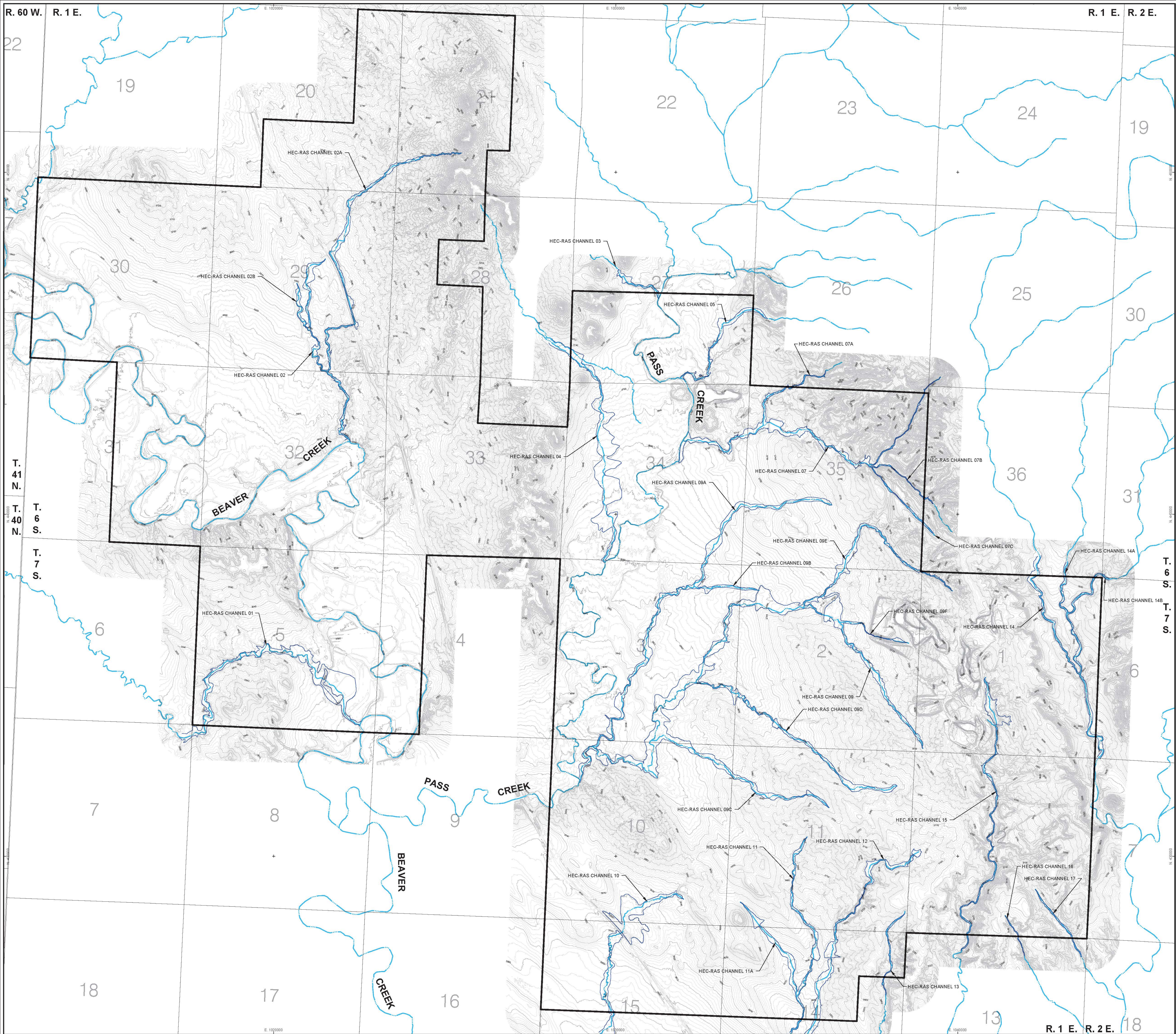


POWERTECH (USA) INC.
EXHIBIT 2.7-M-1
Drainage Basins

Dewey-Burdock Project

COORDS: NAD 27, South Dakota State Plane South (feet)

CHECK SCALES	
<small>If this bar does not measure 1 inch this map is not at its original scale.</small> PLOT DATE 24-June-2011 DRAWN DCJ CHECKED CEB	DATE 24-June-2011 PDF FILE CAD FILE K:\Powertech\11108DWS\SWATERSHED.dwg

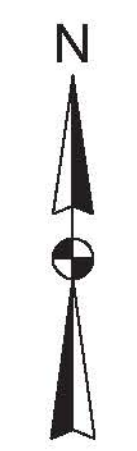
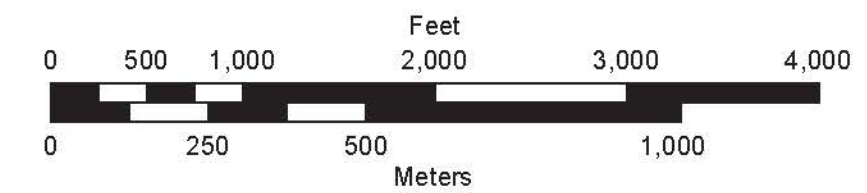


LOCATION MAP

SCALE: 1" = 1000'
C.I. = 2'


LEGEND

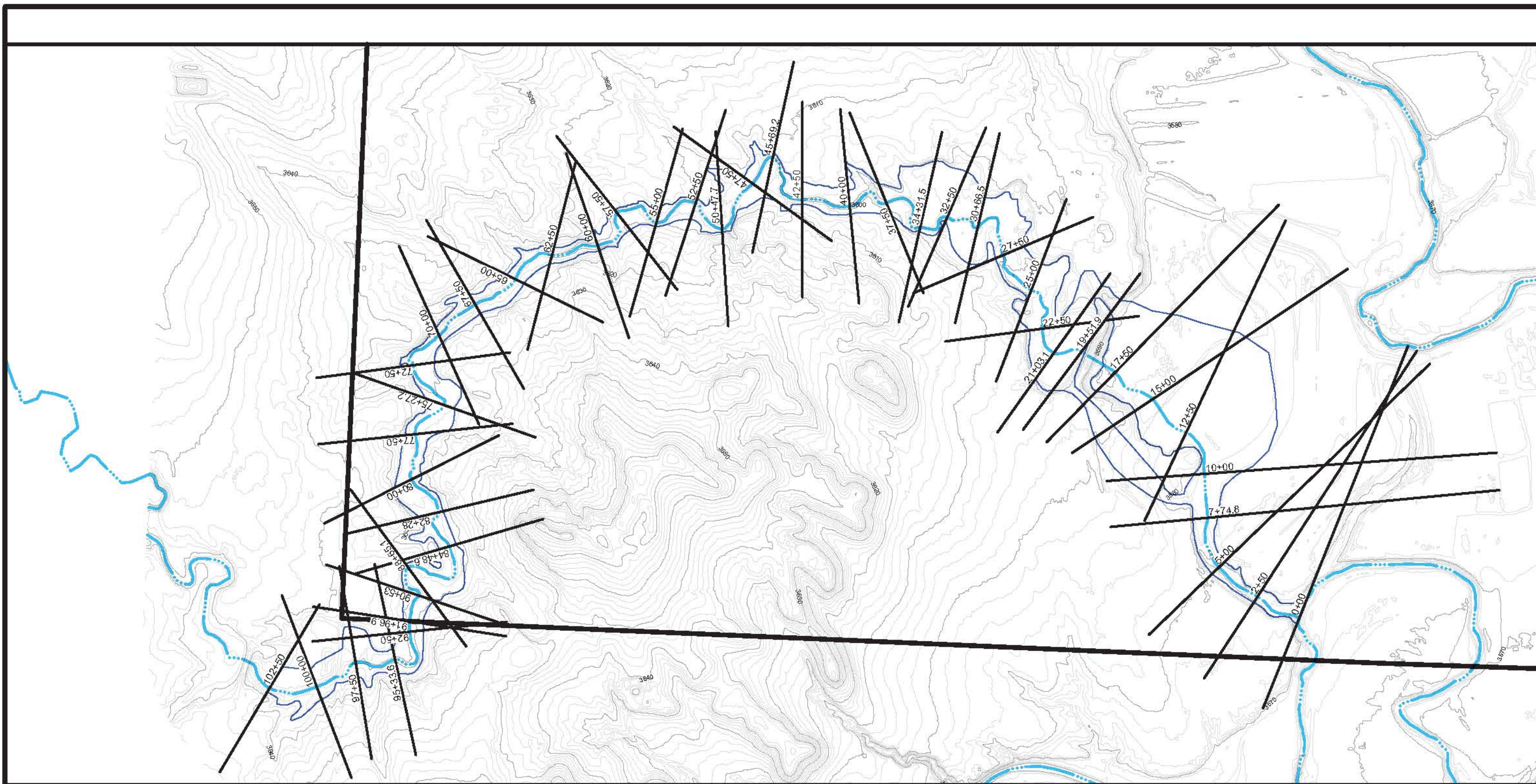
- PERMIT BOUNDARY
- 100-YEAR INUNDATION BOUNDARY



NO.	DATE	REVISIONS		DATE
		CHECKED	APPROVED	

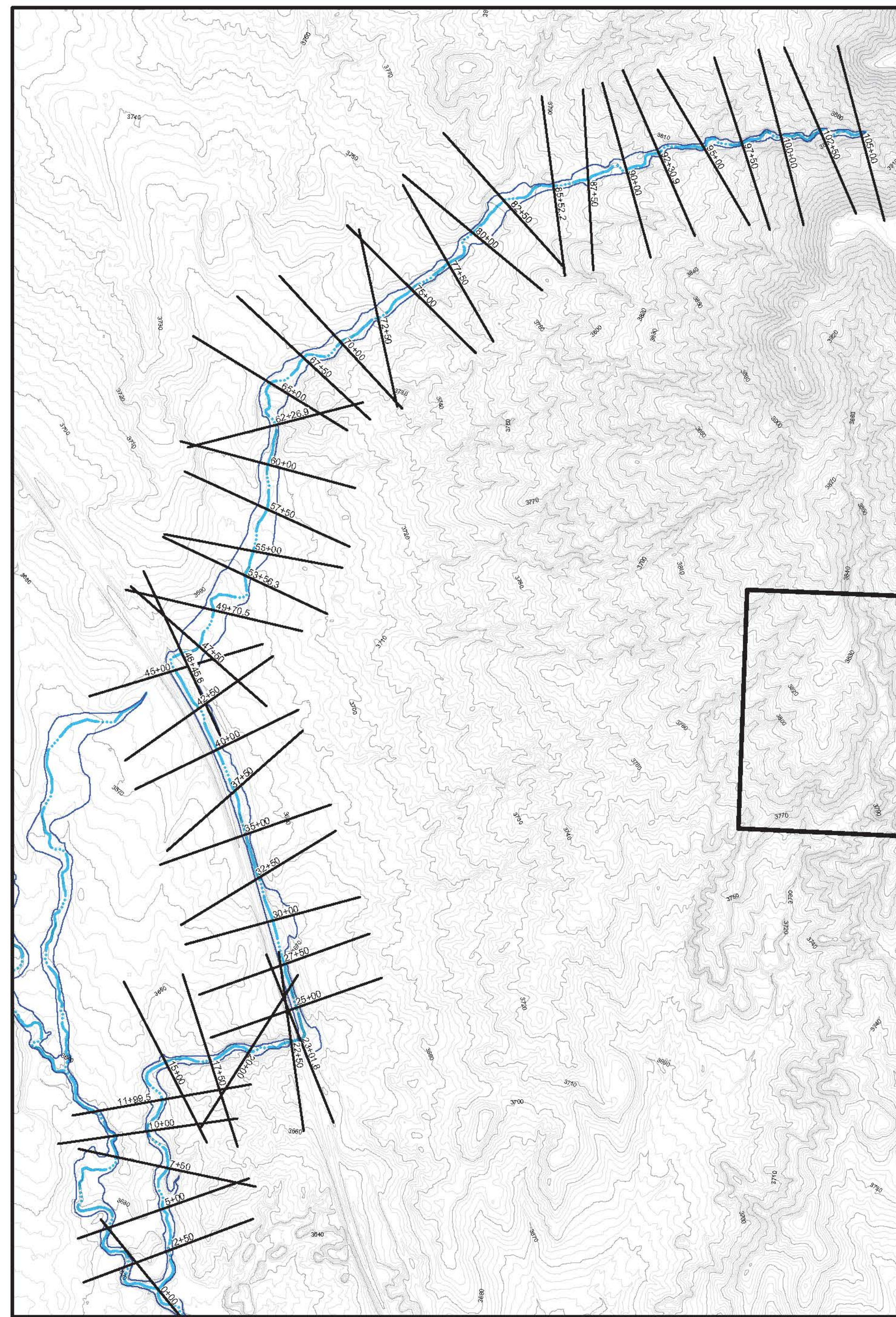
CHECK SCALES <small>1" = 1000'</small> <small>1 inch on this map is not at a single scale</small>	DRAWN: DC CHECKED: CGB	DATE: 16 June 2011 PLOT DATE: 24 June 2011 PLOT FILE: I:\P\111818\DWG\SSHEC_RAS.dwg
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Powertech (USA) Inc.
Exhibit 2.7-M-2
HEC-RAS Location And
100-year Inundation Map
 Dewey-Burdock Project
10000' NAD 27, South Dakota State Plane South (feet)



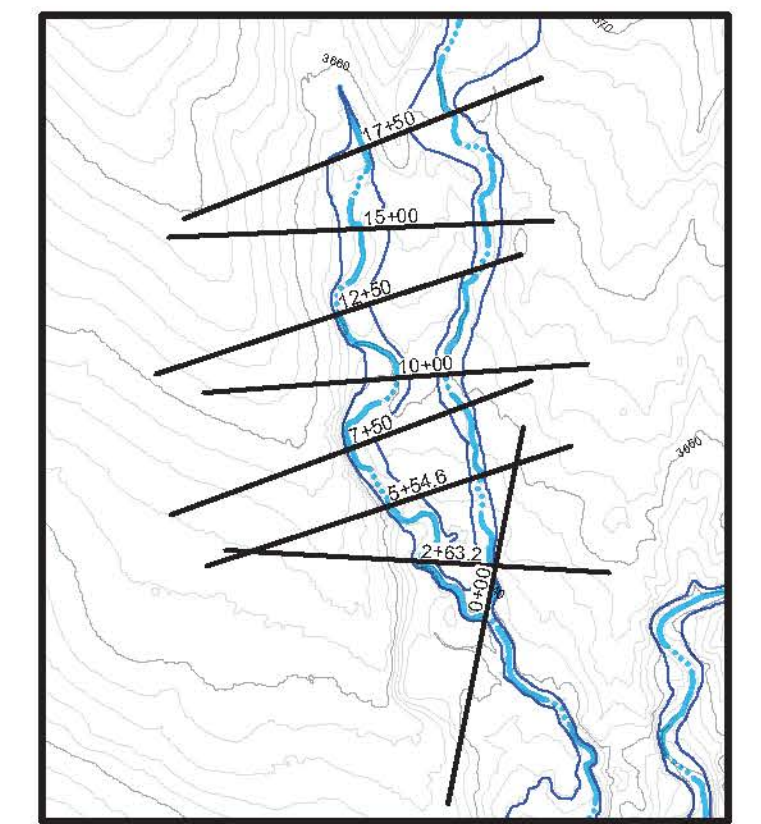
HEC-RAS CHANNEL 01

SCALE: 1" = 500'
C.I. = 2'



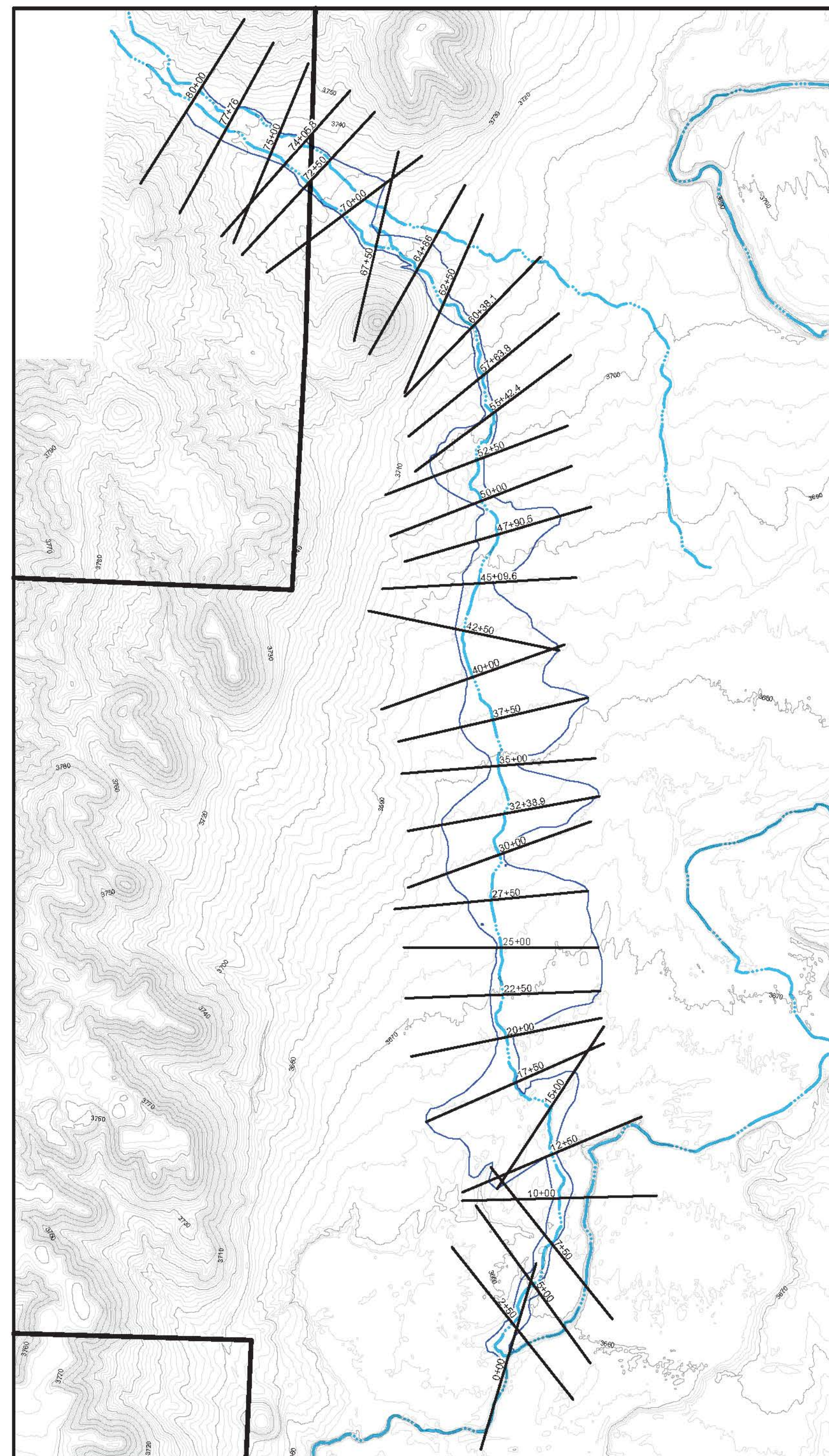
HEC-RAS CHANNEL 02A

SCALE: 1" = 500'
C.I. = 2'



HEC-RAS CHANNEL 02B

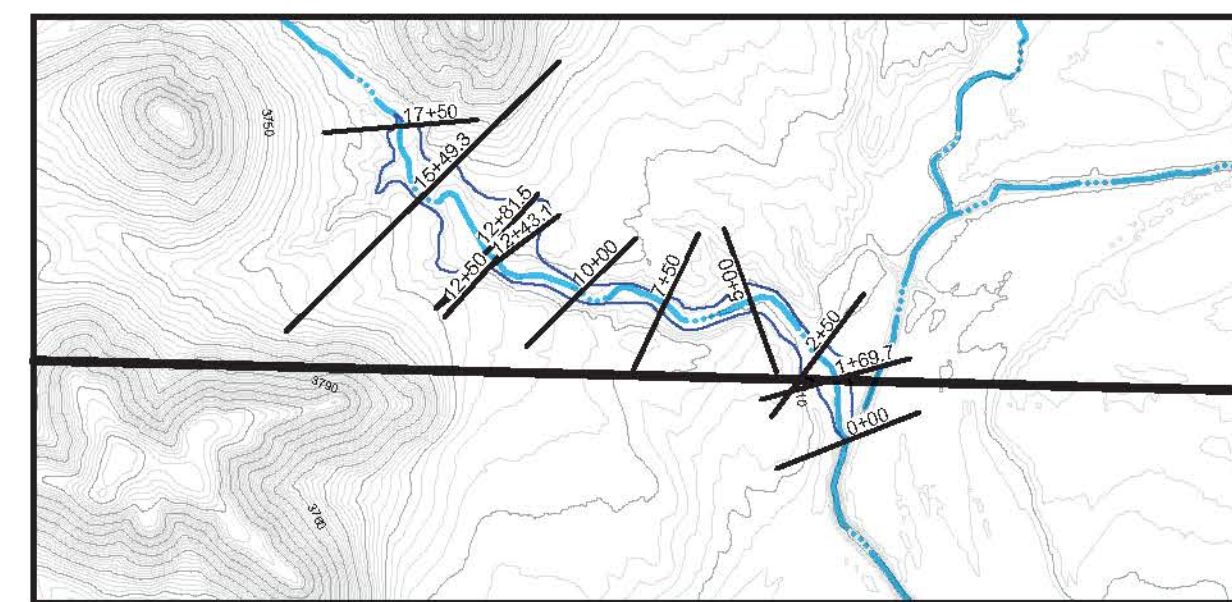
SCALE: 1" = 500'
C.I. = 2'



HEC-RAS CHANNEL 04

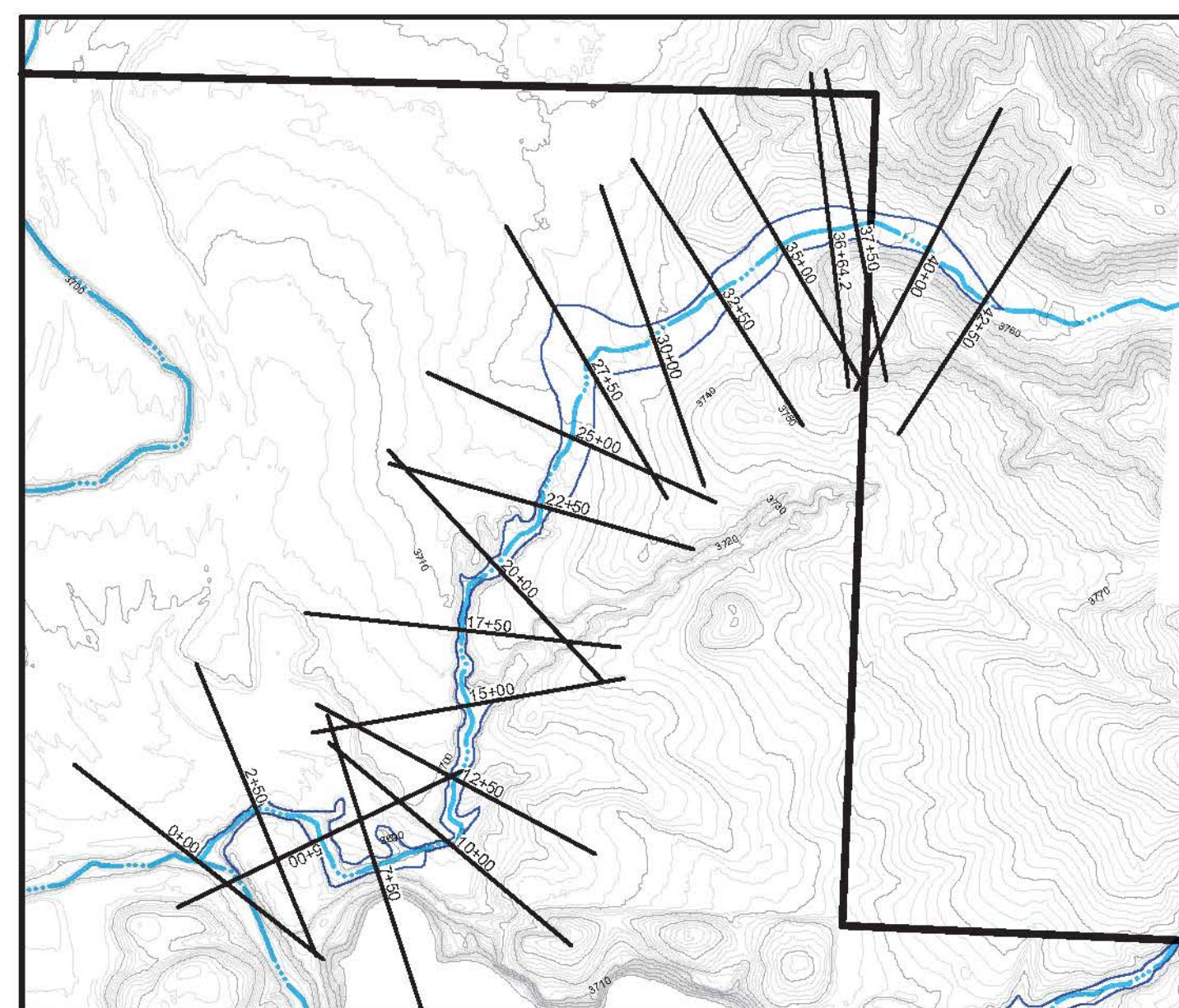
SCALE: 1" = 500'
C.I. = 2'

NOTE: BELOW STATION 50+00 THERE IS NO WELL DEFINED CHANNEL, THEREFORE THE FLOW WILL SPREAD OUT AND BE OVERLAND FLOW.



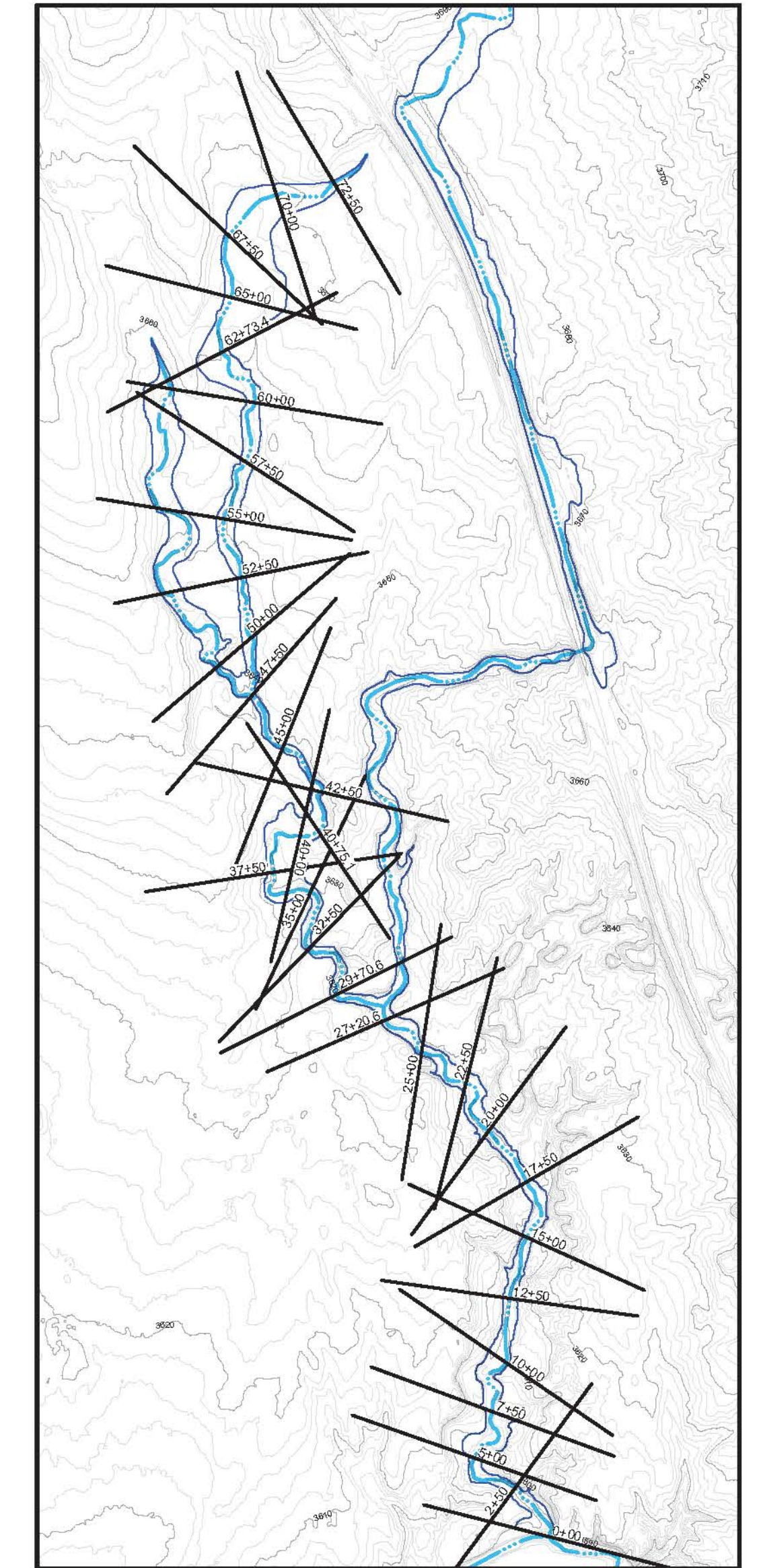
HEC-RAS CHANNEL 03

SCALE: 1" = 500'
C.I. = 2'



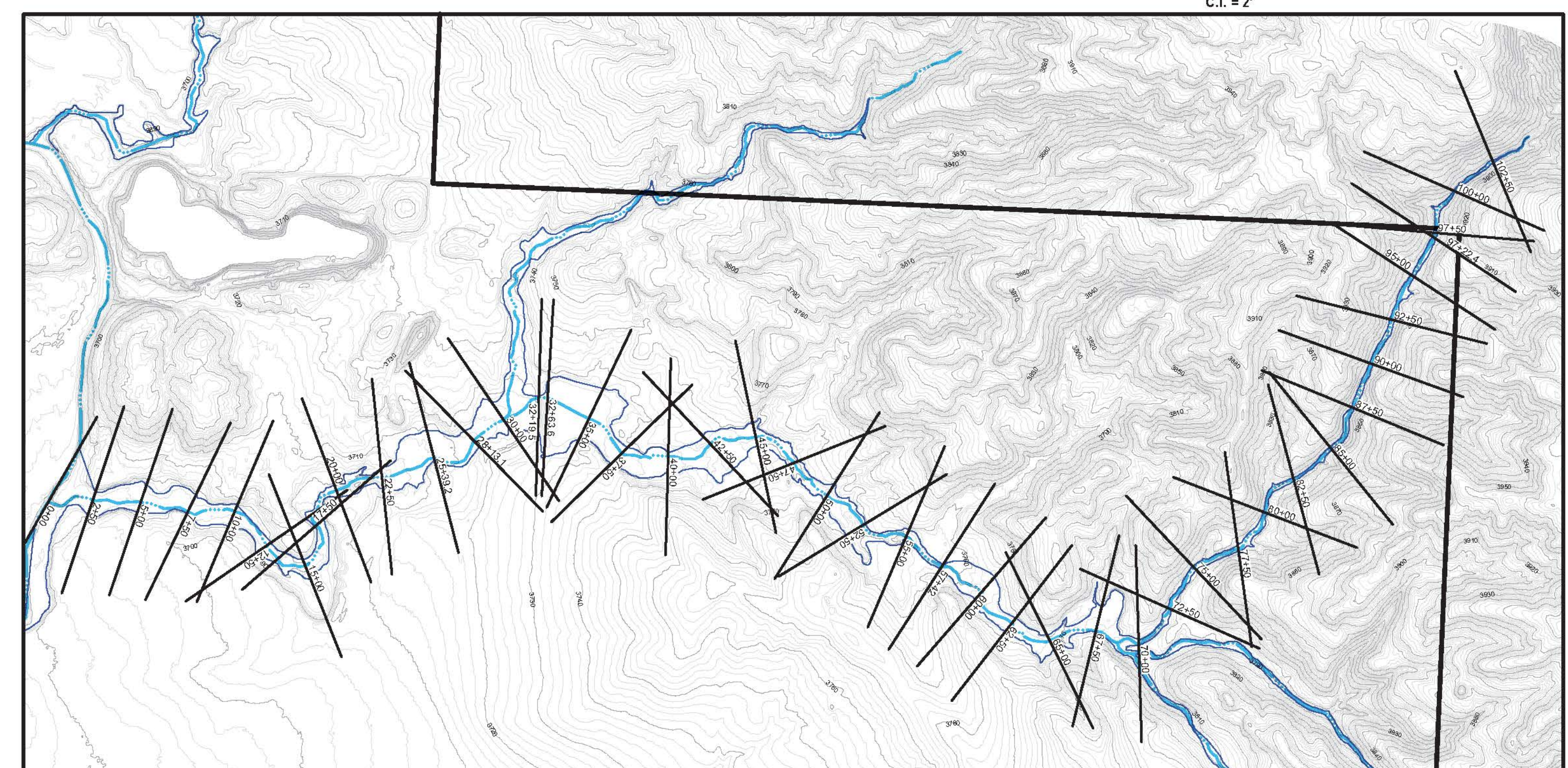
HEC-RAS CHANNEL 05

SCALE: 1" = 500'
C.I. = 2'



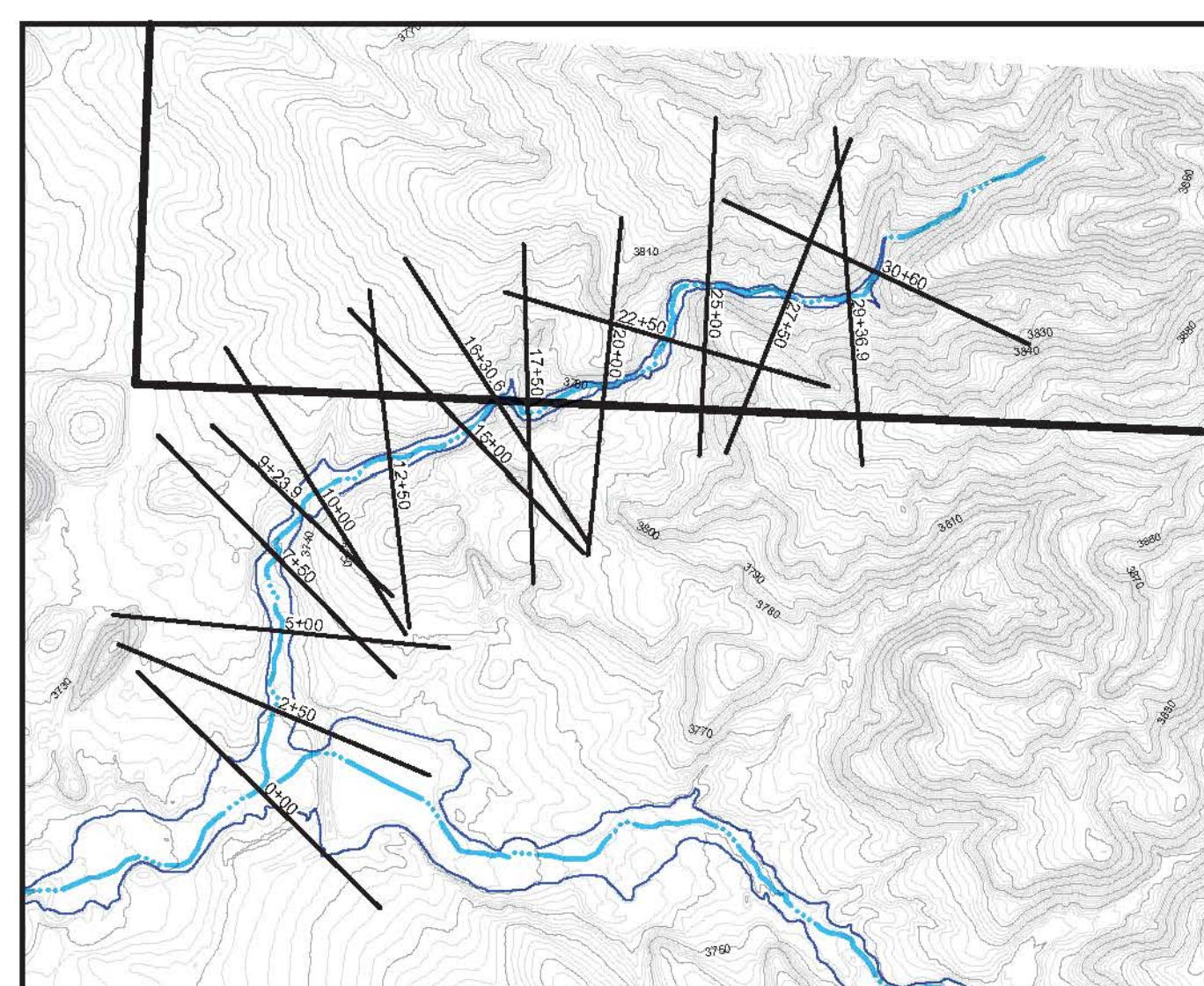
HEC-RAS CHANNEL 02

SCALE: 1" = 500'
C.I. = 2'



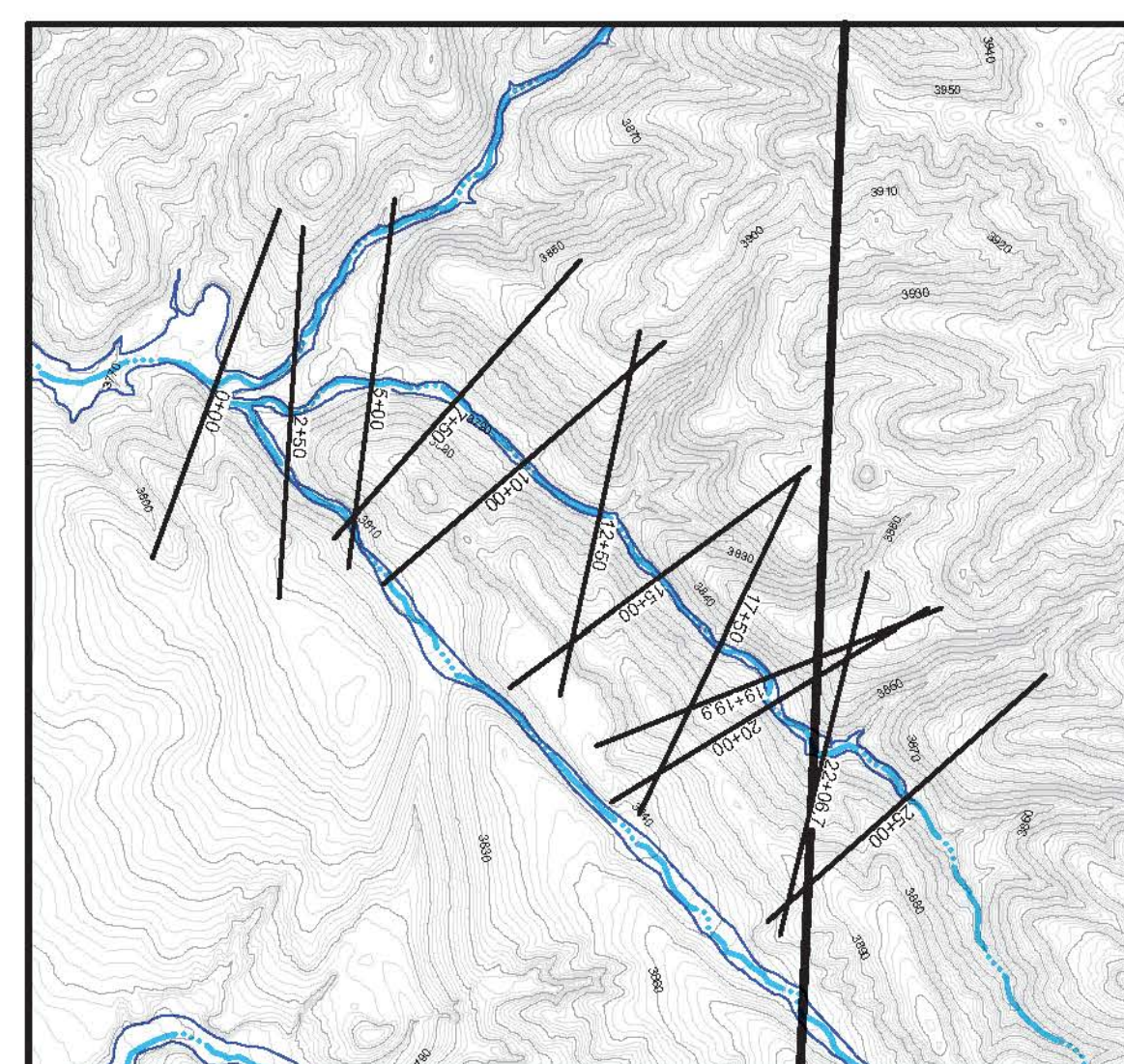
HEC-RAS CHANNEL 07

SCALE: 1" = 500'
C.I. = 2'



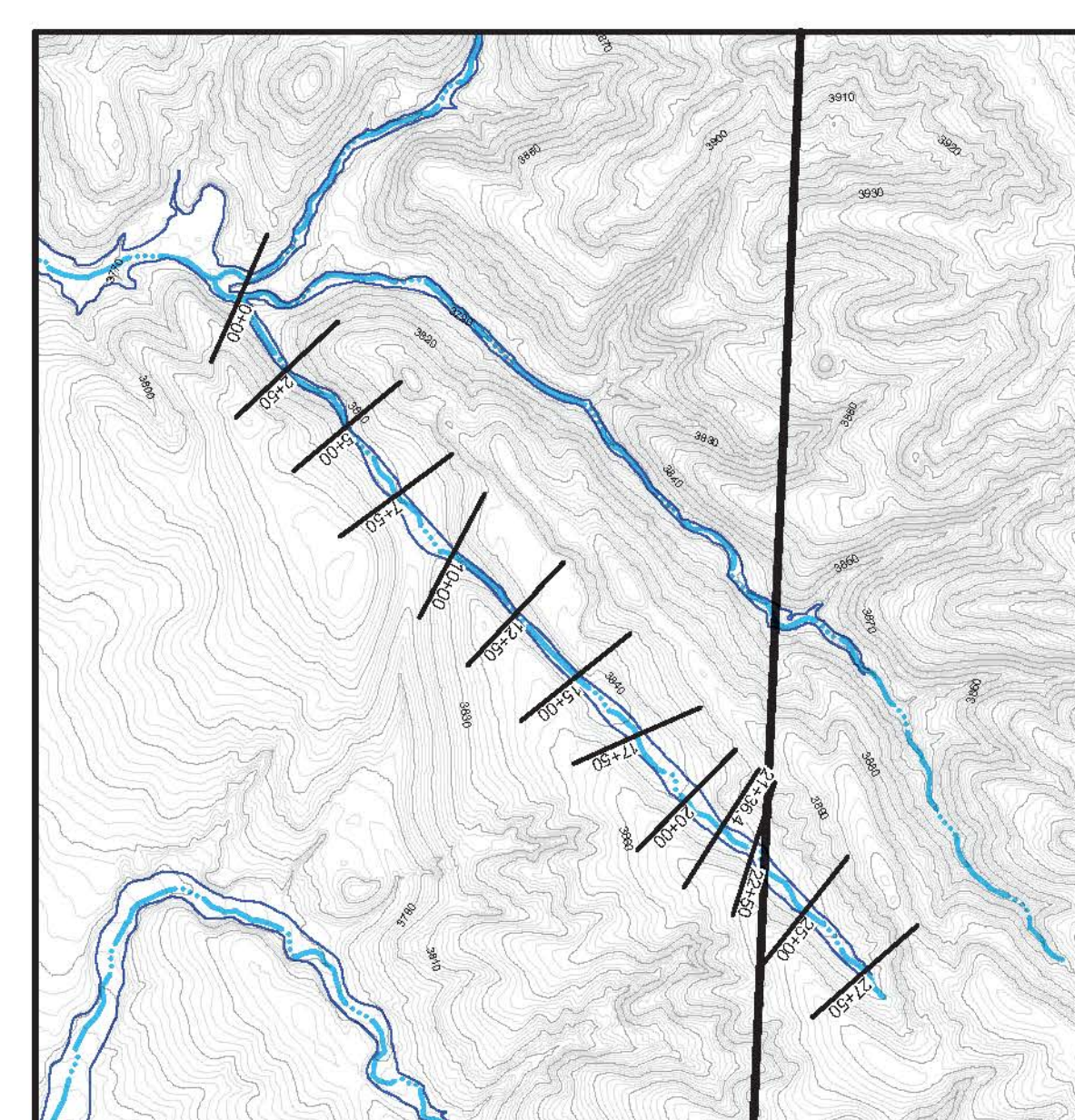
HEC-RAS CHANNEL 7A

SCALE: 1" = 500'
C.I. = 2'



HEC-RAS CHANNEL 07B

SCALE: 1" = 500'
C.I. = 2'



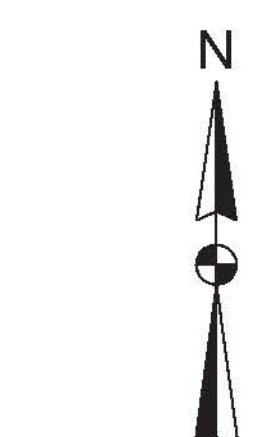
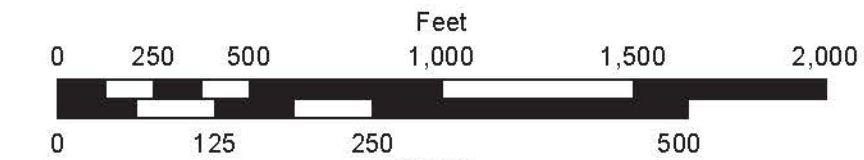
HEC-RAS CHANNEL 07C

SCALE: 1" = 500'
C.I. = 2'

LEGEND

- PERMIT BOUNDARY
- 100-YEAR FLOODING BOUNDARY

NOTE: THERE IS NO HEC-RAS ANALYSIS FOR CHANNEL 06 OR CHANNEL 08, THEY ARE CLOSED BASINS.

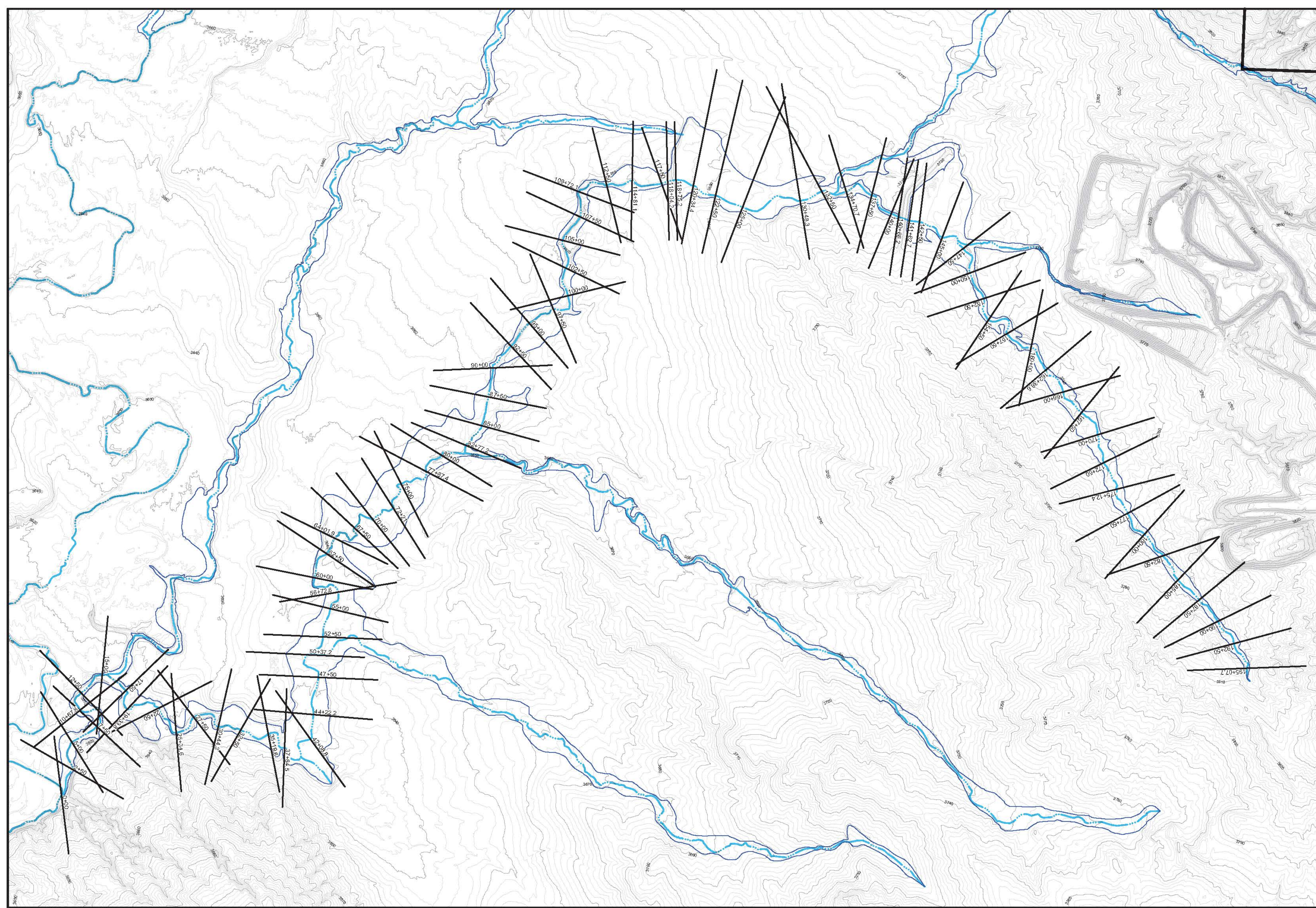


#	REVISIONS			
	DRAWN	CHECKED	APPROVED	DATE

DATE: 16 June 2011	DATE: 16 June 2011
DRAWN: DC	PDF FILE
CHECKED: CEB	CAD FILE: K:\P\w\h\m\1108\W\SS\HEC_RAS.dwg

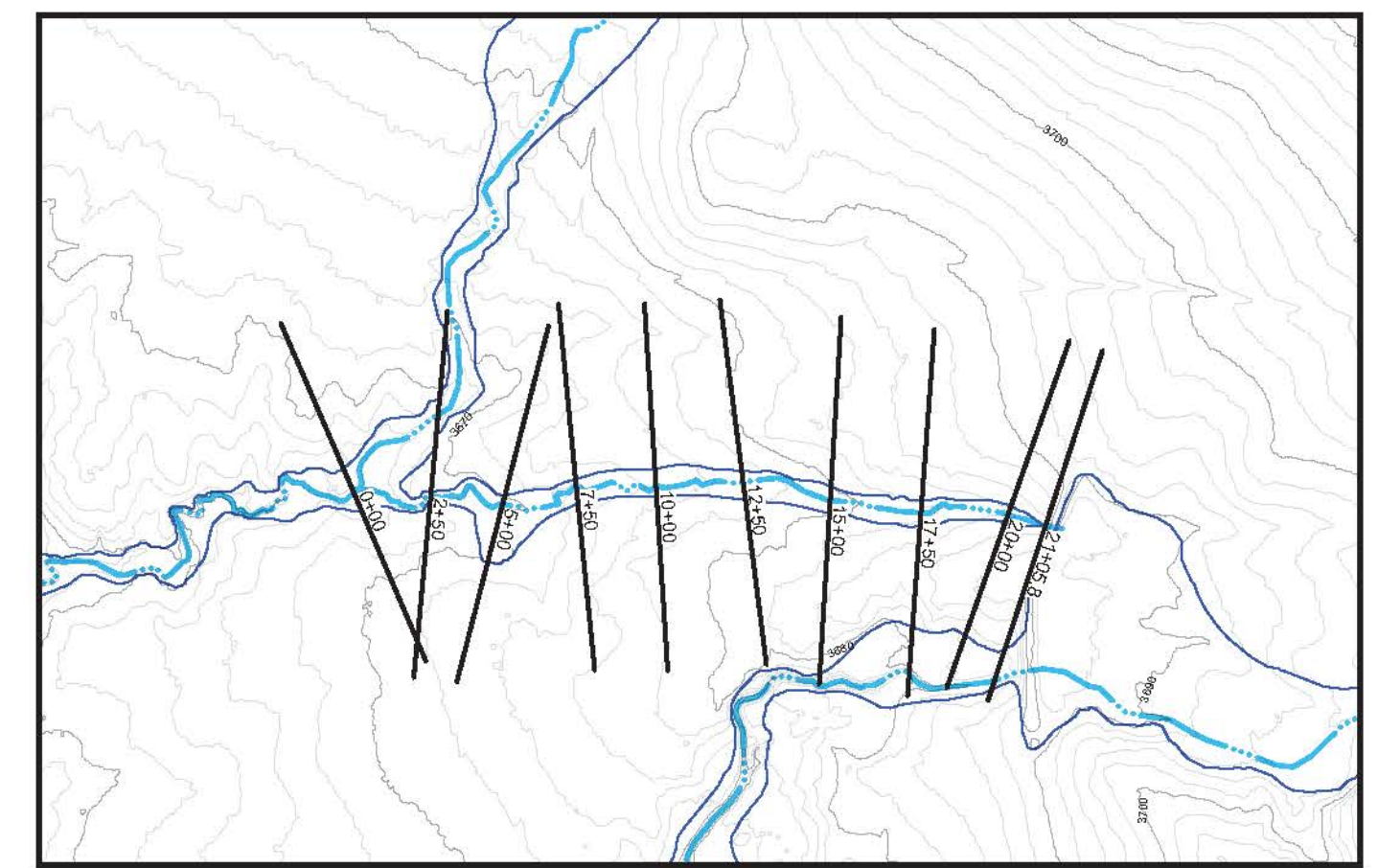

POWERTECH (USA) INC.
EXHIBIT 2.7-M-3
HEC-RAS CROSS SECTIONS

Dewey-Burdock Project
100% NAD 21, South Dakota State Plane South (feet)



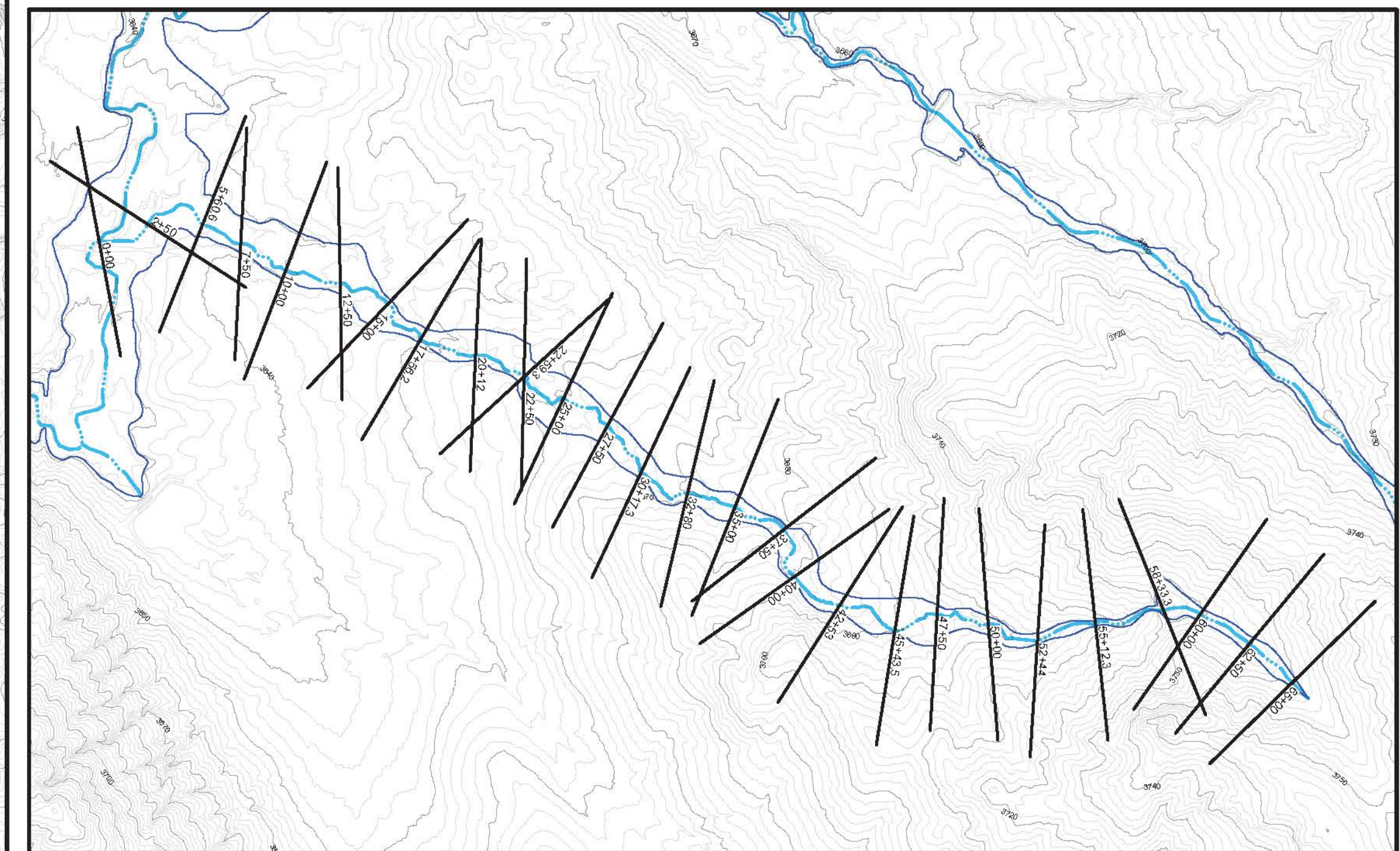
HEC-RAS CHANNEL 09

SCALE: 1" = 500'
C.I. = 2'



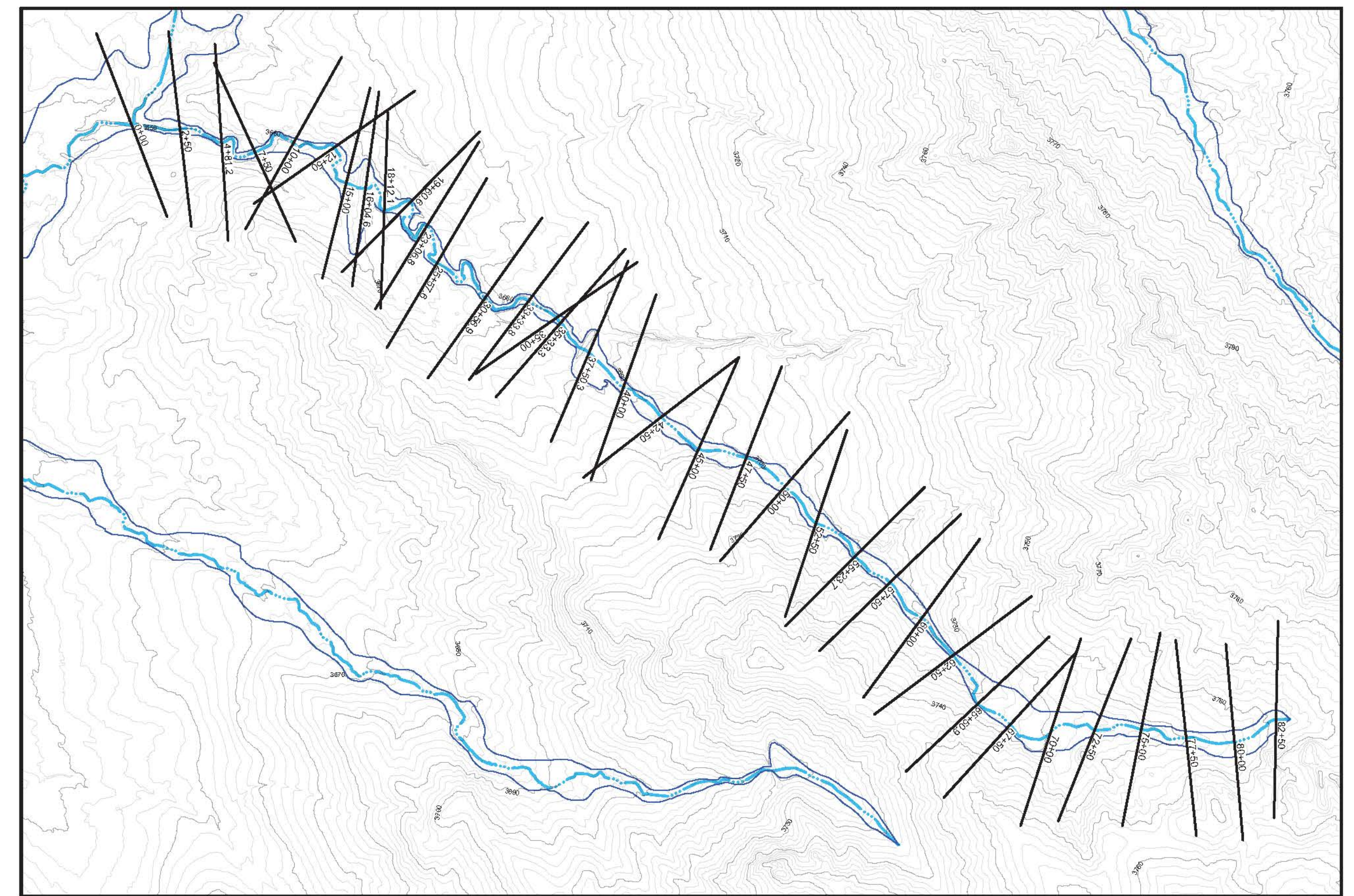
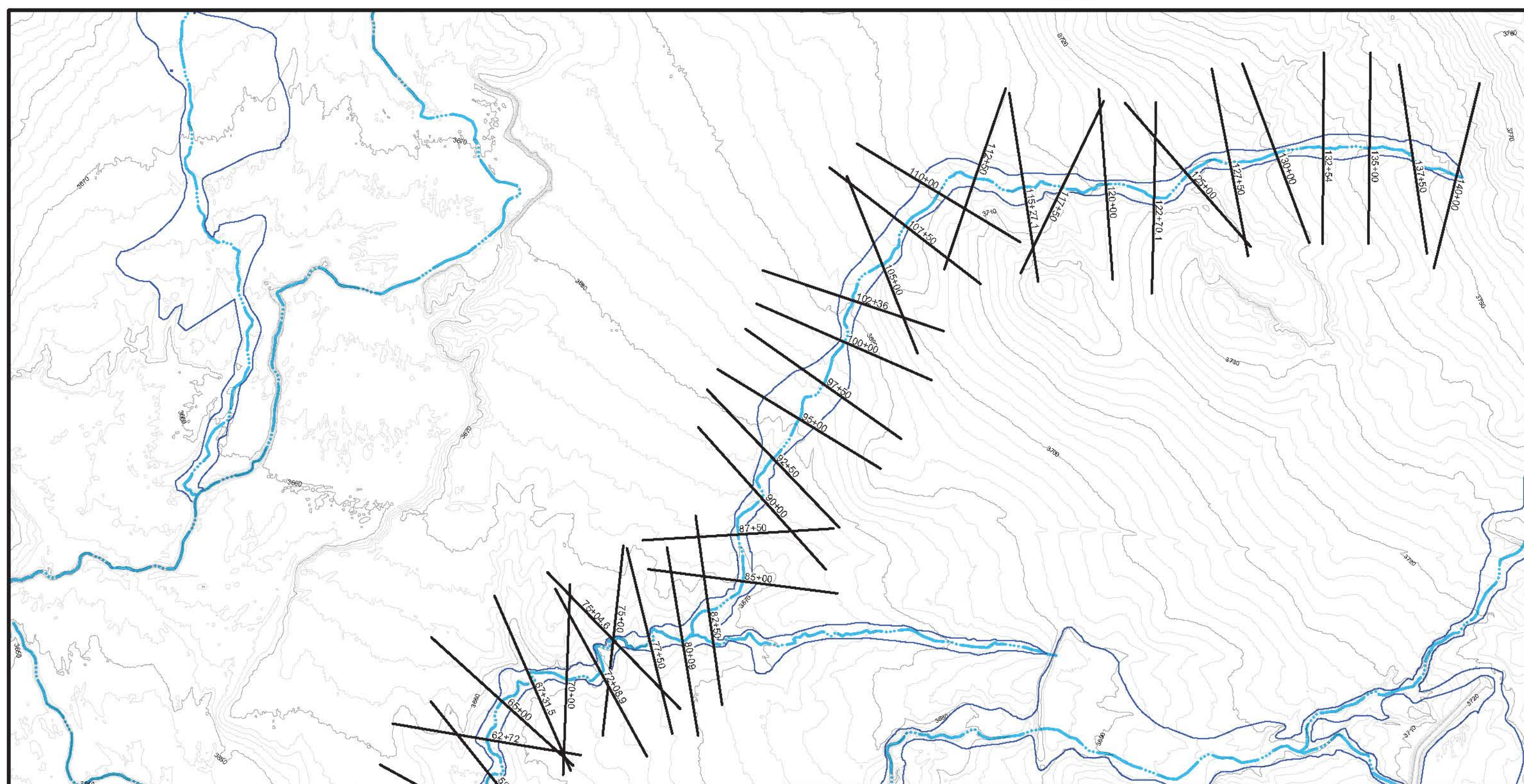
HEC-RAS CHANNEL 09B

SCALE: 1" = 500'
C.I. = 2'



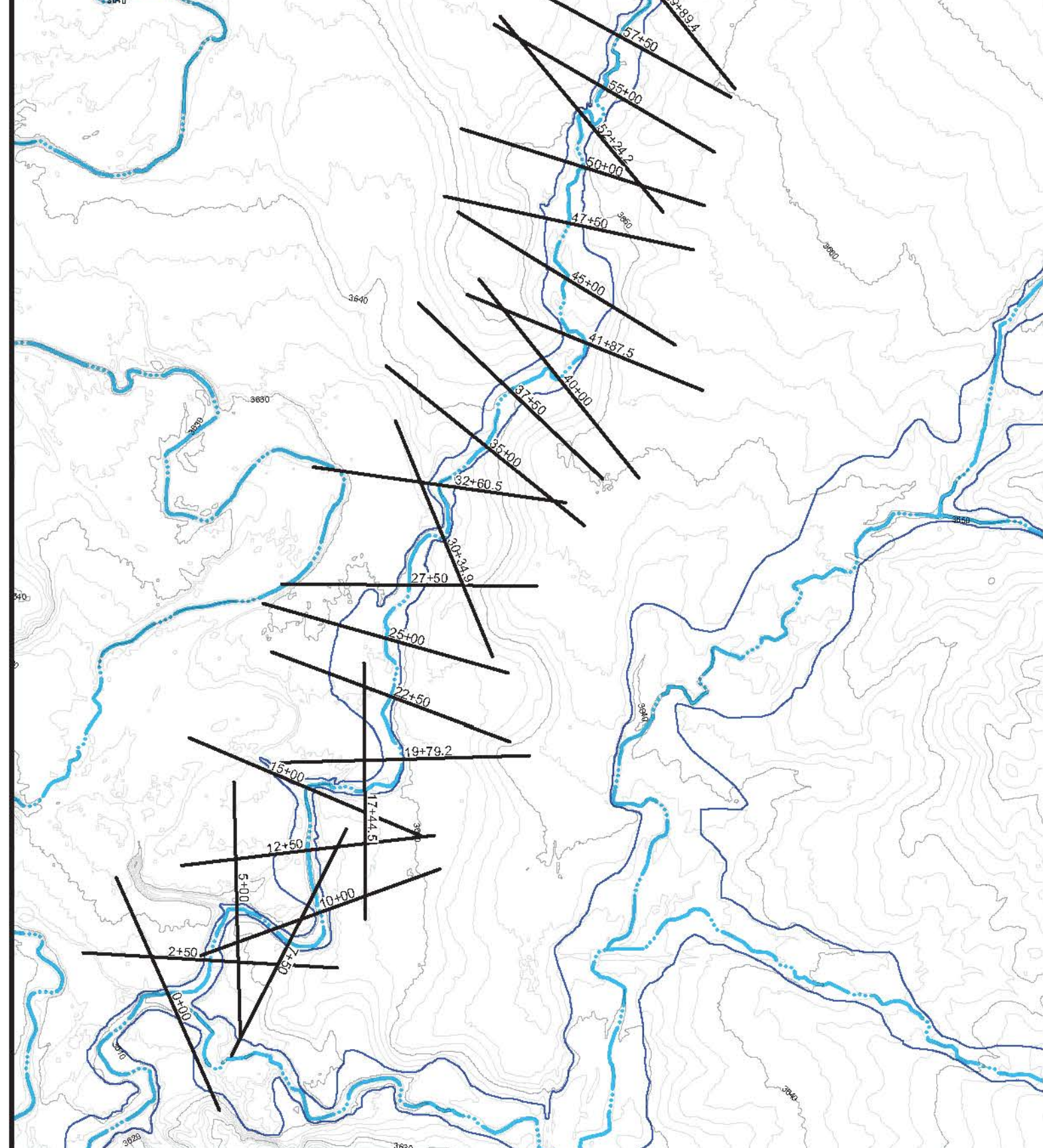
HEC-RAS CHANNEL 09C

SCALE: 1" = 500'
C.I. = 2'



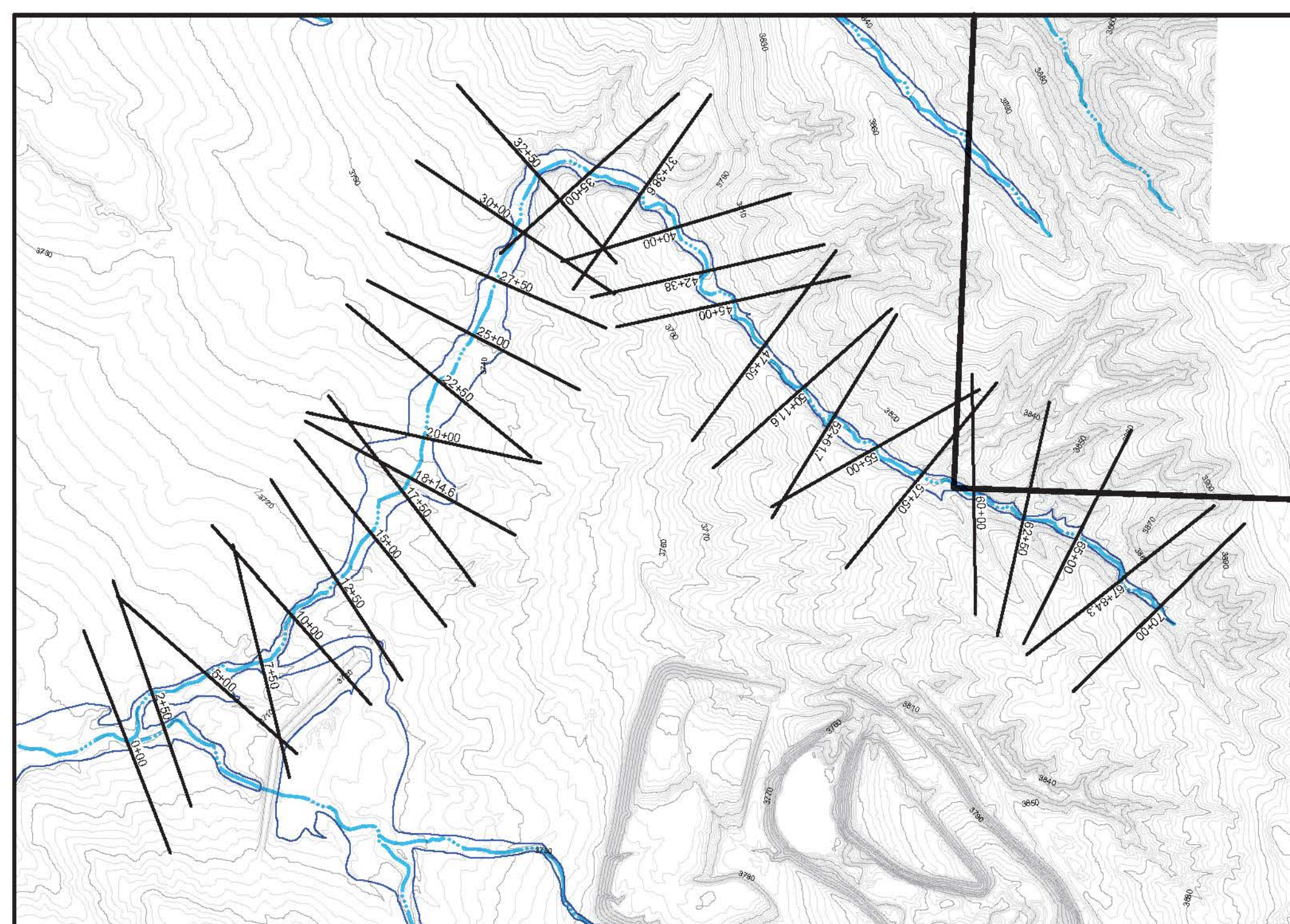
HEC-RAS CHANNEL 09D

SCALE: 1" = 500'
C.I. = 2'



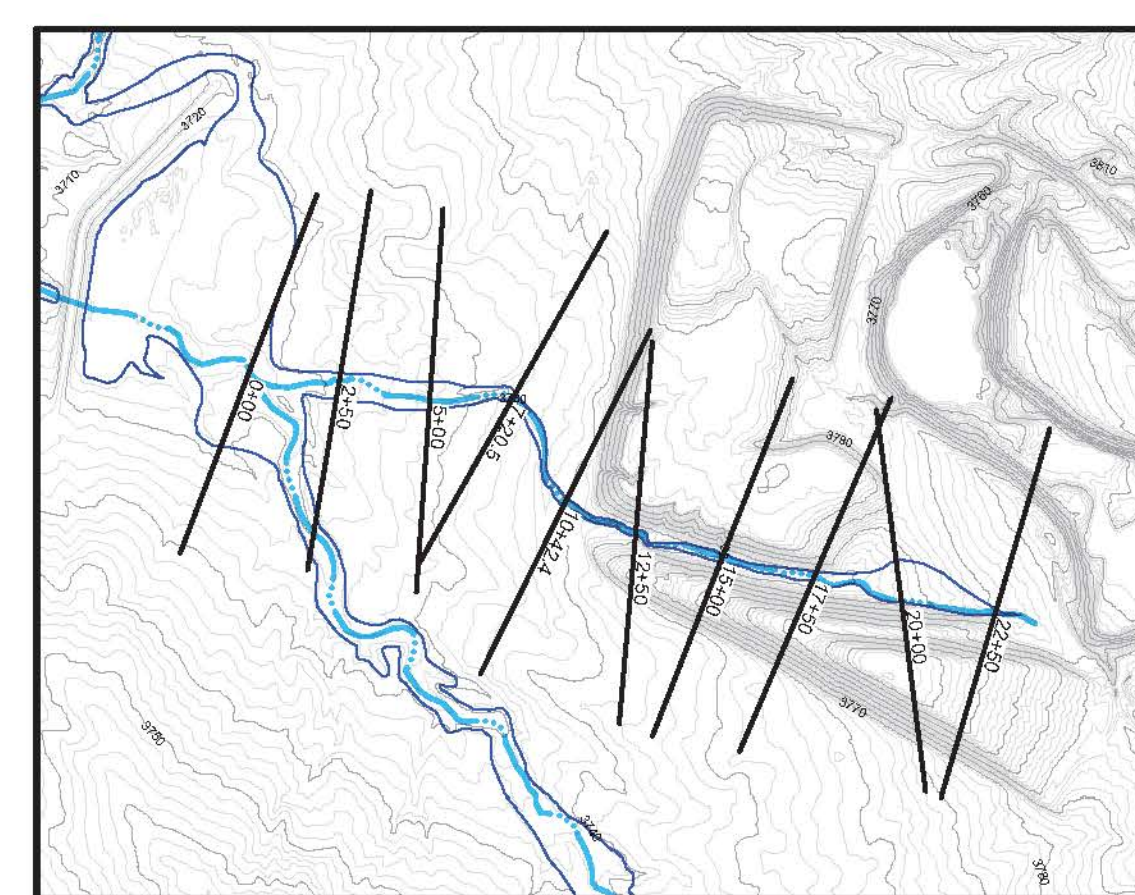
HEC-RAS CHANNEL 09A

SCALE: 1" = 500'
C.I. = 2'



HEC-RAS CHANNEL 09E

SCALE: 1" = 500'
C.I. = 2'

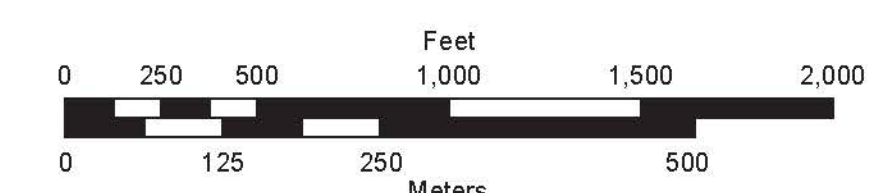


HEC-RAS CHANNEL 09F

SCALE: 1" = 500'
C.I. = 2'

LEGEND

- PERMIT BOUNDARY
- 100-YEAR FLOOD BOUNDARY



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POWERTECH (USA) INC.
EXHIBIT 2.7-M-3
HEC-RAS CROSS SECTIONS

Dewey-Burdock Project
PROJECT: NAD 21, South Dakota State Plane South (feet)

CHECK SCALES	DRAWN DATE: 16 June 2011	DATE: 16 June 2011
1" = 500' (check this map in not at 4x engine scale)	DRAWN: DC	PDF FILE
	CHECKED: cgb	CAD FILE: K:\Powertech\111818\09\HEC_RAS.dwg

