

3Roots San Diego Project  
Environmental Impact Report  
SCH No. 2018041065; Project No. 587128

Appendix R2

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Hydraulic Analyses

June 2019

# HYDRAULIC ANALYSES FOR THE 3ROOTS SAN DIEGO PROJECT

February 6, 2019



A handwritten signature in black ink, appearing to read "Wayne W. Chang".

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**Wayne W. Chang, MS, PE 46548**

**Chang**Consultants

Civil Engineering • Hydrology • Hydraulics • Sedimentation

**P.O. Box 9496  
Rancho Santa Fe, CA 92067  
(858) 692-0760**

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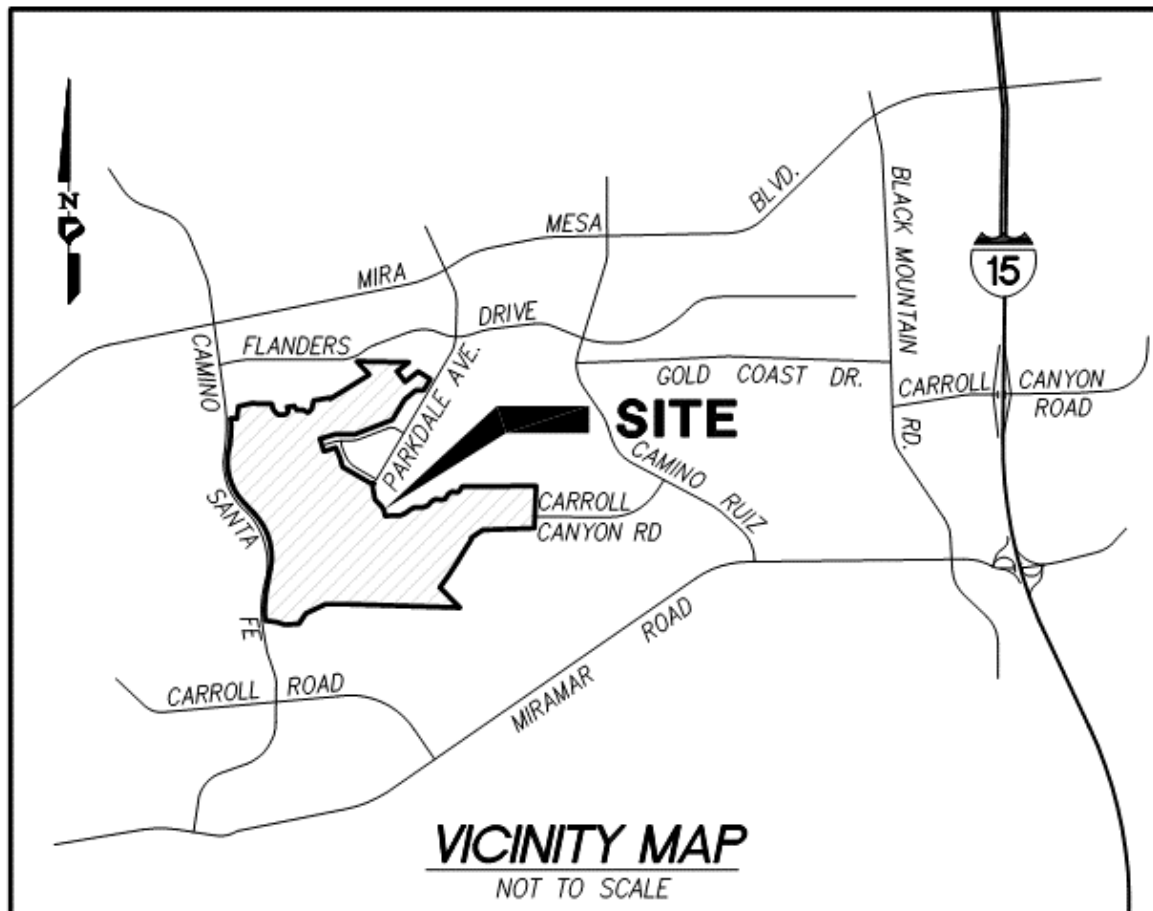
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## INTRODUCTION

The 3Roots San Diego Project (3Roots) site is located on 412 acres east of Camino Santa Fe along Carroll Canyon in the city of San Diego, California (see the Vicinity Map). The site address is 9255 Camino Santa Fe, San Diego, CA 92121. The existing site contains Hanson Aggregates Pacific Southwest's Carroll Canyon Plant, which has historically been used for sand and gravel mining and associated uses. Portions of the site are leased to tenants with construction materials-related operations. The quarry activities are ending, so the site will be reclaimed and then redeveloped as a mixed-use project. The site is bounded by a natural canyon and residential development to the north, commercial and industrial development to the south, natural areas and commercial development to the west, and commercial and industrial (including Vulcan Materials Company's Carroll Canyon quarry) development to the east. Carroll Canyon Creek flows in a westerly direction through the site.



**Vicinity Map**

Under pre-project conditions, the site was used for sand and gravel mining and processing as well as related activities. The mining area occurred north of Carroll Canyon Creek, while the processing, operations, and offices were primarily south of Carroll Canyon Creek. The quarry operations are ending, so the site will be reclaimed and redeveloped.



The project is currently being entitled and will be redeveloped pursuant to a Vesting Tentative Map being prepared by Project Design Consultants. The project includes approximately 259 acres of open space (including approximately 215 acres of natural open space, landscaped slopes, and 44 acres of parkland), a 40 acre mixed-use district (Urban Core), 16.5 acres of medium high residential, 16.7 acres of medium density residential, 69.7 acres of low/medium low density residential, and 39.2 acres of on-site roads and parkways. The project also proposes to extend Carroll Canyon Road nearly 2,000 feet west of Camino Santa Fe.

A FEMA designated floodplain and floodway for Carroll Canyon Creek are currently delineated along the site. The associated *Flood Insurance Rate Maps* (FIRM) are Map Numbers 06073C1343G and 1344G dated May 16, 2012 (see the HEC-RAS Work Map and FIRM Exhibit in the map pocket).

The redevelopment includes alterations and improvements to Carroll Canyon Creek from existing Camino Santa Fe on the downstream (west) end to the upstream (east) limits of the site. The creek modifications are as follows beginning from downstream. Carroll Canyon Creek will be realigned from Camino Santa Fe to the proposed Carroll Canyon Road crossing (see the HEC-RAS Work Map and FIRM Exhibit in the map pocket). The existing creek will be filled and developed, and the creek flow will be redirected to an existing lateral channel south of Carroll Canyon Creek. Grading will be performed along the lateral channel to create a wetlands area and increase the channel capacity. Drop structures will be constructed to lower the channel gradient between drops in order to reduce flow velocities. An approximately 66-foot wide by 24-foot high arch culvert will be constructed where the realigned creek crosses the proposed Carroll Canyon Road. Upstream of the crossing, Carroll Canyon Creek will generally follow its existing alignment, but will be channelized over an approximately 2,700 foot length with a series of drop structures. The drop structures in this reach will also lower the channel gradient between the drops in order to reduce the flow velocities. This will minimize the need for erosion protection along the channel. From the upper end of the channelized segment to the upstream project limits, Carroll Canyon Creek will generally remain under its existing condition, except for some grading and bank protection along the southerly bank.

This report provides existing and proposed condition hydraulic analyses for entitlement purposes. The proposed condition analyses reflect PDC's Vesting Tentative Map. The Carroll Canyon Creek floodplain and floodway will ultimately be revised to follow the new alignment. A Conditional Letter of Map Revision and Letter of Map Revision will be prepared, when needed, for the proposed creek conditions.

## **HYDRAULIC ANALYSES**

Hydraulic analyses have been performed for PDC's Vesting Tentative Map. Carroll Canyon Creek through the site has been analyzed and its floodplain and floodway are currently mapped by FEMA. The effective FEMA models are from a September 1982 HEC-2 and a February 2005 Letter of Map Revision (see the excerpts in Appendix A). The earlier September 1982 HEC-2 covers the entire study reach covered by this report. The 2005 LOMR updates the portion of the

reach between FIRM cross-sections AS and BJ. The following describes the hydraulic modeling input parameters and entitlement-level results for the 3Roots project.

### Existing Conditions

Since the FEMA effective data was prepared many years ago, an updated existing condition HEC-RAS model was created primarily from recent topographic mapping prepared for the project. The following describes the input parameters. The existing condition cross-sections at the upstream (cross-section 54) and downstream (cross-section 27.1) study reach limits are from the effective HEC-2 model to allow tie-in with the FEMA effective data. The remaining cross-sections were created from the 3Roots project's 2-foot contour interval topographic mapping flown on November 3, 2016, where available. This mapping does not extend over the southerly portion of the floodplain from cross-sections 34 to 38.2, so the mapping was supplemented in this area with SanGIS' 2014 2-foot contour interval topographic mapping. The 2016 mapping is on NGVD 29 datum, while the 2014 mapping is on NAVD 88 datum. The elevations of the portion of the cross-sections within the 2014 mapping were reduced by 2.1 feet to convert to NGVD 29, i.e., the analyses in this report are on NGVD 29. This conversion is specified in FEMA's April 5, 2016, *Flood Insurance Study, San Diego County, California and Incorporated Areas* (see Appendix A). The downstream starting water surface elevation was set at the FIRM 100-year water surface elevation (152 feet NAVD = 149.9 feet NGVD 29).

There is an existing bridge and three culverts in the study reach. These were modeled based on field measurements, as-built drawings, and topographic data.

The 100-year flow rates are from the effective model. The flow rate is 5,600 cubic feet per second (cfs) at and below cross-section 27.3, 4,500 cfs from cross-section 27.5 to 34.5, and 3,500 cfs above cross-section 35.

The existing condition roughness coefficients were assigned based on a site visit and review of aerial photographs. The main channel primarily contains cobbles, so a roughness coefficient of 0.040 was assigned for this portion of most cross-sections. The overbank areas contain mature vegetation so a roughness coefficient of 0.075 was assigned for this portion of most cross-sections. There were variations from these typical values in some locations, and the roughness coefficients were adjusted accordingly.

The existing condition HEC-RAS results are included in Appendix B. The existing condition model starts just downstream of Carroll Canyon Road, which is approximately 6,200 feet west of the site. Improvements will ultimately extend towards this location, so it was included in the current modeling. The model extends just upstream of the easterly site boundary.

### Proposed Conditions

The existing condition model was revised to reflect the proposed grading and channel realignment from PDC's Vesting Tentative Map. Cross-sections 38.8 to 50 were modified in the proposed condition model. Since a portion of Carroll Canyon Creek is being realigned, proposed condition cross-sections 38.9 to 48.9 are at different locations than the existing condition cross-sections in this numeric range. Three cross-sections are used at each drop structure. There is one cross-section at the bottom of the drop, one at the top of the drop, and one 5- to 10-foot upstream

of the top of the drop. The proposed culvert at Carroll Canyon Road was represented by the ConSpan Arch option in HEC-RAS based on the proposed dimensions. The roughness coefficients were generally set at 0.040 along the channel bed to represent cobbles and 0.075 beyond the channel bed to represent mature vegetation.

The proposed condition HEC-RAS results are included in Appendix B. The results show that the flow velocities between the drops can generally be lower than the erosive threshold of 6 feet per second (fps). There are some segments along the proposed project (between Camino Santa Fe and Carroll Road, and upstream of the channelization) where the flow velocities are above 6 fps. In these areas, bank protection may be needed or a reduction of the channel gradient can be considered. The City of San Diego's requirement for 2 feet of freeboard is met and the proposed culvert can convey the 100-year flow.

## **CONCLUSION**

Existing and proposed condition 100-year hydraulic analyses have been performed for Lennar's 3Roots San Diego Project's Vesting Tentative Map by PDC. The results show that the proposed channel and culvert can convey the 100-year flow with the required freeboard. In addition, the drop structures can achieve the goal of reducing the flow velocities. Therefore, the entitlement-level analyses show that the proposed channelization is hydraulically feasible. However, bank protection or adjustments may be needed in areas with erosive flow velocities.

The project also proposes to extend Carroll Canyon Road nearly 2,000 feet west of Camino Santa Fe. The 100-year water surface elevations below the Carroll Canyon Road extension and upstream of the site will not be altered by the project (the end of Appendix B combines the existing and proposed condition results to allow comparison). A Conditional Letter of Map Revision and Letter of Map Revision will be processed to update the 100-year floodplain and floodway along the project extents.

# **APPENDIX A**

## **EFFECTIVE FEMA DATA**

# Datum Shift from "Flood Insurance Study"

## 3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the finalization of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are being prepared using NAVD as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD, with exception of two panels: 06073C2151F and 06073C2152F. These panels were not updated with this revision and are referenced to NGVD. Flooding sources on the non-updated FIRMs include Nestor Creek, Otay River, San Diego Bay, Telegraph Canyon Creek, and Tijuana River. The profile panels and floodway data tables that contain information corresponding with the non-updated panels have been included in NGVD, in addition to all of the data being presented in NAVD. Structure and ground elevations in the community must, therefore, be referenced to NAVD. It is important to note that adjacent communities may be referenced to NGVD. This may result in differences in Base (1-percent-annual-chance) Flood Elevations (BFEs) across the corporate limits between the communities. The conversion factor for each flooding source studied by detailed methods is shown below in Table 12 "Flooding Source Conversion Factor."

**TABLE 12: FLOODING SOURCE DATUM SHIFT VALUES**

Stream Name	Elevation (feet NAVD above NGVD)
Adobe Creek	+2.2
Agua Hedionda Creek	+2.2
Agua Hedionda Creek (At City of Carlsbad)	+2.2
Agua Hedionda Creek (At City of Vista)	+2.3
Alvarado Creek	+2.1
Beaver Hollow Creek	+2.2
Beeler Creek	+2.1
Broadway Creek	+2.1
Buena Creek	+2.3
Buena Vista Creek	+2.3
Buena Vista Creek Tributary 1	+2.3
Buena Vista Creek Tributary 3	+2.3
Calavera Creek	+2.2
Carmel Valley Creek	+2.1
<b>Carroll Canyon Creek</b>	<b>+2.1</b>
Coleman Creek	+2.5
County Ditch Creek	+2.1



X1	12.100	18.000	785.000	935.000	280.000	140.000	230.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	785.000	0.000	935.000	0.000	0.000	0.000	0.000
GR	303.100	0.000	70.800	438.500	65.300	472.000	65.200	500.200	72.400	515.700
GR	72.400	527.700	70.600	785.000	67.100	785.100	60.900	790.000	61.200	840.000
GR	59.700	845.000	61.700	930.000	65.200	935.000	68.700	935.000	66.800	1085.000
GR	64.800	1255.000	62.700	1455.000	58.000	1860.000	0.000	0.000	0.000	0.000
SS	1.050	1.300	2.900	0.000	150.000	11.000	813.000	1.000	58.700	58.600
X1	12.300	0.000	0.000	0.000	20.000	20.000	20.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	68.700	67.100	0.000	0.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	785.000	0.000	935.000	0.000	0.000	0.000	0.000
BT	5.000	527.700	72.400	0.000	785.000	70.500	0.000	785.600	70.500	67.100
BT	935.000	68.700	65.200	935.100	68.700	0.000	0.000	0.000	0.000	0.000
X1	12.400	15.000	527.700	740.700	310.000	500.000	260.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	303.100	0.000	70.800	438.500	65.300	472.000	65.200	500.200	72.400	515.700
GR	72.400	527.700	63.600	547.400	64.100	584.900	63.900	632.600	63.900	674.700
GR	60.900	705.300	63.400	722.800	67.400	740.700	67.400	763.200	72.700	798.400
X1	13.000	19.000	324.800	643.400	520.000	520.000	520.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	263.800	0.000	78.900	259.600	70.400	280.500	70.400	293.800	79.100	314.700
GR	79.100	324.800	69.500	345.200	68.100	407.600	68.100	526.700	65.900	575.000
GR	65.000	594.600	67.900	605.700	71.100	643.400	70.600	685.700	72.300	757.400
GR	74.000	796.200	79.300	823.600	80.300	844.800	85.000	857.100	0.000	0.000
SS	3.000	0.040	435.000	0.050	500.000	100.000	800.000	0.000	0.000	0.000

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XI	13.100	9.000	280.000	435.000	200.000	200.000	200.000	0.000	0.000	0.000
GR	150.000	0.000	78.000	250.000	78.000	265.000	68.000	280.000	64.000	370.000
GR	69.000	435.000	69.000	500.000	72.000	600.000	81.000	800.000	0.000	0.000
MC	0.040	0.040	0.050	0.100	0.300	0.000	0.000	0.000	0.000	0.000
XI	14.000	12.000	261.300	440.000	170.000	170.000	170.000	0.000	0.000	0.000
GR	91.600	60.700	76.900	96.700	73.200	126.300	79.100	144.300	77.400	158.500
GR	68.600	188.600	78.200	211.200	78.200	261.300	63.100	338.800	63.100	350.000
GR	85.000	440.000	65.000	650.000	0.000	0.000	0.000	0.000	0.000	0.000
XI	14.050	12.000	305.000	570.000	270.000	270.000	270.000	0.000	0.000	0.000
GR	88.200	88.000	84.700	103.600	82.900	123.900	76.700	150.800	82.700	177.800
GR	82.000	305.000	73.700	320.000	73.400	325.000	73.400	430.000	75.000	500.000
GR	85.500	570.000	85.500	800.000	0.000	0.000	0.000	0.000	0.000	0.000
NR	3.000	0.040	333.000	0.050	600.000	100.000	750.000	0.000	0.000	600.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	337.000	0.000
XI	14.060	7.000	333.000	730.000	120.000	150.000	140.000	0.000	0.000	0.000
GR	88.200	88.000	84.700	333.000	73.500	340.000	73.500	550.000	75.000	600.000
GR	80.000	730.000	88.000	750.000	0.000	0.000	0.000	0.000	0.000	0.000
MC	0.040	0.040	0.050	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	388.000	647.000
XI	14.100	17.000	429.900	469.500	130.000	150.000	140.000	0.000	0.000	0.000
GR	135.200	0.000	85.900	75.100	88.200	88.000	84.700	103.600	82.900	123.900
GR	76.700	150.800	82.700	177.800	82.000	338.300	73.700	362.100	73.400	429.900
GR	69.300	454.900	73.500	469.500	73.600	608.800	77.100	712.600	78.400	734.600
GR	96.200	772.400	92.600	837.200	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	399.000	619.000



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X1	14.300	17.000	436.300	491.600	55.000	55.000	55.000	0.000	0.000	0.000
GR	128.800	0.000	87.000	62.600	88.500	76.300	84.000	106.700	82.900	136.100
GR	77.200	144.900	92.900	187.900	82.800	339.100	74.400	370.100	74.200	436.300
GR	69.900	454.000	72.800	491.600	75.900	615.600	77.800	701.400	79.500	745.500
GR	93.300	779.500	94.300	858.000	0.000	0.000	0.000	0.000	0.000	0.000
EL	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	405.000	600.000
X1	14.400	17.000	436.300	491.600	120.000	120.000	120.000	0.000	0.000	0.000
GR	127.800	0.000	88.000	62.600	89.500	76.300	85.000	106.700	83.900	136.100
GR	78.200	144.900	83.000	187.900	83.000	339.100	75.400	370.100	75.200	436.300
GR	69.900	454.000	73.800	491.600	76.900	615.600	78.800	701.400	80.500	745.500
GR	100.300	779.500	94.300	858.000	0.000	0.000	0.000	0.000	0.000	0.000
NH	4.000	100.000	280.800	0.040	435.100	0.050	489.500	0.040	851.200	0.000
EL	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	300.000	570.000
X1	15.000	18.000	435.100	489.500	50.000	50.000	50.000	0.000	0.000	0.000
GR	123.700	0.000	101.300	23.300	92.200	34.800	94.400	48.600	91.100	66.800
GR	90.900	106.700	82.800	124.100	78.300	169.300	77.000	280.800	77.600	382.600
GR	75.200	435.100	72.300	458.900	74.600	489.500	79.000	608.800	79.400	708.800
GR	81.800	734.200	105.800	802.900	102.800	851.200	0.000	0.000	0.000	0.000
ND	4.000	100.000	1.9.300	0.040	435.100	0.050	489.500	0.040	851.200	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	230.000	600.000
X1	15.050	0.000	0.000	0.000	150.000	180.000	170.000	0.000	0.000	0.000
NC	0.030	0.035	0.027	0.100	0.300	0.000	0.000	0.000	0.000	0.000
EL	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
X1	15.100	18.000	283.000	339.000	140.000	140.000	140.000	0.000	0.000	0.000
GR	110.000	0.000	100.000	8.000	98.000	28.000	96.000	43.000	94.000	70.000
GR	90.000	74.000	86.000	80.000	82.000	88.000	80.000	107.000	80.000	283.000
GR	75.200	293.000	75.200	328.000	78.000	339.000	82.000	340.000	85.000	435.000
GR	86.000	465.000	88.000	595.000	90.000	620.000	0.000	0.000	0.000	0.000

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NO	0.030	0.035	0.014	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	15.200	17.000	278.000	310.000	29.000	28.000	28.000	0.000	0.000	0.000
GR	110.000	0.000	100.000	8.000	98.000	13.000	98.000	36.000	96.000	43.000
GR	90.000	74.000	26.000	80.000	82.000	85.000	81.000	278.000	75.000	278.000
GR	75.000	310.000	81.000	310.000	82.000	339.000	86.000	349.000	87.000	560.000
GR	88.000	620.000	90.000	640.000	0.000	0.000	0.000	0.000	0.000	0.000
SB	1.250	1.500	2.500	0.000	31.300	1.300	150.000	0.000	74.000	74.100
NC	0.030	0.035	0.027	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	15.400	0.000	0.000	0.000	27.000	27.000	27.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	79.000	81.000	0.000	0.000	0.000	0.000	0.000
BT	15.000	0.000	110.000	0.000	8.000	100.000	0.000	13.000	98.000	0.000
BT	36.000	98.000	0.000	43.000	96.000	0.000	74.000	90.000	0.000	80.000
BT	86.000	0.000	85.000	82.000	0.000	278.000	81.000	79.000	310.000	81.000
BT	79.000	339.000	82.000	0.000	349.000	86.000	0.000	560.000	87.000	0.000
BT	620.000	88.000	0.000	660.000	90.000	0.000	0.000	0.000	0.000	0.000
NC	0.030	0.035	0.027	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	16.000	14.000	243.000	310.000	270.000	250.000	255.000	0.000	0.000	0.000
GR	104.600	0.000	102.600	20.200	105.900	42.200	90.600	78.400	81.900	109.000
GR	80.000	243.000	76.000	250.000	76.000	250.000	88.000	310.000	88.000	555.000
GR	89.700	170.000	89.400	596.800	104.800	651.800	115.700	696.400	0.000	0.000
NC	0.030	0.035	0.014	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	16.100	13.000	254.000	286.000	155.000	140.000	150.000	0.000	0.000	0.000
GR	96.000	0.000	100.000	22.000	100.000	70.000	91.000	96.000	82.000	112.000
GR	22.000	252.000	82.600	254.000	76.600	254.000	76.600	286.000	86.000	286.000
GR	89.000	525.000	90.000	550.000	98.000	602.000	0.000	0.000	0.000	0.000
SL	1.250	1.500	2.500	0.000	31.300	1.300	150.000	0.000	76.600	76.700
NC	0.030	0.035	0.027	0.100	0.300	0.000	0.000	0.000	0.000	0.000

X1	16.300	0.000	0.000	0.000	27.000	27.000	27.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	65.000	86.000	-0.000	0.000	0.000	0.000	0.000
BT	9.000	0.000	96.000	0.000	22.000	100.000	0.000	70.000	100.000	0.000
BT	96.000	91.000	0.000	112.000	82.000	0.000	254.000	82.600	81.600	286.000
BT	86.000	81.700	325.000	88.000	0.000	550.000	90.000	0.000	0.000	0.000
NC	0.023	0.035	0.027	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
X1	17.000	11.000	183.000	247.000	275.000	263.000	267.000	0.000	0.000	0.000
GR	115.800	0.000	94.200	41.900	93.000	66.000	83.000	101.000	81.500	183.000
GR	77.700	195.000	77.700	225.000	85.500	247.000	88.900	348.000	90.200	500.200
GR	91.500	537.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.040	0.040	0.045	0.100	0.300	0.000	0.000	0.000	0.000	0.000
E1	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	100.000	250.000
X1	17.100	14.000	116.100	279.900	194.000	167.000	187.000	0.000	0.000	0.000
GR	110.900	0.000	94.200	27.100	89.600	116.100	82.800	132.500	82.800	145.300
GR	81.000	159.200	87.200	184.300	88.300	279.900	90.200	427.800	92.000	556.700
GR	94.300	576.600	55.500	592.600	113.000	666.600	117.900	707.400	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	100.000	250.000
X1	17.300	13.000	127.400	220.000	44.000	44.000	44.000	0.000	0.000	0.000
GR	111.900	0.000	94.400	25.900	89.200	105.500	87.500	127.400	80.500	146.400
GR	80.500	161.100	88.300	220.000	90.300	380.300	92.200	527.100	92.600	562.600
GR	95.000	579.500	95.700	598.100	113.000	681.100	0.000	0.000	0.000	0.000
NC	0.040	0.040	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000



X1	18.000	8.000	94.700	189.200	176.000	216.000	185.000	0.000	0.000	0.000
GR	106.600	0.000	94.200	17.600	93.000	74.000	91.800	94.700	85.600	120.000
GR	93.800	189.200	96.400	518.200	132.000	641.400	0.000	0.000	0.000	0.000
X1	18.100	8.000	220.000	350.000	243.000	243.000	243.000	0.000	0.000	0.000
GR	104.000	0.000	102.000	180.000	100.000	200.000	97.000	220.000	88.000	260.000
GR	85.000	305.000	100.000	350.000	125.000	400.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
X1	19.000	8.000	126.500	268.100	243.000	243.000	243.000	0.000	0.000	0.000
GR	113.800	0.000	110.000	69.200	106.800	126.500	89.200	186.300	89.200	247.200
GR	99.700	269.100	100.700	321.400	152.600	430.100	0.000	0.000	0.000	0.000
GT	5.000	1300.000	3800.000	5600.000	15700.000	5600.000	0.000	0.000	0.000	0.000
X1	19.100	0.000	0.000	0.000	231.000	220.000	231.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	400.510	474.800
X1	20.000	18.000	422.600	474.800	231.000	220.000	231.000	0.000	0.000	0.000
GR	142.100	0.000	139.500	5.700	118.000	33.500	114.200	62.600	106.400	211.100
GR	103.800	284.900	100.300	328.800	96.200	367.600	96.900	422.600	93.100	434.400
GR	93.400	443.200	96.100	474.800	103.400	496.700	105.900	524.800	107.100	609.100
GR	112.000	666.600	119.200	738.800	130.700	834.300	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	397.180	632.400
X1	21.000	15.000	574.700	632.400	482.000	488.000	484.000	0.000	0.000	0.000
GR	235.000	0.000	129.300	224.500	118.000	243.600	118.300	254.500	107.700	284.100
GR	105.100	328.400	104.100	366.600	104.100	447.100	102.700	520.600	102.400	574.700
GR	97.600	595.100	106.300	632.400	108.400	673.900	110.800	694.900	122.900	735.100
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	490.000	615.000

X1	22.000	16.000	526.400	576.100	691.000	704.000	704.000	0.000	0.000	0.000
GR	129.700	0.000	131.500	245.400	123.500	263.600	119.100	313.100	112.800	416.500
GR	106.400	526.400	102.900	547.600	103.600	558.600	107.800	576.100	105.300	589.200
GR	107.700	602.100	110.800	721.700	116.500	771.200	120.600	789.900	121.300	807.800
GR	136.800	869.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	330.000	596.000
X1	23.000	15.000	367.900	493.600	678.000	667.000	671.000	0.000	0.000	0.000
GR	250.100	0.000	140.900	192.300	132.700	226.500	119.800	293.000	117.000	334.300
GR	117.000	348.600	116.600	367.900	112.000	455.100	114.700	495.600	115.600	591.400
GR	119.200	616.900	120.500	623.400	124.400	691.400	128.600	737.700	133.200	761.500
NC	0.042	0.042	0.035	0.100	0.300	0.000	0.000	0.000	0.000	0.000
OT	5.000	1300.000	3800.000	5600.000	15700.000	5600.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
X1	24.000	14.000	319.200	553.800	559.000	559.000	559.000	0.000	0.000	0.000
GR	261.900	0.000	157.300	209.300	131.500	250.700	123.500	289.200	121.800	319.200
GR	120.300	397.800	121.300	443.100	121.000	460.900	123.600	553.800	127.700	630.300
GR	133.700	711.000	140.000	781.500	141.700	798.200	142.600	825.000	0.000	0.000
X1	25.000	17.000	453.400	529.700	884.000	876.000	880.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	155.200	0.000	149.700	33.400	130.800	77.000	130.400	151.400	130.400	182.600
GR	126.900	198.800	126.900	269.600	129.500	286.800	128.000	365.900	130.000	378.900
GR	129.600	453.400	124.200	462.300	124.200	471.100	134.800	529.700	141.200	565.000
GR	150.700	667.600	154.900	698.600	0.000	0.000	0.000	0.000	0.000	0.000
X1	26.000	14.000	421.500	540.700	854.000	854.000	854.000	0.000	0.000	0.000
GR	235.900	0.000	160.300	250.100	149.100	355.300	149.100	366.400	139.300	380.500
GR	139.300	410.100	140.100	421.500	135.000	431.300	136.100	522.300	138.200	540.700
GR	143.200	699.900	150.100	723.300	151.200	747.100	174.800	790.900	0.000	0.000

X1	26.100	15.000	467.500	574.400	290.000	290.000	290.000	0.000	0.000	0.000
GR	260.200	0.000	183.800	260.800	155.600	304.900	155.200	344.200	143.200	366.900
GR	140.700	467.300	137.800	478.300	136.700	497.200	136.700	550.200	139.800	574.400
GR	141.700	713.300	154.800	745.600	154.800	768.600	174.500	800.500	187.000	835.600
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	460.000	599.100
X1	26.300	14.000	477.600	528.700	29.000	29.000	29.000	0.000	0.000	0.000
GR	247.900	0.000	166.800	245.400	157.300	261.000	154.600	344.800	143.100	375.200
GR	140.900	477.600	135.500	500.100	135.500	510.700	140.500	528.700	141.200	557.000
GR	141.500	712.100	153.200	736.300	155.000	762.400	175.600	799.800	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	263.340	576.120
									<i>small handwritten 388.7</i>	
X1	27.000	13.000	388.700	419.500	431.000	431.000	431.000	0.000	0.000	0.000
GR	294.000	0.000	182.900	228.100	144.100	265.200	142.400	388.700	138.000	393.400
GR	138.000	407.000	143.600	419.500	144.300	545.800	147.300	648.000	154.200	676.600
GR	155.900	710.700	169.700	728.900	184.100	770.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	370.000	608.720
X1	27.100	25.000	490.000	499.000	245.000	230.000	235.000	0.000	0.000	0.000
GR	281.200	0.000	183.800	166.400	151.100	217.700	147.300	345.400	147.300	422.800
GR	148.000	449.700	147.800	490.000	145.300	490.000	143.600	491.000	143.300	492.000
GR	143.600	493.000	145.300	494.000	147.800	494.000	147.800	496.000	145.300	496.000
GR	143.600	497.000	143.300	498.000	143.600	499.000	145.300	500.000	147.800	500.000
GR	146.300	561.600	149.400	638.100	151.700	658.800	168.300	694.000	179.000	733.600
SB	1.250	2.480	2.900	0.000	10.000	1.500	25.100	0.000	143.300	142.400
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	370.000	608.720
X1	27.300	0.000	0.000	0.000	75.000	75.000	75.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	147.000	147.800	0.000	0.000	0.000	0.000	0.000
BT	19.000	217.700	151.100	0.000	345.400	147.300	0.000	422.800	147.300	0.000
BT	449.700	145.000	0.000	490.000	147.800	145.300	491.000	147.800	147.000	492.000
BT	147.800	147.300	493.000	147.800	147.000	494.000	147.800	145.300	496.000	147.800



BT	145.300	497.000	147.800	147.000	498.000	147.800	147.300	499.000	147.800	147.000
BT	500.000	147.800	145.300	561.600	146.300	0.000	638.100	149.400	0.000	658.800
BT	151.700	0.000	694.000	168.300	0.000	733.600	179.000	0.000	0.000	0.000
NC	0.045	0.045	0.035	0.100	0.300	0.000	0.000	0.000	0.000	0.000
QT	5.000	1000.000	3000.000	4500.000	12500.000	4500.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000
X1	28.000	15.000	380.500	450.700	680.000	660.000	670.000	0.000	0.000	0.000
GR	232.100	0.000	178.800	162.600	175.200	182.200	154.700	220.800	154.700	244.900
GR	155.500	281.000	154.300	312.300	153.800	380.500	151.200	384.500	151.200	410.900
GR	159.600	450.700	166.200	523.200	170.500	551.400	171.700	571.100	172.900	607.600
X1	29.000	15.000	348.200	383.400	480.000	458.000	453.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	173.200	0.000	173.300	64.500	167.500	169.900	166.400	213.800	158.000	344.100
GR	158.700	348.200	155.700	371.600	163.100	383.400	163.800	395.400	161.200	401.200
GR	161.200	526.500	165.300	535.400	145.800	552.000	179.200	640.000	181.600	665.900
X1	30.000	16.000	324.800	405.600	580.000	580.000	580.000	0.000	0.000	0.000
GR	334.800	0.100	218.300	162.600	167.700	271.300	167.700	307.100	167.400	324.800
GR	163.800	332.600	162.900	376.300	162.900	383.600	172.600	405.600	171.600	425.300
GR	172.200	556.600	173.100	677.400	174.500	709.500	182.200	753.400	185.800	810.100
GR	188.600	895.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	31.000	15.000	382.000	424.200	299.000	387.000	359.000	0.000	0.000	0.000
GR	341.600	0.000	217.500	187.900	168.400	245.000	168.400	266.800	168.400	283.300
GR	170.600	296.000	170.800	382.000	168.300	389.800	169.800	424.200	169.800	499.000
GR	173.500	543.800	185.500	630.100	188.100	650.500	193.000	693.800	203.300	757.200
NC	0.050	0.040	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000

X1	32.000	17.000	136.200	181.600	660.000	660.000	660.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	204.200	0.000	180.000	32.200	175.800	83.600	175.800	136.200	173.900	137.500
GR	173.400	166.800	175.100	181.600	175.100	248.900	178.800	272.100	179.200	332.700
GR	176.400	348.900	176.100	388.900	176.200	400.600	175.300	424.600	189.500	449.600
GR	193.000	471.100	196.900	513.700	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	120.000	280.000
X1	33.000	16.000	135.600	265.700	403.000	387.000	396.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	214.300	0.000	180.800	59.800	180.200	135.600	177.100	142.100	178.700	163.200
GR	177.400	208.900	177.400	252.200	180.400	265.700	180.600	328.800	187.400	345.300
GR	188.700	376.800	187.200	384.100	180.800	396.000	180.000	431.100	197.200	467.100
GR	203.300	530.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
E.I.	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	176.900	280.540
X1	34.000	14.000	176.600	211.500	673.000	673.000	673.000	0.000	0.000	0.000
GR	316.800	0.100	229.200	124.700	182.100	176.600	182.100	193.000	181.300	196.700
GR	184.200	211.500	183.700	244.900	185.500	354.400	184.300	382.500	186.000	396.500
GR	193.200	433.400	198.500	499.400	206.200	546.000	206.000	570.300	0.000	0.000
NC	0.055	0.050	0.033	0.100	0.300	0.000	0.000	0.000	0.000	0.000
QT	5.030	300.000	2000.000	3500.000	9700.000	3500.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	374.900	590.300
X1	35.000	11.000	448.300	590.300	649.000	649.000	673.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	270.600	0.000	223.800	120.400	190.000	238.200	190.600	322.300	190.600	418.500
GR	192.200	448.300	189.800	495.300	189.800	547.500	189.800	575.700	202.500	590.300
GR	213.100	666.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	0.000	0.000	0.000	9.100	0.000	0.000	176.900	275.000





RI	39.000	17.000	348.600	408.800	730.000	744.000	739.000	0.000	0.000	0.000	0.000	0.000
GR	302.400	0.000	245.700	86.100	220.600	111.400	220.800	123.000	219.200	144.400	348.600	348.600
GR	221.200	170.900	273.100	197.800	222.700	267.800	222.900	317.000	216.100	454.500	454.500	454.500
GR	205.300	364.300	205.300	389.100	209.100	408.800	209.100	428.900	229.900	0.000	0.000	0.000
GR	295.500	492.400	236.900	539.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NO	0.055	0.055	0.032	0.100	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RI	5.000	800.000	2000.000	3500.000	9700.000	3500.000	0.000	0.000	0.000	0.000	0.000	0.000
RI	0.000	0.000	0.000	0.000	0.000	10.400	0.000	0.000	0.000	0.000	0.000	0.000
RI	40.000	16.000	419.500	474.600	187.000	172.000	183.000	0.000	0.000	0.000	0.000	0.000
GR	252.400	0.000	240.800	73.800	234.400	104.400	226.700	121.500	226.300	176.600	452.600	452.600
GR	225.300	289.700	226.500	308.800	209.400	374.800	211.400	419.500	209.700	559.700	559.700	559.700
GR	210.500	467.200	211.400	474.600	218.500	497.200	218.700	518.800	237.400	0.000	0.000	0.000
GR	239.300	629.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RI	40.100	13.000	409.000	600.200	326.000	304.000	321.000	0.000	0.000	0.000	0.000	0.000
GR	274.900	0.000	239.600	79.500	226.400	132.700	227.200	200.900	230.600	231.600	575.400	575.400
GR	272.000	242.700	218.000	333.200	217.800	409.000	215.200	465.400	216.500	0.000	0.000	0.000
GR	235.400	600.200	237.400	654.200	239.900	644.200	0.000	0.000	0.000	0.000	0.000	0.000
RI	40.300	17.000	527.500	577.700	66.000	66.000	66.000	0.000	0.000	0.000	0.000	0.000
GR	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	292.300	0.000	244.400	72.300	231.600	113.200	227.400	139.100	227.400	215.700	453.800	453.800
GR	220.600	250.700	220.600	380.000	224.500	398.200	224.200	445.400	226.900	610.200	610.200	610.200
GR	229.500	507.900	220.800	527.500	212.600	556.700	225.800	577.700	234.300	0.000	0.000	0.000
GR	239.400	632.700	243.700	681.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
RI	41.000	22.000	380.000	543.200	385.000	420.000	390.000	0.000	0.000	0.000	0.000	0.000
GR	270.800	0.000	292.400	51.100	242.600	119.900	242.800	131.700	233.100	208.600	325.600	325.600
GR	228.100	212.400	228.300	219.000	232.900	238.300	233.500	291.200	224.500	518.600	518.600	518.600
GR	223.400	362.000	226.300	380.000	225.000	426.500	223.900	490.300	223.900	641.900	641.900	641.900
GR	234.100	543.200	235.900	567.000	236.600	566.200	236.700	615.400	254.400	0.000	0.000	0.000

GR	261.900	672.200	264.000	742.100	0.000	0.000	0.000	0.000	0.000	0.000
X1	42.000	17.000	288.400	627.300	250.000	250.000	230.000	0.000	0.000	0.000
GR	271.300	0.000	252.000	49.700	247.700	82.100	247.900	96.800	239.800	166.800
GR	235.600	177.600	237.500	203.200	237.900	251.000	235.700	258.500	235.700	288.400
GR	229.500	294.900	228.200	386.900	230.100	511.500	231.500	548.100	233.900	595.900
GR	257.400	627.300	266.500	690.700	0.000	0.000	0.000	0.000	0.000	0.000
X1	43.000	20.000	320.700	438.500	312.000	304.000	308.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	256.000	0.000	240.300	11.600	239.100	22.800	246.900	45.800	248.600	148.900
GR	248.000	204.100	242.200	223.700	243.500	262.900	244.200	297.700	243.400	320.700
GR	230.800	340.900	231.000	423.400	236.600	438.500	234.700	483.000	235.700	519.000
GR	235.800	564.100	233.900	577.300	236.500	594.500	236.500	616.400	285.000	670.700
NC	0.045	0.040	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	44.000	16.000	588.300	662.000	422.000	416.000	411.000	0.000	0.000	0.000
GR	274.600	0.000	260.200	111.900	259.400	273.800	258.500	304.500	251.500	368.600
GR	251.900	423.900	252.000	470.900	254.700	525.900	249.500	581.400	252.600	588.300
GR	241.200	593.700	240.400	637.000	240.000	649.200	249.000	662.000	254.200	678.600
GR	288.800	737.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	45.000	25.000	503.700	556.700	385.000	392.000	392.000	0.000	0.000	0.000
GR	276.300	0.000	267.400	36.800	267.500	49.700	281.900	77.900	278.100	90.400
GR	278.100	144.300	294.000	163.400	282.700	173.400	263.900	191.700	264.200	246.200
GR	250.200	269.200	248.800	287.000	246.200	309.400	246.200	450.300	246.200	503.700
GR	243.400	511.900	244.100	544.400	248.500	556.700	250.200	609.300	249.400	620.600
GR	250.800	632.400	260.500	641.800	263.400	689.500	287.600	724.500	304.300	753.500





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NC	0.050	0.033	0.050	0.100	0.300	0.000	0.000	0.000	0.000	0.000
X1	50.000	17.000	165.600	290.100	403.000	403.000	403.000	0.000	0.000	0.000
GR	295.900	0.000	275.400	47.500	274.600	66.900	268.300	89.500	261.900	123.300
GR	258.900	165.600	257.700	215.100	260.200	290.100	260.000	326.300	258.700	334.700
GR	259.300	354.300	264.600	387.200	263.000	431.900	274.400	500.700	276.200	555.100
GR	287.400	567.500	294.200	626.700	0.000	0.000	0.000	0.000	0.000	0.000
X1	51.000	19.000	373.400	494.200	755.000	755.000	755.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	320.500	0.000	292.800	111.800	290.200	160.700	286.000	218.000	272.000	241.400
GR	269.600	270.800	269.100	298.400	271.800	311.400	270.100	353.700	270.100	373.400
GR	267.900	407.200	268.200	484.000	270.700	494.200	269.600	564.400	273.700	582.100
GR	275.600	595.700	275.000	645.400	273.700	656.700	315.400	710.100	0.000	0.000
X1	52.000	23.000	404.300	479.500	590.000	590.000	590.000	0.000	0.000	0.000
GR	342.400	0.000	292.400	177.700	287.500	221.400	286.100	244.600	276.600	264.800
GR	273.200	285.800	275.200	298.000	277.900	312.000	277.900	360.700	275.900	385.100
GR	276.500	404.300	274.200	423.600	274.500	442.700	273.600	447.700	277.300	479.500
GR	277.700	526.200	285.400	559.200	288.800	586.400	288.200	611.300	287.700	635.000
GR	302.800	661.800	304.900	675.900	328.400	724.200	0.000	0.000	0.000	0.000
X1	53.000	19.000	334.600	426.200	561.000	561.000	561.000	0.000	0.000	0.000
GR	335.300	0.000	308.000	197.400	304.200	236.500	290.500	251.400	289.300	275.000
GR	281.700	297.800	283.900	306.000	284.500	334.600	282.900	355.800	282.900	367.000
GR	284.700	374.900	283.400	394.200	286.100	426.200	286.100	475.700	285.700	536.500
GR	288.100	565.900	288.100	588.100	304.500	610.600	310.600	640.000	0.000	0.000
X1	54.000	15.000	409.500	471.500	717.000	717.000	717.000	0.000	0.000	0.000
GR	326.600	0.000	328.100	95.600	318.300	122.600	312.300	213.600	305.900	223.100
GR	304.000	409.900	297.200	412.900	298.800	430.900	298.800	463.100	303.000	471.500
GR	305.200	512.900	304.800	611.600	304.700	656.900	306.200	685.200	337.100	738.200

X1	55.000	16.000	550.400	605.300	539.000	539.000	539.000	0.000	0.000	0.000
GR	349.900	0.000	341.000	106.500	328.000	138.400	316.500	213.700	311.000	252.300
GP	311.700	267.800	310.600	393.300	309.900	463.200	309.000	473.700	311.000	482.700
GR	311.000	543.200	308.100	550.400	308.100	565.600	308.100	572.700	325.500	605.300
GR	336.500	671.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	56.000	17.000	90.700	438.200	739.000	739.000	739.000	0.000	0.000	0.000
GR	392.700	0.000	347.800	62.500	319.600	90.700	319.200	117.500	319.000	195.400
GR	319.600	228.800	318.900	256.600	319.800	284.300	319.600	344.200	321.300	438.200
GR	321.200	481.600	321.200	502.200	321.300	531.500	333.500	549.600	336.300	592.800
GR	344.900	656.000	350.800	695.500	0.000	0.000	0.000	0.000	0.000	0.000
X1	57.000	19.000	377.500	419.200	675.000	675.000	675.000	0.000	0.000	0.000
GR	370.100	0.000	351.100	35.000	332.700	65.000	327.300	84.500	327.600	205.400
GR	327.600	263.500	328.400	273.200	327.100	346.900	328.000	377.500	324.200	391.300
GR	324.200	409.400	327.800	419.200	326.600	451.000	325.800	470.300	326.800	481.400
GR	327.600	504.400	343.200	535.400	349.400	598.000	360.700	644.400	0.000	0.000
X1	58.000	16.000	299.800	347.000	500.000	500.000	500.000	0.000	0.000	0.000
GR	353.900	0.000	345.000	53.800	342.900	59.200	334.100	68.200	331.500	110.600
GR	331.900	123.500	333.700	132.200	334.600	237.300	335.500	299.800	329.500	307.500
GR	328.600	318.000	328.600	334.200	334.400	347.000	333.300	469.500	351.500	503.700
GR	354.000	622.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	59.100	13.000	693.500	718.200	260.000	220.000	240.000	0.000	0.000	0.000
GR	374.600	0.000	353.700	87.700	356.500	231.500	349.600	413.000	346.200	589.300
GR	343.800	693.500	330.300	693.500	330.300	718.200	345.600	718.200	347.500	648.300
GR	349.900	966.100	354.800	1063.400	357.700	1148.600	0.000	0.000	0.000	0.000
SC	0.900	1.300	2.700	0.000	24.600	0.600	168.000	0.000	332.300	330.300
MC	0.000	0.000	0.012	0.100	0.300	0.000	0.000	0.000	0.000	0.000









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X1	66.000	28.000	763.600	796.300	378.000	374.000	376.000	0.000	0.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	796.300	0.000	0.000	0.000	0.000	0.000	0.000
GR	424.100	0.000	411.800	178.300	407.000	200.000	395.400	215.300	386.100	288.500	386.100	288.500
GR	384.300	440.300	380.900	763.600	378.500	714.900	378.500	781.700	383.100	796.300	383.100	796.300
GR	368.800	803.700	359.000	831.800	362.400	976.700	356.900	1016.800	356.100	1155.900	356.100	1155.900
GR	326.500	1179.100	325.200	1190.500	325.200	1464.200	335.600	1481.000	337.600	1508.300	337.600	1508.300
GR	329.400	1519.400	327.200	1595.300	327.200	1672.700	391.600	1684.000	396.200	1707.000	396.200	1707.000
GR	392.000	1720.300	392.500	1746.300	409.400	1780.800	0.000	0.000	0.000	0.000	0.000	0.000
X1	67.000	28.000	769.900	800.200	326.000	326.000	326.000	0.000	0.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	800.200	0.000	0.000	0.000	0.000	0.000	0.000
GR	431.900	0.000	401.800	176.700	393.200	359.400	392.700	454.300	386.800	468.600	386.800	468.600
GR	387.200	650.600	385.200	769.900	380.200	736.400	380.200	792.300	387.600	800.200	387.600	800.200
GR	372.500	810.300	362.700	868.100	364.600	937.700	368.200	963.700	364.800	1007.900	364.800	1007.900
GR	366.100	1026.400	361.000	1031.100	354.500	1097.300	360.700	1124.100	323.900	1144.300	323.900	1144.300
GR	324.500	1169.100	324.500	1702.700	394.900	1721.100	396.800	1751.800	390.400	1761.200	390.400	1761.200
GR	395.700	1786.000	406.800	1800.800	417.800	1839.200	0.000	0.000	0.000	0.000	0.000	0.000
						9.1			482	751		
X1	69.000	26.000	707.300	750.700	348.000	348.000	348.000	0.000	0.000	0.000	0.000	0.000
X2	10.000	0.000	0.000	0.000	0.000	1143.800	0.000	0.000	0.000	0.000	0.000	0.000
GR	443.500	0.000	405.800	445.100	404.600	460.800	391.900	484.600	392.000	520.600	392.000	520.600
GR	391.600	595.200	391.600	648.100	393.700	668.500	391.500	677.800	392.200	707.300	391.500	707.300
GR	382.900	719.100	382.900	721.400	393.000	750.700	394.100	783.800	391.100	844.400	391.100	844.400
GR	391.000	926.400	388.100	962.800	391.300	982.300	394.300	1068.600	400.700	1143.800	400.700	1143.800
GR	387.200	1309.400	326.800	1317.300	326.800	1625.100	332.700	1637.500	435.600	1674.600	435.600	1674.600
GR	446.100	1764.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	5.000	300.000	900.000	1100.000	0.000	1100.000	0.000	0.000	0.000	0.000	0.000	0.000
						10.4						
X1	69.000	37.000	584.500	612.900	270.000	270.000	270.000	0.000	0.000	0.000	0.000	0.000
X2	0.000	0.000	0.000	0.000	0.000	852.100	0.000	0.000	0.000	0.000	0.000	0.000
GR	466.500	0.000	411.400	358.800	409.500	369.800	410.800	384.300	406.900	401.500	406.900	401.500
GR	407.500	433.100	406.500	442.900	395.100	475.800	394.700	513.100	394.000	584.500	394.000	584.500
GR	392.100	659.900	389.700	680.400	389.900	761.600	391.900	772.500	383.200	767.500	383.200	767.500

GR	383.200	794.500	394.000	812.900	394.700	852.100	387.400	886.300	387.400	917.700
GR	386.000	972.500	392.400	1048.100	386.700	1141.000	390.700	1176.300	390.100	1215.600
GR	393.700	1261.200	391.000	1325.900	402.500	1388.000	401.000	1443.000	391.500	1352.700
GR	373.100	1588.000	373.900	1626.700	378.200	1680.600	378.700	1703.800	390.400	1729.600
GR	436.100	1735.800	441.600	1770.400	0.000	0.000	0.000	0.000	0.000	0.000
X1	70.000	16.000	561.700	615.900	170.000	210.000	200.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	615.900	0.000	0.000	0.000	0.000
GR	460.800	0.000	416.600	319.300	409.500	363.400	408.700	418.800	400.200	457.000
GR	399.300	483.200	397.200	561.700	388.900	577.000	388.900	586.400	405.100	615.900
GR	393.700	650.600	384.000	676.900	382.800	682.000	382.800	1226.100	430.400	1267.100
GR	429.100	1285.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	71.000	15.000	303.800	400.000	320.000	320.000	320.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	0.000	0.000	776.500	0.000	0.000	0.000	0.000
GR	465.600	0.000	428.600	244.900	400.700	303.800	398.000	315.000	398.000	340.000
GR	403.000	400.000	403.000	500.000	397.600	515.000	399.600	347.800	401.900	559.200
GR	402.400	591.400	404.600	612.000	407.000	684.900	413.100	730.900	414.000	776.500
X1	71.100	12.000	294.000	329.000	70.000	70.000	70.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	0.000	0.000	329.000	0.000	0.000	0.000	0.000
GR	475.000	100.000	470.000	140.000	450.000	195.000	420.000	260.000	400.000	294.000
GR	376.000	300.000	396.000	316.000	407.500	329.000	407.500	845.000	401.000	865.000
GR	401.000	878.000	410.000	885.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	72.000	14.000	233.500	350.000	180.000	180.000	180.000	0.000	0.000	0.000
X3	0.000	0.000	0.000	0.000	0.000	670.000	0.000	0.000	0.000	0.000
GR	477.900	0.000	436.800	233.500	402.100	312.100	406.100	319.000	402.500	326.800
GR	402.700	328.000	409.500	350.000	410.000	670.000	410.000	955.000	404.000	960.000
GR	404.000	975.000	410.000	980.000	410.000	1013.000	420.000	1045.000	0.000	0.000

X1	72.100	21.000	290.000	305.600	380.000	375.000	377.000	0.000	0.000	0.000
GR	450.000	200.060	416.000	280.000	415.500	290.000	411.600	291.000	410.200	292.000
GR	409.300	293.000	408.600	294.000	408.300	295.000	407.800	296.000	407.600	297.000
GR	407.900	298.000	407.600	299.000	407.800	300.000	408.300	301.000	408.600	302.000
GR	409.300	303.000	410.200	304.000	411.600	305.000	413.000	305.600	413.000	620.000
GR	427.000	800.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	72.120	24.000	290.000	306.000	1.000	1.000	1.000	0.000	0.000	0.000
GR	466.200	0.000	465.000	32.000	450.000	150.000	455.000	238.000	453.400	290.000
GR	415.500	290.000	411.620	291.000	410.210	292.000	490.260	293.000	408.560	294.000
GR	408.310	295.000	407.750	296.000	407.560	297.000	407.500	298.000	407.560	299.000
GR	407.750	300.000	408.310	301.000	408.560	302.000	409.260	303.000	410.210	304.000
GR	411.620	305.000	415.500	306.000	450.000	370.000	445.000	427.000	0.000	0.000
SD	1.250	1.000	2.500	0.000	12.000	0.000	201.000	0.000	411.500	407.500
X1	72.130	23.000	290.000	306.000	210.000	210.000	210.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	427.500	456.300	0.000	0.000	0.000	0.000	0.000
BT	20.000	0.000	470.000	0.000	150.000	463.700	0.000	290.000	456.800	419.500
BT	291.000	456.700	423.400	292.000	456.700	424.800	293.000	456.600	425.700	294.000
BT	456.600	426.400	295.000	456.500	426.700	296.000	456.400	427.300	297.000	456.400
BT	427.400	298.000	456.300	427.500	299.000	456.300	427.400	300.000	456.200	427.300
BT	301.000	456.100	426.700	302.000	456.100	426.400	303.000	456.000	425.700	304.000
BT	456.000	424.800	305.000	456.000	423.400	306.000	456.000	419.500	655.000	437.000
BT	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	466.200	0.000	455.000	32.000	460.000	150.000	455.000	238.000	453.400	290.000
GR	415.630	291.000	414.210	292.000	413.260	293.000	412.570	294.000	412.310	295.000
GR	411.750	296.000	411.560	297.000	411.500	298.000	411.560	299.000	411.750	300.000
GR	412.310	301.000	412.570	302.000	413.260	303.000	414.210	304.000	415.630	305.000
GR	419.500	806.000	450.000	370.000	445.000	427.000	0.000	0.000	0.000	0.000







SECNO	CWSEL	DIFKNS	EQ	TOPWID	GLOB	GCH	GROB	PERENC	STENCL	STCHL	STCHR	STFNCR
* AI 26.300	143.46	0.00	144.59	341.88	528.49	3194.83	1874.67	0.00	0.00	477.60	528.70	0.00
26.300	143.95	0.49	145.88	139.10	284.88	4083.40	1231.72	139.10	460.00	477.60	528.70	599.10
AS 27.000	146.20	0.00	147.10	347.30	1972.20	2190.85	1436.95	0.00	3 0.00	388.70	419.50	0.00
27.000	147.22	1.02	147.65	312.78	2074.63	1772.09	1753.28	312.78	263.34	388.70	419.50	576.12
* AC 27.100	149.60	0.00	150.54	371.77	2811.08	427.88	2361.04	0.00	0.00	490.00	499.00	0.00
27.100	149.89	0.29	151.14	238.72	2304.20	471.97	2823.83	238.72	370.00	490.00	499.00	608.72
AL 27.300	150.25	0.00	150.76	379.57	2926.75	336.15	2337.10	0.00	0.00	490.00	499.00	0.00
27.300	149.98	0.27	151.14	238.72	2323.34	459.11	2817.55	238.72	370.00	490.00	499.00	608.72
* AM 28.000	156.84	0.00	157.95	220.84	2020.55	2479.45	0.00	0.00	0.00	380.50	450.70	0.00
28.000	157.80	0.97	159.52	101.17	1105.18	3393.82	0.00	0.36	341.02	380.50	450.70	450.70
* AD 29.000	163.16	0.00	164.22	254.29	1186.91	2319.08	994.01	0.00	0.00	348.20	383.40	0.00
29.000	163.73	0.57	165.77	119.02	632.55	3120.61	746.84	0.34	334.44	348.20	383.40	454.91
* AD 30.000	169.15	0.00	170.99	129.60	323.17	4176.83	0.00	0.00	0.00	324.80	405.60	0.00
30.000	168.94	-0.21	171.42	72.50	0.00	4500.00	0.00	0.12	324.80	324.80	405.60	405.60
AP 31.000	172.86	0.00	173.33	296.33	2069.92	1124.72	1305.36	0.00	0.00	382.00	424.20	0.00
31.000	173.64	0.78	174.41	188.56	1936.06	1689.21	874.72	0.37	274.33	382.00	424.20	462.90
* AQ 32.000	177.69	0.00	178.67	291.95	572.97	1722.61	2204.42	0.00	0.00	136.20	181.60	0.00
32.000	178.64	0.95	180.44	103.98	0.00	2499.44	2000.56	0.44	136.20	136.20	181.60	240.10
AR 33.000	181.68	0.00	182.55	284.22	161.18	3876.34	462.47	0.00	0.00	135.60	265.70	0.00
33.000	182.65	0.98	183.37	160.00	117.39	4260.12	122.49	160.00	120.00	135.60	265.70	280.00
* AS 34.000	187.08	0.00	187.93	230.91	54.84	1550.88	2894.28	0.00	0.00	176.60	211.50	0.00
34.000	187.37	0.29	189.30	103.64	0.00	2128.87	2371.13	103.64	176.90	176.60	211.50	280.54
* AT 35.000	192.86	0.00	193.22	350.96	1603.49	1896.51	0.00	0.00	0.00	448.30	590.30	0.00
35.000	193.86	1.00	194.37	205.46	666.08	2833.92	0.00	215.40	374.90	448.30	590.30	590.30
* AU 36.000	200.46	0.00	201.65	203.64	0.73	2628.71	870.56	0.00	0.00	176.90	251.90	0.00
36.000	200.83	0.37	202.60	98.10	0.00	3252.54	247.46	98.10	176.90	176.90	251.90	275.00



	SECNO	CWSEL	DIFKWS	EG	TOPWID	GLOB	GCH	GROB	PERENC	STENCL	STCHL	STCHR	STFNCR
	36.100	202.24	0.00	203.27	239.67	0.00	3411.98	88.02	0.00	0.00	141.90	327.70	0.00
AY	36.100	203.20	0.96	203.81	156.57	0.00	3500.00	0.00	185.80	141.90	141.90	327.70	327.70
	36.300	203.27	0.00	203.73	293.95	291.10	1048.87	2140.03	0.00	0.00	216.50	250.30	0.00
AW	36.300	203.74	0.47	204.06	305.52	316.86	983.21	2199.94	0.00	0.00	216.50	250.30	0.00
	37.000	203.96	0.00	204.07	282.26	106.44	3362.61	30.95	0.00	0.00	210.00	456.00	0.00
AX	37.000	204.21	0.25	204.31	284.36	111.25	3354.41	34.35	0.00	0.00	210.00	456.00	0.00
	38.000	203.93	0.00	205.95	79.94	0.00	3500.00	0.00	0.00	0.00	451.80	570.30	0.00
AZ	38.000	204.03	0.10	205.95	80.65	0.00	3500.00	0.00	0.00	0.00	451.80	570.30	0.00
	39.000	211.56	0.00	213.71	76.72	0.00	3268.62	231.38	0.00	0.00	348.60	408.80	0.00
BA	39.000	211.55	-0.01	213.71	76.70	0.00	3269.21	230.79	0.00	0.00	348.60	408.80	0.00
	40.000	214.08	0.00	215.48	126.40	1274.54	2188.50	36.96	0.00	0.00	419.50	474.60	0.00
BB	40.000	215.21	1.12	217.59	64.37	200.70	3299.30	0.00	0.34	410.23	419.50	474.60	474.60
	40.100	218.52	0.00	219.56	251.61	94.01	3405.99	0.00	0.00	0.00	409.00	600.20	0.00
BC	40.100	219.20	0.68	219.88	169.95	0.00	3500.00	0.00	0.07	409.00	409.00	600.20	600.20
	40.300	222.47	0.00	223.90	196.27	828.52	2671.48	0.00	0.00	0.00	527.50	577.70	0.00
BD	40.300	222.80	0.33	225.55	56.22	18.14	3481.26	0.00	0.33	383.95	527.50	577.70	577.70
	41.000	226.75	0.00	227.85	208.46	887.04	2612.96	0.00	0.00	0.00	380.00	543.20	0.00
BE	41.000	227.81	1.06	228.77	148.03	0.00	3500.00	0.00	0.23	380.00	380.00	543.20	543.20
	42.000	231.03	0.00	231.98	242.64	0.00	3500.00	0.00	0.00	0.00	288.40	627.30	0.00
BF	42.000	231.04	0.00	231.98	242.73	0.00	3500.00	0.00	0.00	288.40	288.40	627.30	627.30
	43.000	234.59	0.00	236.30	98.25	0.00	3500.00	0.00	0.00	0.00	320.70	438.50	0.00
BG	43.000	234.59	0.00	236.30	98.25	0.00	3500.00	0.00	0.00	320.70	320.70	438.50	438.50
	44.000	245.46	0.00	247.70	65.29	0.00	3500.00	0.00	0.00	0.00	588.30	662.00	0.00
BH	44.000	245.46	0.00	247.70	65.29	0.00	3500.00	0.00	0.00	588.30	588.30	662.00	662.00
	45.000	249.24	0.00	249.49	298.48	2376.28	1116.58	7.14	0.00	0.00	503.70	556.70	0.00
BI	45.000	249.65	0.40	250.12	159.99	1904.98	1595.02	0.00	0.36	396.71	503.70	556.70	556.70

1-SEP-82 11:24:12

	SECND	CWSEL	DIFKWS	EG	TOPWID	GLOB	GCH	GRDB	PERENC	STENCL	STCHL	BTCHR	STENCR
	46.000	250.22	0.00	250.93	233.52	0.00	2922.10	577.89	0.00	0.00	292.30	480.20	0.00
BI	46.000	251.00	0.78	251.65	161.52	0.00	3500.00	0.00	0.21	292.30	292.30	480.20	480.20
	47.000	252.21	0.00	252.89	142.70	0.00	3500.00	3.00	0.00	0.00	290.90	473.00	0.00
B3	47.000	252.45	0.24	253.05	143.52	0.00	3500.00	0.00	0.00	290.90	290.90	473.00	473.00
	48.000	253.15	0.00	253.32	240.05	1.90	3498.10	0.00	0.00	0.00	229.50	480.40	0.00
BK	48.000	253.26	0.12	253.43	229.08	0.00	3500.00	0.00	0.01	229.50	229.50	480.40	480.40
	48.100	253.28	0.00	254.06	141.53	0.00	3500.00	0.00	0.00	0.00	218.20	380.10	0.00
BL	48.100	253.38	0.10	254.11	142.43	0.00	3500.00	0.00	0.00	218.20	218.20	380.10	380.10
	49.300	256.57	0.00	257.49	248.36	0.00	3500.00	0.00	852.10	0.00	153.20	420.30	852.10
B4	49.300	256.57	0.00	257.49	248.35	0.00	3500.00	0.00	852.10	0.00	153.20	420.30	852.10
	49.000	258.98	0.00	259.14	280.16	162.16	1517.93	1819.91	0.00	0.00	93.20	174.20	0.00
BW	49.000	259.42	0.44	259.70	169.50	0.00	2046.87	1453.11	0.31	93.20	93.20	174.20	262.70
	50.000	261.13	0.00	262.14	231.49	165.19	2414.06	920.75	0.00	0.00	165.60	290.10	0.00
B3	50.000	261.58	0.45	263.05	124.50	0.00	3500.00	0.00	0.38	165.60	165.60	290.10	290.10
	51.000	271.62	0.00	272.10	322.43	591.77	2302.83	605.40	0.00	0.00	373.40	494.20	0.00
B7	51.000	272.67	1.05	273.40	130.80	0.00	3500.00	0.00	0.44	373.40	373.40	494.20	494.20
	52.000	278.30	0.00	279.16	267.59	1259.49	2050.92	189.60	0.00	0.00	404.30	479.50	0.00
B9	52.000	279.14	0.84	280.75	89.30	296.01	3203.99	0.00	0.47	390.20	404.30	479.50	479.50
	53.000	286.93	0.00	287.64	269.46	1087.68	1849.43	562.88	0.00	0.00	334.60	426.20	0.00
BK	53.000	288.12	1.19	289.11	121.36	118.99	3027.17	353.84	0.48	328.71	334.60	426.20	450.07
	54.000	304.21	0.00	306.16	105.12	1.90	3437.95	60.15	0.00	0.00	409.50	471.50	0.00
B5	54.000	303.90	-0.31	306.23	61.93	0.00	3500.00	0.00	0.12	409.50	409.50	471.50	471.50
	55.000	312.72	0.00	313.15	341.13	2641.70	858.80	0.00	0.00	0.00	550.40	605.30	0.00
BT	55.000	313.63	0.91	314.39	147.28	2275.70	1224.30	0.00	0.46	435.79	550.40	605.30	605.30
	56.000	321.44	0.00	321.91	442.85	4.77	3457.80	37.43	0.00	0.00	90.70	438.20	0.00
B4	56.000	321.69	0.25	322.07	347.50	0.00	3500.00	0.00	0.09	90.70	90.70	438.20	438.20





# February 2005 LOMR

## Federal Emergency Management Agency

Washington, D.C. 20472

OCT 14 2004

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

The Honorable Dick Murphy  
Mayor, City of San Diego  
202 C Street, 11th Floor  
San Diego, CA 92101

IN REPLY REFER TO:

Case No.: 04-09-1311P  
Follows Conditional  
Case No.: 02-09-1510R  
Community Name: City of San Diego, CA  
Community No.: 060295  
Effective Date of This Revision: **FEB 10 2005**

Dear Mayor Murphy:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7103, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Sincerely,


Max H. Yuan, P.E., Project Engineer  
Hazard Identification Section  
Mitigation Division  
Emergency Preparedness  
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief  
Hazard Identification Section  
Mitigation Division  
Emergency Preparedness  
and Response Directorate

List of Enclosures:

Letter of Map Revision Determination Document  
Annotated Flood Insurance Rate Map  
Annotated Flood Insurance Study Report

cc: Mr. Walter Gefrom, CFM  
Floodplain Manager  
Transportation Engineering Division  
City of San Diego

 P.E.  
Rick Engineering Company

Mr. Brenden C. Hastie, P.E.  
Water Resources Designer  
Rick Engineering Company

Follows Conditional Case No.: 02-09-1510R



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of San Diego San Diego County California	BRIDGE CHANNELIZATION CULVERT	NEW TOPOGRAPHIC DATA HYDRAULIC ANALYSIS
	COMMUNITY NO.: 060295		
IDENTIFIER	Fenton Carroll Canyon Technology Center	APPROXIMATE LATITUDE & LONGITUDE: 32.906, -117.156 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

**FLOODING SOURCE(S) &  
REVISED REACH(ES)**

Carroll Canyon Creek – from approximately 1,600 feet upstream of Fenton Road to approximately 950 feet downstream of Rehco Road

### SUMMARY OF REVISIONS

Effective Flooding:	Floodway	BFEs*	Zone AE	Zone X (shaded)
Revised Flooding:	Floodway	BFEs	Zone AE	Zone X (shaded)
Increases:	YES	YES	YES	YES
Decreases:	YES	NONE	YES	YES

\* BFEs – Base Flood Elevations

**ANNOTATED MAPPING ENCLOSURES**

TYPE: FIRM\* NO.: 06073C1343 F Date: June 19, 1997

**ANNOTATED STUDY ENCLOSURES**
DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 2, 2002  
FLOODWAY DATA TABLE: 8  
PROFILE: 57P  
PROFILE: 58P

\* FIRM – Flood Insurance Rate Map; \*\* FBFM – Flood Boundary and Floodway Map; \*\*\* FHBM – Flood Hazard Boundary Map

## DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

Max H. Yuan, P.E., Project Engineer  
Hazard Identification Section  
Mitigation Division  
Emergency Preparedness and Response Directorate

102929 101104091311 102IAC



# Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

### COMMUNITY INFORMATION

#### APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the modified channel and culvert rests with your community. We may request that your community submit a description and schedule of channel and culvert activities.

#### COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance flood discharges computed in the FIS for your community without considering subsequent changes in watershed characteristics that could increase flood discharges. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges subsequent to the publication of the FIS report for your community and could, therefore, establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

*ML 10 CJA*

Max H. Yuan, P.E., Project Engineer  
Hazard Identification Section  
Mitigation Division  
Emergency Preparedness and Response Directorate

102929 101104091311 102IAC



Federal Emergency Management Agency  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**COMMUNITY INFORMATION (CONTINUED)**

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski  
Director, Federal Insurance and Mitigation Division  
Federal Emergency Management Agency, Region IX  
1111 Broadway Street, Suite 1200  
Oakland, CA 94607-4052  
(510) 627-7103

**STATUS OF THE COMMUNITY NFIP MAPS**

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

*MHC 10 Ljnn*

Max H. Yuan, P.E., Project Engineer  
Hazard Identification Section  
Mitigation Division  
Emergency Preparedness and Response Directorate

102929 101104091311 102IAC



Federal Emergency Management Agency  
Washington, D.C. 20472

**LETTER OF MAP REVISION  
DETERMINATION DOCUMENT (CONTINUED)**

**PUBLIC NOTIFICATION OF REVISION**

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised BFEs presented in this LOMR may be changed.

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below.

LOCAL NEWSPAPER

Name: *San Diego Daily Transcript*

Dates: 11/04/2004      11/11/2004

**PUBLIC NOTIFICATION**

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET NGVD)		MAP PANEL NUMBER(S)
		EFFECTIVE	REVISED	
Carroll Canyon Creek	Approximately 500 feet upstream of Rehco Road	204	209	06073C1343 F
	Approximately 500 feet upstream of Fenton Road	241	249	06073C1343 F

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at <http://www.fema.gov/nfip>.

*MH Yuan*

Max H. Yuan, P.E., Project Engineer  
Hazard Identification Section  
Mitigation Division

Emergency Preparedness and Response Directorate 102929 101104091311 102IAC



CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITY OF SAN DIEGO, SAN DIEGO COUNTY, CALIFORNIA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On June 19, 1997, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the City of San Diego, San Diego County, California, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in this community is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the community.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A hydraulic analysis was performed to incorporate updated topographic information and the effects of channelization of Carroll Canyon Creek from approximately 1,150 feet downstream of Rehco Road to approximately 850 feet upstream of Fenton Road, a bridge approximately 650 feet downstream of Rehco Road, a culvert approximately 400 feet upstream of Fenton Road, and the extension of Camino Santa Fe. This has resulted in a revised delineation of the regulatory floodway, increases and decreases in SFHA width, and increased BFEs for the revised reach of Carroll Canyon Creek. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 500 feet upstream of Rehco Road	204	209
Approximately 500 feet upstream of Fenton Road	241	249

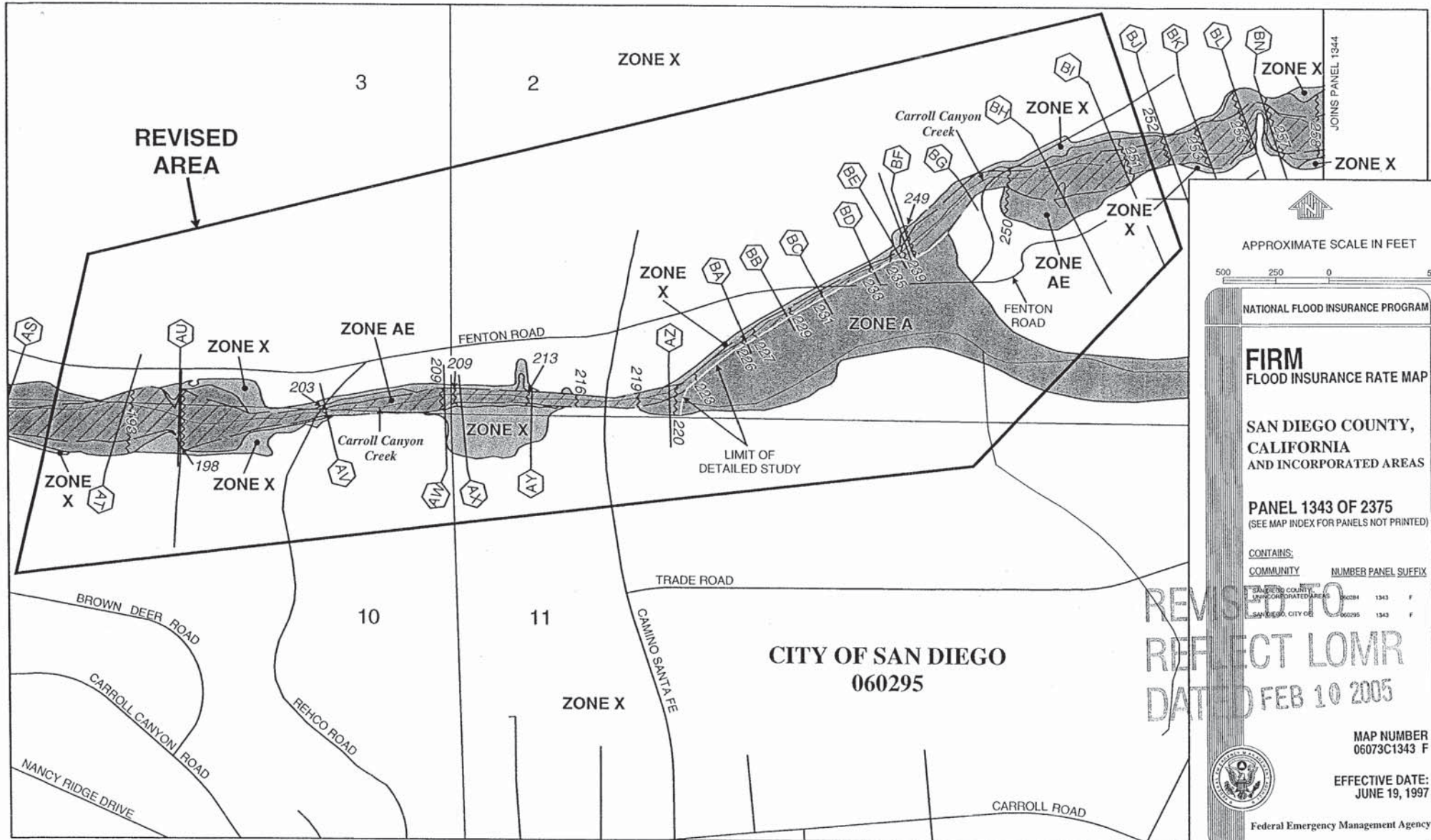
\*National Geodetic Vertical Datum, rounded to nearest whole foot



Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Dick Murphy  
Mayor, City of San Diego  
202 C Street, 11th Floor  
San Diego, CA 92101



  
 APPROXIMATE SCALE IN FEET  


**NATIONAL FLOOD INSURANCE PROGRAM**  
**FIRM**  
**FLOOD INSURANCE RATE MAP**


**SAN DIEGO COUNTY,**  
**CALIFORNIA**  
**AND INCORPORATED AREAS**

**PANEL 1343 OF 2375**  
 (SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:  
 COMMUNITY NUMBER PANEL SUFFIX  
 SAN DIEGO COUNTY 060295 1343 F  
 SAN DIEGO CITY OF 060295 1343 F

REVISED TO  
 REFLECT LOMR  
 DATED FEB 10 2005

MAP NUMBER  
 06073C1343 F  
 EFFECTIVE DATE:  
 JUNE 19, 1997

  
 Federal Emergency Management Agency

JOINS PANEL 1344

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION				
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY			INCREASE
						WITH FLOODWAY			
						(FEET NGVD)			
Carroll Canyon Creek (Cont'd)									
AA	4,423	74	422	13.3	99.9	99.9	100.9	1.0	
AB	4,907	235	919	6.1	105.7	105.7	106.7	1.0	
AC	5,611	125	518	10.8	110.9	110.9	110.9	0.0	
AD	6,282	266	795	7.0	117.3	117.3	117.9	0.6	
AE	6,841	235	607	9.2	124.2	124.2	124.2	0.0	
AF	7,721	251	850	6.6	131.1	131.1	132.0	0.9	
AG	8,575	119	485	11.5	140.3	140.3	140.3	0.0	
AH	8,865	107	599	9.4	142.7	142.7	143.0	0.3	
AI	8,894	139	578	9.7	143.5	143.5	144.0	0.5	
AJ	9,325	213	624	8.6	146.2	146.2	147.2	1.0	
AK	9,560	239	629	8.9	149.6	149.6	149.9	0.3	
AL	9,635	239	652	8.6	150.2	150.2	150.2	0.0	
AM	10,305	101	451	10.0	156.8	156.8	157.8	1.0	
AN	10,758	120	465	9.7	163.2	163.2	163.8	0.6	
AO	11,338	72	356	12.6	169.2	169.2	169.2	0.0	
AP	11,697	189	690	6.5	172.9	172.9	173.7	0.8	
AQ	12,357	104	423	10.6	177.7	177.7	178.7	1.0	
AR	12,753	160	684	6.6	181.7	181.7	182.7	1.0	
AS	13,426	104	409	11.0	187.1	187.1	187.4	0.3	
AT	14,119	265	792	5.6	192.6	192.6	193.6	1.0	
AU	14,399	200	533	9.5	197.8	197.8	197.8	0.0	
AV	15,071	33	232	15.0	203.3	203.3	204.3	1.0	
AW	15,650	100	578	6.9	209.3	209.3	210.2	0.9	
AX	15,700	61	289	12.6	209.4	209.4	210.4	1.0	
AY	16,080	52	283	14.0	213.2	213.2	213.4	0.2	
AZ	16,738	68	307	13.2	220.1	220.1	220.7	0.6	

<sup>1</sup>Feet Above Downstream Face of Atchison, Topeka & Santa Fe Railway Bridge

REVISED DATA

T A B L E  8	FEDERAL EMERGENCY MANAGEMENT AGENCY	<b>FLOODWAY DATA</b>
	<b>SAN DIEGO COUNTY, CA AND INCORPORATED AREAS</b>	REVISED TO <b>CARROLL CANYON CREEK</b> REFLECT LOMR DATED FEB 10 2005

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION				
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY			INCREASE
						WITH FLOODWAY			
		<b>REVISED DATA</b> →			(FEET NGVD)				
Carroll Canyon Creek (Cont'd)									
BA	17,153	46	269	15.4	226.0	226.0	226.0	0.0	
BB	17,403	39	245	14.3	228.8	228.8	229.1	0.3	
BC	17,581	38	245	14.6	231.0	231.0	231.3	0.3	
BD	17,820	46	300	12.4	233.4	233.4	234.1	0.7	
BE	17,970	29	222	15.7	236.1	236.1	236.7	0.6	
BF	18,062	100	891	6.2	249.0	249.0	249.0	0.0	
BG	18,493	72	558	6.3	249.3	249.3	249.3	0.0	
BH	18,885	160	759	4.8	250.3	250.3	250.4	0.1	
BI	19,244	162	552	6.3	250.5	250.5	251.1	0.6	
BJ	19,849	144	564	6.2	252.2	252.2	252.4	0.2	
BK	20,029	229	1,064	3.3	253.1	253.1	253.2	0.1	
BL	20,275	142	510	6.9	253.3	253.3	253.4	0.1	
BM	20,440	248	453	7.7	256.6	256.6	256.6	0.0	
BN	20,986	169	831	4.2	259.0	259.0	259.4	0.4	
BO	21,389	125	359	9.7	261.1	261.1	261.5	0.4	
BP	22,144	121	512	6.8	271.6	271.6	272.6	1.0	
BQ	22,734	89	348	10.1	278.3	278.3	279.1	0.8	
BR	23,295	121	443	7.9	286.9	286.9	287.9	1.0	
BS	24,012	62	285	12.3	304.2	304.2	304.2	0.0	
BT	24,551	147	513	6.8	312.7	312.7	313.6	0.9	
BU	25,290	348	710	4.9	321.4	321.4	321.6	0.2	
BV	25,965	219	509	6.9	328.9	328.9	329.5	0.6	
BW	26,465	224	518	6.8	334.9	334.9	335.9	1.0	
BX	26,705	25	211	16.6	338.8	338.8	338.8	0.0	
BY	26,840	25	313	11.2	345.1	345.1	345.1	0.0	
BZ	27,148	236	1,831	1.9	347.2	347.2	347.2	0.0	

<sup>1</sup>Feet Above Downstream Face of Atchison, Topeka & Santa Fe Railway Bridge

T  
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8

FEDERAL EMERGENCY MANAGEMENT AGENCY

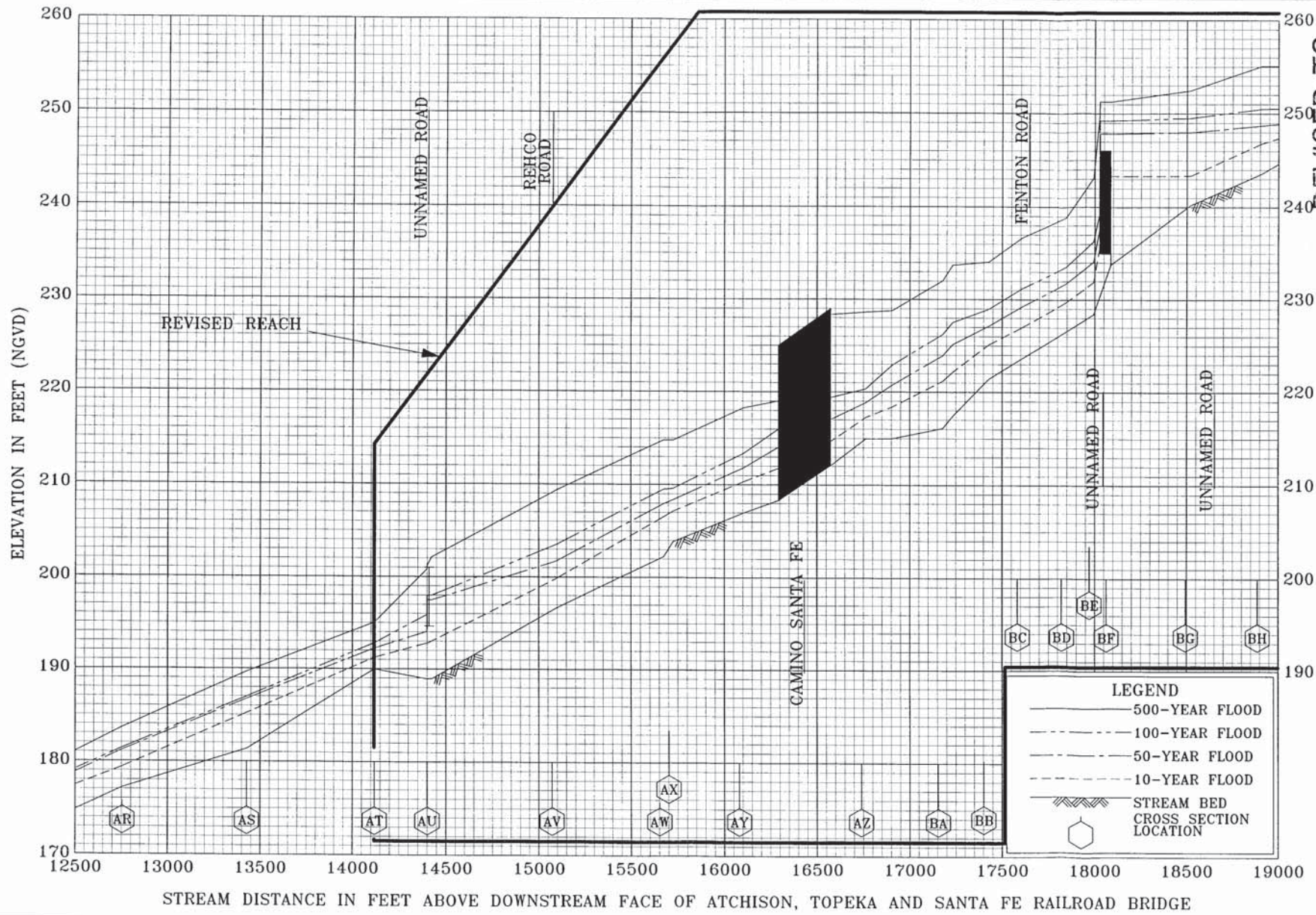
**SAN DIEGO COUNTY, CA  
AND INCORPORATED AREAS**

**FLOODWAY DATA**

**CARROLL CANYON CREEK**

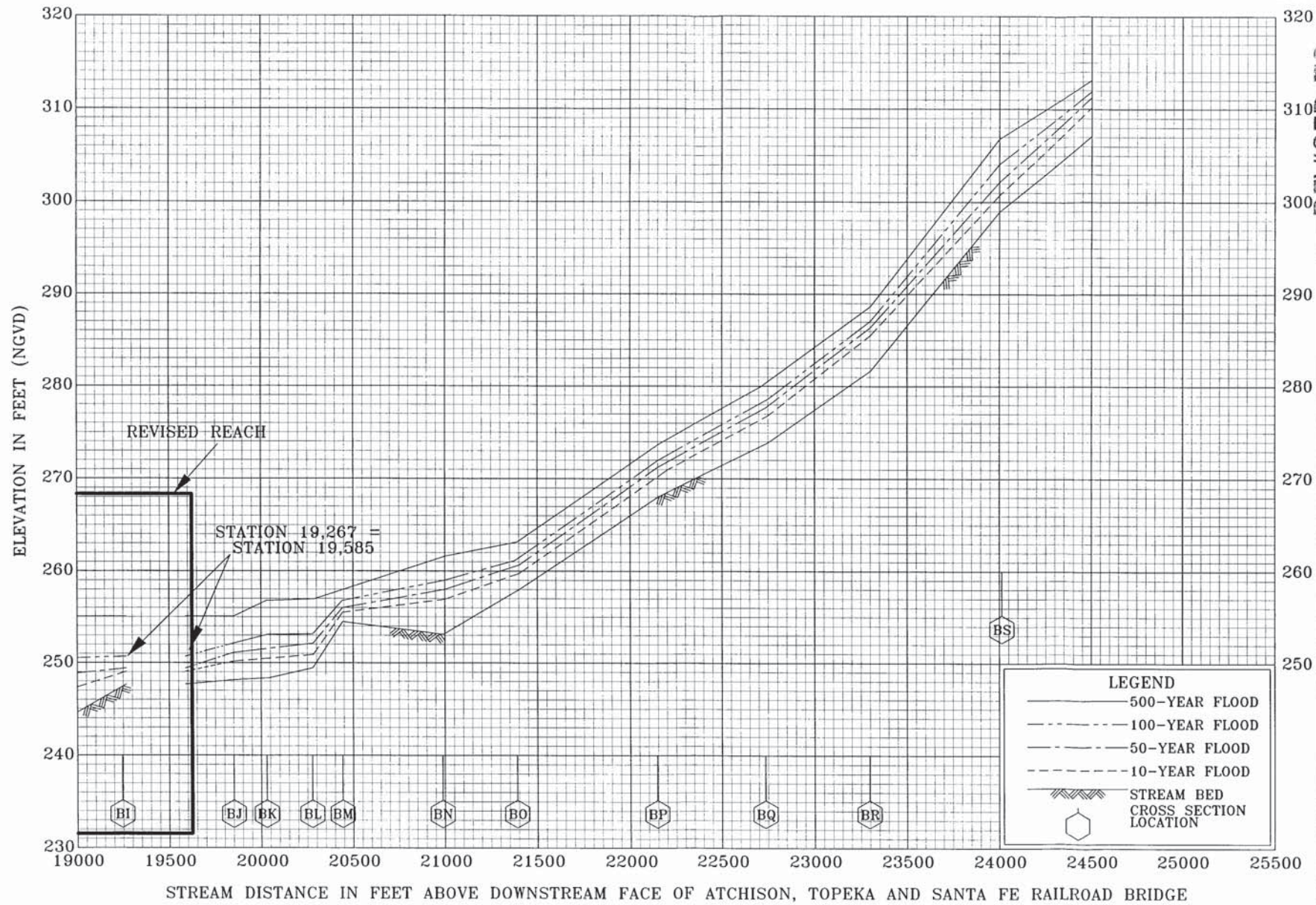
**DATED FEB 10 2005**





REVISED TO  
 FLOOD PROFILES  
 PROJECT LOMR  
 CARROLL CANYON CREEK FEB 10 2005  
 FEDERAL EMERGENCY MANAGEMENT AGENCY  
 SAN DIEGO COUNTY, CA  
 AND INCORPORATED AREAS  
 57P





FEDERAL EMERGENCY MANAGEMENT AGENCY  
 SAN DIEGO COUNTY, CA  
 AND INCORPORATED AREAS

FLOOD PROFILES REVISITED TO REFLECT LOW FLOOD PROFILES  
 CARROLL CANYON CREEK  
 DATED FEB. 10, 2005

58P

# **APPENDIX B**

## **HEC-RAS ANALYSES**

# EXISTING CONDITIONS

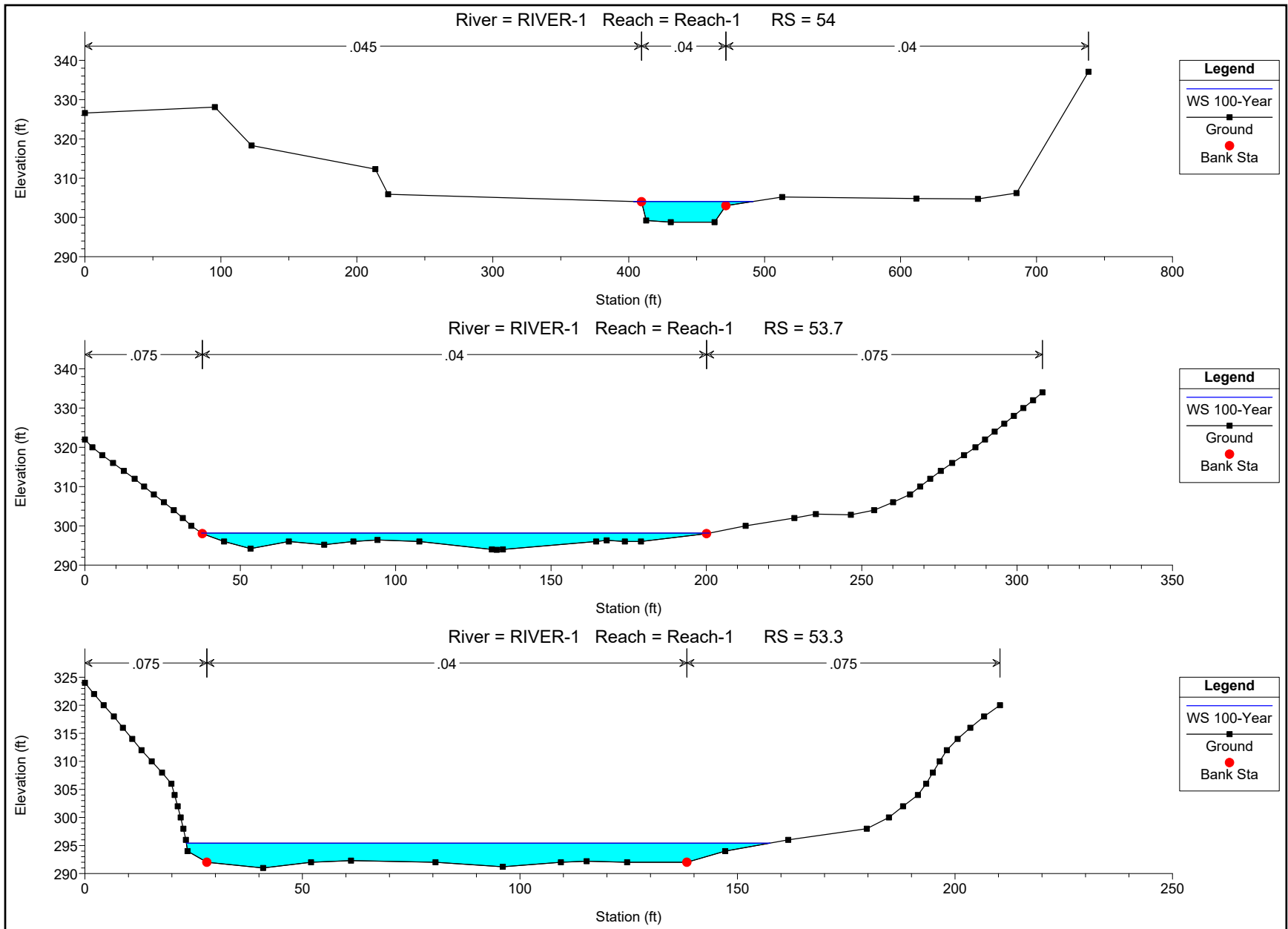
HEC-RAS Plan: Exist Cond River: RIVER-1 Reach: Reach-1 Profile: 100-Year

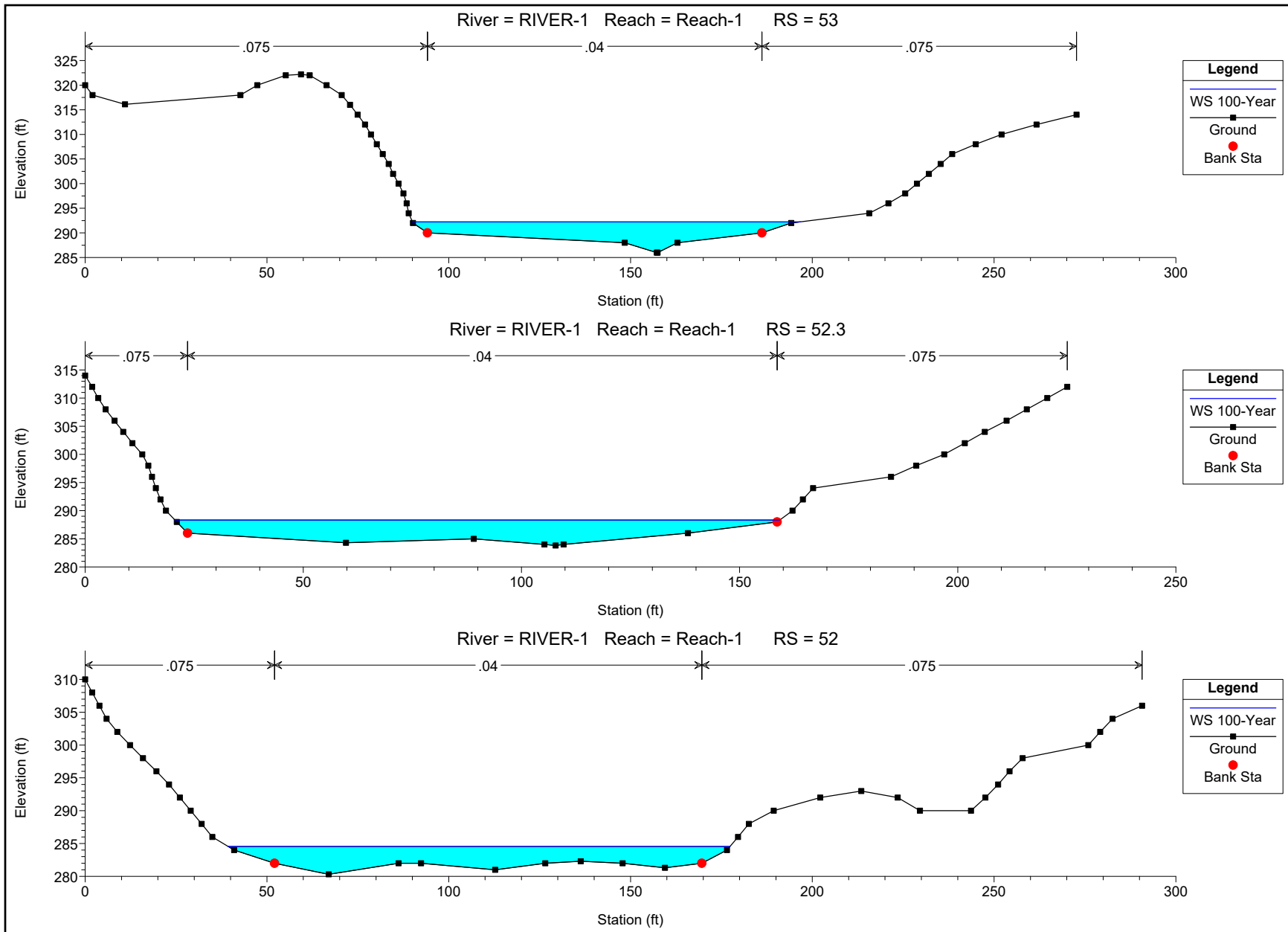
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	54	100-Year	3500.00	298.80	304.06	304.06	306.19	0.013413	11.75	306.18	87.93	0.95
Reach-1	53.7	100-Year	3500.00	293.90	298.15	298.08	299.32	0.016353	8.68	403.28	163.50	0.97
Reach-1	53.3	100-Year	3500.00	291.00	295.42		296.54	0.009787	8.59	434.74	134.17	0.80
Reach-1	53	100-Year	3500.00	286.00	292.24	292.24	293.96	0.015151	10.59	342.12	106.71	0.99
Reach-1	52.3	100-Year	3500.00	283.80	288.33		289.37	0.010462	8.18	430.81	138.62	0.81
Reach-1	52	100-Year	3500.00	280.30	284.55	284.55	285.99	0.016139	9.75	378.52	138.03	1.00
Reach-1	51.5	100-Year	3500.00	275.90	280.17	279.93	281.10	0.012826	7.74	454.70	183.99	0.86
Reach-1	51	100-Year	3500.00	272.00	276.94		277.61	0.009563	6.57	536.93	228.96	0.74
Reach-1	50.5	100-Year	3500.00	267.70	276.89		277.01	0.000477	2.82	1274.46	206.85	0.19
Reach-1	50.1	100-Year	3500.00	263.80	275.63	273.14	276.63	0.002617	9.35	672.49	126.71	0.49
Reach-1	50.05		Culvert									
Reach-1	50	100-Year	3500.00	264.00	272.22	272.22	273.95	0.008316	10.99	373.63	117.17	0.78
Reach-1	49	100-Year	3500.00	258.10	271.50		271.91	0.001188	5.17	701.31	359.88	0.30
Reach-1	48.8	100-Year	3500.00	257.80	271.48		271.74	0.001082	4.65	1153.43	536.40	0.28
Reach-1	48.3	100-Year	3500.00	268.00	269.95	269.93	270.80	0.018895	7.40	472.71	269.90	0.99
Reach-1	48.1	100-Year	3500.00	266.00	268.80		269.34	0.010002	5.86	598.20	304.44	0.73
Reach-1	48	100-Year	3500.00	262.00	265.77	265.73	266.72	0.012700	8.27	485.14	264.03	0.87
Reach-1	47	100-Year	3500.00	260.00	263.24	263.24	264.41	0.016010	8.75	412.48	187.09	0.97
Reach-1	46	100-Year	3500.00	248.00	255.96		256.64	0.002773	6.99	601.85	125.88	0.47
Reach-1	45	100-Year	3500.00	244.00	251.69	251.69	254.76	0.012093	14.87	289.19	56.07	0.99
Reach-1	44	100-Year	3500.00	240.00	252.35		252.52	0.000521	4.16	1310.22	217.48	0.22
Reach-1	43	100-Year	3500.00	236.00	252.02	243.55	252.33	0.000535	5.46	1088.76	191.93	0.24
Reach-1	42.5		Culvert									
Reach-1	42	100-Year	3500.00	230.00	240.50		241.35	0.001862	7.69	530.37	63.88	0.42
Reach-1	41	100-Year	3500.00	230.00	237.87	237.87	240.74	0.011397	14.21	289.47	55.01	0.96
Reach-1	40.3	100-Year	3500.00	224.00	232.74	232.74	235.66	0.010373	14.94	297.51	78.06	0.93
Reach-1	40.1	100-Year	3500.00	222.00	229.45	229.45	232.14	0.011127	13.92	307.91	87.24	0.94
Reach-1	40	100-Year	3500.00	218.00	228.19		229.57	0.003656	9.97	450.69	127.77	0.57
Reach-1	39.5	100-Year	3500.00	215.80	224.84	224.84	228.13	0.010949	16.73	325.55	127.34	0.99
Reach-1	39	100-Year	3500.00	216.00	221.83		222.24	0.001912	5.26	736.17	143.52	0.38
Reach-1	38.8	100-Year	3500.00	214.00	219.08	219.08	221.47	0.013877	12.41	282.02	93.19	1.00
Reach-1	38.5		Culvert									
Reach-1	38.2	100-Year	3500.00	209.80	217.12		218.80	0.007716	10.40	336.63	180.89	0.77
Reach-1	38	100-Year	3500.00	207.80	214.97	214.69	217.09	0.018463	11.71	301.89	65.59	0.91
Reach-1	37.4	100-Year	3500.00	205.40	212.72		214.06	0.011766	9.28	377.03	75.06	0.73
Reach-1	37	100-Year	3500.00	203.90	210.27	209.93	211.94	0.018735	10.35	338.10	80.90	0.89
Reach-1	36.3	100-Year	3500.00	202.90	209.06	208.80	210.55	0.015753	9.93	385.66	123.66	0.83
Reach-1	36.2	100-Year	3500.00	199.90	207.11		207.94	0.005687	7.42	505.51	97.61	0.53

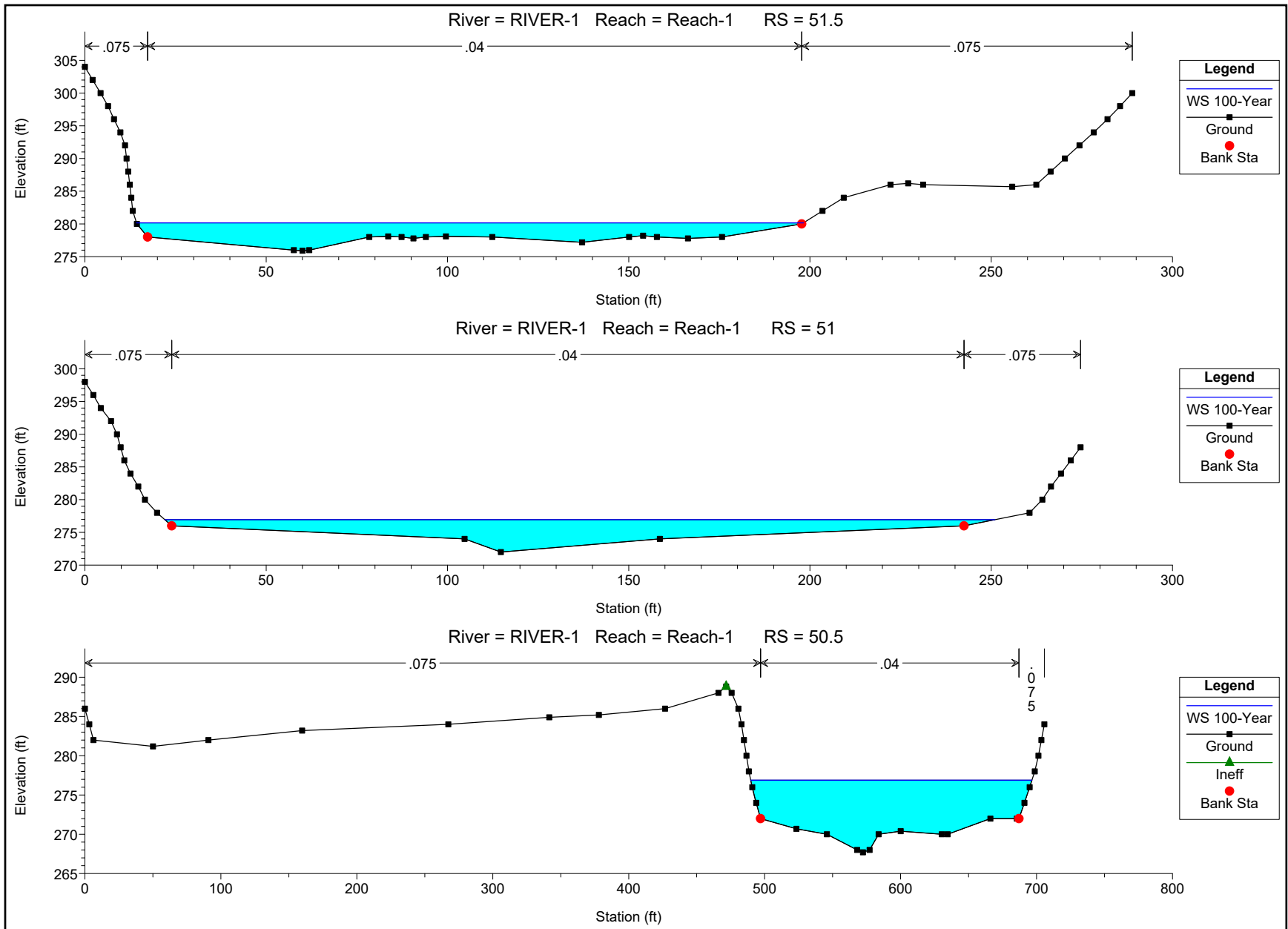


HEC-RAS Plan: Exist Cond River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

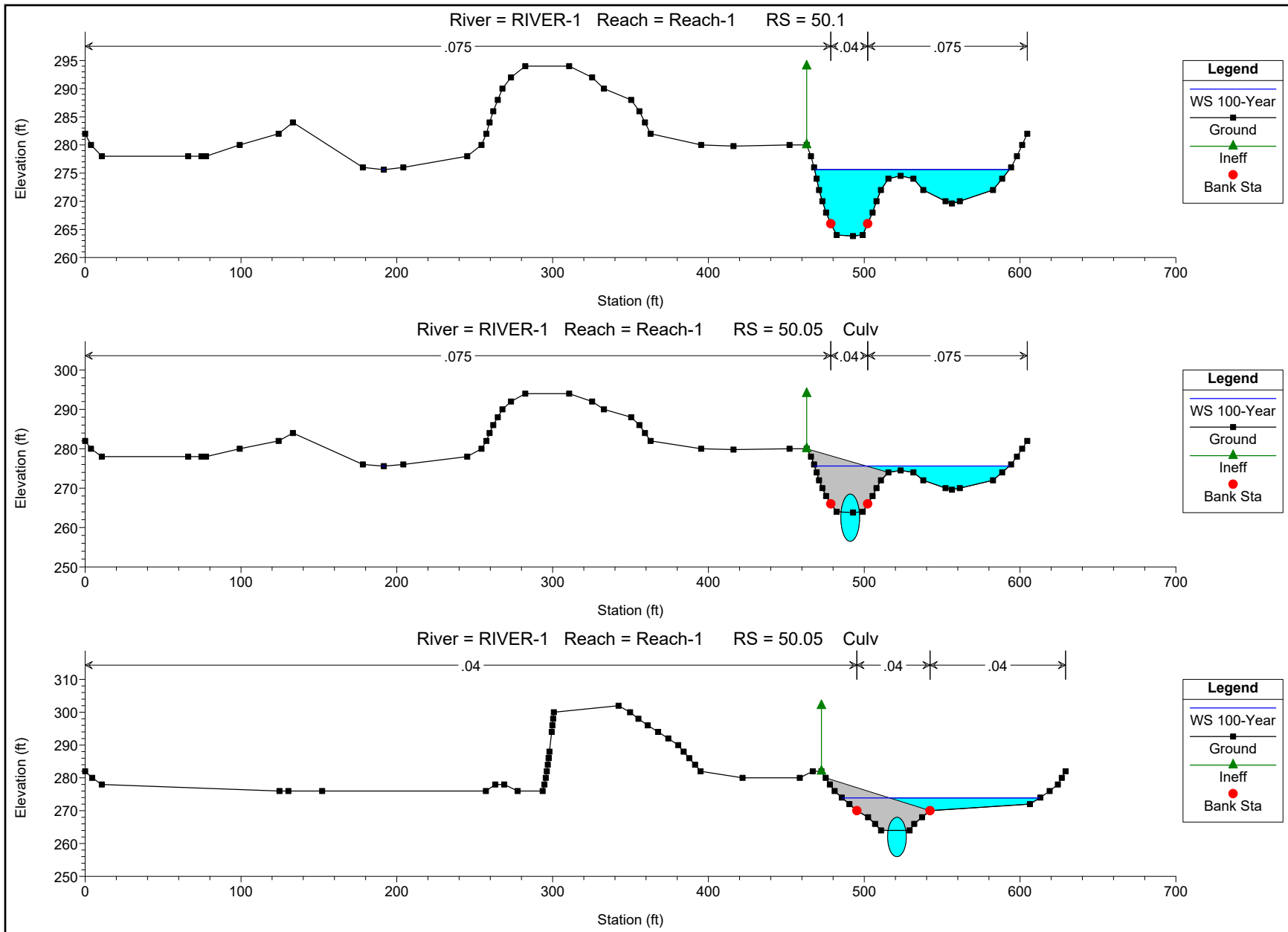
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	36.1	100-Year	3500.00	195.60	203.97		205.53	0.013064	10.01	349.68	66.54	0.77
Reach-1	36.07	100-Year	3500.00	193.10	200.97		202.55	0.012373	10.11	351.07	74.35	0.76
Reach-1	36.03	100-Year	3500.00	191.00	199.76	199.20	200.46	0.005508	7.54	647.88	337.38	0.52
Reach-1	36	100-Year	3500.00	188.90	199.61	197.20	199.80	0.001213	3.99	1036.43	449.00	0.25
Reach-1	35.85		Bridge									
Reach-1	35.7	100-Year	3500.00	188.10	196.16	195.45	197.65	0.013925	9.80	367.42	158.47	0.81
Reach-1	35	100-Year	3500.00	186.30	195.08	194.46	196.03	0.004892	8.63	695.86	302.16	0.61
Reach-1	34.5	100-Year	4500.00	184.00	192.66	192.66	194.22	0.007391	10.83	649.82	303.30	0.75
Reach-1	34	100-Year	4500.00	179.20	188.33	188.33	191.38	0.012185	14.11	339.69	123.15	0.96
Reach-1	33.7	100-Year	4500.00	177.50	186.25		187.35	0.005275	8.57	583.91	133.18	0.63
Reach-1	33.3	100-Year	4500.00	176.30	183.74	183.74	185.55	0.015563	10.79	417.04	116.21	1.00
Reach-1	33	100-Year	4500.00	173.70	180.22		180.87	0.006898	6.49	693.26	228.17	0.65
Reach-1	32.5	100-Year	4500.00	173.20	178.66		179.45	0.008896	7.19	669.56	335.72	0.74
Reach-1	32	100-Year	4500.00	171.20	177.63		178.18	0.005116	5.97	762.92	306.38	0.57
Reach-1	31.7	100-Year	4500.00	169.20	177.19		177.49	0.001704	4.37	1032.99	248.98	0.35
Reach-1	31.3	100-Year	4500.00	168.00	176.99		177.19	0.000918	3.85	1388.37	244.82	0.27
Reach-1	31	100-Year	4500.00	166.20	173.76	173.76	176.46	0.014382	13.20	340.84	247.35	1.00
Reach-1	30.5	100-Year	4500.00	162.00	170.62		171.26	0.002809	6.81	814.78	166.92	0.47
Reach-1	30	100-Year	4500.00	162.00	168.48	168.48	170.25	0.012882	10.98	470.01	140.30	0.93
Reach-1	29.7	100-Year	4500.00	159.90	166.61	166.61	168.41	0.010670	11.79	544.77	220.46	0.89
Reach-1	29.4	100-Year	4500.00	158.00	165.76		166.21	0.002752	5.69	960.07	255.08	0.45
Reach-1	29	100-Year	4500.00	156.00	163.10	162.71	164.99	0.010376	11.07	425.57	260.70	0.86
Reach-1	28.5	100-Year	4500.00	154.00	160.73	160.73	162.34	0.014547	10.23	454.84	172.57	0.97
Reach-1	28	100-Year	4500.00	152.40	158.32		159.22	0.007320	8.14	602.62	193.08	0.71
Reach-1	27.7	100-Year	4500.00	149.80	157.95		158.33	0.001810	5.20	1001.46	252.95	0.37
Reach-1	27.5	100-Year	4500.00	145.80	158.04		158.12	0.000274	2.71	2031.97	380.62	0.16
Reach-1	27.3	100-Year	5600.00	152.00	156.42	156.42	157.82	0.018183	9.56	609.13	242.53	0.88
Reach-1	27.1	100-Year	5600.00	143.30	149.90	149.55	150.60	0.012688	8.49	841.26	384.57	0.66

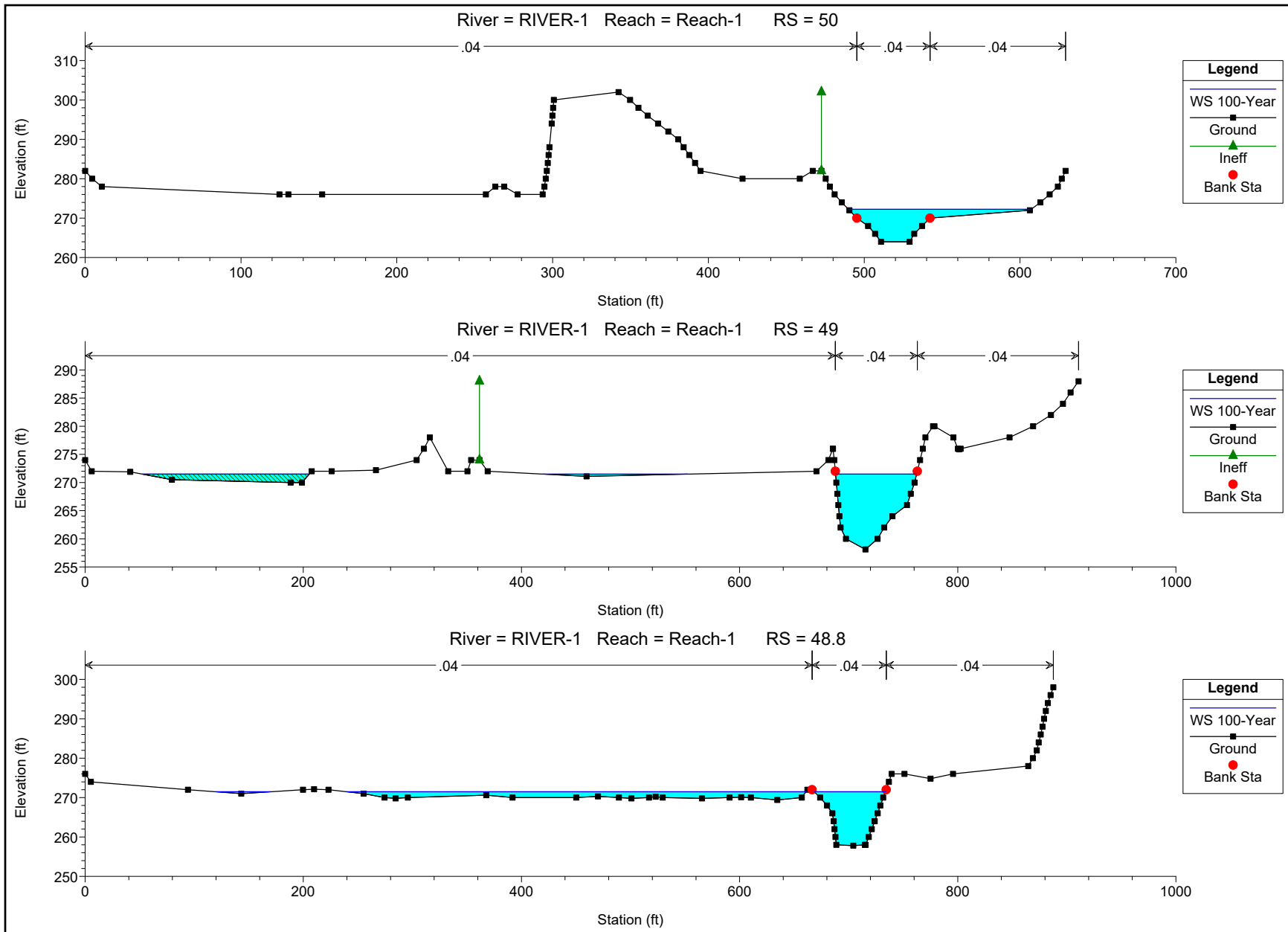


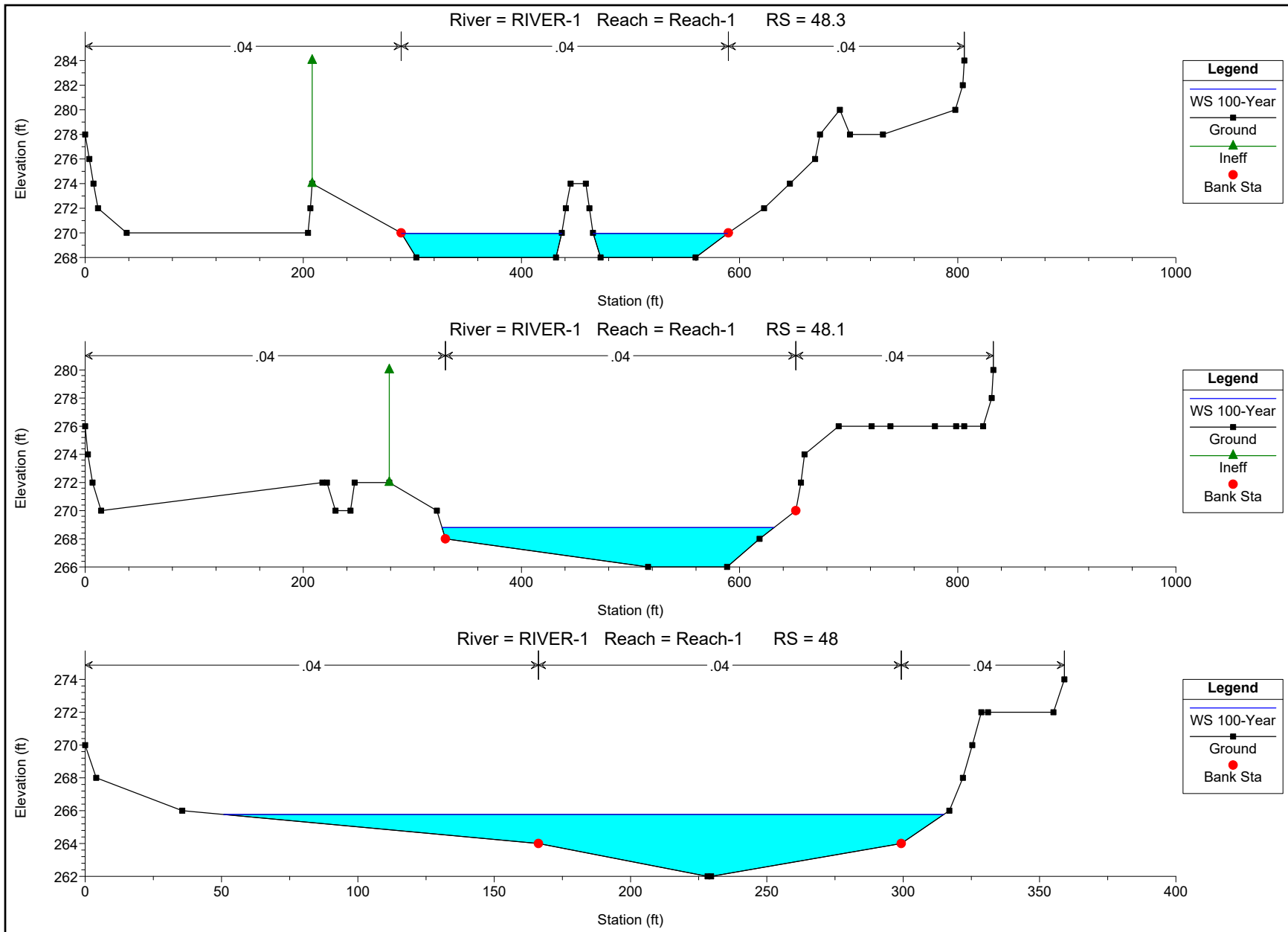


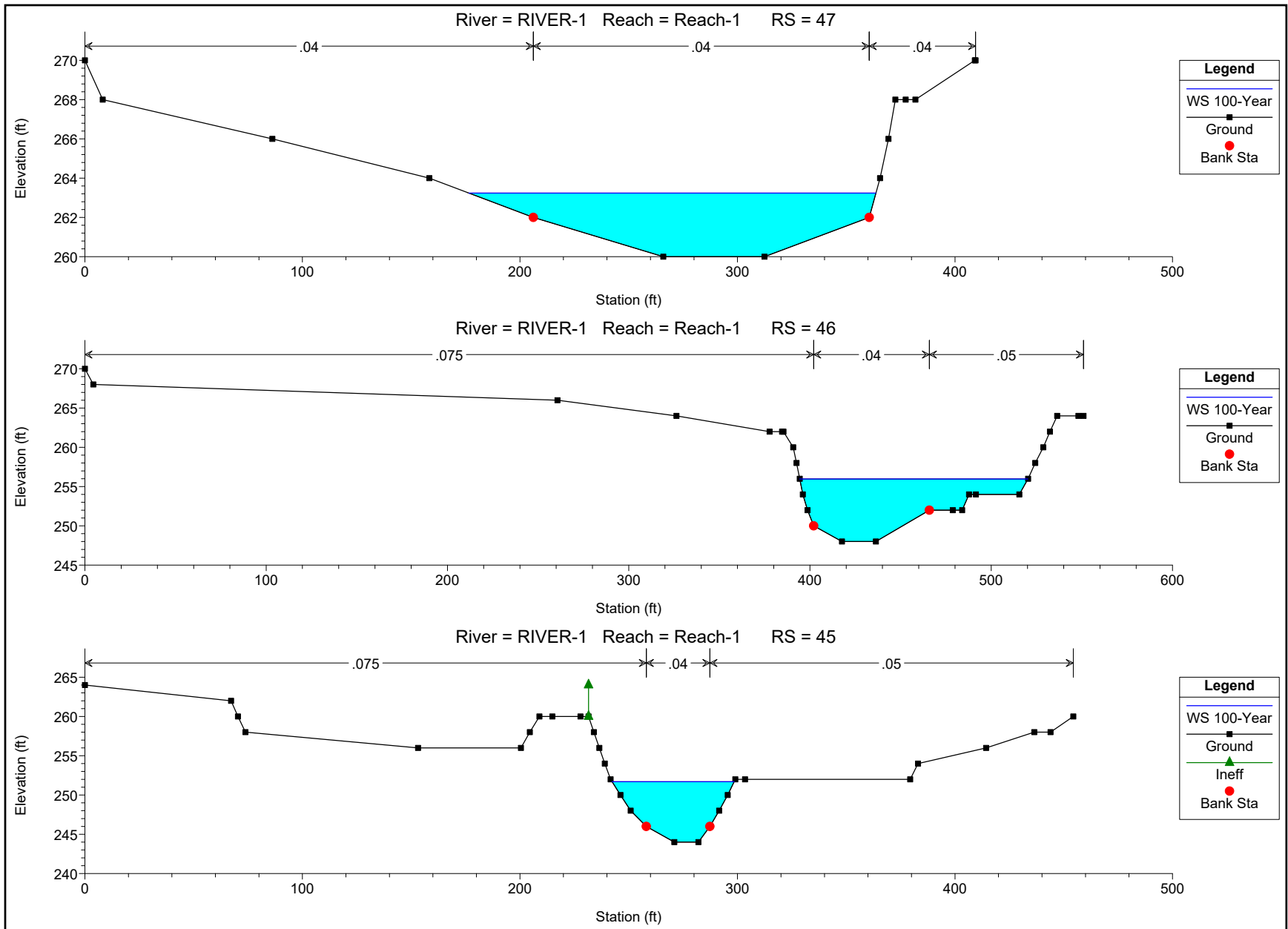




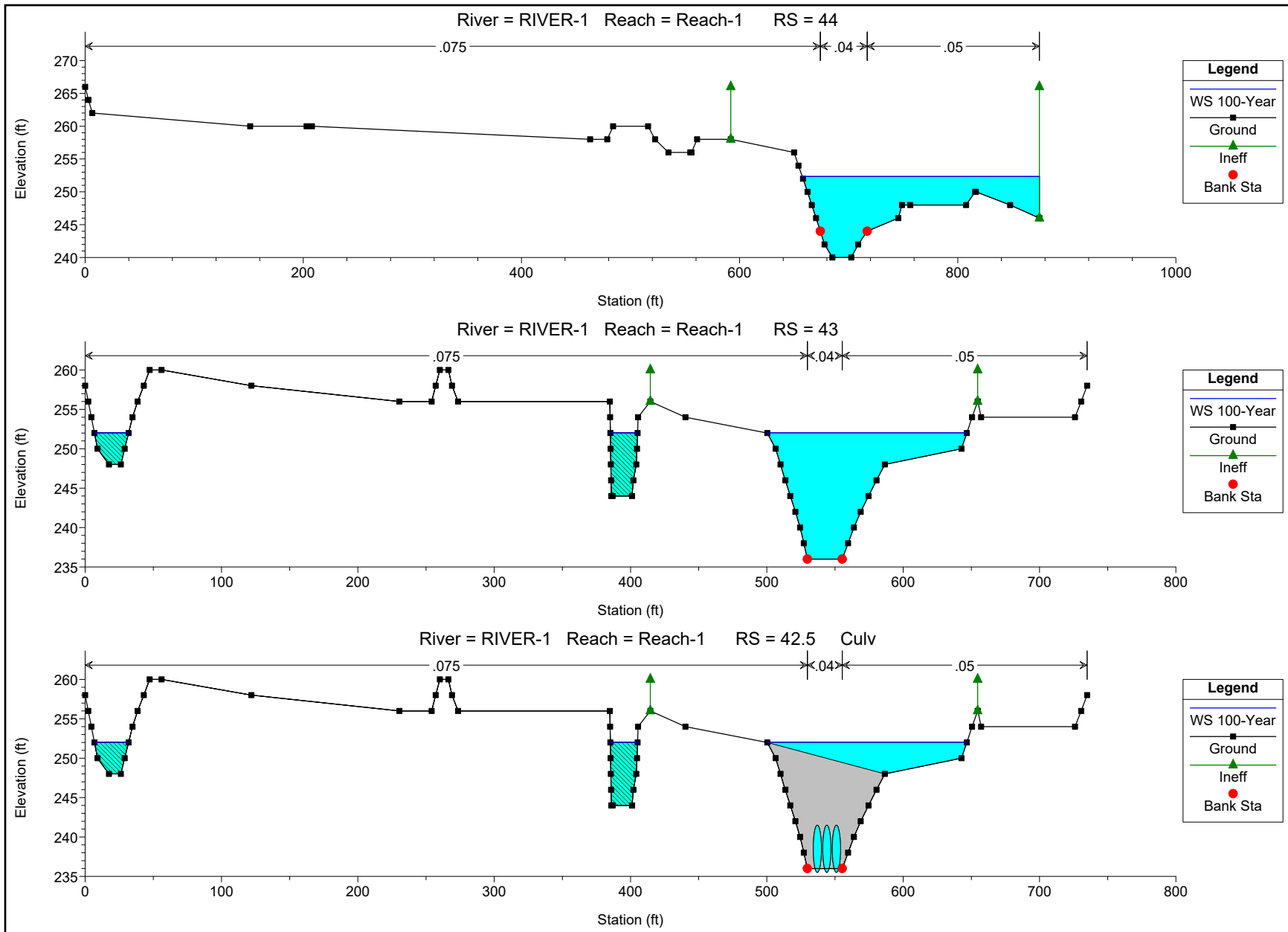


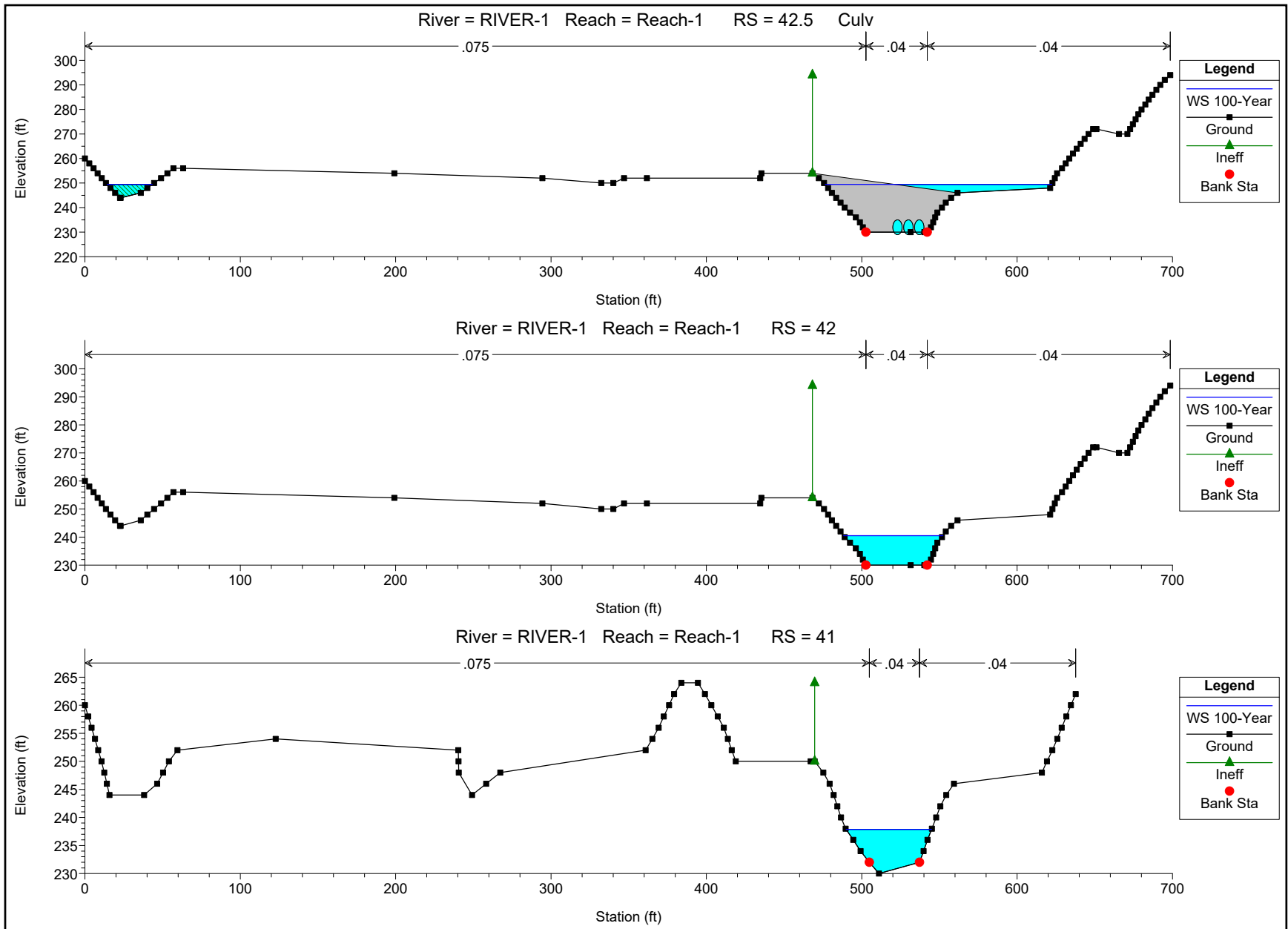


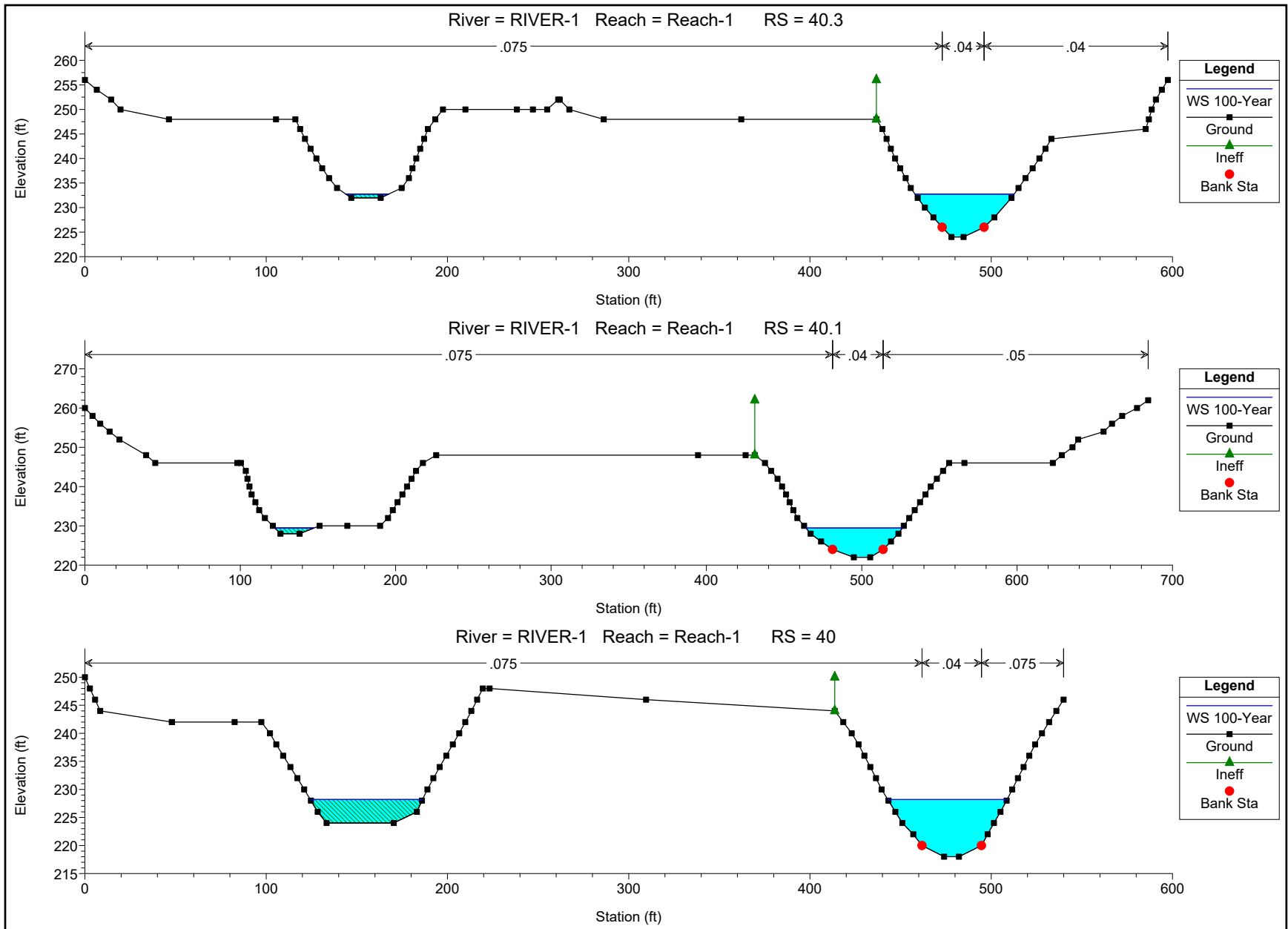


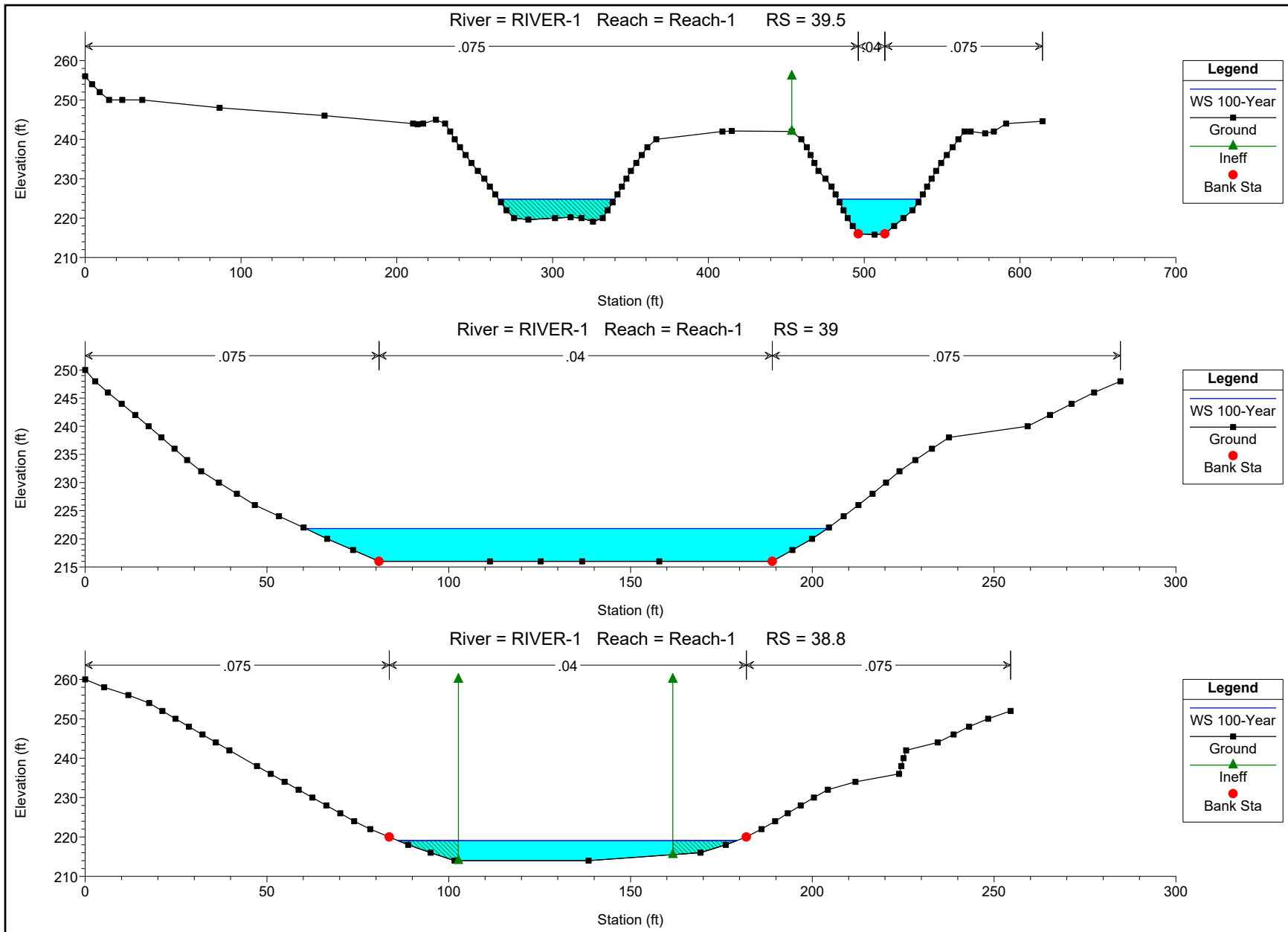




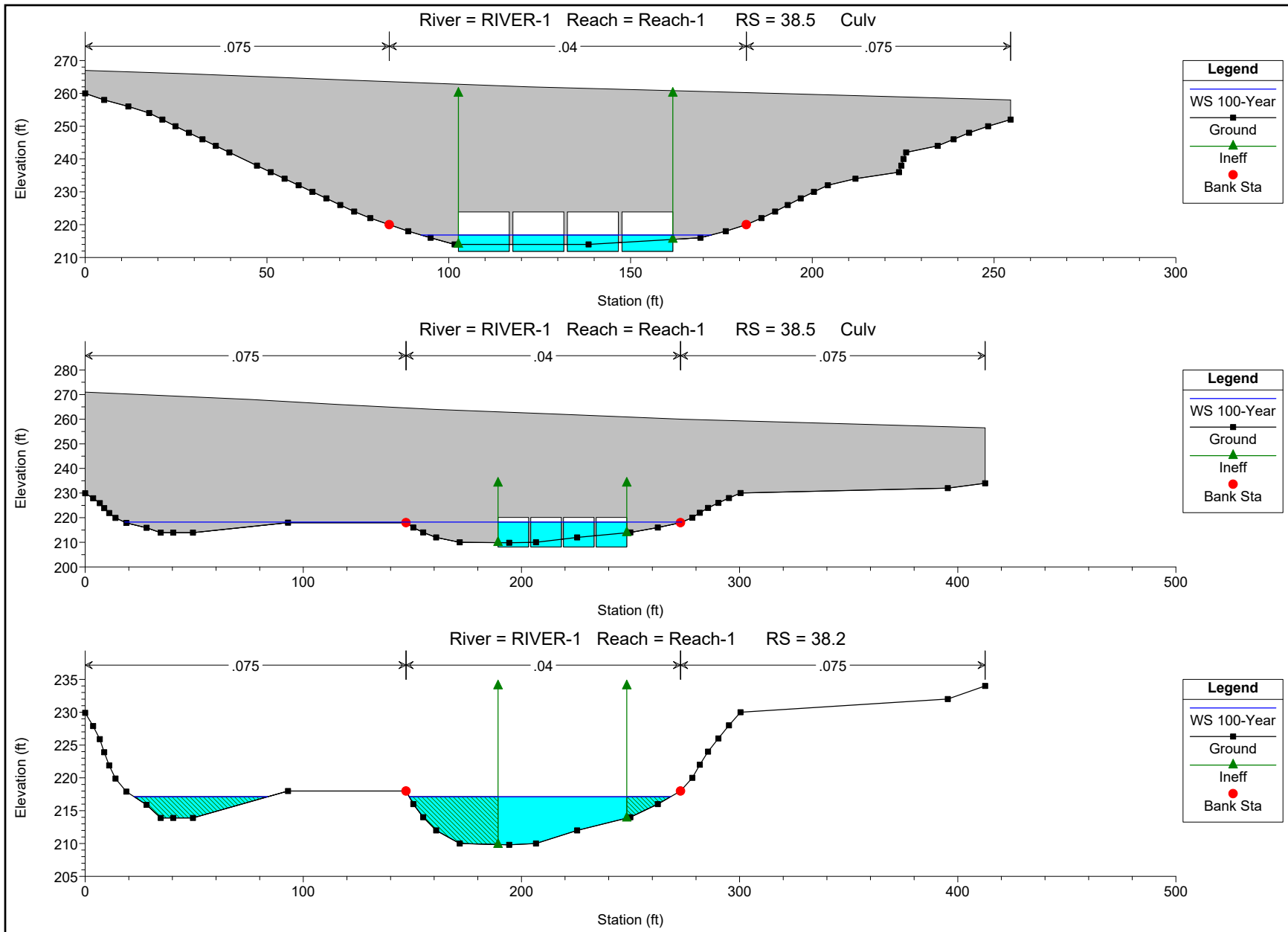


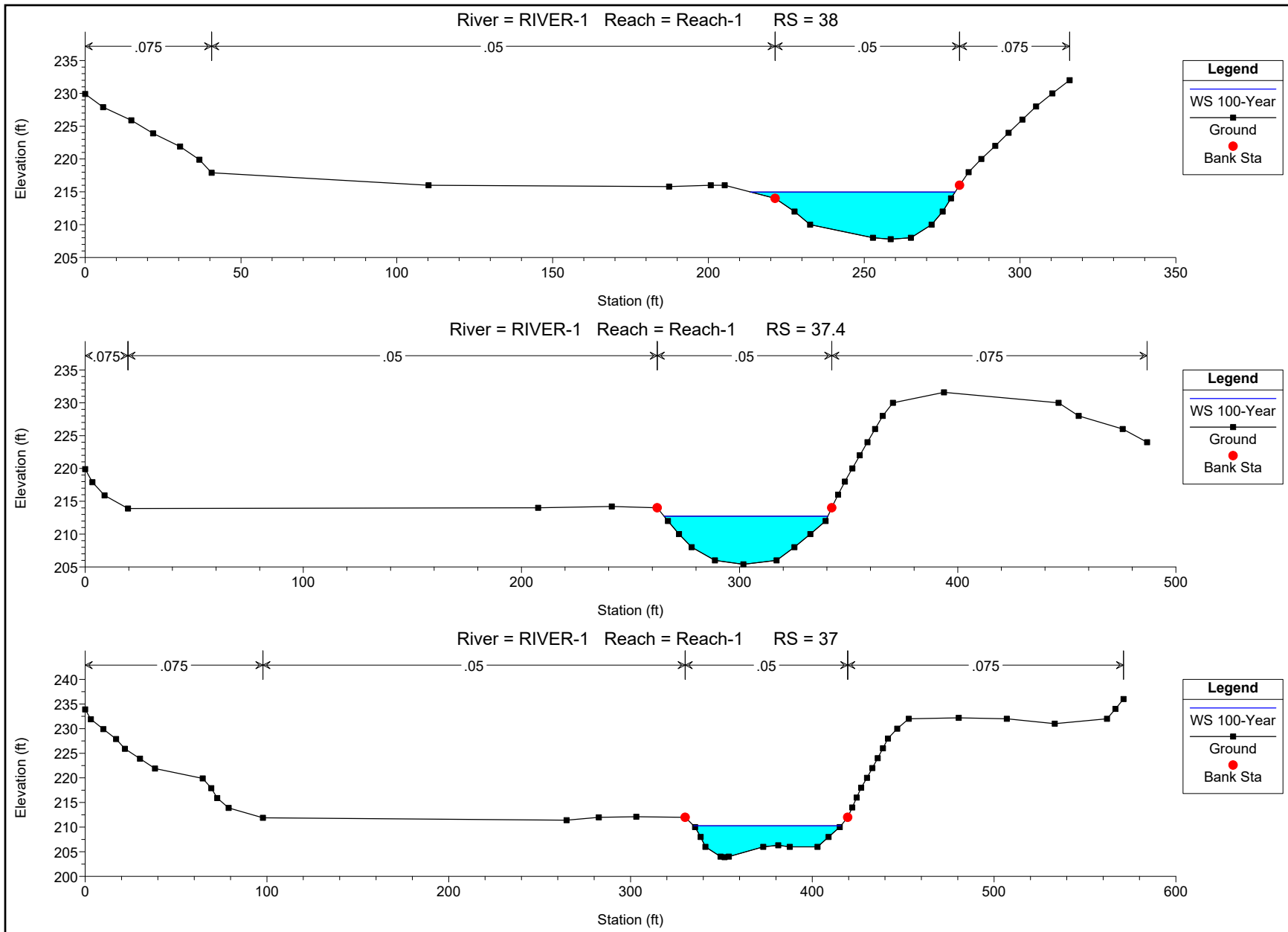


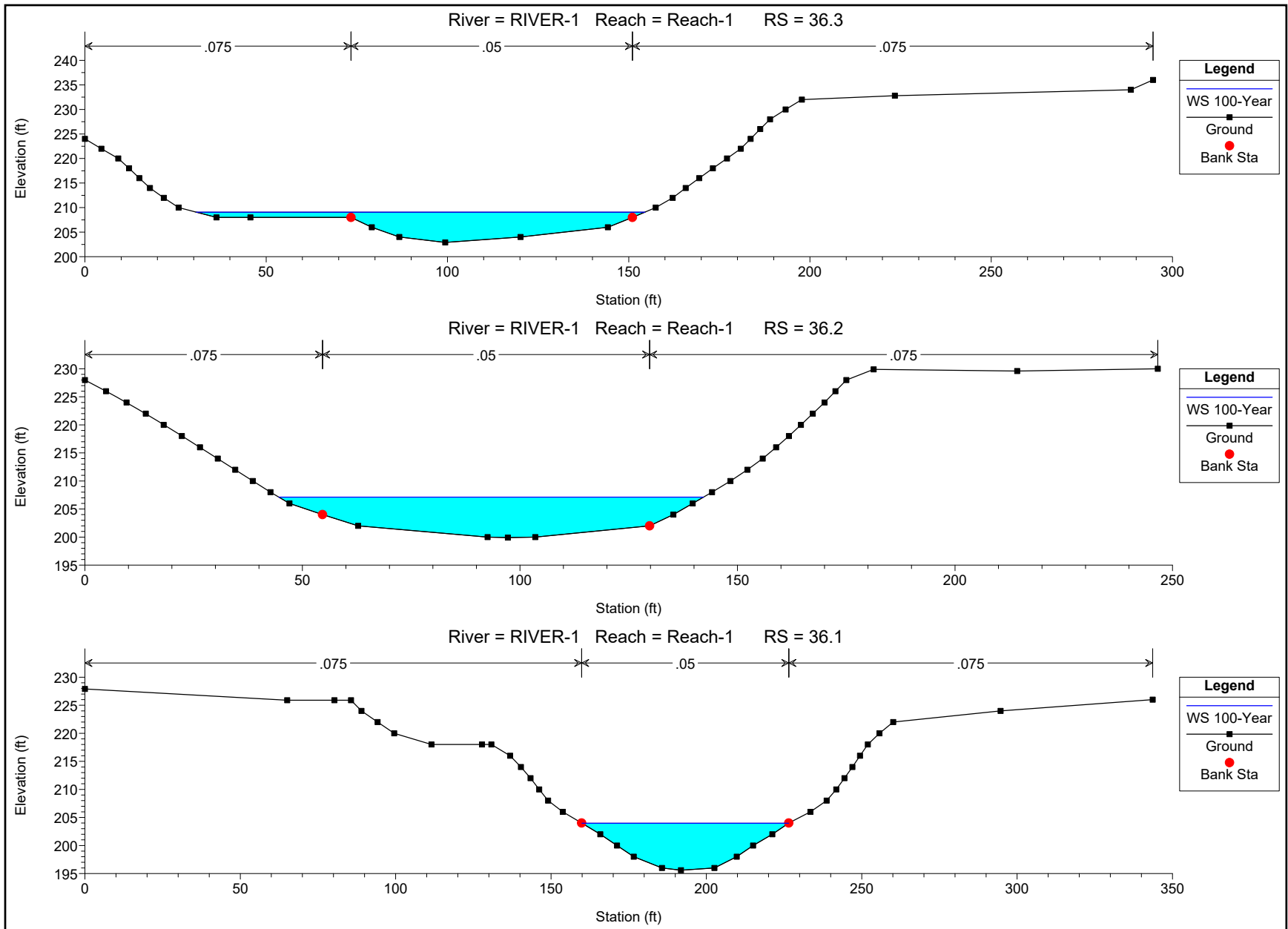


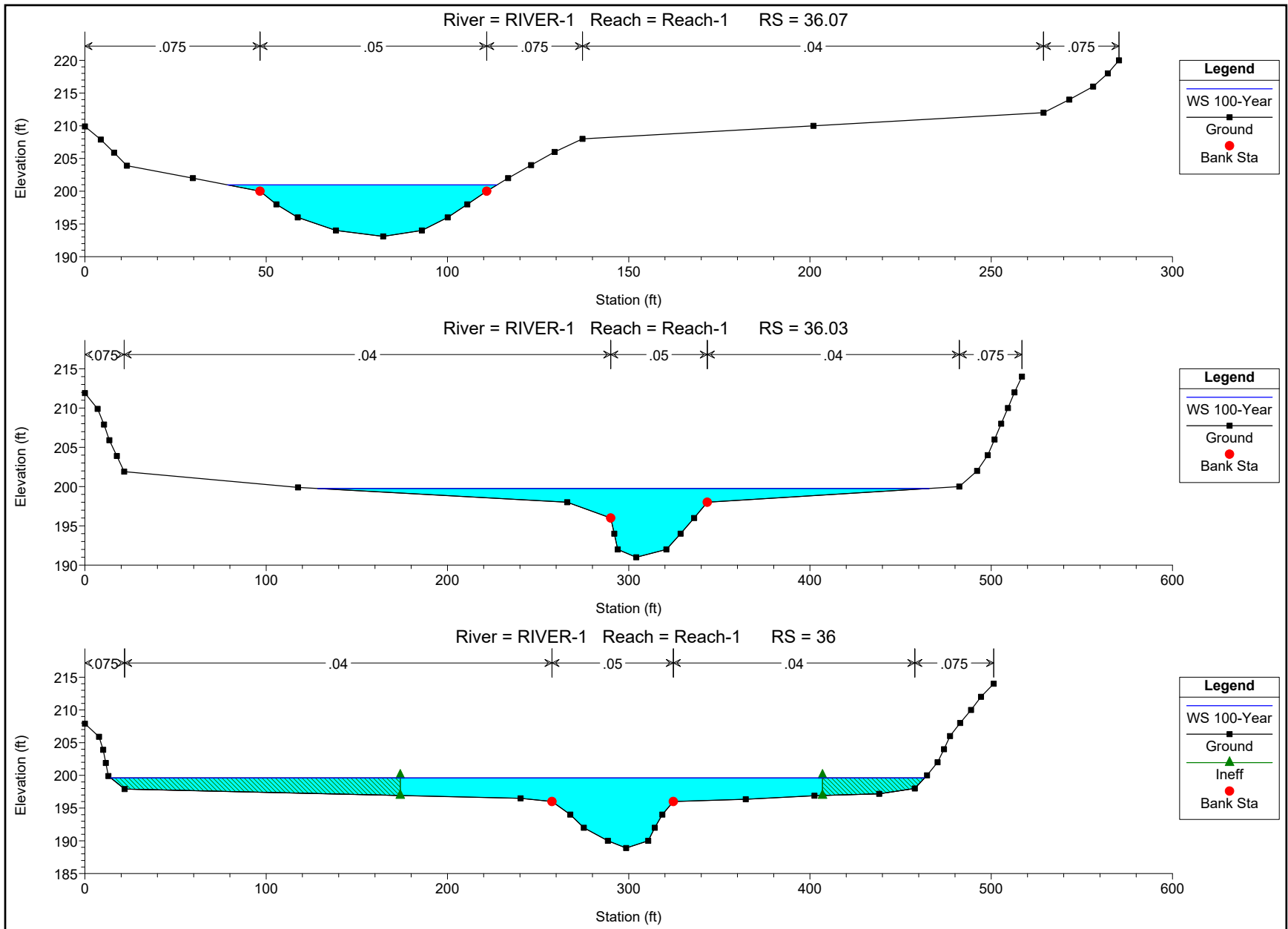


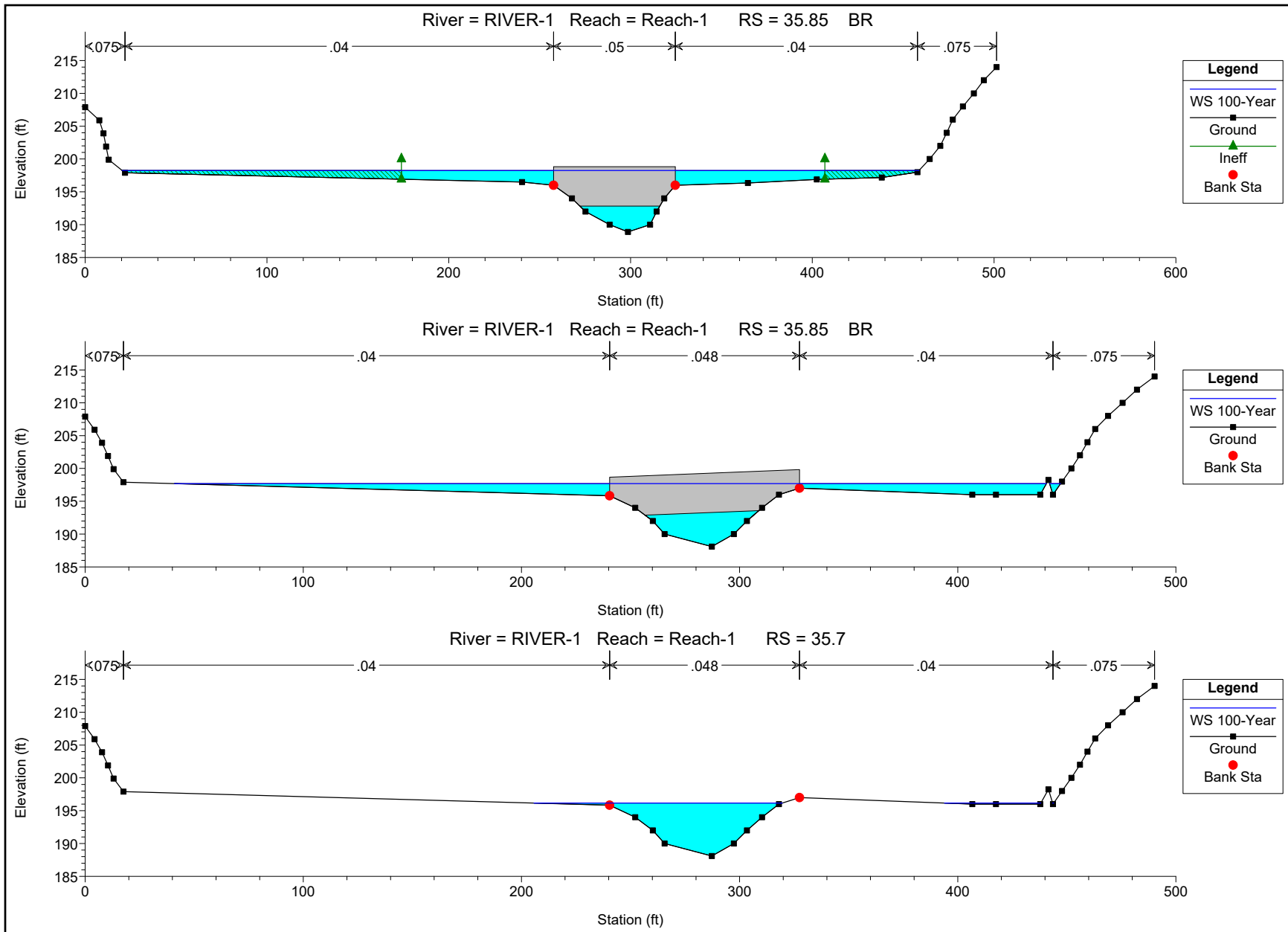




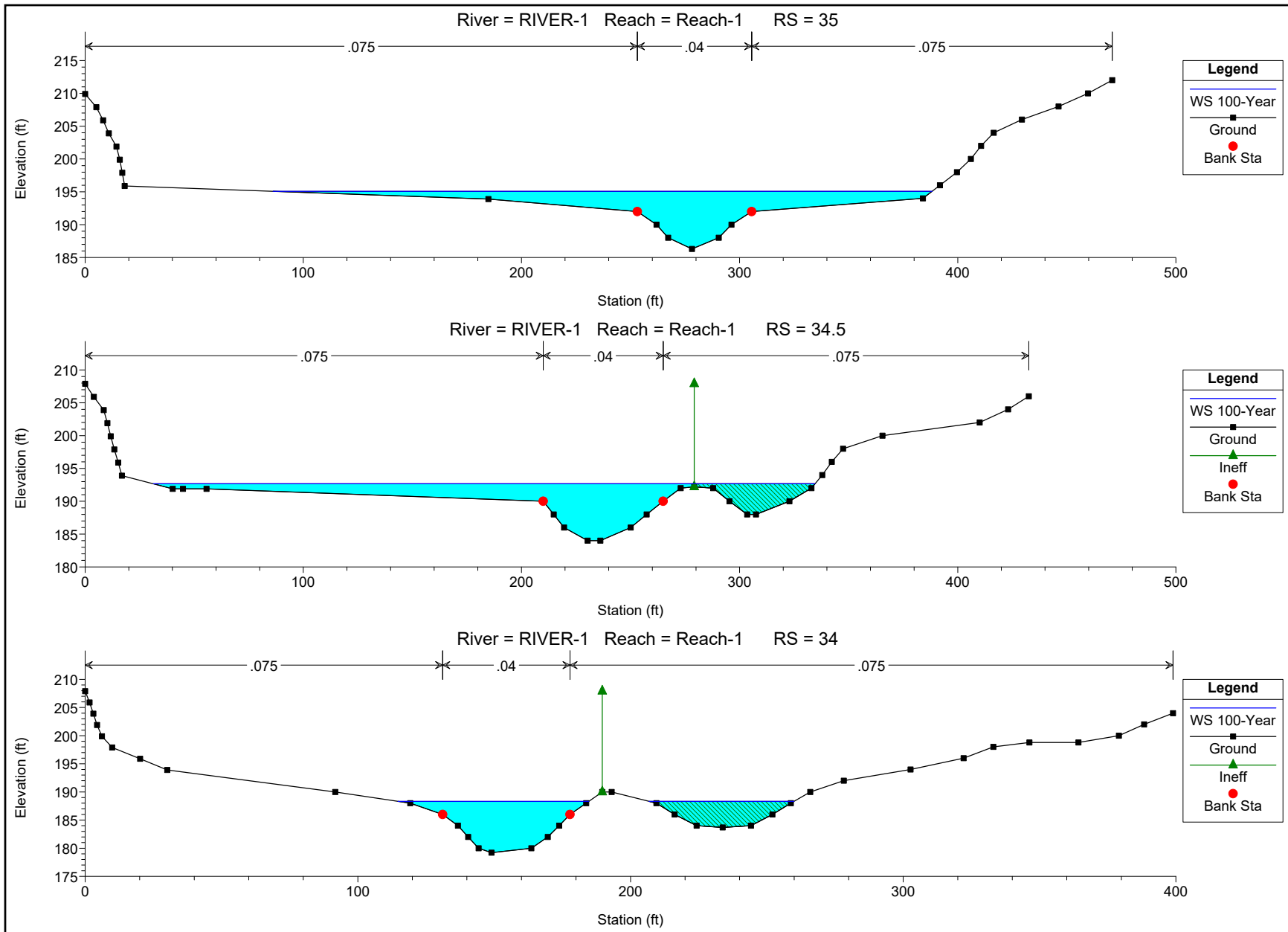


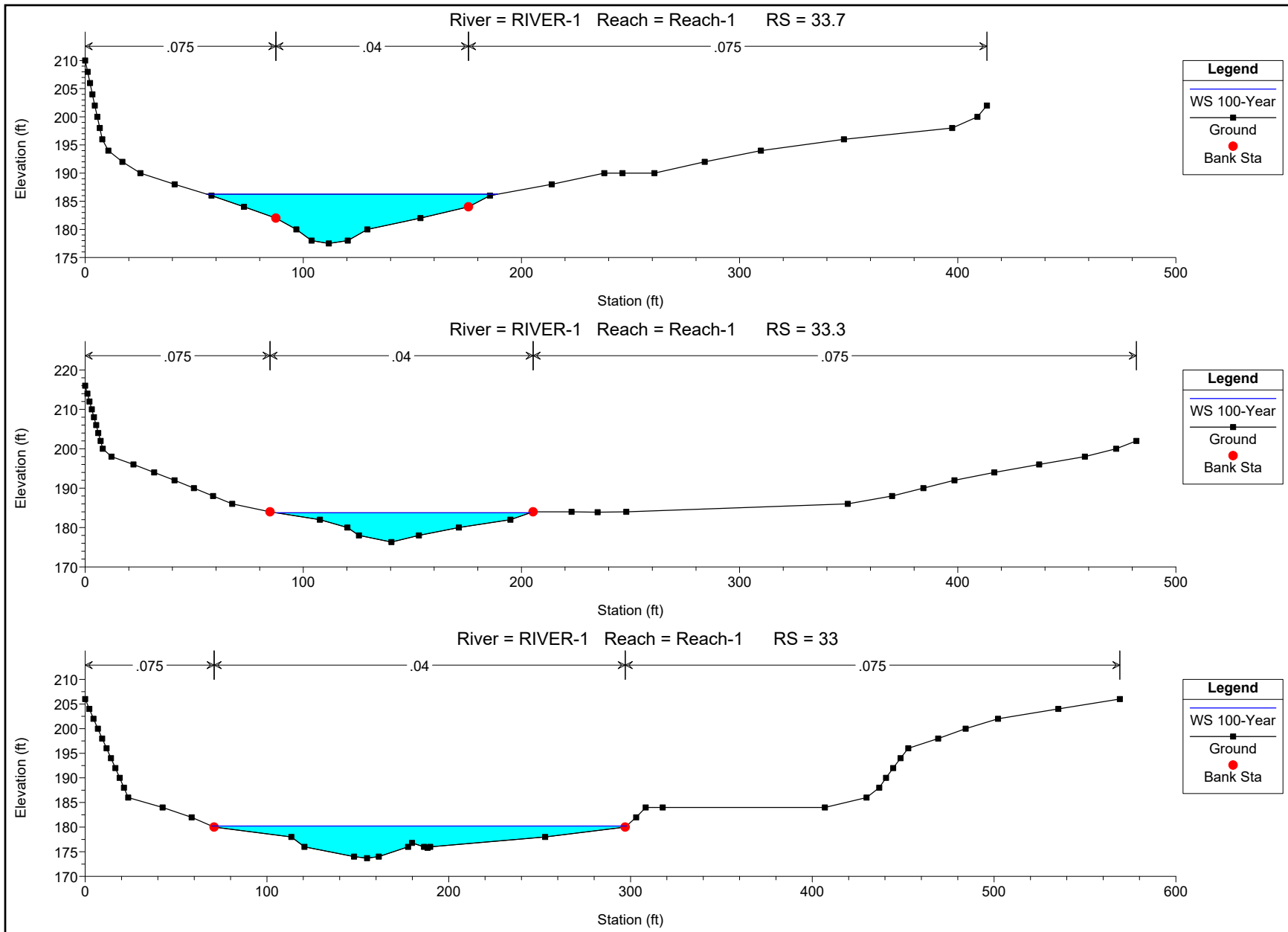


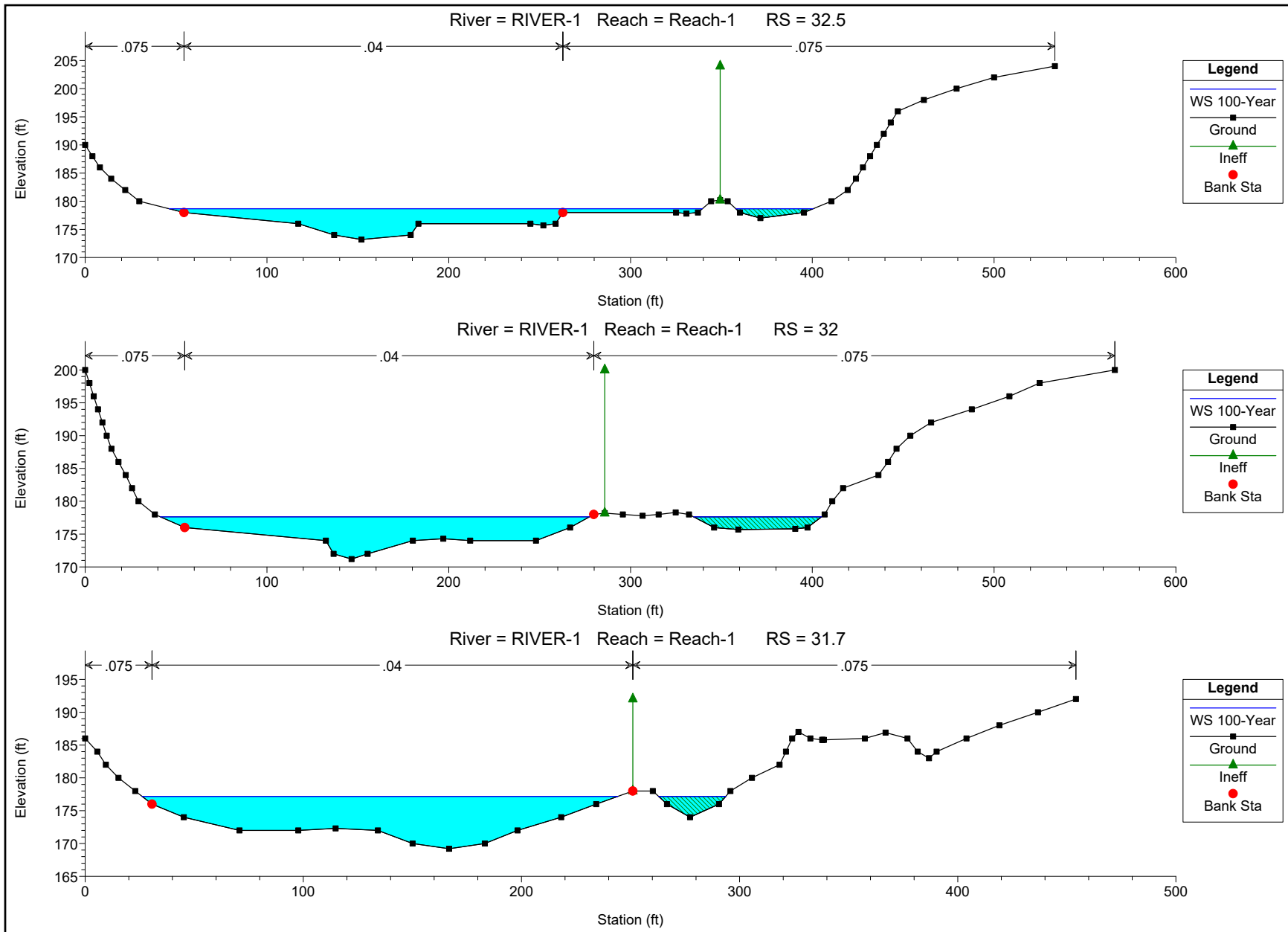


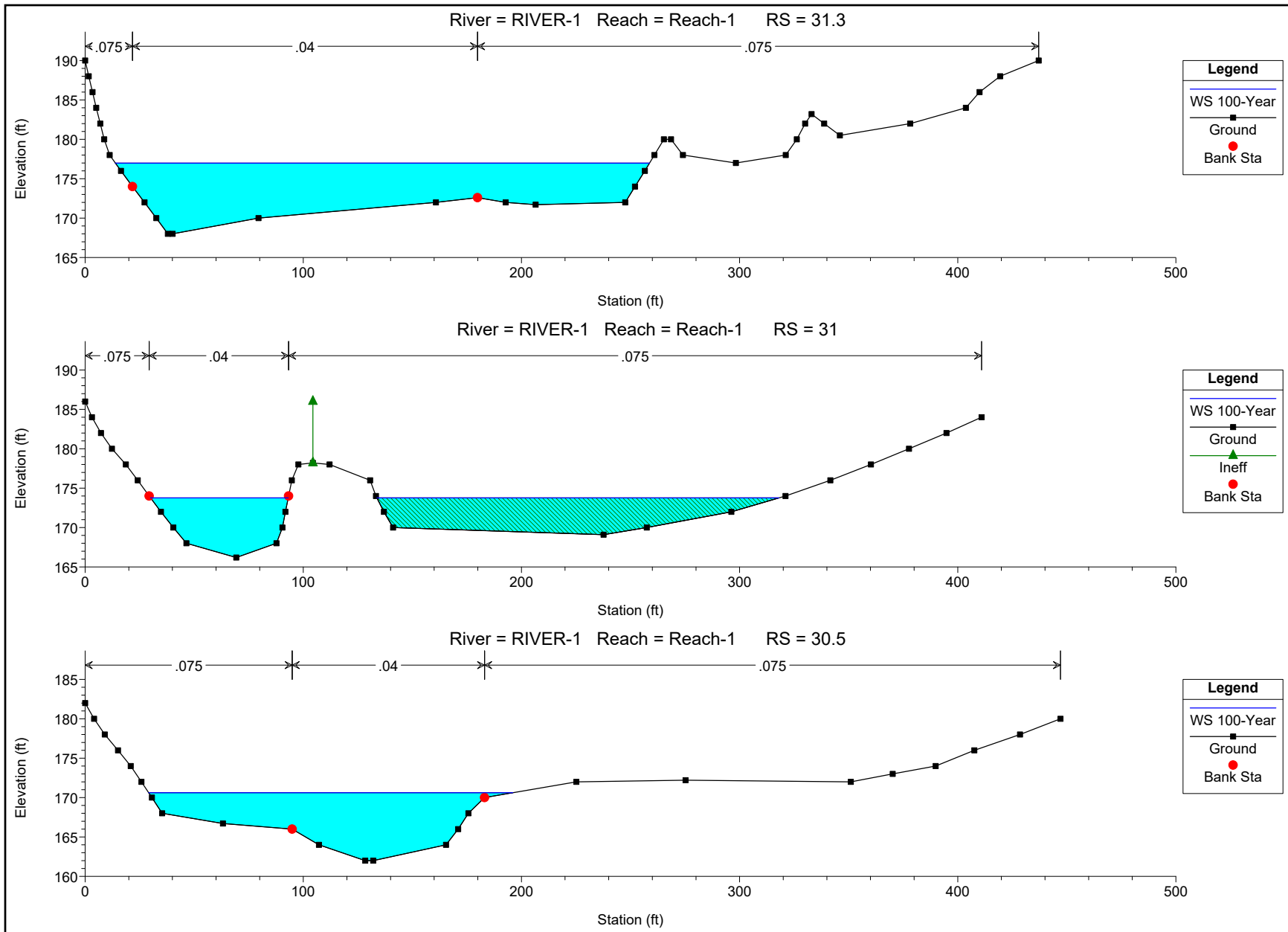


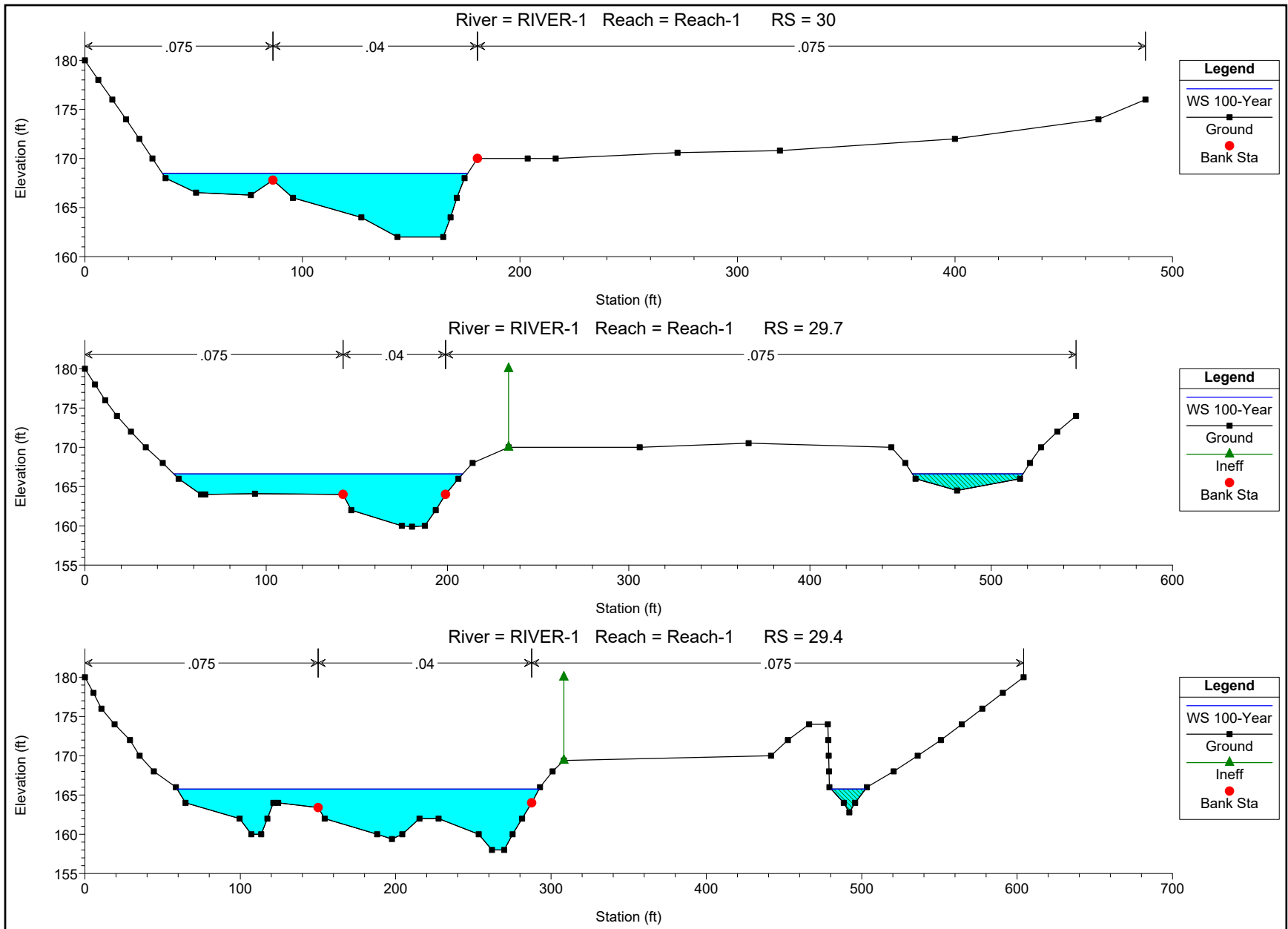




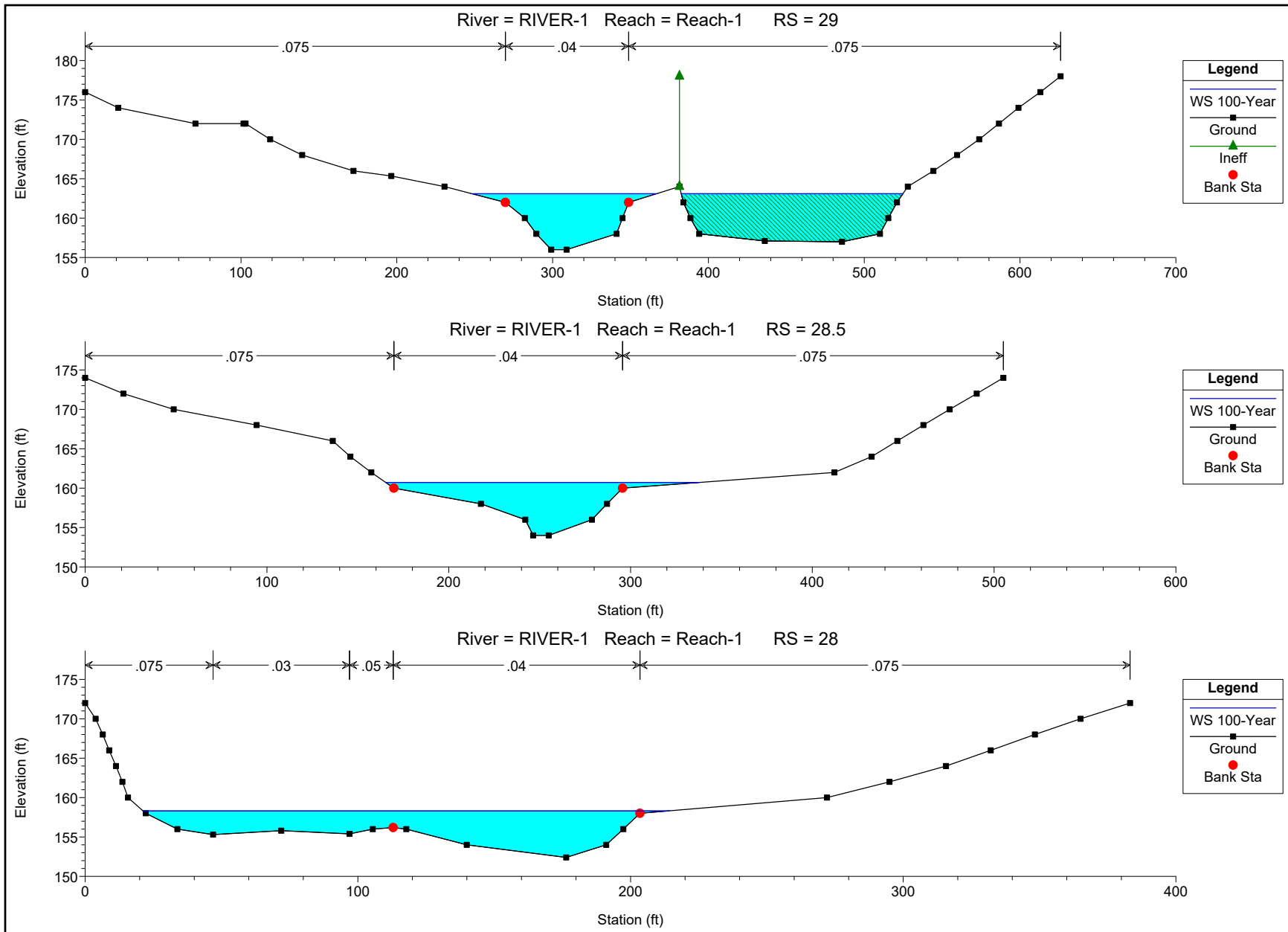


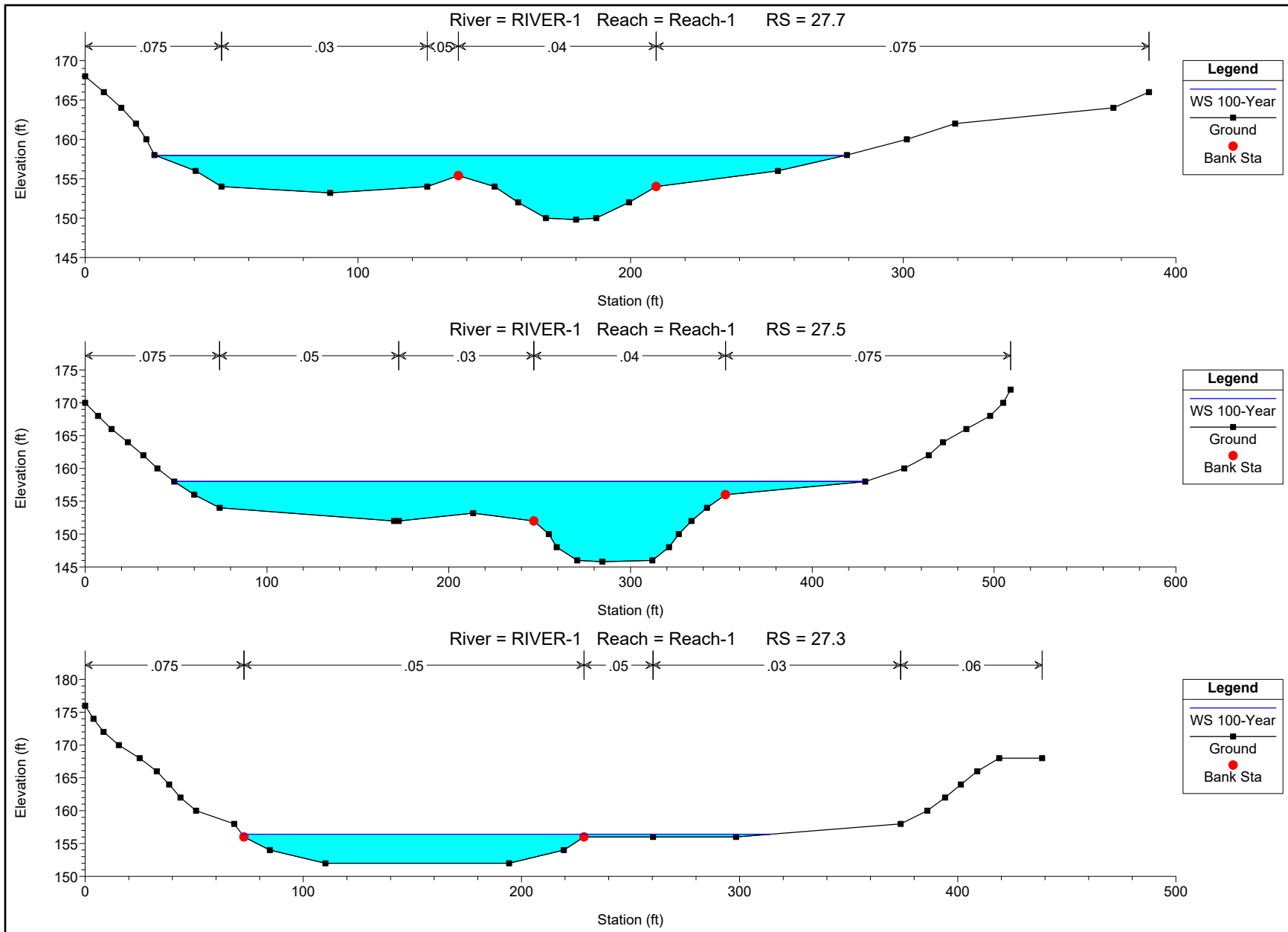


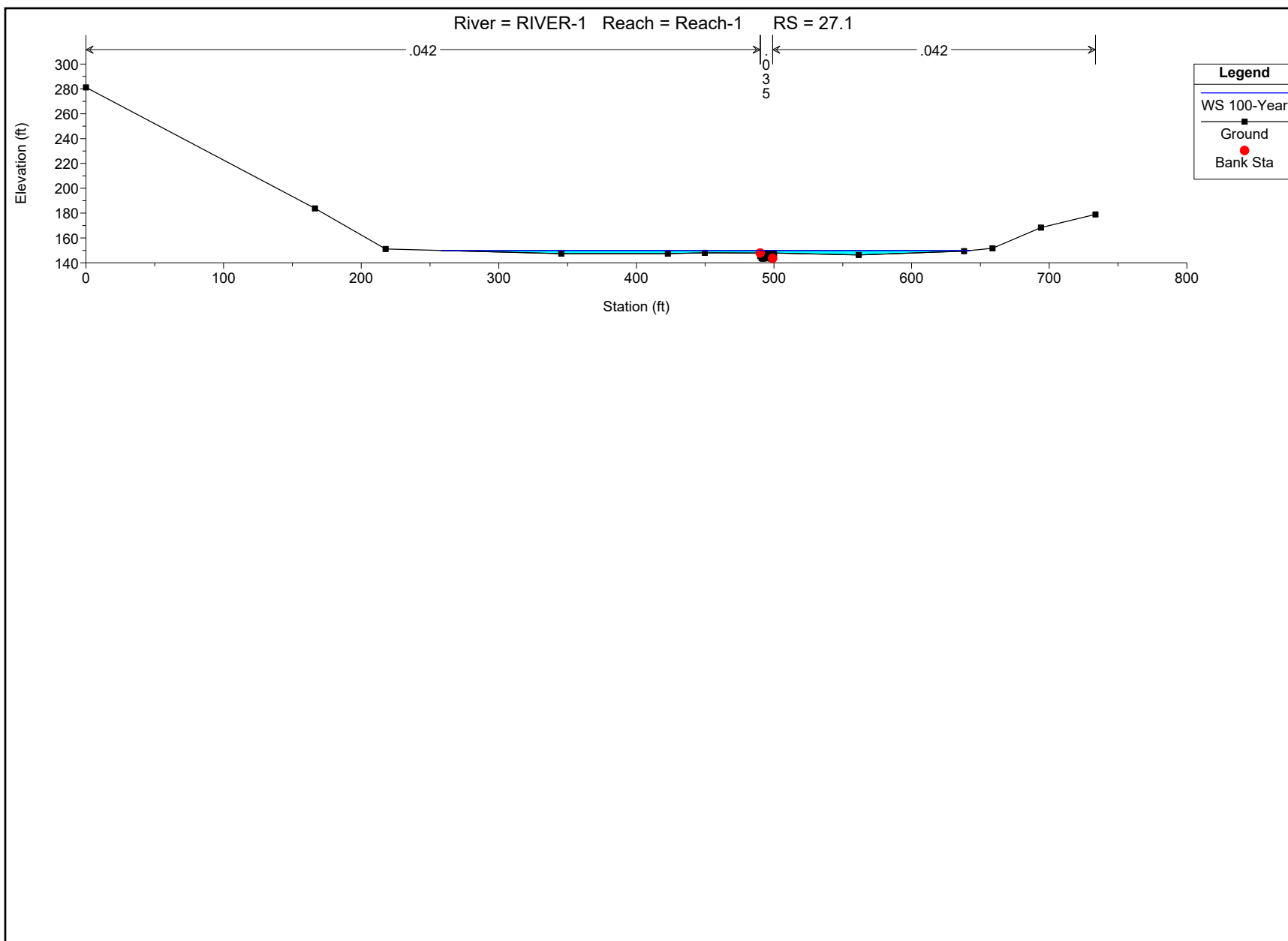












# PROPOSED CONDITIONS

HEC-RAS Plan: PC 2019-0206 River: RIVER-1 Reach: Reach-1 Profile: 100-Year

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)	
Reach-1	54	100-Year	3500.00	298.80	304.06	304.06	306.19	0.013413	11.75	306.18	87.93	0.95
Reach-1	53.7	100-Year	3500.00	293.90	298.15	298.08	299.32	0.016320	8.68	403.53	163.51	0.97
Reach-1	53.3	100-Year	3500.00	291.00	295.42		296.54	0.009799	8.60	434.20	134.28	0.80
Reach-1	53	100-Year	3500.00	286.00	292.24	292.24	293.96	0.015151	10.59	342.12	106.71	0.99
Reach-1	52.3	100-Year	3500.00	283.80	288.33	287.92	289.37	0.010456	8.17	430.89	138.62	0.81
Reach-1	52	100-Year	3500.00	280.30	284.55	284.55	285.99	0.016139	9.75	378.52	138.03	1.00
Reach-1	51.5	100-Year	3500.00	275.90	280.52		281.24	0.008299	6.79	519.16	185.93	0.71
Reach-1	51	100-Year	3500.00	272.00	276.50	276.50	277.50	0.018671	8.03	436.96	224.07	1.00
Reach-1	50.5	100-Year	3500.00	267.70	274.48		274.79	0.002223	4.48	802.27	203.58	0.39
Reach-1	50.1	100-Year	3500.00	263.80	270.37	270.37	273.16	0.012227	13.92	297.41	74.87	0.97
Reach-1	50	100-Year	3500.00	257.79	263.02		263.74	0.003929	7.01	559.02	123.96	0.54
Reach-1	48.9	100-Year	3500.00	257.24	262.70		262.86	0.000812	3.28	1140.82	237.29	0.25
Reach-1	48.8	100-Year	3500.00	257.24	261.69	261.69	262.75	0.016465	12.89	602.91	232.23	1.08
Reach-1	48.7	100-Year	3500.00	252.93	259.55		259.65	0.000418	2.68	1419.06	243.09	0.18
Reach-1	48.3	100-Year	3500.00	252.50	258.88		259.35	0.001951	5.65	723.97	141.91	0.39
Reach-1	48.2	100-Year	3500.00	252.50	257.45	257.45	259.18	0.012943	12.28	436.81	124.77	0.97
Reach-1	48.1	100-Year	3500.00	250.00	257.75		258.11	0.001206	5.05	845.33	138.76	0.32
Reach-1	46.4	100-Year	3500.00	249.27	256.28		257.02	0.002902	7.33	603.08	115.03	0.49
Reach-1	46.3	100-Year	3500.00	246.92	254.31	254.31	256.79	0.011757	15.28	393.53	86.51	0.99
Reach-1	46.2	100-Year	3500.00	247.27	253.76		254.15	0.001576	5.13	753.94	132.44	0.36
Reach-1	45.4	100-Year	3500.00	246.92	253.27		253.68	0.001696	5.25	735.76	131.75	0.37
Reach-1	45.3	100-Year	3500.00	246.92	251.43	251.43	253.48	0.013774	11.90	341.95	91.58	0.99
Reach-1	45.2	100-Year	3500.00	243.42	249.88		250.27	0.001599	5.15	750.25	132.30	0.36
Reach-1	44.7	100-Year	3500.00	243.12	249.47		249.88	0.001696	5.25	735.76	131.75	0.37
Reach-1	44.6	100-Year	3500.00	243.12	247.63	247.63	249.68	0.013774	11.90	341.95	91.58	0.99
Reach-1	44.5	100-Year	3500.00	239.62	246.21		246.58	0.001497	5.05	766.90	132.92	0.35
Reach-1	44	100-Year	3500.00	239.31	245.82		246.21	0.001556	5.11	757.06	132.55	0.35
Reach-1	43.9	100-Year	3500.00	239.31	244.73		246.08	0.007262	9.76	427.57	97.91	0.74
Reach-1	43.8	100-Year	3500.00	237.81	245.48		245.75	0.000887	4.30	913.68	138.34	0.27
Reach-1	42.7	100-Year	3500.00	237.40	244.99		245.38	0.001290	5.15	777.06	121.33	0.33
Reach-1	42.6	100-Year	3500.00	237.40	244.16		245.28	0.004609	9.02	490.78	95.11	0.61
Reach-1	42.5	100-Year	3500.00	235.90	244.75		245.02	0.000758	4.37	933.33	127.61	0.26
Reach-1	42	100-Year	3500.00	235.80	244.32	240.22	244.93	0.001611	6.22	562.58	93.01	0.38
Reach-1	41.3		Culvert									
Reach-1	40.7	100-Year	3500.00	235.33	243.92		244.51	0.001572	6.18	566.72	88.84	0.37
Reach-1	40.11	100-Year	3500.00	235.07	243.72		244.16	0.001270	5.58	775.80	116.03	0.33
Reach-1	40.1	100-Year	3500.00	235.00	241.45	241.45	243.94	0.014679	12.64	276.96	55.82	1.00
Reach-1	40	100-Year	3500.00	231.93	241.49		242.06	0.001472	6.42	698.18	99.73	0.37

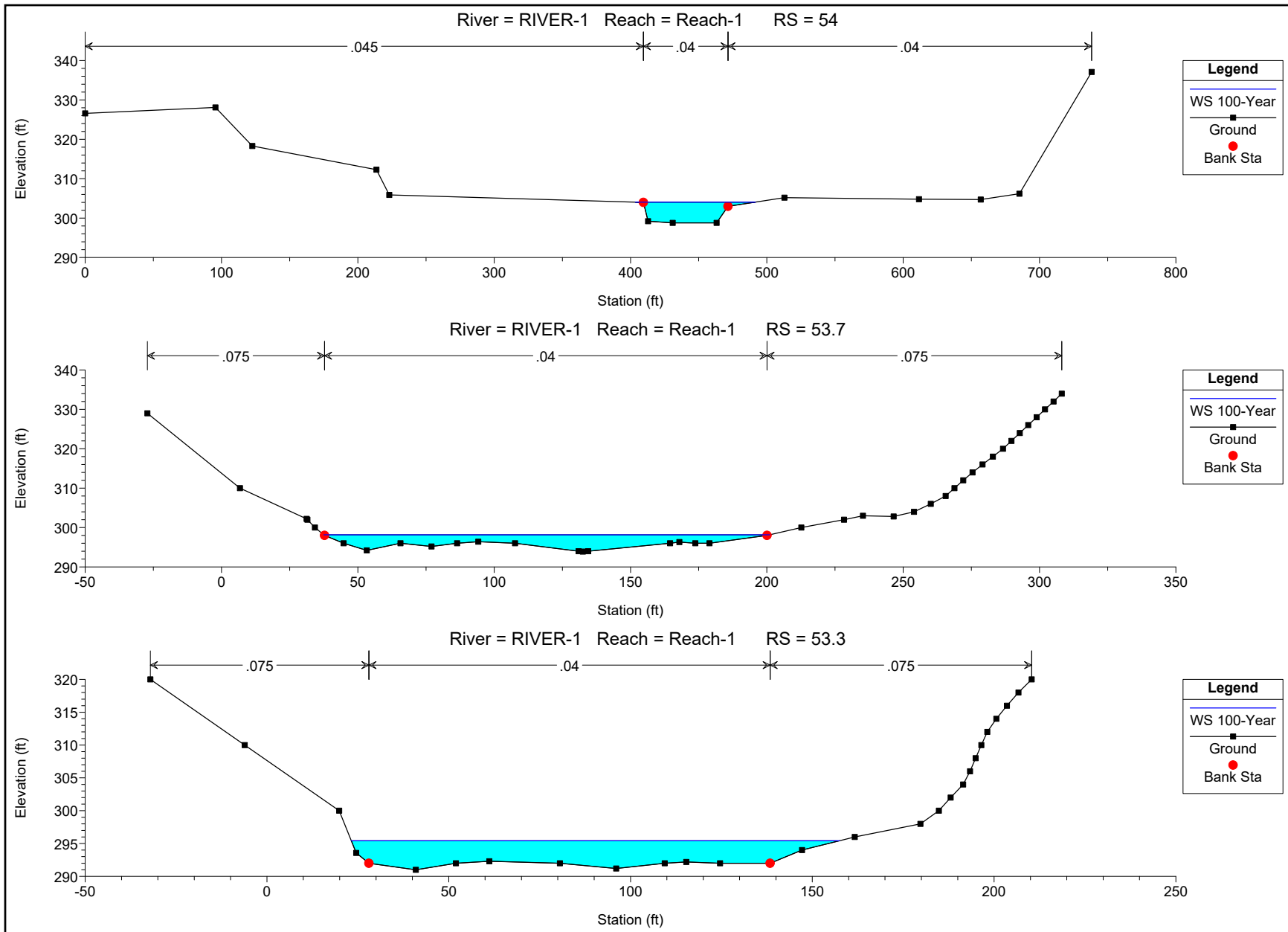
HEC-RAS Plan: PC 2019-0206 River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

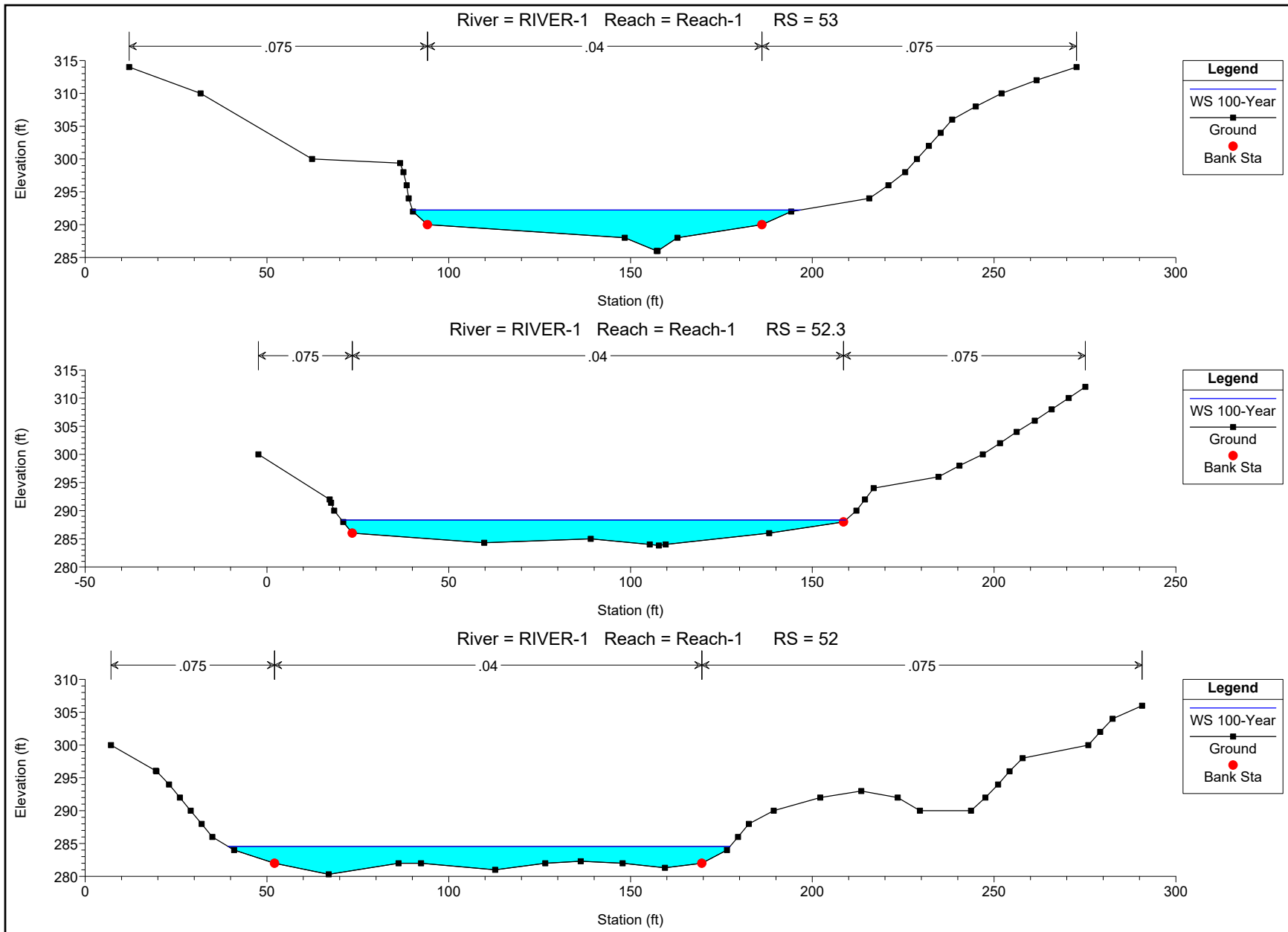
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	39.7	100-Year	3500.00	231.75	241.68		241.85	0.000413	3.49	1278.10	165.84	0.20
Reach-1	39.61	100-Year	3500.00	231.61	241.68		241.80	0.000277	2.88	1485.48	184.80	0.16
Reach-1	39.6	100-Year	3500.00	231.60	238.57	238.57	241.51	0.011655	14.63	306.05	57.87	0.98
Reach-1	39.5	100-Year	3500.00	226.80	236.59		236.83	0.000633	4.28	1066.65	148.00	0.24
Reach-1	39.4	100-Year	3500.00	226.66	236.57		236.76	0.000484	3.77	1188.02	161.85	0.21
Reach-1	39.31	100-Year	3500.00	226.51	236.60		236.70	0.000225	2.60	1583.29	188.73	0.14
Reach-1	39.3	100-Year	3500.00	226.50	233.47	233.47	236.41	0.011655	14.63	306.05	57.87	0.98
Reach-1	39.2	100-Year	3500.00	222.00	225.88	225.67	227.40	0.012264	10.16	385.12	114.83	0.91
Reach-1	39.1	100-Year	3500.00	218.00	224.40	223.31	225.56	0.006477	9.03	454.60	102.54	0.69
Reach-1	39	100-Year	3500.00	217.93	222.50	222.50	224.52	0.014208	12.14	356.75	93.86	1.00
Reach-1	38.9	100-Year	3500.00	214.00	221.13		221.75	0.002455	6.54	623.46	115.76	0.45
Reach-1	38.8	100-Year	3500.00	214.00	219.06	219.06	221.47	0.014031	12.45	281.09	115.14	1.01
Reach-1	38.5		Culvert									
Reach-1	38.2	100-Year	3500.00	209.80	217.12		218.80	0.007716	10.40	336.62	180.89	0.77
Reach-1	38	100-Year	3500.00	207.80	214.97	214.69	217.09	0.018459	11.71	301.91	65.59	0.91
Reach-1	37.4	100-Year	3500.00	205.40	212.72		214.06	0.011777	9.29	376.90	75.05	0.73
Reach-1	37	100-Year	3500.00	203.90	210.27	209.93	211.94	0.018702	10.35	338.31	80.92	0.89
Reach-1	36.3	100-Year	3500.00	202.90	209.04	208.80	210.54	0.015922	9.96	384.08	123.55	0.84
Reach-1	36.2	100-Year	3500.00	199.90	207.19		207.92	0.005589	6.85	513.27	97.96	0.52
Reach-1	36.1	100-Year	3500.00	195.60	203.98		205.54	0.012990	9.99	350.41	66.60	0.77
Reach-1	36.07	100-Year	3500.00	193.10	200.95		202.54	0.012531	10.15	349.54	74.10	0.76
Reach-1	36.03	100-Year	3500.00	191.00	199.76		200.45	0.005445	7.49	639.70	305.03	0.51
Reach-1	36	100-Year	3500.00	188.90	199.60	197.20	199.79	0.001221	4.00	1034.24	407.14	0.25
Reach-1	35.85		Bridge									
Reach-1	35.7	100-Year	3500.00	188.10	196.16	195.45	197.65	0.013925	9.80	367.42	158.47	0.81
Reach-1	35	100-Year	3500.00	186.30	195.08	194.46	196.03	0.004892	8.63	695.86	302.16	0.61
Reach-1	34.5	100-Year	4500.00	184.00	192.66	192.66	194.22	0.007391	10.83	649.82	303.30	0.75
Reach-1	34	100-Year	4500.00	179.20	188.33	188.33	191.38	0.012185	14.11	339.69	123.15	0.96
Reach-1	33.7	100-Year	4500.00	177.50	186.25		187.35	0.005275	8.57	583.91	133.18	0.63
Reach-1	33.3	100-Year	4500.00	176.30	183.74	183.74	185.55	0.015563	10.79	417.04	116.21	1.00
Reach-1	33	100-Year	4500.00	173.70	180.22		180.87	0.006898	6.49	693.26	228.17	0.65
Reach-1	32.5	100-Year	4500.00	173.20	178.66		179.45	0.008896	7.19	669.56	335.72	0.74
Reach-1	32	100-Year	4500.00	171.20	177.63		178.18	0.005116	5.97	762.92	306.38	0.57
Reach-1	31.7	100-Year	4500.00	169.20	177.19		177.49	0.001704	4.37	1032.99	248.98	0.35
Reach-1	31.3	100-Year	4500.00	168.00	176.99		177.19	0.000918	3.85	1388.37	244.82	0.27
Reach-1	31	100-Year	4500.00	166.20	173.76	173.76	176.46	0.014382	13.20	340.84	247.35	1.00
Reach-1	30.5	100-Year	4500.00	162.00	170.62		171.26	0.002809	6.81	814.78	166.92	0.47
Reach-1	30	100-Year	4500.00	162.00	168.48	168.48	170.25	0.012882	10.98	470.01	140.30	0.93

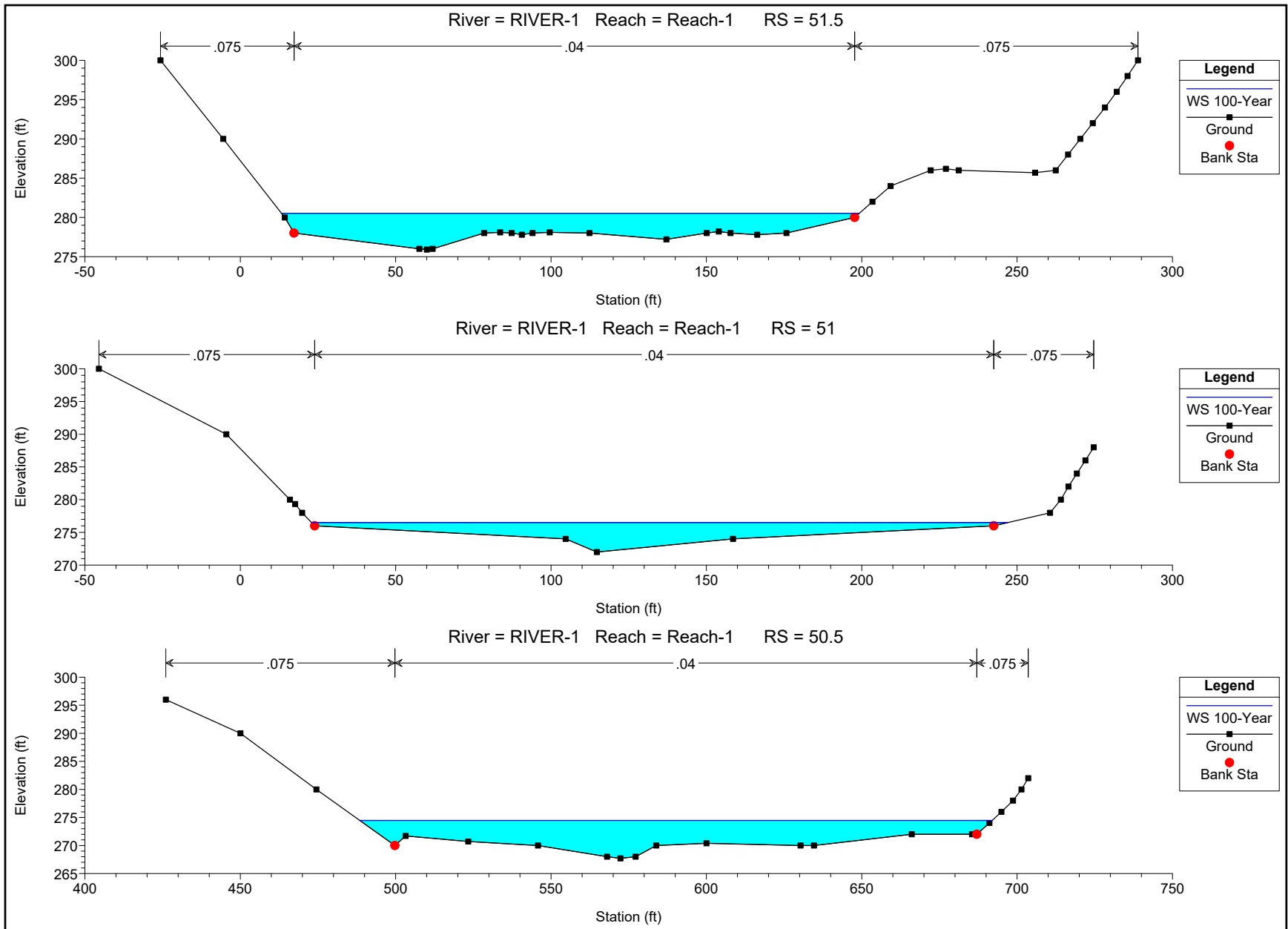


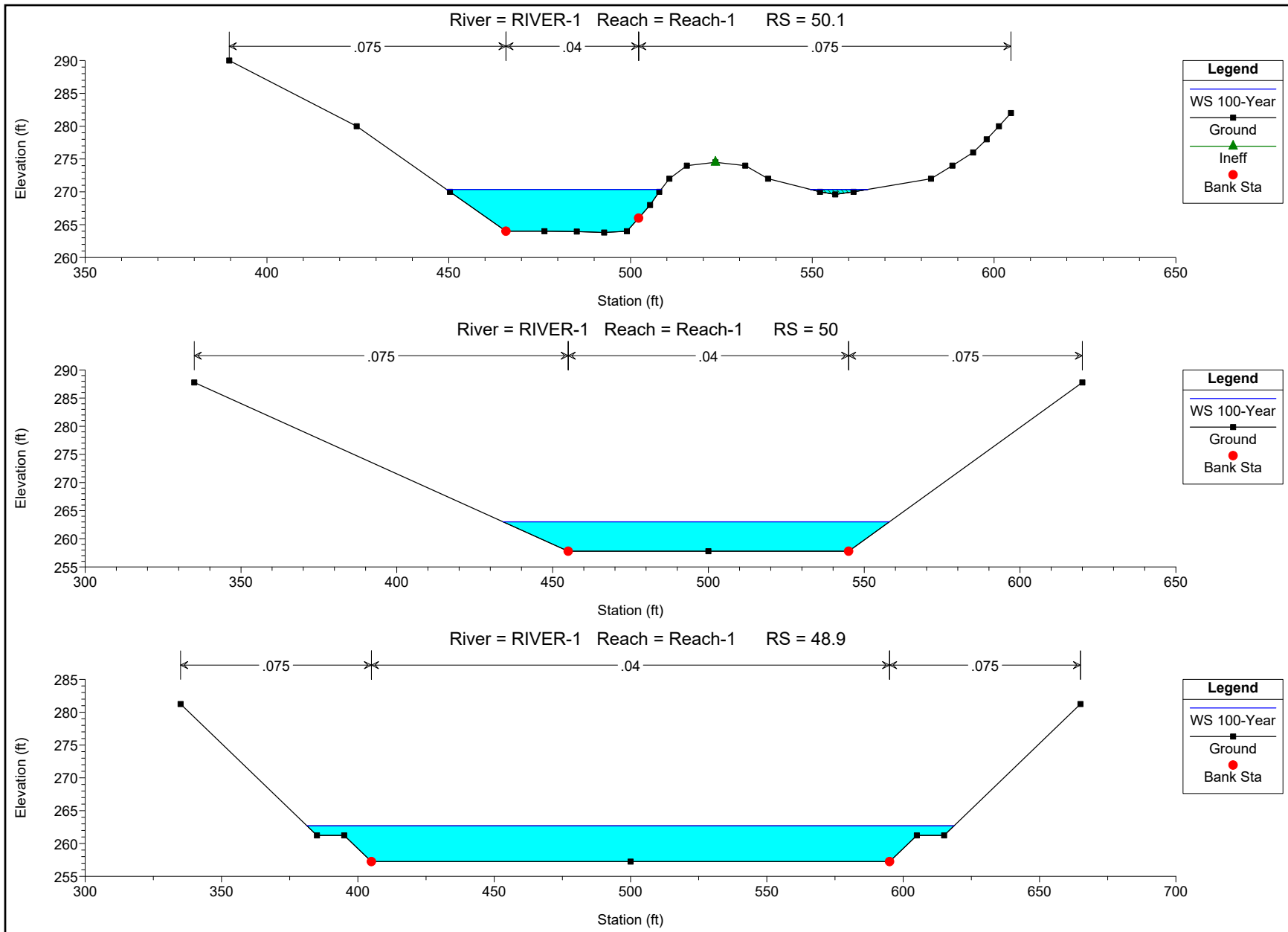
HEC-RAS Plan: PC 2019-0206 River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	29.7	100-Year	4500.00	159.90	166.61	166.61	168.41	0.010670	11.79	544.77	220.46	0.89
Reach-1	29.4	100-Year	4500.00	158.00	165.76		166.21	0.002752	5.69	960.07	255.08	0.45
Reach-1	29	100-Year	4500.00	156.00	163.10	162.71	164.99	0.010376	11.07	425.57	260.70	0.86
Reach-1	28.5	100-Year	4500.00	154.00	160.73	160.73	162.34	0.014547	10.23	454.84	172.57	0.97
Reach-1	28	100-Year	4500.00	152.40	158.32		159.22	0.007320	8.14	602.62	193.08	0.71
Reach-1	27.7	100-Year	4500.00	149.80	157.95		158.33	0.001810	5.20	1001.46	252.95	0.37
Reach-1	27.5	100-Year	4500.00	145.80	158.04		158.12	0.000274	2.71	2031.97	380.62	0.16
Reach-1	27.3	100-Year	5600.00	152.00	156.42	156.42	157.82	0.018183	9.56	609.13	242.53	0.88
Reach-1	27.1	100-Year	5600.00	143.30	149.90	149.55	150.60	0.012688	8.49	841.26	384.57	0.66

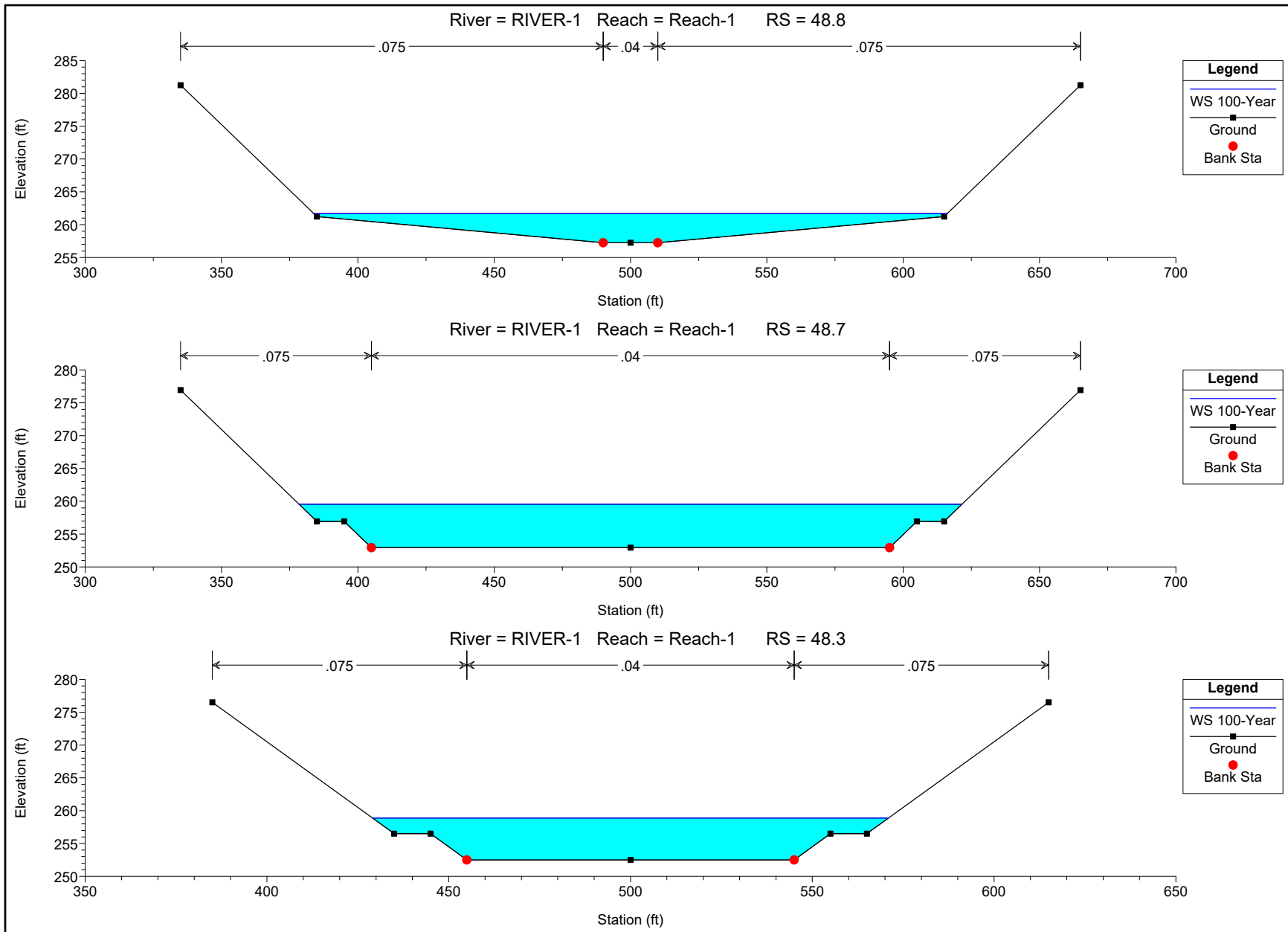


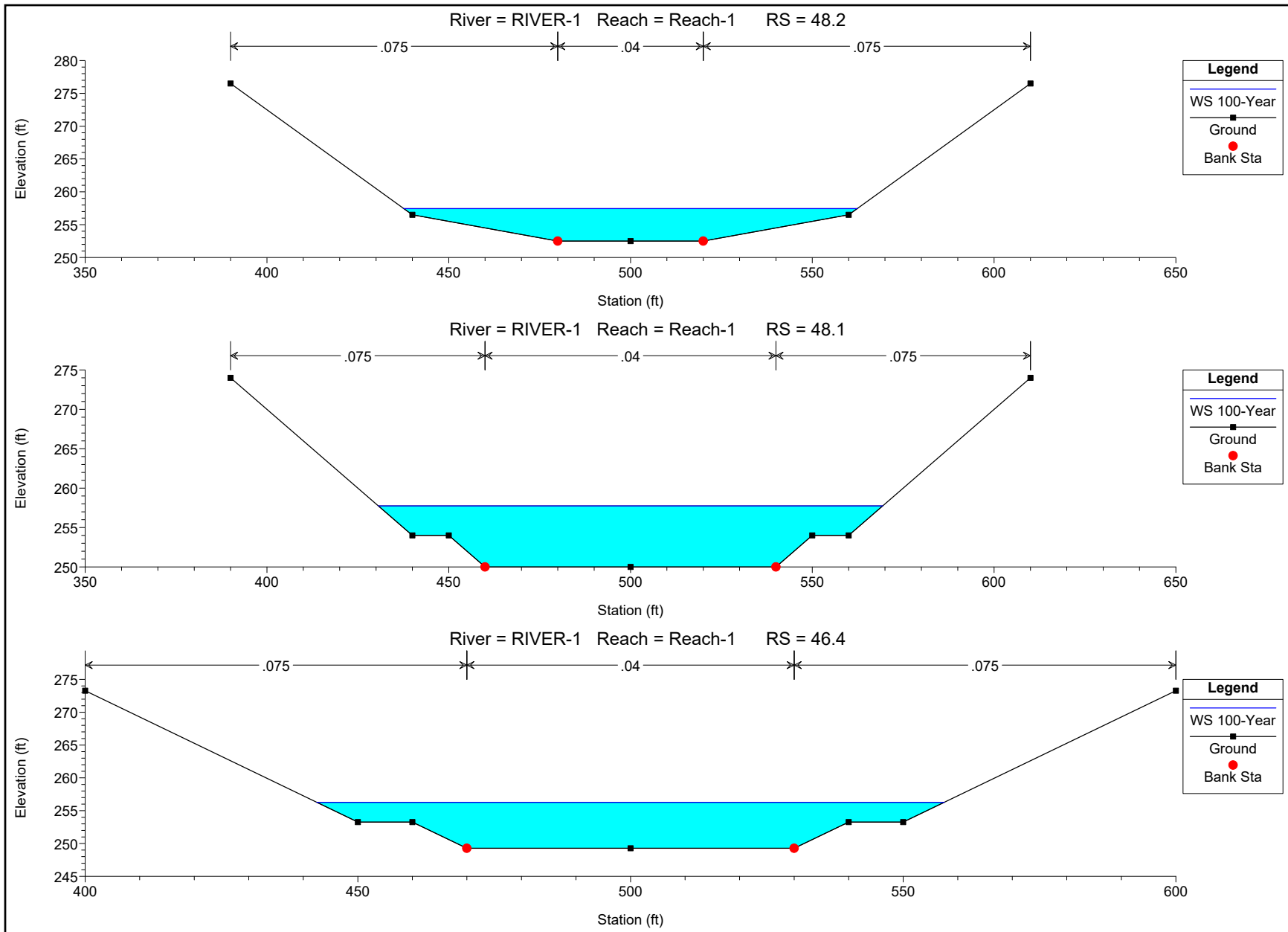


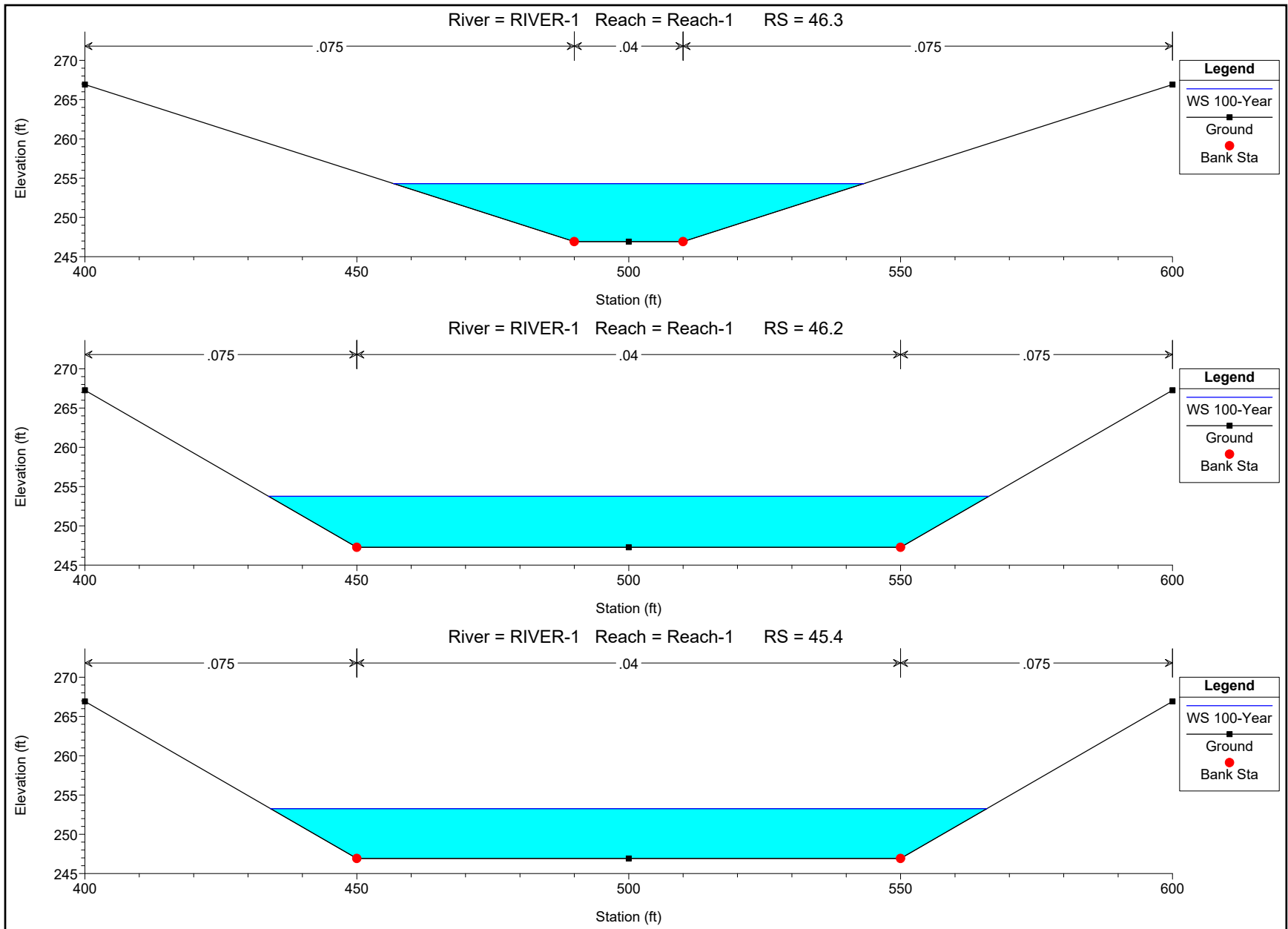


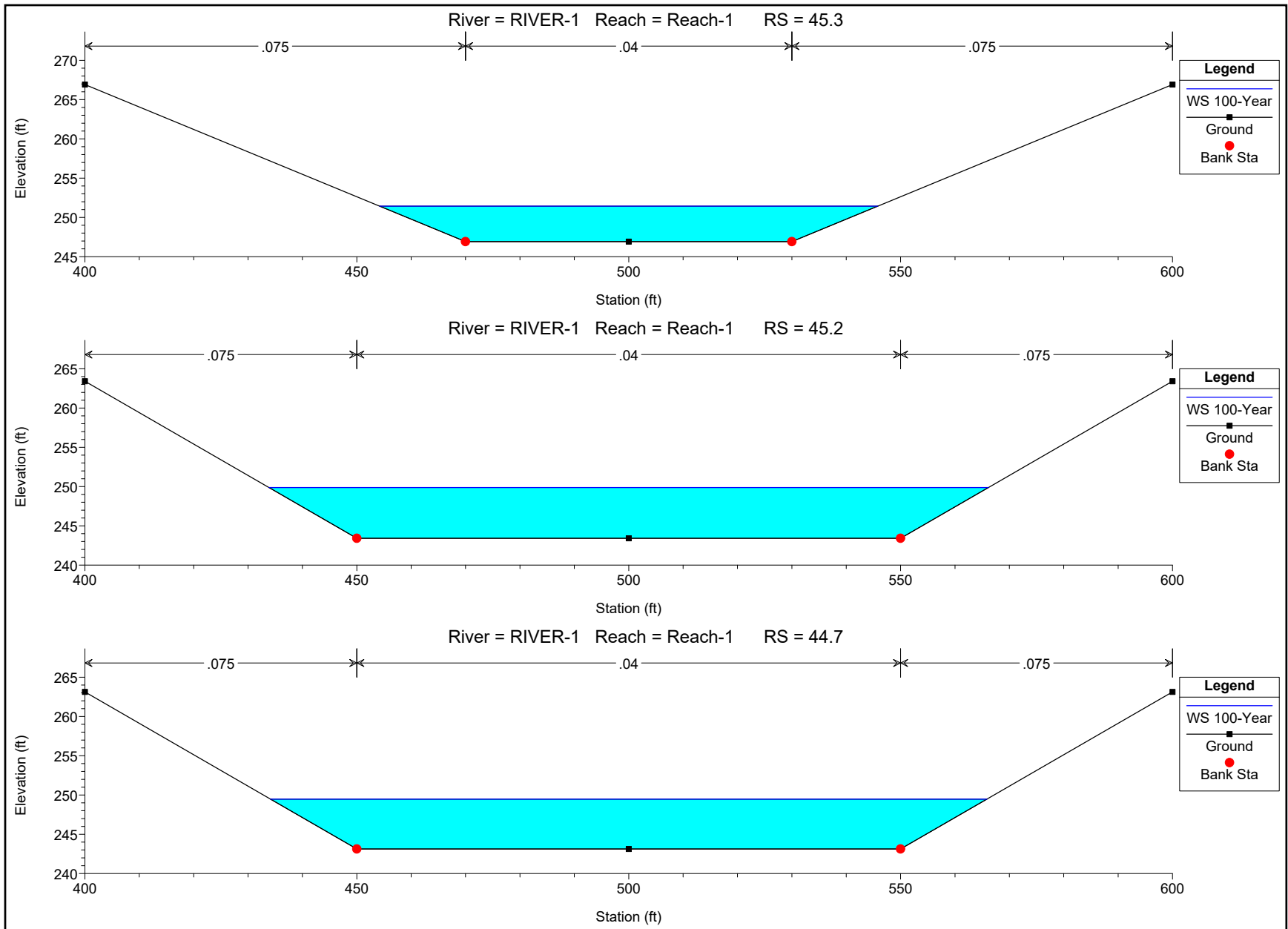


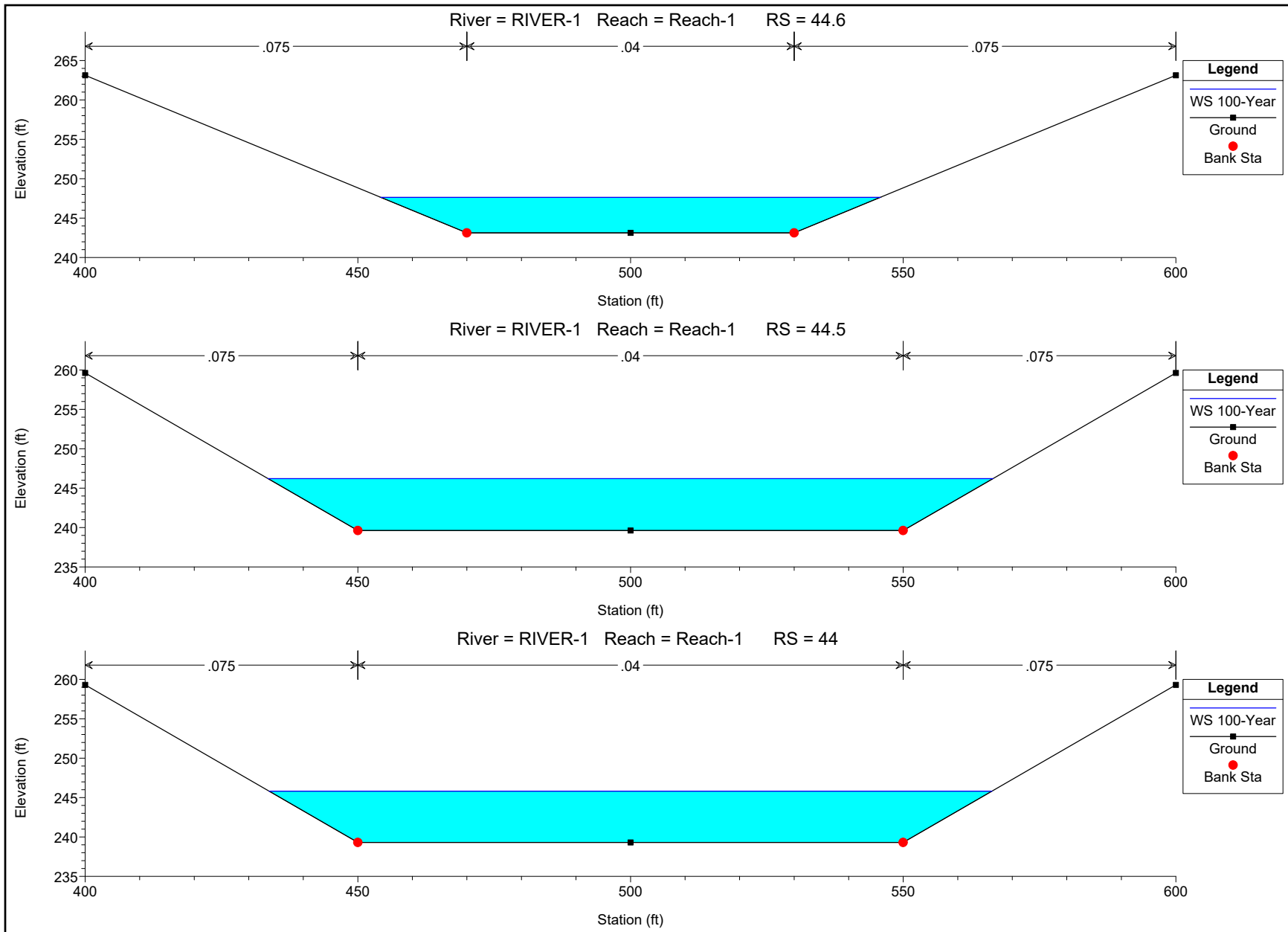


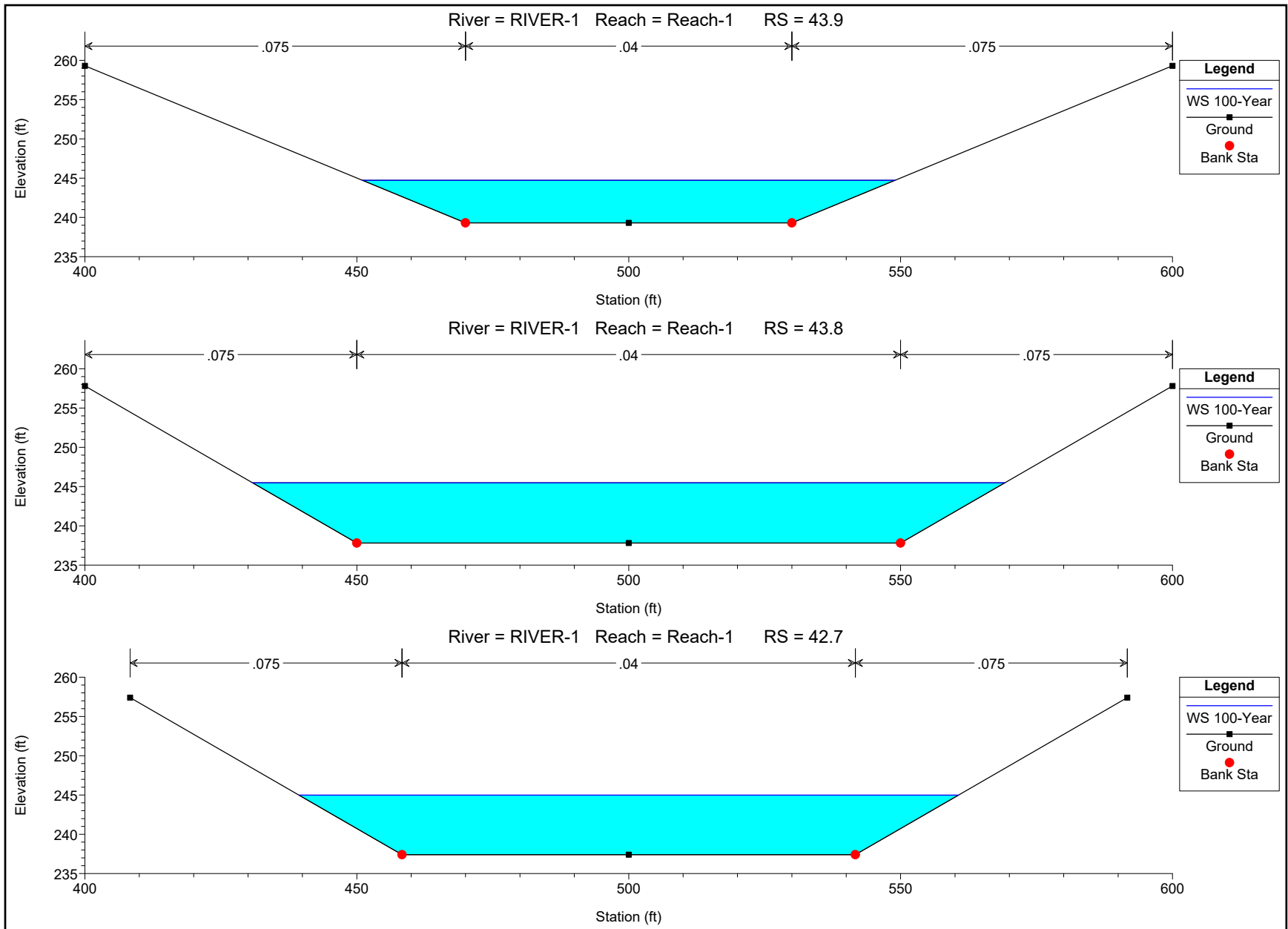




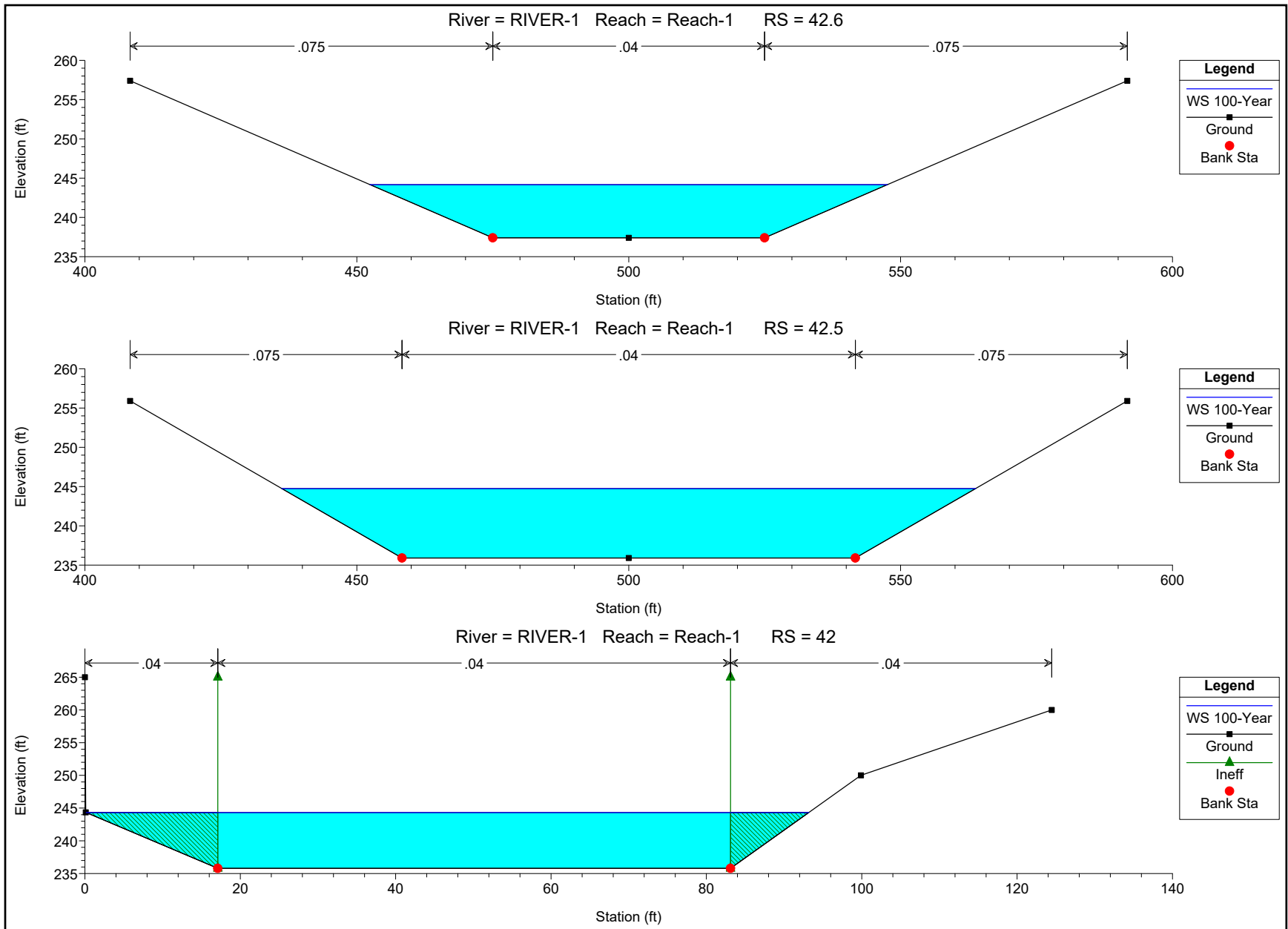


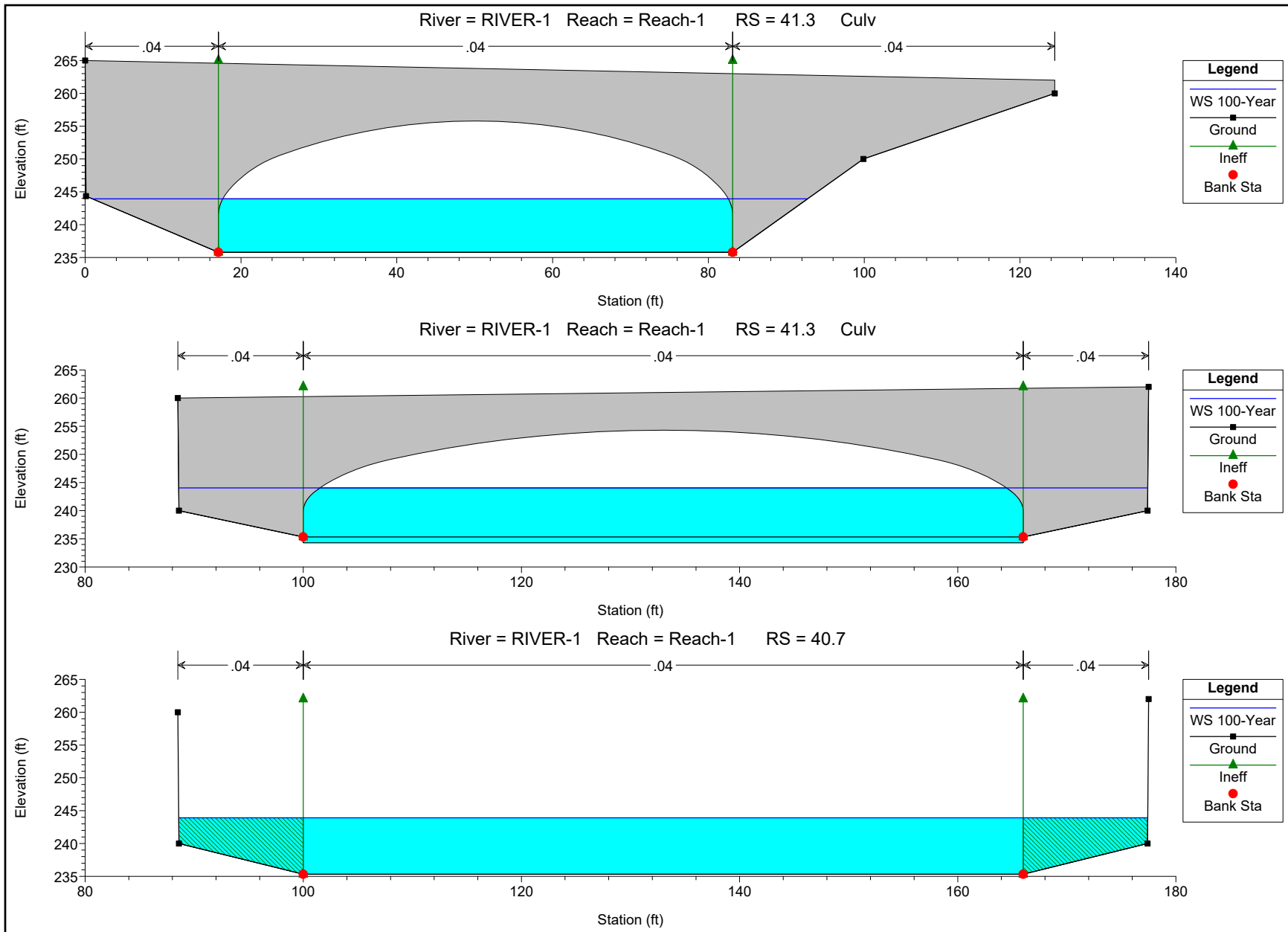


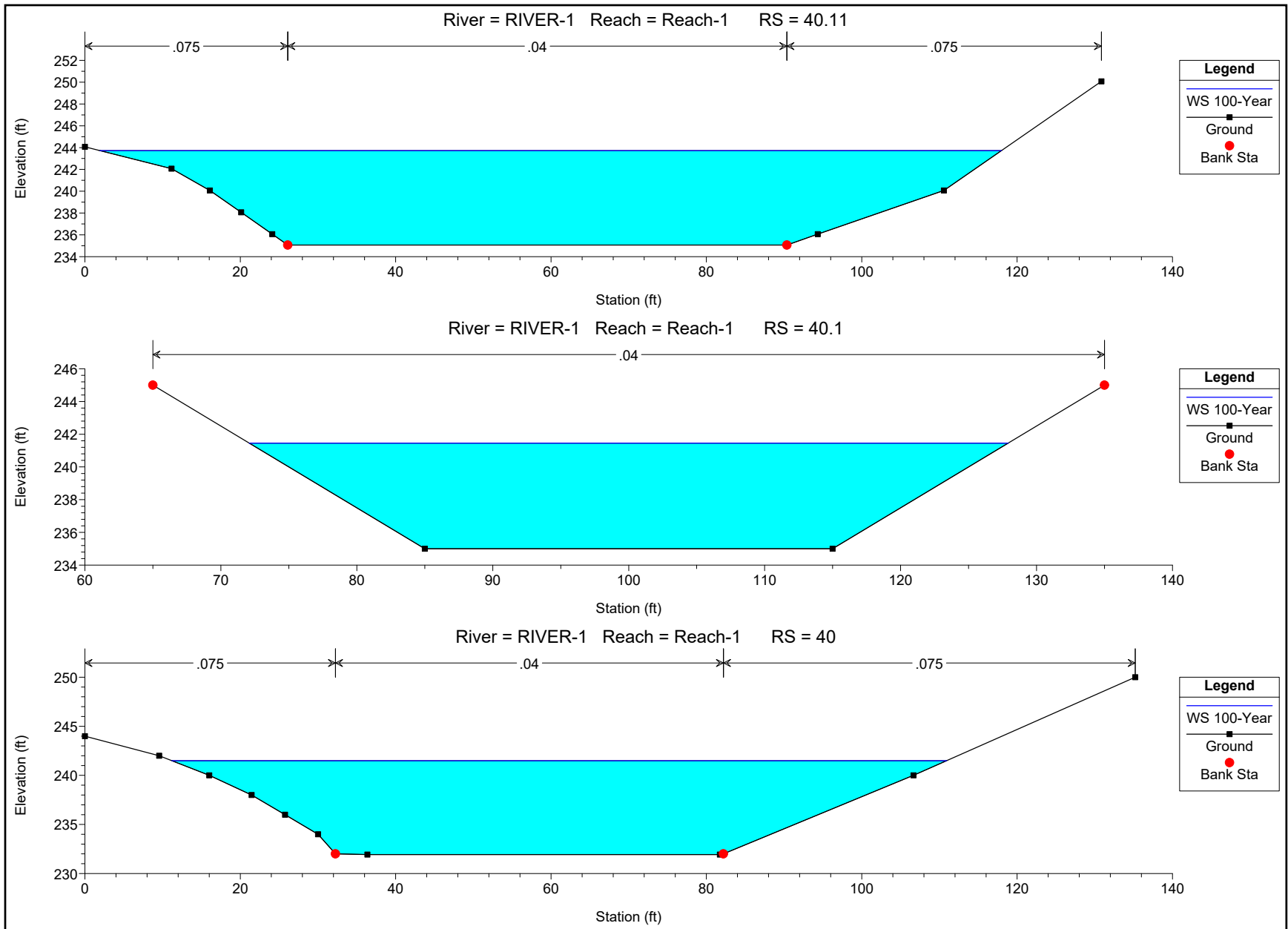


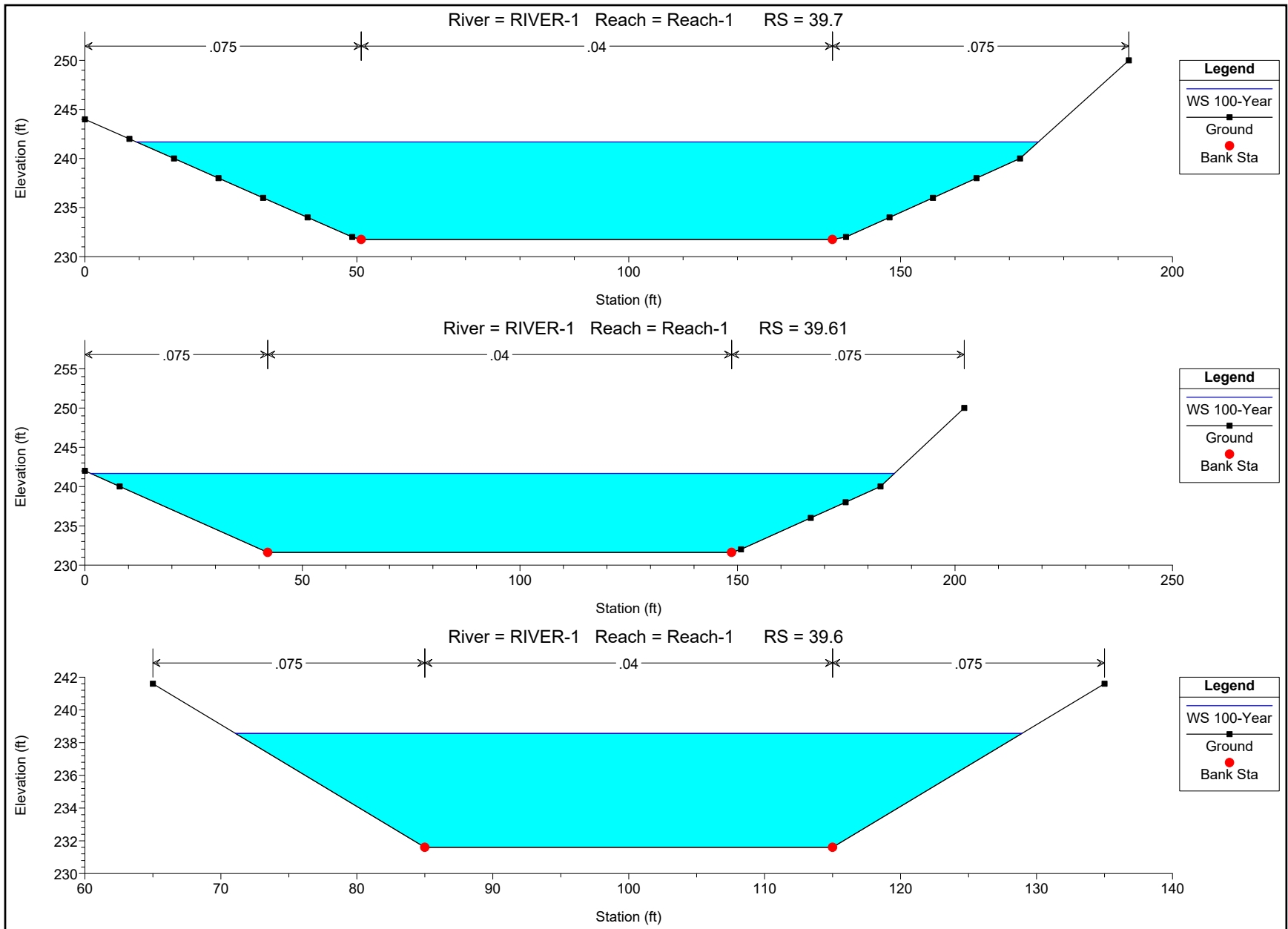


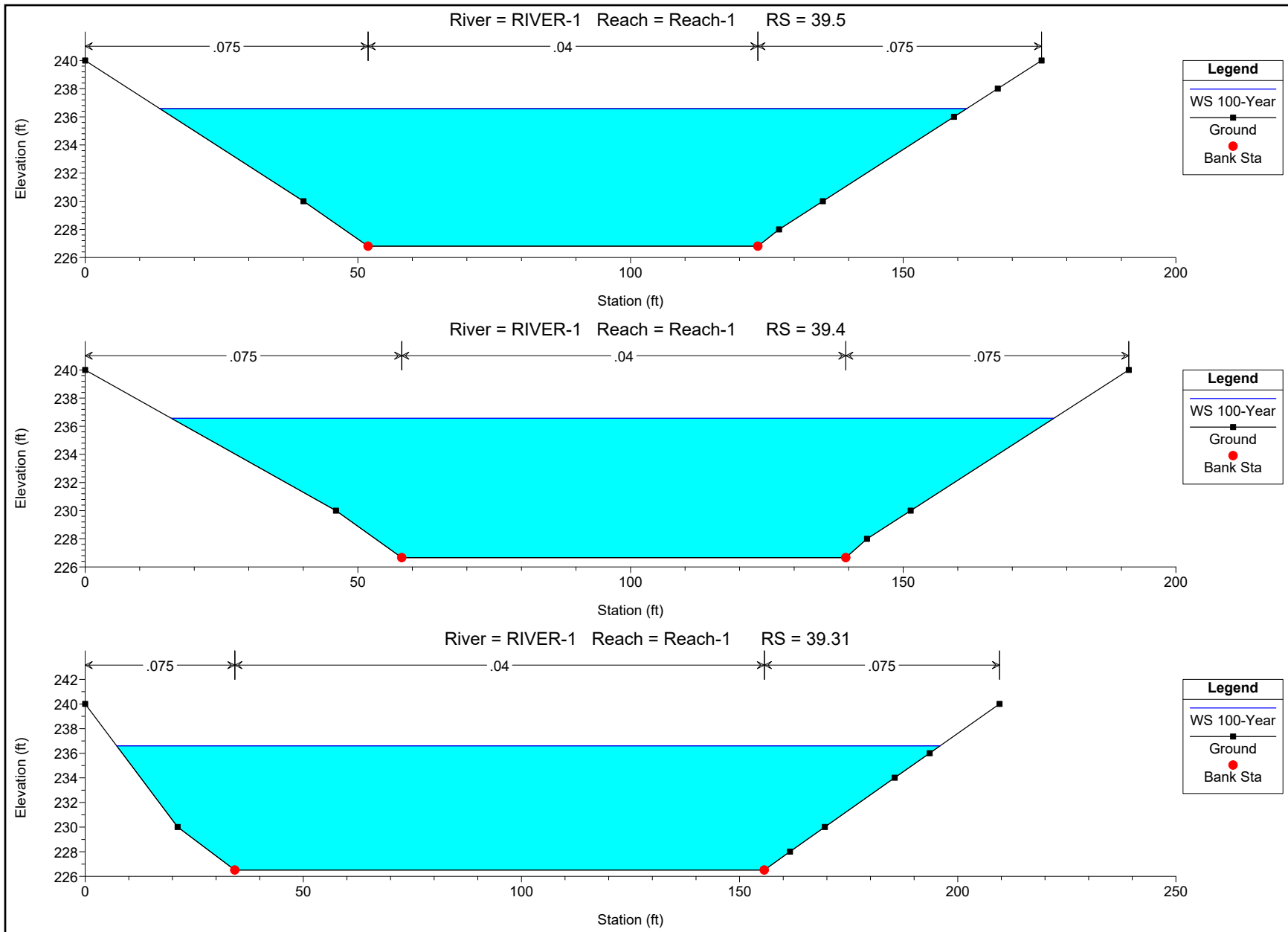


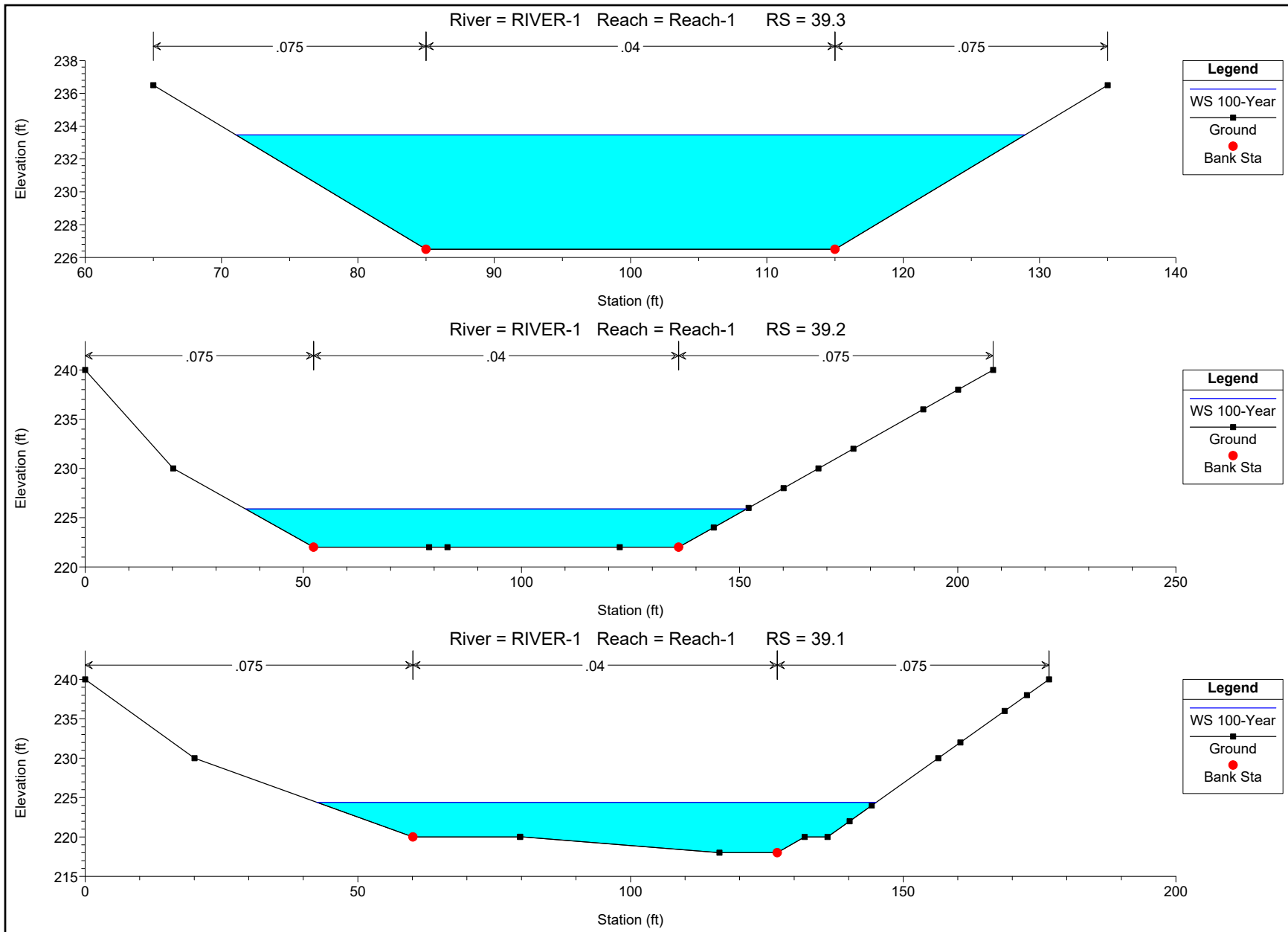




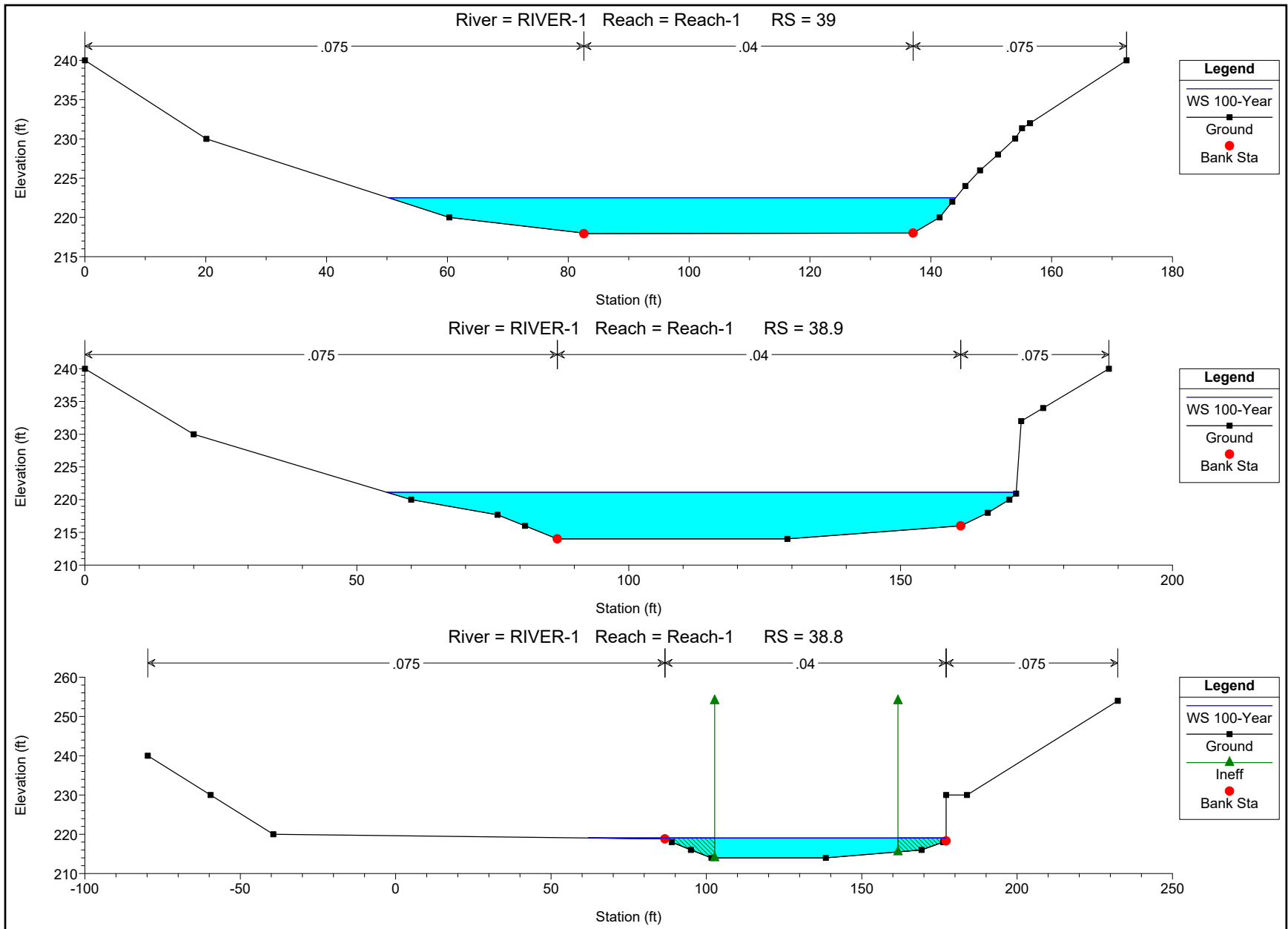


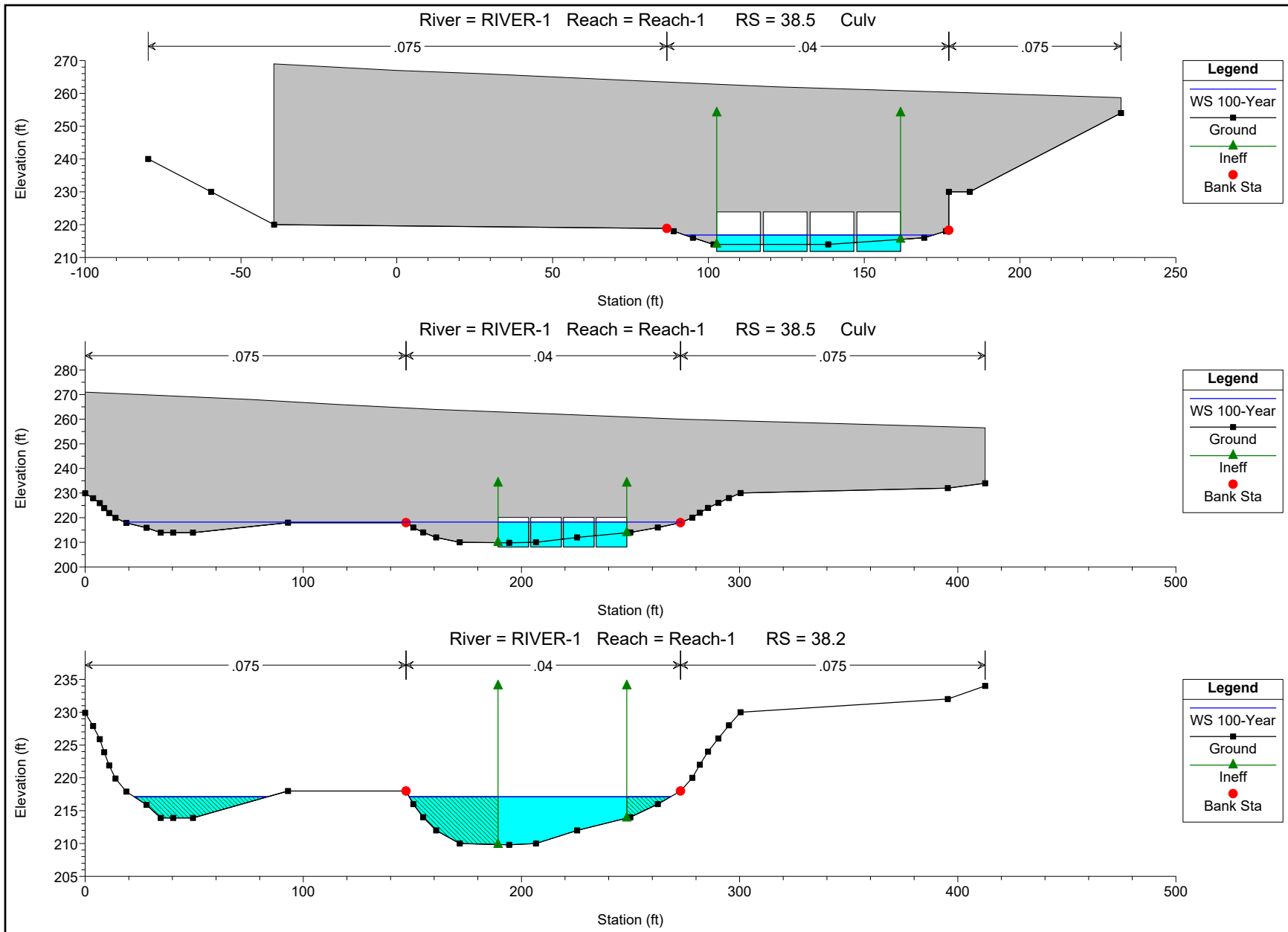


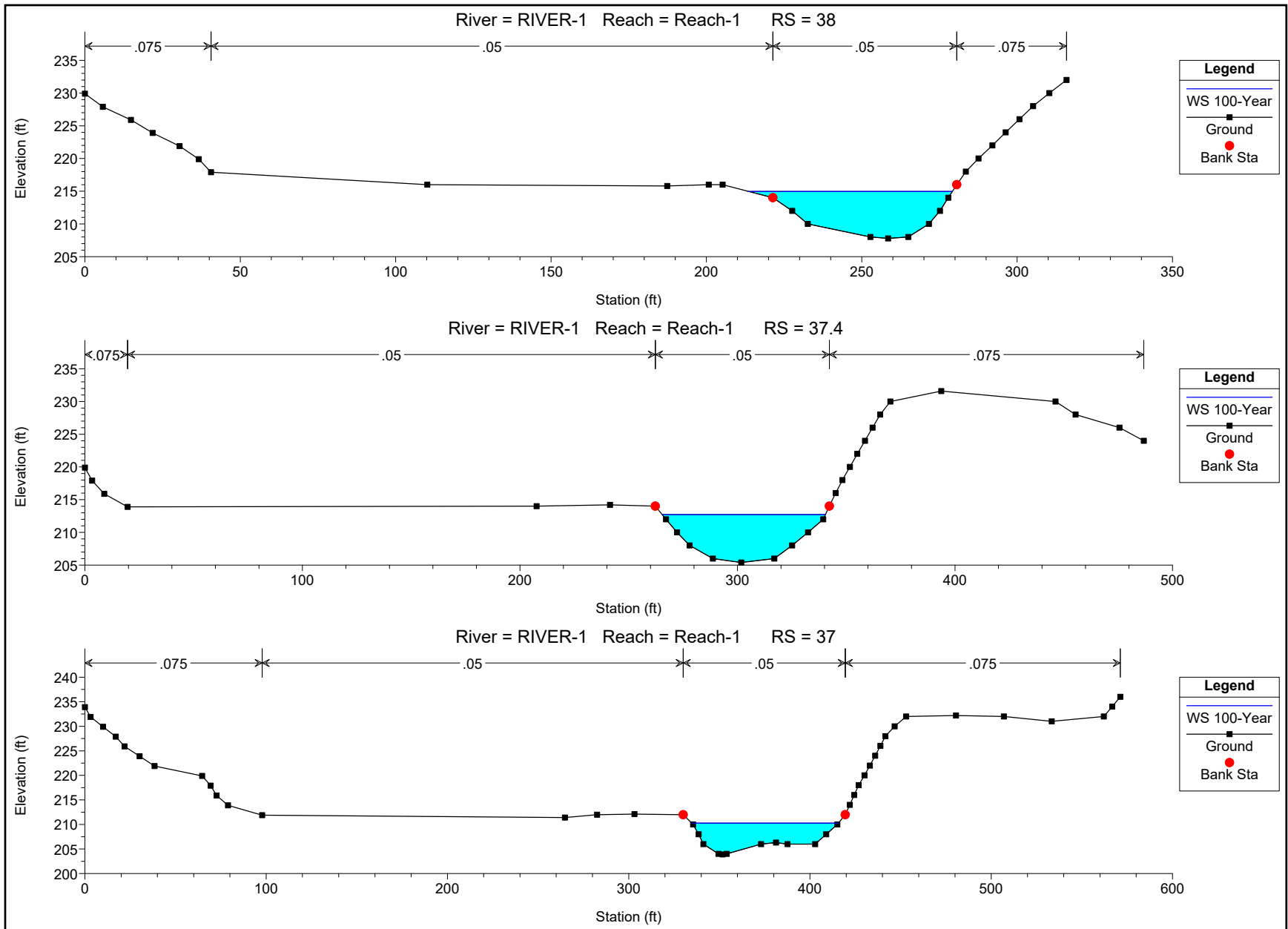


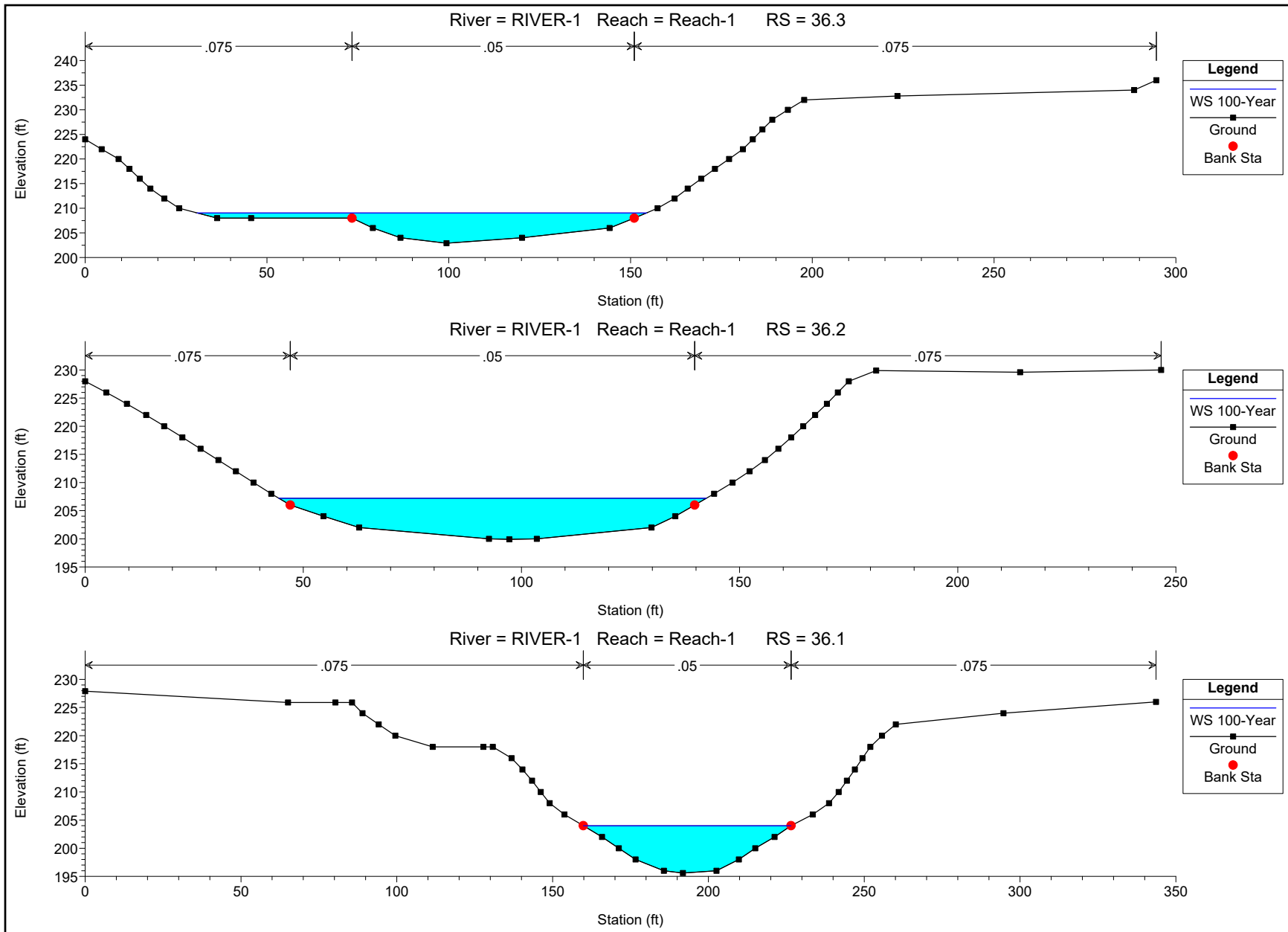


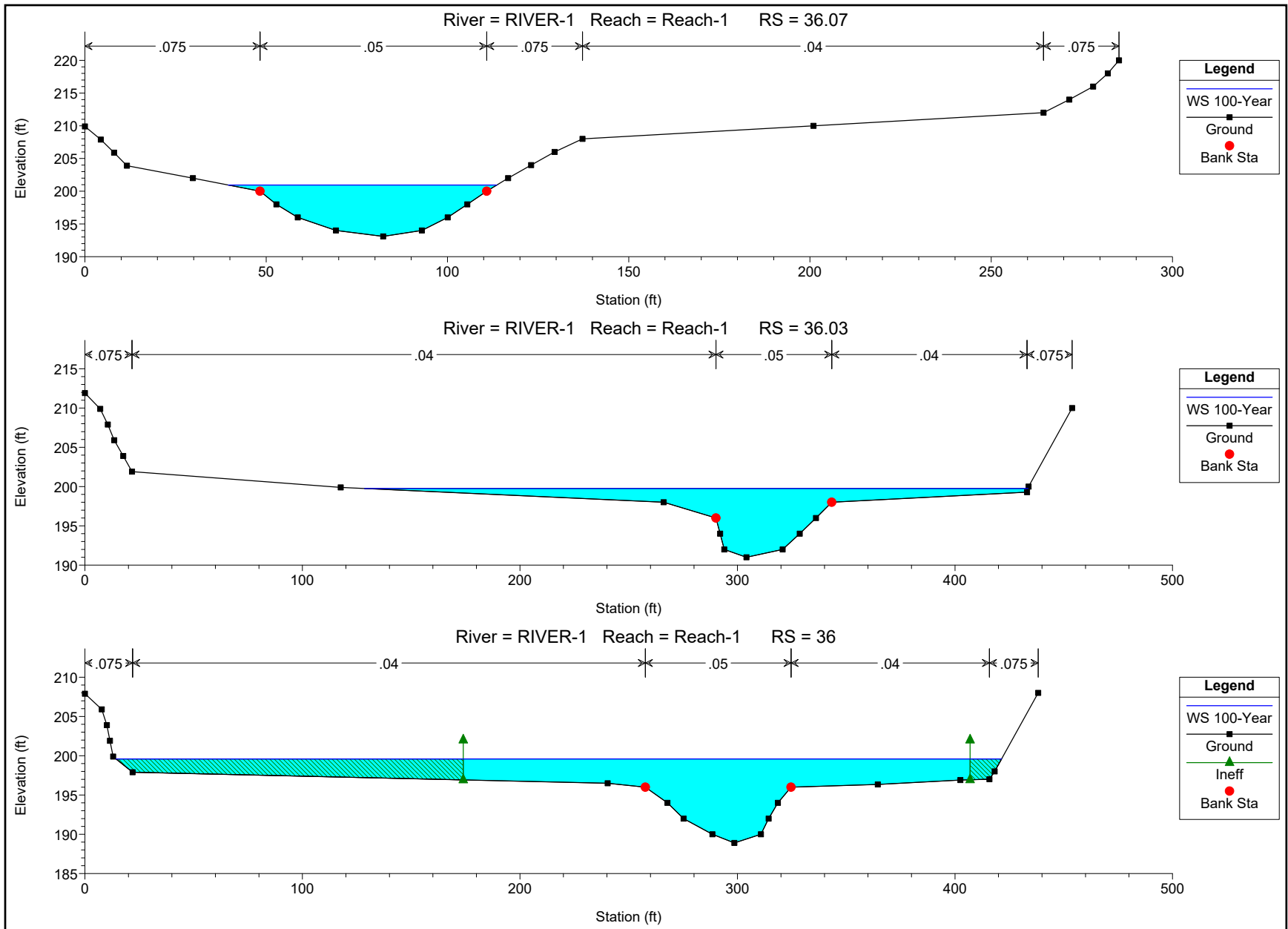


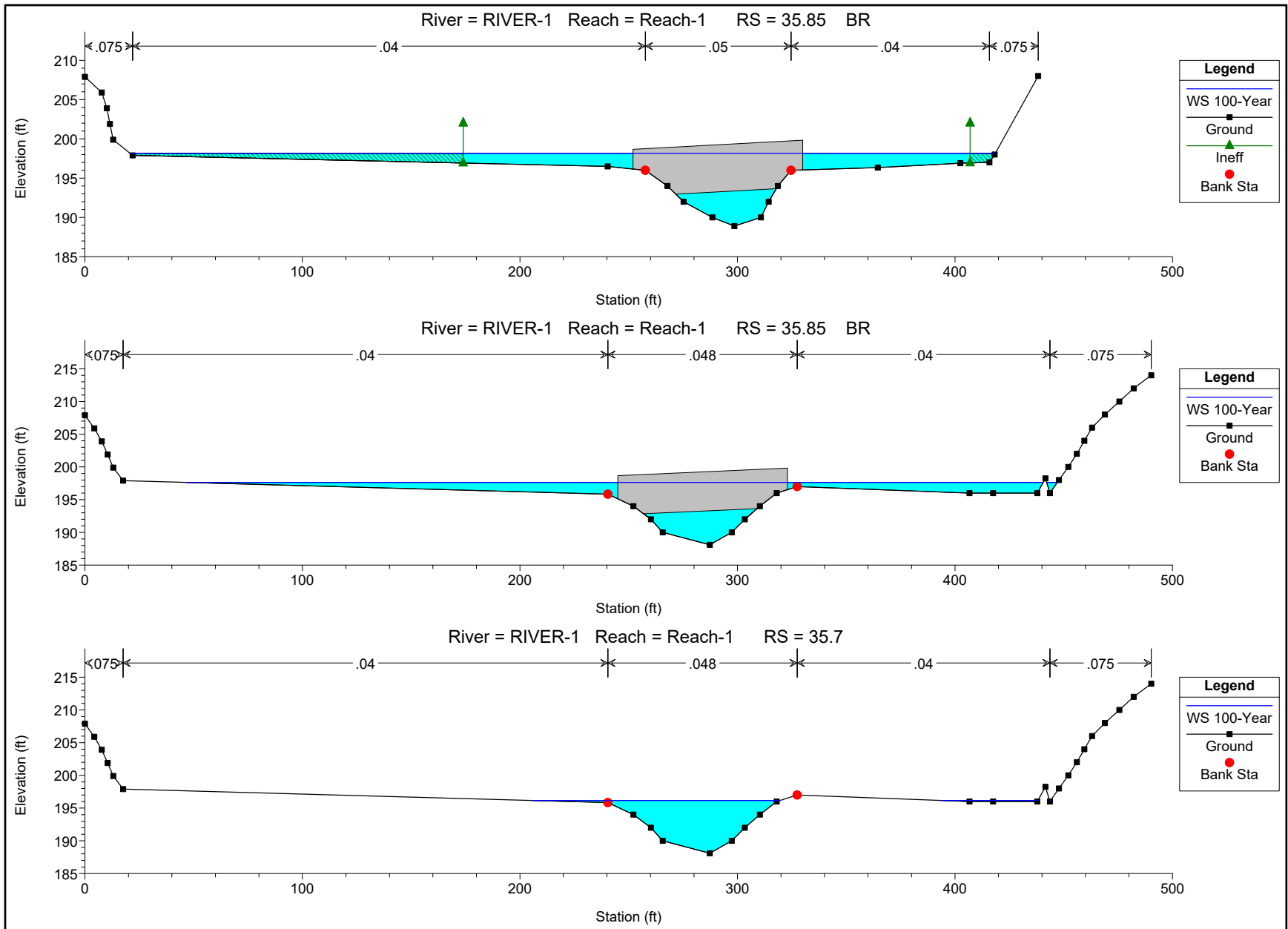


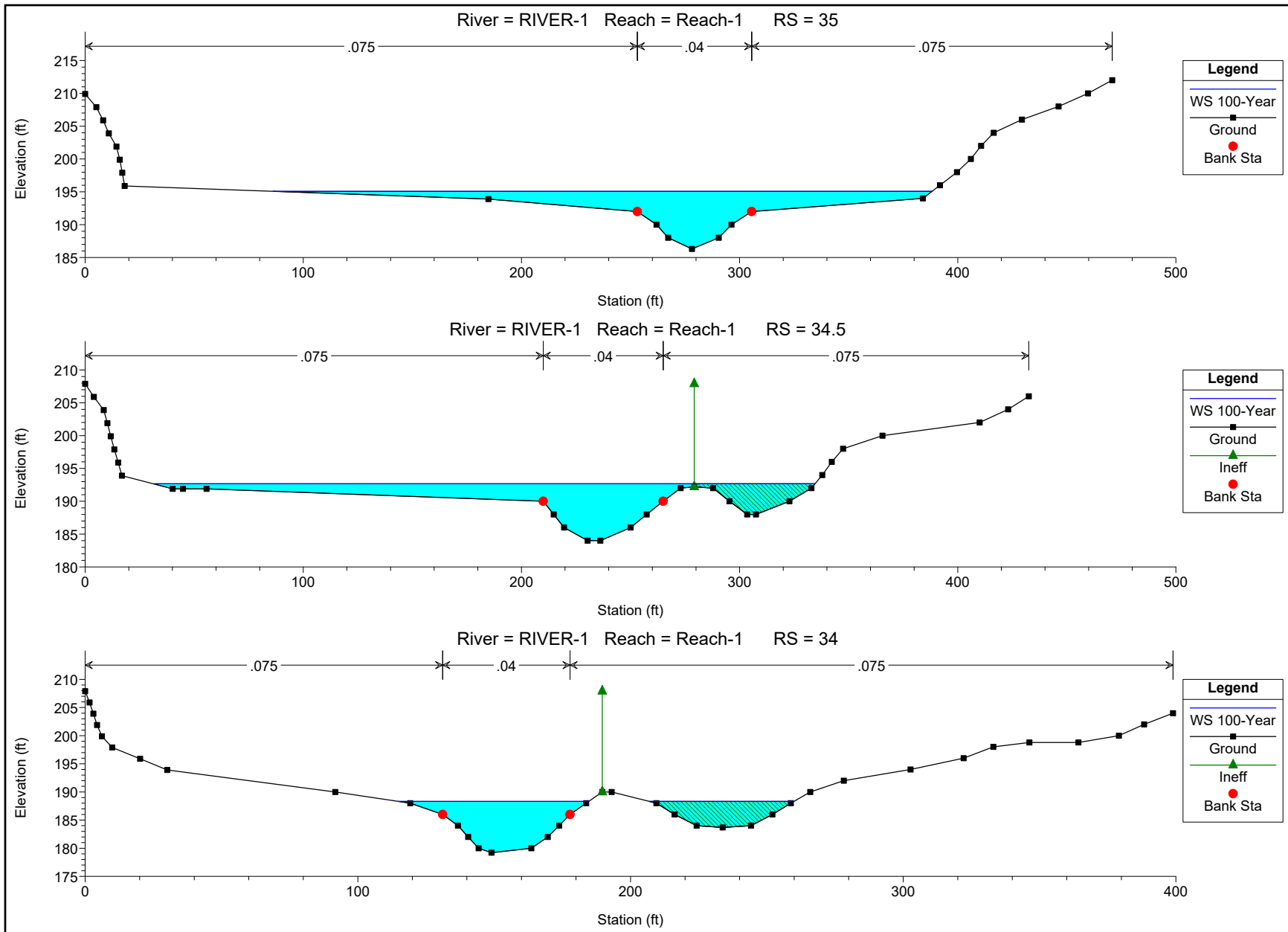




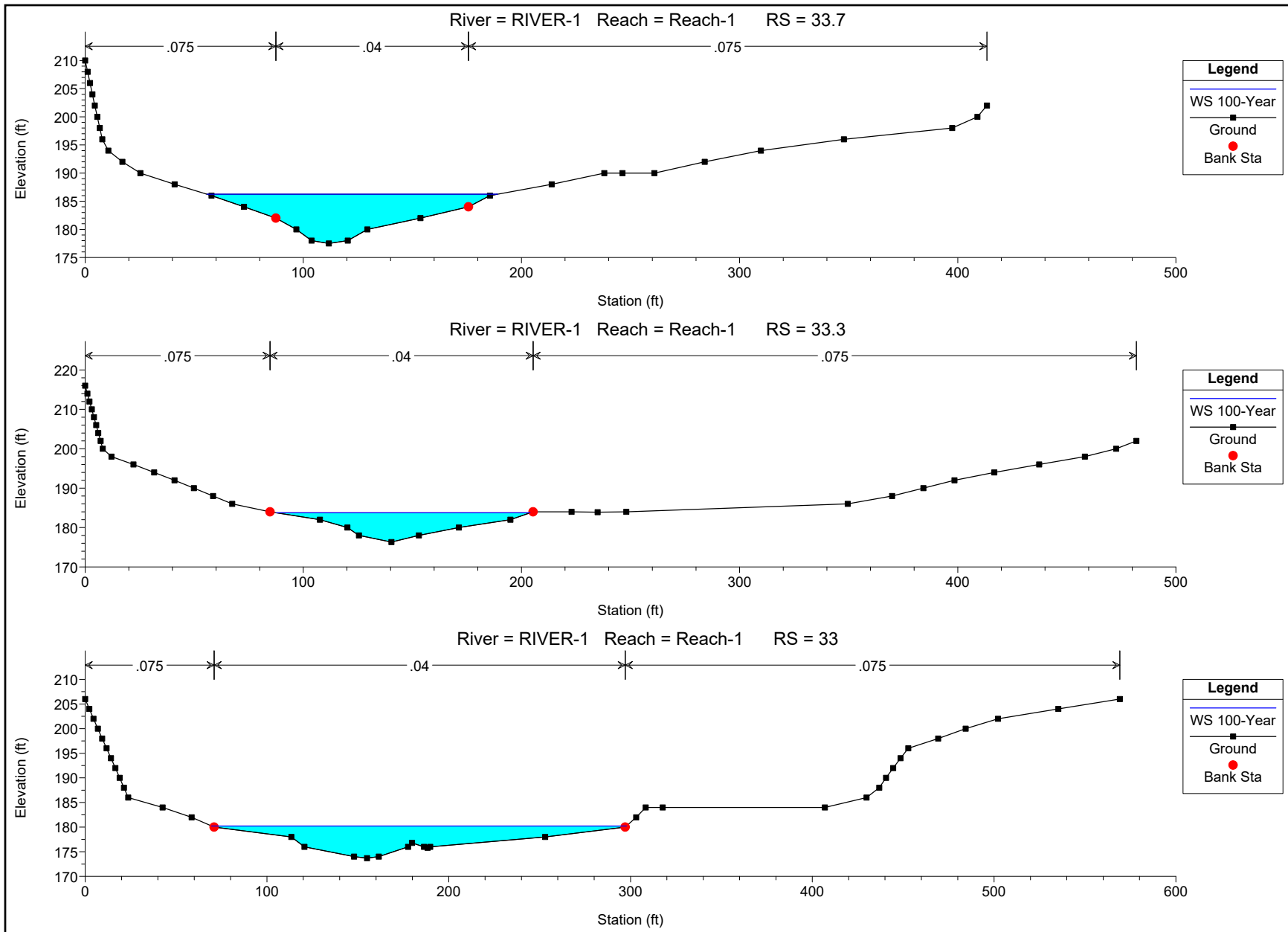


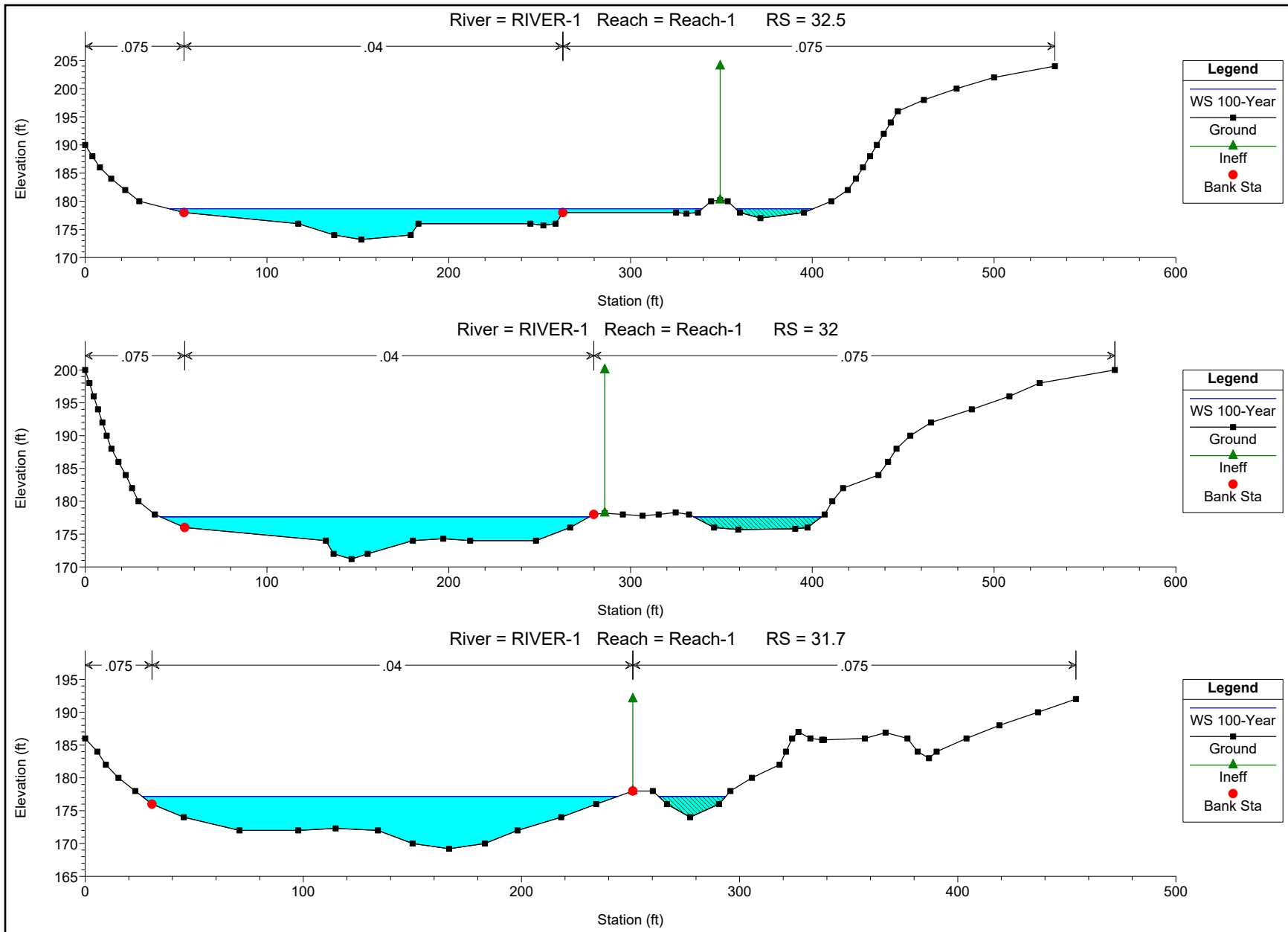


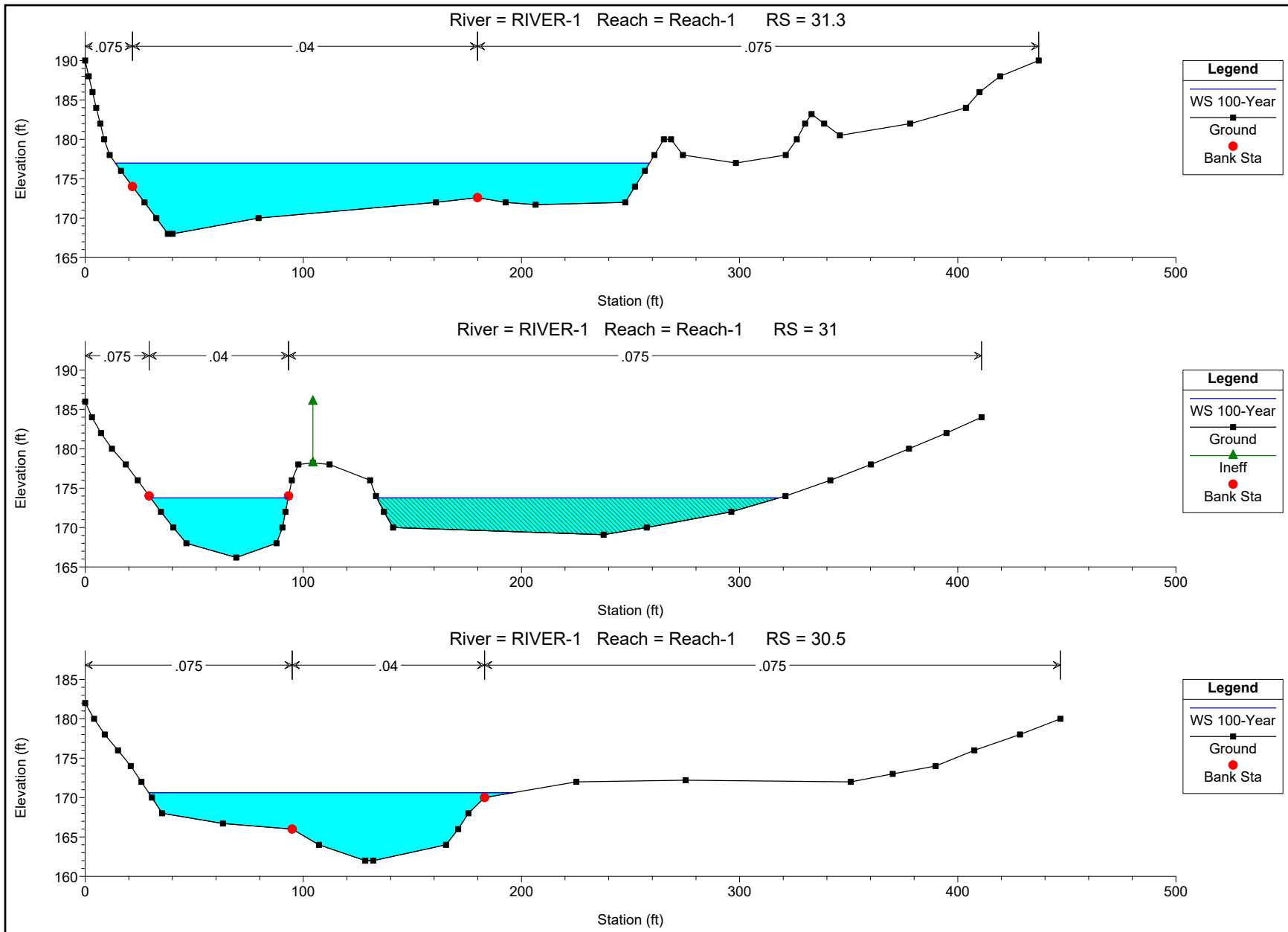


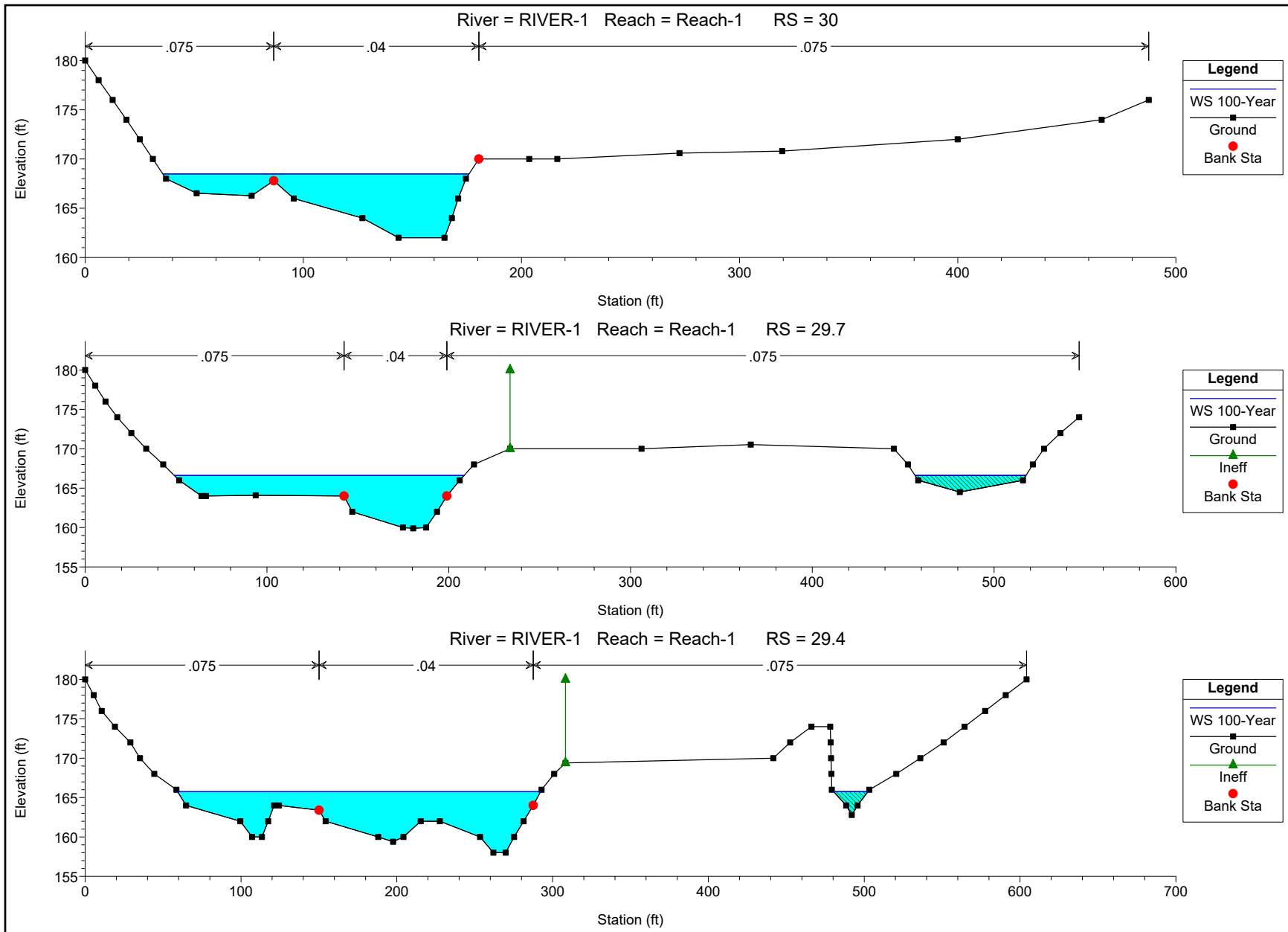


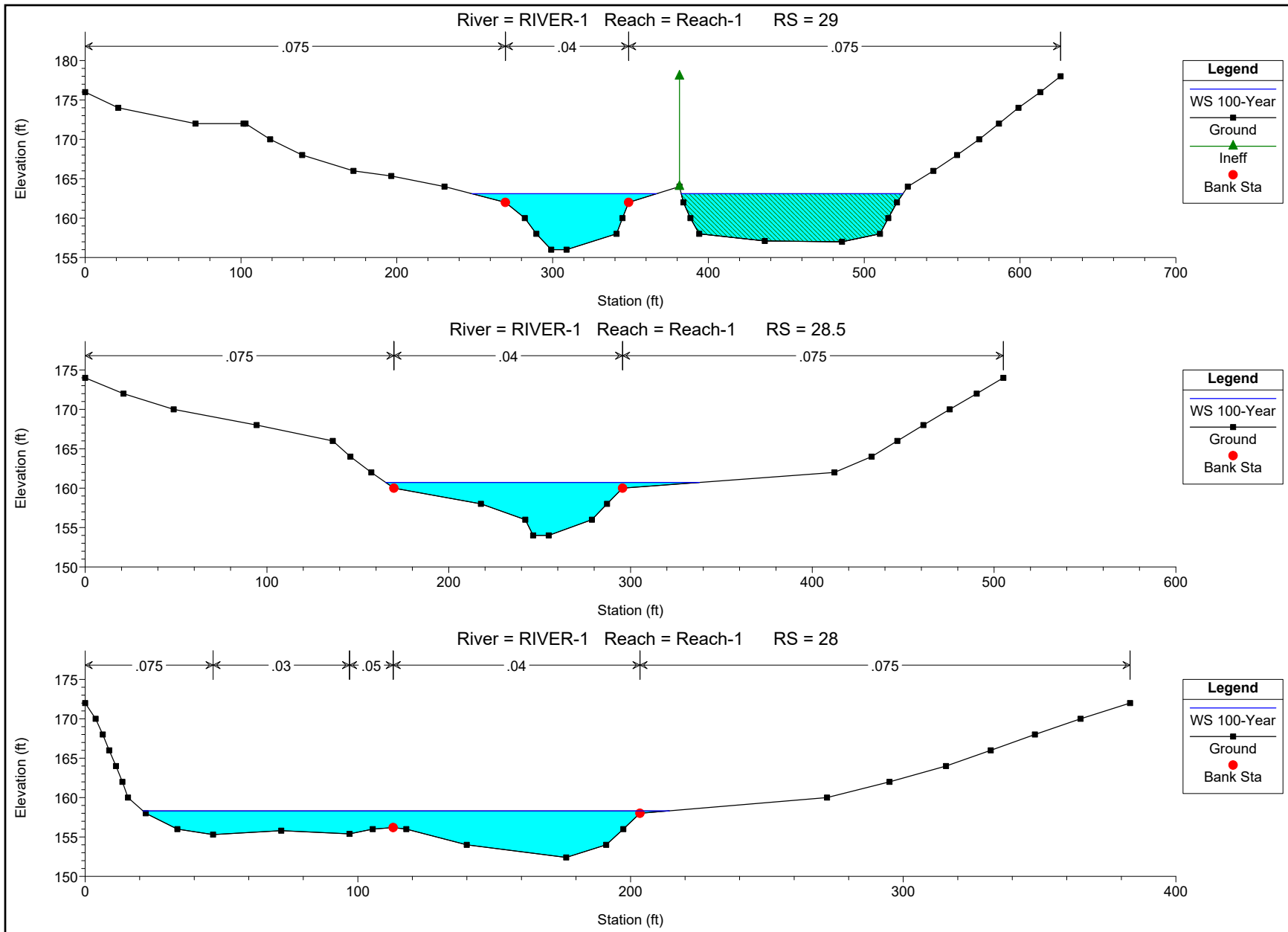


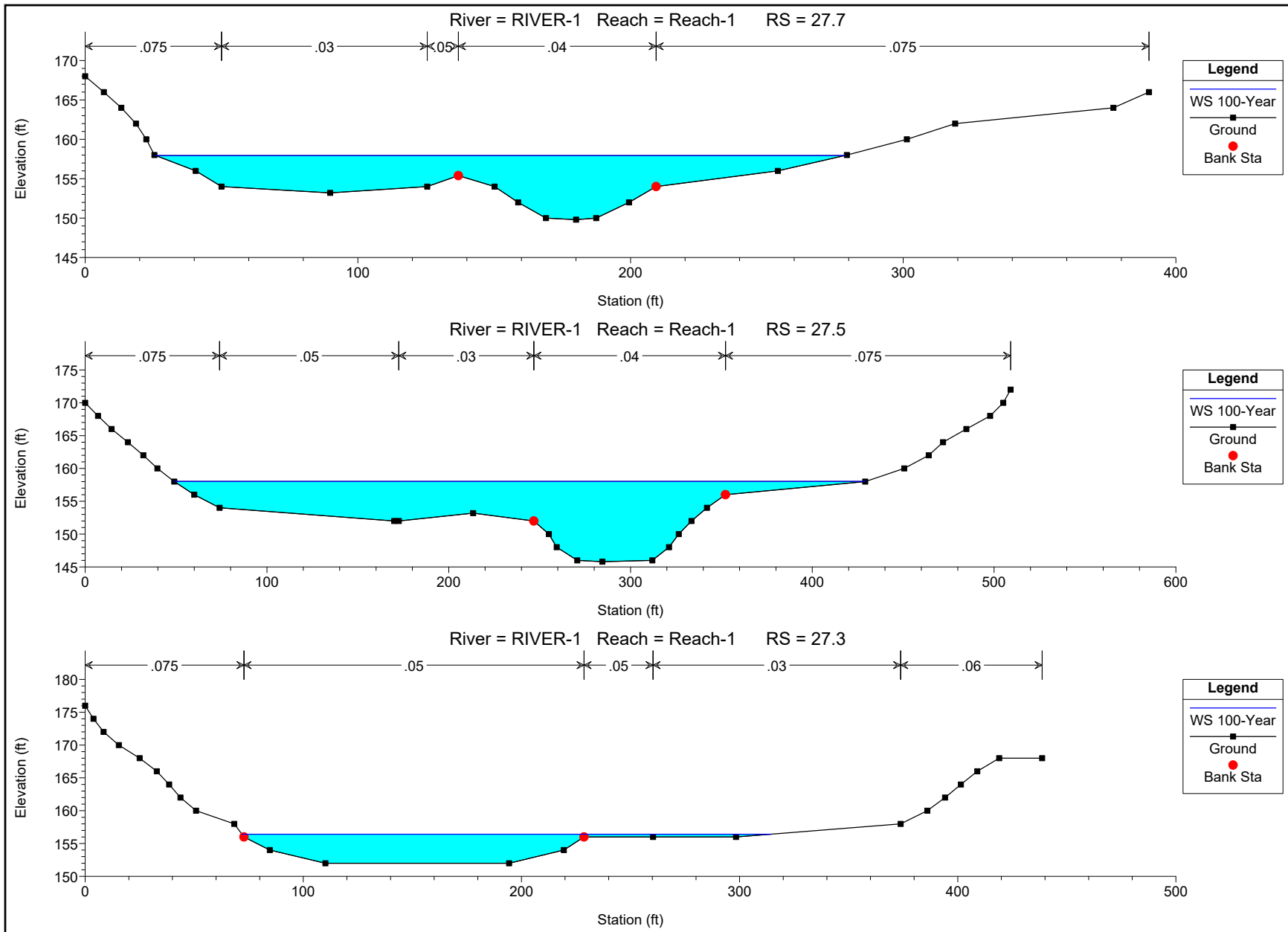


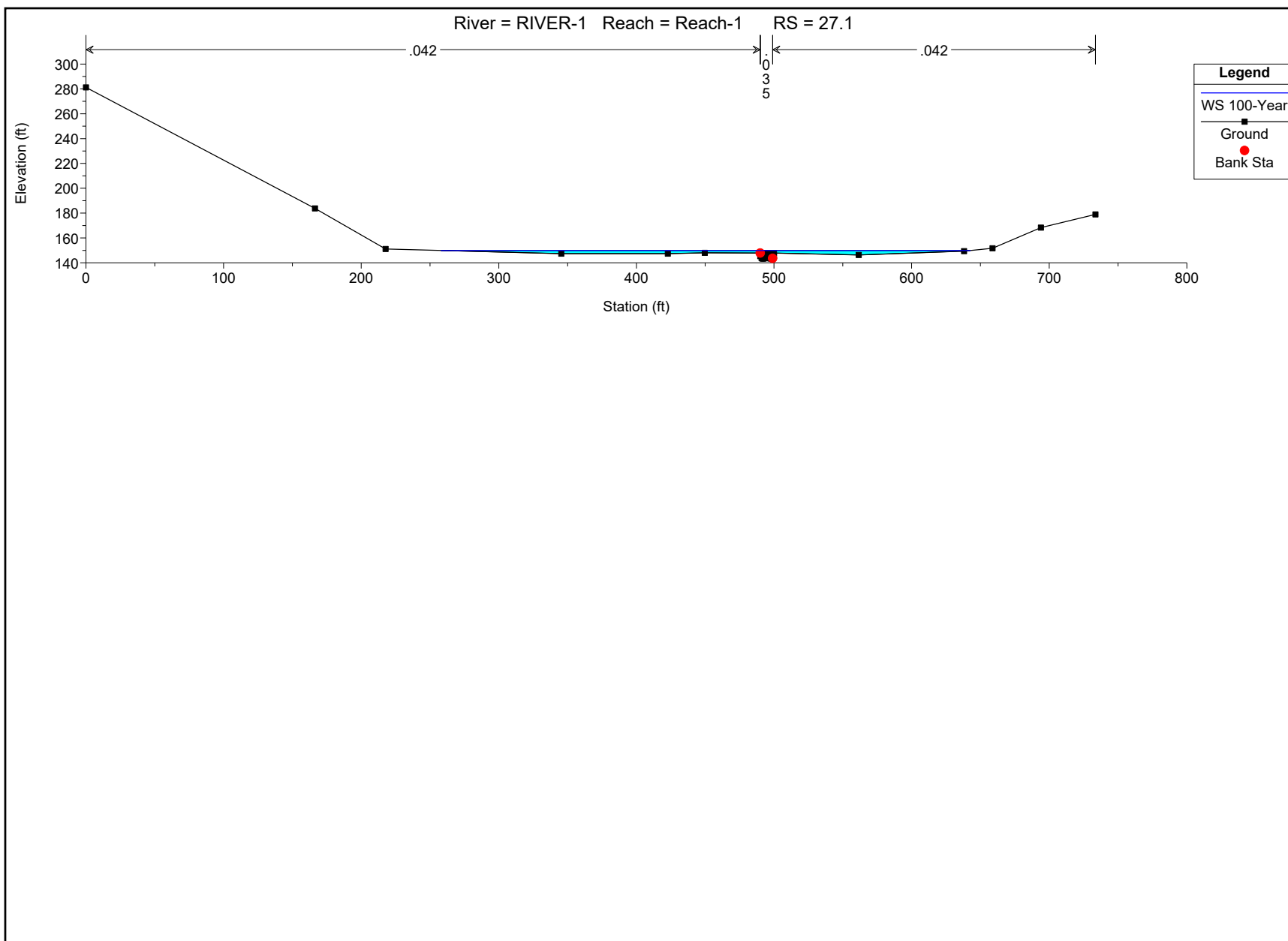














# Comparison of Existing and Proposed Condition Results

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	54	100-Year	Exist Cond	3500.00	298.80	304.06	304.06	306.19	0.013413	11.75	306.18	87.93	0.95
Reach-1	54	100-Year	PC 2019-0206	3500.00	298.80	304.06	304.06	306.19	0.013413	11.75	306.18	87.93	0.95
Reach-1	53.7	100-Year	Exist Cond	3500.00	293.90	298.15	298.08	299.32	0.016353	8.68	403.28	163.50	0.97
Reach-1	53.7	100-Year	PC 2019-0206	3500.00	293.90	298.15	298.08	299.32	0.016320	8.68	403.53	163.51	0.97
Reach-1	53.3	100-Year	Exist Cond	3500.00	291.00	295.42		296.54	0.009787	8.59	434.74	134.17	0.80
Reach-1	53.3	100-Year	PC 2019-0206	3500.00	291.00	295.42		296.54	0.009799	8.60	434.20	134.28	0.80
Reach-1	53	100-Year	Exist Cond	3500.00	286.00	292.24	292.24	293.96	0.015151	10.59	342.12	106.71	0.99
Reach-1	53	100-Year	PC 2019-0206	3500.00	286.00	292.24	292.24	293.96	0.015151	10.59	342.12	106.71	0.99
Reach-1	52.3	100-Year	Exist Cond	3500.00	283.80	288.33		289.37	0.010462	8.18	430.81	138.62	0.81
Reach-1	52.3	100-Year	PC 2019-0206	3500.00	283.80	288.33	287.92	289.37	0.010456	8.17	430.89	138.62	0.81
Reach-1	52	100-Year	Exist Cond	3500.00	280.30	284.55	284.55	285.99	0.016139	9.75	378.52	138.03	1.00
Reach-1	52	100-Year	PC 2019-0206	3500.00	280.30	284.55	284.55	285.99	0.016139	9.75	378.52	138.03	1.00
Reach-1	51.5	100-Year	Exist Cond	3500.00	275.90	280.17	279.93	281.10	0.012826	7.74	454.70	183.99	0.86
Reach-1	51.5	100-Year	PC 2019-0206	3500.00	275.90	280.52		281.24	0.008299	6.79	519.16	185.93	0.71
Reach-1	51	100-Year	Exist Cond	3500.00	272.00	276.94		277.61	0.009563	6.57	536.93	228.96	0.74
Reach-1	51	100-Year	PC 2019-0206	3500.00	272.00	276.50	276.50	277.50	0.018671	8.03	436.96	224.07	1.00
Reach-1	50.5	100-Year	Exist Cond	3500.00	267.70	276.89		277.01	0.000477	2.82	1274.46	206.85	0.19
Reach-1	50.5	100-Year	PC 2019-0206	3500.00	267.70	274.48		274.79	0.002223	4.48	802.27	203.58	0.39
Reach-1	50.1	100-Year	Exist Cond	3500.00	263.80	275.63	273.14	276.63	0.002617	9.35	672.49	126.71	0.49
Reach-1	50.1	100-Year	PC 2019-0206	3500.00	263.80	270.37	270.37	273.16	0.012227	13.92	297.41	74.87	0.97
Reach-1	50.05			Culvert									
Reach-1	50	100-Year	Exist Cond	3500.00	264.00	272.22	272.22	273.95	0.008316	10.99	373.63	117.17	0.78
Reach-1	50	100-Year	PC 2019-0206	3500.00	257.79	263.02		263.74	0.003929	7.01	559.02	123.96	0.54
Reach-1	49	100-Year	Exist Cond	3500.00	258.10	271.50		271.91	0.001188	5.17	701.31	359.88	0.30
Reach-1	48.9	100-Year	PC 2019-0206	3500.00	257.24	262.70		262.86	0.000812	3.28	1140.82	237.29	0.25
Reach-1	48.8	100-Year	Exist Cond	3500.00	257.80	271.48		271.74	0.001082	4.65	1153.43	536.40	0.28
Reach-1	48.8	100-Year	PC 2019-0206	3500.00	257.24	261.69	261.69	262.75	0.016465	12.89	602.91	232.23	1.08
Reach-1	48.7	100-Year	PC 2019-0206	3500.00	252.93	259.55		259.65	0.000418	2.68	1419.06	243.09	0.18

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	48.3	100-Year	Exist Cond	3500.00	268.00	269.95	269.93	270.80	0.018895	7.40	472.71	269.90	0.99
Reach-1	48.3	100-Year	PC 2019-0206	3500.00	252.50	258.88		259.35	0.001951	5.65	723.97	141.91	0.39
Reach-1	48.2	100-Year	PC 2019-0206	3500.00	252.50	257.45	257.45	259.18	0.012943	12.28	436.81	124.77	0.97
Reach-1	48.1	100-Year	Exist Cond	3500.00	266.00	268.80		269.34	0.010002	5.86	598.20	304.44	0.73
Reach-1	48.1	100-Year	PC 2019-0206	3500.00	250.00	257.75		258.11	0.001206	5.05	845.33	138.76	0.32
Reach-1	48	100-Year	Exist Cond	3500.00	262.00	265.77	265.73	266.72	0.012700	8.27	485.14	264.03	0.87
Reach-1	47	100-Year	Exist Cond	3500.00	260.00	263.24	263.24	264.41	0.016010	8.75	412.48	187.09	0.97
Reach-1	46.4	100-Year	PC 2019-0206	3500.00	249.27	256.28		257.02	0.002902	7.33	603.08	115.03	0.49
Reach-1	46.3	100-Year	PC 2019-0206	3500.00	246.92	254.31	254.31	256.79	0.011757	15.28	393.53	86.51	0.99
Reach-1	46.2	100-Year	PC 2019-0206	3500.00	247.27	253.76		254.15	0.001576	5.13	753.94	132.44	0.36
Reach-1	46	100-Year	Exist Cond	3500.00	248.00	255.96		256.64	0.002773	6.99	601.85	125.88	0.47
Reach-1	45.4	100-Year	PC 2019-0206	3500.00	246.92	253.27		253.68	0.001696	5.25	735.76	131.75	0.37
Reach-1	45.3	100-Year	PC 2019-0206	3500.00	246.92	251.43	251.43	253.48	0.013774	11.90	341.95	91.58	0.99
Reach-1	45.2	100-Year	PC 2019-0206	3500.00	243.42	249.88		250.27	0.001599	5.15	750.25	132.30	0.36
Reach-1	45	100-Year	Exist Cond	3500.00	244.00	251.69	251.69	254.76	0.012093	14.87	289.19	56.07	0.99
Reach-1	44.7	100-Year	PC 2019-0206	3500.00	243.12	249.47		249.88	0.001696	5.25	735.76	131.75	0.37
Reach-1	44.6	100-Year	PC 2019-0206	3500.00	243.12	247.63	247.63	249.68	0.013774	11.90	341.95	91.58	0.99
Reach-1	44.5	100-Year	PC 2019-0206	3500.00	239.62	246.21		246.58	0.001497	5.05	766.90	132.92	0.35
Reach-1	44	100-Year	Exist Cond	3500.00	240.00	252.35		252.52	0.000521	4.16	1310.22	217.48	0.22
Reach-1	44	100-Year	PC 2019-0206	3500.00	239.31	245.82		246.21	0.001556	5.11	757.06	132.55	0.35
Reach-1	43.9	100-Year	PC 2019-0206	3500.00	239.31	244.73		246.08	0.007262	9.76	427.57	97.91	0.74
Reach-1	43.8	100-Year	PC 2019-0206	3500.00	237.81	245.48		245.75	0.000887	4.30	913.68	138.34	0.27
Reach-1	43	100-Year	Exist Cond	3500.00	236.00	252.02	243.55	252.33	0.000535	5.46	1088.76	191.93	0.24
Reach-1	42.7	100-Year	PC 2019-0206	3500.00	237.40	244.99		245.38	0.001290	5.15	777.06	121.33	0.33

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	42.6	100-Year	PC 2019-0206	3500.00	237.40	244.16		245.28	0.004609	9.02	490.78	95.11	0.61
Reach-1	42.5			Culvert									
Reach-1	42.5	100-Year	PC 2019-0206	3500.00	235.90	244.75		245.02	0.000758	4.37	933.33	127.61	0.26
Reach-1	42	100-Year	Exist Cond	3500.00	230.00	240.50		241.35	0.001862	7.69	530.37	63.88	0.42
Reach-1	42	100-Year	PC 2019-0206	3500.00	235.80	244.32	240.22	244.93	0.001611	6.22	562.58	93.01	0.38
Reach-1	41	100-Year	Exist Cond	3500.00	230.00	237.87	237.87	240.74	0.011397	14.21	289.47	55.01	0.96
Reach-1	40.7	100-Year	PC 2019-0206	3500.00	235.33	243.92		244.51	0.001572	6.18	566.72	88.84	0.37
Reach-1	40.3	100-Year	Exist Cond	3500.00	224.00	232.74	232.74	235.66	0.010373	14.94	297.51	78.06	0.93
Reach-1	40.11	100-Year	PC 2019-0206	3500.00	235.07	243.72		244.16	0.001270	5.58	775.80	116.03	0.33
Reach-1	40.1	100-Year	Exist Cond	3500.00	222.00	229.45	229.45	232.14	0.011127	13.92	307.91	87.24	0.94
Reach-1	40.1	100-Year	PC 2019-0206	3500.00	235.00	241.45	241.45	243.94	0.014679	12.64	276.96	55.82	1.00
Reach-1	40	100-Year	Exist Cond	3500.00	218.00	228.19		229.57	0.003656	9.97	450.69	127.77	0.57
Reach-1	40	100-Year	PC 2019-0206	3500.00	231.93	241.49		242.06	0.001472	6.42	698.18	99.73	0.37
Reach-1	39.7	100-Year	PC 2019-0206	3500.00	231.75	241.68		241.85	0.000413	3.49	1278.10	165.84	0.20
Reach-1	39.61	100-Year	PC 2019-0206	3500.00	231.61	241.68		241.80	0.000277	2.88	1485.48	184.80	0.16
Reach-1	39.6	100-Year	PC 2019-0206	3500.00	231.60	238.57	238.57	241.51	0.011655	14.63	306.05	57.87	0.98
Reach-1	39.5	100-Year	Exist Cond	3500.00	215.80	224.84	224.84	228.13	0.010949	16.73	325.55	127.34	0.99
Reach-1	39.5	100-Year	PC 2019-0206	3500.00	226.80	236.59		236.83	0.000633	4.28	1066.65	148.00	0.24
Reach-1	39.4	100-Year	PC 2019-0206	3500.00	226.66	236.57		236.76	0.000484	3.77	1188.02	161.85	0.21
Reach-1	39.31	100-Year	PC 2019-0206	3500.00	226.51	236.60		236.70	0.000225	2.60	1583.29	188.73	0.14
Reach-1	39.3	100-Year	PC 2019-0206	3500.00	226.50	233.47	233.47	236.41	0.011655	14.63	306.05	57.87	0.98
Reach-1	39.2	100-Year	PC 2019-0206	3500.00	222.00	225.88	225.67	227.40	0.012264	10.16	385.12	114.83	0.91
Reach-1	39.1	100-Year	PC 2019-0206	3500.00	218.00	224.40	223.31	225.56	0.006477	9.03	454.60	102.54	0.69
Reach-1	39	100-Year	Exist Cond	3500.00	216.00	221.83		222.24	0.001912	5.26	736.17	143.52	0.38
Reach-1	39	100-Year	PC 2019-0206	3500.00	217.93	222.50	222.50	224.52	0.014208	12.14	356.75	93.86	1.00

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	38.9	100-Year	PC 2019-0206	3500.00	214.00	221.13		221.75	0.002455	6.54	623.46	115.76	0.45
Reach-1	38.8	100-Year	Exist Cond	3500.00	214.00	219.08	219.08	221.47	0.013877	12.41	282.02	93.19	1.00
Reach-1	38.8	100-Year	PC 2019-0206	3500.00	214.00	219.06	219.06	221.47	0.014031	12.45	281.09	115.14	1.01
Reach-1	38.5		Culvert										
Reach-1	38.2	100-Year	Exist Cond	3500.00	209.80	217.12		218.80	0.007716	10.40	336.63	180.89	0.77
Reach-1	38.2	100-Year	PC 2019-0206	3500.00	209.80	217.12		218.80	0.007716	10.40	336.62	180.89	0.77
Reach-1	38	100-Year	Exist Cond	3500.00	207.80	214.97	214.69	217.09	0.018463	11.71	301.89	65.59	0.91
Reach-1	38	100-Year	PC 2019-0206	3500.00	207.80	214.97	214.69	217.09	0.018459	11.71	301.91	65.59	0.91
Reach-1	37.4	100-Year	Exist Cond	3500.00	205.40	212.72		214.06	0.011766	9.28	377.03	75.06	0.73
Reach-1	37.4	100-Year	PC 2019-0206	3500.00	205.40	212.72		214.06	0.011777	9.29	376.90	75.05	0.73
Reach-1	37	100-Year	Exist Cond	3500.00	203.90	210.27	209.93	211.94	0.018735	10.35	338.10	80.90	0.89
Reach-1	37	100-Year	PC 2019-0206	3500.00	203.90	210.27	209.93	211.94	0.018702	10.35	338.31	80.92	0.89
Reach-1	36.3	100-Year	Exist Cond	3500.00	202.90	209.06	208.80	210.55	0.015753	9.93	385.66	123.66	0.83
Reach-1	36.3	100-Year	PC 2019-0206	3500.00	202.90	209.04	208.80	210.54	0.015922	9.96	384.08	123.55	0.84
Reach-1	36.2	100-Year	Exist Cond	3500.00	199.90	207.11		207.94	0.005687	7.42	505.51	97.61	0.53
Reach-1	36.2	100-Year	PC 2019-0206	3500.00	199.90	207.19		207.92	0.005589	6.85	513.27	97.96	0.52
Reach-1	36.1	100-Year	Exist Cond	3500.00	195.60	203.97		205.53	0.013064	10.01	349.68	66.54	0.77
Reach-1	36.1	100-Year	PC 2019-0206	3500.00	195.60	203.98		205.54	0.012990	9.99	350.41	66.60	0.77
Reach-1	36.07	100-Year	Exist Cond	3500.00	193.10	200.97		202.55	0.012373	10.11	351.07	74.35	0.76
Reach-1	36.07	100-Year	PC 2019-0206	3500.00	193.10	200.95		202.54	0.012531	10.15	349.54	74.10	0.76
Reach-1	36.03	100-Year	Exist Cond	3500.00	191.00	199.76	199.20	200.46	0.005508	7.54	647.88	337.38	0.52
Reach-1	36.03	100-Year	PC 2019-0206	3500.00	191.00	199.76		200.45	0.005445	7.49	639.70	305.03	0.51
Reach-1	36	100-Year	Exist Cond	3500.00	188.90	199.61	197.20	199.80	0.001213	3.99	1036.43	449.00	0.25
Reach-1	36	100-Year	PC 2019-0206	3500.00	188.90	199.60	197.20	199.79	0.001221	4.00	1034.24	407.14	0.25
Reach-1	35.85		Bridge										
Reach-1	35.7	100-Year	Exist Cond	3500.00	188.10	196.16	195.45	197.65	0.013925	9.80	367.42	158.47	0.81
Reach-1	35.7	100-Year	PC 2019-0206	3500.00	188.10	196.16	195.45	197.65	0.013925	9.80	367.42	158.47	0.81
Reach-1	35	100-Year	Exist Cond	3500.00	186.30	195.08	194.46	196.03	0.004892	8.63	695.86	302.16	0.61

HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	35	100-Year	PC 2019-0206	3500.00	186.30	195.08	194.46	196.03	0.004892	8.63	695.86	302.16	0.61
Reach-1	34.5	100-Year	Exist Cond	4500.00	184.00	192.66	192.66	194.22	0.007391	10.83	649.82	303.30	0.75
Reach-1	34.5	100-Year	PC 2019-0206	4500.00	184.00	192.66	192.66	194.22	0.007391	10.83	649.82	303.30	0.75
Reach-1	34	100-Year	Exist Cond	4500.00	179.20	188.33	188.33	191.38	0.012185	14.11	339.69	123.15	0.96
Reach-1	34	100-Year	PC 2019-0206	4500.00	179.20	188.33	188.33	191.38	0.012185	14.11	339.69	123.15	0.96
Reach-1	33.7	100-Year	Exist Cond	4500.00	177.50	186.25		187.35	0.005275	8.57	583.91	133.18	0.63
Reach-1	33.7	100-Year	PC 2019-0206	4500.00	177.50	186.25		187.35	0.005275	8.57	583.91	133.18	0.63
Reach-1	33.3	100-Year	Exist Cond	4500.00	176.30	183.74	183.74	185.55	0.015563	10.79	417.04	116.21	1.00
Reach-1	33.3	100-Year	PC 2019-0206	4500.00	176.30	183.74	183.74	185.55	0.015563	10.79	417.04	116.21	1.00
Reach-1	33	100-Year	Exist Cond	4500.00	173.70	180.22		180.87	0.006898	6.49	693.26	228.17	0.65
Reach-1	33	100-Year	PC 2019-0206	4500.00	173.70	180.22		180.87	0.006898	6.49	693.26	228.17	0.65
Reach-1	32.5	100-Year	Exist Cond	4500.00	173.20	178.66		179.45	0.008896	7.19	669.56	335.72	0.74
Reach-1	32.5	100-Year	PC 2019-0206	4500.00	173.20	178.66		179.45	0.008896	7.19	669.56	335.72	0.74
Reach-1	32	100-Year	Exist Cond	4500.00	171.20	177.63		178.18	0.005116	5.97	762.92	306.38	0.57
Reach-1	32	100-Year	PC 2019-0206	4500.00	171.20	177.63		178.18	0.005116	5.97	762.92	306.38	0.57
Reach-1	31.7	100-Year	Exist Cond	4500.00	169.20	177.19		177.49	0.001704	4.37	1032.99	248.98	0.35
Reach-1	31.7	100-Year	PC 2019-0206	4500.00	169.20	177.19		177.49	0.001704	4.37	1032.99	248.98	0.35
Reach-1	31.3	100-Year	Exist Cond	4500.00	168.00	176.99		177.19	0.000918	3.85	1388.37	244.82	0.27
Reach-1	31.3	100-Year	PC 2019-0206	4500.00	168.00	176.99		177.19	0.000918	3.85	1388.37	244.82	0.27
Reach-1	31	100-Year	Exist Cond	4500.00	166.20	173.76	173.76	176.46	0.014382	13.20	340.84	247.35	1.00
Reach-1	31	100-Year	PC 2019-0206	4500.00	166.20	173.76	173.76	176.46	0.014382	13.20	340.84	247.35	1.00
Reach-1	30.5	100-Year	Exist Cond	4500.00	162.00	170.62		171.26	0.002809	6.81	814.78	166.92	0.47
Reach-1	30.5	100-Year	PC 2019-0206	4500.00	162.00	170.62		171.26	0.002809	6.81	814.78	166.92	0.47
Reach-1	30	100-Year	Exist Cond	4500.00	162.00	168.48	168.48	170.25	0.012882	10.98	470.01	140.30	0.93
Reach-1	30	100-Year	PC 2019-0206	4500.00	162.00	168.48	168.48	170.25	0.012882	10.98	470.01	140.30	0.93
Reach-1	29.7	100-Year	Exist Cond	4500.00	159.90	166.61	166.61	168.41	0.010670	11.79	544.77	220.46	0.89
Reach-1	29.7	100-Year	PC 2019-0206	4500.00	159.90	166.61	166.61	168.41	0.010670	11.79	544.77	220.46	0.89
Reach-1	29.4	100-Year	Exist Cond	4500.00	158.00	165.76		166.21	0.002752	5.69	960.07	255.08	0.45
Reach-1	29.4	100-Year	PC 2019-0206	4500.00	158.00	165.76		166.21	0.002752	5.69	960.07	255.08	0.45

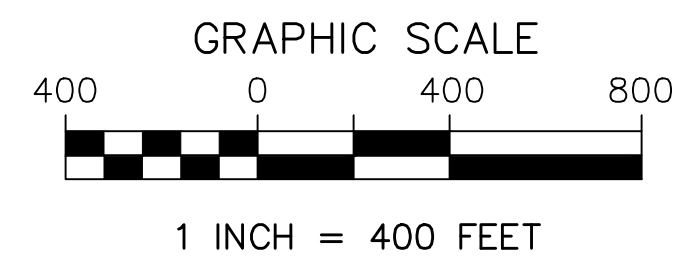
HEC-RAS River: RIVER-1 Reach: Reach-1 Profile: 100-Year (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	29	100-Year	Exist Cond	4500.00	156.00	163.10	162.71	164.99	0.010376	11.07	425.57	260.70	0.86
Reach-1	29	100-Year	PC 2019-0206	4500.00	156.00	163.10	162.71	164.99	0.010376	11.07	425.57	260.70	0.86
Reach-1	28.5	100-Year	Exist Cond	4500.00	154.00	160.73	160.73	162.34	0.014547	10.23	454.84	172.57	0.97
Reach-1	28.5	100-Year	PC 2019-0206	4500.00	154.00	160.73	160.73	162.34	0.014547	10.23	454.84	172.57	0.97
Reach-1	28	100-Year	Exist Cond	4500.00	152.40	158.32		159.22	0.007320	8.14	602.62	193.08	0.71
Reach-1	28	100-Year	PC 2019-0206	4500.00	152.40	158.32		159.22	0.007320	8.14	602.62	193.08	0.71
Reach-1	27.7	100-Year	Exist Cond	4500.00	149.80	157.95		158.33	0.001810	5.20	1001.46	252.95	0.37
Reach-1	27.7	100-Year	PC 2019-0206	4500.00	149.80	157.95		158.33	0.001810	5.20	1001.46	252.95	0.37
Reach-1	27.5	100-Year	Exist Cond	4500.00	145.80	158.04		158.12	0.000274	2.71	2031.97	380.62	0.16
Reach-1	27.5	100-Year	PC 2019-0206	4500.00	145.80	158.04		158.12	0.000274	2.71	2031.97	380.62	0.16
Reach-1	27.3	100-Year	Exist Cond	5600.00	152.00	156.42	156.42	157.82	0.018183	9.56	609.13	242.53	0.88
Reach-1	27.3	100-Year	PC 2019-0206	5600.00	152.00	156.42	156.42	157.82	0.018183	9.56	609.13	242.53	0.88
Reach-1	27.1	100-Year	Exist Cond	5600.00	143.30	149.90	149.55	150.60	0.012688	8.49	841.26	384.57	0.66
Reach-1	27.1	100-Year	PC 2019-0206	5600.00	143.30	149.90	149.55	150.60	0.012688	8.49	841.26	384.57	0.66

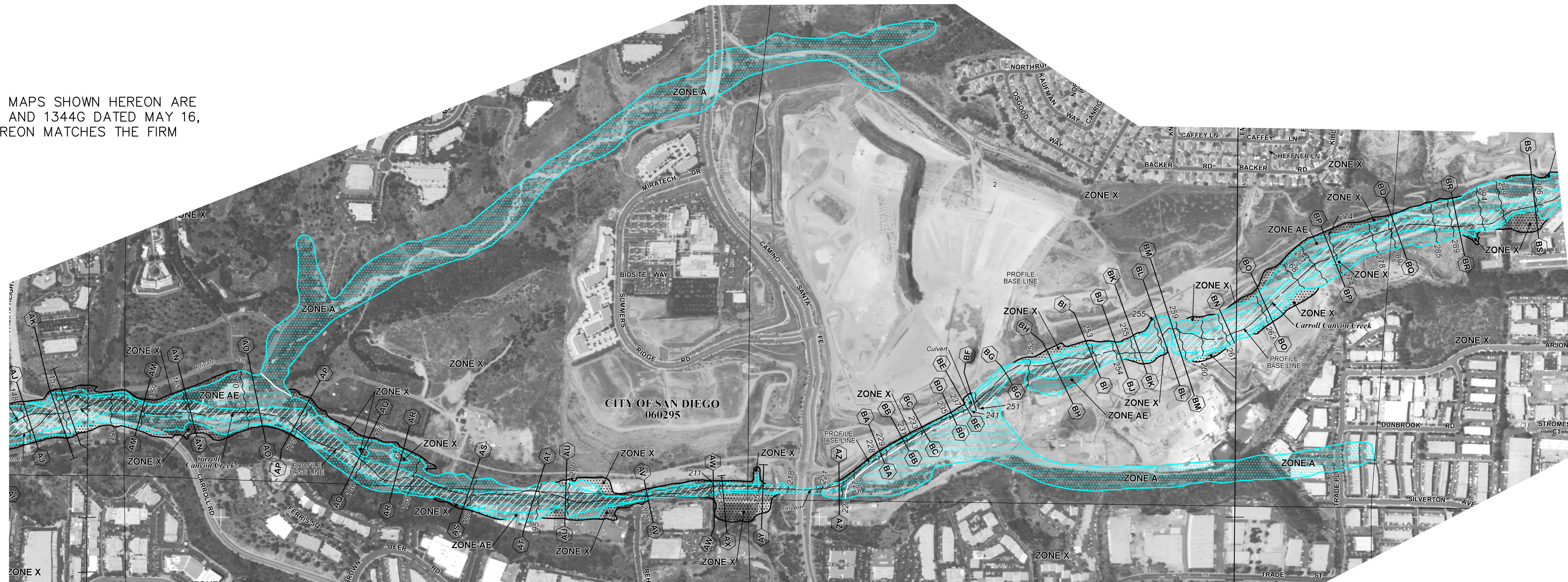
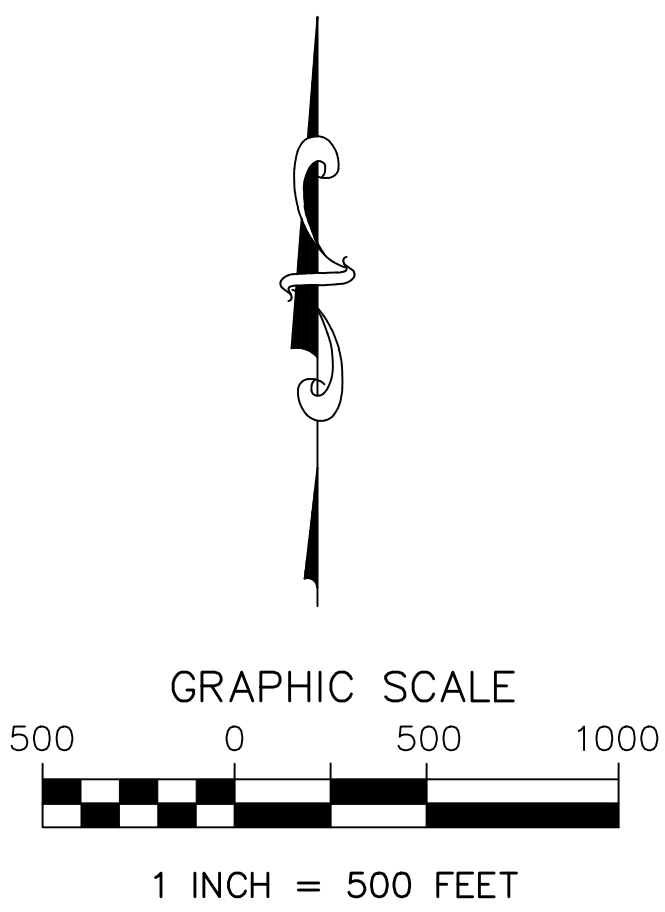


**LEGEND:**

- EXISTING CONDITION HEC-RAS CROSS-SECTION
- PROPOSED CONDITION HEC-RAS CROSS-SECTION
- PROPOSED ARCH CULVERT
- PROPOSED GRADING AND SITE PLAN



**NOTES:**  
 THE FLOOD INSURANCE RATE MAPS SHOWN HEREON ARE MAP NUMBERS 06073C1343G AND 1344G DATED MAY 16, 2012. THE SCALE SHOWN HEREON MATCHES THE FIRM SCALE, WHICH IS 1"=500'.



HEC-RAS WORK MAP AND FIRM