

File 123143

August 27, 2024

Paul Mondell
2264164 Ontario Limited
156 Jozo Weider Blvd., Unit 9B
The Blue Mountains, Ontario L9Y 0V2
pmondell19@hotmail.ca

Re: 796060 Grey Road 19 Development, Town of The Blue Mountains
Natural Hazards Brief

Dear Paul:

Tatham Engineering Limited (Tatham) has been retained to complete a natural hazard assessment in support of the proposed development located at 796060 Grey Road 19 in the Town of The Blue Mountains. This brief has been prepared to present the existing flood and erosion hazards associated with a tributary of Silver Creek across the subject property.

STUDY AREA

The subject property is located at 796060 Grey Road 19 in the Town of The Blue Mountains and is bound by Grey Road 19 to the north, a former driving range property to the east, residential land to the west and undeveloped land to the south. The subject property is within the NVCA regulated area associated with the tributary of Silver Creek which crosses the subject property.

BACKGROUND AND DESIGN CRITERIA

This assessment has been prepared in accordance with the following background documents:

- Drainage Master Plan Existing Conditions Report – Town of The Blue Mountains. Tatham Engineering Limited (October 5, 2022);
- Grey Road 19 BPS Relocation Flood Assessment & Permit Application. Tatham Engineering Limited (May 9, 2024);
- NVCA Natural Hazards Technical Guide. Nottawasaga Valley Conservation Authority (December 2013);
- Technical Guide – River & Stream Erosion Systems: Erosion Hazard Limit. Ontario Ministry of Natural Resources (2002); and

- Technical Guide – River & Streams Systems: Flooding Hazard Limit. Ontario Ministry of Natural Resources (2002).

HYDROLOGIC ANALYSIS

A hydrologic analysis of the tributary of Silver Creek watershed was completed using Visual OTTHYMO (VO) hydrologic modelling software. The tributary's watershed at its crossing of Grey Road 19 is illustrated on the Overall Drainage Plan (Drawing ODP-1) enclosed for reference. The hydrologic model was used to calculate the peak flow for the 1:100-year design storm and Regional (Timmins) Storm. Catchment hydrologic parameters have been calculated using soils information from the Grey County Soil Survey and land use data extracted from the latest available aerial imagery of the watershed. VO hydrologic model results are included in Appendix A for reference. The tributary peak flow has been prorated based on the subcatchment area of watershed 50114 at the downstream property boundary as shown on the Overall Drainage Plan.

Previous analysis completed by Tatham for the *Grey Road 19 BPS Relocation Flood Assessment Brief and Permit Application* identified spills towards the tributary of Silver Creek from other branches of Silver Creek located south of the subject property. One spill enters the tributary of Silver Creek at the southwest boundary of the subject property, while the other enters the tributary at the culvert crossing Grey Road 19 downstream of the subject property. These spills have been accounted for in the peak flows used for this flood hazard assessment. The peak flows used for this flood assessment are summarized in Table 1.

Table 1: Peak Flow Results Summary

TRIBUTARY DESCRIPTION	PEAK FLOW (m ³ /s)	
	1:100-Year	Regional (Timmins)
Tributary of Silver Creek (No spill)	1.97	2.50
Tributary of Silver Creek @ Subject Property (With Spill)	3.49	4.02
Tributary of Silver Creek @ GR 19 (With Spill)	4.80	5.68
Spill to Grey Road 19 Culvert Crossing	23.39	22.62

HYDRAULIC ANALYSIS

An existing conditions 1D HEC-RAS hydraulic model was developed to establish the flood hazard extents across the subject property. The model terrain was refined through the subject property using site-specific topographic survey information. Existing condition model runs were completed for the 1:100-year design storm and the Regional (Timmins) Storm including the spills as summarized in Table 1. The model results determined that the Regional (Timmins) Storm is the Regulatory Storm for the subject property as it produced the greatest flood extents. The existing flood hazard extents across the subject property are



illustrated on the Natural Hazards Plan (Drawing NH-1) enclosed for reference. HEC-RAS hydraulic model results are included in Appendix B for reference.

EROSION HAZARD

The erosion hazard for the tributary of Silver Creek through the subject property at 796060 Grey Road 19 was established following the guidelines defined in the *MNRF Technical Guide – River and Stream Systems: Erosion Hazard Limit*.

The Tributary of Silver Creek which crosses the subject property is considered an unconfined watercourse at the west limit of the subject property and transitions to a confined watercourse approximately 140 m from the west property line through the remainder of the subject property. The erosion hazard limit for the unconfined system was defined with a 62 m meander belt allowance based on 20 times the bankfull width of 3.1 m, plus an additional 6 m erosion access allowance. The erosion hazard limit for the confined portion of the watercourse is defined as the sum of the toe erosion allowance, stable slope allowance and erosion access allowance. The Soil Survey of Grey County identifies the soil at this location as Kemble Silty Clay. Based on the Stiff/Hard Cohesive Soil type, a toe erosion allowance of 8 m has been applied which is conservative as this portion of the channel is generally straight with no indication of meandering. A stable slope allowance equal to a 3:1 slope from the toe erosion allowance to the existing grade has been applied with the addition of a 6 m erosion access allowance to define the erosion hazard limit.

The erosion hazard limit is illustrated on the Natural Hazard Plan (Drawing NH-1) enclosed.

CLOSING

A natural hazard assessment was completed for the proposed development located at 796060 Grey Road 19 in the Town of The Blue Mountains. Hydrologic and hydraulic analysis has been completed to establish the flood hazard limit for the Regulatory Storm (Timmins Storm) across the subject property. The erosion hazard limit for the unconfined portion of the tributary of Silver Creek was defined as the meander belt allowance (62 m) plus an erosion access allowance (6 m). The erosion hazard for the confined portion of the Tributary of Silver Creek was defined as the toe erosion allowance (8 m), plus the stable slope allowance (3:1 slope) and erosion access allowance (6 m). Both the flood hazard and erosion hazard limits are illustrated on the Natural Hazards Plan (NH-1) enclosed.

Yours truly,

Tatham Engineering Limited

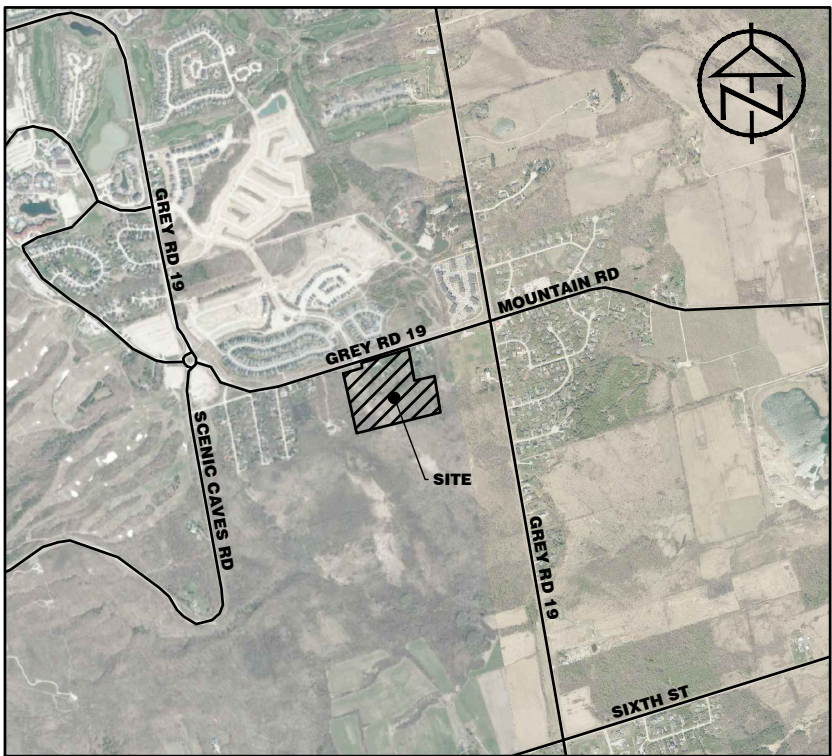
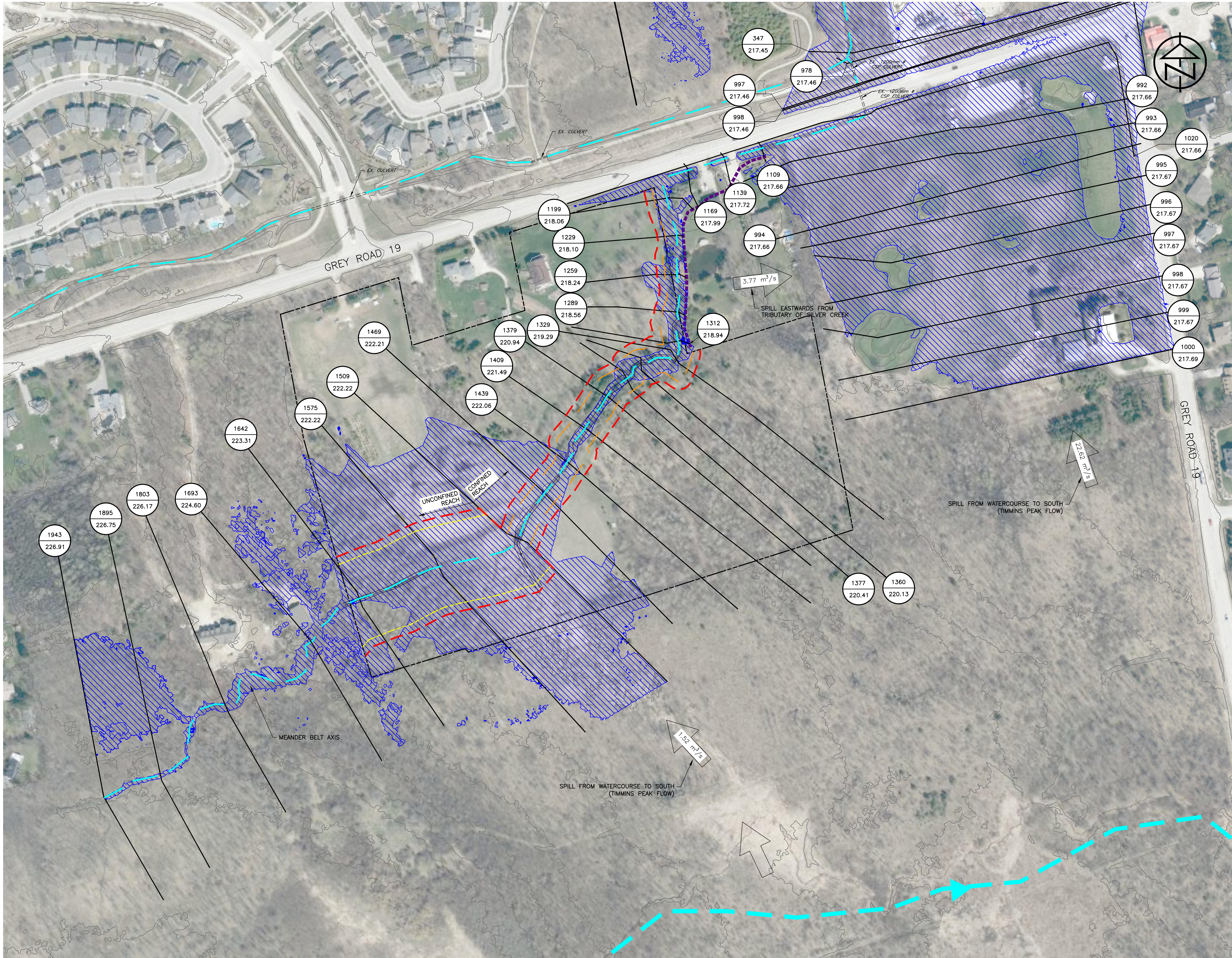


Grace Trombino, B.Eng.
Engineering Candidate
GT/JM:rlh



Jacob Macdonald, B.A.Sc., P.Eng.
Engineer





KEY PLAN
NTS

LEGEND

- 230.00 EXISTING CONTOUR
- FLOOD HAZARD LIMIT
- EROSION HAZARD LIMIT
- STABLE SLOPE ALLOWANCE
- MEANDER BELT ALLOWANCE
- TRIBUTARY OF SILVER CREEK
- EXISTING CULVERT
- HEC-RAS CROSS SECTION
- LATERAL STRUCTURE
- 1469 HEC-RAS CROSS SECTION
- 222.28 REGIONAL (TIMMINS) STORM FLOOD ELEVATION (m)

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NOTES

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No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	NATURAL HAZARDS BRIEF	AUG. 2024	

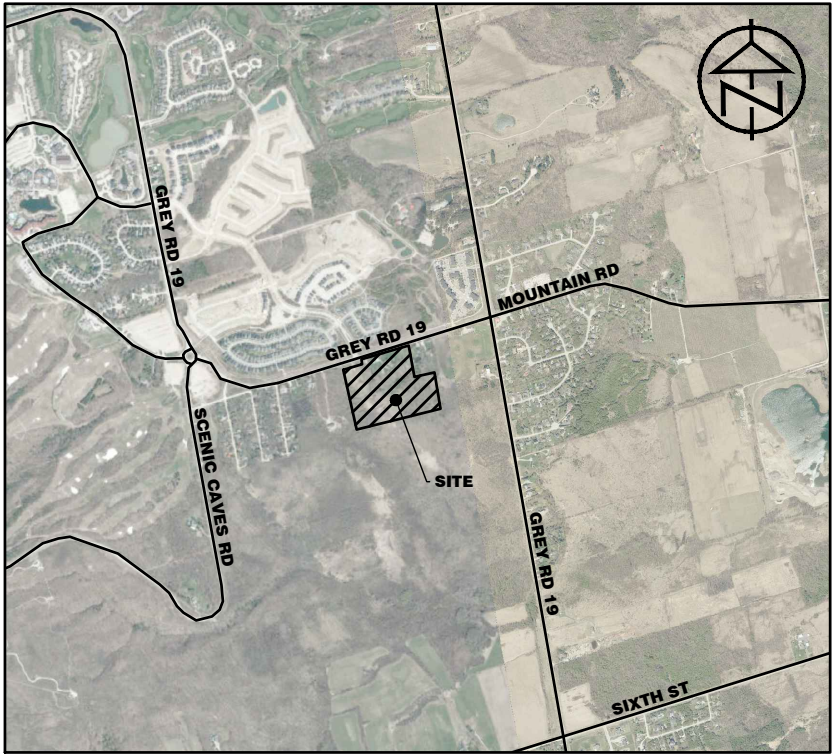
796060 GREY ROAD 19
TOWN OF THE BLUE MOUNTAINS

NATURAL HAZARDS PLAN



DESIGN: GT	FILE: 123143	DWG:
DRAWN: GT	DATE: JULY, 2024	
CHECK: JM	SCALE: 1:1500	

NH-1



KEY PLAN
NTS

- LEGEND
- EXISTING CULVERT CROSSING
 - CATCHMENT BOUNDARY
 - SUBCATCHMENT BOUNDARY
 - PROPERTY BOUNDARY
 - EXISTING CONTOURS
 - EXISTING WATERCOURSE
 - EXISTING OVERLAND FLOW DIRECTION
 - CATCHMENT ID
 - CN NUMBER/% IMPERVIOUS
 - CATCHMENT AREA (ha)

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No.	REVISION DESCRIPTION	DATE	ENGINEER STAMP
1.	NATURAL HAZARDS BRIEF	AUG. 2024	

796060 GREY ROAD 19
TOWN OF THE BLUE MOUNTAINS



OVERALL DRAINAGE PLAN

DESIGN: GT	FILE: 123143	DWG:
DRAWN: GT	DATE: JULY, 2024	ODP-1
CHECK: JM	SCALE: 1:3000	

Appendix A: Hydrologic Analysis

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V V I SSSS U U A L (v 6.2.2015)
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|-----|

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0.08	1.21	6.17	1.97	12.25	15.79	18.33	1.97
0.17	1.21	6.25	1.97	12.33	15.79	18.42	1.97
0.25	1.21	6.33	1.97	12.42	15.79	18.50	1.97
0.33	1.21	6.42	1.97	12.50	15.79	18.58	1.97
0.42	1.21	6.50	1.97	12.58	8.12	18.67	1.97
0.50	1.21	6.58	1.97	12.67	8.12	18.75	1.97
0.58	1.21	6.67	1.97	12.75	8.12	18.83	1.97
0.67	1.21	6.75	1.97	12.83	8.12	18.92	1.97
0.75	1.21	6.83	1.97	12.92	8.12	19.00	1.97
0.83	1.21	6.92	1.97	13.00	8.12	19.08	1.97
0.92	1.21	7.00	1.97	13.08	5.92	19.17	1.97
1.00	1.21	7.08	2.41	13.17	5.92	19.25	1.97
1.08	1.21	7.17	2.41	13.25	5.92	19.33	1.97
1.17	1.21	7.25	2.41	13.33	5.92	19.42	1.97
1.25	1.21	7.33	2.41	13.42	5.92	19.50	1.97
1.33	1.21	7.42	2.41	13.50	5.92	19.58	1.97
1.42	1.21	7.50	2.41	13.58	4.61	19.67	1.97
1.50	1.21	7.58	2.41	13.67	4.61	19.75	1.97
1.58	1.21	7.67	2.41	13.75	4.61	19.83	1.97
1.67	1.21	7.75	2.41	13.83	4.61	19.92	1.97
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2.42	1.43	8.50	2.85	14.58	3.29	20.67	1.32
2.50	1.43	8.58	3.07	14.67	3.29	20.75	1.32
2.58	1.43	8.67	3.07	14.75	3.29	20.83	1.32
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3.25	1.43	9.33	3.51	15.42	3.29	21.50	1.32
3.33	1.43	9.42	3.51	15.50	3.29	21.58	1.32
3.42	1.43	9.50	3.51	15.58	3.29	21.67	1.32
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3.67	1.43	9.75	3.95	15.83	3.29	21.92	1.32

3.75	1.43	9.83	3.95	15.92	3.29	22.00	1.32
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4.08	1.75	10.17	5.05	16.25	1.97	22.33	1.32
4.17	1.75	10.25	5.05	16.33	1.97	22.42	1.32
4.25	1.75	10.33	5.05	16.42	1.97	22.50	1.32
4.33	1.75	10.42	5.05	16.50	1.97	22.58	1.32
4.42	1.75	10.50	5.05	16.58	1.97	22.67	1.32
4.50	1.75	10.58	6.80	16.67	1.97	22.75	1.32
4.58	1.75	10.67	6.80	16.75	1.97	22.83	1.32
4.67	1.75	10.75	6.80	16.83	1.97	22.92	1.32
4.75	1.75	10.83	6.80	16.92	1.97	23.00	1.32
4.83	1.75	10.92	6.80	17.00	1.97	23.08	1.32
4.92	1.75	11.00	6.80	17.08	1.97	23.17	1.32
5.00	1.75	11.08	10.53	17.17	1.97	23.25	1.32
5.08	1.75	11.17	10.53	17.25	1.97	23.33	1.32
5.17	1.75	11.25	10.53	17.33	1.97	23.42	1.32
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5.83	1.75	11.92	134.25	18.00	1.97		
5.92	1.75	12.00	134.25	18.08	1.97		
6.00	1.75	12.08	15.79	18.17	1.97		

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000   T       T   H   H   Y   M   M   000

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DATE: 08/16/2024

TIME: 11:54:04

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COMMENTS: _____

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| ID= 1 DT= 5.0 min | Ia (mm)= 9.01 # of Linear Res.(N)= 3.00
|-----| U.H. Tp(hrs)= 0.68

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Unit Hyd Qpeak (cms)= 3.647

PEAK FLOW (cms)= 3.280 (i)
TIME TO PEAK (hrs)= 12.667
RUNOFF VOLUME (mm)= 47.183
TOTAL RAINFALL (mm)= 109.680
RUNOFF COEFFICIENT = 0.430

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
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0.25	15.00	3.25	3.00	6.25	43.00	9.25	13.00
0.50	15.00	3.50	3.00	6.50	43.00	9.50	13.00
0.75	15.00	3.75	3.00	6.75	43.00	9.75	13.00
1.00	20.00	4.00	5.00	7.00	20.00	10.00	13.00
1.25	20.00	4.25	5.00	7.25	20.00	10.25	13.00
1.50	20.00	4.50	5.00	7.50	20.00	10.50	13.00
1.75	20.00	4.75	5.00	7.75	20.00	10.75	13.00
2.00	10.00	5.00	20.00	8.00	23.00	11.00	8.00
2.25	10.00	5.25	20.00	8.25	23.00	11.25	8.00
2.50	10.00	5.50	20.00	8.50	23.00	11.50	8.00
2.75	10.00	5.75	20.00	8.75	23.00	11.75	8.00

CALIB			
NASHYD (50114)	Area (ha)= 64.46	Curve Number (CN)= 69.0	
ID= 1 DT= 5.0 min	Ia (mm)= 9.01	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.68		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00

1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 3.647

PEAK FLOW (cms)= 4.163 (i)
TIME TO PEAK (hrs)= 7.333
RUNOFF VOLUME (mm)= 113.556
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.588

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

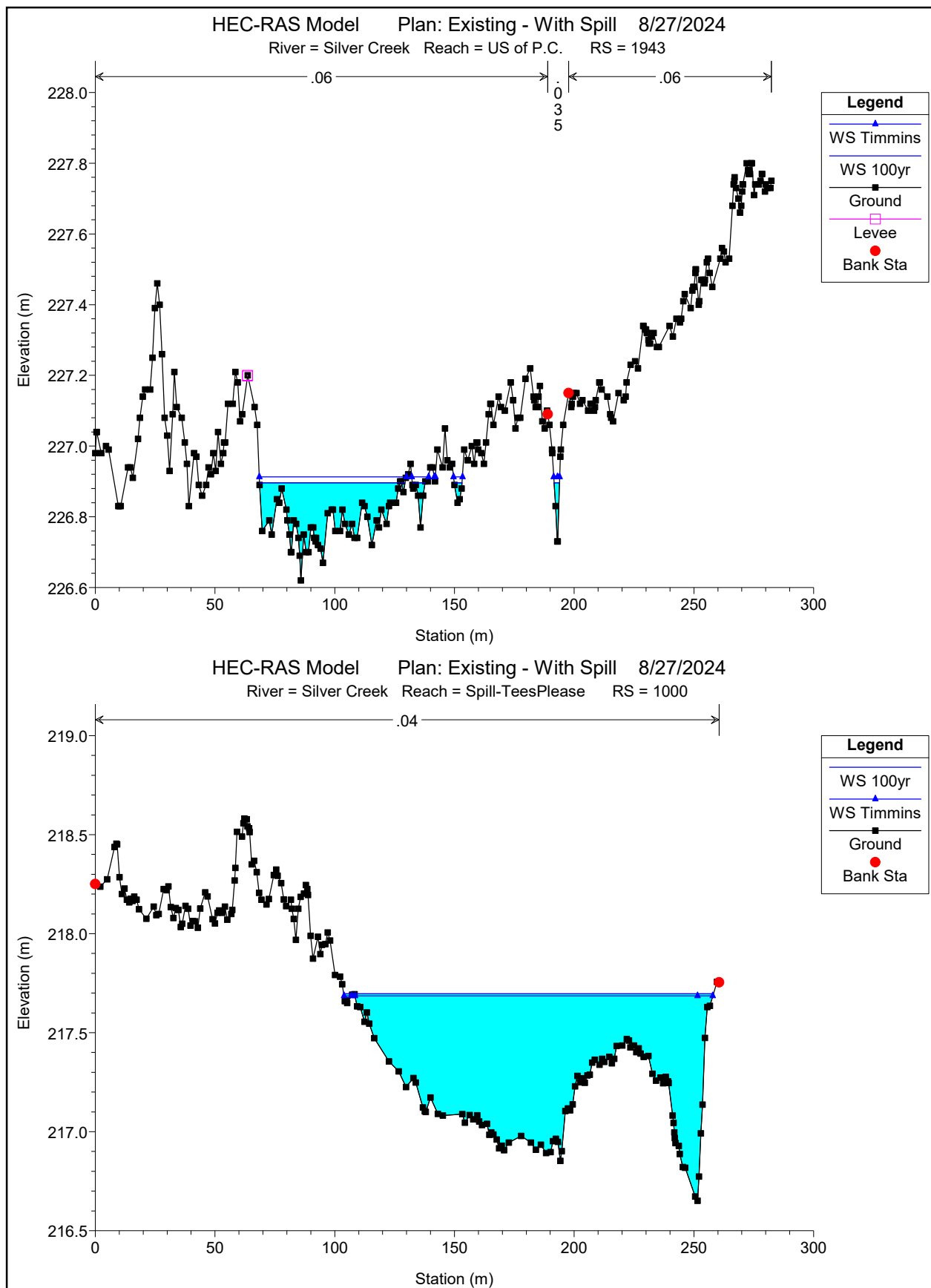
Appendix B: Hydraulic Analysis

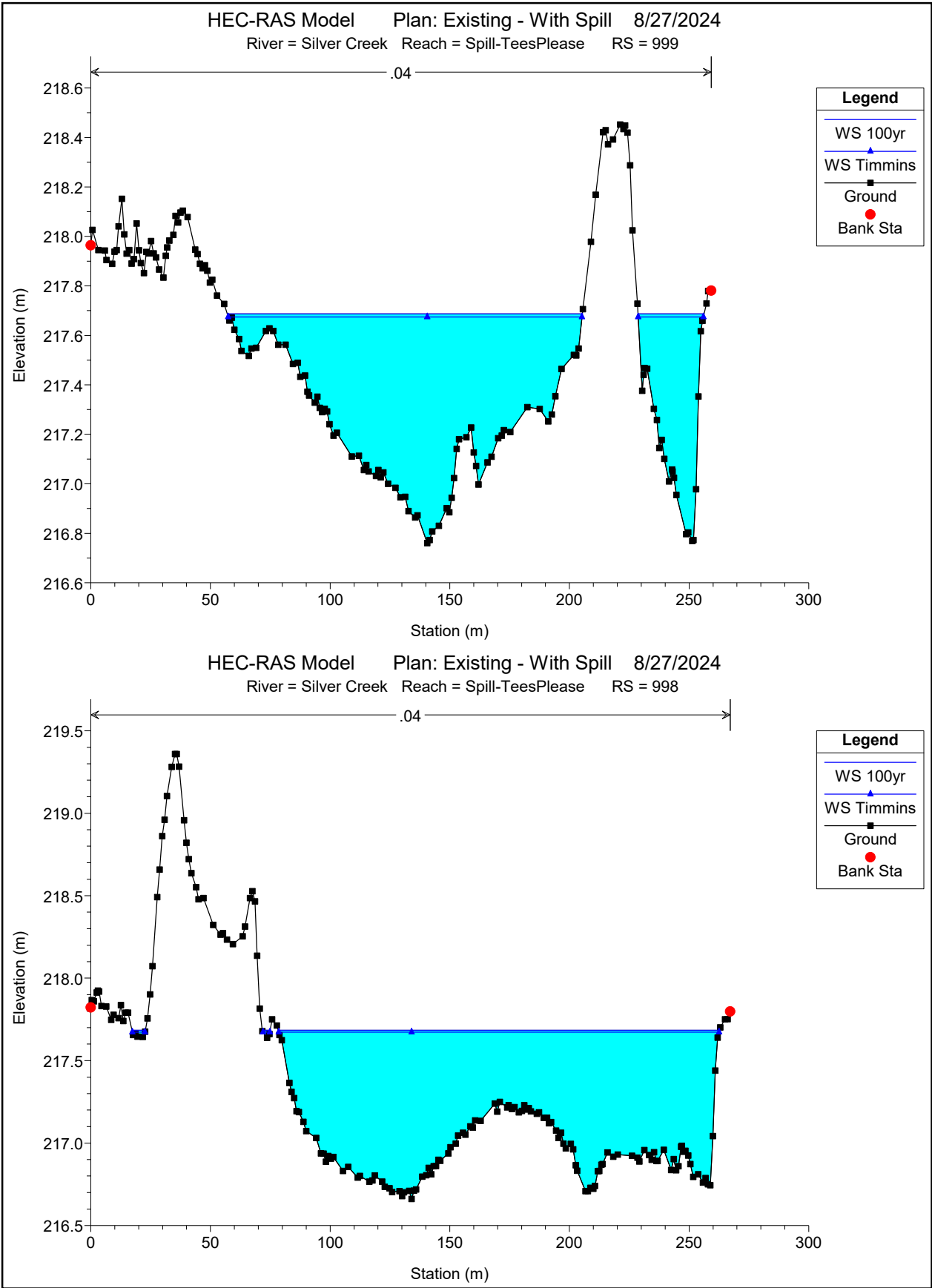
HEC-RAS Plan: Existing - With Spill

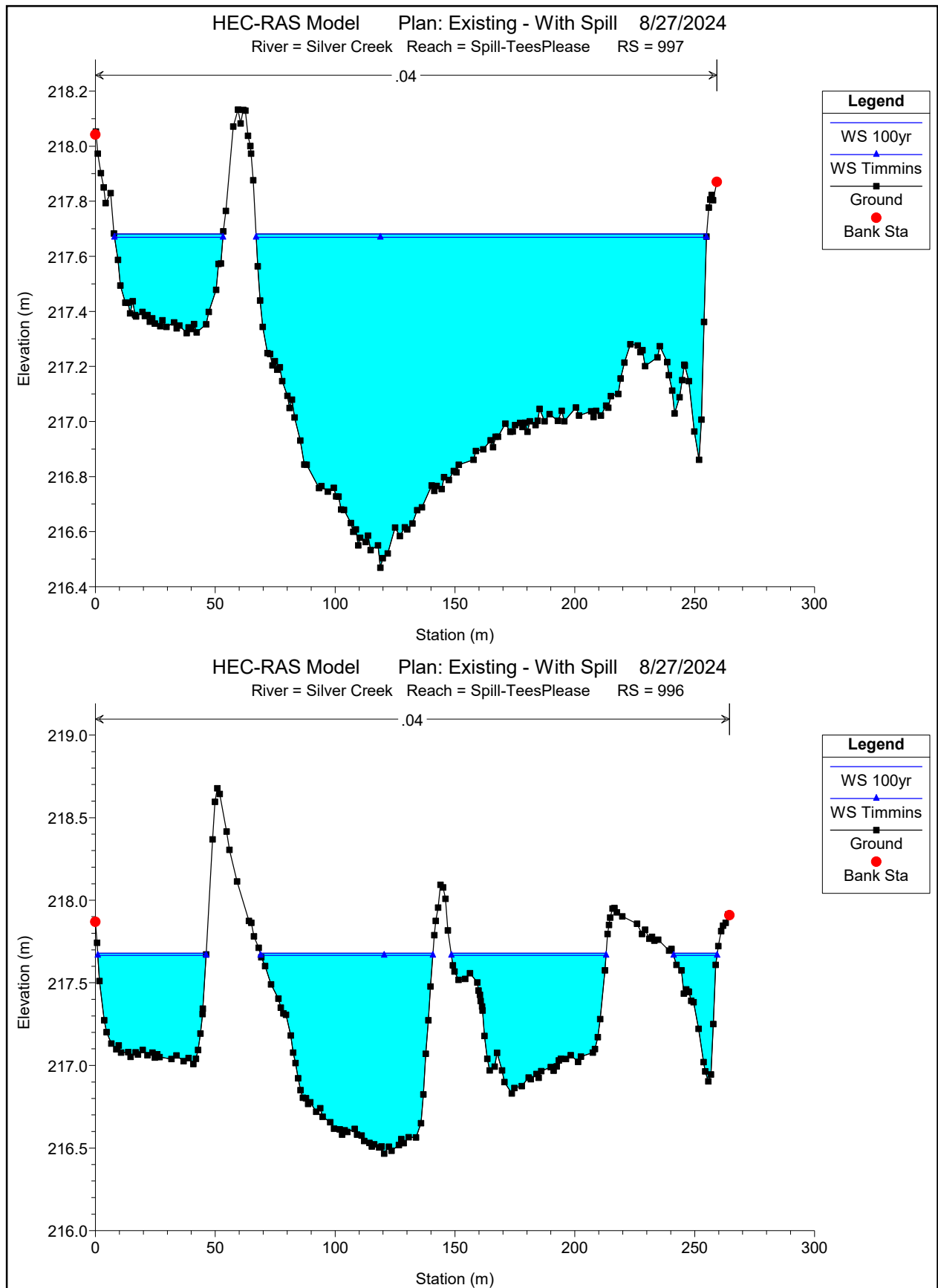
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Spill-TeesPlease	1000	100yr	23.39	216.65	217.70		217.70	0.000355	0.30	78.20	154.45	0.13
Spill-TeesPlease	1000	Timmins	22.62	216.65	217.69		217.69	0.000353	0.30	76.38	152.50	0.13
Spill-TeesPlease	999	100yr	23.39	216.76	217.69		217.69	0.000369	0.29	81.48	175.99	0.13
Spill-TeesPlease	999	Timmins	22.62	216.76	217.67		217.68	0.000374	0.28	79.38	175.11	0.14
Spill-TeesPlease	998	100yr	23.39	216.66	217.68		217.69	0.000083	0.18	132.15	193.40	0.07
Spill-TeesPlease	998	Timmins	22.62	216.66	217.67		217.67	0.000082	0.17	129.85	192.09	0.07
Spill-TeesPlease	997	100yr	27.11	216.47	217.68		217.68	0.000089	0.18	152.69	233.55	0.07
Spill-TeesPlease	997	Timmins	26.94	216.47	217.67		217.67	0.000093	0.18	149.87	233.06	0.07
Spill-TeesPlease	996	100yr	27.11	216.47	217.68		217.68	0.000122	0.21	130.68	200.57	0.08
Spill-TeesPlease	996	Timmins	26.94	216.47	217.67		217.67	0.000128	0.21	128.24	199.64	0.08
Spill-TeesPlease	995	100yr	27.11	216.42	217.68		217.68	0.000042	0.14	190.16	229.41	0.05
Spill-TeesPlease	995	Timmins	26.94	216.42	217.67		217.67	0.000043	0.14	187.35	229.03	0.05
Spill-TeesPlease	994	100yr	27.11	216.41	217.68		217.68	0.000048	0.15	175.39	207.52	0.05
Spill-TeesPlease	994	Timmins	26.94	216.41	217.66		217.67	0.000049	0.16	172.84	206.31	0.05
Spill-TeesPlease	993	100yr	27.11	216.25	217.68		217.68	0.000017	0.11	254.05	251.57	0.03
Spill-TeesPlease	993	Timmins	26.94	216.25	217.66		217.66	0.000018	0.11	250.97	250.29	0.03
Spill-TeesPlease	992	100yr	27.11	216.13	217.68		217.68	0.000018	0.11	255.13	261.35	0.03
Spill-TeesPlease	992	Timmins	26.94	216.13	217.66		217.66	0.000019	0.11	251.92	260.53	0.03
US of P.C.	1943	100yr	1.97	226.73	226.90	226.82	226.90	0.004611	0.38	7.39	70.88	0.41
US of P.C.	1943	Timmins	2.50	226.73	226.91	226.83	226.92	0.004785	0.41	8.67	75.31	0.42
US of P.C.	1895	100yr	1.97	226.53	226.72	226.61	226.72	0.003022	0.32	8.27	65.31	0.33
US of P.C.	1895	Timmins	2.50	226.53	226.75	226.63	226.75	0.002610	0.29	10.16	67.87	0.31
US of P.C.	1803	100yr	1.97	225.82	226.14	226.11	226.22	0.013036	1.27	1.56	6.34	0.82
US of P.C.	1803	Timmins	2.50	225.82	226.17	226.15	226.27	0.015335	1.45	1.73	6.48	0.90
US of P.C.	1693	100yr	1.97	224.15	224.58	224.58	224.63	0.016336	1.04	2.32	31.85	0.85
US of P.C.	1693	Timmins	2.50	224.15	224.60	224.60	224.65	0.014614	1.05	3.30	44.17	0.82
US of P.C.	1642	100yr	1.97	222.67	223.29	223.29	223.33	0.008830	1.08	3.54	45.63	0.67
US of P.C.	1642	Timmins	2.50	222.67	223.31	223.31	223.35	0.009170	1.13	4.46	50.48	0.69
US of P.C.	1575	100yr	1.97	222.20	222.20		222.20	0.000286		26.42	206.86	0.00
US of P.C.	1575	Timmins	2.50	222.20	222.22		222.22	0.000291	0.01	30.91	223.24	0.04
US of P.C.	1509	100yr	3.49	221.37	222.19	221.87	222.20	0.000033	0.10	58.10	216.38	0.05
US of P.C.	1509	Timmins	4.02	221.37	222.22	221.87	222.22	0.000036	0.11	62.57	218.66	0.05
US of P.C.	1469	100yr	3.49	221.53	222.19	222.06	222.19	0.001143	0.43	12.52	83.52	0.25
US of P.C.	1469	Timmins	4.02	221.53	222.21	222.07	222.21	0.001116	0.44	14.41	103.55	0.24
US of P.C.	1439	100yr	3.49	221.30	222.04	222.00	222.10	0.013482	1.26	4.96	35.46	0.82
US of P.C.	1439	Timmins	4.02	221.30	222.06	222.04	222.12	0.013069	1.31	5.69	39.67	0.82
US of P.C.	1409	100yr	3.49	220.84	221.46	221.46	221.60	0.018528	1.65	2.11	7.82	0.99
US of P.C.	1409	Timmins	4.02	220.84	221.49	221.49	221.64	0.017859	1.72	2.36	8.75	0.99
US of P.C.	1379	100yr	3.49	220.33	220.90	220.90	221.04	0.018480	1.67	2.09	7.27	1.00
US of P.C.	1379	Timmins	4.02	220.33	220.94	220.94	221.08	0.018556	1.70	2.36	8.01	1.00
US of P.C.	1377	100yr	3.49	219.83	220.38	220.33	220.45	0.010156	1.17	3.12	14.33	0.73
US of P.C.	1377	Timmins	4.02	219.83	220.41	220.35	220.48	0.009447	1.20	3.57	15.45	0.72
US of P.C.	1360	100yr	4.80	219.46	220.08	220.08	220.23	0.014704	1.73	3.70	18.04	0.92
US of P.C.	1360	Timmins	5.68	219.46	220.13	220.13	220.27	0.013575	1.79	4.54	21.92	0.90
US of P.C.	1329	100yr	4.80	218.64	219.27	219.27	219.39	0.014925	1.68	4.15	16.01	0.92
US of P.C.	1329	Timmins	5.68	218.64	219.29	219.29	219.43	0.018583	1.85	4.47	17.03	1.02
US of P.C.	1315		Lat Struct									
US of P.C.	1312	100yr	4.80	218.06	218.87	218.87	219.07	0.013526	1.98	2.73	13.30	0.92
US of P.C.	1312	Timmins	5.63	218.06	218.94	218.94	219.13	0.011579	2.00	3.68	15.77	0.87
US of P.C.	1289	100yr	4.32	217.80	218.54	218.54	218.69	0.010502	1.90	4.08	18.64	0.83
US of P.C.	1289	Timmins	4.68	217.80	218.56	218.56	218.72	0.010233	1.93	4.52	19.50	0.82
US of P.C.	1259	100yr	3.51	217.75	218.22		218.29	0.008334	1.37	5.50	27.60	0.71
US of P.C.	1259	Timmins	3.64	217.75	218.24		218.29	0.007821	1.36	5.82	28.00	0.69
US of P.C.	1229	100yr	1.55	217.59	218.12		218.13	0.001929	0.69	3.87	15.18	0.34
US of P.C.	1229	Timmins	1.76	217.59	218.10		218.12	0.003031	0.84	3.60	15.11	0.43

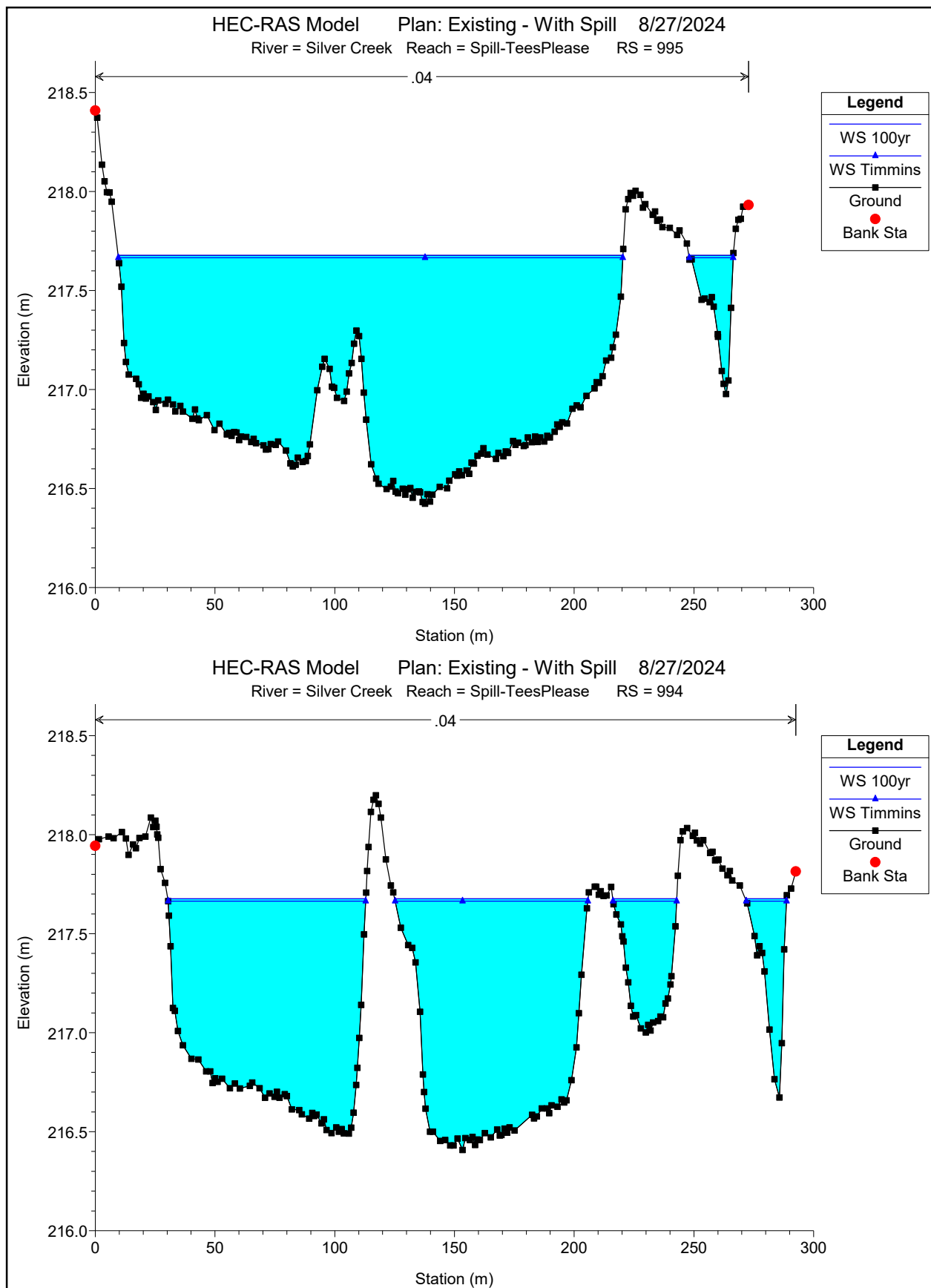
HEC-RAS Plan: Existing - With Spill (Continued)

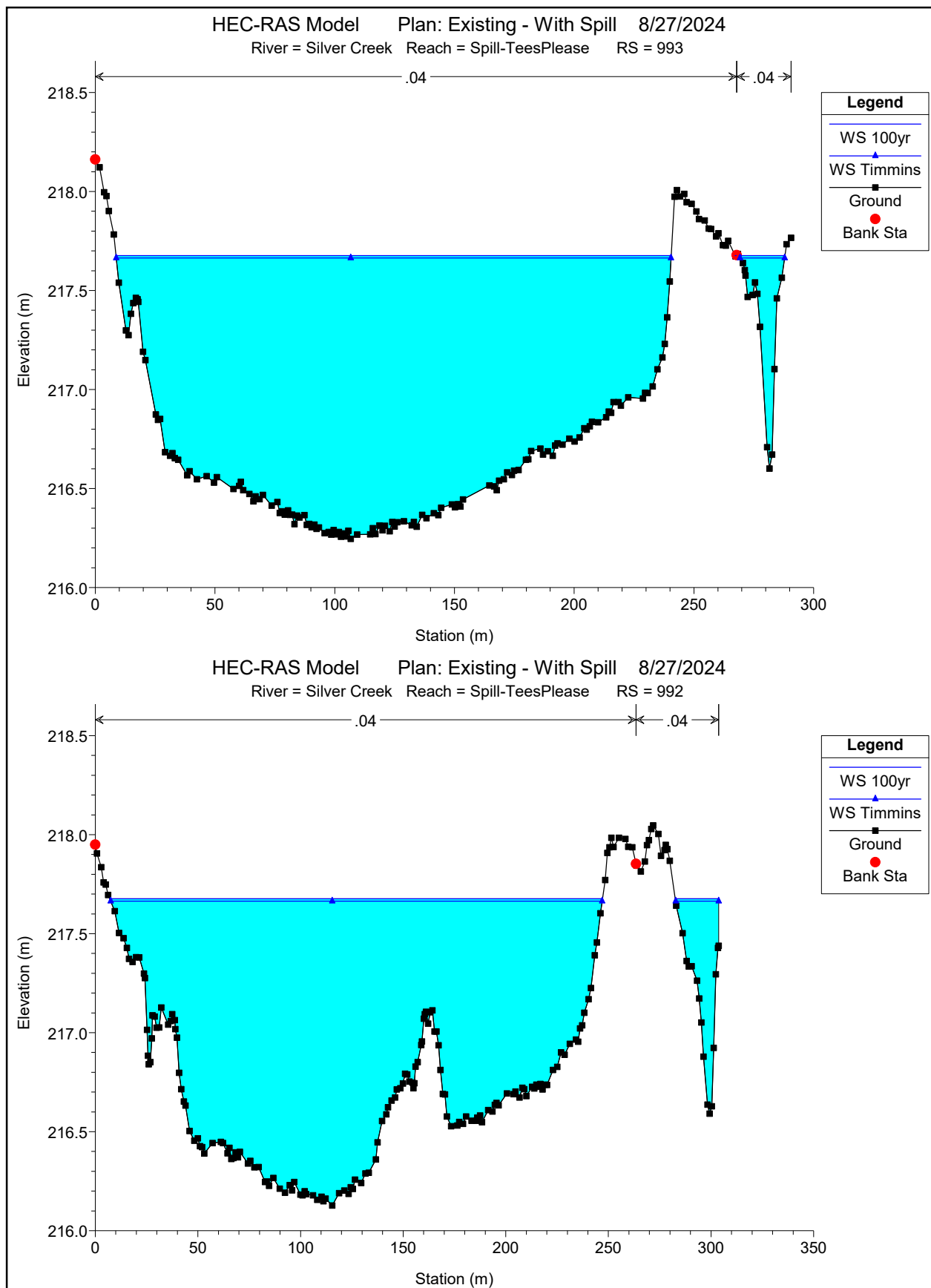
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
US of P.C.	1199	100yr	1.08	217.57	218.10		218.10	0.000426	0.34	5.07	17.89	0.16
US of P.C.	1199	Timmins	1.36	217.57	218.06		218.07	0.000941	0.48	4.42	16.41	0.24
US of P.C.	1169	100yr	1.67	217.42	218.04		218.06	0.002478	0.63	2.69	10.93	0.37
US of P.C.	1169	Timmins	1.33	217.42	217.99		218.01	0.002574	0.59	2.25	8.48	0.37
US of P.C.	1139	100yr	1.67	217.26	217.77	217.77	217.89	0.020629	1.55	1.08	4.53	1.01
US of P.C.	1139	Timmins	1.33	217.26	217.72	217.72	217.84	0.021266	1.49	0.89	4.04	1.01
US of P.C.	1109	100yr	1.67	216.69	217.67		217.68	0.000618	0.51	4.27	7.97	0.20
US of P.C.	1109	Timmins	1.33	216.69	217.66		217.67	0.000411	0.41	4.19	7.93	0.16
US of P.C.-Lower	1020	100yr	28.78	215.65	217.68	217.20	217.68	0.000013	0.14	328.09	343.00	0.03
US of P.C.-Lower	1020	Timmins	28.27	215.65	217.66	217.20	217.66	0.000013	0.13	324.57	343.00	0.03
US of P.C.-Lower	1009		Culvert									
US of P.C.-Lower	998	100yr	28.78	215.55	217.52	217.10	217.52	0.000020	0.15	315.45	354.93	0.04
US of P.C.-Lower	998	Timmins	28.27	215.55	217.46	217.10	217.46	0.000023	0.16	295.38	354.93	0.05
US of P.C.-Lower	997	100yr	28.78	215.55	217.52	216.55	217.52	0.000028	0.18	261.71	294.97	0.05
US of P.C.-Lower	997	Timmins	28.27	215.55	217.46	216.55	217.46	0.000033	0.19	245.01	294.97	0.05
US of P.C.-Lower	986		Culvert									
US of P.C.-Lower	978	100yr	28.78	215.55	217.52	216.70	217.52	0.000100	0.32	190.12	243.04	0.09
US of P.C.-Lower	978	Timmins	28.27	215.55	217.46	216.69	217.46	0.000123	0.34	176.38	243.04	0.10

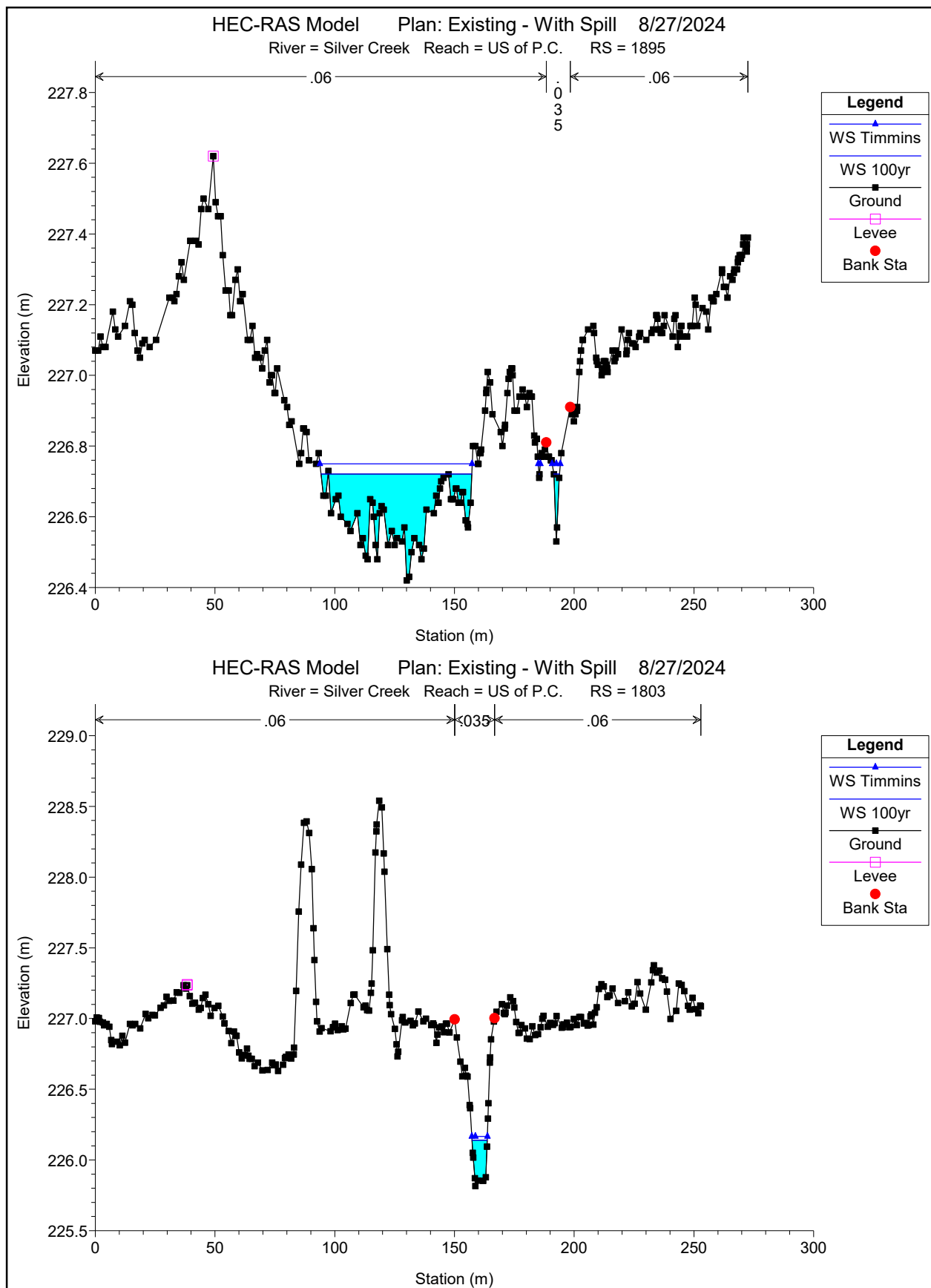


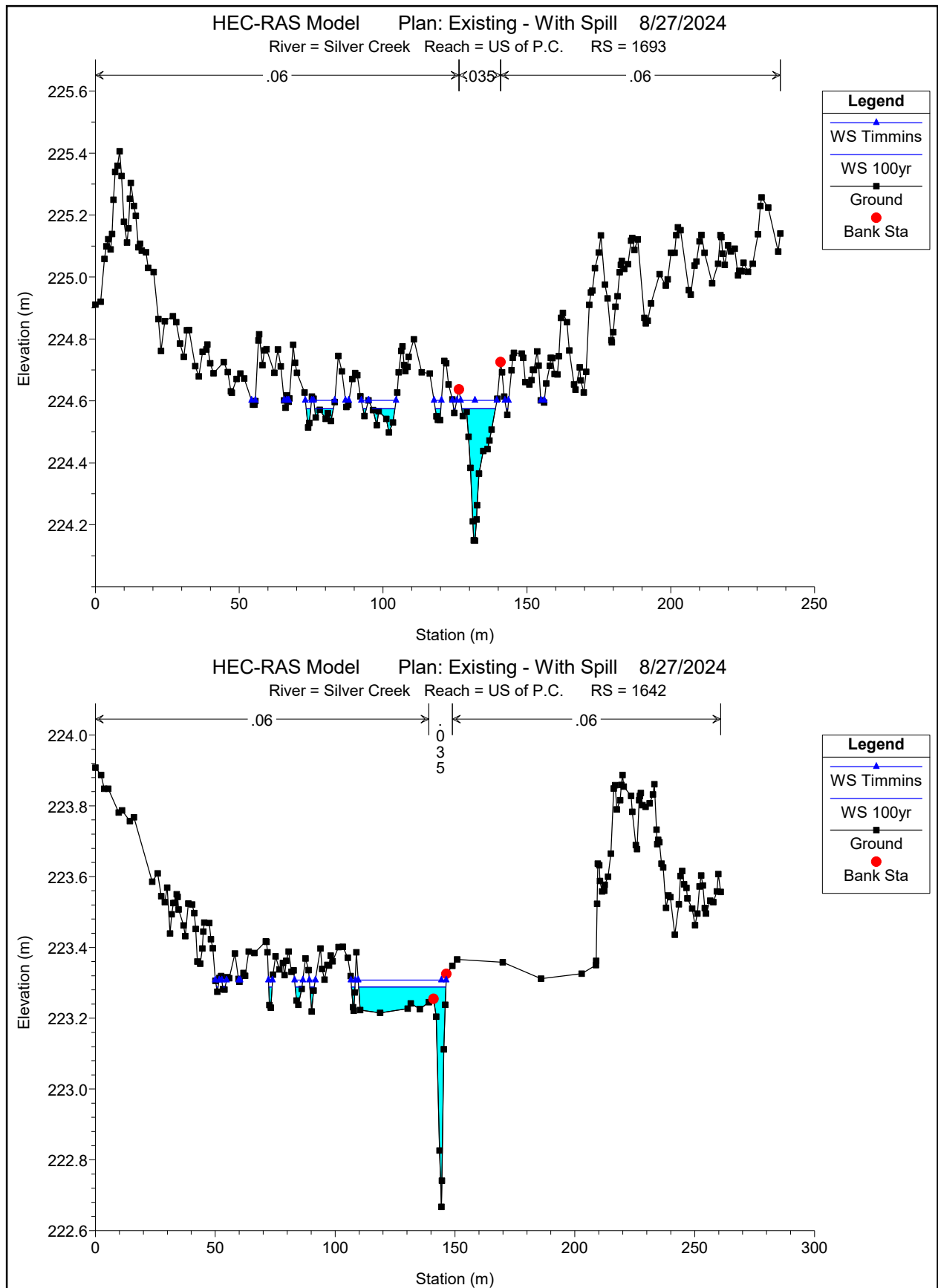


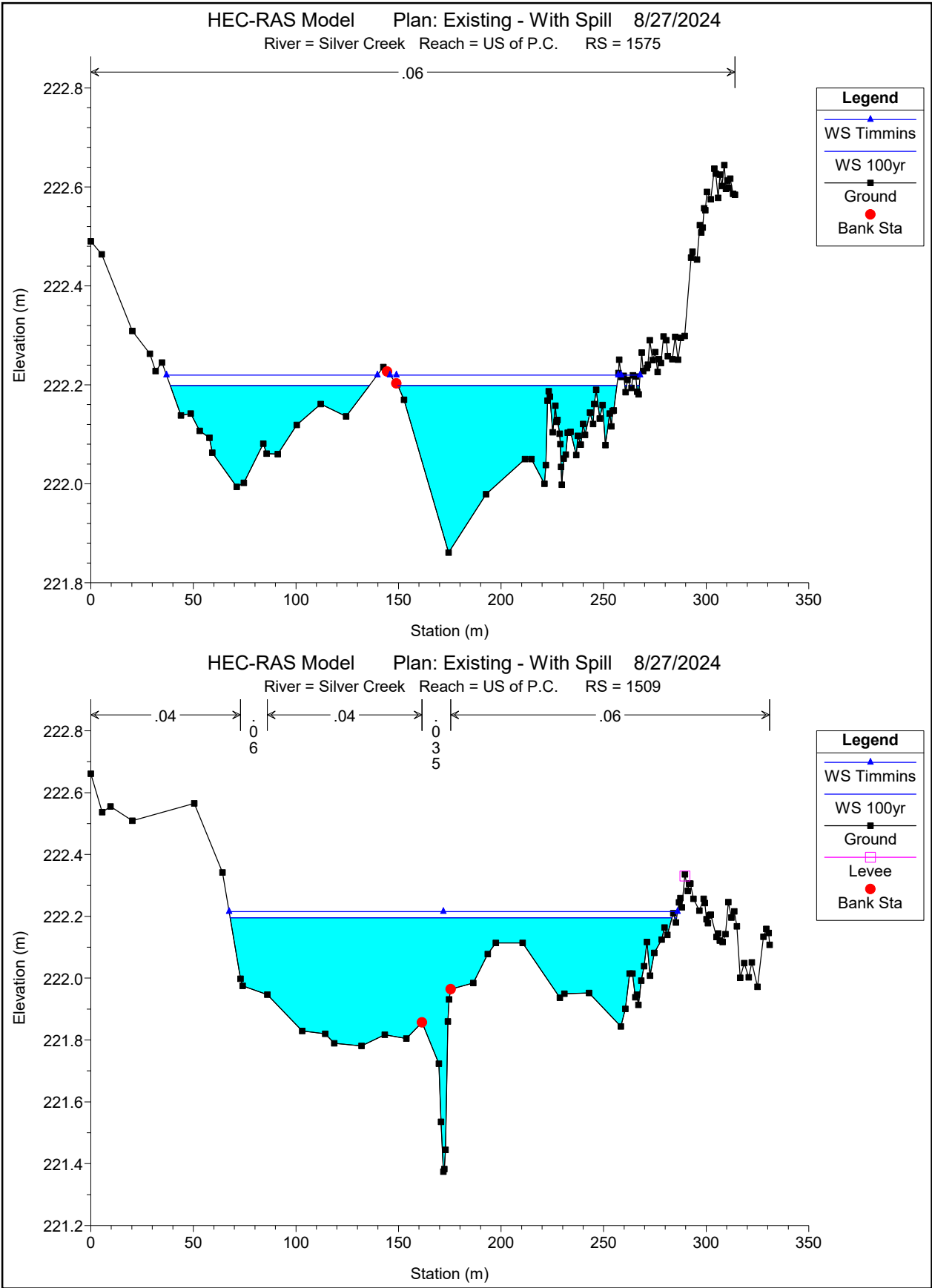


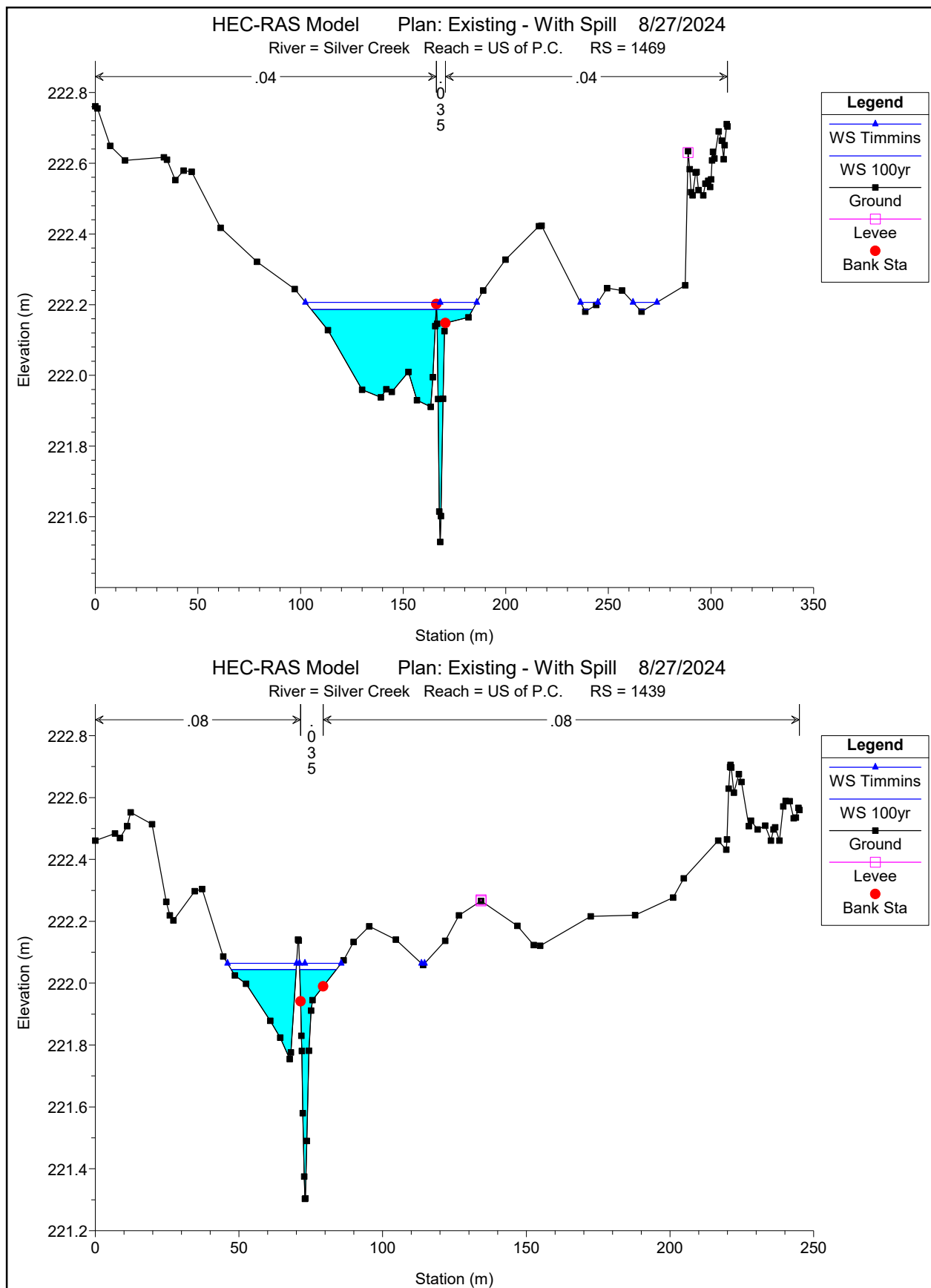


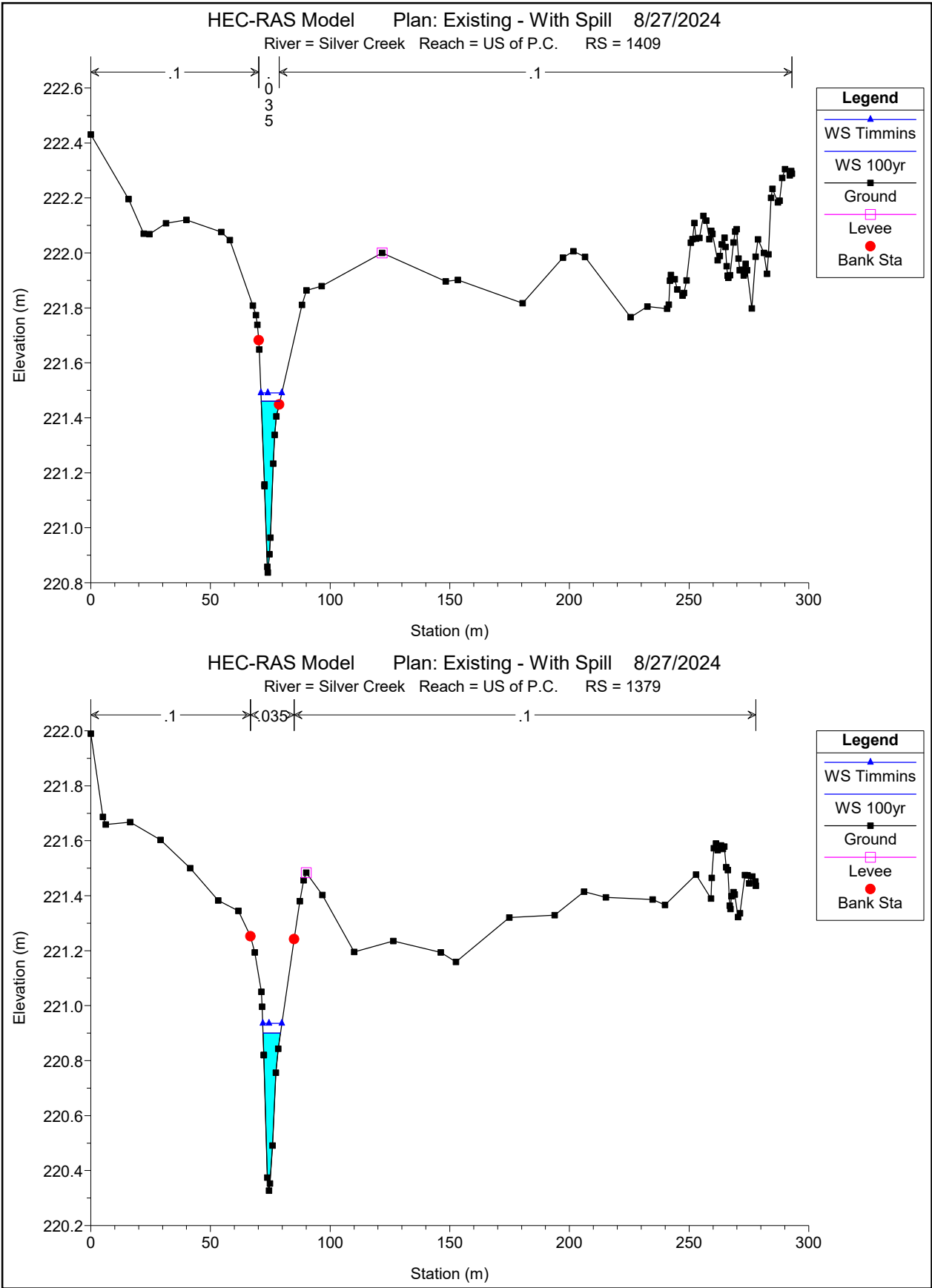


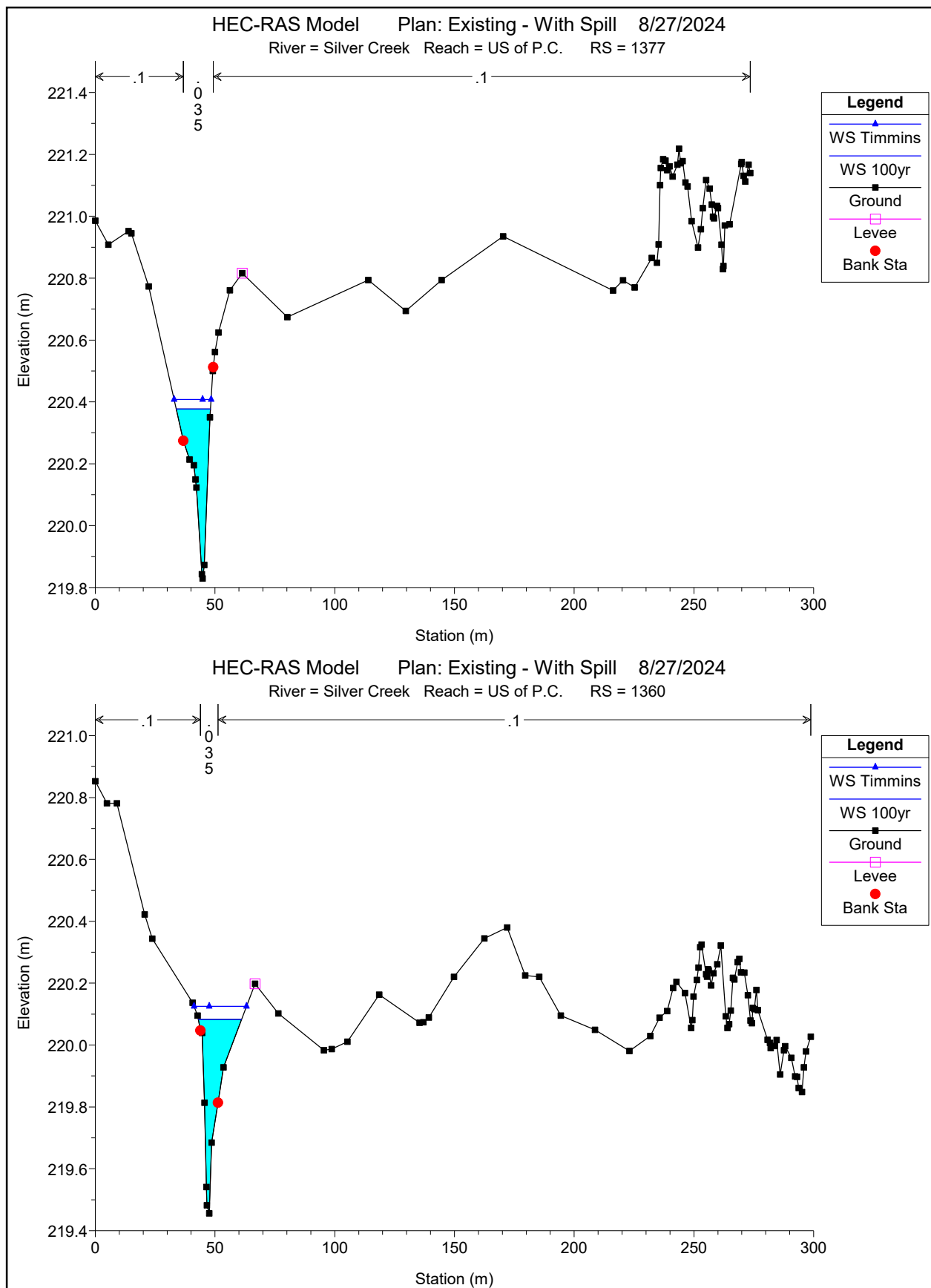


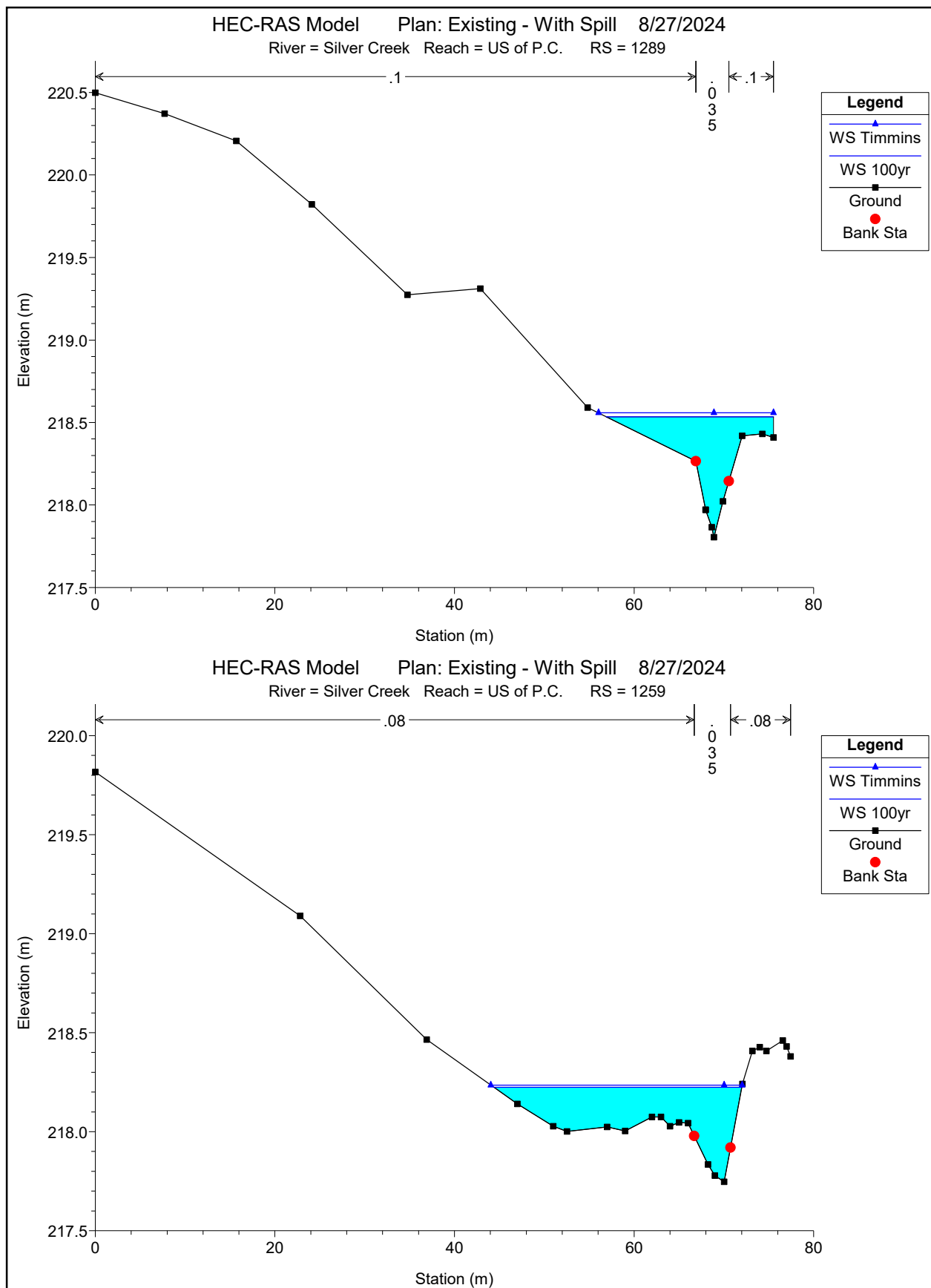


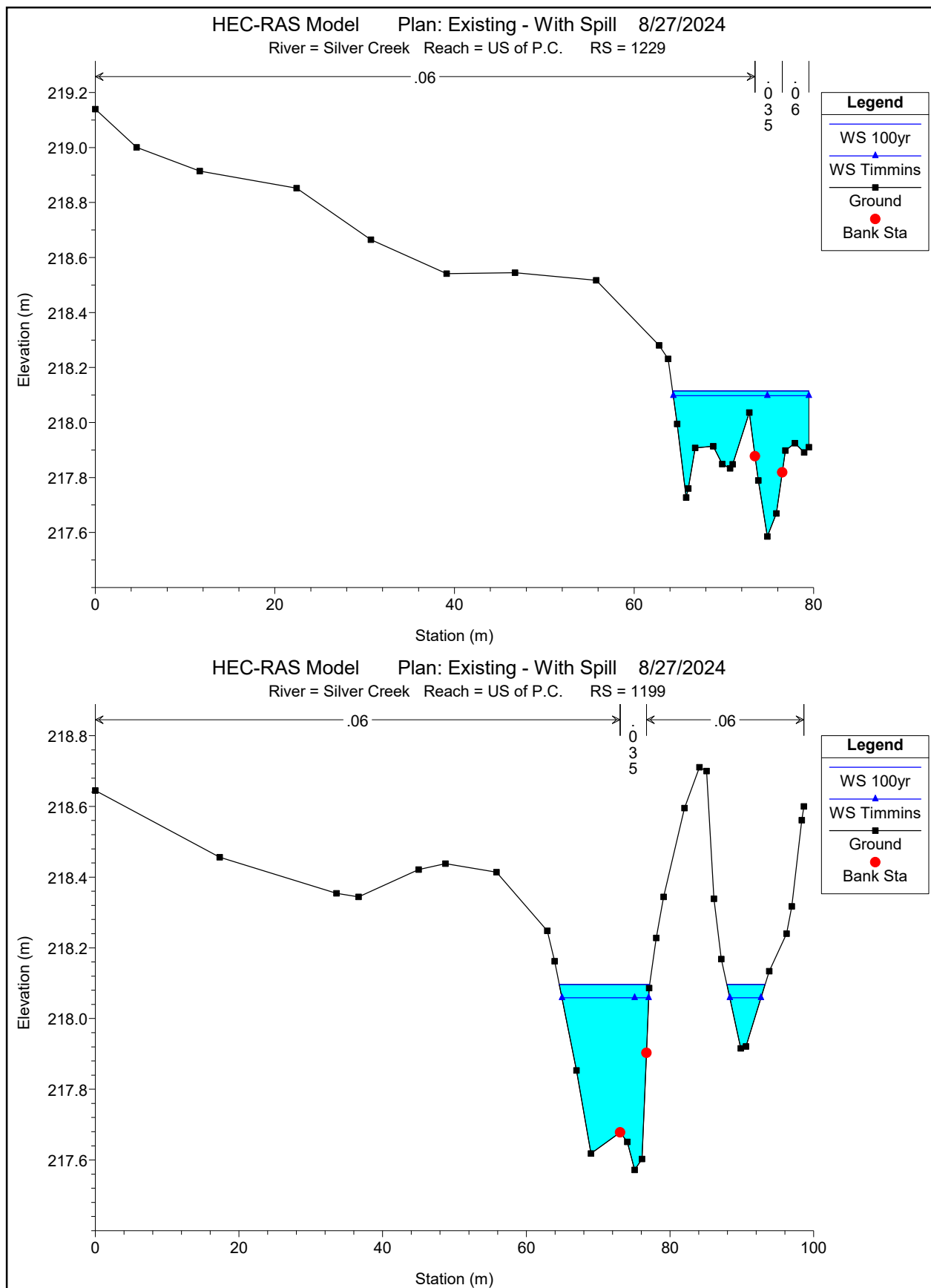


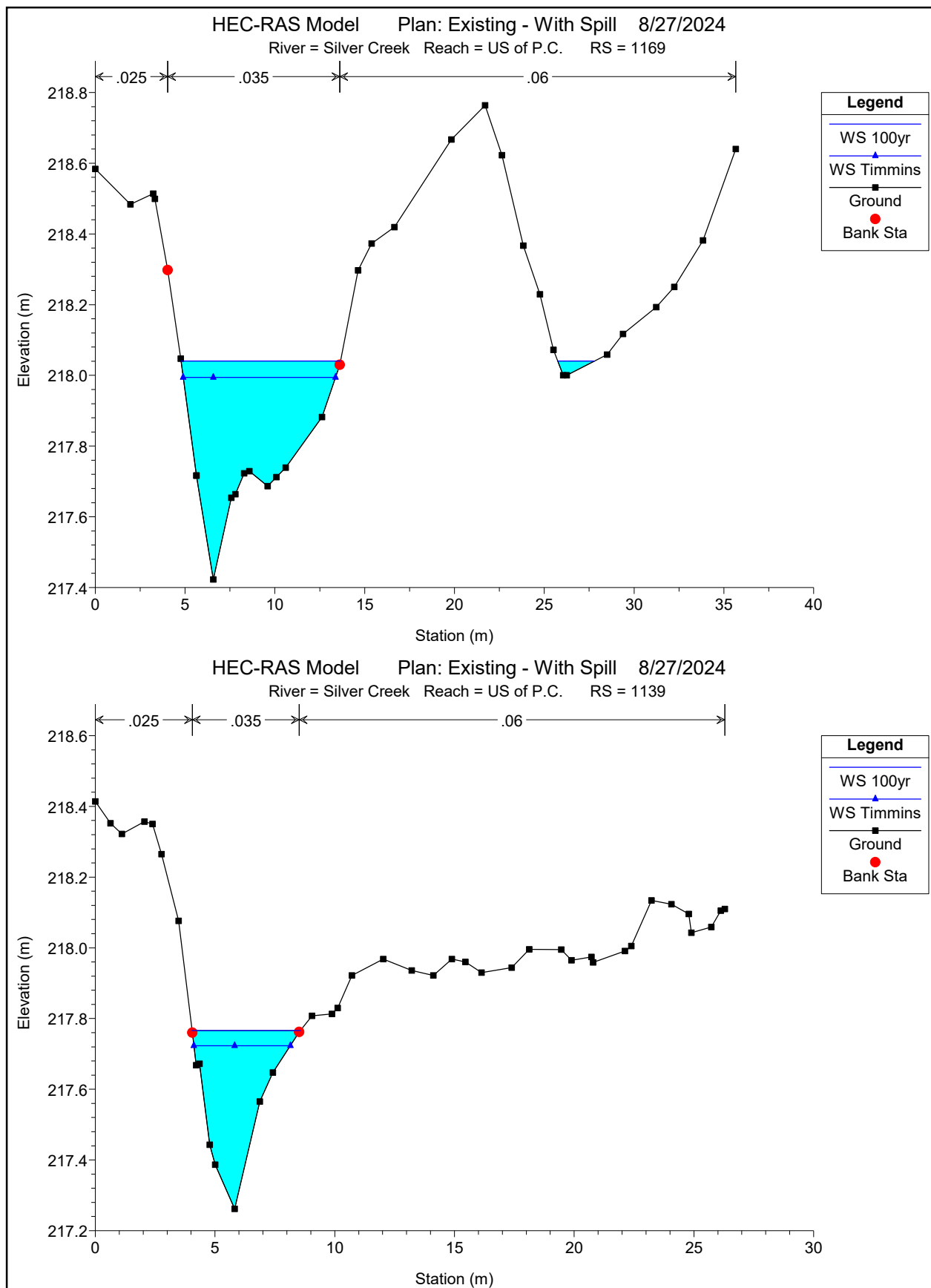


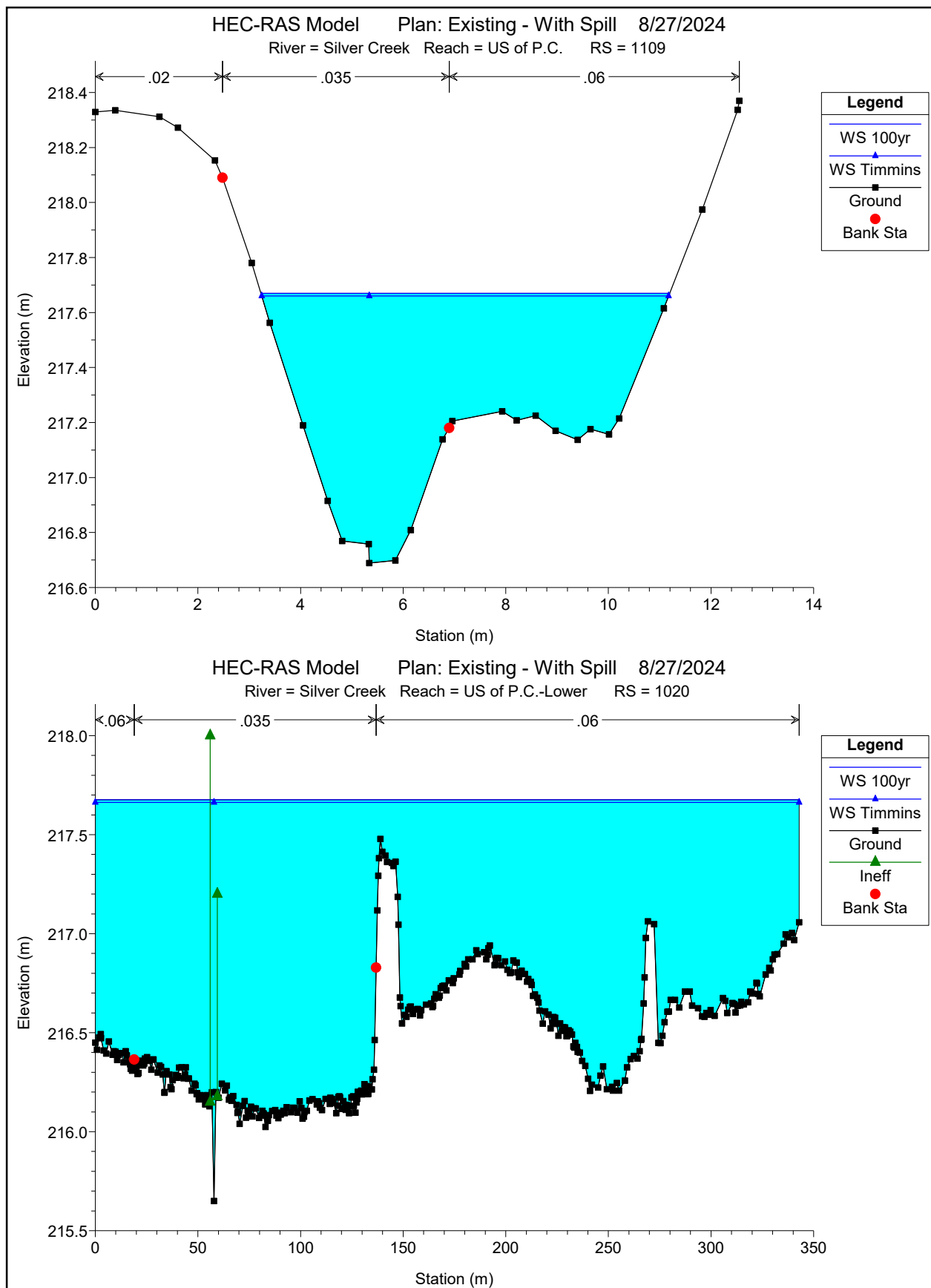


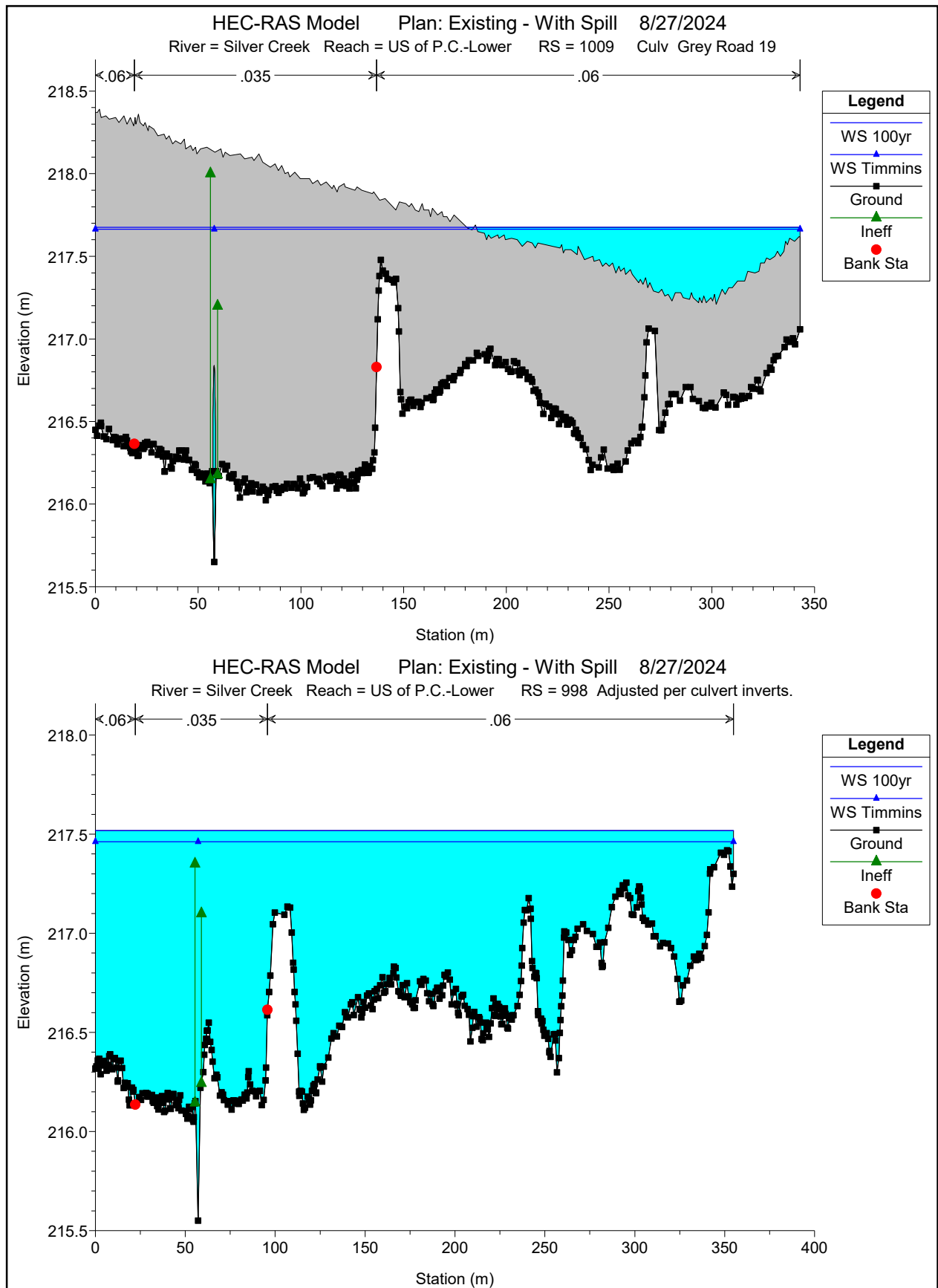


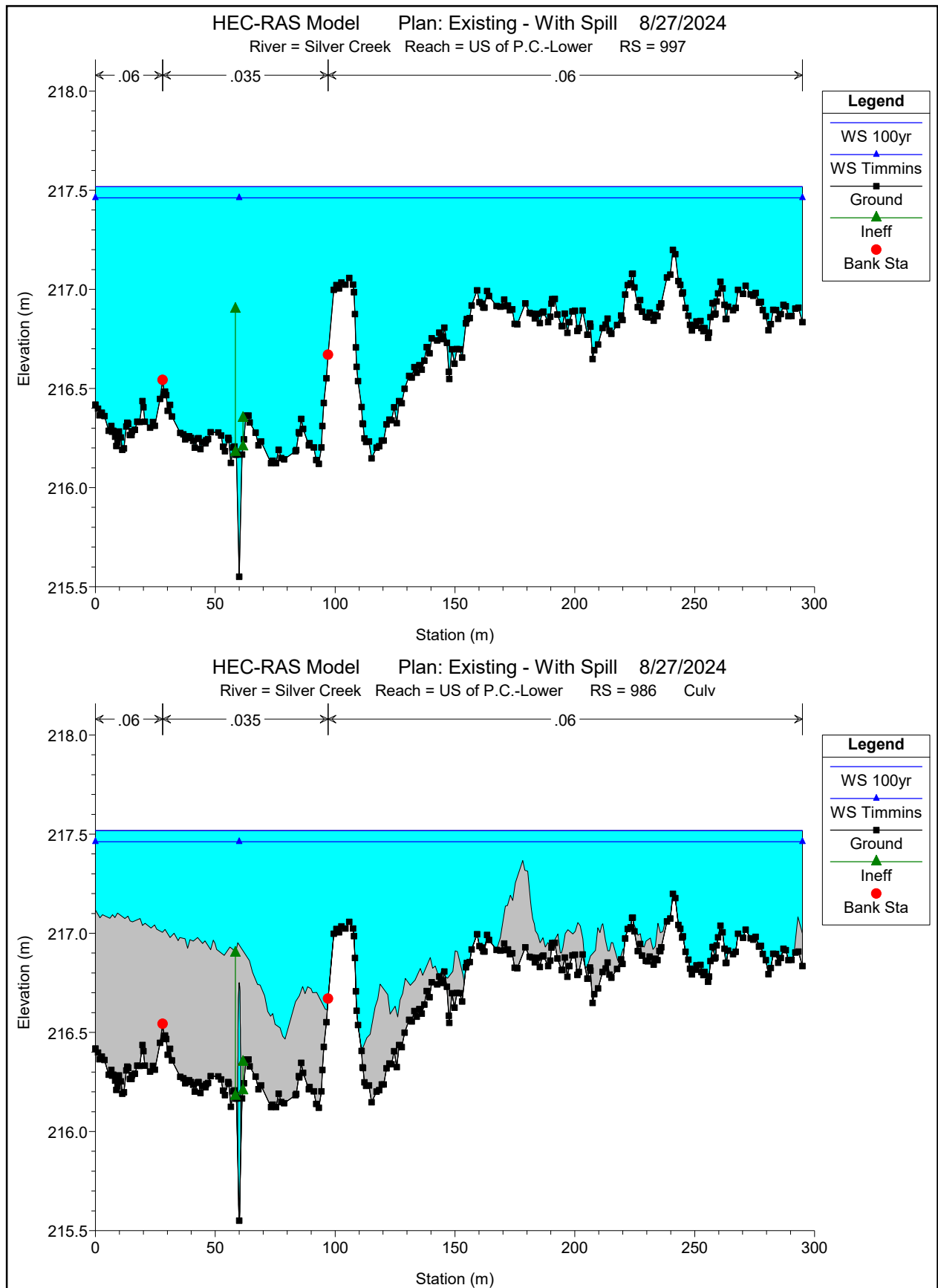












HEC-RAS Model Plan: Existing - With Spill 8/27/2024
River = Silver Creek Reach = US of P.C.-Lower RS = 978

