INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT FOR ALVARADO CHANNEL (UPPER PORTION) MAP NUMBERS 63 & 64

August 5, 2010
Job Number 15541-A

RICK
ENGINEERING COMPANY

INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT

Site Name/Facility: Alvarado Channel (Upper Portion)
Map Numbers 63 & 64

Date: August 5, 2010

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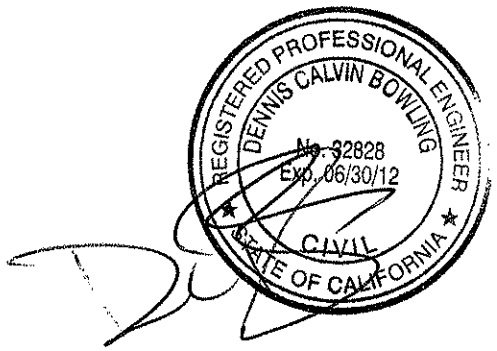


• **Instructions**: This form must be completed for each target facility following the completion of the Individual Maintenance Plan (IMP) report form and prior to any work being conducted in the facility. Attach additional sheets if needed.

Description of creek/channel (limits of reach, surrounding land use and area, creek/channel geometry and vegetative condition):

The area of study extends from the location where the channel transitions from an underground culvert, immediately south of Alvarado Road, and flows in a westerly direction for approximately 4,000 feet to a point where the channel is conveyed in a crossing under College Avenue (see workmap located in the Attachments). This portion of the channel is aligned south of the medical and commercial buildings that are located on the south side of Alvarado Road. The upper portion of the channel, within the area of study, is fully concrete lined (approximately 1,400 feet). The central portion of the channel consists of concrete lined side slopes and a natural bottom (approximately 1,400 feet). The downstream portion of the area of study is a natural channel (approximately 1,400 feet). The channel geometry is trapezoidal in shape throughout the area of study.

For purposes of this assessment, the area of study has been divided into three reaches: Reach 1 (HEC-RAS Cross Sections 5.8 to 1432.62), Reach 2 (HEC-RAS Cross Sections 1432.62 to 2808.99) and Reach 3 (HEC-RAS Cross Sections 2808.99 to 3975.02). Reach 1 is the most downstream reach. Reach 1 extends from the downstream limits of the area of study and continues upstream for approximately 1,400 feet. Reach 1 consists of dense vegetation and is bounded by Alvarado Road to the north and a parking lot to the south. At the upstream limits of Reach 1 there is an existing pedestrian bridge. The downstream limits of Reach 2 begins approximately 120 feet upstream of the existing pedestrian bridge and extend upstream approximately 1,400 feet. Reach 2 has dense vegetation in the lower portion and is bounded by commercial and medical buildings to the north and a vegetated slope to the south. Reach 3 is the most upstream reach and is approximately 1,200 feet in length. Reach 3 is relatively free of vegetation and is bounded by the commercial and medical building to the north and a vegetated slope on the south. The channel at the upstream portion of Reach 3 is located immediately adjacent to a hospital.

Note: See attached pictures

Hydrologic information (source of hydrologic information, summary of flow rates and return frequencies):

There are two (2) sources to hydrologic information. The first source of hydrologic information is based on the Federal Emergency Management Agency's (FEMA's) DRAFT (no date) Flood Insurance Study (FIS). The second source of hydrologic information is based on FEMA's 2006 FIS. The difference between these two sources is that the DRAFT FIS has not been officially adopted at the authoring of this assessment. While the hydrologic information utilized for this project is based on the 2006 FIS, hydrologic information from the DRAFT FIS was compared for any discrepancies of information. For this project reach, no discrepancies were

noted. The FIS provided the 10-, 50-, and 100-year flow rate information. This flow rate information was then plotted on log-probability paper to determine a flow rate distribution. From this distribution, flow rates were determined and equated to a storm event. The following flow rates were provided in the FIS:

100-Year = 3,900 cubic feet per second (cfs)
50-Year = 3,400 cfs
10-Year = 2,100 cfs

The following flow rates were determined from log-probability paper:

35-Year = 3,000 cfs
7-Year = 2,000 cfs
5-Year = 1,700 cfs
2-Year = 1,000 cfs

Hydraulic analyses (description of hydraulic models created for project):

The US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) Version 4.0 was used to analyze the hydraulic characteristics of Alvarado Channel. HEC-RAS has the ability to perform one-dimensional hydraulic calculations for natural and engineered channels, by utilizing the energy equation and the momentum equation. For the purposes of this project, all HEC-RAS modeling was performed using a sub-critical flow regime.

The hydraulic modeling prepared for the Current Vegetated Condition, Ultimate Vegetated Condition, the three Maintained Conditions (no sediment removed), and Maintained Condition (sediment removed) analyses are based on the 1999 City of San Diego 2-foot contour topographic information. The topography and the hydraulic modeling performed for Alvarado Channel are all on the National Geodetic Vertical Datum of 1929 (NGVD 29).

The following provides general descriptions of hydraulic analyses/models that were prepared for this area of study:

Current Vegetated Condition:

The hydraulic analysis for Current Vegetated Condition was created to reflect the current vegetated condition of the channel and determine the actual channel capacity. A field visit was performed on October 13, 2009 to determine and confirm the Manning's Roughness Coefficients within Alvarado Channel for the Current Vegetated Condition.

Based on the site visit, it was determined that Manning's Roughness Coefficients ranged from an n-value of 0.018 for concrete portion to an n-value of 0.15, reflecting dense vegetation.

Note: See Hydraulic Profiles for Current Vegetated Condition Model and Workmap

Ultimate Vegetated Condition:

The Ultimate Vegetated Condition reflects dense vegetation in the channel, which assumes no maintenance is being performed. The existing vegetation that currently exists in the channel will become more dense. This dense vegetation will reduce velocities. The slower velocities will cause sediment to drop out and ultimately cause deposition in the upstream areas where the channel is fully lined. The vegetation will migrate upstream and thus further decrease the capacity of the channel and potentially cause flooding to occur more frequently.

To establish this ultimate vegetated condition in the hydraulic model, a Manning's Roughness Coefficients of 0.15 was assumed throughout the area of study.

Note: See Hydraulic Profiles for Ultimate Vegetated Condition Model and Workmap

Maintained Condition (No sediment removed): 3 models were prepared.

1. Maintained Condition (Bank to Bank):

This Maintained Condition (Bank to Bank) assumes vegetation-only maintenance of the channel. With this model, maintenance was proposed for the bottom and the sides of the channel. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above described limits of maintenance, to establish the maintained condition (bank to bank) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the bottom and the sides of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

2. Maintained Condition (bottom of the channel only):

This Maintained Condition (bottom of the channel only) assumes vegetation-only maintenance of the channel bottom. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above-described limits of maintenance, to establish the maintained condition (bottom of the channel only) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the bottom of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

3. Maintained Condition (25-30 foot swath only):

This Maintained Condition (25-30 foot swath only) assumes vegetation-only maintenance of a 25-30-foot swath at the bottom of the channel. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 1,400 feet upstream of the beginning limits of maintenance.

For the above described limits of maintenance, to establish the maintained condition (25-30-foot swath) in this hydraulic model, the Manning's Roughness Coefficient of 0.035 was utilized for the 25-30-foot swath of the bottom of the channel. For the portions of the channel that is concrete lined, the Manning's Roughness Coefficient of 0.018 was utilized.

Additional Notes:
For the three models prepared for the Maintained Condition (No sediment removed), it is important to note that the Manning's Roughness Coefficients for the remaining portions of the channel, outside of the limits of maintenance, were kept the same as the current vegetated condition.

Note: See Hydraulic Profiles for Maintained Condition Model (no sediment removed) and Workmap

Maintained Condition (Sediment and vegetation removed): 2 models were prepared.

1. Maintained Condition (bottom of the channel only):

In addition to the vegetation-only maintenance (3 models), a Maintained Condition was also prepared that modeled the removal of sediment and vegetation from the bottom of the channel, that has deposited over the years. The location of the beginning of the sediment removed is approximately 120 feet upstream of the pedestrian bridge. From that location, for modeling purposes, the sediment was removed for a distance of approximately 910 feet upstream. The removal of sediment, to the historic flowline from the bottom of the channel, will increase the capacity of the channel and thus reduce the potential for flooding.

2. Maintained Condition (25-30 foot swath):

This Maintained Condition (25-30 foot swath only) assumes sediment and vegetation removal maintenance of a 25-30-foot swath at the bottom of the channel that has deposited over the years. The limits of maintenance, for modeling purposes, begin approximately 120 feet upstream of the pedestrian bridge and extend approximately 910 feet upstream of the beginning limits of maintenance. The removal of sediment, to the historic flowline from the 25-30 foot swath from the bottom of the channel, will increase the capacity of the channel and thus allow retention of the vegetation along the channel banks and portions of the channel bottom (outside of 25-50 foot maintained swath).

In the hydraulic analysis, the low flow portion of the channel, for the two models maintained condition (sediment removed), was adjusted to reflect the approximate geometry of the channel after the sediment is removed.

Note: See Hydraulic Profiles for Maintained Condition Model (sediment and vegetation removed) and Workmap

Hydraulics Results (Describe capacity of channel for each condition):

Based on the hydrologic and hydraulic assessment, maintenance is recommended in only Reach 2. Additionally the maintenance is recommended to utilize the 25-30-foot swath approach with sediment removal over a portion of the channel. It is important to note that if maintenance does not occur within Reach 2 in the near future, the limits of maintenance that are identified in this assessment will most likely have to be extended into Reach 3.

The recommended approach would increase the flood conveyance capacity of Reach 2 from a less than 2-year storm event (1,000 cfs) to a 12.5-year storm event (2,330 cfs).

Current Vegetated Condition:

Capacity:
Reach 1 ranges from 3,000 to 3,900 cfs (50- to 100-year storm event & a 6- hour precipitation of 2.3" to 2.6").
Reach 2 is less than 1,000 cfs (less than 2-year storm event and a 6-hour precipitation of 1.25 ").
Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.8").

The hydraulic model determined that the current channel, based on the vegetated condition observed during the site visit, does not have capacity to convey the 100-year storm event.

Note: Reference Detailed Hydraulic Results for Current Vegetated Condition Model

Ultimate Vegetated Condition:

Capacity:
Reach 1 is approximately 3,4 00 cfs (50-year storm event & a 6- hour precipitation of 2.3").
Reach 2 is less than 1,000 cfs (less than 2-year storm event and a 6-hour precipitation of less than 1.25"
Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.65").

Due to the dense vegetation that currently exists today, there is not a significant change in the capacity when comparing the Ultimate Vegetated Condition model to the Current Vegetated Condition model.

Note: Reference Detailed Hydraulic Results for Ultimate Vegetated Condition Model

Maintained Condition (No sediment removed) - Based on the 3 models prepared, it was determined that the maintenance method of vegetation removal only along the 25-30-foot swath along the channel bottom in Reach 2 is the most beneficial model. The following are the results for the determined maintenance model:

Capacity would be:
Reach 1 ranges from 3,400 to 3,900 cfs (50- to 100-year storm event & a 6 hour precipitation of 2.3" to 2.6").
Reach 2 is approximately 1,700 cfs (5-year storm event & a 6- hour precipitation of 1.65")
Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6 hour precipitation of 1.2 5" to 1.65").

Based on the result of the hydraulic analyses, it was determined that the 25-30-foot swath method would be a beneficial approach because it would increase the channel capacity conveyance while allowing retention of vegetation along the channel banks and portions of the channel bottom (outside of 25-30 foot maintained swath).

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed)

Maintained Condition (Sediment and vegetation removed): Based on the 2 models prepared, it was determined that the maintenance method, sediment and vegetation removal along 25-30-foot swath along the channel bottom in portion of Reach 2 is the most beneficial model. The following are the results for the determined maintenance model:

Capacity would be:
Reach 1 ranges from 3,400 to 3,900 cfs (50- to 100-year storm event & a 6- hour precipitation of 2.3" to 2.6").
Reach 2 ranges from 2,100 to 3,000 cfs (10- to 35-year storm event & a 6- hour precipitation of 1.85" to 2.2").
Reach 3 ranges from 1,000 cfs to 1,700 cfs (2- to 5-year storm event & a 6- hour precipitation of 1.25" to 1.65").

Based on the profiles, there was evidence of deposition in the lower portion of Reach 2. Additionally, based on the result of the hydraulic analyses, it was determined that the 25-30-foot swath method would be a beneficial approach because it would increase the channel capacity conveyance while allowing retention of vegetation along the channel banks and portions of the channel bottom (outside of 25-30 foot maintained swath). This hydraulic analysis modeled the removal of sediment and vegetation for a length of approximately 910 feet (within the 25-30 foot swath) and removal of vegetation-only for the remaining portion of Reach 2 for a length of approximately 490 feet (within the 25-30-foot swath). This approach would significantly increase the capacity of the channel and reduce the backwater effects upstream.

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (Sediment and vegetation Removed)

Are there areas of native vegetation identified in the IBA that can be retained during maintenance? If so, identify location and any thinning or other modifications which must be made in the retained area.

In order to preserve additional vegetation within the channel, if there are individual mature native trees such as sycamores or cottonwoods within the swath of maintenance and the trees are located no closer than 50 feet apart, maintenance can be performed around the trees. As discussed above, the 25-30 foot swath would allow vegetation along banks and portions of channel bottom to remain.

Is a downstream check dam or comparably mechanism required pursuant to Water Quality Protocol # 24? If not, explain why. If so, describe what mechanism should be included in the IMP?

No. Based on the non-erosive velocities and capacity of the channel, it was determined in the above-described hydraulic analyses, that downstream check dams are not necessary.

Conclusion/Recommendations (Describe the limits of recommended maintenance, degree to which native vegetation within the facility can be retained, and capacity of maintained channel):

Several hydraulic models were created to determine the limits of maintenance. It was determined that sediment and vegetation removal should occur in Reach 2, along the channel bottom, within a 25 to 30-foot swath for a distance of 630 feet. In addition to the 630 feet sediment and vegetation removal in Reach 2, also it is recommended sediment and vegetation removal maintenance in the lower portion of Reach 2, for a distance of 280 feet (portion not owned by the City of San Diego). The balance of Reach 2 (490 feet) would involve removal of vegetation only. Please refer to the maintenance plan for limits of maintenance and notes. Furthermore, it is recommended that in the portion of Reach 2 for a distance of 910 feet, sediment and vegetation be removed to bring the channel back to the historic flowline.

Additional Comments:

It is important to note that the frequency of flooding will be increased and the capacity of the channel will be reduced should maintenance (sediment and vegetation removal) be neglected within 280 feet of State of California property (see Note 1 on IMP). The City is not responsible for maintenance on properties owned by others. If the City maintains its portion upstream of the State of California property, flooding frequency will be reduced, however, significant benefits with respect to increasing the capacity and further reducing the frequency of flooding would be achieved when this additional area offsite is maintained. The City will notify and request the responsible party to maintain this area (280 feet downstream of City-owned land) to minimize the backwater effect that could contribute to the frequency of flooding of adjacent properties.

LIST OF ATTACHMENTS:

- ☑ Site Photos
- ☑ Hydraulic Workmap
- ☑ Hydraulic Profiles for Current Vegetated Condition Model
- ☑ Hydraulic Profiles for Ultimate Vegetated Condition Model
- ☑ Hydraulic Profiles for Maintained Condition Model (No Sediment Removed)
- ☑ Hydraulic Profiles for Maintained Condition Model (Sediment Removed)
- ☑ Detailed Hydraulic Results for Current Vegetated Condition Model
- ☑ Detailed Hydraulic Results for Ultimate Vegetated Condition Model
- ☑ Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed)
- ☑ Detailed Hydraulic Results for Maintained Condition Model (Sediment Removed)

SITE PHOTOS:

A site visit was conducted on October 13, 2009. See Hydraulic Workmap for picture locations and orientation.

1.

2.

3.

4.

5.

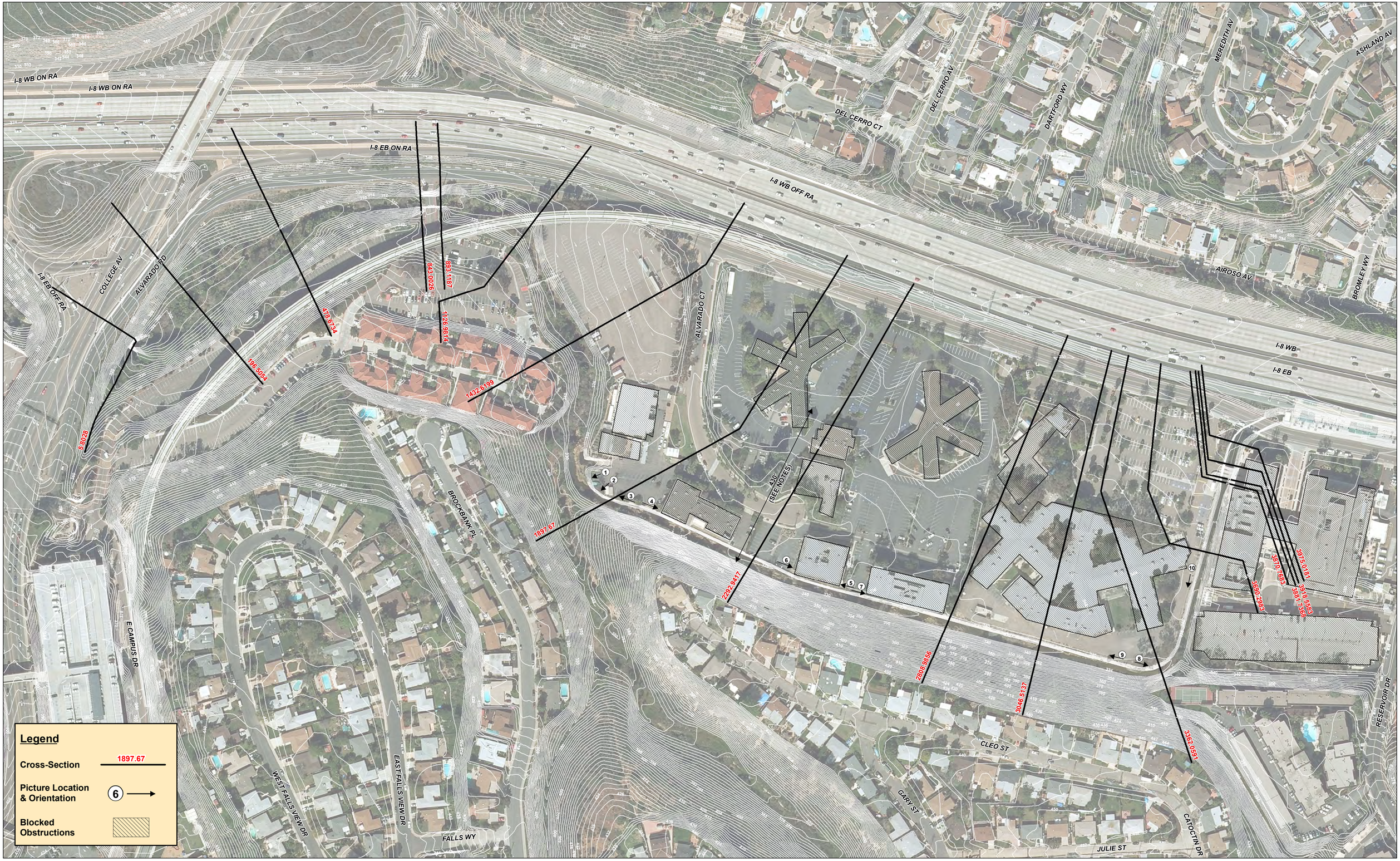
6.

7.

8.

9.

10.



Legend

- **Cross-Section** — 1897.67
- **Picture Location & Orientation** — 6
- **Blocked Obstructions**

Alvarado Channel, Map Numbers 63 & 64 - Hydraulic Workmap

W:\15541-A\AlvaradoCreek\Exhibits\AlvaradoChannel_HydraulicWorkmap.mxd

Exhibit Date: July 7, 2010

REC JN: 15541A

0 50 100 200 Feet

Data Sources:
SanGIS Topo 2' Contours: 1999
SanGIS Roads - March 2010
Eagle Aerial Photo: March 2009

RICK ENGINEERING COMPANY

Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010

Avarado Ck Upper

Legend

- WS Q100 = 3900
- WS Q50=3400
- WS Q35=3000
- WS Q10=2100
- WS Q7=2000
- WS Q5=1700
- WS Q2=1000
- Ground
- LOB
- ROB

Elevation (ft)

360
340
320
300
280

0
1000
2000
3000
4000

Main Channel Distance (ft)

196.5054
478.6733 FEMA Section O
843.0025 d/s Entrance into Parking Lot from Alvarado Road
893.1187 u/s Entrance into Parking Lot from Alvarado Road
1126.981 Approx. local of old drop strucure (no plans available)
1432.619 FEMA Section P
1897.670
2292.941
2808.985 FEMA Section Q
3046.513
3382.059
3690.298
3870.768
3918.558 FEMA Section R
3975.018

1 in Horiz. = 150 ft 1 in Vert. = 5 ft

Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010

Avarado Ck Upper

Legend

- WS Q100 = 3900
- WS Q50=3400
- WS Q35=3000
- WS Q10=2100
- WS Q7=2000
- WS Q5=1700
- WS Q2=1000
- Ground
- LOB
- ROB

Elevation (ft)

360
340
320
300
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196.5054
478.6733
843.0025 d/s Entrance into Parking Lot from Alvarado Road
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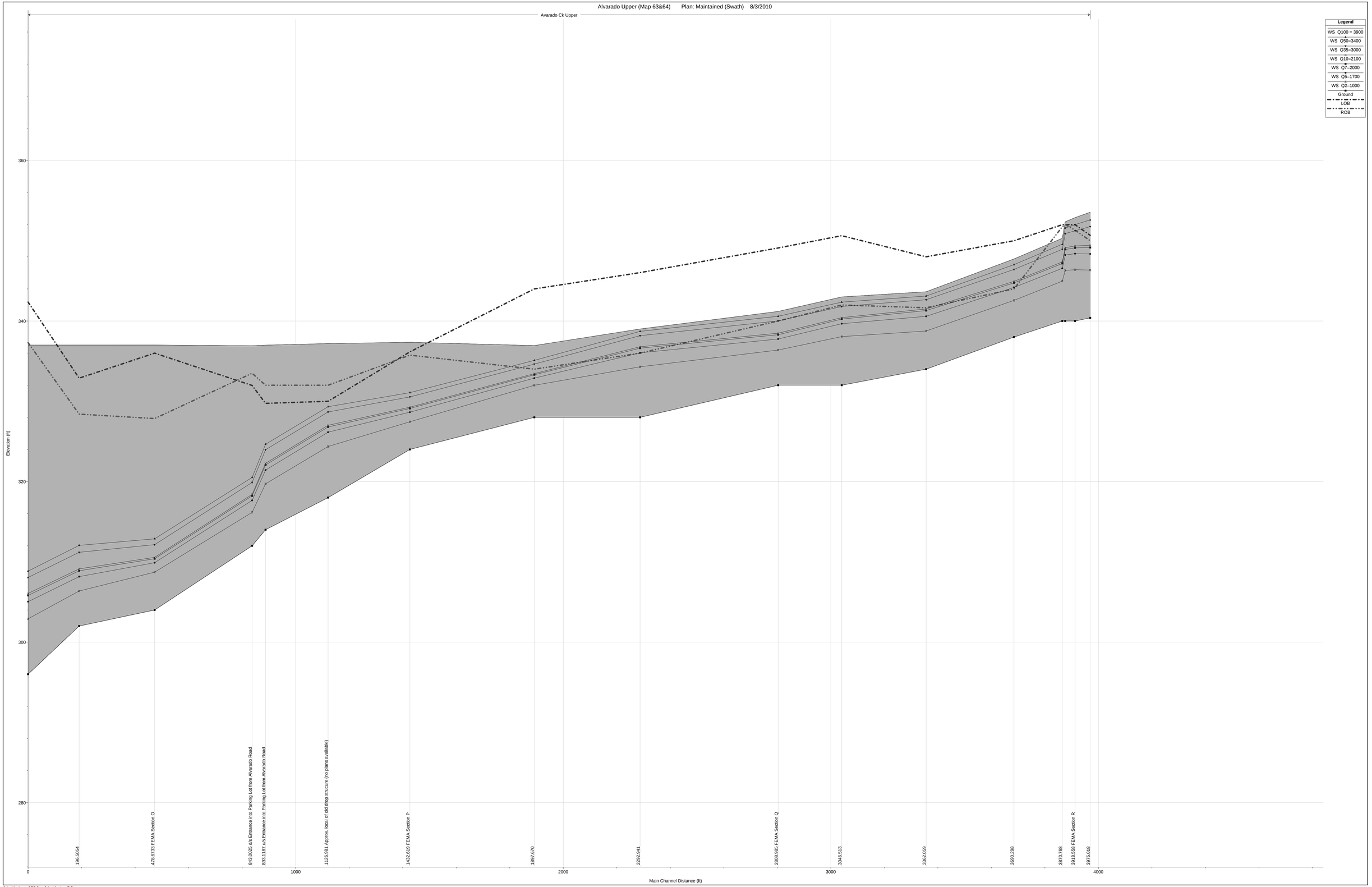
1432.619
1897.670
2292.941
2808.985
3046.513
3362.059
3690.298
3870.768
3918.558
3975.018

0
1000
2000
3000
4000

Main Channel Distance (ft)

1 in Horiz. = 150 ft 1 in Vert. = 5 ft

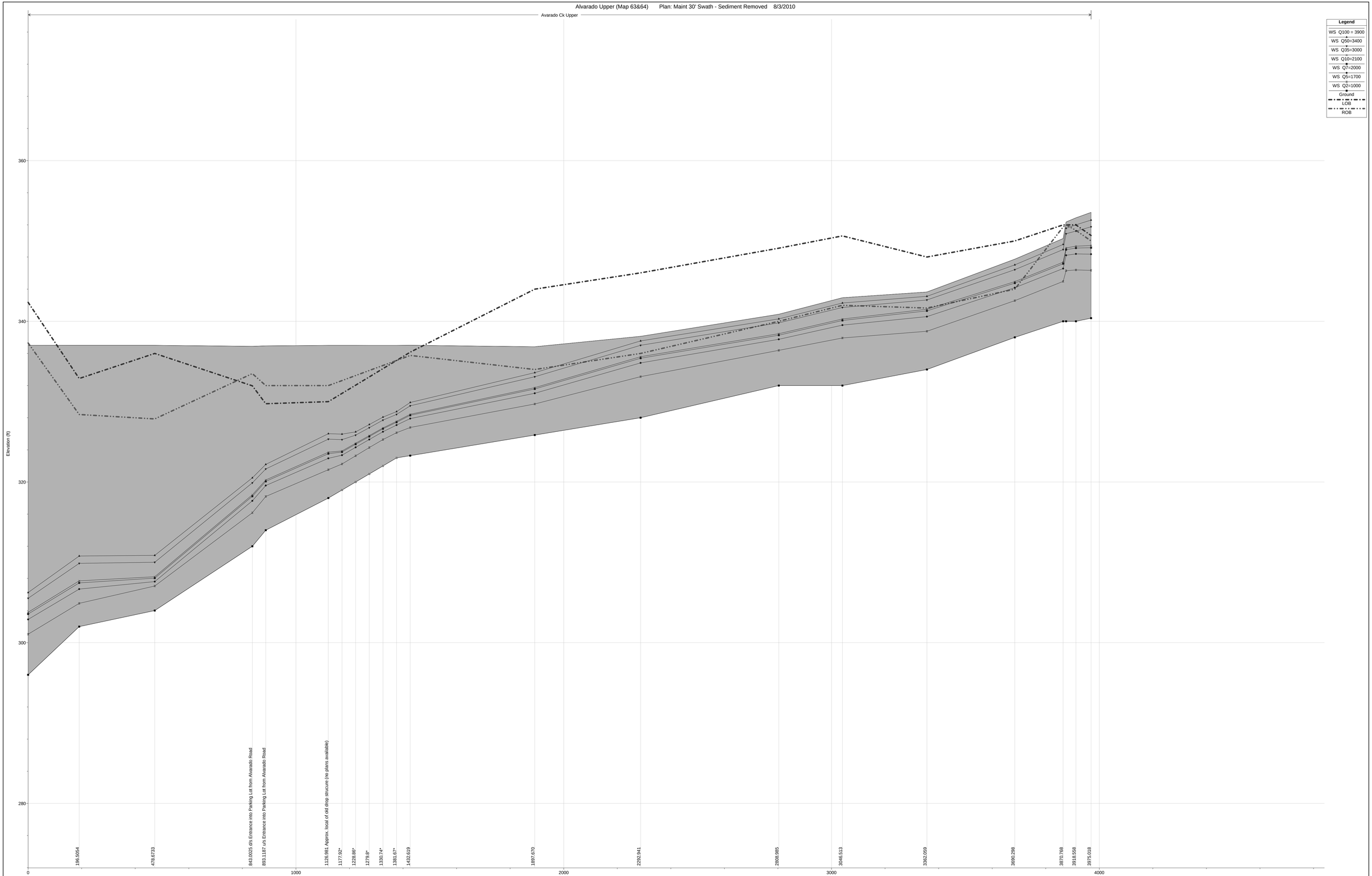
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010



1 in Horiz. = 150 ft 1 in Vert. = 5 ft

Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010

Avarado Ck Upper



1 in Horiz. = 150 ft 1 in Vert. = 5 ft

DETAILED HYDRAULIC RESULTS FOR CURRENT VEGETATED CONDITION MODEL

HEC-RAS Plan: Current Veg River: Avarado Ck Reach: Upper

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)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000020	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	308.85	306.24	311.01	0.030015	11.82	287.75	29.60	0.67
Upper	5.802783	Q35=3000	3000.00	296.00	308.06	305.53	310.05	0.030023	11.34	264.65	28.90	0.66
Upper	5.802783	Q10=2100	2100.00	296.00	306.06	303.79	307.63	0.030014	10.05	208.96	27.07	0.64
Upper	5.802783	Q7=2000	2000.00	296.00	305.82	303.57	307.34	0.030020	9.89	202.32	26.81	0.63
Upper	5.802783	Q5=1700	1700.00	296.00	305.04	302.90	306.40	0.030036	9.35	181.78	25.98	0.62
Upper	5.802783	Q2=1000	1000.00	296.00	302.91	301.05	303.84	0.030013	7.77	128.72	23.68	0.59
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.01		337.01	0.000013	0.63	6157.76	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	312.05		312.19	0.002038	3.04	1117.07	151.76	0.20
Upper	196.5054	Q35=3000	3000.00	302.00	311.19		311.33	0.002344	3.04	987.92	147.42	0.21
Upper	196.5054	Q10=2100	2100.00	302.00	309.13		309.27	0.003536	3.02	695.11	136.97	0.24
Upper	196.5054	Q7=2000	2000.00	302.00	308.89		309.03	0.003742	3.02	662.56	135.74	0.24
Upper	196.5054	Q5=1700	1700.00	302.00	308.16		308.30	0.004518	3.01	565.02	132.02	0.26
Upper	196.5054	Q2=1000	1000.00	302.00	306.37		306.50	0.007662	2.92	342.70	115.27	0.30
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000028	0.84	4619.83	305.39	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	312.87		313.20	0.006654	4.65	730.83	110.81	0.32
Upper	478.6733	Q35=3000	3000.00	304.00	312.14		312.47	0.007481	4.60	651.54	108.04	0.33
Upper	478.6733	Q10=2100	2100.00	304.00	310.56		310.85	0.009415	4.33	485.52	101.33	0.35
Upper	478.6733	Q7=2000	2000.00	304.00	310.39		310.67	0.009579	4.27	468.51	100.62	0.35
Upper	478.6733	Q5=1700	1700.00	304.00	309.89		310.15	0.009859	4.06	419.15	98.48	0.35
Upper	478.6733	Q2=1000	1000.00	304.00	308.71		308.88	0.009250	3.27	305.95	93.16	0.32
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.92		337.10	0.000866	3.37	1158.29	241.59	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.081603	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.084785	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	318.40	318.40	321.05	0.091964	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.093236	12.88	155.27	30.14	1.00
Upper	843.0025	Q5=1700	1700.00	312.00	317.65	317.65	320.00	0.097055	12.29	138.38	29.57	1.00
Upper	843.0025	Q2=1000	1000.00	312.00	316.17	316.17	317.87	0.108524	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.99		337.14	0.000581	3.02	1289.80	265.42	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	324.65	322.19	326.24	0.024628	10.12	335.85	43.34	0.64
Upper	893.1187	Q35=3000	3000.00	314.00	323.97	321.62	325.45	0.025292	9.77	307.18	41.29	0.63
Upper	893.1187	Q10=2100	2100.00	314.00	322.27	320.25	323.46	0.026641	8.73	240.54	37.35	0.61
Upper	893.1187	Q7=2000	2000.00	314.00	322.07	320.08	323.21	0.026725	8.58	233.00	36.96	0.60
Upper	893.1187	Q5=1700	1700.00	314.00	321.43	319.56	322.45	0.026985	8.11	209.74	36.06	0.59
Upper	893.1187	Q2=1000	1000.00	314.00	319.72	318.20	320.41	0.027428	6.67	149.91	33.81	0.56

HEC-RAS Plan: Current Veg River: Avarado Ck Reach: Upper (Continued)

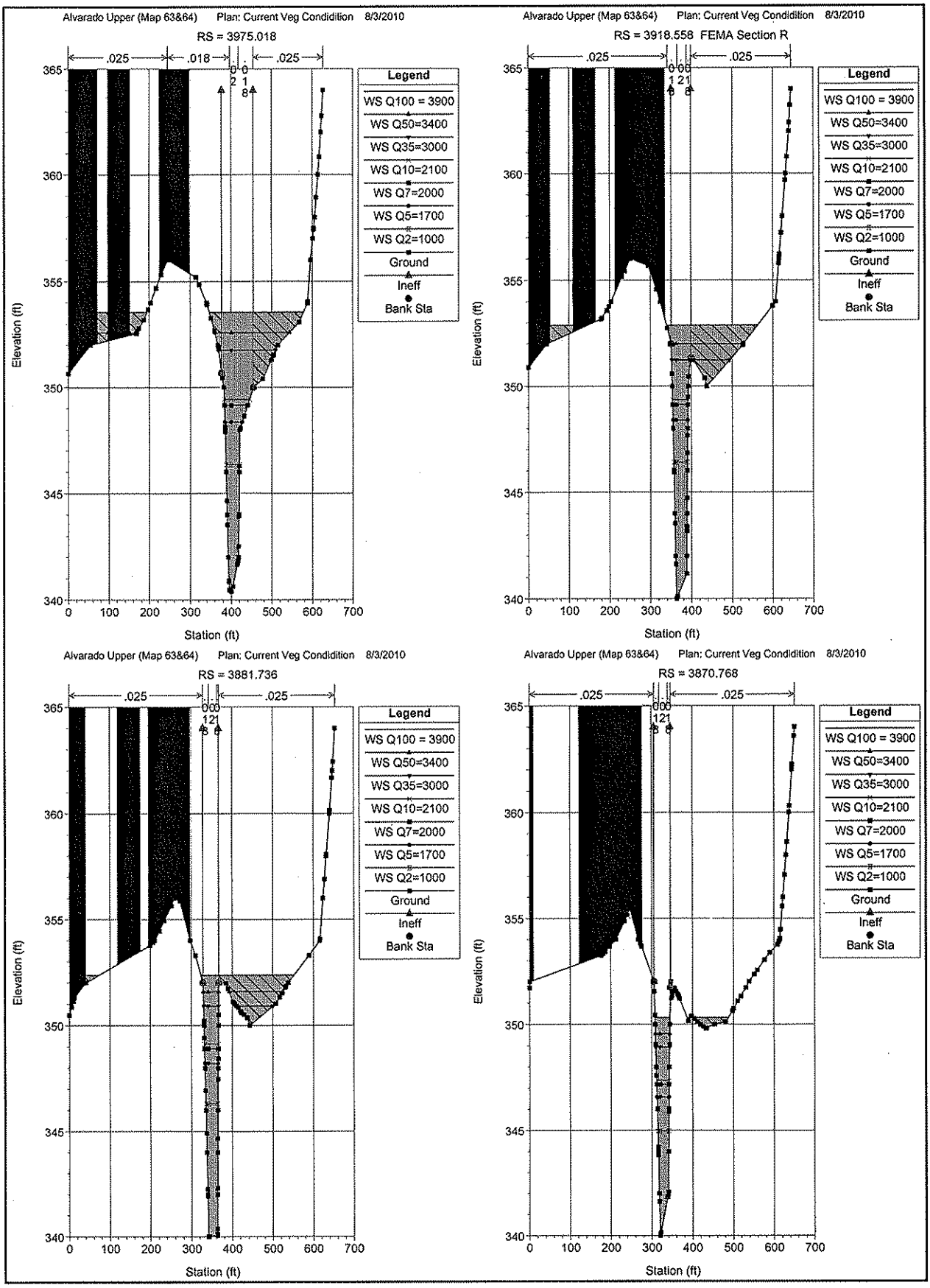
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.19		337.31	0.001007	2.79	1399.19	334.62	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	329.33		329.76	0.009617	5.26	646.24	87.09	0.34
Upper	1126.981	Q35=3000	3000.00	318.00	328.67		329.07	0.009956	5.08	590.50	83.70	0.34
Upper	1126.981	Q10=2100	2100.00	318.00	327.01		327.33	0.010899	4.58	458.32	75.02	0.33
Upper	1126.981	Q7=2000	2000.00	318.00	326.80		327.12	0.011018	4.51	442.97	73.94	0.33
Upper	1126.981	Q5=1700	1700.00	318.00	326.15		326.44	0.011378	4.29	396.02	70.56	0.32
Upper	1126.981	Q2=1000	1000.00	318.00	324.37		324.57	0.012189	3.59	278.28	61.24	0.30
Upper	1432.619	Q100 = 3900	3900.00	324.00	337.66		337.89	0.003963	3.87	1006.97	191.46	0.23
Upper	1432.619	Q50=3400	3400.00	324.00	333.30		333.88	0.019806	6.11	556.65	85.69	0.42
Upper	1432.619	Q35=3000	3000.00	324.00	332.78		333.31	0.020166	5.86	512.27	83.28	0.42
Upper	1432.619	Q10=2100	2100.00	324.00	331.45		331.87	0.021045	5.18	405.62	77.17	0.40
Upper	1432.619	Q7=2000	2000.00	324.00	331.28		331.69	0.021155	5.09	392.98	76.41	0.40
Upper	1432.619	Q5=1700	1700.00	324.00	330.76		331.12	0.021519	4.81	353.72	74.02	0.39
Upper	1432.619	Q2=1000	1000.00	324.00	329.31		329.55	0.022845	3.99	250.84	67.41	0.36
Upper	1897.670	Q100 = 3900	3900.00	328.00	339.83		340.69	0.008520	7.42	525.38	396.74	0.45
Upper	1897.670	Q50=3400	3400.00	328.00	339.03		339.82	0.008753	7.13	476.85	387.65	0.44
Upper	1897.670	Q35=3000	3000.00	328.00	338.47		339.18	0.008518	6.76	443.95	380.02	0.43
Upper	1897.670	Q10=2100	2100.00	328.00	337.03		337.55	0.007907	5.80	362.16	365.61	0.40
Upper	1897.670	Q7=2000	2000.00	328.00	336.84		337.34	0.007835	5.68	352.13	364.33	0.39
Upper	1897.670	Q5=1700	1700.00	328.00	336.26		336.70	0.007577	5.30	321.04	360.26	0.38
Upper	1897.670	Q2=1000	1000.00	328.00	334.61		334.88	0.006842	4.21	237.32	165.52	0.34
Upper	2292.941	Q100 = 3900	3900.00	328.00	341.63		342.82	0.003444	8.73	446.57	266.33	0.47
Upper	2292.941	Q50=3400	3400.00	328.00	340.85		341.90	0.003287	8.22	413.82	265.59	0.46
Upper	2292.941	Q35=3000	3000.00	328.00	340.23		341.15	0.003096	7.72	388.38	265.00	0.44
Upper	2292.941	Q10=2100	2100.00	328.00	338.61		339.26	0.002629	6.49	323.80	243.61	0.40
Upper	2292.941	Q7=2000	2000.00	328.00	338.40		339.02	0.002574	6.33	315.77	243.42	0.39
Upper	2292.941	Q5=1700	1700.00	328.00	337.75		338.28	0.002400	5.85	290.47	242.81	0.37
Upper	2292.941	Q2=1000	1000.00	328.00	335.88		336.20	0.001937	4.53	220.55	212.94	0.33
Upper	2808.985	Q100 = 3900	3900.00	332.00	343.24		344.81	0.003854	10.06	387.76	334.28	0.62
Upper	2808.985	Q50=3400	3400.00	332.00	342.44		343.91	0.004089	9.72	349.63	315.46	0.63
Upper	2808.985	Q35=3000	3000.00	332.00	341.78		343.15	0.004286	9.41	318.88	92.89	0.63
Upper	2808.985	Q10=2100	2100.00	332.00	340.09		341.26	0.005122	8.67	242.25	46.53	0.65
Upper	2808.985	Q7=2000	2000.00	332.00	339.88		341.02	0.005268	8.59	232.83	43.83	0.66
Upper	2808.985	Q5=1700	1700.00	332.00	339.19		340.27	0.005772	8.34	203.73	41.34	0.66
Upper	2808.985	Q2=1000	1000.00	332.00	337.27		338.18	0.008078	7.64	130.89	35.05	0.70

HEC-RAS Plan: Current Veg River: Avarado Ck Reach: Upper (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)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	343.93		345.33	0.001313	9.49	410.99	170.29	0.59
Upper	3046.513	Q50=3400	3400.00	332.00	343.14		344.44	0.001340	9.15	371.61	80.65	0.59
Upper	3046.513	Q35=3000	3000.00	332.00	342.49		343.70	0.001358	8.83	339.81	61.91	0.59
Upper	3046.513	Q10=2100	2100.00	332.00	340.85		341.83	0.001338	7.95	264.31	42.84	0.56
Upper	3046.513	Q7=2000	2000.00	332.00	340.65		341.60	0.001326	7.82	255.81	41.99	0.56
Upper	3046.513	Q5=1700	1700.00	332.00	340.01		340.86	0.001279	7.40	229.78	39.24	0.54
Upper	3046.513	Q2=1000	1000.00	332.00	338.22		338.80	0.001193	6.11	163.62	34.74	0.50
Upper	3362.059	Q100 = 3900	3900.00	334.00	343.65	343.65	346.60	0.003426	13.80	282.63	123.76	1.00
Upper	3362.059	Q50=3400	3400.00	334.00	343.11	343.11	345.82	0.003476	13.23	257.07	123.28	1.00
Upper	3362.059	Q35=3000	3000.00	334.00	342.66	342.66	345.17	0.003523	12.72	235.87	93.25	1.00
Upper	3362.059	Q10=2100	2100.00	334.00	341.50	341.50	343.56	0.003720	11.50	182.56	44.34	1.00
Upper	3362.059	Q7=2000	2000.00	334.00	341.30	341.30	343.36	0.003750	11.50	173.90	42.25	1.00
Upper	3362.059	Q5=1700	1700.00	334.00	340.58	340.58	342.68	0.003859	11.62	146.26	34.80	1.00
Upper	3362.059	Q2=1000	1000.00	334.00	338.76	338.76	340.53	0.004182	10.69	93.56	26.27	1.00
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.003123	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.003198	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.003269	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.003486	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.003520	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.003645	12.19	139.44	86.45	1.00
Upper	3690.298	Q2=1000	1000.00	338.00	342.57	342.57	344.34	0.003918	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.003645	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.003713	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.003791	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.003979	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349.76	0.004001	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.004089	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.004381	10.72	93.29	26.22	1.00
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.36		354.05	0.001262	10.43	373.84	262.06	0.60
Upper	3881.736	Q50=3400	3400.00	340.00	351.58		353.10	0.001241	9.91	343.18	171.19	0.59
Upper	3881.736	Q35=3000	3000.00	340.00	350.90		352.29	0.001199	9.45	317.30	125.84	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.13		350.20	0.001088	8.27	253.99	34.45	0.54
Upper	3881.736	Q7=2000	2000.00	340.00	348.91		349.94	0.001074	8.12	246.44	34.09	0.53
Upper	3881.736	Q5=1700	1700.00	340.00	348.22		349.12	0.001026	7.62	223.09	32.98	0.52
Upper	3881.736	Q2=1000	1000.00	340.00	346.30		346.89	0.000873	6.15	162.71	30.13	0.47

HEC-RAS Plan: Current Veg River: Avarado Ck Reach: Upper (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)	
Upper	3918.558	Q100 = 3900	3900.00	340.00	352.88		354.14	0.000914	9.00	433.23	278.70	0.53
Upper	3918.558	Q50=3400	3400.00	340.00	352.00		353.18	0.000982	8.71	390.46	177.04	0.54
Upper	3918.558	Q35=3000	3000.00	340.00	351.24		352.35	0.001003	8.49	353.46	134.72	0.54
Upper	3918.558	Q10=2100	2100.00	340.00	349.35		350.25	0.000891	7.61	276.12	37.94	0.50
Upper	3918.558	Q7=2000	2000.00	340.00	349.12		349.99	0.000885	7.48	267.41	37.58	0.49
Upper	3918.558	Q5=1700	1700.00	340.00	348.39		349.17	0.000867	7.07	240.41	36.44	0.49
Upper	3918.558	Q2=1000	1000.00	340.00	346.39		346.92	0.000812	5.86	170.66	33.41	0.46
Upper	3975.018	Q100 = 3900	3900.00	340.39	353.55		354.23	0.000506	6.61	589.83	298.86	0.42
Upper	3975.018	Q50=3400	3400.00	340.39	352.60		353.27	0.000601	6.59	515.94	226.40	0.45
Upper	3975.018	Q35=3000	3000.00	340.39	351.76		352.45	0.000732	6.65	450.92	139.89	0.49
Upper	3975.018	Q10=2100	2100.00	340.39	349.43		350.31	0.001380	7.54	278.47	61.97	0.63
Upper	3975.018	Q7=2000	2000.00	340.39	349.16		350.06	0.001387	7.63	262.21	56.95	0.63
Upper	3975.018	Q5=1700	1700.00	340.39	348.36		349.26	0.001247	7.64	222.47	42.56	0.59
Upper	3975.018	Q2=1000	1000.00	340.39	346.34		347.02	0.001143	6.62	150.99	32.99	0.55


Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
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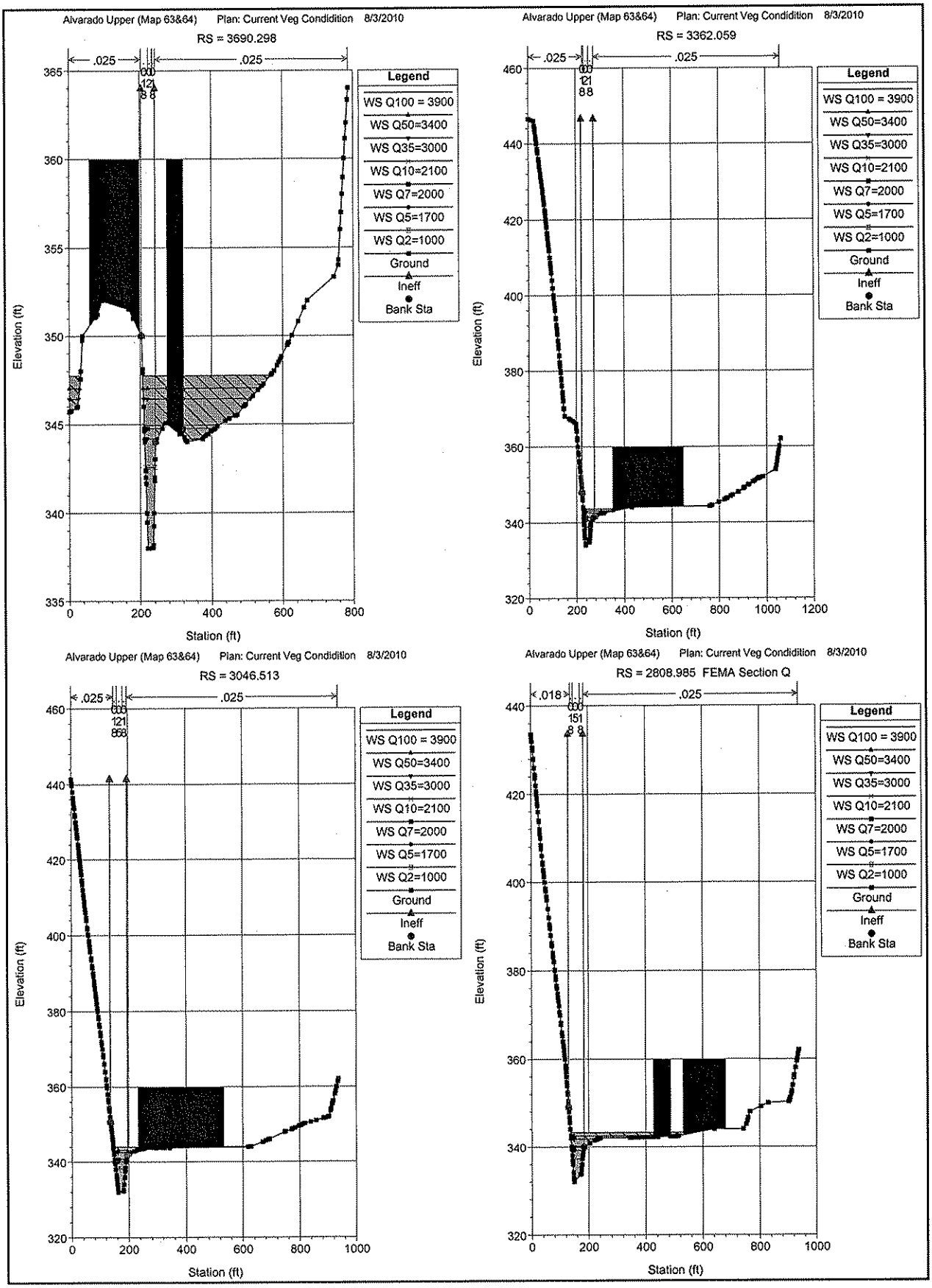
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 3918.558 FEMA Section R
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 3881.736
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 3870.768
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 3362.059
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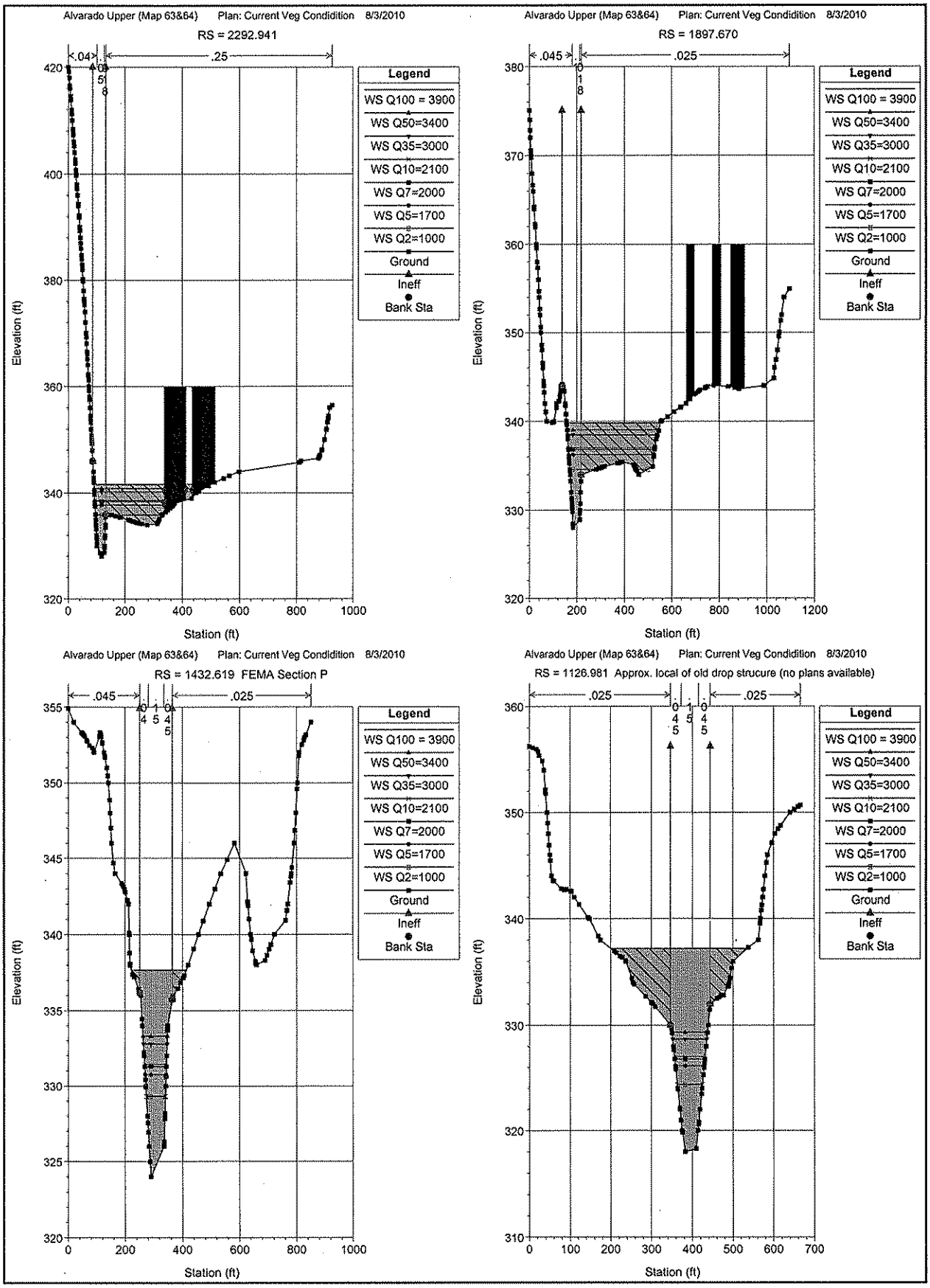
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 3046.513
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 2808.985 FEMA Section Q
.018
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 1897.670
.045
.025
Legend
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WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 1432.619 FEMA Section P
.045
.025
Legend
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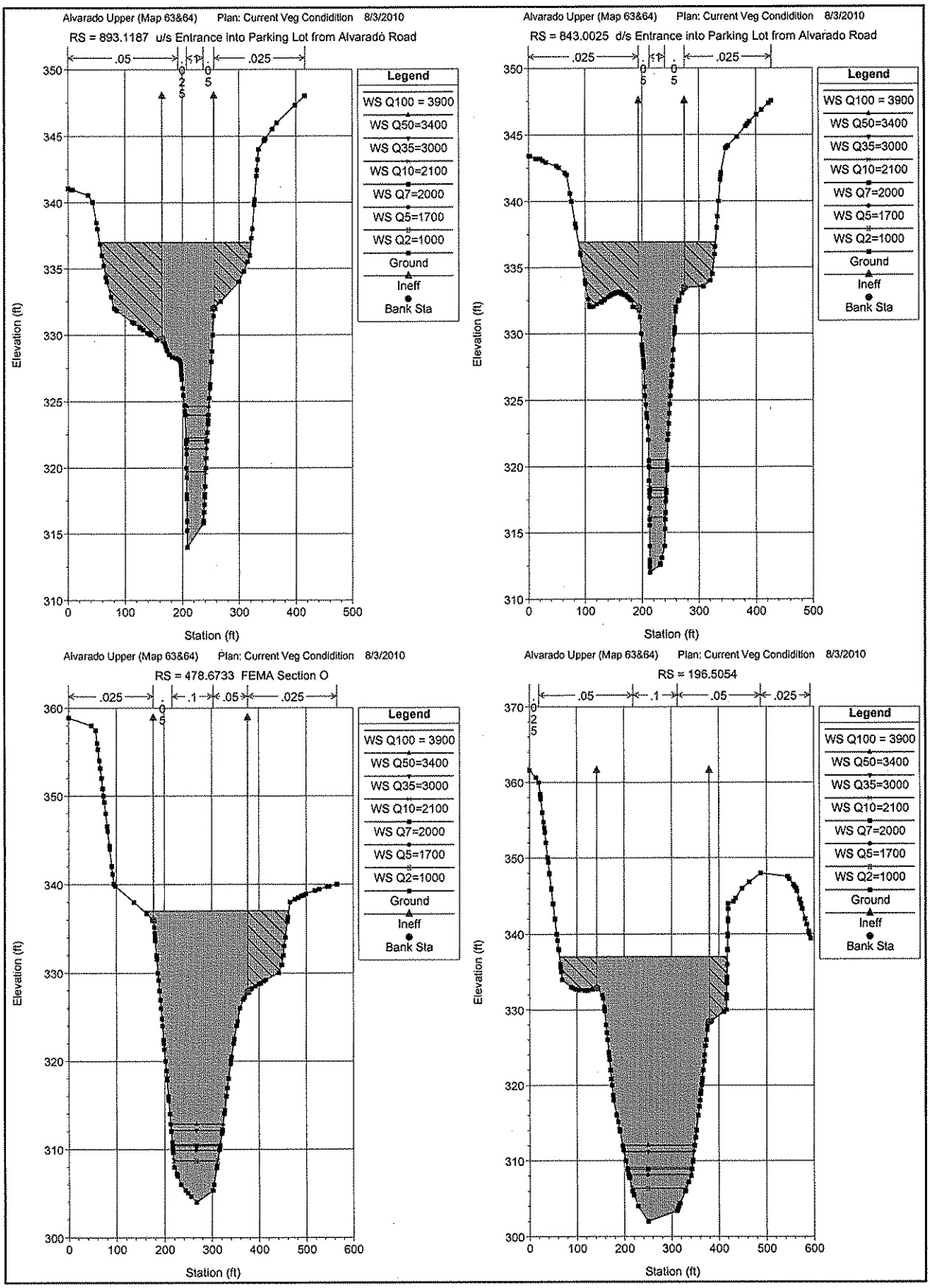
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 1126.981 Approx. local of old drop strucure (no plans available)
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
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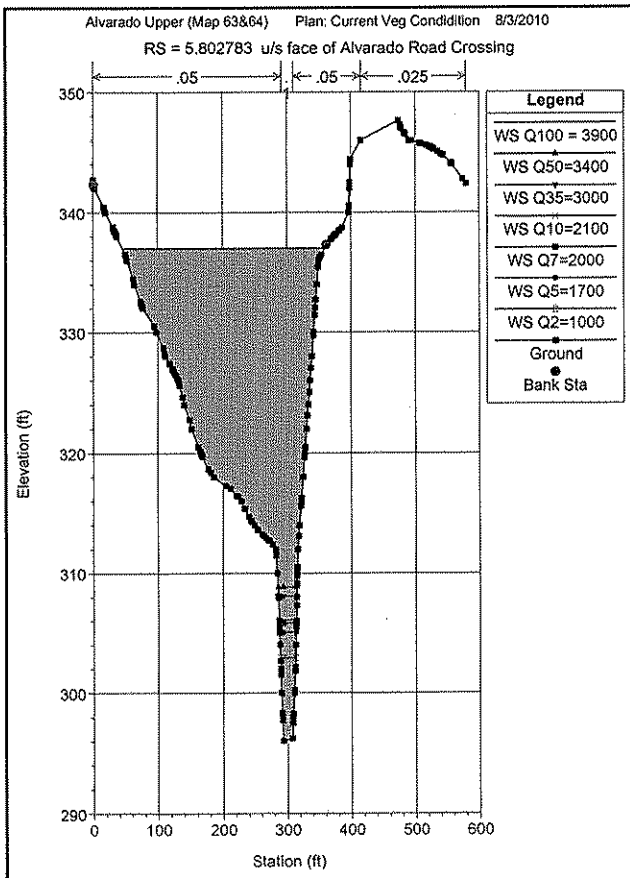
.05
.1
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 843.0025 d/s Entrance into Parking Lot from Alvarado Road
.025
.1
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 478.6733 FEMA Section O
.025
.1
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 196.5054
.05
.1
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Current Veg Condidition 8/3/2010
RS = 5.802783 u/s face of Alvarado Road Crossing
.05
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Bank Sta
Elevation (ft)
350
340
330
320
310
300
290
0
100
200
300
400
500
600
Station (ft)

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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PROJECT DATA
Project Title: Alvarado Upper (Map 63&64)
Project File : Alvarado6364.prj
Run Date and Time: 8/3/2010 1:46:46 PM

Project in English units

Project Description:
City Stormwater Maintenance (First Year)
Alvarado Canyon Creek (Upper)
Helix
Map Number 63 & 64
October 17, 2009 J-15541A

PLAN DATA

Plan Title: Current Veg Condidition
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p01

Geometry Title: Current n-value (GIS Geometry)
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g02

Flow Title : FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description:
Geometry is from TIN
Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:

Number of:	Cross Sections	= 17	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0

Bridges = 0 Lateral Structures = 0

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

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River	Reach	RS	Q100 = 3900	Q50=3400	Q35=3000	Q10=2100	Q7=2000	Q5=1700	2330	800
Avarado Ck	Upper	3975.018	3900	3400	3000	2100	2000	1700	2330	800

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Avarado Ck	Upper	Q100 = 3900		
			Known WS = 337	
Avarado Ck	Upper	Q50=3400		
			Normal S = 0.03	
Avarado Ck	Upper	Q35=3000		
			Normal S = 0.03	
Avarado Ck	Upper	Q10=2100		
			Normal S = 0.03	
Avarado Ck	Upper	Q7=2000		
			Normal S = 0.03	
Avarado Ck	Upper	Q5=1700		
			Normal S = 0.03	

GEOMETRY DATA

Geometry Title: Current n-value (GIS Geometry)
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g02

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 3975.018

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.66	54.55	352	168.06	352.55	169.75	352.62	174.25	352.81
186.4	353.2	196.62	353.69	203.07	354	216.59	354.69	229	355.32
244.96	356	313.71	355.2	321.79	354.85	340	354	340.76	353.95
340.92	353.94	341.22	353.92	350.36	353.29	359.4	352.68	368.34	352
368.63	351.95	369.6	351.82	377.54	350.68	379.23	350.46	382.41	350
385.23	348.13	385.42	348	385.58	347.89	388.06	346	389.7	344.66
390.46	344	390.99	343.53	392.73	342	394.26	340.86	394.64	340.91
395.4	340.47	397	340.44	400.41	340.39	403.98	340.64	414.41	341.66
415.6	341.75	416.29	341.81	416.76	341.84	417.94	342	418.25	342.52
419.07	343.94	419.1	344	419.12	344.02	420.38	346	420.56	346.28
421.71	348	422.75	348.06	431.94	348.64	454.83	350	478.38	350.41
499.51	351.3	503.88	351.51	504.44	351.53	504.87	351.54	505.16	351.55
515.48	352	567.91	353.08	587.99	353.98	588.51	354	588.66	354.05
595.5	356	600.77	357.01	602.99	357.43	603.15	357.45	603.3	357.48
605.48	358	609.26	358.92	613.68	360	616.49	360.83	620.64	362
623.06	362.78	626.85	364						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	244.96	.018	397	.02	418.25	.018	454.83	.025

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

```
       377.54  454.83            56.06   56.46   57.46             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  377.54              F
  454.83  626.85              F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   71.99     365   97.43  152.37     365   224.1  297.99     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3918.558

INPUT
Description: FEMA Section R
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  350.89   45.61     352  179.04  353.17  180.56  353.23  193.04
353.58
  197.76  353.78  203.01     354  230.15  355.16  237.25  355.42  250.67
356
   294.4  355.68  314.27  354.58  324.48     354  341.01  352.75  350.82
352
  352.57  350.58  353.44     350  354.29  349.11  355.36     348  357.25
346.02
  357.27     346  357.33  345.94  359.19     344  359.68  343.53   361.3
342
   361.7  341.63  363.62     340  365.9134 0.1096  388.28  341.18  388.59
342
  389.03  343.17  389.11  343.38  389.34     344  389.62  344.72  390.14
346
   390.5  346.84     391  347.66  391.19     348  392.09  349.49  392.37
350
  393.96  350.46  398.11  351.25  399.59  351.32   400.7  351.38   402.6
351.24
  403.71  351.29  432.41  350.39  438.19     350  526.18  351.95  526.68
351.96
  526.98  351.97  527.72     352  599.34   353.8  606.95     354  614.22
355.8
  615.03     356  615.89  356.21  620.14  357.22  623.29     358  630.16
359.69
   631.4     360  634.28  360.79   638.7     362  640.01  362.42  642.45
363.24
  644.88     364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  341.01    .018  365.91     .02  388.28    .018  399.59
.025

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

```
       350.82  399.59             36.89   36.82   36.86              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  350.82               F
  399.59  644.88               F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev    Sta L   Sta R    Elev    Sta L   Sta R    Elev
       0   54.03     365    109.3  165.48     365  212.28  335.49     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3881.736

INPUT
Description:
Station Elevation Data    num=      79
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  350.48    6.07  350.87   10.29  351.15   12.92  351.31   40.92
352
     199  353.76  206.08  353.91  206.69  353.92  210.21     354  222.24
354.44
   233.9  354.94  251.37  355.63  258.69     356  271.86  355.88   296.8
354
  309.56  353.29  328.41     352  330.64  350.21  330.92     350  331.62
349.42
  333.32     348  334.54  346.94  335.46     346  336.53  344.91  337.43
344
  339.15  342.25   339.4     342  339.49  341.91  341.37     340
342.76340.0032
  363.11  340.05  363.14  340.12  363.24  340.37  363.78     342  363.88
342.31
  364.44     344  364.68  344.67  365.18     346  365.75  347.47  365.95
348
  366.13  348.45  366.76     350  366.98   350.5  367.69     352  385.02
351.97
  389.85  351.73  401.73   351.1  404.62  351.04   406.3     351  410.61
350.92
  415.48  350.84  419.61  350.67  421.56  350.62  423.52  350.58  428.95
350.5
  436.77  350.38  437.79  350.35  443.09     350  507.58  351.01  517.23
351.31
  523.05   351.5  531.06  351.78  532.85  351.84  538.19     352  589.11
353.29
  615.46  353.99  615.84     354   616.1  354.06  623.91     356  627.56
356.9
  632.01     358  632.22  358.05  632.33  358.08  639.85     360  640.33
360.14
  645.87  361.67  647.07     362  648.51  362.43  653.47     364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
```

```
       0     .025  328.41     .018  342.76      .02  363.11     .018  367.69
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        328.41  367.69             11.11   10.97   10.38              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  328.41                F
  367.69  653.47                F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   40.99     365  118.74  175.55     365   195.2  297.51     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3870.768

INPUT
Description:
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  351.72     .69     352  176.77  353.23  181.76  353.33  186.43
353.41
   197.1  353.65  213.03     354  234.28  354.85  240.42  355.16  245.89
355.43
  246.64  355.46  267.28     354  272.64  353.82  272.67 353.819  275.67
353.67
  305.95     352  306.57  351.54  308.04  350.43   308.6     350  309.85
349.05
  311.24     348  311.77  347.59  313.71     346  315.77  344.21  316.02
344
  316.21  343.83  318.18     342   318.6   341.6  320.17     340  321.64
340.147
  338.64 341.841  340.04  341.98  340.05     342  340.07  342.06  340.77
344
  341.44  345.88  341.48  345.99  341.49  346.01   342.6     348  343.42
349.05
  344.21     350  346.01  351.74  346.27     352  348.08  351.23  349.08
351.56
  350.42  351.36  354.74   351.7  355.64  351.67  359.27  351.55  363.01
351.43
  364.73  351.37  366.08  351.33  368.29   351.2   389.9  350.16  397.33
350.39
  404.15  350.27  404.59  350.26  412.11  350.12  418.82     350  420.14
349.98
  426.27   349.9  433.22   349.8  434.21  349.82  453.99     350  481.77
350.11
   497.7  350.62  501.02  350.74  511.44  351.09  518.78  351.31  530.89
351.71
  538.75     352  551.73  352.35  558.84  352.54  576.49  353.03  589.82
353.37
```

```
  608.45  353.74  611.81  353.89  614.18     354  614.26  354.01  614.32
354.03
  615.95  354.47   620.3  355.57  621.91     356  626.05  357.06  629.47
358
  631.85  358.62  636.85     360  637.98  360.31  644.01     362  644.38
362.1
   644.9  362.25  649.64  363.57  651.05     364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  305.95    .018   318.6     .02  338.64    .018  346.01
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        305.95  346.01           179.97  180.47  180.91            .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  305.95             F
  346.01  651.05             F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    9.75     365  121.57  277.04     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3690.298

INPUT
Description:
Station Elevation Data    num=      90
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  345.71     3.53  345.75     5.97  345.77    20.93  345.96     23.5
346
    30.97  347.56    32.17     348    35.83  349.75    36.38     350    73.85
351.06
    76.35  351.12    80.39  351.24    93.24     352   167.58  351.52   180.07
350.99
   203.46     350   206.33  348.11   206.49     348    206.6  347.92    209.4
346
    211.3  344.63   212.19     344   214.44  342.39   214.98     342   215.47
341.65
   217.78     340   218.52  339.47   220.56     338  223.92338.0069   235.27
338.03
   235.44  338.18    236.7  339.26   237.56     340   239.68  341.82   239.89
342
   241.12  343.04   242.24     344   270.01  345.07   310.29  344.45   322.56
344.28
   326.36   344.1   330.94     344   375.39  344.17   382.11  344.34   386.03
344.44
   387.03  344.43   390.42  344.44   396.81  344.59   400.84  344.63   407.01
344.7
```

```
  416.13  344.88  438.84  345.18   448.8   345.3  450.55  345.31  465.65
345.48
  468.22  345.49  472.87  345.52  491.47     346  494.34  346.07  495.53
346.1
  515.92  346.57  530.49  346.92  540.57  347.15  545.75  347.26  566.83
347.78
  569.21  347.84  575.67     348  583.79   348.3  588.52  348.49  592.91
348.66
  596.44   348.8  613.02  349.46  615.24  349.55  616.85  349.62  626.37
350
  644.26  350.81  661.23   351.6  669.77     352  744.72  353.34   757.4
354
  758.19   354.3  762.72     356  765.36  356.97  768.25     358  770.91
358.93
  774.03     360  777.36  361.13   779.9     362  783.91  363.32  785.95
364

Manning's n Values          num=        5
     Sta   n Val     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025  203.46    .018  223.92     .02  235.27    .018  242.24
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        203.46  242.24           344.53  328.24  316.06              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  203.46               F
  242.24  785.95               F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev    Sta L   Sta R    Elev
     275  321.35     360    57.06  198.78     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3362.059

INPUT
Description:
Station Elevation Data     num=      187
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  446.54    10.14  446.29    20.91      446    24.19    444.7    25.61
444
   27.19  443.21    29.68     442    30.85   441.42    33.27   440.27    33.66
440.07
   33.81     440    36.64  438.61    37.91      438    38.67   437.63    42.05
436
   42.49  435.79    43.46  435.33    45.38    434.4    46.24      434    48.24
433.04
   50.46     432    51.07  431.71    52.21   431.18    54.08   430.27    54.64
430
```

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426								
64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16								
72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53								
79.06	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22								
85.27	412.07	85.38	412	85.58	411.87	88.54	410	90.63
408.68								
91.7	408	92.99	407.18	94.86	406	97.97	404.03	98.02
404								
101.08	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
400								
105.29	399.3	107.26	398	109.04	396.82	110.28	396	113.2
394.05								
113.28	394	113.32	393.98	113.51	393.85	115.98	392.19	116.26
392								
117.51	391.16	119.23	390	119.73	389.67	122.21	388	123.85
386.85								
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
382								
131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
377.96								
136.13	377.56	138	376.16	138.21	376	140.41	374.38	140.92
374								
142.28	373	143.63	372	146.21	370.09	146.35	370	146.39
369.97								
149.39	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
366.38								
197.44	366	198.93	364.92	200.18	364	202.56	362.3	202.97
362								
203.33	361.74	205.83	360	208.02	358.47	208.7	358	211.37
356.14								
211.57	356	213.46	354.69	214.45	354	215.2	353.47	217.32
352								
218.52	351.16	220.19	350	221.67	348.86	222.79	348	223.55
347.15								
224.57	346	226.32	344.03	226.34	344	226.44	343.89	228.12
342								
229.22	340.76	229.89	340	230.44	339.38	231.72	338	232.63
337.01								
233.63	336	233.78	335.91	236.2	334.56	237.12	334	252.9
334.87								
253.61	335.49	254.18	336	255.55	337.21	256.43	338	257.85
339.26								
258.68	340	266.68	340.85	274.32	341.65	277.87	342	284.94
342.14								
302.27	342.45	306.07	342.51	309.61	342.52	431.19	344	758.76
344.35								
768.31	344.6	797.19	345.41	821.62	346	830	346.31	831.03
346.34								
833.5	346.43	847.74	346.96	856.58	347.25	879.57	348	880.41
348.03								
880.72	348.04	881.24	348.07	901.94	348.95	906.43	349.16	921.76
349.83								

```
  923.27   349.9  925.42     350  942.25  350.68  949.16  350.95  960.33
351.4
  963.86  351.55  965.66  351.58  967.08  351.64  969.78  351.75  971.07
351.79
  984.45     352 1038.39  353.93 1038.73     354 1041.06  354.92 1043.88
356
 1045.68  356.71 1048.94     358 1050.91  358.78 1053.99     360 1059.87
361.95
 1059.99  361.99 1060.03     362

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  228.12    .018  233.78     .02  253.61    .018  274.32
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        222.79  274.32            323.3  315.55  308.79             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  222.79               F
  274.32 1060.03               F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  350.42  649.42     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3046.513

INPUT
Description:
Station Elevation Data     num=     182
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  441.38     1.65  440.18     1.89      440     2.26  439.73     4.62
438
     6.7  436.48     7.36      436      8.5  435.16    10.09      434    10.57
433.65
   12.82      432    13.42  431.56    15.56      430    17.26  428.76    18.29
428
   20.08  426.69    21.03      426    21.34  425.77    23.76      424    24.83
423.22
    26.5      422    27.68  421.13    29.23      420    30.54  419.04    31.97
418
   33.39  416.96     34.7      416    36.66  414.57    37.43      414    38.34
413.34
   40.17      412    41.97  410.69     42.9      410    44.71  408.84    46.04
408
   47.74  406.95    49.28      406    51.46  404.66    52.53      404    55.65
402.08
   55.78      402    56.21  401.73    58.56  400.29    59.03      400    61.34
398.58
```

```
   62.29     398   62.38  397.94   63.73  397.12   65.44  396.06   65.55
396
      66  395.72   68.81     394    69.5  393.58   72.08     392   73.03
391.42
   75.35     390   76.54  389.27   78.62     388   80.04  387.13   81.89
386
   84.06  384.67   85.16     384   86.41  383.24   88.44     382   90.48
380.76
   91.72     380   93.93  378.65      95     378   97.38  376.55   98.28
376
   100.9   374.4  101.56     374  102.26  373.57  104.84     372  105.98
371.3
  108.12     370  110.66  368.46  111.41     368  114.45  366.15   114.7
366
  117.91  364.04  117.98     364  118.05  363.96   121.2     362  121.22
361.99
  121.34   361.9   123.3  360.47  123.95     360  124.33  359.72  126.69
358
   128.6  356.62  129.44     356   131.8  354.28  132.19     354  132.86
353.52
  134.94     352  136.83  350.63   137.7     350   139.3  348.84  140.46
348
  142.24  346.71  143.23     346   144.6  345.01     146     344  146.37
343.73
  148.77     342  150.97  340.41  151.55     340  152.21  339.52  154.32
338
  156.46  336.46   157.1     336  157.84  335.47  158.82  334.77  159.88
334
  161.68  333.02  163.38     332  181.72  332.23  181.93  332.42  182.16
332.61
  183.79     334  185.96  335.84  186.15     336  187.92   337.5  188.51
338
  189.01  338.46  190.75     340  196.48  341.99  196.52     342  219.42
342.83
  228.12  343.15  232.61  343.32  245.18   343.4  249.52  343.53  252.86
343.63
  255.39   343.7  264.28  343.83  281.18  343.76  295.78   343.7  309.77
343.77
  324.93  343.72  342.77  343.67  618.57  343.93  628.31     344  669.36
345.21
  680.15  345.54  689.98  345.88  691.38  345.92  692.91  345.96  693.63
346
  747.86  347.89  748.45  347.91  748.79  347.92   749.9     348  772.09
348.57
  776.41  348.74  784.94  349.02  798.19   349.5   802.2  349.65  805.77
349.77
  812.25     350  818.51   350.2  839.73  350.56  858.41  350.94  883.51
351.54
  888.56  351.65  890.61  351.69  899.49  351.84  903.12     352  908.37
353.53
  909.21  353.73  910.24     354  914.52  355.26  915.46  355.54  916.35
355.8
  917.05     356  917.51  356.13     924     358  926.64  358.81  930.52
360
  934.83  361.33  937.02     362

Manning's n Values         num=       5
```

```
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   148.77     .018   161.68     .025   182.16     .018   196.48
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
         136.83   196.48            240.61   237.53   235.74               .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   136.83                 F
  196.48   937.02                 F
Blocked Obstructions      num=        1
   Sta L    Sta R     Elev
  232.03   534.15      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 2808.985

INPUT
Description: FEMA Section Q
Station Elevation Data     num=      166
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   433.56      .91   432.99     2.45      432     4.61   430.58     5.49
430
    8.37   428.05     8.45      428     8.51   427.96     11.2      426    13.39
424.38
    13.9      424     14.4   423.62    16.57      422    18.29    420.7    19.22
420
   20.43   419.08    21.83      418    22.65   417.37    24.42      416     26.9
414.09
   27.01      414    27.25   413.82     29.6      412    30.93   410.98    32.19
410
   34.27    408.4    34.79      408    35.27   407.62    37.38      406    39.74
404.46
   40.46      404     42.6   402.78    43.95      402    45.26   401.25    47.44
400
   49.89    398.6    50.93      398    53.08   396.77    54.41      396     57.9
394
   57.93   393.98    61.39      392    64.13   390.43    64.88      390    65.68
389.54
   68.37      388    71.48   386.21    71.86      386    72.47   385.65    75.35
384
   76.94   383.09    78.84      382       82   380.19    82.32      380    84.45
378.78
   85.81      378    88.27   376.59    89.29      376    91.35   374.82    92.78
374
   94.32   373.11    96.26      372    98.55   370.68    99.74      370   102.85
368.21
  103.21      368   103.47   367.85   106.69      366   107.94   365.28   110.16
364
```

```
   111.9      363  113.64      362  115.55   360.9  117.11      360  118.88
358.56
  119.57      358  120.51  357.16  121.79      356  123.11  354.82  124.02
354
  125.82  352.38  126.24      352  128.08  350.35  128.47      350  129.47
349.1
  130.69      348  132.19  346.66  132.92      346  133.52  345.47  135.15
344
  136.86  342.47  137.39      342  139.59  340.03  139.62  340.01  139.63
340
  139.64  339.99  141.87      338  143.15  336.86  144.11      336  146.18
334.16
  146.36      334  147.63  332.88  147.74  332.78  148.61      332  171.18
333.693
  173.54  333.87  173.71      334  174.92  334.97   176.2      336  177.85
337.36
  178.63      338  180.37   338.6  183.91      340  204.05  340.84   220.8
341.48
  223.19  341.56  224.98  341.61  226.38  341.66  230.53  341.78  231.59
341.81
  232.58  341.84  238.45  341.95  241.64      342  345.14   342.1  353.05
342.11
   364.5  342.13  374.22  342.15  375.34  342.14  387.76  342.16  397.36
342.17
  404.24  342.18  408.46  342.19  416.48   342.2  428.16  342.22  443.31
342.24
  485.66  342.33  497.31  342.35  503.12  342.36  507.71  342.39  507.93
342.4
  509.37  342.41   511.1  342.42  513.15  342.44  514.72  342.45  640.38
344
  743.14  344.08  752.59  345.12  756.86      346  759.82  346.64   766.1
348
  804.74  349.19  830.08      350  903.05  350.24  905.01  350.63  907.37
351.1
  912.05      352  913.64   352.7  916.54      354  920.63  355.78  921.16
356
  921.92  356.29  926.64      358  931.03  359.58  932.27      360   935.2
361
  938.12      362

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .018   137.39    .018   147.63     .05   171.18    .018   183.91
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        129.47  183.91           519.53  516.04  514.95              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  129.47                F
  183.91  938.12                F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev    Sta L   Sta R    Elev
     531  680.76     360    427.1  487.82     360
```

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 2292.941

INPUT
Description:
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420	1.71	419.13	3.22	418	5.21	416.53	5.92	416
7.92	414.52	8.61	414	8.8	413.86	11.29	412	12.33	411.23
13.97	410	16.15	408.37	16.65	408	17.59	407.3	19.32	406
20.39	405.2	21.99	404	23.78	402.66	24.66	402	26.35	400.73
27.31	400	27.67	399.73	29.95	398	30.97	397.22	32.59	396
34.76	394.35	35.22	394	37.41	392.22	37.68	392	37.86	391.83
39.92	390	40.63	389.37	42.17	388	43.31	386.99	44.42	386
45.85	384.73	46.66	384	47.84	382.95	48.91	382	50.93	380.2
51.15	380	51.41	379.76	53.39	378	55.09	376.48	55.62	376
56.33	375.37	57.86	374	60.08	372.02	60.09	372	60.1	371.99
62.23	370	63.05	369.22	64.34	368	65.95	366.45	66.41	366
67.34	365.08	68.41	364	70.18	362.23	70.41	362	71.2	361.21
72.39	360	73.19	359.18	74.36	358	74.78	357.57	76.32	356
77.82	354.47	78.28	354	78.92	353.34	80.22	352	81.35	350.84
82.17	350	82.82	349.32	84.1	348	86	346.03	86.02	346
86.05	345.97	87.92	344	88.99	342.87	89.8	342	91.38	340.32
91.68	340	91.91	339.76	93.56	338	94.02	337.5	95.43	336
96.44	334.92	97.29	334	98.07	333.17	99.16	332	99.73	331.39
100.54	330.52	100.87	330.16	101.02	330	111.2	328.65	116.9	328
127.23	328.74	127.84	329.66	128.08	330	129.12	331.57	129.42	332
130.42	333.5	130.77	334	131.73	335.44	132.12	336	146.63	335.88
151.77	335.91	152.42	335.9	166.66	335.68	168.69	335.64	180.39	335.44

```
  183.48  335.39  212.35  334.98  216.01  334.89  220.32  334.78  225.53
334.65
  230.05  334.59  234.72  334.53  239.35  334.42  242.63  334.39  247.74
334.31
  248.01   334.3   253.7  334.26  259.16  334.22  277.03     334  312.77
334.21
  314.04  334.33  316.53  334.64  318.99  334.93  321.02  335.16  329.71
335.83
  330.22  335.88  330.47  335.91  331.97     336  341.96  336.37  349.34
336.76
  357.03  337.15  360.29  337.37  365.52  337.52   366.9  337.63     368
337.71
  368.92  337.76  373.25     338  432.96  339.01  448.76     340  458.82
340.32
  491.34  341.34  513.06     342  544.49  342.78  563.66  343.26  598.15
344
  808.65  345.76  810.45  345.77  816.29     346  877.95  346.51  878.74
346.59
  879.53  346.73  881.53  346.95  882.54  347.12  888.48     348  890.22
348.1
   898.3     350  905.34  351.91  905.68     352  909.62  353.27  911.72
354
  912.89  354.45  916.98     356  926.01  356.42

Manning's n Values        num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0     .04   100.54     .05   127.23    .018   132.12     .25

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
            86  132.12           410.33  395.27  385.35              .1
.3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
       0      86               F
  132.12  926.01               F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  433.05  515.24     360   336.6  413.18     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1897.670

INPUT
Description:
Station Elevation Data    num=     153
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  375.06      1.5      374     3.11  372.85      4.3      372     6.33
370.55
     7.1      370     7.55  369.79    11.35      368    14.21    366.7    15.72
366
   19.52  364.27    20.12      364     23.9  362.28    24.52      362    24.63
361.95
```

```
   28.93     360   29.87  359.58   33.36     358   34.75  357.36   37.56
356
      40   354.7   41.43     354   43.95  352.66   45.28     352   47.88
350.61
   49.11     350   51.79  348.58   52.94     348   55.68  346.54   56.76
346
   59.56  344.51   60.58     344   62.09  343.25   64.64     342   68.83
341.05
   73.08     340   94.71  339.87   98.75  339.89  102.49     340  113.39
341.51
  114.24     342   122.4  342.23  124.88  342.26  127.41  342.78  129.99
343.2
  131.34  343.51  137.82     344  138.79  344.11  139.23  344.16  140.86
344
  143.14  343.81  143.66  343.72  147.06  343.37  150.64     342  150.96
341.88
  151.36  341.72  153.81  340.79  155.86     340  156.96  339.58  158.44
339.01
  160.34  338.27  161.02     338  163.87  336.88  166.13     336  166.97
335.67
  167.91   335.3  169.86  334.54  171.23     334  173.09  333.27  176.16
332
  177.75  331.34  178.78  330.86  179.76  330.41  180.39     330  180.67
329.81
   182.7  328.44  183.35     328  212.15  328.86  212.26  328.94  213.11
329.59
  213.63     330  214.45  330.73     216     332  217.37  333.26  218.15
334
  281.89   334.6  291.52  334.69  294.54  334.72   299.5  334.76  300.49
334.77
  304.09  334.81  309.86  334.87  317.13  334.94   371.4  335.28  376.63
335.32
  384.58   335.4  387.54  335.42  388.98  335.44  391.52  335.46  439.05
335.11
  441.03  334.99  442.89  334.88  444.37  334.79  445.18  334.74  446.08
334.68
  447.07  334.62  448.18  334.57  450.14  334.59   453.2  334.42  460.27
334.03
  460.91     334  520.63  334.92  524.57     336  529.48  337.11  534.66
338
  539.55  338.45  544.97  338.91  554.54     340  558.74  340.08  583.12
340.51
  610.25  341.05  636.17  341.55  639.13   341.6  659.54     342  675.97
342.47
  694.81  343.02  699.45  343.14  709.92   343.3  714.55  343.41  718.52
343.52
  739.32  343.71  741.92  343.76  743.78   343.8   752.4   343.9  775.83
344
  837.31   343.9   864.6  343.73  883.59  343.61  987.66  343.97  987.85
343.98
  988.73     344 1030.28  344.84 1032.62     346 1038.87  346.92  1045.1
348
  1051.6  349.55 1053.43     350 1059.26  351.34 1062.42     352 1072.59
353.99
 1072.65     354 1072.82  354.01 1095.66  354.97

Manning's n Values         num=        4
```

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	180.67	.1	213.11	.018	218.15	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
137.82	218.15	469.57	465.05	461.75	.1

.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	137.82		F
218.15	1095.66		F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
660.68	695.1	360	769.36	808.01	360	847.78	907.86	360

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 1432.619

INPUT
Description: FEMA Section P
Station Elevation Data num= 139

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.9	19.02	354.02	19.48	354	19.72	353.99	46.71	353.33
47.47	353.3	49.15	353.27	50.37	353.24	54.53	353.16	58.29	353.05
64.75	352.82	66.86	352.74	75.27	352.47	84.62	352.32	88.84	352.09
89.18	352.11	90.76	352	108.71	353.03	109.25	353.09	111.15	353.31
113.74	353.2	114.07	353.17	114.65	353.12	115.4	353.04	118.93	352.69
119.69	352.62	125.83	352	127.94	351.78	128.86	351.68	135.28	351
138.97	350.46	141.76	350	145.19	348.86	147.4	348	149.89	347.02
152.5	346	159.12	344.7	165.1	344	187.92	343.35	192.1	343.25
194.8	343.13	197.63	342.97	200.39	342.79	208.12	342.27	209.15	342.22
212.11	342	214.19	340.09	214.28	340	215.83	338.79	216.76	338.07
216.85	338	217.04	337.98	225.83	337.39	230.4	337.22	246.26	336.41
251.6	336.16	253.84	336	258.54	334.45	259.92	334	265.29	332.22
265.97	332	270.74	330.42	271.98	330	272.18	329.93	277.9	328
279.21	327.55	281.05	326.93	283.79	326	287.35	324.99	290.43	324
336.19	325.98	336.23	326	336.25	326.02	336.71	326.31	339.1	327.83

```
  339.37     328  339.66  328.18  342.52     330  343.53  330.64  345.66
332
  348.32  333.69  348.77     334  364.84  335.75  366.23   335.9  368.11
336
  384.32  336.44   393.3  336.84  402.63  337.16  406.41   337.3  419.79
338
  439.23  339.05  457.12     340  473.52  340.89  493.94     342  513.92
342.98
  534.12     344  556.37  344.92   582.7     346  622.44  344.01  622.46
344
  628.46  342.15  628.97     342  629.54  341.87  633.24  341.02  639.24
340
  641.39  339.67  645.57  338.93  655.27  338.24  656.06  338.14  656.43
338.11
  656.69  338.09   656.9  338.07  659.82     338  689.49  338.31   696.6
338.63
  704.11  339.04  709.79  339.33  722.31     340  762.36  340.92  766.54
341.55
   766.8  341.57  769.87     342     778   343.4  780.44  343.81  781.79
344
  783.64  344.39  791.78     346  794.24  346.85  797.54     348  802.12
349.59
   803.3     350  808.59  351.78  809.21     352  819.76  352.52  825.72
352.81
     829  352.97  832.85  353.14  833.66  353.18  851.54     354

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .045   251.6     .04  281.05     .15  336.25    .045  364.84
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
         251.6  364.84           293.25  305.64  317.13              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   251.6               F
  364.84  851.54               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1126.981

INPUT
Description: Approx. local of old drop strucure (no plans available)
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  356.26    8.34  356.12   16.72     356   20.79  355.76   23.82
355.4
   31.25  354.85   35.62     354   38.94  352.15   39.21     352   39.55
351.81
```

```
   42.81      350    44.6      349    46.43      348    48.45   346.91    50.12
346
   51.14   345.45   53.88      344    57.63   343.59    60.05   343.52    78.32
342.8
   85.89   342.69   88.55   342.73    90.46   342.76   100.83   342.61   101.59
342.6
  102.59   342.57   102.9   342.56    110.1      342   122.34   341.33   143.92
340.14
  147.12      340  169.65   338.35   174.57      338   208.21   336.95   213.89
336.81
  222.42   336.48  228.13   336.37    235.7   336.08   236.85      336   251.45
334.4
  254.25      334   257.5   333.86   285.84   332.72   299.59   332.17   301.18
332.11
  303.96      332  309.39   331.74   347.23      330   348.92   329.85   349.54
329.63
  350.55   329.26  353.92      328   354.81   327.67   359.29      326    359.7
325.84
  364.66      324  364.81   323.94   369.64   322.14   370.02      322   372.75
320.97
   375.3      320  375.93   319.85   382.42      318   409.31   318.28   413.73
320
  415.29   320.61  415.76   320.79   418.86      322   422.58   323.46   423.98
324
  427.27   325.29  429.07      326   429.99   326.37   434.12      328   437.37
329.29
  439.16      330   442.8   331.45   444.28      332   460.94   332.52   465.33
332.6
   469.4   332.76  473.47    332.8   477.54   332.82   487.31   333.64   488.63
333.63
  489.21   333.72  489.91    333.8   491.62      334   493.37   334.43    497.2
335.37
  500.02      336  538.15    337.3   562.32      338   566.66   339.56   567.88
340
  570.08   340.79  571.45   341.28   573.44      342   575.51   342.74      579
344
  582.46   345.25  584.56      346   595.56   347.12   603.22      348   611.05
348.43
  617.52   348.78  640.14      350   650.33   350.28   659.89   350.55   664.79
350.69

Manning's n Values          num=        5
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   347.23     .045   372.75      .15   415.29     .045   444.28
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
         347.23   444.28            215.16   233.86   259.36              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   347.23                  F
  444.28   664.79                  F

CROSS SECTION
```

RIVER: Avarado Ck
REACH: Upper RS: 893.1187

INPUT
Description: u/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41	340.58
42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19	336.87
59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11	332.86
80.74	332	84.11	331.89	85.87	331.83	112.84	330.97	115.86	330.88
125.01	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98	330.13
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35	329.73
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21	328.91
173.36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26	328.33
183.77	328.34	188.66	328.25	189.44	328.26	192.99	328.17	195.25	328.09
195.82	328	196.64	327.88	197.1	327.67	197.75	327.32	198.21	327.02
198.98	326.67	200.42	326	201.52	325.46	203.22	324.74	204.27	324.29
204.58	324	206.21	322.11	206.25	322	206.31	321.83	206.57	321.06
206.94	320	207.14	319.28	207.49	318	207.55	317.65	207.92	316
207.94	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57	316
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83	318.6
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94	323.31
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91	326.29
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78	332
267.66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19	336
321.68	337.29	323.02	338	326.46	339.81	326.82	340	327.22	340.21
330.62	342	331.45	342.44	332.97	343.23	334.42	344	343.82	344.63
344.55	344.68	345.2	344.72	345.73	344.75	346.14	344.78	346.4	344.79
358.71	345.53	366.61	346	398.47	347.31	415.46	348	416.2	348.02

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	192.99	.025	207.94	.1	237.57	.05	255.78	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr. Expan.	
164.89	255.78	49.65	50.12	51.56	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	164.89		F
255.78	416.2		F

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 843.0025

INPUT
Description: d/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data num= 156

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.42	2.76	343.4	12.36	343.22	12.94	343.2	16.73	343.21
19.9	343.22	24.77	343.07	30.96	342.92	49.04	342.66	53.21	342.53
64.01	342.14	67.44	342	73.11	340.59	75.5	340	82.22	338.32
83.53	338	91.1	336.11	91.52	336	91.58	335.98	99.41	334
100.38	333.75	105.16	332.6	107.01	332.15	107.77	332	113.88	332.03
120.46	332.21	128.03	332.41	129.28	332.35	133.87	332.5	135.07	332.59
140.71	332.75	143.64	332.84	144.21	332.87	144.92	332.89	145.97	332.94
148.3	332.98	149.8	332.99	150.42	333	151.43	333.01	152.47	333.03
153.57	333.06	154.78	333.11	155.4	333.13	157.09	333.15	158.91	333.08
159.86	333.12	160.78	333.16	163.48	332.99	164.13	333.03	165.29	333.06
167.93	332.89	169.3	332.92	171.18	332.95	173.26	332.8	175.06	332.75
176.14	332.7	178.05	332.64	178.68	332.56	180.77	332.5	183.37	332
194	331.97	194.16	331.89	194.8	331.72	196.28	331.23	198.22	330
199.21	329.16	199.4	329.08	199.71	328.96	199.85	328.9	200.2	328.76
200.51	328.64	201.11	328.39	201.7	328	202.15	327.69	202.44	327.44

```
  203.94     326  204.75  325.33  205.76  324.66  207.12     324  207.57
323.78
   207.9  323.65  209.66  322.99  210.39     322  211.31  320.42  211.48
320
  211.76  318.94  212.01     318  212.28  316.86  212.47     316  212.56
315.56
  212.88     314  213.08  312.93  213.13  312.65  213.18  312.38  213.25
312
  231.31  312.59   231.8  312.68  234.12   313.1  239.04     314  239.96
315.3
  240.47     316  240.86  316.54  241.46  317.38  241.92     318  243.26
319.75
  243.45     320  243.58  320.17  245.04     322  245.52  322.46  246.49
323.24
  247.55     324  248.56  324.72  249.47  325.32   250.5     326  251.08
326.38
  251.88  326.91  252.88  327.53  253.62     328  254.86  328.78  256.81
330
  257.02  330.13  257.52  330.44  259.27  331.67  259.76     332  263.82
332.43
  264.57  332.49  265.21  332.53  265.61  332.56  270.08  333.03  270.29
333.04
   272.8  333.32  273.94  333.43  274.94  333.49  307.07  333.53  308.37
333.58
  320.33     334  324.19  334.49  327.75     336  328.78  336.56  331.41
338
  332.95  338.85     335     340  337.92  341.63  338.57     342  339.03
342.16
  347.36     344  349.55  344.09  351.48  344.18  367.08  344.83  382.17
345.64
  385.33   345.8  388.81     346  400.98  346.51  410.17  346.87  422.67
347.37
   427.2  347.55

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025      194     .05   213.13      .1   240.86     .05   274.94
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
           194  274.94           356.37  364.33  373.23              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0     194                F
  274.94   427.2                F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 478.6733

INPUT
Description: FEMA Section O
```

Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.87	47.84	358	56.98	357.46	60.13	356	61.62	355.3
64.42	354	66.28	353.13	68.72	352	71.24	350.83	73.01	350
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85.16	344.34
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31	340.07
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67	336
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94	332
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49	326.94
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88	322
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14	317.89
208.01	316	208.71	315.54	211.05	314	212.78	312.85	214.08	312
215.9	310.8	216.82	310.18	217.1	310	217.7	309.66	220.29	308
225.13	307.28	226.2	307.12	227.04	307	233.99	306	243.37	305.4
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99	305.99
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08	310
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11	314.44
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14	320
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42	324.52
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77	328
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.75	403.49	328.85
409.64	329.05	414.47	329.2	441.62	330	448.33	330.93	451.03	332
453.44	333.04	455.81	334	459.99	335.81	460.42	336	460.73	336.13
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8	338.5
489.23	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63	339.3
527.91	339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18	339.99
566.16	340								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
       0    .025  177.67     .05  216.82      .1  303.99     .05  376.25
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        177.67  376.25           263.01  282.17   291.3             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  177.67              F
  376.25  566.16              F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 196.5054

INPUT
Description:
Station Elevation Data    num=     148
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  361.57   13.89  360.66   20.01     360    22.8  358.47   23.36
358.18
    23.7     358   24.06  357.81   27.45     356   29.87  354.71    31.2
354
   32.34  353.39   34.95     352   38.53  350.09    38.7     350   39.78
349.42
   42.46     348   42.66   347.9   46.29     346   46.47   345.9   50.12
344
   50.28  343.92   53.95     342   54.07  341.94   57.78     340   57.83
339.97
   59.41  339.15    61.6     338   61.71  337.94   65.43     336   66.12
335.64
   67.23  335.06   69.26     334   87.67  333.02   91.15   332.9   96.79
332.76
   99.06   332.7  104.37  332.57  115.16   332.6  118.43  332.53  122.53
332.56
  124.74  332.63  133.39   332.7  136.91  332.82  142.54  332.88  154.09
332
  156.48  331.51  158.27   330.4  158.91     330  159.16  329.85  162.09
328
  163.72  326.97   165.2     326  167.64  324.39  168.23     324   169.1
323.42
  171.23     322  172.95  320.84   174.2     320  176.62  318.69  177.61
318.16
  177.95     318  183.93  316.11  184.28     316  187.09  315.12  190.19
314.14
  190.63     314  191.07  313.86  196.98     312  198.77  311.43  203.32
310
  208.74  308.29  209.66     308  210.45  307.75  216.44     306  219.05
305.56
  219.58  305.47  228.46     304  249.87  302.01  249.97     302  311.64
303.39
   313.2  303.68  314.95     304  317.39  304.38  328.22     306  335.63
307.21
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  340.86      308  344.52  309.88  344.74      310  344.93   310.1  348.49
312
  348.58  312.05  350.53  313.08  352.25      314  352.38  314.07     356
316
  358.18  317.16  359.75     318  361.34   318.87  362.11  319.28  363.45
320
  364.29  320.52  364.86  320.89  366.56      322  368.37  323.18  369.63
324
  371.52  325.24  372.69     326  374.73   327.33  375.76     328  379.79
328.4
  380.58  328.42  382.12  328.46  385.05   328.55  410.07  329.71  415.78
330
  416.23  331.48  416.39     332  416.84   333.51  416.99     334  417.09
334.32
  417.59     336  418.15  337.87  418.19      338  418.68  339.69  418.77
340
  419.27  341.68  419.36     342  419.78    343.3  420.01     344  430.88
344.29
  435.08   344.7  448.65     346  463.87   346.83  487.74     348  544.46
347.54
  548.06  347.24  556.42   346.5  559.66   346.24   562.4     346  564.14
345.65
  569.42  344.57  572.14     344  575.15   343.33   581.2     342  584.36
341.28
  588.47  340.35  590.08     340  592.51    339.4

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025    20.01     .05   219.05      .1   313.2      .05  487.74
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        142.54  379.79           225.51   190.7  180.22              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  142.54               F
  379.79  592.51               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 5.802783

INPUT
Description: u/s face of Alvarado Road Crossing
Station Elevation Data     num=      201
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  342.76     1.15  342.36      1.9  342.17     2.32      342   16.02
340.49
   17.61  340.36    19.05     340    30.76  338.79    31.07  338.72    32.63
338.54
```

33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
338.16								
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46
334.46								
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34								
75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332								
94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95
328.1								
111.98	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09
326.81								
125.85	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
325.84								
133.38	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
322								
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
319.71								
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
317.06								
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31
314.71								
243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58								
261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63
312.7								
276.97	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62
310								
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26
305.45								
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
301.51								
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
297.73								
293.33	296	307.28	296.23	308.28	297.51	308.67	298	308.89
298.27								
310.28	300	310.44	300.2	311.76	301.84	311.89	302	312
302.14								
313.02	304	313.68	305.49	313.94	306	314.34	307.3	314.63
308								
314.97	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4
312								
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37
316.26								
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322								
332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04								
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332								
345.15	332.7	346.84	334	348.83	335.46	349.54	336	351.35
336.25								
353.83	336.45	362	337.3	368.9	337.75	369.76	337.82	372.93
338								
375.05	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382
338.5								

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  385.92  338.73  396.28     340  396.64  340.53   397.6     342  397.91
342.49
  398.85     344  399.12  344.41   415.3     346  473.91  347.62  476.83
347.27
  477.02  347.19  477.22  347.12   477.4  347.08   477.7  347.13  478.68
346.94
  482.66  346.63  484.13  346.55  484.71  346.49  490.41     346  493.45
345.96
  506.78  345.79  507.71  345.76  507.76  345.75  508.59  345.73  516.71
345.61
  517.78  345.58  521.56  345.52  522.54  345.49  523.29  345.47  523.71
345.45
  524.12  345.44  524.46  345.43  524.83  345.42  524.95  345.41  525.61
345.39
  526.52  345.35  526.91  345.34  527.41  345.32  528.95  345.27  529.36
345.25
  535.06  345.09  539.77  344.87  542.14  344.81  543.79  344.77  555.55
344.13
  555.77  344.12  555.89  344.11  556.15   344.1  557.82     344  574.08
342.79
   579.5  342.38

Manning's n Values          num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0     .05   292.07      .1   310.44     .05   415.3    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          1.15     362              8.78     5.8       0             .1
.3
```

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

Reach	River Sta.	n1	n2	n3	n4	n5
Upper	3975.018	.025	.018	.02	.018	.025
Upper	3918.558	.025	.018	.02	.018	.025
Upper	3881.736	.025	.018	.02	.018	.025
Upper	3870.768	.025	.018	.02	.018	.025
Upper	3690.298	.025	.018	.02	.018	.025
Upper	3362.059	.025	.018	.02	.018	.025
Upper	3046.513	.025	.018	.025	.018	.025
Upper	2808.985	.018	.018	.05	.018	.025
Upper	2292.941	.04	.05	.018	.25	

Upper	1897.670	.045	.1	.018	.025
Upper	1432.619	.045	.04	.15	.045
.025					
Upper	1126.981	.025	.045	.15	.045
.025					
Upper	893.1187	.05	.025	.1	.05
.025					
Upper	843.0025	.025	.05	.1	.05
.025					
Upper	478.6733	.025	.05	.1	.05
.025					
Upper	196.5054	.025	.05	.1	.05
.025					
Upper	5.802783	.05	.1	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3

Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3

HEC-RAS Plan: Cap River: Avarado Ck Reach: Upper

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)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000024	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	310.98	306.24	312.41	0.030019	9.62	353.36	32.56	0.51
Upper	5.802783	Q35=3000	3000.00	296.00	310.09	305.53	311.41	0.030038	9.22	325.28	30.78	0.50
Upper	5.802783	Q10=2100	2100.00	296.00	307.85	303.79	308.87	0.030012	8.12	258.78	28.70	0.48
Upper	5.802783	Q7=2000	2000.00	296.00	307.57	303.57	308.56	0.030015	7.97	250.83	28.43	0.47
Upper	5.802783	Q5=1700	1700.00	296.00	306.69	302.90	307.57	0.030030	7.52	226.12	27.62	0.46
Upper	5.802783	Q2=1000	1000.00	296.00	304.25	301.05	304.85	0.030013	6.19	161.65	25.19	0.43
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.01		337.01	0.000022	0.63	6158.09	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	313.50		313.60	0.002250	2.53	1343.35	159.13	0.15
Upper	196.5054	Q35=3000	3000.00	302.00	312.59		312.69	0.002520	2.50	1200.27	154.51	0.16
Upper	196.5054	Q10=2100	2100.00	302.00	310.37		310.46	0.003520	2.42	868.79	143.27	0.17
Upper	196.5054	Q7=2000	2000.00	302.00	310.10		310.19	0.003689	2.41	831.11	141.94	0.18
Upper	196.5054	Q5=1700	1700.00	302.00	309.29		309.37	0.004312	2.37	716.98	137.78	0.18
Upper	196.5054	Q2=1000	1000.00	302.00	307.24		307.32	0.006936	2.24	447.13	123.63	0.21
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000051	0.84	4620.91	305.51	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	314.45		314.67	0.006902	3.73	911.15	116.77	0.24
Upper	478.6733	Q35=3000	3000.00	304.00	313.66		313.87	0.007575	3.66	819.67	113.80	0.24
Upper	478.6733	Q10=2100	2100.00	304.00	311.83		312.01	0.009319	3.40	617.75	106.70	0.25
Upper	478.6733	Q7=2000	2000.00	304.00	311.62		311.80	0.009503	3.36	595.94	105.83	0.25
Upper	478.6733	Q5=1700	1700.00	304.00	311.01		311.17	0.009969	3.20	531.57	103.23	0.25
Upper	478.6733	Q2=1000	1000.00	304.00	309.53		309.64	0.009854	2.60	383.90	96.82	0.23
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.95		337.13	0.001423	3.36	1160.63	241.76	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.168737	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.176826	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	319.02		321.14	0.137186	11.69	179.58	30.96	0.86
Upper	843.0025	Q7=2000	2000.00	312.00	318.94		320.92	0.129680	11.28	177.29	30.88	0.83
Upper	843.0025	Q5=1700	1700.00	312.00	318.63		320.22	0.112330	10.14	167.61	30.56	0.76
Upper	843.0025	Q2=1000	1000.00	312.00	317.22		318.20	0.099071	7.96	125.58	29.15	0.68
Upper	893.1187	Q100 = 3900	3900.00	314.00	337.05		337.19	0.000985	3.01	1294.60	265.73	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	326.01	322.19	327.14	0.029149	8.53	398.42	48.16	0.52
Upper	893.1187	Q35=3000	3000.00	314.00	325.33	321.62	326.37	0.029710	8.19	366.13	45.82	0.51
Upper	893.1187	Q10=2100	2100.00	314.00	323.39		324.24	0.032928	7.40	283.67	39.96	0.49
Upper	893.1187	Q7=2000	2000.00	314.00	323.15		323.98	0.033331	7.30	274.12	39.36	0.49
Upper	893.1187	Q5=1700	1700.00	314.00	322.42		323.16	0.034123	6.91	245.98	37.64	0.48
Upper	893.1187	Q2=1000	1000.00	314.00	320.50		321.00	0.034566	5.66	176.75	34.77	0.44

HEC-RAS Plan: Cap River: Avarado Ck Reach: Upper (Continued)

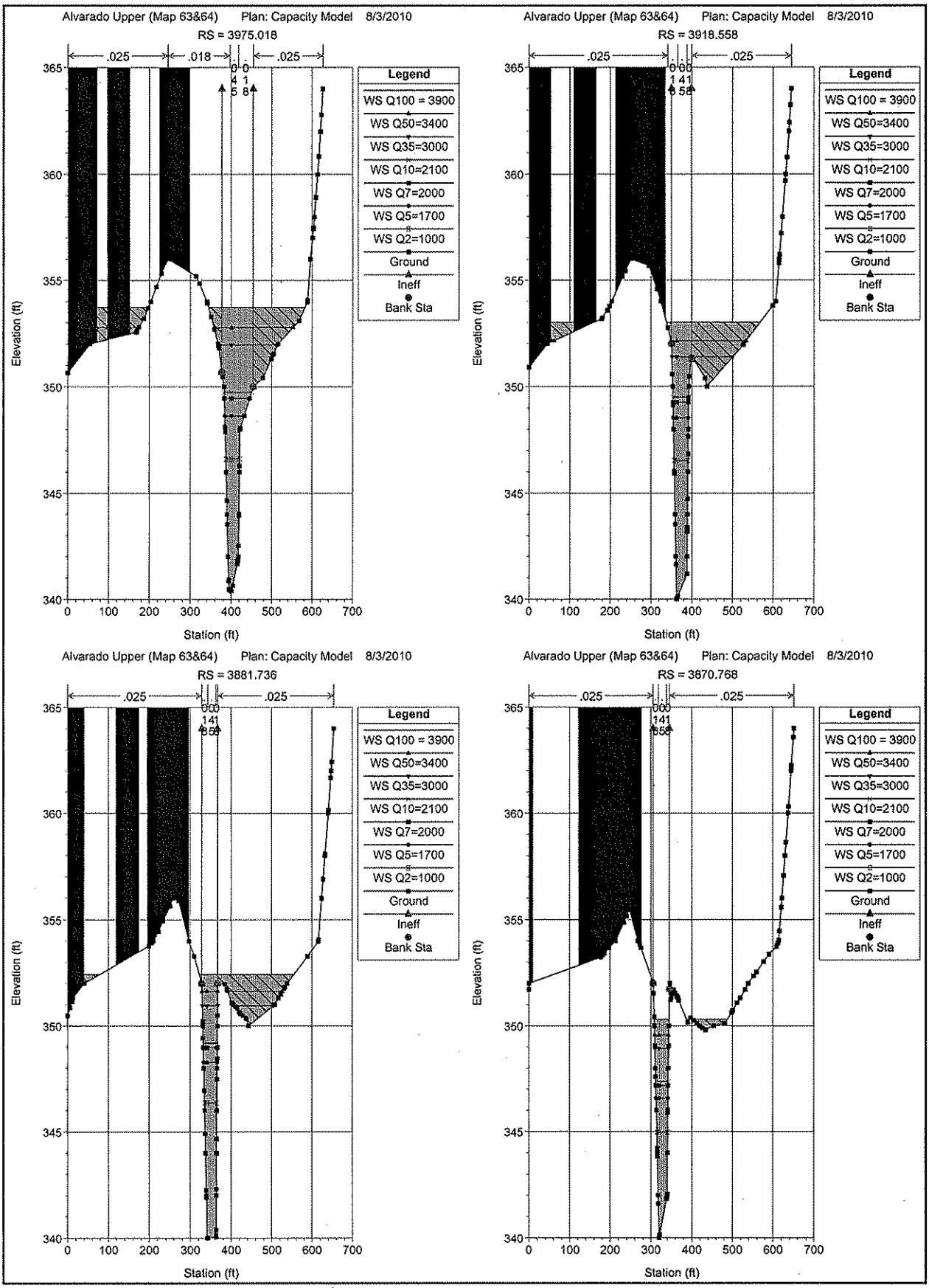
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.30		337.42	0.000983	2.77	1409.68	341.26	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	329.94		330.30	0.007481	4.85	700.53	91.07	0.31
Upper	1126.981	Q35=3000	3000.00	318.00	329.26		329.60	0.007697	4.68	640.59	86.75	0.30
Upper	1126.981	Q10=2100	2100.00	318.00	327.50		327.78	0.008464	4.23	496.27	77.61	0.29
Upper	1126.981	Q7=2000	2000.00	318.00	327.29		327.56	0.008565	4.17	479.48	76.48	0.29
Upper	1126.981	Q5=1700	1700.00	318.00	326.60		326.84	0.008881	3.97	428.02	72.88	0.29
Upper	1126.981	Q2=1000	1000.00	318.00	324.71		324.88	0.009608	3.34	299.68	63.04	0.27
Upper	1432.619	Q100 = 3900	3900.00	324.00	337.75		337.98	0.003825	3.83	1017.73	194.69	0.23
Upper	1432.619	Q50=3400	3400.00	324.00	333.30		333.88	0.019862	6.11	556.17	85.67	0.42
Upper	1432.619	Q35=3000	3000.00	324.00	332.74		333.28	0.020557	5.89	509.23	83.11	0.42
Upper	1432.619	Q10=2100	2100.00	324.00	331.36		331.79	0.022300	5.27	398.45	76.74	0.41
Upper	1432.619	Q7=2000	2000.00	324.00	331.19		331.60	0.022526	5.19	385.45	75.96	0.41
Upper	1432.619	Q5=1700	1700.00	324.00	330.65		331.03	0.023270	4.92	345.31	73.50	0.40
Upper	1432.619	Q2=1000	1000.00	324.00	329.17		329.44	0.025738	4.13	241.86	66.80	0.38
Upper	1897.670	Q100 = 3900	3900.00	328.00	340.42		341.17	0.013531	6.93	562.64	457.72	0.41
Upper	1897.670	Q50=3400	3400.00	328.00	340.14		340.75	0.011390	6.24	544.93	437.89	0.37
Upper	1897.670	Q35=3000	3000.00	328.00	339.57		340.11	0.011003	5.89	509.35	393.77	0.36
Upper	1897.670	Q10=2100	2100.00	328.00	338.07		338.46	0.009971	4.99	420.48	374.56	0.32
Upper	1897.670	Q7=2000	2000.00	328.00	337.88		338.25	0.009841	4.88	409.59	372.62	0.32
Upper	1897.670	Q5=1700	1700.00	328.00	337.26		337.58	0.009431	4.53	375.17	367.48	0.31
Upper	1897.670	Q2=1000	1000.00	328.00	335.50		335.70	0.008238	3.55	281.70	355.34	0.27
Upper	2292.941	Q100 = 3900	3900.00	328.00	344.75		345.45	0.008829	6.70	581.91	441.88	0.33
Upper	2292.941	Q50=3400	3400.00	328.00	343.95		344.55	0.008231	6.22	546.23	349.02	0.31
Upper	2292.941	Q35=3000	3000.00	328.00	343.21		343.74	0.007798	5.84	514.03	314.38	0.30
Upper	2292.941	Q10=2100	2100.00	328.00	341.29		341.66	0.006703	4.86	432.15	266.00	0.27
Upper	2292.941	Q7=2000	2000.00	328.00	341.05		341.39	0.006567	4.74	421.99	265.77	0.26
Upper	2292.941	Q5=1700	1700.00	328.00	340.26		340.56	0.006141	4.36	389.79	265.03	0.25
Upper	2292.941	Q2=1000	1000.00	328.00	338.01		338.18	0.004953	3.33	300.62	243.05	0.21
Upper	2808.985	Q100 = 3900	3900.00	332.00	348.28		348.85	0.005070	6.06	643.19	434.28	0.31
Upper	2808.985	Q50=3400	3400.00	332.00	347.33		347.84	0.005045	5.74	592.68	421.06	0.30
Upper	2808.985	Q35=3000	3000.00	332.00	346.49		346.95	0.005052	5.46	549.11	416.25	0.29
Upper	2808.985	Q10=2100	2100.00	332.00	344.32		344.67	0.005143	4.77	440.03	400.04	0.28
Upper	2808.985	Q7=2000	2000.00	332.00	344.05		344.39	0.005164	4.69	426.68	355.41	0.28
Upper	2808.985	Q5=1700	1700.00	332.00	343.18		343.48	0.005253	4.42	384.73	334.21	0.27
Upper	2808.985	Q2=1000	1000.00	332.00	340.74		340.95	0.005776	3.69	271.32	62.83	0.26

HEC-RAS Plan: Cap River: Avarado Ck Reach: Upper (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)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	348.63		349.17	0.000603	5.88	663.27	331.98	0.30
Upper	3046.513	Q50=3400	3400.00	332.00	347.67		348.15	0.000593	5.58	609.00	298.44	0.30
Upper	3046.513	Q35=3000	3000.00	332.00	346.82		347.26	0.000588	5.33	562.50	273.01	0.29
Upper	3046.513	Q10=2100	2100.00	332.00	344.64		344.98	0.000580	4.70	447.16	202.82	0.28
Upper	3046.513	Q7=2000	2000.00	332.00	344.37		344.70	0.000580	4.62	433.17	193.17	0.28
Upper	3046.513	Q5=1700	1700.00	332.00	343.50		343.79	0.000582	4.37	389.38	85.34	0.28
Upper	3046.513	Q2=1000	1000.00	332.00	341.07		341.27	0.000591	3.66	273.58	43.75	0.26
Upper	3362.059	Q100 = 3900	3900.00	334.00	348.68		349.51	0.001136	7.31	533.75	374.76	0.40
Upper	3362.059	Q50=3400	3400.00	334.00	347.73		348.49	0.001184	7.02	484.57	349.20	0.40
Upper	3362.059	Q35=3000	3000.00	334.00	346.89		347.61	0.001229	6.79	441.86	323.06	0.40
Upper	3362.059	Q10=2100	2100.00	334.00	344.73		345.34	0.001443	6.28	334.65	248.13	0.42
Upper	3362.059	Q7=2000	2000.00	334.00	344.46		345.06	0.001486	6.22	321.51	237.86	0.43
Upper	3362.059	Q5=1700	1700.00	334.00	343.60		344.17	0.001661	6.07	280.21	123.72	0.44
Upper	3362.059	Q2=1000	1000.00	334.00	341.18		341.72	0.002791	5.92	168.81	40.98	0.51
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.006539	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.006810	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.007068	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.007840	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.007956	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.008376	12.19	139.44	86.45	1.00
Upper	3690.298	Q2=1000	1000.00	338.00	342.57	342.57	344.34	0.009893	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.010323	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.010877	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.011451	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.013036	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349.76	0.013242	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.013993	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.016509	10.72	93.29	26.22	1.00
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.42		354.09	0.003149	10.37	376.14	270.47	0.59
Upper	3881.736	Q50=3400	3400.00	340.00	351.64		353.14	0.003142	9.84	345.45	174.07	0.58
Upper	3881.736	Q35=3000	3000.00	340.00	350.96		352.33	0.003104	9.39	319.49	132.97	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.19		350.24	0.003001	8.20	255.98	34.54	0.53
Upper	3881.736	Q7=2000	2000.00	340.00	348.97		349.98	0.002987	8.05	248.41	34.18	0.53
Upper	3881.736	Q5=1700	1700.00	340.00	348.27		349.16	0.002932	7.56	224.98	33.07	0.51
Upper	3881.736	Q2=1000	1000.00	340.00	346.36		346.93	0.002703	6.08	164.40	30.21	0.46

HEC-RAS Plan: Cap River: Avarado Ck Reach: Upper (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)	
Upper	3918.558	Q100 = 3900	3900.00	340.00	353.01		354.23	0.002171	8.87	439.64	285.66	0.52
Upper	3918.558	Q50=3400	3400.00	340.00	352.14		353.28	0.002314	8.56	397.19	191.95	0.53
Upper	3918.558	Q35=3000	3000.00	340.00	351.38		352.46	0.002467	8.33	360.32	148.86	0.54
Upper	3918.558	Q10=2100	2100.00	340.00	349.49		350.35	0.002436	7.46	281.44	38.16	0.48
Upper	3918.558	Q7=2000	2000.00	340.00	349.26		350.09	0.002439	7.33	272.67	37.80	0.48
Upper	3918.558	Q5=1700	1700.00	340.00	348.53		349.27	0.002445	6.92	245.51	36.66	0.47
Upper	3918.558	Q2=1000	1000.00	340.00	346.53		347.03	0.002446	5.71	175.23	33.60	0.44
Upper	3975.018	Q100 = 3900	3900.00	340.39	353.72		354.37	0.000946	6.47	602.35	308.20	0.41
Upper	3975.018	Q50=3400	3400.00	340.39	352.78		353.42	0.001104	6.42	529.60	241.66	0.43
Upper	3975.018	Q35=3000	3000.00	340.39	351.96		352.60	0.001314	6.43	466.26	145.88	0.46
Upper	3975.018	Q10=2100	2100.00	340.39	349.74		350.51	0.002603	7.04	298.32	67.59	0.59
Upper	3975.018	Q7=2000	2000.00	340.39	349.45		350.25	0.002773	7.15	279.86	62.38	0.59
Upper	3975.018	Q5=1700	1700.00	340.39	348.63		349.45	0.003050	7.24	234.93	47.37	0.57
Upper	3975.018	Q2=1000	1000.00	340.39	346.61		347.22	0.003154	6.25	160.00	33.53	0.50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WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 3918.558
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Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 3881.736
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WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 3870.768
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.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
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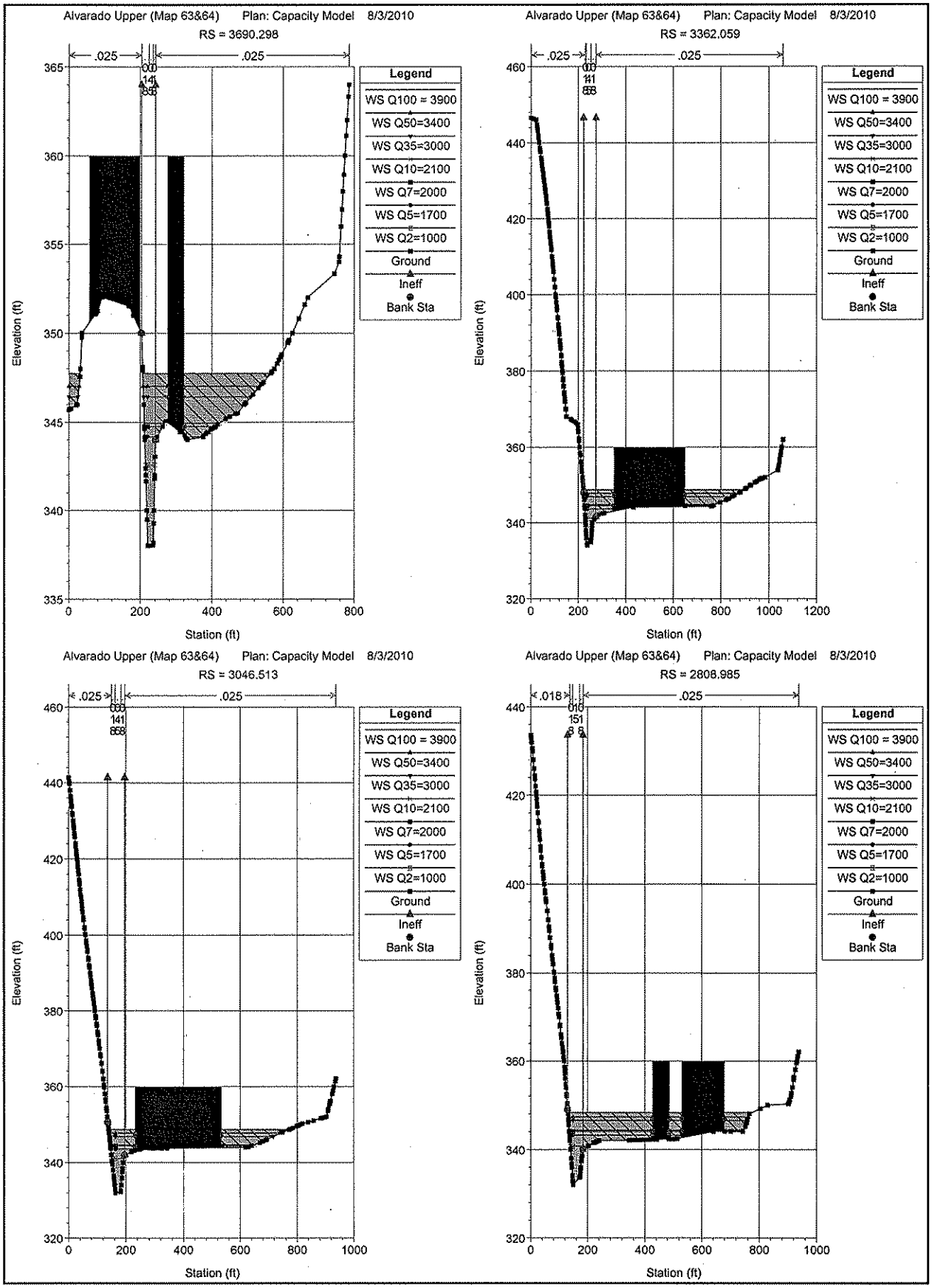
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 3362.059
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.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 3046.513
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.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 2808.985
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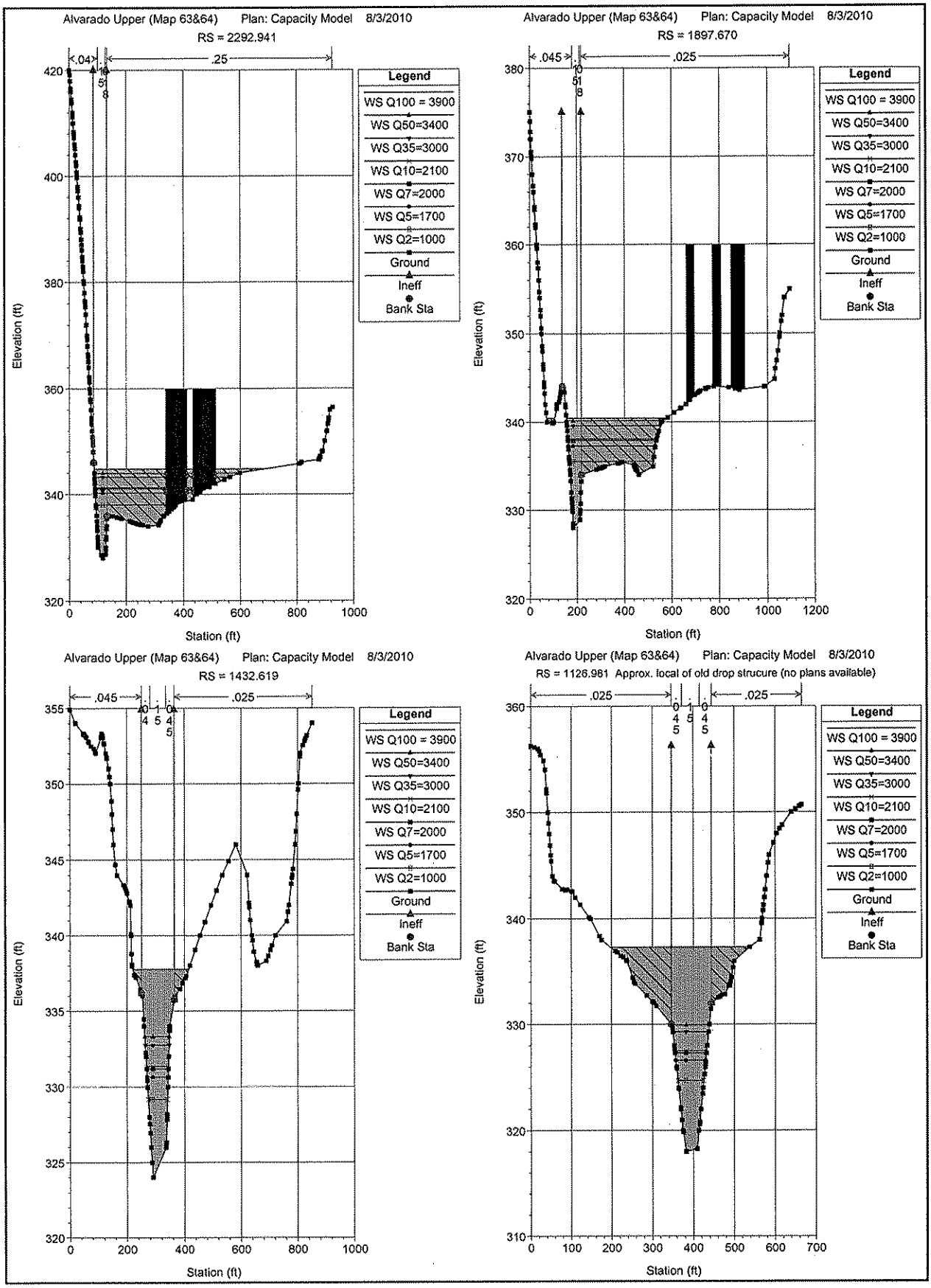
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS Q35=3000
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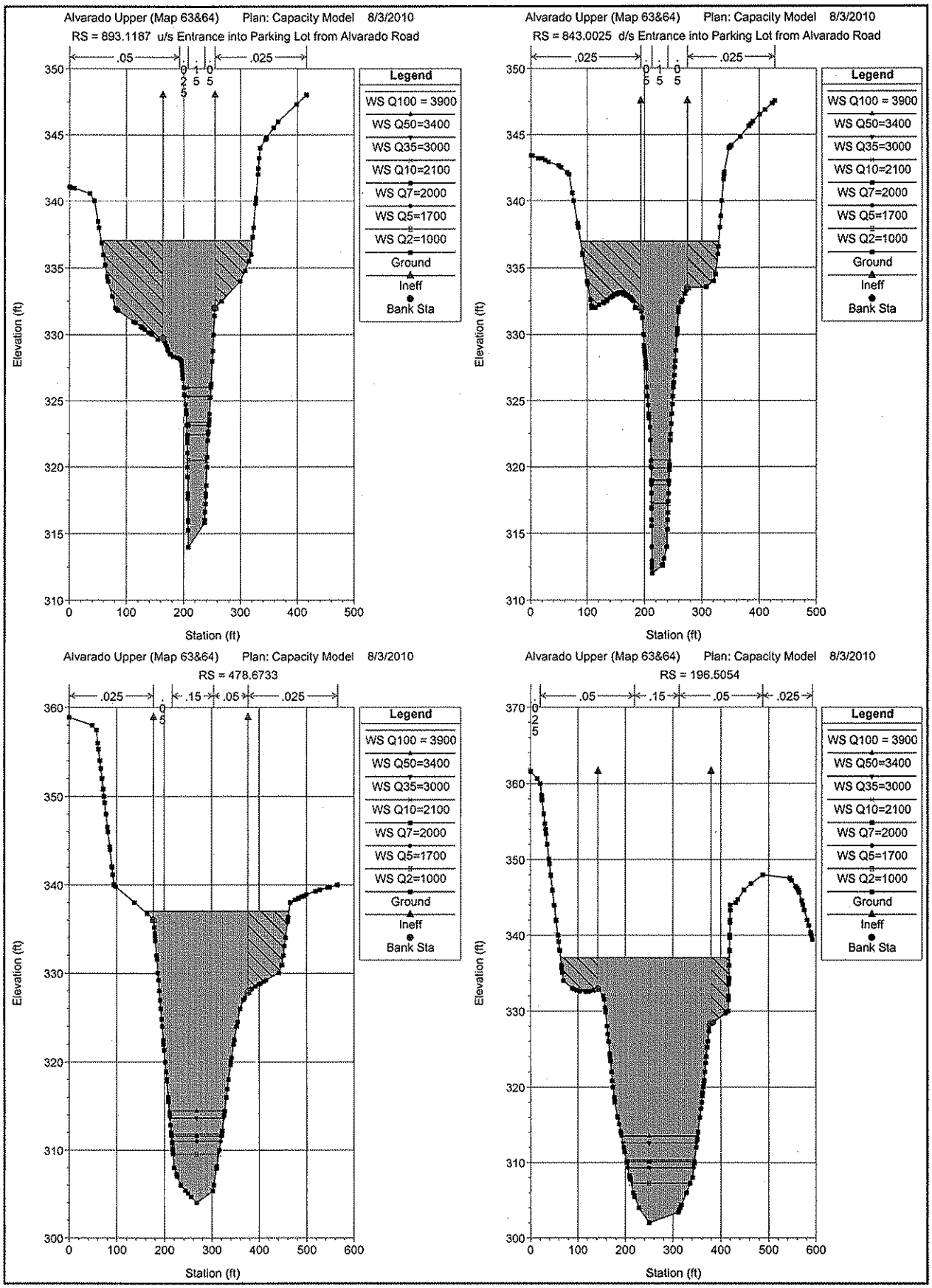
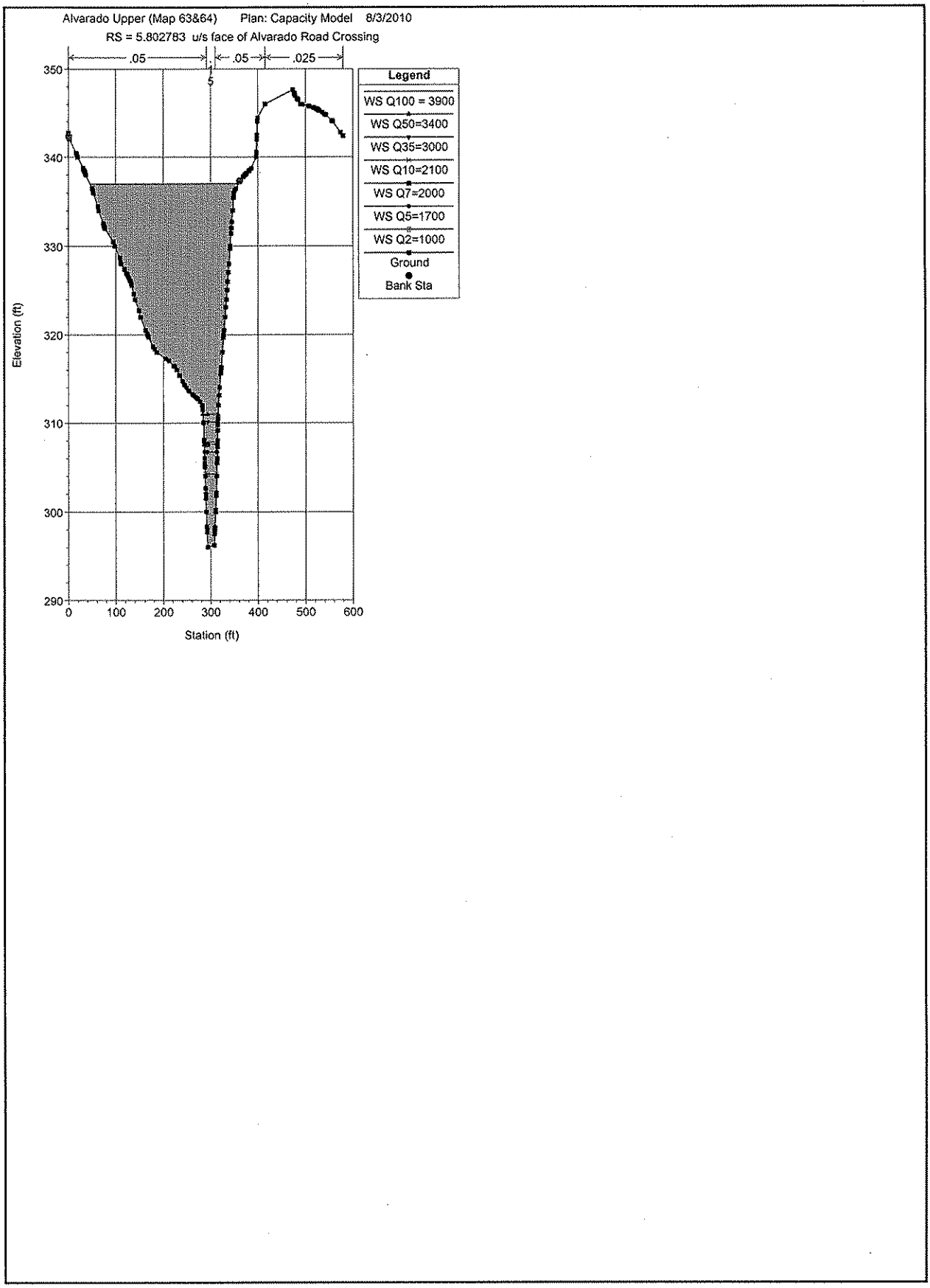
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 1897.670
.045
.025
.1
.05
.08
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 1432.619
.045
.025
.1
.045
.1
.045
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 1126.981 Approx. local of old drop strucure (no plans available)
.025
.025
.1
.045
.1
.045
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 893.1187 u/s Entrance into Parking Lot from Alvarado Road
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 843.0025 d/s Entrance into Parking Lot from Alvarado Road
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 478.6733
.025
.15
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 196.5054
.05
.15
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Capacity Model 8/3/2010
RS = 5.802783 u/s face of Alvarado Road Crossing
.05
.05
.025
5
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Bank Sta
Elevation (ft)
350
340
330
320
310
300
290
0
100
200
300
400
500
600
Station (ft)

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Alvarado Upper (Map 63&64)
Project File : Alvarado6364.prj
Run Date and Time: 8/3/2010 1:51:08 PM

Project in English units

Project Description:
City Stormwater Maintenance (First Year)
Alvarado Canyon Creek (Upper)
Helix
Map Number 63 & 64
October 17, 2009 J-15541A

PLAN DATA

Plan Title: Capacity Model
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p03

Geometry Title: Capacity
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g04

Flow Title : FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description:
Geometry is from TIN
Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:

Number of:	Cross Sections	= 17	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0

Bridges = 0 Lateral Structures = 0

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

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River	Reach	RS	Q100 = 3900	Q50=3400	Q35=3000	Q10=2100	Q7=2000	Q5=1700	2330	800
Avarado Ck	Upper	3975.018	3900	3400	3000	2100	2000	1700	2330	800

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Avarado Ck	Upper	Q100 = 3900	Known WS = 337	
Avarado Ck	Upper	Q50=3400	Normal S = 0.03	
Avarado Ck	Upper	Q35=3000	Normal S = 0.03	
Avarado Ck	Upper	Q10=2100	Normal S = 0.03	
Avarado Ck	Upper	Q7=2000	Normal S = 0.03	
Avarado Ck	Upper	Q5=1700	Normal S = 0.03	

GEOMETRY DATA

Geometry Title: Capacity
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g04

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 3975.018

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.66	54.55	352	168.06	352.55	169.75	352.62	174.25	352.81
186.4	353.2	196.62	353.69	203.07	354	216.59	354.69	229	355.32
244.96	356	313.71	355.2	321.79	354.85	340	354	340.76	353.95
340.92	353.94	341.22	353.92	350.36	353.29	359.4	352.68	368.34	352
368.63	351.95	369.6	351.82	377.54	350.68	379.23	350.46	382.41	350
385.23	348.13	385.42	348	385.58	347.89	388.06	346	389.7	344.66
390.46	344	390.99	343.53	392.73	342	394.26	340.86	394.64	340.91
395.4	340.47	397	340.44	400.41	340.39	403.98	340.64	414.41	341.66
415.6	341.75	416.29	341.81	416.76	341.84	417.94	342	418.25	342.52
419.07	343.94	419.1	344	419.12	344.02	420.38	346	420.56	346.28
421.71	348	422.75	348.06	431.94	348.64	454.83	350	478.38	350.41
499.51	351.3	503.88	351.51	504.44	351.53	504.87	351.54	505.16	351.55
515.48	352	567.91	353.08	587.99	353.98	588.51	354	588.66	354.05
595.5	356	600.77	357.01	602.99	357.43	603.15	357.45	603.3	357.48
605.48	358	609.26	358.92	613.68	360	616.49	360.83	620.64	362
623.06	362.78	626.85	364						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	244.96	.018	397	.045	418.25	.018	454.83	.025

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

```
       377.54  454.83             56.06   56.46   57.46              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  377.54                F
  454.83  626.85                F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   71.99     365   97.43  152.37     365   224.1  297.99     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3918.558

INPUT
Description:
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  350.89   45.61     352  179.04  353.17  180.56  353.23  193.04
353.58
  197.76  353.78  203.01     354  230.15  355.16  237.25  355.42  250.67
356
   294.4  355.68  314.27  354.58  324.48     354  341.01  352.75  350.82
352
  352.57  350.58  353.44     350  354.29  349.11  355.36     348  357.25
346.02
  357.27     346  357.33  345.94  359.19     344  359.68  343.53   361.3
342
   361.7  341.63  363.62     340  365.91340.1096  388.28  341.18  388.59
342
  389.03  343.17  389.11  343.38  389.34     344  389.62  344.72  390.14
346
   390.5  346.84     391  347.66  391.19     348  392.09  349.49  392.37
350
  393.96  350.46  398.11  351.25  399.59  351.32   400.7  351.38   402.6
351.24
  403.71  351.29  432.41  350.39  438.19     350  526.18  351.95  526.68
351.96
  526.98  351.97  527.72     352  599.34   353.8  606.95     354  614.22
355.8
  615.03     356  615.89  356.21  620.14  357.22  623.29     358  630.16
359.69
   631.4     360  634.28  360.79   638.7     362  640.01  362.42  642.45
363.24
  644.88     364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  341.01    .018  365.91    .045  388.28    .018  399.59
.025

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

```
       350.82  399.59             36.89   36.82   36.86              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  350.82               F
  399.59  644.88               F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   54.03     365   109.3  165.48     365  212.28  335.49     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3881.736

INPUT
Description:
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  350.48    6.07  350.87   10.29  351.15   12.92  351.31   40.92
352
     199  353.76  206.08  353.91  206.69  353.92  210.21     354  222.24
354.44
   233.9  354.94  251.37  355.63  258.69     356  271.86  355.88   296.8
354
  309.56  353.29  328.41     352  330.64  350.21  330.92     350  331.62
349.42
  333.32     348  334.54  346.94  335.46     346  336.53  344.91  337.43
344
  339.15  342.25   339.4     342  339.49  341.91  341.37     340
342.76340.0032
  363.11  340.05  363.14  340.12  363.24  340.37  363.78     342  363.88
342.31
  364.44     344  364.68  344.67  365.18     346  365.75  347.47  365.95
348
  366.13  348.45  366.76     350  366.98   350.5  367.69     352  385.02
351.97
  389.85  351.73  401.73   351.1  404.62  351.04   406.3     351  410.61
350.92
  415.48  350.84  419.61  350.67  421.56  350.62  423.52  350.58  428.95
350.5
  436.77  350.38  437.79  350.35  443.09     350  507.58  351.01  517.23
351.31
  523.05   351.5  531.06  351.78  532.85  351.84  538.19     352  589.11
353.29
  615.46  353.99  615.84     354   616.1  354.06  623.91     356  627.56
356.9
  632.01     358  632.22  358.05  632.33  358.08  639.85     360  640.33
360.14
  645.87  361.67  647.07     362  648.51  362.43  653.47     364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
```

```
       0     .025  328.41     .018  342.76     .045  363.11     .018  367.69
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        328.41  367.69            11.11   10.97   10.38              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  328.41                F
  367.69  653.47                F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   40.99     365  118.74  175.55     365   195.2  297.51     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3870.768

INPUT
Description:
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  351.72     .69     352  176.77  353.23  181.76  353.33  186.43
353.41
   197.1  353.65  213.03     354  234.28  354.85  240.42  355.16  245.89
355.43
  246.64  355.46  267.28     354  272.64  353.82  272.67 353.819  275.67
353.67
  305.95     352  306.57  351.54  308.04  350.43   308.6     350  309.85
349.05
  311.24     348  311.77  347.59  313.71     346  315.77  344.21  316.02
344
  316.21  343.83  318.18     342   318.6   341.6  320.17     340  321.64
340.147
  338.64 341.841  340.04  341.98  340.05     342  340.07  342.06  340.77
344
  341.44  345.88  341.48  345.99  341.49  346.01   342.6     348  343.42
349.05
  344.21     350  346.01  351.74  346.27     352  348.08  351.23  349.08
351.56
  350.42  351.36  354.74   351.7  355.64  351.67  359.27  351.55  363.01
351.43
  364.73  351.37  366.08  351.33  368.29   351.2   389.9  350.16  397.33
350.39
  404.15  350.27  404.59  350.26  412.11  350.12  418.82     350  420.14
349.98
  426.27   349.9  433.22   349.8  434.21  349.82  453.99     350  481.77
350.11
   497.7  350.62  501.02  350.74  511.44  351.09  518.78  351.31  530.89
351.71
  538.75     352  551.73  352.35  558.84  352.54  576.49  353.03  589.82
353.37
```

```
  608.45  353.74  611.81  353.89  614.18     354  614.26  354.01  614.32
354.03
  615.95  354.47   620.3  355.57  621.91     356  626.05  357.06  629.47
358
  631.85  358.62  636.85     360  637.98  360.31  644.01     362  644.38
362.1
   644.9  362.25  649.64  363.57  651.05     364

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   305.95    .018   318.6    .045   338.64    .018   346.01
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        305.95  346.01           179.97  180.47  180.91              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  305.95                F
  346.01  651.05                F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0     9.75    365  121.57  277.04    365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3690.298

INPUT
Description:
Station Elevation Data     num=       90
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  345.71     3.53  345.75     5.97  345.77    20.93  345.96     23.5
346
    30.97  347.56    32.17     348    35.83  349.75    36.38     350    73.85
351.06
    76.35  351.12    80.39  351.24    93.24     352   167.58  351.52   180.07
350.99
   203.46     350   206.33  348.11   206.49     348    206.6  347.92    209.4
346
    211.3  344.63   212.19     344   214.44  342.39   214.98     342   215.47
341.65
   217.78     340   218.52  339.47   220.56     338  223.92338.0069   235.27
338.03
   235.44  338.18    236.7  339.26   237.56     340   239.68  341.82   239.89
342
   241.12  343.04   242.24     344   270.01  345.07   310.29  344.45   322.56
344.28
   326.36   344.1   330.94     344   375.39  344.17   382.11  344.34   386.03
344.44
   387.03  344.43   390.42  344.44   396.81  344.59   400.84  344.63   407.01
344.7
```

```
  416.13  344.88  438.84  345.18   448.8   345.3  450.55  345.31  465.65
345.48
  468.22  345.49  472.87  345.52  491.47     346  494.34  346.07  495.53
346.1
  515.92  346.57  530.49  346.92  540.57  347.15  545.75  347.26  566.83
347.78
  569.21  347.84  575.67     348  583.79   348.3  588.52  348.49  592.91
348.66
  596.44   348.8  613.02  349.46  615.24  349.55  616.85  349.62  626.37
350
  644.26  350.81  661.23   351.6  669.77     352  744.72  353.34   757.4
354
  758.19   354.3  762.72     356  765.36  356.97  768.25     358  770.91
358.93
  774.03     360  777.36  361.13   779.9     362  783.91  363.32  785.95
364

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  203.46    .018  223.92    .045  235.27    .018  242.24
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        203.46  242.24           344.53  328.24  316.06              .1
.3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
       0  203.46              F
  242.24  785.95              F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     275  321.35     360   57.06  198.78     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3362.059

INPUT
Description:
Station Elevation Data     num=     187
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  446.54    10.14  446.29    20.91     446    24.19    444.7    25.61
444
   27.19  443.21    29.68     442    30.85  441.42    33.27  440.27    33.66
440.07
   33.81     440    36.64  438.61    37.91     438    38.67  437.63    42.05
436
   42.49  435.79    43.46  435.33    45.38   434.4    46.24     434    48.24
433.04
   50.46     432    51.07  431.71    52.21  431.18    54.08  430.27    54.64
430
```

57.03	428.84	58.76	428	59.55	427.62	60.36	427.22	62.58
426								
64.09	425.13	66.11	424	68.65	422.51	69.49	422	70.86
421.16								
72.75	420	73.27	419.67	74.6	418.83	75.91	418	78.23
416.53								
79.06	416	80.3	415.22	82.22	414	83.08	413.46	85.03
412.22								
85.27	412.07	85.38	412	85.58	411.87	88.54	410	90.63
408.68								
91.7	408	92.99	407.18	94.86	406	97.97	404.03	98.02
404								
101.08	402.03	101.11	402.01	101.13	402	101.2	401.96	104.22
400								
105.29	399.3	107.26	398	109.04	396.82	110.28	396	113.2
394.05								
113.28	394	113.32	393.98	113.51	393.85	115.98	392.19	116.26
392								
117.51	391.16	119.23	390	119.73	389.67	122.21	388	123.85
386.85								
125.08	386	127.54	384.11	127.67	384	130	382.21	130.28
382								
131.19	381.3	132.89	380	133.44	379.58	135.54	378	135.6
377.96								
136.13	377.56	138	376.16	138.21	376	140.41	374.38	140.92
374								
142.28	373	143.63	372	146.21	370.09	146.35	370	146.39
369.97								
149.39	368	167.44	367.39	173.88	367.1	183.82	366.76	190.8
366.38								
197.44	366	198.93	364.92	200.18	364	202.56	362.3	202.97
362								
203.33	361.74	205.83	360	208.02	358.47	208.7	358	211.37
356.14								
211.57	356	213.46	354.69	214.45	354	215.2	353.47	217.32
352								
218.52	351.16	220.19	350	221.67	348.86	222.79	348	223.55
347.15								
224.57	346	226.32	344.03	226.34	344	226.44	343.89	228.12
342								
229.22	340.76	229.89	340	230.44	339.38	231.72	338	232.63
337.01								
233.63	336	233.78	335.91	236.2	334.56	237.12	334	252.9
334.87								
253.61	335.49	254.18	336	255.55	337.21	256.43	338	257.85
339.26								
258.68	340	266.68	340.85	274.32	341.65	277.87	342	284.94
342.14								
302.27	342.45	306.07	342.51	309.61	342.52	431.19	344	758.76
344.35								
768.31	344.6	797.19	345.41	821.62	346	830	346.31	831.03
346.34								
833.5	346.43	847.74	346.96	856.58	347.25	879.57	348	880.41
348.03								
880.72	348.04	881.24	348.07	901.94	348.95	906.43	349.16	921.76
349.83								

```
  923.27   349.9  925.42     350  942.25  350.68  949.16  350.95  960.33
351.4
  963.86  351.55  965.66  351.58  967.08  351.64  969.78  351.75  971.07
351.79
  984.45     352 1038.39  353.93 1038.73     354 1041.06  354.92 1043.88
356
 1045.68  356.71 1048.94     358 1050.91  358.78 1053.99     360 1059.87
361.95
 1059.99  361.99 1060.03     362

Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  228.12    .018  233.78    .045  253.61    .018  274.32
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        222.79  274.32             323.3  315.55  308.79              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  222.79                F
  274.32 1060.03                F
Blocked Obstructions      num=        1
   Sta L   Sta R    Elev
  350.42  649.42     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 3046.513

INPUT
Description:
Station Elevation Data      num=      182
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  441.38     1.65  440.18     1.89      440     2.26  439.73     4.62
438
     6.7  436.48     7.36      436      8.5  435.16    10.09      434    10.57
433.65
   12.82      432    13.42  431.56    15.56      430    17.26  428.76    18.29
428
   20.08  426.69    21.03      426    21.34  425.77    23.76      424    24.83
423.22
    26.5      422    27.68  421.13    29.23      420    30.54  419.04    31.97
418
   33.39  416.96     34.7      416    36.66  414.57    37.43      414    38.34
413.34
   40.17      412    41.97  410.69     42.9      410    44.71  408.84    46.04
408
   47.74  406.95    49.28      406    51.46  404.66    52.53      404    55.65
402.08
   55.78      402    56.21  401.73    58.56  400.29    59.03      400    61.34
398.58
```

```
   62.29     398   62.38  397.94   63.73  397.12   65.44  396.06   65.55
396
      66  395.72   68.81     394    69.5  393.58   72.08     392   73.03
391.42
   75.35     390   76.54  389.27   78.62     388   80.04  387.13   81.89
386
   84.06  384.67   85.16     384   86.41  383.24   88.44     382   90.48
380.76
   91.72     380   93.93  378.65      95     378   97.38  376.55   98.28
376
   100.9   374.4  101.56     374  102.26  373.57  104.84     372  105.98
371.3
  108.12     370  110.66  368.46  111.41     368  114.45  366.15   114.7
366
  117.91  364.04  117.98     364  118.05  363.96   121.2     362  121.22
361.99
  121.34   361.9   123.3  360.47  123.95     360  124.33  359.72  126.69
358
   128.6  356.62  129.44     356   131.8  354.28  132.19     354  132.86
353.52
  134.94     352  136.83  350.63   137.7     350   139.3  348.84  140.46
348
  142.24  346.71  143.23     346   144.6  345.01     146     344  146.37
343.73
  148.77     342  150.97  340.41  151.55     340  152.21  339.52  154.32
338
  156.46  336.46   157.1     336  157.84  335.47  158.82  334.77  159.88
334
  161.68  333.02  163.38     332  181.72  332.23  181.93  332.42  182.16
332.61
  183.79     334  185.96  335.84  186.15     336  187.92   337.5  188.51
338
  189.01  338.46  190.75     340  196.48  341.99  196.52     342  219.42
342.83
  228.12  343.15  232.61  343.32  245.18   343.4  249.52  343.53  252.86
343.63
  255.39   343.7  264.28  343.83  281.18  343.76  295.78   343.7  309.77
343.77
  324.93  343.72  342.77  343.67  618.57  343.93  628.31     344  669.36
345.21
  680.15  345.54  689.98  345.88  691.38  345.92  692.91  345.96  693.63
346
  747.86  347.89  748.45  347.91  748.79  347.92   749.9     348  772.09
348.57
  776.41  348.74  784.94  349.02  798.19   349.5   802.2  349.65  805.77
349.77
  812.25     350  818.51   350.2  839.73  350.56  858.41  350.94  883.51
351.54
  888.56  351.65  890.61  351.69  899.49  351.84  903.12     352  908.37
353.53
  909.21  353.73  910.24     354  914.52  355.26  915.46  355.54  916.35
355.8
  917.05     356  917.51  356.13     924     358  926.64  358.81  930.52
360
  934.83  361.33  937.02     362

Manning's n Values         num=       5
```

```
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   148.77     .018   161.68     .045   182.16     .018   196.48
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
         136.83   196.48            240.61   237.53   235.74              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   136.83                F
  196.48   937.02                F
Blocked Obstructions      num=        1
   Sta L    Sta R     Elev
  232.03   534.15      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 2808.985

INPUT
Description:
Station Elevation Data     num=      166
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   433.56      .91   432.99     2.45      432     4.61   430.58     5.49
430
    8.37   428.05     8.45      428     8.51   427.96     11.2      426    13.39
424.38
    13.9      424     14.4   423.62    16.57      422    18.29    420.7    19.22
420
   20.43   419.08    21.83      418    22.65   417.37    24.42      416     26.9
414.09
   27.01      414    27.25   413.82     29.6      412    30.93   410.98    32.19
410
   34.27    408.4    34.79      408    35.27   407.62    37.38      406    39.74
404.46
   40.46      404     42.6   402.78    43.95      402    45.26   401.25    47.44
400
   49.89    398.6    50.93      398    53.08   396.77    54.41      396     57.9
394
   57.93   393.98    61.39      392    64.13   390.43    64.88      390    65.68
389.54
   68.37      388    71.48   386.21    71.86      386    72.47   385.65    75.35
384
   76.94   383.09    78.84      382       82   380.19    82.32      380    84.45
378.78
   85.81      378    88.27   376.59    89.29      376    91.35   374.82    92.78
374
   94.32   373.11    96.26      372    98.55   370.68    99.74      370   102.85
368.21
  103.21      368   103.47   367.85   106.69      366   107.94   365.28   110.16
364
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   111.9      363   113.64      362   115.55    360.9   117.11      360   118.88
358.56
  119.57      358   120.51   357.16   121.79      356   123.11   354.82   124.02
354
  125.82   352.38   126.24      352   128.08   350.35   128.47      350   129.47
349.1
  130.69      348   132.19   346.66   132.92      346   133.52   345.47   135.15
344
  136.86   342.47   137.39      342   139.59   340.03   139.62   340.01   139.63
340
  139.64   339.99   141.87      338   143.15   336.86   144.11      336   146.18
334.16
  146.36      334   147.63   332.88   147.74   332.78   148.61      332   171.18
333.693
  173.54   333.87   173.71      334   174.92   334.97    176.2      336   177.85
337.36
  178.63      338   180.37    338.6   183.91      340   204.05   340.84    220.8
341.48
  223.19   341.56   224.98   341.61   226.38   341.66   230.53   341.78   231.59
341.81
  232.58   341.84   238.45   341.95   241.64      342   345.14    342.1   353.05
342.11
   364.5   342.13   374.22   342.15   375.34   342.14   387.76   342.16   397.36
342.17
  404.24   342.18   408.46   342.19   416.48    342.2   428.16   342.22   443.31
342.24
  485.66   342.33   497.31   342.35   503.12   342.36   507.71   342.39   507.93
342.4
  509.37   342.41    511.1   342.42   513.15   342.44   514.72   342.45   640.38
344
  743.14   344.08   752.59   345.12   756.86      346   759.82   346.64    766.1
348
  804.74   349.19   830.08      350   903.05   350.24   905.01   350.63   907.37
351.1
  912.05      352   913.64    352.7   916.54      354   920.63   355.78   921.16
356
  921.92   356.29   926.64      358   931.03   359.58   932.27      360    935.2
361
  938.12      362

Manning's n Values          num=        5
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .018   137.39     .018   147.63      .15   171.18     .018   183.91
.025

Bank Sta: Left    Right    Lengths: Left Channel    Right      Coeff Contr.
Expan.
        129.47   183.91           519.53   516.04   514.95              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   129.47                F
  183.91   938.12                F
Blocked Obstructions      num=        2
   Sta L    Sta R     Elev    Sta L    Sta R     Elev
     531   680.76      360    427.1   487.82      360
```

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 2292.941

INPUT
Description:
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420	1.71	419.13	3.22	418	5.21	416.53	5.92	416
7.92	414.52	8.61	414	8.8	413.86	11.29	412	12.33	411.23
13.97	410	16.15	408.37	16.65	408	17.59	407.3	19.32	406
20.39	405.2	21.99	404	23.78	402.66	24.66	402	26.35	400.73
27.31	400	27.67	399.73	29.95	398	30.97	397.22	32.59	396
34.76	394.35	35.22	394	37.41	392.22	37.68	392	37.86	391.83
39.92	390	40.63	389.37	42.17	388	43.31	386.99	44.42	386
45.85	384.73	46.66	384	47.84	382.95	48.91	382	50.93	380.2
51.15	380	51.41	379.76	53.39	378	55.09	376.48	55.62	376
56.33	375.37	57.86	374	60.08	372.02	60.09	372	60.1	371.99
62.23	370	63.05	369.22	64.34	368	65.95	366.45	66.41	366
67.34	365.08	68.41	364	70.18	362.23	70.41	362	71.2	361.21
72.39	360	73.19	359.18	74.36	358	74.78	357.57	76.32	356
77.82	354.47	78.28	354	78.92	353.34	80.22	352	81.35	350.84
82.17	350	82.82	349.32	84.1	348	86	346.03	86.02	346
86.05	345.97	87.92	344	88.99	342.87	89.8	342	91.38	340.32
91.68	340	91.91	339.76	93.56	338	94.02	337.5	95.43	336
96.44	334.92	97.29	334	98.07	333.17	99.16	332	99.73	331.39
100.54	330.52	100.87	330.16	101.02	330	111.2	328.65	116.9	328
127.23	328.74	127.84	329.66	128.08	330	129.12	331.57	129.42	332
130.42	333.5	130.77	334	131.73	335.44	132.12	336	146.63	335.88
151.77	335.91	152.42	335.9	166.66	335.68	168.69	335.64	180.39	335.44

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  183.48  335.39  212.35  334.98  216.01  334.89  220.32  334.78  225.53
334.65
  230.05  334.59  234.72  334.53  239.35  334.42  242.63  334.39  247.74
334.31
  248.01   334.3   253.7  334.26  259.16  334.22  277.03     334  312.77
334.21
  314.04  334.33  316.53  334.64  318.99  334.93  321.02  335.16  329.71
335.83
  330.22  335.88  330.47  335.91  331.97     336  341.96  336.37  349.34
336.76
  357.03  337.15  360.29  337.37  365.52  337.52   366.9  337.63     368
337.71
  368.92  337.76  373.25     338  432.96  339.01  448.76     340  458.82
340.32
  491.34  341.34  513.06     342  544.49  342.78  563.66  343.26  598.15
344
  808.65  345.76  810.45  345.77  816.29     346  877.95  346.51  878.74
346.59
  879.53  346.73  881.53  346.95  882.54  347.12  888.48     348  890.22
348.1
   898.3     350  905.34  351.91  905.68     352  909.62  353.27  911.72
354
  912.89  354.45  916.98     356  926.01  356.42

Manning's n Values          num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0     .04  100.54     .15  127.23    .018  132.12     .25

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
            86  132.12           410.33  395.27  385.35              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0      86                F
  132.12  926.01                F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev    Sta L   Sta R    Elev
  433.05  515.24     360    336.6  413.18     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1897.670

INPUT
Description:
Station Elevation Data     num=      153
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  375.06      1.5      374     3.11  372.85      4.3      372     6.33
370.55
     7.1      370     7.55  369.79    11.35      368    14.21    366.7    15.72
366
   19.52  364.27    20.12      364     23.9  362.28    24.52      362    24.63
361.95
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   28.93     360   29.87  359.58   33.36     358   34.75  357.36   37.56
356
      40   354.7   41.43     354   43.95  352.66   45.28     352   47.88
350.61
   49.11     350   51.79  348.58   52.94     348   55.68  346.54   56.76
346
   59.56  344.51   60.58     344   62.09  343.25   64.64     342   68.83
341.05
   73.08     340   94.71  339.87   98.75  339.89  102.49     340  113.39
341.51
  114.24     342   122.4  342.23  124.88  342.26  127.41  342.78  129.99
343.2
  131.34  343.51  137.82     344  138.79  344.11  139.23  344.16  140.86
344
  143.14  343.81  143.66  343.72  147.06  343.37  150.64     342  150.96
341.88
  151.36  341.72  153.81  340.79  155.86     340  156.96  339.58  158.44
339.01
  160.34  338.27  161.02     338  163.87  336.88  166.13     336  166.97
335.67
  167.91   335.3  169.86  334.54  171.23     334  173.09  333.27  176.16
332
  177.75  331.34  178.78  330.86  179.76  330.41  180.39     330  180.67
329.81
   182.7  328.44  183.35     328  212.15  328.86  212.26  328.94  213.11
329.59
  213.63     330  214.45  330.73     216     332  217.37  333.26  218.15
334
  281.89   334.6  291.52  334.69  294.54  334.72   299.5  334.76  300.49
334.77
  304.09  334.81  309.86  334.87  317.13  334.94   371.4  335.28  376.63
335.32
  384.58   335.4  387.54  335.42  388.98  335.44  391.52  335.46  439.05
335.11
  441.03  334.99  442.89  334.88  444.37  334.79  445.18  334.74  446.08
334.68
  447.07  334.62  448.18  334.57  450.14  334.59   453.2  334.42  460.27
334.03
  460.91     334  520.63  334.92  524.57     336  529.48  337.11  534.66
338
  539.55  338.45  544.97  338.91  554.54     340  558.74  340.08  583.12
340.51
  610.25  341.05  636.17  341.55  639.13   341.6  659.54     342  675.97
342.47
  694.81  343.02  699.45  343.14  709.92   343.3  714.55  343.41  718.52
343.52
  739.32  343.71  741.92  343.76  743.78   343.8   752.4   343.9  775.83
344
  837.31   343.9   864.6  343.73  883.59  343.61  987.66  343.97  987.85
343.98
  988.73     344 1030.28  344.84 1032.62     346 1038.87  346.92  1045.1
348
  1051.6  349.55 1053.43     350 1059.26  351.34 1062.42     352 1072.59
353.99
 1072.65     354 1072.82  354.01 1095.66  354.97

Manning's n Values         num=        4
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     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val
       0     .045   180.67      .15   213.11     .018   218.15     .025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
        137.82   218.15            469.57   465.05   461.75              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   137.82                F
  218.15  1095.66                F
Blocked Obstructions      num=        3
   Sta L    Sta R     Elev    Sta L    Sta R     Elev    Sta L    Sta R     Elev
  660.68    695.1      360   769.36   808.01      360   847.78   907.86      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1432.619

INPUT
Description:
Station Elevation Data     num=      139
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0    354.9    19.02   354.02    19.48      354    19.72   353.99    46.71
353.33
   47.47    353.3    49.15   353.27    50.37   353.24    54.53   353.16    58.29
353.05
   64.75   352.82    66.86   352.74    75.27   352.47    84.62   352.32    88.84
352.09
   89.18   352.11    90.76      352   108.71   353.03   109.25   353.09   111.15
353.31
  113.74    353.2   114.07   353.17   114.65   353.12    115.4   353.04   118.93
352.69
  119.69   352.62   125.83      352   127.94   351.78   128.86   351.68   135.28
351
  138.97   350.46   141.76      350   145.19   348.86    147.4      348   149.89
347.02
   152.5      346   159.12    344.7    165.1      344   187.92   343.35    192.1
343.25
   194.8   343.13   197.63   342.97   200.39   342.79   208.12   342.27   209.15
342.22
  212.11      342   214.19   340.09   214.28      340   215.83   338.79   216.76
338.07
  216.85      338   217.04   337.98   225.83   337.39    230.4   337.22   246.26
336.41
   251.6   336.16   253.84      336   258.54   334.45   259.92      334   265.29
332.22
  265.97      332   270.74   330.42   271.98      330   272.18   329.93    277.9
328
  279.21   327.55   281.05   326.93   283.79      326   287.35   324.99   290.43
324
  336.19   325.98   336.23      326   336.25   326.02   336.71   326.31    339.1
327.83
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  339.37     328  339.66  328.18  342.52     330  343.53  330.64  345.66
332
  348.32  333.69  348.77     334  364.84  335.75  366.23   335.9  368.11
336
  384.32  336.44   393.3  336.84  402.63  337.16  406.41   337.3  419.79
338
  439.23  339.05  457.12     340  473.52  340.89  493.94     342  513.92
342.98
  534.12     344  556.37  344.92   582.7     346  622.44  344.01  622.46
344
  628.46  342.15  628.97     342  629.54  341.87  633.24  341.02  639.24
340
  641.39  339.67  645.57  338.93  655.27  338.24  656.06  338.14  656.43
338.11
  656.69  338.09   656.9  338.07  659.82     338  689.49  338.31   696.6
338.63
  704.11  339.04  709.79  339.33  722.31     340  762.36  340.92  766.54
341.55
   766.8  341.57  769.87     342     778   343.4  780.44  343.81  781.79
344
  783.64  344.39  791.78     346  794.24  346.85  797.54     348  802.12
349.59
   803.3     350  808.59  351.78  809.21     352  819.76  352.52  825.72
352.81
     829  352.97  832.85  353.14  833.66  353.18  851.54     354

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .045   251.6     .04  281.05     .15  336.25    .045  364.84
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
         251.6  364.84           293.25  305.64  317.13              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   251.6               F
  364.84  851.54               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1126.981

INPUT
Description: Approx. local of old drop strucure (no plans available)
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  356.26    8.34  356.12   16.72     356   20.79  355.76   23.82
355.4
   31.25  354.85   35.62     354   38.94  352.15   39.21     352   39.55
351.81
```

```
   42.81     350    44.6     349   46.43     348   48.45  346.91   50.12
346
   51.14  345.45   53.88     344   57.63  343.59   60.05  343.52   78.32
342.8
   85.89  342.69   88.55  342.73   90.46  342.76  100.83  342.61  101.59
342.6
  102.59  342.57   102.9  342.56   110.1     342  122.34  341.33  143.92
340.14
  147.12     340  169.65  338.35  174.57     338  208.21  336.95  213.89
336.81
  222.42  336.48  228.13  336.37   235.7  336.08  236.85     336  251.45
334.4
  254.25     334   257.5  333.86  285.84  332.72  299.59  332.17  301.18
332.11
  303.96     332  309.39  331.74  347.23     330  348.92  329.85  349.54
329.63
  350.55  329.26  353.92     328  354.81  327.67  359.29     326   359.7
325.84
  364.66     324  364.81  323.94  369.64  322.14  370.02     322  372.75
320.97
   375.3     320  375.93  319.85  382.42     318  409.31  318.28  413.73
320
  415.29  320.61  415.76  320.79  418.86     322  422.58  323.46  423.98
324
  427.27  325.29  429.07     326  429.99  326.37  434.12     328  437.37
329.29
  439.16     330   442.8  331.45  444.28     332  460.94  332.52  465.33
332.6
   469.4  332.76  473.47   332.8  477.54  332.82  487.31  333.64  488.63
333.63
  489.21  333.72  489.91   333.8  491.62     334  493.37  334.43   497.2
335.37
  500.02     336  538.15   337.3  562.32     338  566.66  339.56  567.88
340
  570.08  340.79  571.45  341.28  573.44     342  575.51  342.74     579
344
  582.46  345.25  584.56     346  595.56  347.12  603.22     348  611.05
348.43
  617.52  348.78  640.14     350  650.33  350.28  659.89  350.55  664.79
350.69

Manning's n Values          num=          5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   347.23    .045   372.75     .15   415.29    .045   444.28
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        347.23  444.28           215.16  233.86  259.36              .1
.3
Ineffective Flow      num=          2
   Sta L   Sta R    Elev  Permanent
       0  347.23                F
  444.28  664.79                F

CROSS SECTION
```

RIVER: Avarado Ck
REACH: Upper RS: 893.1187

INPUT
Description: u/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41	340.58
42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19	336.87
59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11	332.86
80.74	332	84.11	331.89	85.87	331.83	112.84	330.97	115.86	330.88
125.01	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98	330.13
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35	329.73
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21	328.91
173.36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26	328.33
183.77	328.34	188.66	328.25	189.44	328.26	192.99	328.17	195.25	328.09
195.82	328	196.64	327.88	197.1	327.67	197.75	327.32	198.21	327.02
198.98	326.67	200.42	326	201.52	325.46	203.22	324.74	204.27	324.29
204.58	324	206.21	322.11	206.25	322	206.31	321.83	206.57	321.06
206.94	320	207.14	319.28	207.49	318	207.55	317.65	207.92	316
207.94	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57	316
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83	318.6
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94	323.31
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91	326.29
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78	332
267.66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19	336
321.68	337.29	323.02	338	326.46	339.81	326.82	340	327.22	340.21
330.62	342	331.45	342.44	332.97	343.23	334.42	344	343.82	344.63
344.55	344.68	345.2	344.72	345.73	344.75	346.14	344.78	346.4	344.79
358.71	345.53	366.61	346	398.47	347.31	415.46	348	416.2	348.02

```
Manning's n Values          num=        5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0     .05  192.99    .025  207.94     .15  237.57     .05  255.78
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        164.89  255.78            49.65   50.12   51.56             .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  164.89               F
  255.78   416.2               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 843.0025

INPUT
Description: d/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data      num=      156
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  343.42     2.76   343.4    12.36  343.22    12.94   343.2    16.73
343.21
    19.9  343.22    24.77  343.07    30.96  342.92    49.04  342.66    53.21
342.53
   64.01  342.14    67.44     342    73.11  340.59     75.5     340    82.22
338.32
   83.53     338     91.1  336.11    91.52     336    91.58  335.98    99.41
334
  100.38  333.75   105.16   332.6   107.01  332.15   107.77     332   113.88
332.03
  120.46  332.21   128.03  332.41   129.28  332.35   133.87   332.5   135.07
332.59
  140.71  332.75   143.64  332.84   144.21  332.87   144.92  332.89   145.97
332.94
   148.3  332.98    149.8  332.99   150.42     333   151.43  333.01   152.47
333.03
  153.57  333.06   154.78  333.11    155.4  333.13   157.09  333.15   158.91
333.08
  159.86  333.12   160.78  333.16   163.48  332.99   164.13  333.03   165.29
333.06
  167.93  332.89    169.3  332.92   171.18  332.95   173.26   332.8   175.06
332.75
  176.14   332.7   178.05  332.64   178.68  332.56   180.77   332.5   183.37
332
     194  331.97   194.16  331.89    194.8  331.72   196.28  331.23   198.22
330
  199.21  329.16    199.4  329.08   199.71  328.96   199.85   328.9    200.2
328.76
  200.51  328.64   201.11  328.39    201.7     328   202.15  327.69   202.44
327.44
```

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  203.94     326  204.75  325.33  205.76  324.66  207.12     324  207.57
323.78
   207.9  323.65  209.66  322.99  210.39     322  211.31  320.42  211.48
320
  211.76  318.94  212.01     318  212.28  316.86  212.47     316  212.56
315.56
  212.88     314  213.08  312.93  213.13  312.65  213.18  312.38  213.25
312
  231.31  312.59   231.8  312.68  234.12   313.1  239.04     314  239.96
315.3
  240.47     316  240.86  316.54  241.46  317.38  241.92     318  243.26
319.75
  243.45     320  243.58  320.17  245.04     322  245.52  322.46  246.49
323.24
  247.55     324  248.56  324.72  249.47  325.32   250.5     326  251.08
326.38
  251.88  326.91  252.88  327.53  253.62     328  254.86  328.78  256.81
330
  257.02  330.13  257.52  330.44  259.27  331.67  259.76     332  263.82
332.43
  264.57  332.49  265.21  332.53  265.61  332.56  270.08  333.03  270.29
333.04
   272.8  333.32  273.94  333.43  274.94  333.49  307.07  333.53  308.37
333.58
  320.33     334  324.19  334.49  327.75     336  328.78  336.56  331.41
338
  332.95  338.85     335     340  337.92  341.63  338.57     342  339.03
342.16
  347.36     344  349.55  344.09  351.48  344.18  367.08  344.83  382.17
345.64
  385.33   345.8  388.81     346  400.98  346.51  410.17  346.87  422.67
347.37
   427.2  347.55

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025      194     .05  213.13     .15  240.86     .05  274.94
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
           194  274.94           356.37  364.33  373.23              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0     194                F
  274.94   427.2                F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 478.6733

INPUT
Description:
```

Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.87	47.84	358	56.98	357.46	60.13	356	61.62	355.3
64.42	354	66.28	353.13	68.72	352	71.24	350.83	73.01	350
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85.16	344.34
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31	340.07
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67	336
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94	332
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49	326.94
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88	322
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14	317.89
208.01	316	208.71	315.54	211.05	314	212.78	312.85	214.08	312
215.9	310.8	216.82	310.18	217.1	310	217.7	309.66	220.29	308
225.13	307.28	226.2	307.12	227.04	307	233.99	306	243.37	305.4
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99	305.99
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08	310
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11	314.44
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14	320
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42	324.52
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77	328
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.75	403.49	328.85
409.64	329.05	414.47	329.2	441.62	330	448.33	330.93	451.03	332
453.44	333.04	455.81	334	459.99	335.81	460.42	336	460.73	336.13
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8	338.5
489.23	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63	339.3
527.91	339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18	339.99
566.16	340								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .025  177.67      .05  216.82      .15  303.99      .05  376.25
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        177.67  376.25           263.01  282.17   291.3             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  177.67               F
  376.25  566.16               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 196.5054

INPUT
Description:
Station Elevation Data     num=      148
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  361.57    13.89  360.66    20.01     360     22.8  358.47    23.36
358.18
    23.7     358    24.06  357.81    27.45     356    29.87  354.71     31.2
354
   32.34  353.39    34.95     352    38.53  350.09     38.7     350    39.78
349.42
   42.46     348    42.66   347.9    46.29     346    46.47   345.9    50.12
344
   50.28  343.92    53.95     342    54.07  341.94    57.78     340    57.83
339.97
   59.41  339.15     61.6     338    61.71  337.94    65.43     336    66.12
335.64
   67.23  335.06    69.26     334    87.67  333.02    91.15   332.9    96.79
332.76
   99.06   332.7   104.37  332.57   115.16   332.6   118.43  332.53   122.53
332.56
  124.74  332.63   133.39   332.7   136.91  332.82   142.54  332.88   154.09
332
  156.48  331.51   158.27   330.4   158.91     330   159.16  329.85   162.09
328
  163.72  326.97    165.2     326   167.64  324.39   168.23     324    169.1
323.42
  171.23     322   172.95  320.84    174.2     320   176.62  318.69   177.61
318.16
  177.95     318   183.93  316.11   184.28     316   187.09  315.12   190.19
314.14
  190.63     314   191.07  313.86   196.98     312   198.77  311.43   203.32
310
  208.74  308.29   209.66     308   210.45  307.75   216.44     306   219.05
305.56
  219.58  305.47   228.46     304   249.87  302.01   249.97     302   311.64
303.39
   313.2  303.68   314.95     304   317.39  304.38   328.22     306   335.63
307.21
```

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  340.86      308  344.52  309.88  344.74      310  344.93   310.1  348.49
312
  348.58  312.05  350.53  313.08  352.25      314  352.38  314.07     356
316
  358.18  317.16  359.75     318  361.34   318.87  362.11  319.28  363.45
320
  364.29  320.52  364.86  320.89  366.56      322  368.37  323.18  369.63
324
  371.52  325.24  372.69     326  374.73   327.33  375.76     328  379.79
328.4
  380.58  328.42  382.12  328.46  385.05   328.55  410.07  329.71  415.78
330
  416.23  331.48  416.39     332  416.84   333.51  416.99     334  417.09
334.32
  417.59      336  418.15  337.87  418.19      338  418.68  339.69  418.77
340
  419.27  341.68  419.36     342  419.78    343.3  420.01     344  430.88
344.29
  435.08   344.7  448.65     346  463.87   346.83  487.74     348  544.46
347.54
  548.06  347.24  556.42   346.5  559.66   346.24   562.4     346  564.14
345.65
  569.42  344.57  572.14     344  575.15   343.33   581.2     342  584.36
341.28
  588.47  340.35  590.08     340  592.51    339.4

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025    20.01     .05   219.05     .15   313.2      .05   487.74
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        142.54  379.79           225.51   190.7  180.22              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  142.54             F
  379.79  592.51             F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 5.802783

INPUT
Description: u/s face of Alvarado Road Crossing
Station Elevation Data     num=      201
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  342.76     1.15  342.36      1.9  342.17     2.32      342   16.02
340.49
   17.61  340.36    19.05     340    30.76  338.79    31.07  338.72    32.63
338.54
```

33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
338.16								
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46
334.46								
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34								
75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332								
94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95
328.1								
111.98	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09
326.81								
125.85	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
325.84								
133.38	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
322								
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
319.71								
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
317.06								
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31
314.71								
243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58								
261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63
312.7								
276.97	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62
310								
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26
305.45								
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
301.51								
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
297.73								
293.33	296	307.28	296.23	308.28	297.51	308.67	298	308.89
298.27								
310.28	300	310.44	300.2	311.76	301.84	311.89	302	312
302.14								
313.02	304	313.68	305.49	313.94	306	314.34	307.3	314.63
308								
314.97	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4
312								
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37
316.26								
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322								
332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04								
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332								
345.15	332.7	346.84	334	348.83	335.46	349.54	336	351.35
336.25								
353.83	336.45	362	337.3	368.9	337.75	369.76	337.82	372.93
338								
375.05	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382
338.5								

```
  385.92  338.73  396.28     340  396.64  340.53   397.6     342  397.91
342.49
  398.85     344  399.12  344.41   415.3     346  473.91  347.62  476.83
347.27
  477.02  347.19  477.22  347.12   477.4  347.08   477.7  347.13  478.68
346.94
  482.66  346.63  484.13  346.55  484.71  346.49  490.41     346  493.45
345.96
  506.78  345.79  507.71  345.76  507.76  345.75  508.59  345.73  516.71
345.61
  517.78  345.58  521.56  345.52  522.54  345.49  523.29  345.47  523.71
345.45
  524.12  345.44  524.46  345.43  524.83  345.42  524.95  345.41  525.61
345.39
  526.52  345.35  526.91  345.34  527.41  345.32  528.95  345.27  529.36
345.25
  535.06  345.09  539.77  344.87  542.14  344.81  543.79  344.77  555.55
344.13
  555.77  344.12  555.89  344.11  556.15   344.1  557.82     344  574.08
342.79
   579.5  342.38

Manning's n Values         num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0     .05   292.07     .15   310.44     .05   415.3     .025

Bank Sta: Left    Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          1.15      362              8.78     5.8       0              .1
.3
```

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

Reach	River Sta.	n1	n2	n3	n4	n5
Upper	3975.018	.025	.018	.045	.018	.025
Upper	3918.558	.025	.018	.045	.018	.025
Upper	3881.736	.025	.018	.045	.018	.025
Upper	3870.768	.025	.018	.045	.018	.025
Upper	3690.298	.025	.018	.045	.018	.025
Upper	3362.059	.025	.018	.045	.018	.025
Upper	3046.513	.025	.018	.045	.018	.025
Upper	2808.985	.018	.018	.15	.018	.025
Upper	2292.941	.04	.15	.018	.25	

Upper	1897.670	.045	.15	.018	.025
Upper	1432.619	.045	.04	.15	.045
.025					
Upper	1126.981	.025	.045	.15	.045
.025					
Upper	893.1187	.05	.025	.15	.05
.025					
Upper	843.0025	.025	.05	.15	.05
.025					
Upper	478.6733	.025	.05	.15	.05
.025					
Upper	196.5054	.025	.05	.15	.05
.025					
Upper	5.802783	.05	.15	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3

Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3

DETAILED HYDRAULIC RESULTS FOR MAINTAINED CONDITION MODEL (NO SEDIMENT REMOVED)

HEC-RAS Plan: maint 30 swath River: Avarado Ck Reach: Upper

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)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000020	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	308.85	306.24	311.01	0.030015	11.82	287.75	29.60	0.67
Upper	5.802783	Q35=3000	3000.00	296.00	308.06	305.53	310.05	0.030023	11.34	264.65	28.90	0.66
Upper	5.802783	Q10=2100	2100.00	296.00	306.06	303.79	307.63	0.030014	10.05	208.96	27.07	0.64
Upper	5.802783	Q7=2000	2000.00	296.00	305.82	303.57	307.34	0.030020	9.89	202.32	26.81	0.63
Upper	5.802783	Q5=1700	1700.00	296.00	305.04	302.90	306.40	0.030036	9.35	181.78	25.98	0.62
Upper	5.802783	Q2=1000	1000.00	296.00	302.91	301.05	303.84	0.030013	7.77	128.72	23.68	0.59
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.01		337.01	0.000013	0.63	6157.76	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	312.05		312.19	0.002038	3.04	1117.07	151.76	0.20
Upper	196.5054	Q35=3000	3000.00	302.00	311.19		311.33	0.002344	3.04	987.92	147.42	0.21
Upper	196.5054	Q10=2100	2100.00	302.00	309.13		309.27	0.003536	3.02	695.11	136.97	0.24
Upper	196.5054	Q7=2000	2000.00	302.00	308.89		309.03	0.003742	3.02	662.56	135.74	0.24
Upper	196.5054	Q5=1700	1700.00	302.00	308.16		308.30	0.004518	3.01	565.02	132.02	0.26
Upper	196.5054	Q2=1000	1000.00	302.00	306.37		306.50	0.007662	2.92	342.70	115.27	0.30
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.01		337.02	0.000028	0.84	4619.83	305.39	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	312.87		313.20	0.006654	4.65	730.83	110.81	0.32
Upper	478.6733	Q35=3000	3000.00	304.00	312.14		312.47	0.007481	4.60	651.54	108.04	0.33
Upper	478.6733	Q10=2100	2100.00	304.00	310.56		310.85	0.009415	4.33	485.52	101.33	0.35
Upper	478.6733	Q7=2000	2000.00	304.00	310.39		310.67	0.009579	4.27	468.51	100.62	0.35
Upper	478.6733	Q5=1700	1700.00	304.00	309.89		310.15	0.009859	4.06	419.15	98.48	0.35
Upper	478.6733	Q2=1000	1000.00	304.00	308.71		308.88	0.009250	3.27	305.95	93.16	0.32
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.92		337.10	0.000866	3.37	1158.29	241.59	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.081603	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.084785	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	318.40	318.40	321.05	0.091964	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.093236	12.88	155.27	30.14	1.00
Upper	843.0025	Q5=1700	1700.00	312.00	317.65	317.65	320.00	0.097055	12.29	138.38	29.57	1.00
Upper	843.0025	Q2=1000	1000.00	312.00	316.17	316.17	317.87	0.108524	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.99		337.14	0.000581	3.02	1289.80	265.42	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	324.65	322.19	326.24	0.024628	10.12	335.85	43.34	0.64
Upper	893.1187	Q35=3000	3000.00	314.00	323.97	321.62	325.45	0.025292	9.77	307.18	41.29	0.63
Upper	893.1187	Q10=2100	2100.00	314.00	322.27	320.25	323.46	0.026641	8.73	240.54	37.35	0.61
Upper	893.1187	Q7=2000	2000.00	314.00	322.07	320.08	323.21	0.026725	8.58	233.00	36.96	0.60
Upper	893.1187	Q5=1700	1700.00	314.00	321.43	319.56	322.45	0.026985	8.11	209.74	36.06	0.59
Upper	893.1187	Q2=1000	1000.00	314.00	319.72	318.20	320.41	0.027428	6.67	149.91	33.81	0.56

HEC-RAS Plan: maint 30 swath River: Avarado Ck Reach: Upper (Continued)

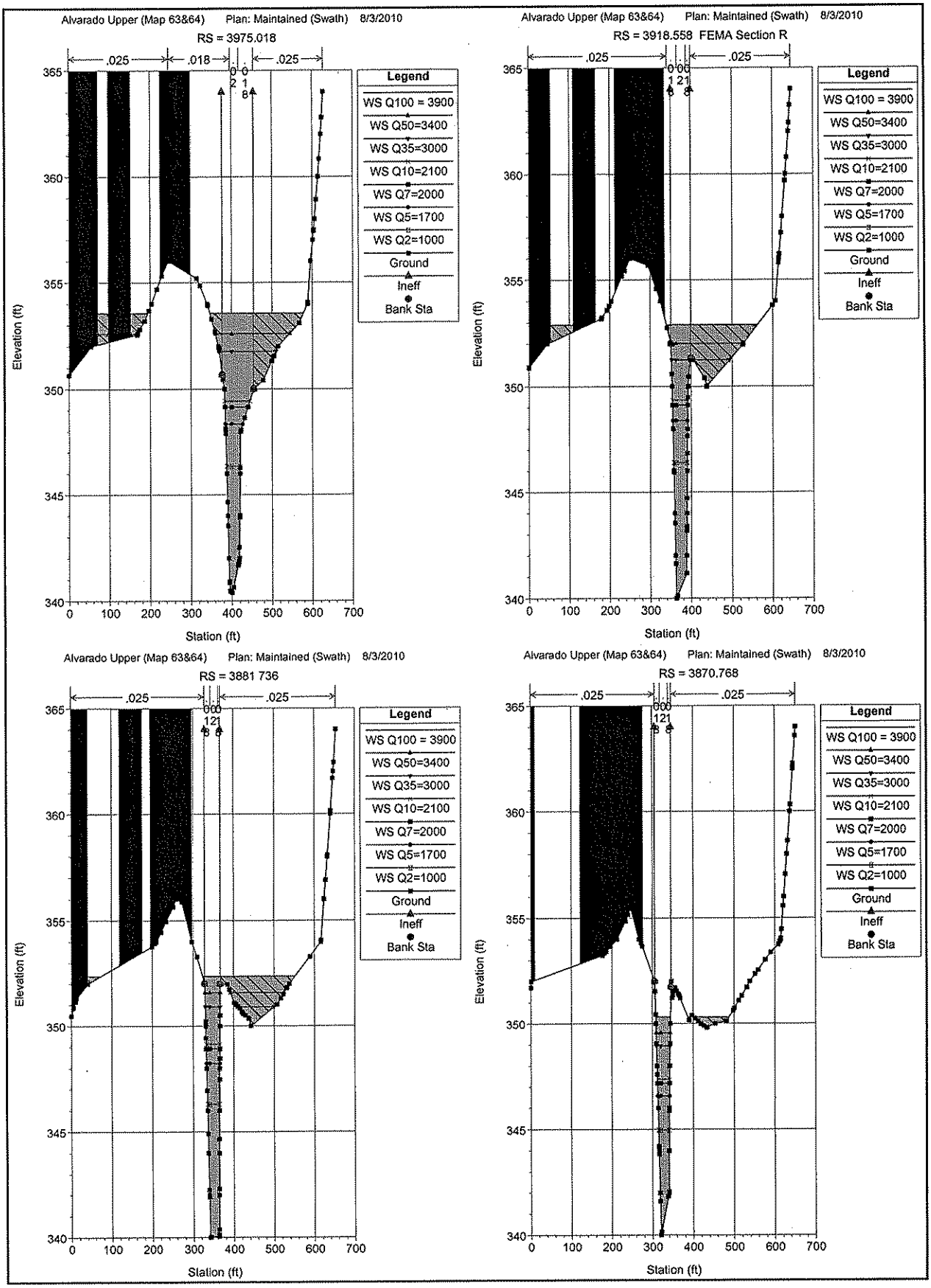
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.19		337.31	0.001007	2.79	1399.19	334.62	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	329.33		329.76	0.009617	5.26	646.24	87.09	0.34
Upper	1126.981	Q35=3000	3000.00	318.00	328.67		329.07	0.009956	5.08	590.50	83.70	0.34
Upper	1126.981	Q10=2100	2100.00	318.00	327.01		327.33	0.010899	4.58	458.32	75.02	0.33
Upper	1126.981	Q7=2000	2000.00	318.00	326.80		327.12	0.011018	4.51	442.97	73.94	0.33
Upper	1126.981	Q5=1700	1700.00	318.00	326.15		326.44	0.011378	4.29	396.02	70.56	0.32
Upper	1126.981	Q2=1000	1000.00	318.00	324.37		324.57	0.012189	3.59	278.28	61.24	0.30
Upper	1432.619	Q100 = 3900	3900.00	324.00	337.35		337.60	0.000666	4.01	972.02	180.49	0.24
Upper	1432.619	Q50=3400	3400.00	324.00	331.08		332.34	0.006210	9.01	377.23	75.46	0.71
Upper	1432.619	Q35=3000	3000.00	324.00	330.55		331.77	0.006599	8.88	337.92	73.03	0.73
Upper	1432.619	Q10=2100	2100.00	324.00	329.26	328.64	330.38	0.007873	8.48	247.77	67.20	0.78
Upper	1432.619	Q7=2000	2000.00	324.00	329.11	328.52	330.21	0.008069	8.42	237.55	66.51	0.79
Upper	1432.619	Q5=1700	1700.00	324.00	328.65	328.18	329.69	0.008689	8.21	207.17	64.40	0.81
Upper	1432.619	Q2=1000	1000.00	324.00	327.45	327.25	328.32	0.011108	7.49	133.46	59.00	0.88
Upper	1897.670	Q100 = 3900	3900.00	328.00	336.94		338.79	0.006459	10.91	357.61	365.03	0.75
Upper	1897.670	Q50=3400	3400.00	328.00	335.10	335.10	337.72	0.011795	13.01	261.43	255.62	1.00
Upper	1897.670	Q35=3000	3000.00	328.00	334.63	334.63	337.09	0.011872	12.56	238.76	171.28	1.00
Upper	1897.670	Q10=2100	2100.00	328.00	333.44	333.44	335.49	0.012404	11.49	182.81	44.91	1.00
Upper	1897.670	Q7=2000	2000.00	328.00	333.30	333.30	335.29	0.012396	11.32	176.65	44.41	1.00
Upper	1897.670	Q5=1700	1700.00	328.00	332.88	332.85	334.67	0.012239	10.74	158.35	42.94	0.99
Upper	1897.670	Q2=1000	1000.00	328.00	331.99		333.04	0.009117	8.24	121.43	39.81	0.83
Upper	2292.941	Q100 = 3900	3900.00	328.00	339.01		341.06	0.004870	11.49	339.56	263.64	0.69
Upper	2292.941	Q50=3400	3400.00	328.00	338.71		340.38	0.004095	10.37	327.95	245.92	0.63
Upper	2292.941	Q35=3000	3000.00	328.00	338.18		339.66	0.003862	9.77	307.07	243.21	0.61
Upper	2292.941	Q10=2100	2100.00	328.00	336.80		337.85	0.003287	8.25	254.54	241.92	0.56
Upper	2292.941	Q7=2000	2000.00	328.00	336.62		337.63	0.003228	8.07	247.82	241.75	0.55
Upper	2292.941	Q5=1700	1700.00	328.00	336.04		336.91	0.003055	7.51	226.32	237.57	0.53
Upper	2292.941	Q2=1000	1000.00	328.00	334.30		334.87	0.002673	6.07	164.80	99.07	0.49
Upper	2808.985	Q100 = 3900	3900.00	332.00	341.20	340.88	343.97	0.005606	13.35	292.11	75.11	0.93
Upper	2808.985	Q50=3400	3400.00	332.00	340.59	340.30	343.15	0.005841	12.85	264.68	59.13	0.93
Upper	2808.985	Q35=3000	3000.00	332.00	340.01	339.81	342.46	0.006327	12.56	238.80	44.57	0.95
Upper	2808.985	Q10=2100	2100.00	332.00	338.48	338.45	340.71	0.007875	11.98	175.25	38.69	0.99
Upper	2808.985	Q7=2000	2000.00	332.00	338.29	338.27	340.49	0.008119	11.91	167.94	37.93	1.00
Upper	2808.985	Q5=1700	1700.00	332.00	337.76	337.76	339.80	0.008584	11.46	148.30	36.20	1.00
Upper	2808.985	Q2=1000	1000.00	332.00	336.38	336.38	337.91	0.010045	9.93	100.71	32.98	1.00

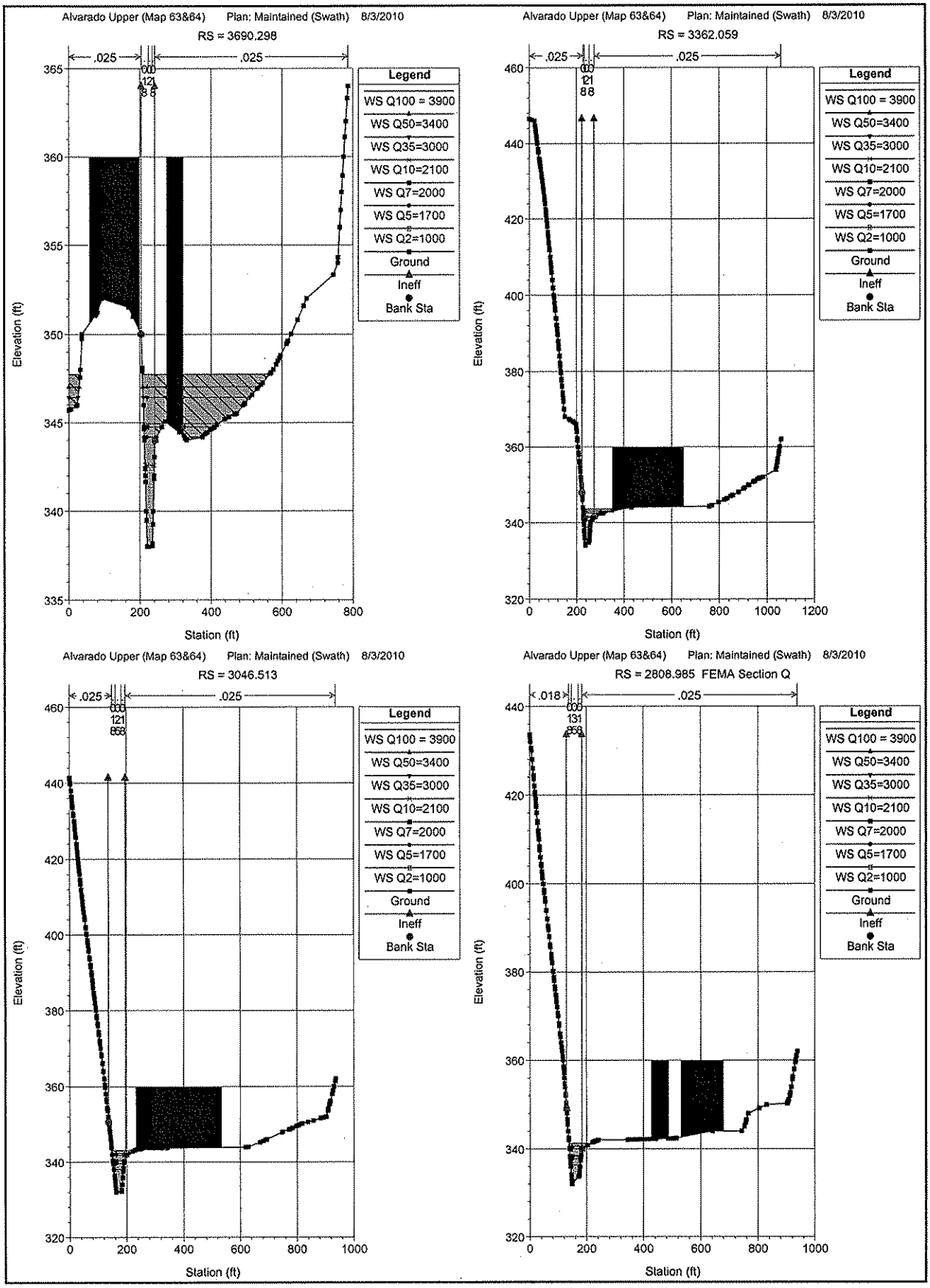
HEC-RAS Plan: maint 30 swath River: Avarado Ck Reach: Upper (Continued)

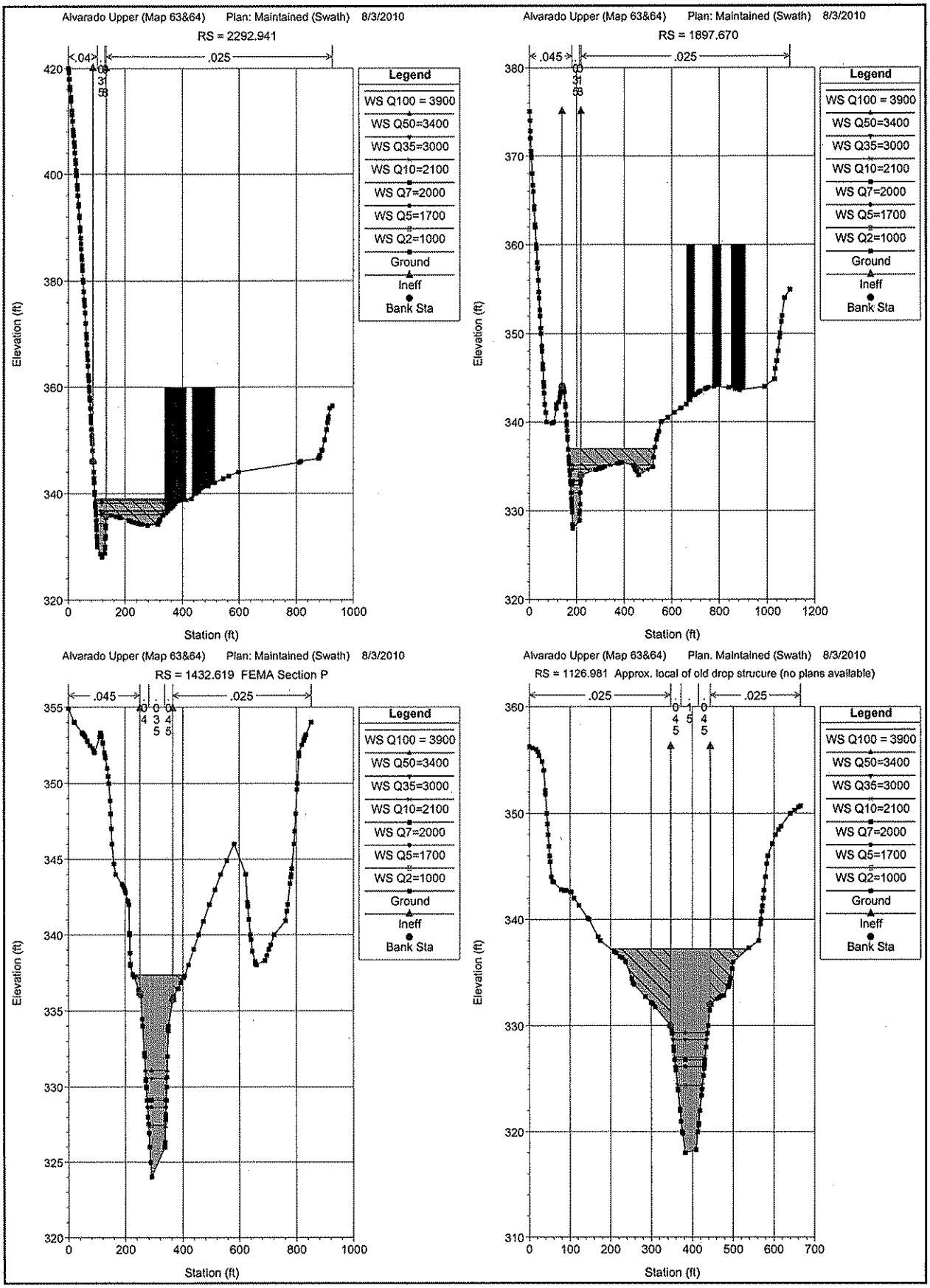
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	343.00		344.78	0.001862	10.69	364.81	76.70	0.69
Upper	3046.513	Q50=3400	3400.00	332.00	342.35		343.97	0.001850	10.21	333.11	57.89	0.68
Upper	3046.513	Q35=3000	3000.00	332.00	341.81		343.29	0.001814	9.76	307.41	46.94	0.67
Upper	3046.513	Q10=2100	2100.00	332.00	340.42		341.55	0.001620	8.53	246.22	41.00	0.61
Upper	3046.513	Q7=2000	2000.00	332.00	340.24		341.33	0.001591	8.37	239.07	40.25	0.60
Upper	3046.513	Q5=1700	1700.00	332.00	339.67		340.62	0.001522	7.86	216.41	38.36	0.58
Upper	3046.513	Q2=1000	1000.00	332.00	338.06		338.68	0.001322	6.33	158.05	34.34	0.52
Upper	3362.059	Q100 = 3900	3900.00	334.00	343.65	343.65	346.60	0.003426	13.80	282.63	123.76	1.00
Upper	3362.059	Q50=3400	3400.00	334.00	343.11	343.11	345.82	0.003476	13.23	257.07	123.28	1.00
Upper	3362.059	Q35=3000	3000.00	334.00	342.66	342.66	345.17	0.003523	12.72	235.87	93.25	1.00
Upper	3362.059	Q10=2100	2100.00	334.00	341.50	341.50	343.56	0.003720	11.50	182.56	44.34	1.00
Upper	3362.059	Q7=2000	2000.00	334.00	341.30	341.30	343.36	0.003750	11.50	173.90	42.25	1.00
Upper	3362.059	Q5=1700	1700.00	334.00	340.58	340.58	342.68	0.003859	11.62	146.26	34.80	1.00
Upper	3362.059	Q2=1000	1000.00	334.00	338.76	338.76	340.53	0.004182	10.69	93.56	26.27	1.00
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.003123	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.003198	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.003269	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.003486	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.003520	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.003645	12.19	139.44	86.45	1.00
Upper	3690.298	Q2=1000	1000.00	338.00	342.57	342.57	344.34	0.003918	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.003645	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.003713	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.003791	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.003979	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349.76	0.004001	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.004089	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.004381	10.72	93.29	26.22	1.00
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.36		354.05	0.001262	10.43	373.84	262.06	0.60
Upper	3881.736	Q50=3400	3400.00	340.00	351.58		353.10	0.001241	9.91	343.18	171.19	0.59
Upper	3881.736	Q35=3000	3000.00	340.00	350.90		352.29	0.001199	9.45	317.30	125.84	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.13		350.20	0.001088	8.27	253.99	34.45	0.54
Upper	3881.736	Q7=2000	2000.00	340.00	348.91		349.94	0.001074	8.12	246.44	34.09	0.53
Upper	3881.736	Q5=1700	1700.00	340.00	348.22		349.12	0.001026	7.62	223.09	32.98	0.52
Upper	3881.736	Q2=1000	1000.00	340.00	346.30		346.89	0.000873	6.15	162.71	30.13	0.47

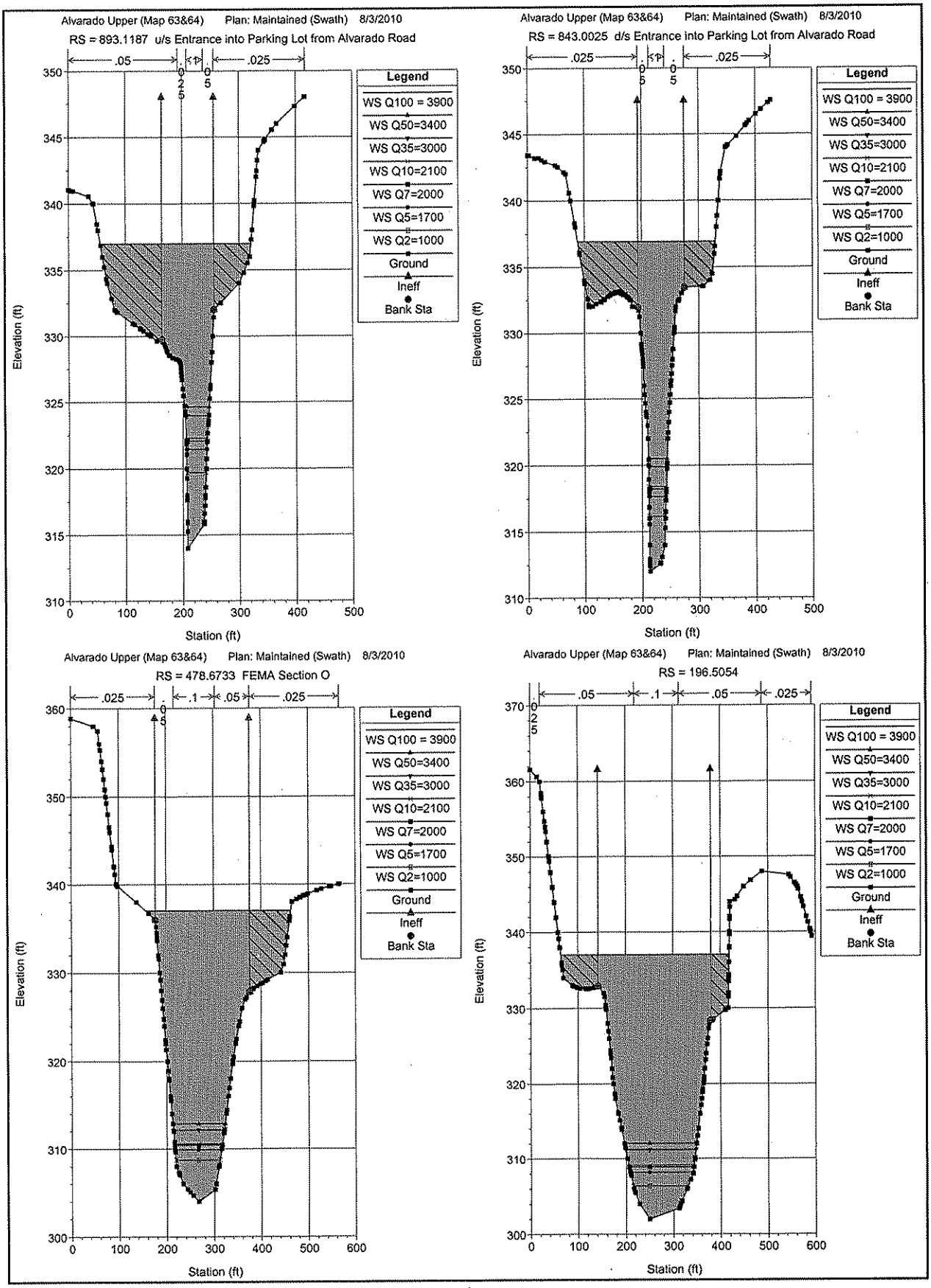
HEC-RAS Plan: maint 30 swath River: Avarado Ck Reach: Upper (Continued)

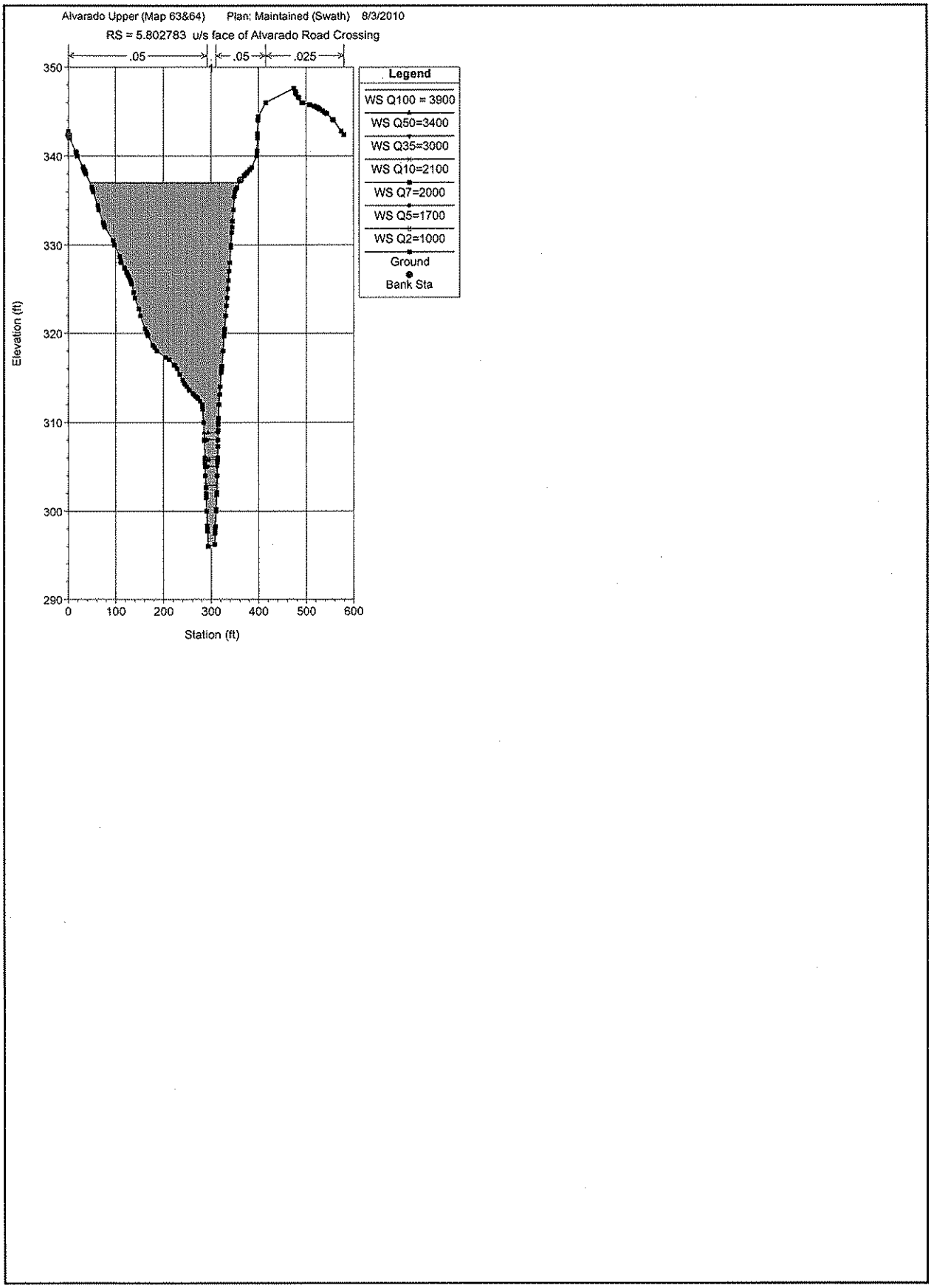
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	3918.558	Q100 = 3900	3900.00	340.00	352.88		354.14	0.000914	9.00	433.23	278.70	0.53
Upper	3918.558	Q50=3400	3400.00	340.00	352.00		353.18	0.000982	8.71	390.46	177.04	0.54
Upper	3918.558	Q35=3000	3000.00	340.00	351.24		352.35	0.001003	8.49	353.46	134.72	0.54
Upper	3918.558	Q10=2100	2100.00	340.00	349.35		350.25	0.000891	7.61	276.12	37.94	0.50
Upper	3918.558	Q7=2000	2000.00	340.00	349.12		349.99	0.000885	7.48	267.41	37.58	0.49
Upper	3918.558	Q5=1700	1700.00	340.00	348.39		349.17	0.000867	7.07	240.41	36.44	0.49
Upper	3918.558	Q2=1000	1000.00	340.00	346.39		346.92	0.000812	5.86	170.66	33.41	0.46
Upper	3975.018	Q100 = 3900	3900.00	340.39	353.55		354.23	0.000506	6.61	589.83	298.86	0.42
Upper	3975.018	Q50=3400	3400.00	340.39	352.60		353.27	0.000601	6.59	515.94	226.40	0.45
Upper	3975.018	Q35=3000	3000.00	340.39	351.76		352.45	0.000732	6.65	450.92	139.89	0.49
Upper	3975.018	Q10=2100	2100.00	340.39	349.43		350.31	0.001380	7.54	278.47	61.97	0.63
Upper	3975.018	Q7=2000	2000.00	340.39	349.16		350.06	0.001387	7.63	262.21	56.95	0.63
Upper	3975.018	Q5=1700	1700.00	340.39	348.36		349.26	0.001247	7.64	222.47	42.56	0.59
Upper	3975.018	Q2=1000	1000.00	340.39	346.34		347.02	0.001143	6.62	150.99	32.99	0.55


Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3975.018
.025
.018
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3918.558 FEMA Section R
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3881 736
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3870.768
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3690.298
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3362.059
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 3046.513
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 2808.985 FEMA Section Q
.018
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 2292.941
.045
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 1897.670
.045
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 1432.619 FEMA Section P
.045
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan. Maintained (Swath) 8/3/2010
RS = 1126.981 Approx. local of old drop strucure (no plans available)
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 893.1187 u/s Entrance into Parking Lot from Alvarado Road
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 843.0025 d/s Entrance into Parking Lot from Alvarado Road
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 478.6733 FEMA Section O
.025
.1
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 196.5054
.05
.1
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maintained (Swath) 8/3/2010
RS = 5.802783 u/s face of Alvarado Road Crossing
.05
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Bank Sta
Elevation (ft)
350
340
330
320
310
300
290
0
100
200
300
400
500
600
Station (ft)

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Alvarado Upper (Map 63&64)
Project File : Alvarado6364.prj
Run Date and Time: 8/3/2010 2:04:36 PM

Project in English units

Project Description:
City Stormwater Maintenance (First Year)
Alvarado Canyon Creek (Upper)
Helix
Map Number 63 & 64
October 17, 2009 J-15541A

PLAN DATA

Plan Title: Maintained (Swath)
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p06

Geometry Title: Maintained 30' Swath
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g06

Flow Title : FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description:
Geometry is from TIN
Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:

Number of:	Cross Sections	= 17	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0

Bridges = 0 Lateral Structures = 0

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

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River	Reach	RS	Q100 = 3900	Q50=3400
Q35=3000	Q10=2100	Q7=2000	Q5=1700	2330
800				
Avarado Ck	Upper	3975.018	3900	3400
3000	2100	2000	1700	2330
800				

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Avarado Ck	Upper	Q100 = 3900	
Known WS = 337			
Avarado Ck	Upper	Q50=3400	
Normal S = 0.03			
Avarado Ck	Upper	Q35=3000	
Normal S = 0.03			
Avarado Ck	Upper	Q10=2100	
Normal S = 0.03			
Avarado Ck	Upper	Q7=2000	
Normal S = 0.03			
Avarado Ck	Upper	Q5=1700	
Normal S = 0.03			

GEOMETRY DATA

Geometry Title: Maintained 30' Swath
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g06

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 3975.018

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.66	54.55	352	168.06	352.55	169.75	352.62	174.25	352.81
186.4	353.2	196.62	353.69	203.07	354	216.59	354.69	229	355.32
244.96	356	313.71	355.2	321.79	354.85	340	354	340.76	353.95
340.92	353.94	341.22	353.92	350.36	353.29	359.4	352.68	368.34	352
368.63	351.95	369.6	351.82	377.54	350.68	379.23	350.46	382.41	350
385.23	348.13	385.42	348	385.58	347.89	388.06	346	389.7	344.66
390.46	344	390.99	343.53	392.73	342	394.26	340.86	394.64	340.91
395.4	340.47	397	340.44	400.41	340.39	403.98	340.64	414.41	341.66
415.6	341.75	416.29	341.81	416.76	341.84	417.94	342	418.25	342.52
419.07	343.94	419.1	344	419.12	344.02	420.38	346	420.56	346.28
421.71	348	422.75	348.06	431.94	348.64	454.83	350	478.38	350.41
499.51	351.3	503.88	351.51	504.44	351.53	504.87	351.54	505.16	351.55
515.48	352	567.91	353.08	587.99	353.98	588.51	354	588.66	354.05
595.5	356	600.77	357.01	602.99	357.43	603.15	357.45	603.3	357.48
605.48	358	609.26	358.92	613.68	360	616.49	360.83	620.64	362
623.06	362.78	626.85	364						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	244.96	.018	397	.02	418.25	.018	454.83	.025

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

```
       377.54  454.83             56.06   56.46   57.46              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  377.54                F
  454.83  626.85                F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   71.99     365   97.43  152.37     365   224.1  297.99     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3918.558

INPUT
Description: FEMA Section R
Station Elevation Data    num=      66
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0   350.89   45.61      352   179.04   353.17   180.56   353.23   193.04
353.58
  197.76   353.78  203.01      354   230.15   355.16   237.25   355.42   250.67
356
   294.4   355.68  314.27   354.58   324.48      354   341.01   352.75   350.82
352
  352.57   350.58  353.44      350   354.29   349.11   355.36      348   357.25
346.02
  357.27      346  357.33   345.94   359.19      344   359.68   343.53    361.3
342
   361.7   341.63  363.62      340  365.9134 0.1096   388.28   341.18   388.59
342
  389.03   343.17  389.11   343.38   389.34      344   389.62   344.72   390.14
346
   390.5   346.84     391   347.66   391.19      348   392.09   349.49   392.37
350
  393.96   350.46  398.11   351.25   399.59   351.32    400.7   351.38    402.6
351.24
  403.71   351.29  432.41   350.39   438.19      350   526.18   351.95   526.68
351.96
  526.98   351.97  527.72      352   599.34    353.8   606.95      354   614.22
355.8
  615.03      356  615.89   356.21   620.14   357.22   623.29      358   630.16
359.69
   631.4      360  634.28   360.79    638.7      362   640.01   362.42   642.45
363.24
  644.88      364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  341.01    .018  365.91     .02  388.28    .018  399.59
.025

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

```
       350.82  399.59              36.89   36.82   36.86              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  350.82               F
  399.59  644.88               F
Blocked Obstructions      num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   54.03     365   109.3  165.48     365  212.28  335.49     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 3881.736

INPUT
Description:
Station Elevation Data     num=       79
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  350.48     6.07  350.87    10.29  351.15    12.92  351.31    40.92
352
     199  353.76   206.08  353.91   206.69  353.92   210.21     354   222.24
354.44
   233.9  354.94   251.37  355.63   258.69     356   271.86  355.88    296.8
354
  309.56  353.29   328.41     352   330.64  350.21   330.92     350   331.62
349.42
  333.32     348   334.54  346.94   335.46     346   336.53  344.91   337.43
344
  339.15  342.25    339.4     342   339.49  341.91   341.37     340
342.76340.0032
  363.11  340.05   363.14  340.12   363.24  340.37   363.78     342   363.88
342.31
  364.44     344   364.68  344.67   365.18     346   365.75  347.47   365.95
348
  366.13  348.45   366.76     350   366.98   350.5   367.69     352   385.02
351.97
  389.85  351.73   401.73   351.1   404.62  351.04    406.3     351   410.61
350.92
  415.48  350.84   419.61  350.67   421.56  350.62   423.52  350.58   428.95
350.5
  436.77  350.38   437.79  350.35   443.09     350   507.58  351.01   517.23
351.31
  523.05   351.5   531.06  351.78   532.85  351.84   538.19     352   589.11
353.29
  615.46  353.99   615.84     354    616.1  354.06   623.91     356   627.56
356.9
  632.01     358   632.22  358.05   632.33  358.08   639.85     360   640.33
360.14
  645.87  361.67   647.07     362   648.51  362.43   653.47     364

Manning's n Values         num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
```

```
       0     .025  328.41     .018  342.76      .02  363.11     .018  367.69
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        328.41  367.69            11.11   10.97   10.38             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  328.41              F
  367.69  653.47              F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   40.99     365  118.74  175.55     365   195.2  297.51     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3870.768

INPUT
Description:
Station Elevation Data    num=      93
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  351.72      .69      352  176.77  353.23  181.76  353.33  186.43
353.41
   197.1  353.65  213.03      354  234.28  354.85  240.42  355.16  245.89
355.43
  246.64  355.46  267.28      354  272.64  353.82  272.67 353.819  275.67
353.67
  305.95     352  306.57  351.54  308.04  350.43   308.6     350  309.85
349.05
  311.24     348  311.77  347.59  313.71     346  315.77  344.21  316.02
344
  316.21  343.83  318.18     342   318.6   341.6  320.17     340  321.64
340.147
  338.64 341.841  340.04  341.98  340.05     342  340.07  342.06  340.77
344
  341.44  345.88  341.48  345.99  341.49  346.01   342.6     348  343.42
349.05
  344.21     350  346.01  351.74  346.27     352  348.08  351.23  349.08
351.56
  350.42  351.36  354.74   351.7  355.64  351.67  359.27  351.55  363.01
351.43
  364.73  351.37  366.08  351.33  368.29   351.2   389.9  350.16  397.33
350.39
  404.15  350.27  404.59  350.26  412.11  350.12  418.82     350  420.14
349.98
  426.27   349.9  433.22   349.8  434.21  349.82  453.99     350  481.77
350.11
   497.7  350.62  501.02  350.74  511.44  351.09  518.78  351.31  530.89
351.71
  538.75     352  551.73  352.35  558.84  352.54  576.49  353.03  589.82
353.37
```

```
  608.45  353.74  611.81  353.89  614.18     354  614.26  354.01  614.32
354.03
  615.95  354.47   620.3  355.57  621.91     356  626.05  357.06  629.47
358
  631.85  358.62  636.85     360  637.98  360.31  644.01     362  644.38
362.1
   644.9  362.25  649.64  363.57  651.05     364

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  305.95    .018   318.6     .02  338.64    .018  346.01
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        305.95  346.01           179.97  180.47  180.91            .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  305.95             F
  346.01  651.05             F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    9.75     365  121.57  277.04     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3690.298

INPUT
Description:
Station Elevation Data     num=      90
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  345.71    3.53  345.75    5.97  345.77   20.93  345.96    23.5
346
   30.97  347.56   32.17     348   35.83  349.75   36.38     350   73.85
351.06
   76.35  351.12   80.39  351.24   93.24     352  167.58  351.52  180.07
350.99
  203.46     350  206.33  348.11  206.49     348   206.6  347.92   209.4
346
   211.3  344.63  212.19     344  214.44  342.39  214.98     342  215.47
341.65
  217.78     340  218.52  339.47  220.56     338  223.92338.0069  235.27
338.03
  235.44  338.18   236.7  339.26  237.56     340  239.68  341.82  239.89
342
  241.12  343.04  242.24     344  270.01  345.07  310.29  344.45  322.56
344.28
  326.36   344.1  330.94     344  375.39  344.17  382.11  344.34  386.03
344.44
  387.03  344.43  390.42  344.44  396.81  344.59  400.84  344.63  407.01
344.7
```

```
  416.13  344.88  438.84  345.18   448.8   345.3  450.55  345.31  465.65
345.48
  468.22  345.49  472.87  345.52  491.47     346  494.34  346.07  495.53
346.1
  515.92  346.57  530.49  346.92  540.57  347.15  545.75  347.26  566.83
347.78
  569.21  347.84  575.67     348  583.79   348.3  588.52  348.49  592.91
348.66
  596.44   348.8  613.02  349.46  615.24  349.55  616.85  349.62  626.37
350
  644.26  350.81  661.23   351.6  669.77     352  744.72  353.34   757.4
354
  758.19   354.3  762.72     356  765.36  356.97  768.25     358  770.91
358.93
  774.03     360  777.36  361.13   779.9     362  783.91  363.32  785.95
364

Manning's n Values          num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   203.46    .018   223.92     .02   235.27    .018   242.24
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        203.46  242.24           344.53  328.24  316.06              .1
.3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
       0  203.46             F
  242.24  785.95             F
Blocked Obstructions      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     275  321.35     360   57.06  198.78     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3362.059

INPUT
Description:
Station Elevation Data     num=     187
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  446.54    10.14  446.29    20.91      446    24.19    444.7    25.61
444
   27.19  443.21    29.68     442    30.85   441.42    33.27   440.27    33.66
440.07
   33.81     440    36.64  438.61    37.91      438    38.67   437.63    42.05
436
   42.49  435.79    43.46  435.33    45.38    434.4    46.24      434    48.24
433.04
   50.46     432    51.07  431.71    52.21   431.18    54.08   430.27    54.64
430
```

57.03 428.84 58.76 428 59.55 427.62 60.36 427.22 62.58
426
64.09 425.13 66.11 424 68.65 422.51 69.49 422 70.86
421.16
72.75 420 73.27 419.67 74.6 418.83 75.91 418 78.23
416.53
79.06 416 80.3 415.22 82.22 414 83.08 413.46 85.03
412.22
85.27 412.07 85.38 412 85.58 411.87 88.54 410 90.63
408.68
91.7 408 92.99 407.18 94.86 406 97.97 404.03 98.02
404
101.08 402.03 101.11 402.01 101.13 402 101.2 401.96 104.22
400
105.29 399.3 107.26 398 109.04 396.82 110.28 396 113.2
394.05
113.28 394 113.32 393.98 113.51 393.85 115.98 392.19 116.26
392
117.51 391.16 119.23 390 119.73 389.67 122.21 388 123.85
386.85
125.08 386 127.54 384.11 127.67 384 130 382.21 130.28
382
131.19 381.3 132.89 380 133.44 379.58 135.54 378 135.6
377.96
136.13 377.56 138 376.16 138.21 376 140.41 374.38 140.92
374
142.28 373 143.63 372 146.21 370.09 146.35 370 146.39
369.97
149.39 368 167.44 367.39 173.88 367.1 183.82 366.76 190.8
366.38
197.44 366 198.93 364.92 200.18 364 202.56 362.3 202.97
362
203.33 361.74 205.83 360 208.02 358.47 208.7 358 211.37
356.14
211.57 356 213.46 354.69 214.45 354 215.2 353.47 217.32
352
218.52 351.16 220.19 350 221.67 348.86 222.79 348 223.55
347.15
224.57 346 226.32 344.03 226.34 344 226.44 343.89 228.12
342
229.22 340.76 229.89 340 230.44 339.38 231.72 338 232.63
337.01
233.63 336 233.78 335.91 236.2 334.56 237.12 334 252.9
334.87
253.61 335.49 254.18 336 255.55 337.21 256.43 338 257.85
339.26
258.68 340 266.68 340.85 274.32 341.65 277.87 342 284.94
342.14
302.27 342.45 306.07 342.51 309.61 342.52 431.19 344 758.76
344.35
768.31 344.6 797.19 345.41 821.62 346 830 346.31 831.03
346.34
833.5 346.43 847.74 346.96 856.58 347.25 879.57 348 880.41
348.03
880.72 348.04 881.24 348.07 901.94 348.95 906.43 349.16 921.76
349.83

```
  923.27   349.9  925.42     350  942.25  350.68  949.16  350.95  960.33
351.4
  963.86  351.55  965.66  351.58  967.08  351.64  969.78  351.75  971.07
351.79
  984.45     352 1038.39  353.93 1038.73     354 1041.06  354.92 1043.88
356
 1045.68  356.71 1048.94     358 1050.91  358.78 1053.99     360 1059.87
361.95
 1059.99  361.99 1060.03     362

Manning's n Values          num=        5
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   228.12     .018   233.78      .02   253.61     .018   274.32
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
        222.79   274.32             323.3  315.55  308.79              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev  Permanent
       0   222.79                F
  274.32  1060.03                F
Blocked Obstructions      num=        1
   Sta L    Sta R     Elev
  350.42   649.42      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 3046.513

INPUT
Description:
Station Elevation Data      num=      182
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   441.38     1.65   440.18     1.89      440     2.26   439.73     4.62
438
     6.7   436.48     7.36      436      8.5   435.16    10.09      434    10.57
433.65
   12.82      432    13.42   431.56    15.56      430    17.26   428.76    18.29
428
   20.08   426.69    21.03      426    21.34   425.77    23.76      424    24.83
423.22
    26.5      422    27.68   421.13    29.23      420    30.54   419.04    31.97
418
   33.39   416.96     34.7      416    36.66   414.57    37.43      414    38.34
413.34
   40.17      412    41.97   410.69     42.9      410    44.71   408.84    46.04
408
   47.74   406.95    49.28      406    51.46   404.66    52.53      404    55.65
402.08
   55.78      402    56.21   401.73    58.56   400.29    59.03      400    61.34
398.58
```

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   62.29     398   62.38  397.94   63.73  397.12   65.44  396.06   65.55
396
      66  395.72   68.81     394    69.5  393.58   72.08     392   73.03
391.42
   75.35     390   76.54  389.27   78.62     388   80.04  387.13   81.89
386
   84.06  384.67   85.16     384   86.41  383.24   88.44     382   90.48
380.76
   91.72     380   93.93  378.65      95     378   97.38  376.55   98.28
376
   100.9   374.4  101.56     374  102.26  373.57  104.84     372  105.98
371.3
  108.12     370  110.66  368.46  111.41     368  114.45  366.15   114.7
366
  117.91  364.04  117.98     364  118.05  363.96   121.2     362  121.22
361.99
  121.34   361.9   123.3  360.47  123.95     360  124.33  359.72  126.69
358
   128.6  356.62  129.44     356   131.8  354.28  132.19     354  132.86
353.52
  134.94     352  136.83  350.63   137.7     350   139.3  348.84  140.46
348
  142.24  346.71  143.23     346   144.6  345.01     146     344  146.37
343.73
  148.77     342  150.97  340.41  151.55     340  152.21  339.52  154.32
338
  156.46  336.46   157.1     336  157.84  335.47  158.82  334.77  159.88
334
  161.68  333.02  163.38     332  181.72  332.23  181.93  332.42  182.16
332.61
  183.79     334  185.96  335.84  186.15     336  187.92   337.5  188.51
338
  189.01  338.46  190.75     340  196.48  341.99  196.52     342  219.42
342.83
  228.12  343.15  232.61  343.32  245.18   343.4  249.52  343.53  252.86
343.63
  255.39   343.7  264.28  343.83  281.18  343.76  295.78   343.7  309.77
343.77
  324.93  343.72  342.77  343.67  618.57  343.93  628.31     344  669.36
345.21
  680.15  345.54  689.98  345.88  691.38  345.92  692.91  345.96  693.63
346
  747.86  347.89  748.45  347.91  748.79  347.92   749.9     348  772.09
348.57
  776.41  348.74  784.94  349.02  798.19   349.5   802.2  349.65  805.77
349.77
  812.25     350  818.51   350.2  839.73  350.56  858.41  350.94  883.51
351.54
  888.56  351.65  890.61  351.69  899.49  351.84  903.12     352  908.37
353.53
  909.21  353.73  910.24     354  914.52  355.26  915.46  355.54  916.35
355.8
  917.05     356  917.51  356.13     924     358  926.64  358.81  930.52
360
  934.83  361.33  937.02     362

Manning's n Values          num=       5
```

```
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   148.77     .018   161.68     .025   182.16     .018   196.48
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
         136.83   196.48            240.61   237.53   235.74              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   136.83                 F
  196.48   937.02                 F
Blocked Obstructions      num=        1
   Sta L    Sta R     Elev
  232.03   534.15      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 2808.985

INPUT
Description: FEMA Section Q
Station Elevation Data     num=      166
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   433.56      .91   432.99     2.45      432     4.61   430.58     5.49
430
    8.37   428.05     8.45      428     8.51   427.96     11.2      426    13.39
424.38
    13.9      424     14.4   423.62    16.57      422    18.29    420.7    19.22
420
   20.43   419.08    21.83      418    22.65   417.37    24.42      416     26.9
414.09
   27.01      414    27.25   413.82     29.6      412    30.93   410.98    32.19
410
   34.27    408.4    34.79      408    35.27   407.62    37.38      406    39.74
404.46
   40.46      404     42.6   402.78    43.95      402    45.26   401.25    47.44
400
   49.89    398.6    50.93      398    53.08   396.77    54.41      396     57.9
394
   57.93   393.98    61.39      392    64.13   390.43    64.88      390    65.68
389.54
   68.37      388    71.48   386.21    71.86      386    72.47   385.65    75.35
384
   76.94   383.09    78.84      382       82   380.19    82.32      380    84.45
378.78
   85.81      378    88.27   376.59    89.29      376    91.35   374.82    92.78
374
   94.32   373.11    96.26      372    98.55   370.68    99.74      370   102.85
368.21
  103.21      368   103.47   367.85   106.69      366   107.94   365.28   110.16
364
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   111.9     363  113.64     362  115.55   360.9  117.11     360  118.88
358.56
  119.57     358  120.51  357.16  121.79     356  123.11  354.82  124.02
354
  125.82  352.38  126.24     352  128.08  350.35  128.47     350  129.47
349.1
  130.69     348  132.19  346.66  132.92     346  133.52  345.47  135.15
344
  136.86  342.47  137.39     342  139.59  340.03  139.62  340.01  139.63
340
  139.64  339.99  141.87     338  143.15  336.86  144.11     336  146.18
334.16
  146.36     334  147.63  332.88  147.74  332.78  148.61     332  171.18
333.693
  173.54  333.87  173.71     334  174.92  334.97   176.2     336  177.85
337.36
  178.63     338  180.37   338.6  183.91     340  204.05  340.84   220.8
341.48
  223.19  341.56  224.98  341.61  226.38  341.66  230.53  341.78  231.59
341.81
  232.58  341.84  238.45  341.95  241.64     342  345.14   342.1  353.05
342.11
   364.5  342.13  374.22  342.15  375.34  342.14  387.76  342.16  397.36
342.17
  404.24  342.18  408.46  342.19  416.48   342.2  428.16  342.22  443.31
342.24
  485.66  342.33  497.31  342.35  503.12  342.36  507.71  342.39  507.93
342.4
  509.37  342.41   511.1  342.42  513.15  342.44  514.72  342.45  640.38
344
  743.14  344.08  752.59  345.12  756.86     346  759.82  346.64   766.1
348
  804.74  349.19  830.08     350  903.05  350.24  905.01  350.63  907.37
351.1
  912.05     352  913.64   352.7  916.54     354  920.63  355.78  921.16
356
  921.92  356.29  926.64     358  931.03  359.58  932.27     360   935.2
361
  938.12     362

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .018   137.39    .018   147.63    .035   171.18    .018   183.91
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        129.47  183.91           519.53  516.04  514.95              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  129.47               F
  183.91  938.12               F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev    Sta L   Sta R    Elev
     531  680.76     360    427.1  487.82     360
```

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 2292.941

INPUT
Description:
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420	1.71	419.13	3.22	418	5.21	416.53	5.92	416
7.92	414.52	8.61	414	8.8	413.86	11.29	412	12.33	411.23
13.97	410	16.15	408.37	16.65	408	17.59	407.3	19.32	406
20.39	405.2	21.99	404	23.78	402.66	24.66	402	26.35	400.73
27.31	400	27.67	399.73	29.95	398	30.97	397.22	32.59	396
34.76	394.35	35.22	394	37.41	392.22	37.68	392	37.86	391.83
39.92	390	40.63	389.37	42.17	388	43.31	386.99	44.42	386
45.85	384.73	46.66	384	47.84	382.95	48.91	382	50.93	380.2
51.15	380	51.41	379.76	53.39	378	55.09	376.48	55.62	376
56.33	375.37	57.86	374	60.08	372.02	60.09	372	60.1	371.99
62.23	370	63.05	369.22	64.34	368	65.95	366.45	66.41	366
67.34	365.08	68.41	364	70.18	362.23	70.41	362	71.2	361.21
72.39	360	73.19	359.18	74.36	358	74.78	357.57	76.32	356
77.82	354.47	78.28	354	78.92	353.34	80.22	352	81.35	350.84
82.17	350	82.82	349.32	84.1	348	86	346.03	86.02	346
86.05	345.97	87.92	344	88.99	342.87	89.8	342	91.38	340.32
91.68	340	91.91	339.76	93.56	338	94.02	337.5	95.43	336
96.44	334.92	97.29	334	98.07	333.17	99.16	332	99.73	331.39
100.54	330.52	100.87	330.16	101.02	330	111.2	328.65	116.9	328
127.23	328.74	127.84	329.66	128.08	330	129.12	331.57	129.42	332
130.42	333.5	130.77	334	131.73	335.44	132.12	336	146.63	335.88
151.77	335.91	152.42	335.9	166.66	335.68	168.69	335.64	180.39	335.44

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  183.48  335.39  212.35  334.98  216.01  334.89  220.32  334.78  225.53
334.65
  230.05  334.59  234.72  334.53  239.35  334.42  242.63  334.39  247.74
334.31
  248.01   334.3   253.7  334.26  259.16  334.22  277.03     334  312.77
334.21
  314.04  334.33  316.53  334.64  318.99  334.93  321.02  335.16  329.71
335.83
  330.22  335.88  330.47  335.91  331.97     336  341.96  336.37  349.34
336.76
  357.03  337.15  360.29  337.37  365.52  337.52   366.9  337.63     368
337.71
  368.92  337.76  373.25     338  432.96  339.01  448.76     340  458.82
340.32
  491.34  341.34  513.06     342  544.49  342.78  563.66  343.26  598.15
344
  808.65  345.76  810.45  345.77  816.29     346  877.95  346.51  878.74
346.59
  879.53  346.73  881.53  346.95  882.54  347.12  888.48     348  890.22
348.1
   898.3     350  905.34  351.91  905.68     352  909.62  353.27  911.72
354
  912.89  354.45  916.98     356  926.01  356.42

Manning's n Values          num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04  100.54    .035  127.23    .018  132.12    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
           86  132.12           410.33  395.27  385.35            .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0      86               F
  132.12  926.01               F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  433.05  515.24     360   336.6  413.18     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1897.670

INPUT
Description:
Station Elevation Data     num=      153
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  375.06      1.5      374     3.11  372.85      4.3      372     6.33
370.55
     7.1      370     7.55  369.79    11.35      368    14.21    366.7    15.72
366
   19.52  364.27    20.12      364     23.9  362.28    24.52      362    24.63
361.95
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   28.93     360   29.87  359.58   33.36     358   34.75  357.36   37.56
356
      40   354.7   41.43     354   43.95  352.66   45.28     352   47.88
350.61
   49.11     350   51.79  348.58   52.94     348   55.68  346.54   56.76
346
   59.56  344.51   60.58     344   62.09  343.25   64.64     342   68.83
341.05
   73.08     340   94.71  339.87   98.75  339.89  102.49     340  113.39
341.51
  114.24     342   122.4  342.23  124.88  342.26  127.41  342.78  129.99
343.2
  131.34  343.51  137.82     344  138.79  344.11  139.23  344.16  140.86
344
  143.14  343.81  143.66  343.72  147.06  343.37  150.64     342  150.96
341.88
  151.36  341.72  153.81  340.79  155.86     340  156.96  339.58  158.44
339.01
  160.34  338.27  161.02     338  163.87  336.88  166.13     336  166.97
335.67
  167.91   335.3  169.86  334.54  171.23     334  173.09  333.27  176.16
332
  177.75  331.34  178.78  330.86  179.76  330.41  180.39     330  180.67
329.81
   182.7  328.44  183.35     328  212.15  328.86  212.26  328.94  213.11
329.59
  213.63     330  214.45  330.73     216     332  217.37  333.26  218.15
334
  281.89   334.6  291.52  334.69  294.54  334.72   299.5  334.76  300.49
334.77
  304.09  334.81  309.86  334.87  317.13  334.94   371.4  335.28  376.63
335.32
  384.58   335.4  387.54  335.42  388.98  335.44  391.52  335.46  439.05
335.11
  441.03  334.99  442.89  334.88  444.37  334.79  445.18  334.74  446.08
334.68
  447.07  334.62  448.18  334.57  450.14  334.59   453.2  334.42  460.27
334.03
  460.91     334  520.63  334.92  524.57     336  529.48  337.11  534.66
338
  539.55  338.45  544.97  338.91  554.54     340  558.74  340.08  583.12
340.51
  610.25  341.05  636.17  341.55  639.13   341.6  659.54     342  675.97
342.47
  694.81  343.02  699.45  343.14  709.92   343.3  714.55  343.41  718.52
343.52
  739.32  343.71  741.92  343.76  743.78   343.8   752.4   343.9  775.83
344
  837.31   343.9   864.6  343.73  883.59  343.61  987.66  343.97  987.85
343.98
  988.73     344 1030.28  344.84 1032.62     346 1038.87  346.92  1045.1
348
  1051.6  349.55 1053.43     350 1059.26  351.34 1062.42     352 1072.59
353.99
 1072.65     354 1072.82  354.01 1095.66  354.97

Manning's n Values         num=        4
```

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	180.67	.035	213.11	.018	218.15	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr. Expan.
137.82	218.15	469.57	465.05	461.75	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	137.82		F
218.15	1095.66		F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
660.68	695.1	360	769.36	808.01	360	847.78	907.86	360

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 1432.619

INPUT
Description: FEMA Section P
Station Elevation Data num= 139

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.9	19.02	354.02	19.48	354	19.72	353.99	46.71	353.33
47.47	353.3	49.15	353.27	50.37	353.24	54.53	353.16	58.29	353.05
64.75	352.82	66.86	352.74	75.27	352.47	84.62	352.32	88.84	352.09
89.18	352.11	90.76	352	108.71	353.03	109.25	353.09	111.15	353.31
113.74	353.2	114.07	353.17	114.65	353.12	115.4	353.04	118.93	352.69
119.69	352.62	125.83	352	127.94	351.78	128.86	351.68	135.28	351
138.97	350.46	141.76	350	145.19	348.86	147.4	348	149.89	347.02
152.5	346	159.12	344.7	165.1	344	187.92	343.35	192.1	343.25
194.8	343.13	197.63	342.97	200.39	342.79	208.12	342.27	209.15	342.22
212.11	342	214.19	340.09	214.28	340	215.83	338.79	216.76	338.07
216.85	338	217.04	337.98	225.83	337.39	230.4	337.22	246.26	336.41
251.6	336.16	253.84	336	258.54	334.45	259.92	334	265.29	332.22
265.97	332	270.74	330.42	271.98	330	272.18	329.93	277.9	328
279.21	327.55	281.05	326.93	283.79	326	287.35	324.99	290.43	324
336.19	325.98	336.23	326	336.25	326.02	336.71	326.31	339.1	327.83

```
  339.37     328  339.66  328.18  342.52     330  343.53  330.64  345.66
332
  348.32  333.69  348.77     334  364.84  335.75  366.23   335.9  368.11
336
  384.32  336.44   393.3  336.84  402.63  337.16  406.41   337.3  419.79
338
  439.23  339.05  457.12     340  473.52  340.89  493.94     342  513.92
342.98
  534.12     344  556.37  344.92   582.7     346  622.44  344.01  622.46
344
  628.46  342.15  628.97     342  629.54  341.87  633.24  341.02  639.24
340
  641.39  339.67  645.57  338.93  655.27  338.24  656.06  338.14  656.43
338.11
  656.69  338.09   656.9  338.07  659.82     338  689.49  338.31   696.6
338.63
  704.11  339.04  709.79  339.33  722.31     340  762.36  340.92  766.54
341.55
   766.8  341.57  769.87     342     778   343.4  780.44  343.81  781.79
344
  783.64  344.39  791.78     346  794.24  346.85  797.54     348  802.12
349.59
   803.3     350  808.59  351.78  809.21     352  819.76  352.52  825.72
352.81
     829  352.97  832.85  353.14  833.66  353.18  851.54     354

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .045   251.6     .04  281.05    .035  336.25    .045  364.84
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
         251.6  364.84           293.25  305.64  317.13             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   251.6               F
  364.84  851.54               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1126.981

INPUT
Description: Approx. local of old drop strucure (no plans available)
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta
Elev
       0  356.26    8.34  356.12   16.72     356   20.79  355.76   23.82
355.4
   31.25  354.85   35.62     354   38.94  352.15   39.21     352   39.55
351.81
```

```
   42.81     350    44.6     349   46.43     348   48.45  346.91   50.12
346
   51.14  345.45   53.88     344   57.63  343.59   60.05  343.52   78.32
342.8
   85.89  342.69   88.55  342.73   90.46  342.76  100.83  342.61  101.59
342.6
  102.59  342.57   102.9  342.56   110.1     342  122.34  341.33  143.92
340.14
  147.12     340  169.65  338.35  174.57     338  208.21  336.95  213.89
336.81
  222.42  336.48  228.13  336.37   235.7  336.08  236.85     336  251.45
334.4
  254.25     334   257.5  333.86  285.84  332.72  299.59  332.17  301.18
332.11
  303.96     332  309.39  331.74  347.23     330  348.92  329.85  349.54
329.63
  350.55  329.26  353.92     328  354.81  327.67  359.29     326   359.7
325.84
  364.66     324  364.81  323.94  369.64  322.14  370.02     322  372.75
320.97
   375.3     320  375.93  319.85  382.42     318  409.31  318.28  413.73
320
  415.29  320.61  415.76  320.79  418.86     322  422.58  323.46  423.98
324
  427.27  325.29  429.07     326  429.99  326.37  434.12     328  437.37
329.29
  439.16     330   442.8  331.45  444.28     332  460.94  332.52  465.33
332.6
   469.4  332.76  473.47   332.8  477.54  332.82  487.31  333.64  488.63
333.63
  489.21  333.72  489.91   333.8  491.62     334  493.37  334.43   497.2
335.37
  500.02     336  538.15   337.3  562.32     338  566.66  339.56  567.88
340
  570.08  340.79  571.45  341.28  573.44     342  575.51  342.74     579
344
  582.46  345.25  584.56     346  595.56  347.12  603.22     348  611.05
348.43
  617.52  348.78  640.14     350  650.33  350.28  659.89  350.55  664.79
350.69

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   347.23    .045   372.75     .15   415.29    .045   444.28
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        347.23  444.28           215.16  233.86  259.36              .1
.3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  347.23                F
  444.28  664.79                F

CROSS SECTION
```

RIVER: Avarado Ck
REACH: Upper RS: 893.1187

INPUT
Description: u/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41	340.58
42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19	336.87
59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11	332.86
80.74	332	84.11	331.89	85.87	331.83	112.84	330.97	115.86	330.88
125.01	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98	330.13
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35	329.73
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21	328.91
173.36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26	328.33
183.77	328.34	188.66	328.25	189.44	328.26	192.99	328.17	195.25	328.09
195.82	328	196.64	327.88	197.1	327.67	197.75	327.32	198.21	327.02
198.98	326.67	200.42	326	201.52	325.46	203.22	324.74	204.27	324.29
204.58	324	206.21	322.11	206.25	322	206.31	321.83	206.57	321.06
206.94	320	207.14	319.28	207.49	318	207.55	317.65	207.92	316
207.94	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57	316
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83	318.6
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94	323.31
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91	326.29
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78	332
267.66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19	336
321.68	337.29	323.02	338	326.46	339.81	326.82	340	327.22	340.21
330.62	342	331.45	342.44	332.97	343.23	334.42	344	343.82	344.63
344.55	344.68	345.2	344.72	345.73	344.75	346.14	344.78	346.4	344.79
358.71	345.53	366.61	346	398.47	347.31	415.46	348	416.2	348.02

```
Manning's n Values          num=        5
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0      .05   192.99     .025   207.94       .1   237.57      .05   255.78
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
        164.89   255.78             49.65    50.12    51.56               .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   164.89                  F
  255.78    416.2                  F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 843.0025

INPUT
Description: d/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data      num=      156
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   343.42     2.76    343.4    12.36   343.22    12.94    343.2    16.73
343.21
    19.9   343.22    24.77   343.07    30.96   342.92    49.04   342.66    53.21
342.53
   64.01   342.14    67.44      342    73.11   340.59     75.5      340    82.22
338.32
   83.53      338     91.1   336.11    91.52      336    91.58   335.98    99.41
334
  100.38   333.75   105.16    332.6   107.01   332.15   107.77      332   113.88
332.03
  120.46   332.21   128.03   332.41   129.28   332.35   133.87    332.5   135.07
332.59
  140.71   332.75   143.64   332.84   144.21   332.87   144.92   332.89   145.97
332.94
   148.3   332.98    149.8   332.99   150.42      333   151.43   333.01   152.47
333.03
  153.57   333.06   154.78   333.11    155.4   333.13   157.09   333.15   158.91
333.08
  159.86   333.12   160.78   333.16   163.48   332.99   164.13   333.03   165.29
333.06
  167.93   332.89    169.3   332.92   171.18   332.95   173.26    332.8   175.06
332.75
  176.14    332.7   178.05   332.64   178.68   332.56   180.77    332.5   183.37
332
     194   331.97   194.16   331.89    194.8   331.72   196.28   331.23   198.22
330
  199.21   329.16    199.4   329.08   199.71   328.96   199.85    328.9    200.2
328.76
  200.51   328.64   201.11   328.39    201.7      328   202.15   327.69   202.44
327.44
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  203.94     326  204.75  325.33  205.76  324.66  207.12     324  207.57
323.78
   207.9  323.65  209.66  322.99  210.39     322  211.31  320.42  211.48
320
  211.76  318.94  212.01     318  212.28  316.86  212.47     316  212.56
315.56
  212.88     314  213.08  312.93  213.13  312.65  213.18  312.38  213.25
312
  231.31  312.59   231.8  312.68  234.12   313.1  239.04     314  239.96
315.3
  240.47     316  240.86  316.54  241.46  317.38  241.92     318  243.26
319.75
  243.45     320  243.58  320.17  245.04     322  245.52  322.46  246.49
323.24
  247.55     324  248.56  324.72  249.47  325.32   250.5     326  251.08
326.38
  251.88  326.91  252.88  327.53  253.62     328  254.86  328.78  256.81
330
  257.02  330.13  257.52  330.44  259.27  331.67  259.76     332  263.82
332.43
  264.57  332.49  265.21  332.53  265.61  332.56  270.08  333.03  270.29
333.04
   272.8  333.32  273.94  333.43  274.94  333.49  307.07  333.53  308.37
333.58
  320.33     334  324.19  334.49  327.75     336  328.78  336.56  331.41
338
  332.95  338.85     335     340  337.92  341.63  338.57     342  339.03
342.16
  347.36     344  349.55  344.09  351.48  344.18  367.08  344.83  382.17
345.64
  385.33   345.8  388.81     346  400.98  346.51  410.17  346.87  422.67
347.37
   427.2  347.55

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025      194     .05   213.13      .1   240.86     .05   274.94
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
           194  274.94           356.37  364.33  373.23              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0     194                F
  274.94   427.2                F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 478.6733

INPUT
Description: FEMA Section O
```

Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.87	47.84	358	56.98	357.46	60.13	356	61.62	355.3
64.42	354	66.28	353.13	68.72	352	71.24	350.83	73.01	350
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85.16	344.34
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31	340.07
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67	336
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94	332
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49	326.94
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88	322
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14	317.89
208.01	316	208.71	315.54	211.05	314	212.78	312.85	214.08	312
215.9	310.8	216.82	310.18	217.1	310	217.7	309.66	220.29	308
225.13	307.28	226.2	307.12	227.04	307	233.99	306	243.37	305.4
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99	305.99
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08	310
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11	314.44
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14	320
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42	324.52
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77	328
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.75	403.49	328.85
409.64	329.05	414.47	329.2	441.62	330	448.33	330.93	451.03	332
453.44	333.04	455.81	334	459.99	335.81	460.42	336	460.73	336.13
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8	338.5
489.23	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63	339.3
527.91	339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18	339.99
566.16	340								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .025  177.67      .05  216.82       .1  303.99      .05  376.25
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        177.67  376.25           263.01  282.17   291.3             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  177.67               F
  376.25  566.16               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 196.5054

INPUT
Description:
Station Elevation Data     num=     148
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  361.57    13.89  360.66    20.01      360     22.8  358.47    23.36
358.18
    23.7      358    24.06  357.81    27.45      356    29.87  354.71     31.2
354
   32.34  353.39    34.95     352    38.53  350.09     38.7     350    39.78
349.42
   42.46     348    42.66   347.9    46.29      346    46.47   345.9    50.12
344
   50.28  343.92    53.95     342    54.07  341.94    57.78     340    57.83
339.97
   59.41  339.15     61.6     338    61.71  337.94    65.43     336    66.12
335.64
   67.23  335.06    69.26     334    87.67  333.02    91.15   332.9    96.79
332.76
   99.06   332.7   104.37  332.57   115.16   332.6   118.43  332.53   122.53
332.56
  124.74  332.63   133.39   332.7   136.91  332.82   142.54  332.88   154.09
332
  156.48  331.51   158.27   330.4   158.91     330   159.16  329.85   162.09
328
  163.72  326.97    165.2     326   167.64  324.39   168.23     324    169.1
323.42
  171.23     322   172.95  320.84    174.2     320   176.62  318.69   177.61
318.16
  177.95     318   183.93  316.11   184.28     316   187.09  315.12   190.19
314.14
  190.63     314   191.07  313.86   196.98     312   198.77  311.43   203.32
310
  208.74  308.29   209.66     308   210.45  307.75   216.44     306   219.05
305.56
  219.58  305.47   228.46     304   249.87  302.01   249.97     302   311.64
303.39
   313.2  303.68   314.95     304   317.39  304.38   328.22     306   335.63
307.21
```

```
  340.86     308  344.52  309.88  344.74     310  344.93   310.1  348.49
312
  348.58  312.05  350.53  313.08  352.25     314  352.38  314.07     356
316
  358.18  317.16  359.75     318  361.34  318.87  362.11  319.28  363.45
320
  364.29  320.52  364.86  320.89  366.56     322  368.37  323.18  369.63
324
  371.52  325.24  372.69     326  374.73  327.33  375.76     328  379.79
328.4
  380.58  328.42  382.12  328.46  385.05  328.55  410.07  329.71  415.78
330
  416.23  331.48  416.39     332  416.84  333.51  416.99     334  417.09
334.32
  417.59     336  418.15  337.87  418.19     338  418.68  339.69  418.77
340
  419.27  341.68  419.36     342  419.78   343.3  420.01     344  430.88
344.29
  435.08   344.7  448.65     346  463.87  346.83  487.74     348  544.46
347.54
  548.06  347.24  556.42   346.5  559.66  346.24   562.4     346  564.14
345.65
  569.42  344.57  572.14     344  575.15  343.33   581.2     342  584.36
341.28
  588.47  340.35  590.08     340  592.51   339.4

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025   20.01     .05  219.05      .1   313.2     .05  487.74
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        142.54  379.79           225.51   190.7  180.22              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  142.54             F
  379.79  592.51             F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 5.802783

INPUT
Description: u/s face of Alvarado Road Crossing
Station Elevation Data     num=     201
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  342.76    1.15  342.36     1.9  342.17    2.32     342   16.02
340.49
   17.61  340.36   19.05     340   30.76  338.79   31.07  338.72   32.63
338.54
```

33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96
338.16								
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46
334.46								
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32
332.34								
75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56
332								
94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95
328.1								
111.98	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09
326.81								
125.85	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29
325.84								
133.38	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57
322								
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34
319.71								
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3
317.06								
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31
314.71								
243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46
313.58								
261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63
312.7								
276.97	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62
310								
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26
305.45								
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61
301.51								
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1
297.73								
293.33	296	307.28	296.23	308.28	297.51	308.67	298	308.89
298.27								
310.28	300	310.44	300.2	311.76	301.84	311.89	302	312
302.14								
313.02	304	313.68	305.49	313.94	306	314.34	307.3	314.63
308								
314.97	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4
312								
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37
316.26								
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47
322								
332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6
327.04								
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25
332								
345.15	332.7	346.84	334	348.83	335.46	349.54	336	351.35
336.25								
353.83	336.45	362	337.3	368.9	337.75	369.76	337.82	372.93
338								
375.05	338.07	375.57	338.11	376.42	338.18	380.73	338.42	382
338.5								

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  385.92  338.73  396.28     340  396.64  340.53   397.6     342  397.91
342.49
  398.85     344  399.12  344.41   415.3     346  473.91  347.62  476.83
347.27
  477.02  347.19  477.22  347.12   477.4  347.08   477.7  347.13  478.68
346.94
  482.66  346.63  484.13  346.55  484.71  346.49  490.41     346  493.45
345.96
  506.78  345.79  507.71  345.76  507.76  345.75  508.59  345.73  516.71
345.61
  517.78  345.58  521.56  345.52  522.54  345.49  523.29  345.47  523.71
345.45
  524.12  345.44  524.46  345.43  524.83  345.42  524.95  345.41  525.61
345.39
  526.52  345.35  526.91  345.34  527.41  345.32  528.95  345.27  529.36
345.25
  535.06  345.09  539.77  344.87  542.14  344.81  543.79  344.77  555.55
344.13
  555.77  344.12  555.89  344.11  556.15   344.1  557.82     344  574.08
342.79
   579.5  342.38

Manning's n Values          num=        4
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
       0     .05   292.07      .1   310.44     .05   415.3    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          1.15     362              8.78     5.8       0              .1
.3
```

SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

Reach	River Sta.	n1	n2	n3	n4	n5
Upper	3975.018	.025	.018	.02	.018	.025
Upper	3918.558	.025	.018	.02	.018	.025
Upper	3881.736	.025	.018	.02	.018	.025
Upper	3870.768	.025	.018	.02	.018	.025
Upper	3690.298	.025	.018	.02	.018	.025
Upper	3362.059	.025	.018	.02	.018	.025
Upper	3046.513	.025	.018	.025	.018	.025
Upper	2808.985	.018	.018	.035	.018	.025
Upper	2292.941	.04	.035	.018	.025	

Upper	1897.670	.045	.035	.018	.025
Upper	1432.619	.045	.04	.035	.045
.025					
Upper	1126.981	.025	.045	.15	.045
.025					
Upper	893.1187	.05	.025	.1	.05
.025					
Upper	843.0025	.025	.05	.1	.05
.025					
Upper	478.6733	.025	.05	.1	.05
.025					
Upper	196.5054	.025	.05	.1	.05
.025					
Upper	5.802783	.05	.1	.05	.025

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	293.25	305.64	317.13
Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3

Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3

HEC-RAS Plan: maint30swath sed River: Avarado Ck Reach: Upper

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)	
Upper	5.802783	Q100 = 3900	3900.00	296.00	337.00	307.02	337.01	0.000017	0.76	5135.41	313.42	0.03
Upper	5.802783	Q50=3400	3400.00	296.00	306.24	306.24	310.17	0.020395	15.90	213.77	27.22	1.00
Upper	5.802783	Q35=3000	3000.00	296.00	305.53	305.53	309.22	0.020156	15.42	194.57	26.49	1.00
Upper	5.802783	Q10=2100	2100.00	296.00	303.79	303.79	306.83	0.019197	14.00	150.01	24.69	1.00
Upper	5.802783	Q7=2000	2000.00	296.00	303.57	303.57	306.54	0.019129	13.83	144.59	24.43	1.00
Upper	5.802783	Q5=1700	1700.00	296.00	302.90	302.90	305.61	0.018685	13.22	128.55	23.67	1.00
Upper	5.802783	Q2=1000	1000.00	296.00	301.05	301.05	303.10	0.017552	11.49	87.02	21.23	1.00
Upper	196.5054	Q100 = 3900	3900.00	302.00	337.00		337.01	0.000005	0.63	6157.42	354.39	0.02
Upper	196.5054	Q50=3400	3400.00	302.00	310.79		311.00	0.000862	3.66	929.57	145.40	0.25
Upper	196.5054	Q35=3000	3000.00	302.00	309.88		310.09	0.001044	3.75	799.06	140.80	0.28
Upper	196.5054	Q10=2100	2100.00	302.00	307.70		307.97	0.001967	4.16	504.66	128.22	0.37
Upper	196.5054	Q7=2000	2000.00	302.00	307.44		307.72	0.002141	4.24	472.16	125.65	0.39
Upper	196.5054	Q5=1700	1700.00	302.00	306.67		306.98	0.002868	4.49	378.20	118.17	0.44
Upper	196.5054	Q2=1000	1000.00	302.00	304.89		305.35	0.007431	5.40	185.34	97.77	0.69
Upper	478.6733	Q100 = 3900	3900.00	304.00	337.00		337.01	0.000006	0.84	4618.85	305.27	0.03
Upper	478.6733	Q50=3400	3400.00	304.00	310.87		311.54	0.002847	6.57	517.19	102.63	0.52
Upper	478.6733	Q35=3000	3000.00	304.00	310.01		310.76	0.003866	6.96	430.88	99.03	0.59
Upper	478.6733	Q10=2100	2100.00	304.00	308.21		309.22	0.009068	8.09	259.52	90.91	0.84
Upper	478.6733	Q7=2000	2000.00	304.00	308.03	307.78	309.08	0.009991	8.20	243.88	90.12	0.88
Upper	478.6733	Q5=1700	1700.00	304.00	307.61	307.50	308.66	0.011894	8.25	206.07	86.09	0.94
Upper	478.6733	Q2=1000	1000.00	304.00	307.06		307.66	0.008726	6.24	160.17	80.66	0.78
Upper	843.0025	Q100 = 3900	3900.00	312.00	336.89		337.07	0.000238	3.37	1156.04	241.43	0.16
Upper	843.0025	Q50=3400	3400.00	312.00	320.52	320.52	323.99	0.013407	14.96	227.24	32.60	1.00
Upper	843.0025	Q35=3000	3000.00	312.00	319.89	319.89	323.15	0.013569	14.48	207.13	31.86	1.00
Upper	843.0025	Q10=2100	2100.00	312.00	318.40	318.40	321.05	0.013771	13.06	160.84	30.33	1.00
Upper	843.0025	Q7=2000	2000.00	312.00	318.22	318.22	320.80	0.013838	12.88	155.27	30.14	1.00
Upper	843.0025	Q5=1700	1700.00	312.00	317.65	317.65	320.00	0.014010	12.29	138.38	29.57	1.00
Upper	843.0025	Q2=1000	1000.00	312.00	316.17	316.17	317.87	0.014658	10.47	95.50	28.16	1.00
Upper	893.1187	Q100 = 3900	3900.00	314.00	336.94		337.09	0.000209	3.03	1285.04	265.11	0.14
Upper	893.1187	Q50=3400	3400.00	314.00	322.19	322.19	325.37	0.011940	14.32	237.39	37.18	1.00
Upper	893.1187	Q35=3000	3000.00	314.00	321.62	321.62	324.60	0.012144	13.85	216.66	36.33	1.00
Upper	893.1187	Q10=2100	2100.00	314.00	320.25	320.25	322.67	0.012655	12.50	168.06	34.46	1.00
Upper	893.1187	Q7=2000	2000.00	314.00	320.08	320.08	322.44	0.012797	12.34	162.10	34.24	1.00
Upper	893.1187	Q5=1700	1700.00	314.00	319.56	319.56	321.71	0.013071	11.76	144.59	33.62	1.00
Upper	893.1187	Q2=1000	1000.00	314.00	318.20	318.20	319.75	0.014106	10.02	99.84	32.03	1.00

HEC-RAS Plan: maint30swath sed River: Avarado Ck Reach: Upper (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)	
Upper	1126.981	Q100 = 3900	3900.00	318.00	337.00		337.13	0.000137	2.82	1380.63	322.88	0.13
Upper	1126.981	Q50=3400	3400.00	318.00	326.01		327.22	0.004632	8.80	386.32	69.85	0.66
Upper	1126.981	Q35=3000	3000.00	318.00	325.33		326.54	0.005141	8.82	339.98	66.31	0.69
Upper	1126.981	Q10=2100	2100.00	318.00	323.71		324.90	0.006746	8.79	238.99	57.78	0.76
Upper	1126.981	Q7=2000	2000.00	318.00	323.52		324.71	0.006949	8.76	228.43	56.80	0.77
Upper	1126.981	Q5=1700	1700.00	318.00	322.95		324.11	0.007678	8.65	196.61	53.79	0.80
Upper	1126.981	Q2=1000	1000.00	318.00	321.53		322.51	0.009593	7.95	125.77	46.40	0.85
Upper	1177.92*	Q100 = 3900	3900.00	319.00	337.00		337.14	0.000162	2.96	1319.24	270.45	0.14
Upper	1177.92*	Q50=3400	3400.00	319.00	325.96		327.67	0.007627	10.49	324.27	66.17	0.83
Upper	1177.92*	Q35=3000	3000.00	319.00	325.27	324.91	327.06	0.008995	10.71	280.06	62.72	0.89
Upper	1177.92*	Q10=2100	2100.00	319.00	323.86	323.86	325.63	0.012174	10.68	196.57	55.65	1.00
Upper	1177.92*	Q7=2000	2000.00	319.00	323.73	323.73	325.46	0.012299	10.56	189.40	55.00	1.00
Upper	1177.92*	Q5=1700	1700.00	319.00	323.34	323.34	324.93	0.012565	10.11	168.16	53.03	1.00
Upper	1177.92*	Q2=1000	1000.00	319.00	322.24	322.24	323.45	0.013657	8.83	113.31	46.83	1.00
Upper	1228.86*	Q100 = 3900	3900.00	320.00	337.00		337.15	0.000199	3.11	1252.57	254.72	0.16
Upper	1228.86*	Q50=3400	3400.00	320.00	326.24	326.24	328.44	0.011226	11.92	285.35	64.45	1.00
Upper	1228.86*	Q35=3000	3000.00	320.00	325.83	325.83	327.91	0.011461	11.55	259.75	62.51	1.00
Upper	1228.86*	Q10=2100	2100.00	320.00	324.82	324.82	326.55	0.012163	10.55	199.12	57.60	1.00
Upper	1228.86*	Q7=2000	2000.00	320.00	324.70	324.70	326.39	0.012291	10.42	191.92	56.99	1.00
Upper	1228.86*	Q5=1700	1700.00	320.00	324.31	324.31	325.86	0.012649	9.99	170.21	55.11	1.00
Upper	1228.86*	Q2=1000	1000.00	320.00	323.26	323.26	324.43	0.013828	8.70	114.98	49.17	1.00
Upper	1279.8*	Q100 = 3900	3900.00	321.00	337.00		337.17	0.000250	3.30	1180.35	223.04	0.17
Upper	1279.8*	Q50=3400	3400.00	321.00	327.15	327.15	329.33	0.011294	11.84	287.22	65.90	1.00
Upper	1279.8*	Q35=3000	3000.00	321.00	326.76	326.76	328.80	0.011538	11.47	261.60	64.04	1.00
Upper	1279.8*	Q10=2100	2100.00	321.00	325.77	325.77	327.47	0.012280	10.46	200.83	59.37	1.00
Upper	1279.8*	Q7=2000	2000.00	321.00	325.66	325.66	327.31	0.012334	10.31	194.03	58.83	1.00
Upper	1279.8*	Q5=1700	1700.00	321.00	325.29	325.29	326.79	0.012649	9.86	172.47	57.07	1.00
Upper	1279.8*	Q2=1000	1000.00	321.00	324.29	324.29	325.41	0.013800	8.48	117.86	52.36	1.00
Upper	1330.74*	Q100 = 3900	3900.00	322.00	337.00		337.19	0.000324	3.54	1102.56	209.88	0.19
Upper	1330.74*	Q50=3400	3400.00	322.00	328.07	328.07	330.22	0.011363	11.76	289.13	67.34	1.00
Upper	1330.74*	Q35=3000	3000.00	322.00	327.70	327.70	329.70	0.011521	11.36	264.20	65.61	1.00
Upper	1330.74*	Q10=2100	2100.00	322.00	326.72	326.72	328.39	0.012392	10.37	202.51	61.09	1.00
Upper	1330.74*	Q7=2000	2000.00	322.00	326.62	326.62	328.23	0.012369	10.20	196.12	60.60	1.00
Upper	1330.74*	Q5=1700	1700.00	322.00	326.26	326.26	327.73	0.012708	9.75	174.35	58.89	1.00
Upper	1330.74*	Q2=1000	1000.00	322.00	325.28	325.28	326.37	0.014032	8.40	119.02	54.39	1.00

HEC-RAS Plan: maint30swath sed River: Avarado Ck Reach: Upper (Continued)

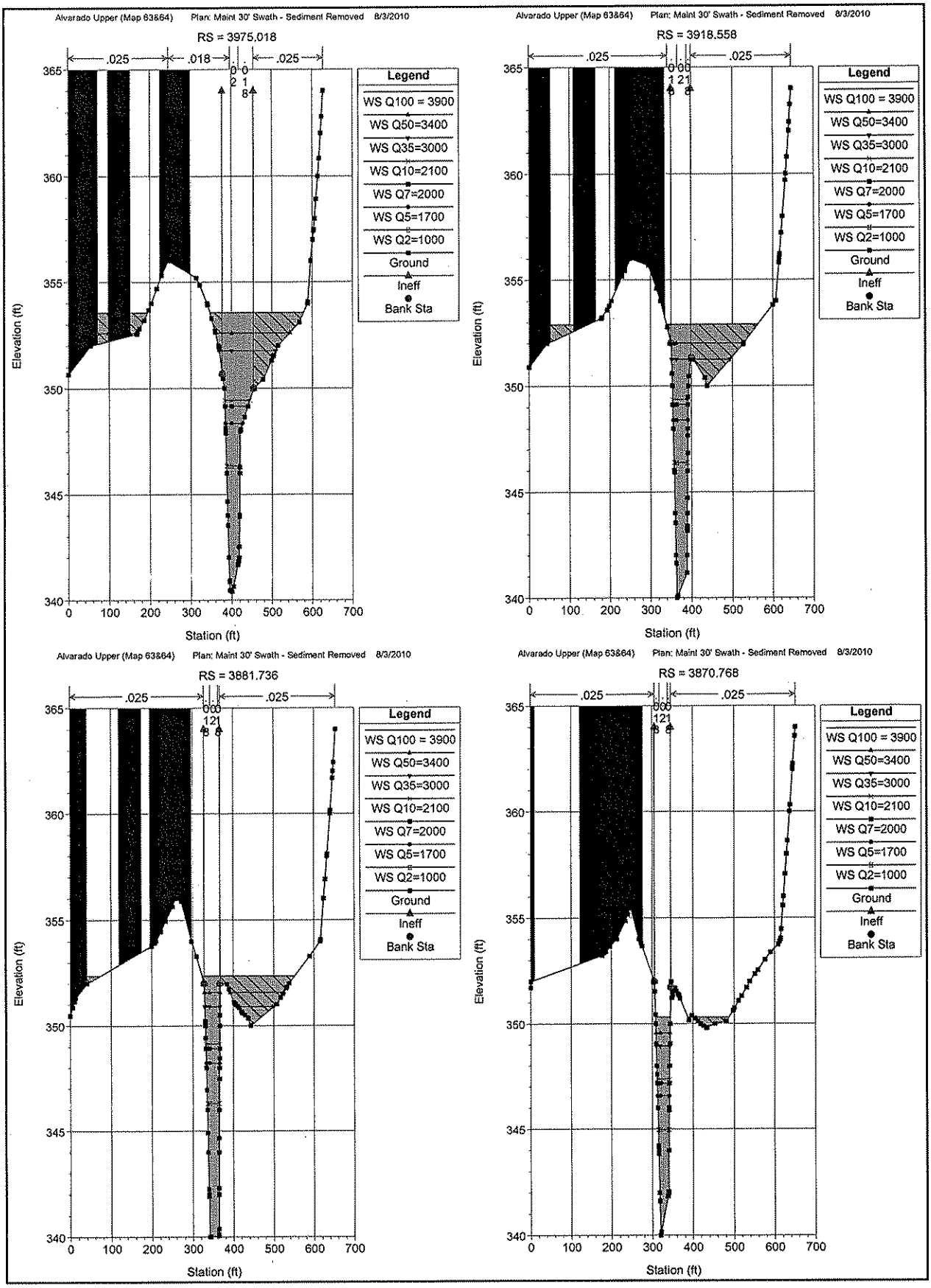
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper	1381.67*	Q100 = 3900	3900.00	323.00	337.00		337.22	0.000411	3.74	1042.39	194.45	0.21
Upper	1381.67*	Q50=3400	3400.00	323.00	328.76	328.63	330.79	0.010510	11.43	297.37	67.69	0.96
Upper	1381.67*	Q35=3000	3000.00	323.00	328.41	328.25	330.27	0.010403	10.95	273.89	66.08	0.95
Upper	1381.67*	Q10=2100	2100.00	323.00	327.56	327.29	328.98	0.009842	9.59	219.04	62.17	0.90
Upper	1381.67*	Q7=2000	2000.00	323.00	327.44	327.17	328.82	0.009888	9.45	211.64	61.63	0.90
Upper	1381.67*	Q5=1700	1700.00	323.00	327.09	326.82	328.32	0.009802	8.93	190.32	60.03	0.88
Upper	1381.67*	Q2=1000	1000.00	323.00	326.13		326.98	0.009493	7.39	135.33	55.69	0.84
Upper	1432.619	Q100 = 3900	3900.00	323.28	337.01		337.25	0.000648	3.89	1003.50	163.83	0.23
Upper	1432.619	Q50=3400	3400.00	323.28	329.90		331.28	0.006670	9.40	361.59	70.11	0.73
Upper	1432.619	Q35=3000	3000.00	323.28	329.48		330.75	0.006524	9.02	332.51	68.20	0.72
Upper	1432.619	Q10=2100	2100.00	323.28	328.42		329.41	0.006088	7.99	262.90	63.40	0.69
Upper	1432.619	Q7=2000	2000.00	323.28	328.30		329.26	0.005996	7.84	255.18	62.85	0.69
Upper	1432.619	Q5=1700	1700.00	323.28	327.89		328.74	0.005787	7.40	229.87	60.99	0.67
Upper	1432.619	Q2=1000	1000.00	323.28	326.79		327.36	0.005094	6.05	165.22	55.99	0.62
Upper	1897.670	Q100 = 3900	3900.00	325.84	336.83		338.21	0.004092	9.41	414.66	364.26	0.60
Upper	1897.670	Q50=3400	3400.00	325.84	333.61	333.61	336.40	0.011851	13.42	253.42	45.51	1.00
Upper	1897.670	Q35=3000	3000.00	325.84	333.10	333.10	335.72	0.011884	13.01	230.64	43.68	1.00
Upper	1897.670	Q10=2100	2100.00	325.84	331.74	331.74	333.99	0.012392	12.02	174.65	38.90	1.00
Upper	1897.670	Q7=2000	2000.00	325.84	331.58	331.58	333.77	0.012423	11.88	168.36	38.31	1.00
Upper	1897.670	Q5=1700	1700.00	325.84	331.04	331.04	333.08	0.012713	11.46	148.40	36.45	1.00
Upper	1897.670	Q2=1000	1000.00	325.84	329.71	329.63	331.19	0.012742	9.75	102.57	32.44	0.97
Upper	2292.941	Q100 = 3900	3900.00	328.00	338.13		340.37	0.005747	12.01	324.75	243.16	0.73
Upper	2292.941	Q50=3400	3400.00	328.00	337.56		339.52	0.005360	11.23	302.81	242.63	0.70
Upper	2292.941	Q35=3000	3000.00	328.00	337.01		338.77	0.005138	10.63	282.11	242.12	0.68
Upper	2292.941	Q10=2100	2100.00	328.00	335.59		336.89	0.004604	9.14	229.70	191.21	0.64
Upper	2292.941	Q7=2000	2000.00	328.00	335.41		336.66	0.004549	8.97	223.01	177.46	0.63
Upper	2292.941	Q5=1700	1700.00	328.00	334.82		335.92	0.004358	8.40	202.36	134.12	0.61
Upper	2292.941	Q2=1000	1000.00	328.00	333.11		333.85	0.003992	6.88	145.34	32.04	0.57
Upper	2808.985	Q100 = 3900	3900.00	332.00	340.88	340.88	343.94	0.006594	14.05	277.66	66.44	1.00
Upper	2808.985	Q50=3400	3400.00	332.00	340.30	340.30	343.14	0.006866	13.51	251.67	51.84	1.00
Upper	2808.985	Q35=3000	3000.00	332.00	339.81	339.81	342.45	0.007094	13.05	229.90	43.58	1.00
Upper	2808.985	Q10=2100	2100.00	332.00	338.45	338.45	340.71	0.008020	12.06	174.19	38.58	1.00
Upper	2808.985	Q7=2000	2000.00	332.00	338.27	338.27	340.49	0.008227	11.96	167.20	37.85	1.00
Upper	2808.985	Q5=1700	1700.00	332.00	337.76	337.76	339.80	0.008584	11.46	148.30	36.20	1.00
Upper	2808.985	Q2=1000	1000.00	332.00	336.38	336.38	337.91	0.010045	9.93	100.71	32.98	1.00

HEC-RAS Plan: maint30swath sed River: Avarado Ck Reach: Upper (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)	
Upper	3046.513	Q100 = 3900	3900.00	332.00	342.93		344.74	0.001567	10.79	361.45	74.75	0.70
Upper	3046.513	Q50=3400	3400.00	332.00	342.28		343.93	0.001552	10.31	329.71	55.85	0.69
Upper	3046.513	Q35=3000	3000.00	332.00	341.72		343.24	0.001523	9.90	303.17	46.55	0.68
Upper	3046.513	Q10=2100	2100.00	332.00	340.28		341.47	0.001356	8.73	240.67	40.42	0.63
Upper	3046.513	Q7=2000	2000.00	332.00	340.11		341.24	0.001329	8.56	233.53	39.65	0.62
Upper	3046.513	Q5=1700	1700.00	332.00	339.53		340.53	0.001271	8.05	211.07	38.01	0.60
Upper	3046.513	Q2=1000	1000.00	332.00	337.93		338.59	0.001087	6.51	153.53	34.00	0.54
Upper	3362.059	Q100 = 3900	3900.00	334.00	343.65	343.65	346.60	0.003426	13.80	282.63	123.76	1.00
Upper	3362.059	Q50=3400	3400.00	334.00	343.11	343.11	345.82	0.003476	13.23	257.07	123.28	1.00
Upper	3362.059	Q35=3000	3000.00	334.00	342.66	342.66	345.17	0.003523	12.72	235.87	93.25	1.00
Upper	3362.059	Q10=2100	2100.00	334.00	341.50	341.50	343.56	0.003720	11.50	182.56	44.34	1.00
Upper	3362.059	Q7=2000	2000.00	334.00	341.30	341.30	343.36	0.003750	11.50	173.90	42.25	1.00
Upper	3362.059	Q5=1700	1700.00	334.00	340.58	340.58	342.68	0.003859	11.62	146.26	34.80	1.00
Upper	3362.059	Q2=1000	1000.00	334.00	338.76	338.76	340.53	0.004182	10.69	93.56	26.27	1.00
Upper	3690.298	Q100 = 3900	3900.00	338.00	347.73	347.73	351.34	0.003123	15.24	255.92	343.19	1.00
Upper	3690.298	Q50=3400	3400.00	338.00	347.03	347.03	350.38	0.003198	14.70	231.26	309.32	1.00
Upper	3690.298	Q35=3000	3000.00	338.00	346.43	346.43	349.57	0.003269	14.22	210.92	280.10	1.00
Upper	3690.298	Q10=2100	2100.00	338.00	344.94	344.94	347.53	0.003486	12.91	162.68	154.86	1.00
Upper	3690.298	Q7=2000	2000.00	338.00	344.76	344.76	347.28	0.003520	12.74	157.01	139.26	1.00
Upper	3690.298	Q5=1700	1700.00	338.00	344.18	344.18	346.49	0.003645	12.19	139.44	86.45	1.00
Upper	3690.298	Q2=1000	1000.00	338.00	342.57	342.57	344.34	0.003918	10.68	93.59	26.38	1.00
Upper	3870.768	Q100 = 3900	3900.00	340.00	350.30	350.30	353.85	0.003645	15.11	258.13	129.46	1.00
Upper	3870.768	Q50=3400	3400.00	340.00	349.57	349.57	352.90	0.003713	14.65	232.09	34.69	1.00
Upper	3870.768	Q35=3000	3000.00	340.00	348.93	348.93	352.09	0.003791	14.25	210.48	33.33	1.00
Upper	3870.768	Q10=2100	2100.00	340.00	347.36	347.36	350.02	0.003979	13.08	160.54	30.19	1.00
Upper	3870.768	Q7=2000	2000.00	340.00	347.17	347.17	349.76	0.004001	12.92	154.85	29.85	1.00
Upper	3870.768	Q5=1700	1700.00	340.00	346.57	346.57	348.95	0.004089	12.39	137.22	28.78	1.00
Upper	3870.768	Q2=1000	1000.00	340.00	344.97	344.97	346.75	0.004381	10.72	93.29	26.22	1.00
Upper	3881.736	Q100 = 3900	3900.00	340.00	352.36		354.05	0.001262	10.43	373.84	262.06	0.60
Upper	3881.736	Q50=3400	3400.00	340.00	351.58		353.10	0.001241	9.91	343.18	171.19	0.59
Upper	3881.736	Q35=3000	3000.00	340.00	350.90		352.29	0.001199	9.45	317.30	125.84	0.57
Upper	3881.736	Q10=2100	2100.00	340.00	349.13		350.20	0.001088	8.27	253.99	34.45	0.54
Upper	3881.736	Q7=2000	2000.00	340.00	348.91		349.94	0.001074	8.12	246.44	34.09	0.53
Upper	3881.736	Q5=1700	1700.00	340.00	348.22		349.12	0.001026	7.62	223.09	32.98	0.52
Upper	3881.736	Q2=1000	1000.00	340.00	346.30		346.89	0.000873	6.15	162.71	30.13	0.47

HEC-RAS Plan: maint30swath sed River: Avarado Ck Reach: Upper (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)	
Upper	3918.558	Q100 = 3900	3900.00	340.00	352.88		354.14	0.000914	9.00	433.23	278.70	0.53
Upper	3918.558	Q50=3400	3400.00	340.00	352.00		353.18	0.000982	8.71	390.46	177.04	0.54
Upper	3918.558	Q35=3000	3000.00	340.00	351.24		352.35	0.001003	8.49	353.46	134.72	0.54
Upper	3918.558	Q10=2100	2100.00	340.00	349.35		350.25	0.000891	7.61	276.12	37.94	0.50
Upper	3918.558	Q7=2000	2000.00	340.00	349.12		349.99	0.000885	7.48	267.41	37.58	0.49
Upper	3918.558	Q5=1700	1700.00	340.00	348.39		349.17	0.000867	7.07	240.41	36.44	0.49
Upper	3918.558	Q2=1000	1000.00	340.00	346.39		346.92	0.000812	5.86	170.66	33.41	0.46
Upper	3975.018	Q100 = 3900	3900.00	340.39	353.55		354.23	0.000506	6.61	589.83	298.86	0.42
Upper	3975.018	Q50=3400	3400.00	340.39	352.60		353.27	0.000601	6.59	515.94	226.40	0.45
Upper	3975.018	Q35=3000	3000.00	340.39	351.76		352.45	0.000732	6.65	450.92	139.89	0.49
Upper	3975.018	Q10=2100	2100.00	340.39	349.43		350.31	0.001380	7.54	278.47	61.97	0.63
Upper	3975.018	Q7=2000	2000.00	340.39	349.16		350.06	0.001387	7.63	262.21	56.95	0.63
Upper	3975.018	Q5=1700	1700.00	340.39	348.36		349.26	0.001247	7.64	222.47	42.56	0.59
Upper	3975.018	Q2=1000	1000.00	340.39	346.34		347.02	0.001143	6.62	150.99	32.99	0.55


Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3975.018
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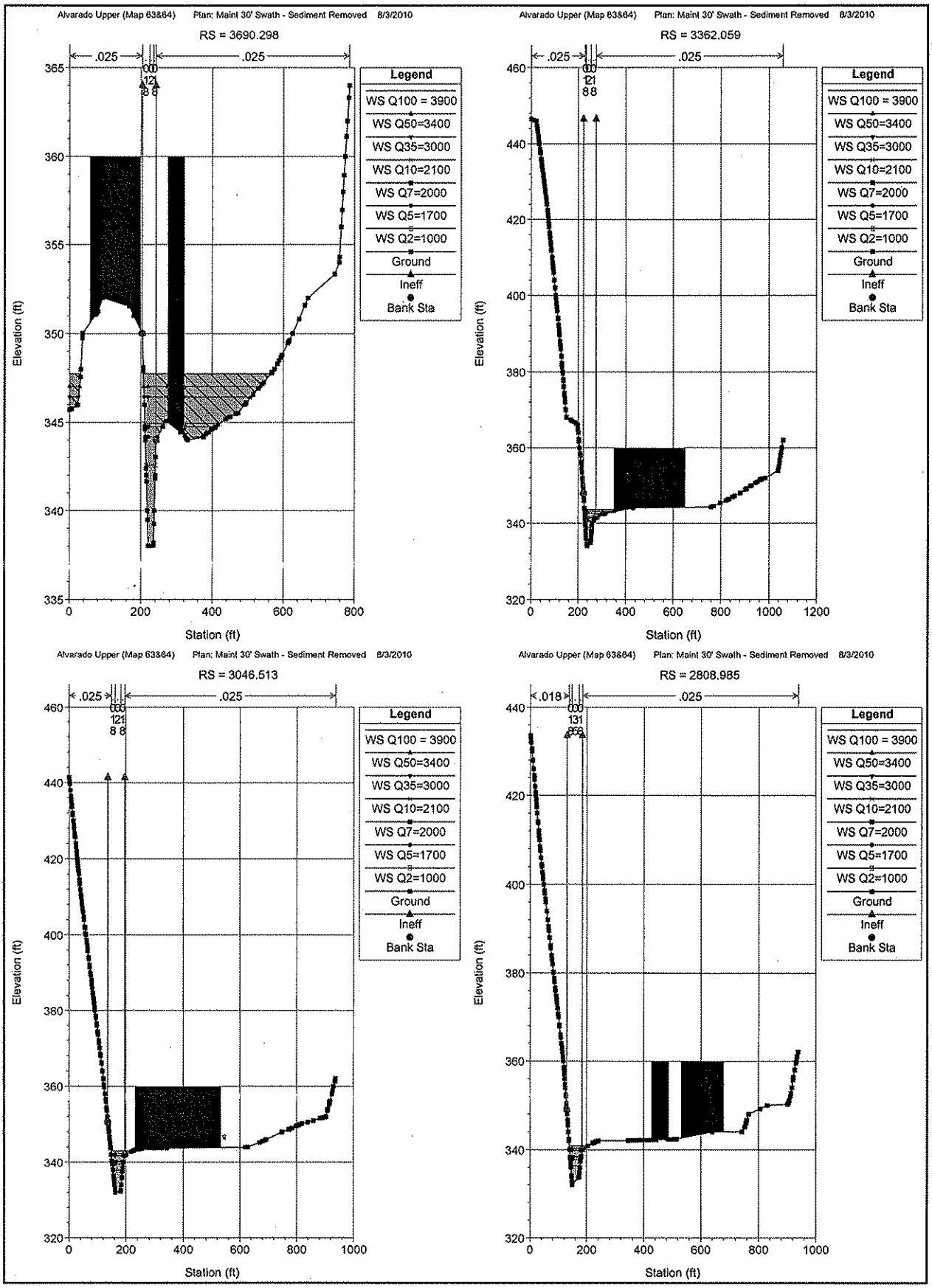
.018
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3918.558
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3881.736
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3870.768
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3690.298
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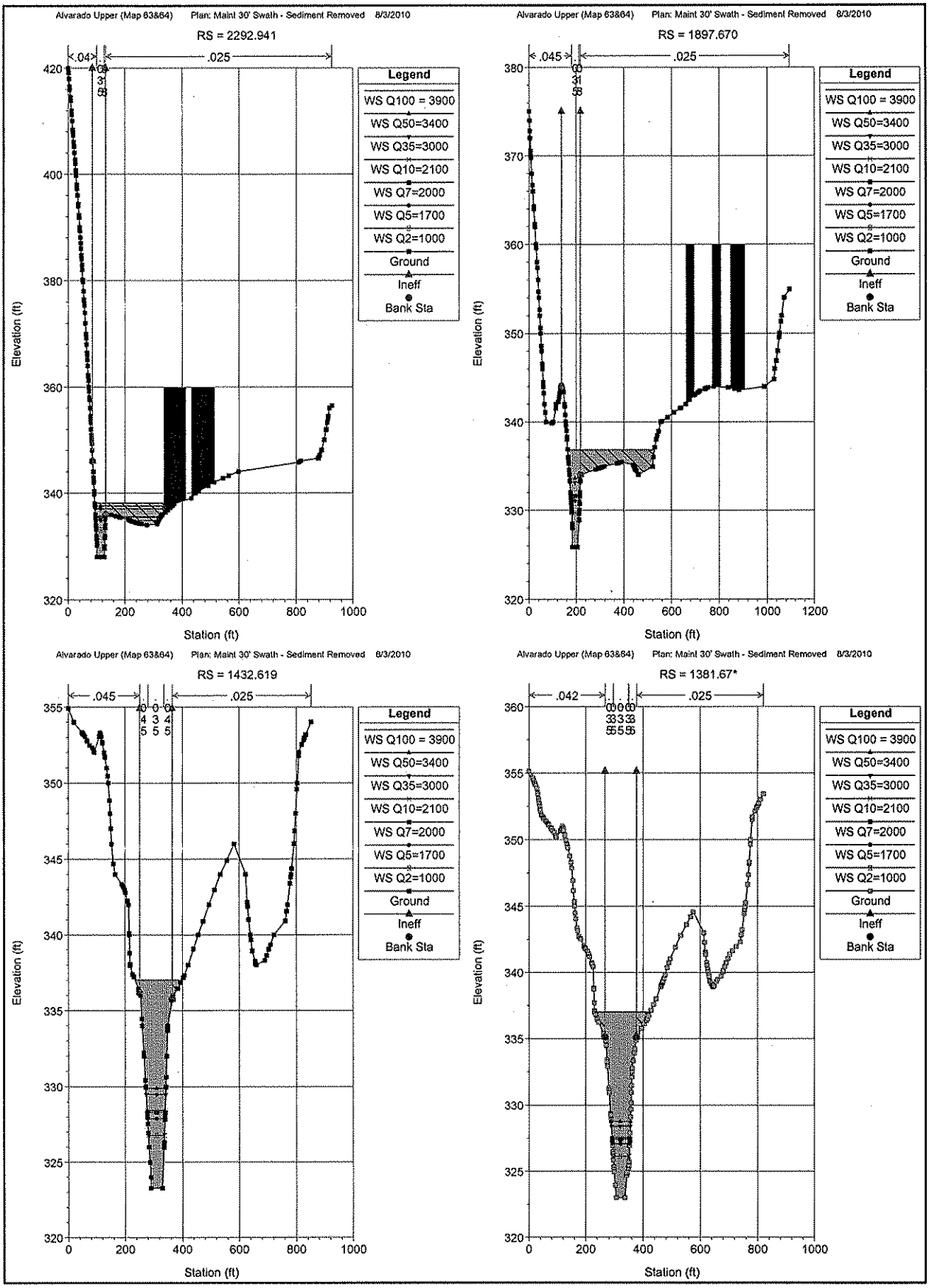
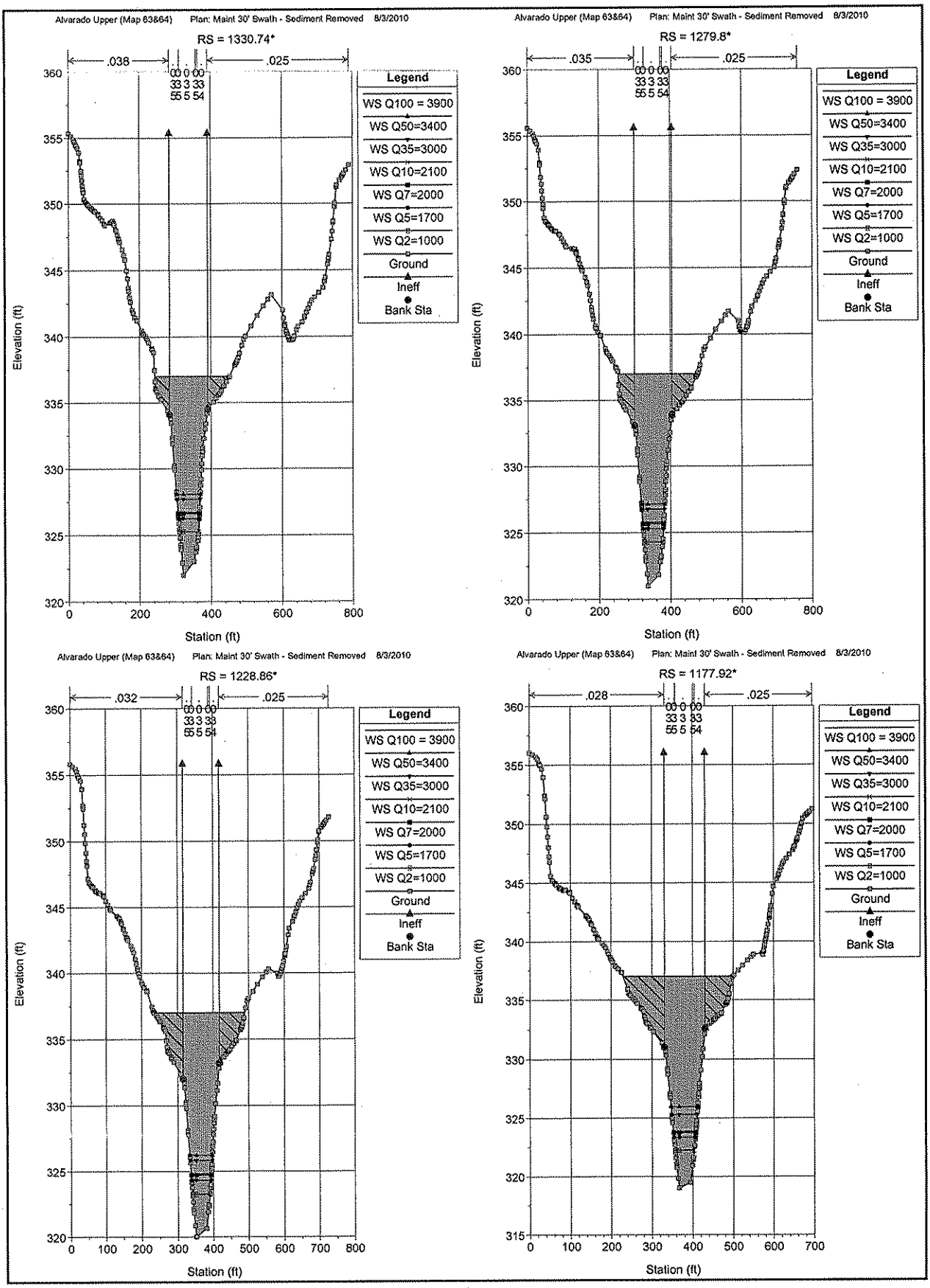
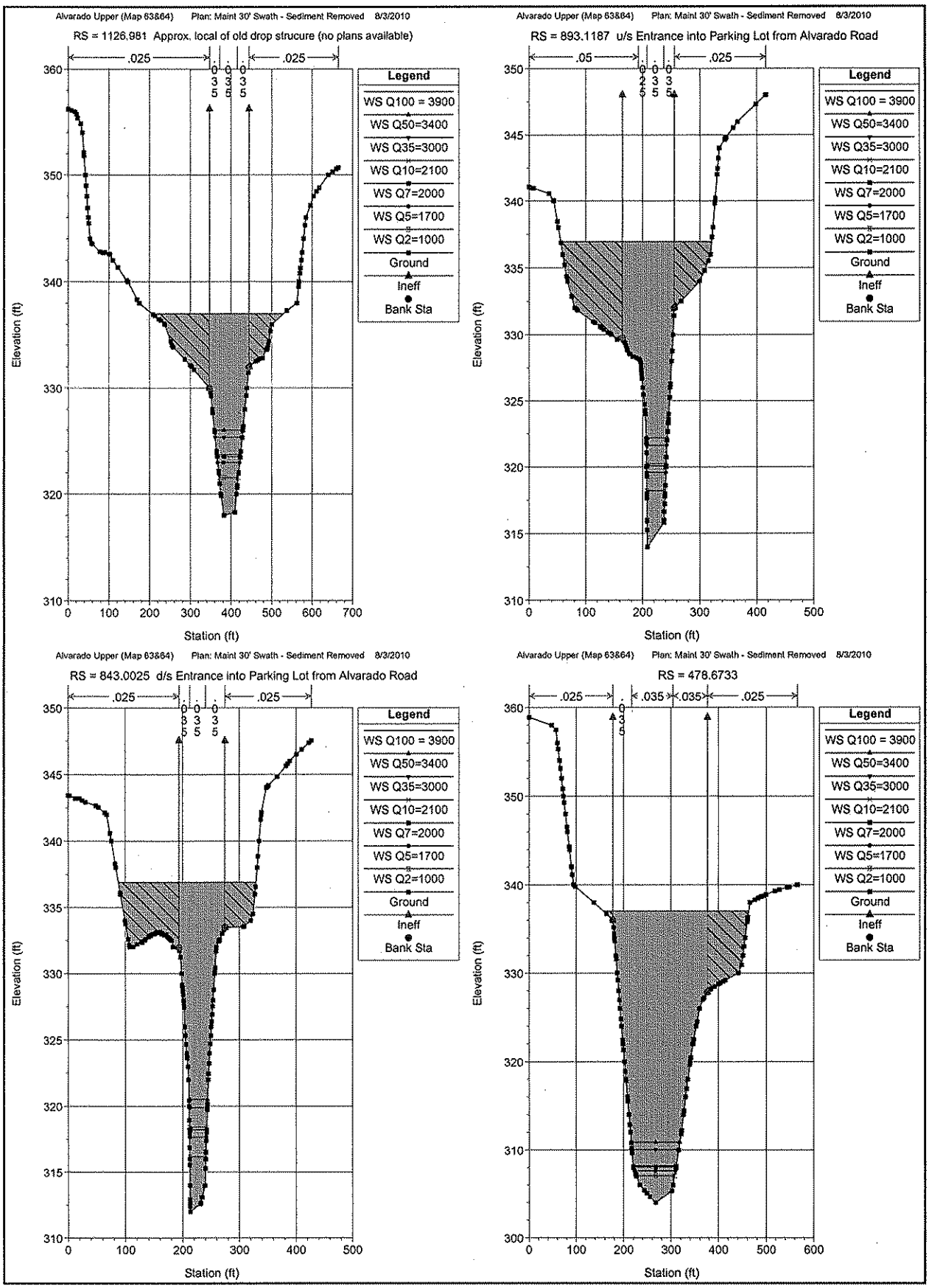
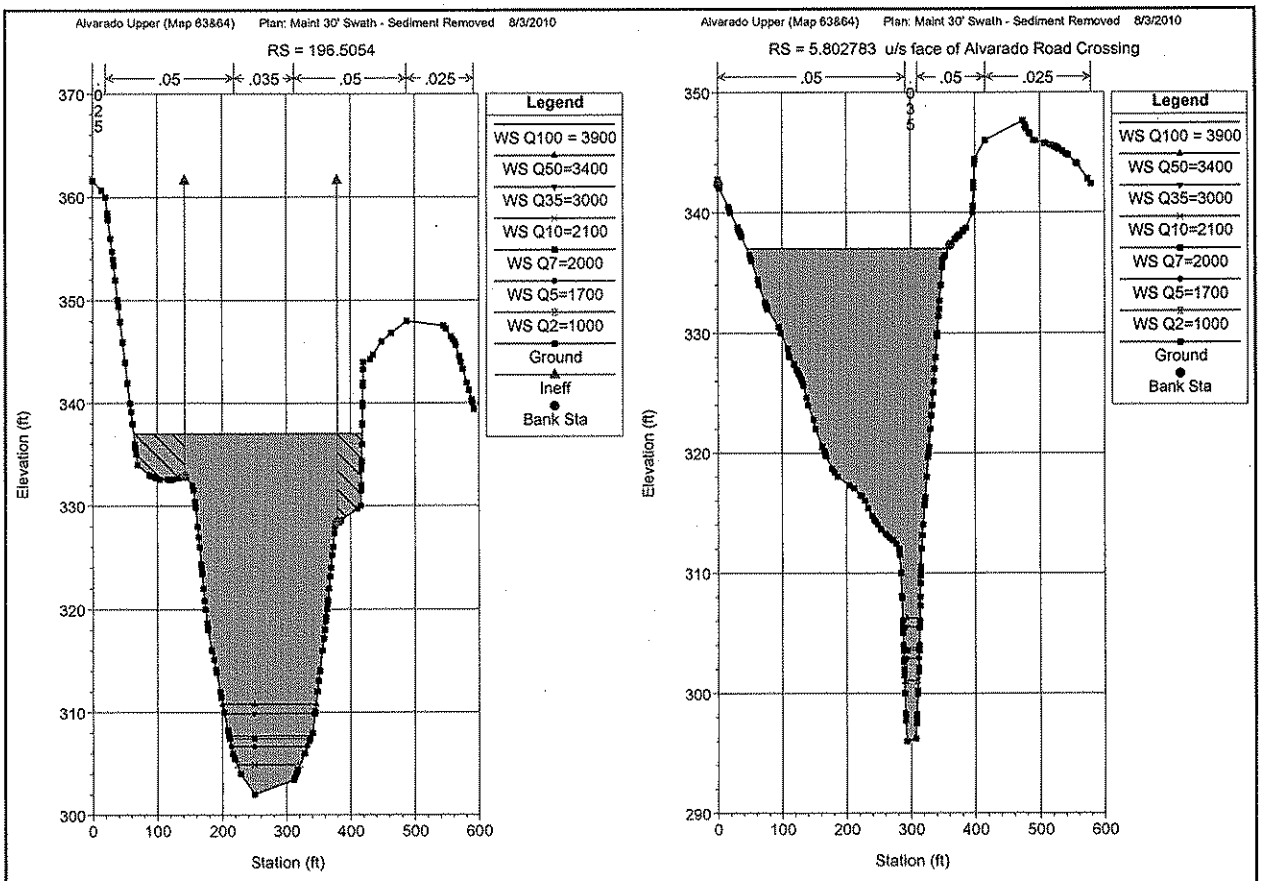
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3362.059
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 3046.513
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 2808.985
.018
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 2292.941
.04
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1897.670
.045
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1432.619
.045
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1381.67*
.042
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1330.74*
.038
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1279.8*
.035
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1228.86*
.032
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1177.92*
.028
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 1126.981 Approx. local of old drop strucure (no plans available)
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 893.1187 u/s Entrance into Parking Lot from Alvarado Road
.05
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 843.0025 d/s Entrance into Parking Lot from Alvarado Road
.025
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Alvarado Upper (Map 63&64) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 478.6733
.025
.035
.035
.025
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Alvarado Upper (Map 63864) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 196.5054
.05
.035
.05
.025
Elevation (ft)
Station (ft)
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Ineff
Bank Sta
Alvarado Upper (Map 63864) Plan: Maint 30' Swath - Sediment Removed 8/3/2010
RS = 5.802783 u/s face of Alvarado Road Crossing
.05
.05
.025
Elevation (ft)
Station (ft)
Legend
WS Q100 = 3900
WS Q50=3400
WS Q35=3000
WS Q10=2100
WS Q7=2000
WS Q5=1700
WS Q2=1000
Ground
Bank Sta

HEC-RAS Version 4.0.0 March 2008
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PROJECT DATA
Project Title: Alvarado Upper (Map 63&64)
Project File : Alvarado6364.prj
Run Date and Time: 8/3/2010 2:37:55 PM

Project in English units

Project Description:
City Stormwater Maintenance (First Year)
Alvarado Canyon Creek (Upper)
Helix
Map Number 63 & 64
October 17, 2009 J-15541A

PLAN DATA

Plan Title: Maint 30' Swath - Sediment Removed
Plan File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.p08

Geometry Title: Maint 30' Swath - Sediment Removed
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g07

Flow Title : FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Plan Description:
Geometry is from TIN
Flow Data is from DRAFT FIS (no date at this time)

Plan Summary Information:
Number of: Cross Sections = 22 Multiple Openings = 0
Culverts = 0 Inline Structures = 0

Bridges = 0 Lateral Structures = 0

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

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: FEMAQ and WSE
Flow File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.f02

Flow Data (cfs)

River	Reach	RS	Q100 = 3900	Q50=3400	Q35=3000	Q10=2100	Q7=2000	Q5=1700	2330	800
Avarado Ck	Upper	3975.018	3900	3400	3000	2100	2000	1700	2330	800

River	Reach	RS	Q2=1000	555
Avarado Ck	Upper	3975.018	1000	555

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Avarado Ck	Upper	Q100 = 3900		
			Known WS = 337	
Avarado Ck	Upper	Q50=3400		
			Normal S = 0.03	
Avarado Ck	Upper	Q35=3000		
			Normal S = 0.03	
Avarado Ck	Upper	Q10=2100		
			Normal S = 0.03	
Avarado Ck	Upper	Q7=2000		
			Normal S = 0.03	
Avarado Ck	Upper	Q5=1700		
			Normal S = 0.03	

GEOMETRY DATA

Geometry Title: Maint 30' Swath - Sediment Removed
Geometry File : w:\15541-A\AlvaradoCreek\HECRAS\UpperReach\Alvarado6364.g07

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 3975.018

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.66	54.55	352	168.06	352.55	169.75	352.62	174.25	352.81
186.4	353.2	196.62	353.69	203.07	354	216.59	354.69	229	355.32
244.96	356	313.71	355.2	321.79	354.85	340	354	340.76	353.95
340.92	353.94	341.22	353.92	350.36	353.29	359.4	352.68	368.34	352
368.63	351.95	369.6	351.82	377.54	350.68	379.23	350.46	382.41	350
385.23	348.13	385.42	348	385.58	347.89	388.06	346	389.7	344.66
390.46	344	390.99	343.53	392.73	342	394.26	340.86	394.64	340.91
395.4	340.47	397	340.44	400.41	340.39	403.98	340.64	414.41	341.66
415.6	341.75	416.29	341.81	416.76	341.84	417.94	342	418.25	342.52
419.07	343.94	419.1	344	419.12	344.02	420.38	346	420.56	346.28
421.71	348	422.75	348.06	431.94	348.64	454.83	350	478.38	350.41
499.51	351.3	503.88	351.51	504.44	351.53	504.87	351.54	505.16	351.55
515.48	352	567.91	353.08	587.99	353.98	588.51	354	588.66	354.05
595.5	356	600.77	357.01	602.99	357.43	603.15	357.45	603.3	357.48
605.48	358	609.26	358.92	613.68	360	616.49	360.83	620.64	362
623.06	362.78	626.85	364						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	244.96	.018	397	.02	418.25	.018	454.83	.025

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

```
       377.54  454.83             56.06   56.46   57.46              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  377.54                F
  454.83  626.85                F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0   71.99     365   97.43  152.37     365   224.1  297.99     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3918.558

INPUT
Description:
Station Elevation Data    num=      66
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  350.89    45.61      352   179.04   353.17   180.56   353.23   193.04
353.58
  197.76  353.78   203.01      354   230.15   355.16   237.25   355.42   250.67
356
   294.4  355.68   314.27   354.58   324.48      354   341.01   352.75   350.82
352
  352.57  350.58   353.44      350   354.29   349.11   355.36      348   357.25
346.02
  357.27     346   357.33   345.94   359.19      344   359.68   343.53    361.3
342
   361.7  341.63   363.62      340  365.91340.1096   388.28   341.18   388.59
342
  389.03  343.17   389.11   343.38   389.34      344   389.62   344.72   390.14
346
   390.5  346.84      391   347.66   391.19      348   392.09   349.49   392.37
350
  393.96  350.46   398.11   351.25   399.59   351.32    400.7   351.38    402.6
351.24
  403.71  351.29   432.41   350.39   438.19      350   526.18   351.95   526.68
351.96
  526.98  351.97   527.72      352   599.34    353.8   606.95      354   614.22
355.8
  615.03     356   615.89   356.21   620.14   357.22   623.29      358   630.16
359.69
   631.4     360   634.28   360.79    638.7      362   640.01   362.42   642.45
363.24
  644.88     364

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   341.01    .018   365.91     .02   388.28    .018   399.59
.025

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

```
       350.82  399.59             36.89   36.82   36.86              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  350.82               F
  399.59  644.88               F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev    Sta L   Sta R    Elev    Sta L   Sta R    Elev
       0   54.03     365    109.3  165.48     365   212.28  335.49     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3881.736

INPUT
Description:
Station Elevation Data    num=       79
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  350.48     6.07  350.87    10.29  351.15    12.92  351.31    40.92
352
     199  353.76   206.08  353.91   206.69  353.92   210.21     354   222.24
354.44
   233.9  354.94   251.37  355.63   258.69     356   271.86  355.88    296.8
354
  309.56  353.29   328.41     352   330.64  350.21   330.92     350   331.62
349.42
  333.32     348   334.54  346.94   335.46     346   336.53  344.91   337.43
344
  339.15  342.25    339.4     342   339.49  341.91   341.37     340
342.76340.0032
  363.11  340.05   363.14  340.12   363.24  340.37   363.78     342   363.88
342.31
  364.44     344   364.68  344.67   365.18     346   365.75  347.47   365.95
348
  366.13  348.45   366.76     350   366.98   350.5   367.69     352   385.02
351.97
  389.85  351.73   401.73   351.1   404.62  351.04    406.3     351   410.61
350.92
  415.48  350.84   419.61  350.67   421.56  350.62   423.52  350.58   428.95
350.5
  436.77  350.38   437.79  350.35   443.09     350   507.58  351.01   517.23
351.31
  523.05   351.5   531.06  351.78   532.85  351.84   538.19     352   589.11
353.29
  615.46  353.99   615.84     354    616.1  354.06   623.91     356   627.56
356.9
  632.01     358   632.22  358.05   632.33  358.08   639.85     360   640.33
360.14
  645.87  361.67   647.07     362   648.51  362.43   653.47     364

Manning's n Values        num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
```

```
       0     .025  328.41     .018  342.76      .02  363.11     .018  367.69
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        328.41  367.69            11.11   10.97   10.38             .1
.3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
       0  328.41               F
  367.69  653.47               F
Blocked Obstructions      num=       3
   Sta L   Sta R    Elev    Sta L   Sta R    Elev    Sta L   Sta R    Elev
       0   40.99     365   118.74  175.55     365   195.2  297.51     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3870.768

INPUT
Description:
Station Elevation Data    num=       93
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  351.72      .69      352  176.77  353.23  181.76  353.33  186.43
353.41
   197.1  353.65  213.03      354  234.28  354.85  240.42  355.16  245.89
355.43
  246.64  355.46  267.28      354  272.64  353.82  272.67 353.819  275.67
353.67
  305.95     352  306.57  351.54  308.04  350.43   308.6     350  309.85
349.05
  311.24     348  311.77  347.59  313.71     346  315.77  344.21  316.02
344
  316.21  343.83  318.18     342   318.6   341.6  320.17     340  321.64
340.147
  338.64 341.841  340.04  341.98  340.05     342  340.07  342.06  340.77
344
  341.44  345.88  341.48  345.99  341.49  346.01   342.6     348  343.42
349.05
  344.21     350  346.01  351.74  346.27     352  348.08  351.23  349.08
351.56
  350.42  351.36  354.74   351.7  355.64  351.67  359.27  351.55  363.01
351.43
  364.73  351.37  366.08  351.33  368.29   351.2   389.9  350.16  397.33
350.39
  404.15  350.27  404.59  350.26  412.11  350.12  418.82     350  420.14
349.98
  426.27   349.9  433.22   349.8  434.21  349.82  453.99     350  481.77
350.11
   497.7  350.62  501.02  350.74  511.44  351.09  518.78  351.31  530.89
351.71
  538.75     352  551.73  352.35  558.84  352.54  576.49  353.03  589.82
353.37
```

```
  608.45  353.74  611.81  353.89  614.18     354  614.26  354.01  614.32
354.03
  615.95  354.47   620.3  355.57  621.91     356  626.05  357.06  629.47
358
  631.85  358.62  636.85     360  637.98  360.31  644.01     362  644.38
362.1
   644.9  362.25  649.64  363.57  651.05     364

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   305.95    .018   318.6     .02   338.64    .018   346.01
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        305.95  346.01           179.97  180.47  180.91              .1
.3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  305.95               F
  346.01  651.05               F
Blocked Obstructions      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
       0    9.75     365  121.57  277.04     365

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3690.298

INPUT
Description:
Station Elevation Data     num=       90
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   345.71     3.53   345.75     5.97   345.77    20.93   345.96     23.5
346
    30.97   347.56    32.17      348    35.83   349.75    36.38      350    73.85
351.06
    76.35   351.12    80.39   351.24    93.24      352   167.58   351.52   180.07
350.99
   203.46      350   206.33   348.11   206.49      348    206.6   347.92    209.4
346
    211.3   344.63   212.19      344   214.44   342.39   214.98      342   215.47
341.65
   217.78      340   218.52   339.47   220.56      338  223.923 38.0069   235.27
338.03
   235.44   338.18    236.7   339.26   237.56      340   239.68   341.82   239.89
342
   241.12   343.04   242.24      344   270.01   345.07   310.29   344.45   322.56
344.28
   326.36    344.1   330.94      344   375.39   344.17   382.11   344.34   386.03
344.44
   387.03   344.43   390.42   344.44   396.81   344.59   400.84   344.63   407.01
344.7
```

```
  416.13  344.88  438.84  345.18   448.8   345.3  450.55  345.31  465.65
345.48
  468.22  345.49  472.87  345.52  491.47     346  494.34  346.07  495.53
346.1
  515.92  346.57  530.49  346.92  540.57  347.15  545.75  347.26  566.83
347.78
  569.21  347.84  575.67     348  583.79   348.3  588.52  348.49  592.91
348.66
  596.44   348.8  613.02  349.46  615.24  349.55  616.85  349.62  626.37
350
  644.26  350.81  661.23   351.6  669.77     352  744.72  353.34   757.4
354
  758.19   354.3  762.72     356  765.36  356.97  768.25     358  770.91
358.93
  774.03     360  777.36  361.13   779.9     362  783.91  363.32  785.95
364

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  203.46    .018  223.92     .02  235.27    .018  242.24
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       203.46  242.24           344.53  328.24  316.06             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  203.46               F
  242.24  785.95               F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
     275  321.35     360   57.06  198.78     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 3362.059

INPUT
Description:
Station Elevation Data    num=     187
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  446.54   10.14  446.29   20.91     446   24.19   444.7   25.61
444
   27.19  443.21   29.68     442   30.85  441.42   33.27  440.27   33.66
440.07
   33.81     440   36.64  438.61   37.91     438   38.67  437.63   42.05
436
   42.49  435.79   43.46  435.33   45.38   434.4   46.24     434   48.24
433.04
   50.46     432   51.07  431.71   52.21  431.18   54.08  430.27   54.64
430
```

57.03 428.84 58.76 428 59.55 427.62 60.36 427.22 62.58
426
64.09 425.13 66.11 424 68.65 422.51 69.49 422 70.86
421.16
72.75 420 73.27 419.67 74.6 418.83 75.91 418 78.23
416.53
79.06 416 80.3 415.22 82.22 414 83.08 413.46 85.03
412.22
85.27 412.07 85.38 412 85.58 411.87 88.54 410 90.63
408.68
91.7 408 92.99 407.18 94.86 406 97.97 404.03 98.02
404
101.08 402.03 101.11 402.01 101.13 402 101.2 401.96 104.22
400
105.29 399.3 107.26 398 109.04 396.82 110.28 396 113.2
394.05
113.28 394 113.32 393.98 113.51 393.85 115.98 392.19 116.26
392
117.51 391.16 119.23 390 119.73 389.67 122.21 388 123.85
386.85
125.08 386 127.54 384.11 127.67 384 130 382.21 130.28
382
131.19 381.3 132.89 380 133.44 379.58 135.54 378 135.6
377.96
136.13 377.56 138 376.16 138.21 376 140.41 374.38 140.92
374
142.28 373 143.63 372 146.21 370.09 146.35 370 146.39
369.97
149.39 368 167.44 367.39 173.88 367.1 183.82 366.76 190.8
366.38
197.44 366 198.93 364.92 200.18 364 202.56 362.3 202.97
362
203.33 361.74 205.83 360 208.02 358.47 208.7 358 211.37
356.14
211.57 356 213.46 354.69 214.45 354 215.2 353.47 217.32
352
218.52 351.16 220.19 350 221.67 348.86 222.79 348 223.55
347.15
224.57 346 226.32 344.03 226.34 344 226.44 343.89 228.12
342
229.22 340.76 229.89 340 230.44 339.38 231.72 338 232.63
337.01
233.63 336 233.78 335.91 236.2 334.56 237.12 334 252.9
334.87
253.61 335.49 254.18 336 255.55 337.21 256.43 338 257.85
339.26
258.68 340 266.68 340.85 274.32 341.65 277.87 342 284.94
342.14
302.27 342.45 306.07 342.51 309.61 342.52 431.19 344 758.76
344.35
768.31 344.6 797.19 345.41 821.62 346 830 346.31 831.03
346.34
833.5 346.43 847.74 346.96 856.58 347.25 879.57 348 880.41
348.03
880.72 348.04 881.24 348.07 901.94 348.95 906.43 349.16 921.76
349.83

```
  923.27   349.9  925.42     350  942.25  350.68  949.16  350.95  960.33
351.4
  963.86  351.55  965.66  351.58  967.08  351.64  969.78  351.75  971.07
351.79
  984.45     352 1038.39  353.93 1038.73     354 1041.06  354.92 1043.88
356
 1045.68  356.71 1048.94     358 1050.91  358.78 1053.99     360 1059.87
361.95
 1059.99  361.99 1060.03     362

Manning's n Values          num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .025  228.12    .018  233.78     .02  253.61    .018  274.32
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        222.79  274.32            323.3  315.55  308.79              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  222.79               F
  274.32 1060.03               F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  350.42  649.42     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 3046.513

INPUT
Description:
Station Elevation Data     num=     182
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0   441.38     1.65   440.18     1.89      440     2.26   439.73     4.62
438
     6.7   436.48     7.36      436      8.5   435.16    10.09      434    10.57
433.65
   12.82      432    13.42   431.56    15.56      430    17.26   428.76    18.29
428
   20.08   426.69    21.03      426    21.34   425.77    23.76      424    24.83
423.22
    26.5      422    27.68   421.13    29.23      420    30.54   419.04    31.97
418
   33.39   416.96     34.7      416    36.66   414.57    37.43      414    38.34
413.34
   40.17      412    41.97   410.69     42.9      410    44.71   408.84    46.04
408
   47.74   406.95    49.28      406    51.46   404.66    52.53      404    55.65
402.08
   55.78      402    56.21   401.73    58.56   400.29    59.03      400    61.34
398.58
```

```
   62.29     398   62.38  397.94   63.73  397.12   65.44  396.06   65.55
396
      66  395.72   68.81     394    69.5  393.58   72.08     392   73.03
391.42
   75.35     390   76.54  389.27   78.62     388   80.04  387.13   81.89
386
   84.06  384.67   85.16     384   86.41  383.24   88.44     382   90.48
380.76
   91.72     380   93.93  378.65      95     378   97.38  376.55   98.28
376
   100.9   374.4  101.56     374  102.26  373.57  104.84     372  105.98
371.3
  108.12     370  110.66  368.46  111.41     368  114.45  366.15   114.7
366
  117.91  364.04  117.98     364  118.05  363.96   121.2     362  121.22
361.99
  121.34   361.9   123.3  360.47  123.95     360  124.33  359.72  126.69
358
   128.6  356.62  129.44     356   131.8  354.28  132.19     354  132.86
353.52
  134.94     352  136.83  350.63   137.7     350   139.3  348.84  140.46
348
  142.24  346.71  143.23     346   144.6  345.01     146     344  146.37
343.73
  148.77     342  150.97  340.41  151.55     340  152.21  339.52  154.32
338
  156.46  336.46   157.1     336  157.84  335.47  158.82  334.77  159.88
334
  161.68  333.02  163.38     332  181.72  332.23  181.93  332.42  182.16
332.61
  183.79     334  185.96  335.84  186.15     336  187.92   337.5  188.51
338
  189.01  338.46  190.75     340  196.48  341.99  196.52     342  219.42
342.83
  228.12  343.15  232.61  343.32  245.18   343.4  249.52  343.53  252.86
343.63
  255.39   343.7  264.28  343.83  281.18  343.76  295.78   343.7  309.77
343.77
  324.93  343.72  342.77  343.67  618.57  343.93  628.31     344  669.36
345.21
  680.15  345.54  689.98  345.88  691.38  345.92  692.91  345.96  693.63
346
  747.86  347.89  748.45  347.91  748.79  347.92   749.9     348  772.09
348.57
  776.41  348.74  784.94  349.02  798.19   349.5   802.2  349.65  805.77
349.77
  812.25     350  818.51   350.2  839.73  350.56  858.41  350.94  883.51
351.54
  888.56  351.65  890.61  351.69  899.49  351.84  903.12     352  908.37
353.53
  909.21  353.73  910.24     354  914.52  355.26  915.46  355.54  916.35
355.8
  917.05     356  917.51  356.13     924     358  926.64  358.81  930.52
360
  934.83  361.33  937.02     362

Manning's n Values         num=       5
```

```
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .025   148.77     .018   161.68      .02   182.16     .018   196.48
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
         136.83   196.48            240.61   237.53   235.74              .1
.3
Ineffective Flow      num=         2
   Sta L    Sta R     Elev   Permanent
       0   136.83                 F
  196.48   937.02                 F
Blocked Obstructions      num=         1
   Sta L    Sta R     Elev
  232.03   534.15      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 2808.985

INPUT
Description:
Station Elevation Data     num=      166
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   433.56      .91   432.99     2.45      432     4.61   430.58     5.49
430
    8.37   428.05     8.45      428     8.51   427.96     11.2      426    13.39
424.38
    13.9      424     14.4   423.62    16.57      422    18.29    420.7    19.22
420
   20.43   419.08    21.83      418    22.65   417.37    24.42      416     26.9
414.09
   27.01      414    27.25   413.82     29.6      412    30.93   410.98    32.19
410
   34.27    408.4    34.79      408    35.27   407.62    37.38      406    39.74
404.46
   40.46      404     42.6   402.78    43.95      402    45.26   401.25    47.44
400
   49.89    398.6    50.93      398    53.08   396.77    54.41      396     57.9
394
   57.93   393.98    61.39      392    64.13   390.43    64.88      390    65.68
389.54
   68.37      388    71.48   386.21    71.86      386    72.47   385.65    75.35
384
   76.94   383.09    78.84      382       82   380.19    82.32      380    84.45
378.78
   85.81      378    88.27   376.59    89.29      376    91.35   374.82    92.78
374
   94.32   373.11    96.26      372    98.55   370.68    99.74      370   102.85
368.21
  103.21      368   103.47   367.85   106.69      366   107.94   365.28   110.16
364
```

```
   111.9      363   113.64      362   115.55    360.9   117.11      360   118.88
358.56
  119.57      358   120.51   357.16   121.79      356   123.11   354.82   124.02
354
  125.82   352.38   126.24      352   128.08   350.35   128.47      350   129.47
349.1
  130.69      348   132.19   346.66   132.92      346   133.52   345.47   135.15
344
  136.86   342.47   137.39      342   139.59   340.03   139.62   340.01   139.63
340
  139.64   339.99   141.87      338   143.15   336.86   144.11      336   146.18
334.16
  146.36      334   147.63   332.88   147.74   332.78   148.61      332   171.18
333.693
  173.54   333.87   173.71      334   174.92   334.97    176.2      336   177.85
337.36
  178.63      338   180.37    338.6   183.91      340   204.05   340.84    220.8
341.48
  223.19   341.56   224.98   341.61   226.38   341.66   230.53   341.78   231.59
341.81
  232.58   341.84   238.45   341.95   241.64      342   345.14    342.1   353.05
342.11
   364.5   342.13   374.22   342.15   375.34   342.14   387.76   342.16   397.36
342.17
  404.24   342.18   408.46   342.19   416.48    342.2   428.16   342.22   443.31
342.24
  485.66   342.33   497.31   342.35   503.12   342.36   507.71   342.39   507.93
342.4
  509.37   342.41    511.1   342.42   513.15   342.44   514.72   342.45   640.38
344
  743.14   344.08   752.59   345.12   756.86      346   759.82   346.64    766.1
348
  804.74   349.19   830.08      350   903.05   350.24   905.01   350.63   907.37
351.1
  912.05      352   913.64    352.7   916.54      354   920.63   355.78   921.16
356
  921.92   356.29   926.64      358   931.03   359.58   932.27      360    935.2
361
  938.12      362

Manning's n Values          num=        5
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
       0     .018   137.39     .018   147.63     .035   171.18     .018   183.91
.025

Bank Sta: Left    Right     Lengths: Left Channel    Right      Coeff Contr.
Expan.
        129.47   183.91           519.53   516.04   514.95              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0   129.47                  F
  183.91   938.12                  F
Blocked Obstructions      num=        2
   Sta L    Sta R     Elev    Sta L    Sta R     Elev
     531   680.76      360    427.1   487.82      360
```

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 2292.941

INPUT
Description:
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	420	1.71	419.13	3.22	418	5.21	416.53	5.92	416
7.92	414.52	8.61	414	8.8	413.86	11.29	412	12.33	411.23
13.97	410	16.15	408.37	16.65	408	17.59	407.3	19.32	406
20.39	405.2	21.99	404	23.78	402.66	24.66	402	26.35	400.73
27.31	400	27.67	399.73	29.95	398	30.97	397.22	32.59	396
34.76	394.35	35.22	394	37.41	392.22	37.68	392	37.86	391.83
39.92	390	40.63	389.37	42.17	388	43.31	386.99	44.42	386
45.85	384.73	46.66	384	47.84	382.95	48.91	382	50.93	380.2
51.15	380	51.41	379.76	53.39	378	55.09	376.48	55.62	376
56.33	375.37	57.86	374	60.08	372.02	60.09	372	60.1	371.99
62.23	370	63.05	369.22	64.34	368	65.95	366.45	66.41	366
67.34	365.08	68.41	364	70.18	362.23	70.41	362	71.2	361.21
72.39	360	73.19	359.18	74.36	358	74.78	357.57	76.32	356
77.82	354.47	78.28	354	78.92	353.34	80.22	352	81.35	350.84
82.17	350	82.82	349.32	84.1	348	86	346.03	86.02	346
86.05	345.97	87.92	344	88.99	342.87	89.8	342	91.38	340.32
91.68	340	91.91	339.76	93.56	338	94.02	337.5	95.43	336
96.44	334.92	97.29	334	98.07	333.17	99.16	332	99.73	331.39
100.54	330.52	100.87	330.16	101.02	328	111.2	328	116.9	328
127.23	328	127.84	329.66	128.08	330	129.12	331.57	129.42	332
130.42	333.5	130.77	334	131.73	335.44	132.12	336	146.63	335.88
151.77	335.91	152.42	335.9	166.66	335.68	168.69	335.64	180.39	335.44

```
  183.48  335.39  212.35  334.98  216.01  334.89  220.32  334.78  225.53
334.65
  230.05  334.59  234.72  334.53  239.35  334.42  242.63  334.39  247.74
334.31
  248.01   334.3   253.7  334.26  259.16  334.22  277.03     334  312.77
334.21
  314.04  334.33  316.53  334.64  318.99  334.93  321.02  335.16  329.71
335.83
  330.22  335.88  330.47  335.91  331.97     336  341.96  336.37  349.34
336.76
  357.03  337.15  360.29  337.37  365.52  337.52   366.9  337.63     368
337.71
  368.92  337.76  373.25     338  432.96  339.01  448.76     340  458.82
340.32
  491.34  341.34  513.06     342  544.49  342.78  563.66  343.26  598.15
344
  808.65  345.76  810.45  345.77  816.29     346  877.95  346.51  878.74
346.59
  879.53  346.73  881.53  346.95  882.54  347.12  888.48     348  890.22
348.1
   898.3     350  905.34  351.91  905.68     352  909.62  353.27  911.72
354
  912.89  354.45  916.98     356  926.01  356.42

Manning's n Values         num=        4
     Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val
       0      .04   100.54     .035   127.23     .018   132.12     .025

Bank Sta: Left    Right    Lengths: Left Channel    Right      Coeff Contr.
Expan.
            86   132.12            410.33   395.27   385.35              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
       0       86                 F
  132.12   926.01                 F
Blocked Obstructions      num=        2
   Sta L    Sta R     Elev    Sta L    Sta R     Elev
  433.05   515.24      360    336.6   413.18      360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1897.670

INPUT
Description:
Station Elevation Data     num=      155
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   375.06      1.5      374     3.11   372.85      4.3      372     6.33
370.55
     7.1      370     7.55   369.79    11.35      368    14.21    366.7    15.72
366
   19.52   364.27    20.12      364     23.9   362.28    24.52      362    24.63
361.95
```

28.93	360	29.87	359.58	33.36	358	34.75	357.36	37.56
356								
40	354.7	41.43	354	43.95	352.66	45.28	352	47.88
350.61								
49.11	350	51.79	348.58	52.94	348	55.68	346.54	56.76
346								
59.56	344.51	60.58	344	62.09	343.25	64.64	342	68.83
341.05								
73.08	340	94.71	339.87	98.75	339.89	102.49	340	113.39
341.51								
114.24	342	122.4	342.23	124.88	342.26	127.41	342.78	129.99
343.2								
131.34	343.51	137.82	344	138.79	344.11	139.23	344.16	140.86
344								
143.14	343.81	143.66	343.72	147.06	343.37	150.64	342	150.96
341.88								
151.36	341.72	153.81	340.79	155.86	340	156.96	339.58	158.44
339.01								
160.34	338.27	161.02	338	163.87	336.88	166.13	336	166.97
335.67								
167.91	335.3	169.86	334.54	171.23	334	173.09	333.27	176.16
332								
177.75	331.34	178.78	330.86	179.76	330.41	180.39	330	180.67
329.81								
182.7	328.44	183.35	328	184	325.84	205	325.84	212.15
328.86								
212.26	328.94	213.11	329.59	213.63	330	214.45	330.73	216
332								
217.37	333.26	218.15	334	281.89	334.6	291.52	334.69	294.54
334.72								
299.5	334.76	300.49	334.77	304.09	334.81	309.86	334.87	317.13
334.94								
371.4	335.28	376.63	335.32	384.58	335.4	387.54	335.42	388.98
335.44								
391.52	335.46	439.05	335.11	441.03	334.99	442.89	334.88	444.37
334.79								
445.18	334.74	446.08	334.68	447.07	334.62	448.18	334.57	450.14
334.59								
453.2	334.42	460.27	334.03	460.91	334	520.63	334.92	524.57
336								
529.48	337.11	534.66	338	539.55	338.45	544.97	338.91	554.54
340								
558.74	340.08	583.12	340.51	610.25	341.05	636.17	341.55	639.13
341.6								
659.54	342	675.97	342.47	694.81	343.02	699.45	343.14	709.92
343.3								
714.55	343.41	718.52	343.52	739.32	343.71	741.92	343.76	743.78
343.8								
752.4	343.9	775.83	344	837.31	343.9	864.6	343.73	883.59
343.61								
987.66	343.97	987.85	343.98	988.73	344	1030.28	344.84	1032.62
346								
1038.87	346.92	1045.1	348	1051.6	349.55	1053.43	350	1059.26
351.34								
1062.42	352	1072.59	353.99	1072.65	354	1072.82	354.01	1095.66
354.97								

```
Manning's n Values          num=        4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .045  180.67    .035  213.11    .018  218.15    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        137.82  218.15           469.57  465.05  461.75             .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  137.82               F
  218.15 1095.66               F
Blocked Obstructions      num=        3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  660.68   695.1     360  769.36  808.01     360  847.78  907.86     360

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1432.619

INPUT
Description:
Station Elevation Data     num=      141
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0    354.9   19.02   354.02   19.48      354   19.72   353.99   46.71
353.33
   47.47    353.3   49.15   353.27   50.37   353.24   54.53   353.16   58.29
353.05
   64.75   352.82   66.86   352.74   75.27   352.47   84.62   352.32   88.84
352.09
   89.18   352.11   90.76      352  108.71   353.03  109.25   353.09  111.15
353.31
  113.74    353.2  114.07   353.17  114.65   353.12   115.4   353.04  118.93
352.69
  119.69   352.62  125.83      352  127.94   351.78  128.86   351.68  135.28
351
  138.97   350.46  141.76      350  145.19   348.86   147.4      348  149.89
347.02
   152.5      346  159.12    344.7   165.1      344  187.92   343.35   192.1
343.25
   194.8   343.13  197.63   342.97  200.39   342.79  208.12   342.27  209.15
342.22
  212.11      342  214.19   340.09  214.28      340  215.83   338.79  216.76
338.07
  216.85      338  217.04   337.98  225.83   337.39   230.4   337.22  246.26
336.41
   251.6   336.16  253.84      336  258.54   334.45  259.92      334  265.29
332.22
  265.97      332  270.74   330.42  271.98      330  272.18   329.93   277.9
328
  279.21   327.55  281.05   326.93  283.79      326  287.35   324.99  290.43
324
   290.5   323.28     330   323.28  336.19   325.98  336.23      326  336.25
326.02
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  336.71  326.31   339.1  327.83  339.37     328  339.66  328.18  342.52
330
  343.53  330.64  345.66     332  348.32  333.69  348.77     334  364.84
335.75
  366.23   335.9  368.11     336  384.32  336.44   393.3  336.84  402.63
337.16
  406.41   337.3  419.79     338  439.23  339.05  457.12     340  473.52
340.89
  493.94     342  513.92  342.98  534.12     344  556.37  344.92   582.7
346
  622.44  344.01  622.46     344  628.46  342.15  628.97     342  629.54
341.87
  633.24  341.02  639.24     340  641.39  339.67  645.57  338.93  655.27
338.24
  656.06  338.14  656.43  338.11  656.69  338.09   656.9  338.07  659.82
338
  689.49  338.31   696.6  338.63  704.11  339.04  709.79  339.33  722.31
340
  762.36  340.92  766.54  341.55   766.8  341.57  769.87     342     778
343.4
  780.44  343.81  781.79     344  783.64  344.39  791.78     346  794.24
346.85
  797.54     348  802.12  349.59   803.3     350  808.59  351.78  809.21
352
  819.76  352.52  825.72  352.81     829  352.97  832.85  353.14  833.66
353.18
  851.54     354

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .045   251.6    .045  281.05    .035  336.25    .045  364.84
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
         251.6  364.84            48.87   50.94   52.85             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   251.6             F
  364.84  851.54             F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper              RS: 1381.67*

INPUT
Description:
Station Elevation Data    num=     244
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta
Elev
       0  355.13     6.43  354.87    12.88  354.62    16.02  354.46    18.35
354.32
```

20.22	354.22	20.71	354.2	20.97	354.18	24.08	354.07	27.44
353.87								
30	353.51	30.21	353.48	30.47	353.44	32.98	353.09	34.36
352.9								
35.77	352.71	37.33	352.5	38.62	352.32	39.4	352.21	41.51
351.93								
44.4	351.81	46.27	351.76	49.67	351.67	50.48	351.63	52.26
351.59								
53.56	351.56	57.98	351.45	60.35	351.38	61.98	351.34	66.18
351.21								
68.23	351.16	68.85	351.14	69.7	351.12	71.1	351.07	77.69
350.89								
78.27	350.87	79.04	350.85	79.28	350.84	80.04	350.81	84.83
350.66								
89.98	350.54	94.26	350.31	94.47	350.29	94.83	350.31	96.51
350.19								
110.89	350.67	113.35	350.76	115.6	350.82	116.17	350.86	118.19
351.02								
120.95	350.88	121.3	350.85	121.91	350.8	122.71	350.72	126.46
350.37								
127.27	350.3	130.71	349.97	133.8	349.68	134.5	349.61	136.04
349.47								
137.02	349.38	143.85	348.77	147.77	348.29	150.74	347.89	154.39
346.92								
156.74	346.18	159.39	345.35	160.42	345.02	162.16	344.48	164.8
344.06								
169.2	343.35	171.37	343.13	175.56	342.73	175.77	342.72	181.61
342.55								
182.49	342.51	193.74	341.99	195.9	341.88	198.4	341.8	199.82
341.76								
204.27	341.63	207.14	341.51	210.15	341.35	213.08	341.17	220.24
340.73								
221.3	340.67	222.4	340.62	225.55	340.41	227.76	338.8	227.85
338.72								
229.5	337.7	230.49	337.09	230.59	337.03	230.79	337.01	230.83
337.01								
232.06	336.93	234.2	336.8	238.38	336.54	240.14	336.43	245
336.24								
261.86	335.4	267.54	335.13	269.37	335	269.74	334.95	270.05
334.85								
271.14	334.49	274.37	333.4	274.8	333.25	275.73	332.95	275.77
332.93								
280.64	331.29	281.01	331.16	281.08	331.14	281.68	330.94	286.38
329.36								
286.47	329.32	286.63	329.27	287.6	328.93	287.8	328.87	291.88
327.47								
292.29	327.32	293.43	326.93	294.72	326.48	295.26	326.3	296.53
325.86								
298.03	325.34	298.71	325.12	299.23	324.95	302.73	323.96	305.76
323								
337.2	323	342.37	324.69	344.19	324.86	344.74	324.91	348.36
325.25								
350.24	325.42	350.27	325.44	350.29	325.46	350.74	325.72	352.71
326.91								
353.06	327.12	353.33	327.28	353.61	327.44	354.35	327.89	356.39
329.11								

```
  357.37   329.7  358.19   330.2  359.44  330.95   360.3  331.47  361.37
332.12
  362.02  332.51  362.46  332.79   366.2  333.35     370  333.92  372.09
334.23
  376.35  334.87  378.08  335.12  379.34  335.25  381.05  335.34  395.78
335.75
  403.95   336.1   411.5  336.36  412.43  336.39  415.86  336.51  420.31
336.73
  428.02  337.13  428.47  337.15  436.63  337.56   444.8  337.97  445.69
338.02
  461.95  338.92   464.4  339.06  467.04  339.19  468.21  339.26  469.61
339.35
  473.04  339.55  476.55   339.8  476.85  339.82  484.24  340.34  489.89
340.72
  495.41  341.02  513.57  341.88  531.93  342.79  552.15  343.61  566.38
344.19
  576.08  344.57   612.2     343  612.22  342.99  614.86  342.25  617.67
341.54
  618.13  341.43  618.65  341.34  622.01  340.73  623.57  340.53  626.02
340.23
  627.47  340.04  629.42  339.83  630.43  339.69  633.18  339.33  633.22
339.32
  637.17  339.18  641.32  339.04  642.04  339.01  642.75  338.95  643.09
338.93
  643.33  338.93  643.52  338.91  646.17  338.94  648.32  339.02  655.26
339.3
  659.48  339.46  673.14  339.71   679.6  340.03  681.54  340.14  686.42
340.43
  691.59  340.72  696.91  341.04  702.96  341.36  712.61  341.61  725.59
341.94
  739.36  342.29  743.16  342.83   743.4  342.85  746.19  343.22  753.58
344.42
   755.8  344.77  757.02  344.94   758.7  345.27   766.1  346.64  768.34
347.36
  770.97  348.22  771.34  348.33   775.5  349.67  776.57  350.01  781.38
351.51
  781.94  351.69  791.41  352.14  791.53  352.15  796.95   352.4  799.93
352.54
  803.43  352.69  804.16  352.73  810.59  353.01  820.41  353.45

Manning's n Values          num=        8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .042  267.54    .035  296.53    .035  298.03    .035  348.36
.035
  350.24    .035  378.08    .025  820.41    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        267.54  378.08            48.87   50.94   52.85              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent                    .
       0267.5383               F
  378.08  820.41               F

CROSS SECTION
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RIVER: Avarado Ck
REACH: Upper RS: 1330.74*

INPUT
Description:
Station Elevation Data num= 244

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.35	6.81	355.12	13.65	354.89	16.97	354.72	19.45	354.53
21.43	354.42	21.95	354.39	22.22	354.38	25.51	354.23	29.08	353.89
31.79	353.24	32.01	353.18	32.29	353.12	34.95	352.48	36.41	352.12
37.91	351.77	39.55	351.38	40.92	351.06	41.75	350.86	43.99	350.35
47.05	350.16	49.02	350.11	52.63	350	53.48	349.97	55.38	349.92
56.75	349.88	61.44	349.75	63.94	349.66	65.68	349.62	70.12	349.5
72.29	349.47	72.95	349.46	73.85	349.45	75.33	349.4	82.32	349.23
82.94	349.22	83.75	349.19	84.01	349.18	84.81	349.14	89.89	348.93
95.34	348.76	99.88	348.51	100.1	348.5	100.48	348.5	102.26	348.39
117.5	348.56	120.11	348.61	122.48	348.62	123.09	348.64	125.23	348.72
128.15	348.56	128.52	348.53	129.18	348.48	130.02	348.4	134	348.04
134.85	347.97	138.5	347.65	141.77	347.36	142.52	347.29	144.15	347.17
145.19	347.09	152.42	346.54	156.58	346.13	159.72	345.78	163.58	344.97
166.07	344.37	168.88	343.68	169.98	343.41	171.82	342.96	174.62	342.61
179.28	342	181.58	341.8	186.02	341.46	186.24	341.45	192.42	341.25
193.36	341.21	205.28	340.48	207.57	340.3	210.22	340.21	211.73	340.16
216.44	340.02	219.48	339.89	222.67	339.73	225.78	339.56	233.36	339.13
234.49	339.07	235.65	339.02	238.98	338.81	241.33	337.5	241.43	337.44
243.17	336.61	244.22	336.11	244.32	336.06	244.54	336.04	244.58	336.04
245.88	335.97	248.15	335.84	252.58	335.58	254.44	335.47	259.59	335.26
277.46	334.39	283.48	334.11	285.28	333.97	285.65	333.91	285.95	333.81
287.03	333.44	290.2	332.35	290.63	332.2	291.54	331.89	291.58	331.88
296.37	330.23	296.74	330.1	296.81	330.08	297.4	329.88	302.02	328.29

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  302.11  328.26  302.27   328.2  303.22  327.87  303.41   327.8  307.43
326.4
  307.84  326.26  308.95  325.87  310.22  325.42  310.76  325.23  312.01
324.8
  313.48  324.28  314.16  324.07  314.66  323.91  318.11  322.93  321.09
322
  351.62  323.03  356.64  323.75  358.41  324.01  358.94  324.09  362.46
324.6
  364.28  324.86  364.32  324.88  364.34   324.9  364.77  325.14  366.68
326.22
  367.03  326.41  367.28  326.55  367.56  326.71  368.27  327.11  370.25
328.23
  371.21  328.76  372.01  329.22  373.22   329.9  374.05  330.37   375.1
330.97
  375.73  331.32  376.15  331.58  379.79  332.28  383.48  332.99  385.51
333.39
  389.64  334.19  391.32   334.5  392.46  334.61  393.99  334.68  407.25
335.05
  414.59  335.36  421.39  335.59  422.22  335.62  425.31  335.72  429.31
335.9
  436.25  336.25  436.66  336.27     444  336.61  451.35  336.94  452.15
336.99
  466.78  337.85  468.98  337.98  471.36  338.08  472.41  338.16  473.67
338.24
  476.76  338.44  479.92  338.72  480.19  338.75  486.83  339.34  491.92
339.78
  496.88  340.03  513.22  340.79  529.74  341.57  547.93   342.3  560.73
342.81
  569.46  343.15  601.96  341.99  601.97  341.99  604.36   341.4  606.88
340.93
   607.3  340.86  607.76  340.81  610.79  340.44  612.19  340.34  614.39
340.18
  615.69  340.09  617.45  339.98  618.36  339.91  620.83  339.72  620.87
339.72
  624.42  339.75  628.16  339.78   628.8  339.78  629.45  339.76  629.75
339.76
  629.96  339.76  630.13  339.76  632.52  339.87  634.46  340.02   640.7
340.49
  644.49  340.77  656.78   341.1   662.6  341.43  664.35  341.54  668.74
341.83
  673.38  342.12  678.17  342.43  683.62  342.72   692.3  342.97  703.98
343.31
  716.37  343.66  719.79  344.12     720  344.13  722.51  344.44  729.16
345.44
  731.15  345.74  732.26  345.88  733.77  346.15  740.42  347.29  742.44
347.88
   744.8  348.57  745.13  348.67  748.88  349.75  749.84  350.03  754.17
351.23
  754.68  351.38  763.19  351.77   763.3  351.77  768.18  351.99  770.86
352.11
  774.01  352.24  774.67  352.27  780.45  352.52  789.29   352.9

Manning's n Values          num=        8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .038   283.48    .035   311.52    .035   311.83    .035   359.11
.035
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  364.09     .034  391.32     .025  789.29     .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        283.48  391.32            48.87   50.94   52.85             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0283.4767              F
  391.32  789.29              F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1279.8*

INPUT
Description:
Station Elevation Data    num=     244
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  355.58     7.19  355.37    14.42  355.17    17.93  354.98    20.54
354.75
   22.63  354.62    23.18  354.59    23.47  354.57    26.95  354.38    30.71
353.92
   33.58  352.97    33.81  352.89     34.1  352.79    36.91  351.86    38.46
351.34
   40.04  350.82    41.78  350.26    43.22  349.79     44.1  349.51    46.46
348.76
   49.69  348.52    51.78  348.46    55.59  348.34    56.49   348.3    58.49
348.24
   59.94  348.19    64.89  348.04    67.54  347.95    69.37  347.91    74.06
347.8
   76.36  347.79    77.06  347.78       78  347.77    79.57  347.74    86.95
347.58
    87.6  347.56    88.46  347.54    88.73  347.53    89.57  347.48    94.94
347.2
   100.7  346.98   105.49  346.72   105.72   346.7   106.13   346.7   108.01
346.58
   124.1  346.46   126.86  346.45   129.37  346.41   130.01  346.41   132.27
346.43
  135.36  346.24   135.75  346.21   136.44  346.15   137.33  346.08   141.53
345.72
  142.44  345.65   146.29  345.32   149.74  345.03   150.53  344.97   152.25
344.86
  153.35  344.79   160.99  344.31   165.38  343.96    168.7  343.67   172.78
343.03
  175.41  342.55   178.38  342.01   179.54  341.79   181.48  341.45   184.44
341.16
  189.36  340.64   191.79  340.47   196.48  340.19   196.72  340.18   203.24
339.96
  204.23  339.91   216.82  338.96   219.24  338.73   222.04  338.62   223.63
338.57
  228.61   338.4   231.82  338.27   235.19  338.11   238.47  337.94   246.48
337.53
```

247.67 337.47 248.9 337.41 252.42 337.22 254.9 336.21 255
336.16
256.85 335.51 257.95 335.13 258.06 335.09 258.29 335.08 258.34
335.07
259.71 335 262.1 334.88 266.79 334.62 268.75 334.51 274.19
334.28
293.06 333.37 299.42 333.08 301.19 332.94 301.55 332.86 301.84
332.76
302.91 332.4 306.03 331.3 306.45 331.15 307.35 330.84 307.39
330.83
312.1 329.17 312.46 329.04 312.53 329.02 313.11 328.82 317.66
327.23
317.75 327.19 317.9 327.14 318.84 326.8 319.03 326.74 322.98
325.34
323.38 325.19 324.48 324.8 325.73 324.35 326.25 324.17 327.48
323.73
328.94 323.21 329.6 323.01 330.1 322.86 333.49 321.89 336.42
321
366.04 321.84 370.91 322.81 372.63 323.16 373.15 323.26 376.56
323.95
378.33 324.3 378.36 324.32 378.38 324.33 378.8 324.55 380.66
325.53
380.99 325.7 381.24 325.83 381.5 325.97 382.2 326.33 384.12
327.34
385.05 327.83 385.82 328.24 387 328.86 387.81 329.28 388.82
329.82
389.43 330.14 389.85 330.37 393.37 331.21 396.95 332.07 398.92
332.54
402.93 333.5 404.56 333.88 405.57 333.96 406.94 334.02 418.71
334.36
425.24 334.62 431.28 334.82 432.02 334.84 434.76 334.93 438.32
335.08
444.48 335.38 444.84 335.39 451.37 335.66 457.9 335.91 458.61
335.95
471.6 336.77 473.56 336.89 475.68 336.97 476.61 337.05 477.73
337.13
480.47 337.33 483.28 337.65 483.52 337.68 489.42 338.35 493.94
338.83
498.36 339.05 512.87 339.69 527.55 340.36 543.71 340.99 555.09
341.43
562.84 341.72 591.72 340.99 591.73 340.98 593.85 340.55 596.09
340.33
596.46 340.29 596.87 340.27 599.56 340.15 600.81 340.14 602.76
340.14
603.92 340.13 605.48 340.14 606.29 340.13 608.49 340.11 608.52
340.11
611.68 340.31 615 340.52 615.57 340.55 616.14 340.57 616.41
340.58
616.6 340.6 616.75 340.6 618.87 340.81 620.59 341.01 626.14
341.68
629.51 342.08 640.43 342.5 645.6 342.83 647.15 342.93 651.05
343.22
655.18 343.51 659.43 343.82 664.27 344.08 671.99 344.34 682.36
344.68
693.37 345.04 696.41 345.4 696.6 345.41 698.83 345.67 704.74
346.47

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  706.51   346.7  707.49  346.81  708.83  347.03  714.75  347.93  716.53
348.39
  718.64  348.93  718.93     349  722.26  349.83  723.12  350.04  726.96
350.96
  727.41  351.08  734.98   351.4  735.08   351.4  739.41  351.58  741.79
351.68
  744.59  351.79  745.17  351.82  750.31  352.03  758.16  352.35

Manning's n Values          num=        8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .035   299.42    .035   326.76    .035   327.06    .035   373.15
.035
  378.01    .034   404.56    .025   758.16    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        299.42  404.56             48.87   50.94   52.85              .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0 299.415                F
  404.56  758.16                F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper                RS: 1228.86*

INPUT
Description:
Station Elevation Data     num=      244
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   355.81     7.57   355.62    15.19   355.45    18.88   355.24    21.63
354.97
   23.84   354.82    24.42   354.78    24.72   354.76    28.38   354.54    32.35
353.95
   35.37   352.69    35.61   352.59    35.92   352.46    38.88   351.24    40.51
350.56
   42.17   349.88       44   349.14    45.52   348.53    46.45   348.16    48.93
347.17
   52.34   346.88    54.54   346.82    58.55   346.67     59.5   346.64     61.6
346.57
   63.13   346.51    68.35   346.33    71.13   346.23    73.06    346.2    78.01
346.1
   80.42    346.1    81.16    346.1    82.16    346.1     83.8   346.07    91.57
345.92
   92.26   345.91    93.17   345.88    93.45   345.87    94.34   345.81    99.99
345.47
  106.06    345.2   111.11   344.92   111.35   344.91   111.78    344.9   113.76
344.78
  130.71   344.35   133.61    344.3   136.26    344.2   136.93   344.18   139.31
344.13
  142.56   343.92   142.97   343.89    143.7   343.83   144.64   343.75   149.07
343.4
```

150.02 343.32 154.08 343 157.71 342.71 158.54 342.64 160.36
342.55
161.51 342.49 169.56 342.08 174.18 341.79 177.68 341.56 181.98
341.08
184.75 340.73 187.87 340.33 189.1 340.18 191.14 339.93 194.25
339.71
199.44 339.29 202 339.14 206.93 338.92 207.19 338.91 214.06
338.67
215.11 338.6 228.37 337.44 230.91 337.15 233.86 337.04 235.54
336.97
240.78 336.79 244.16 336.65 247.71 336.49 251.17 336.33 259.6
335.93
260.86 335.87 262.15 335.81 265.86 335.63 268.46 334.92 268.58
334.88
270.52 334.42 271.69 334.15 271.8 334.12 272.04 334.11 272.09
334.11
273.53 334.04 276.06 333.92 280.99 333.66 283.05 333.55 288.78
333.3
308.66 332.36 315.35 332.05 317.1 331.91 317.45 331.82 317.74
331.72
318.79 331.35 321.86 330.25 322.27 330.1 323.15 329.79 323.19
329.78
327.83 328.12 328.19 327.98 328.25 327.96 328.83 327.76 333.3
326.16
333.38 326.13 333.54 326.07 334.46 325.74 334.65 325.67 338.54
324.27
338.93 324.13 340.01 323.74 341.24 323.29 341.75 323.1 342.96
322.66
344.39 322.14 345.04 321.96 345.53 321.81 348.87 320.86 351.76
320
380.47 320.65 385.18 321.88 386.85 322.31 387.35 322.44 390.66
323.3
392.37 323.75 392.41 323.76 392.42 323.77 392.83 323.97 394.63
324.84
394.95 324.99 395.19 325.11 395.45 325.23 396.13 325.55 397.99
326.46
398.89 326.89 399.64 327.25 400.78 327.81 401.56 328.19 402.54
328.67
403.14 328.96 403.54 329.16 406.95 330.14 410.42 331.14 412.33
331.69
416.22 332.82 417.8 333.25 418.68 333.31 419.88 333.36 430.18
333.66
435.88 333.88 441.16 334.06 441.81 334.07 444.21 334.14 447.32
334.25
452.71 334.5 453.03 334.52 458.74 334.7 464.44 334.88 465.07
334.92
476.43 335.69 478.14 335.81 480 335.85 480.81 335.94 481.79
336.02
484.19 336.22 486.64 336.58 486.85 336.61 492.01 337.36 495.97
337.89
499.83 338.06 512.52 338.59 525.36 339.14 539.49 339.68 549.44
340.05
556.22 340.29 581.47 339.98 581.49 339.97 583.34 339.7 585.3
339.72
585.62 339.72 585.99 339.74 588.34 339.86 589.42 339.95 591.13
340.09

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  592.15  340.17  593.51   340.3  594.22  340.35  596.14   340.5  596.17
340.5
  598.93  340.87  601.84  341.26  602.33  341.33  602.84  341.38  603.07
341.41
  603.24  341.43  603.37  341.45  605.22  341.74  606.73  342.01  611.58
342.87
  614.53  343.38  624.08   343.9  628.59  344.22  629.95  344.33  633.37
344.61
  636.97  344.91   640.7  345.21  644.93  345.44  651.68   345.7  660.75
346.04
  670.38  346.41  673.03  346.68   673.2   346.7  675.15  346.89  680.31
347.49
  681.86  347.66  682.72  347.75   683.9  347.91  689.07  348.58  690.63
348.9
  692.47  349.29  692.73  349.34  695.64   349.9  696.39  350.05  699.75
350.69
  700.14  350.77  706.76  351.02  706.85  351.03  710.63  351.18  712.72
351.26
  715.16  351.35  715.68  351.37  720.17  351.53  727.04  351.79

Manning's n Values          num=        8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n
Val
       0    .032  315.35    .035     342    .035  342.29    .035   387.2
.035
  391.94    .034   417.8    .025  727.04    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
       315.35   417.8            48.87   50.94   52.85             .1
.3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0315.3533              F
   417.8  727.04              F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1177.92*

INPUT
Description:
Station Elevation Data     num=     244
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  356.03     7.96  355.87    15.95  355.72    19.84   355.5    22.73
355.18
   25.04  355.02    25.65  354.98    25.97  354.96    29.82  354.69    33.98
353.97
   37.15  352.42    37.41   352.3    37.73  352.14    40.84  350.62    42.55
349.78
    44.3  348.94    46.23  348.03    47.82  347.26    48.79   346.8    51.41
345.59
   54.98  345.23    57.29  345.17     61.5  345.01    62.51  344.97    64.72
344.89
```

66.32 344.83 71.8 344.63 74.73 344.52 76.75 344.48 81.95
344.39
84.49 344.42 85.26 344.42 86.31 344.43 88.04 344.4 96.2
344.27
96.93 344.25 97.88 344.23 98.18 344.22 99.11 344.15 105.05
343.73
111.42 343.42 116.72 343.13 116.98 343.11 117.43 343.09 119.51
342.97
137.31 342.25 140.37 342.15 143.14 341.99 143.85 341.96 146.36
341.84
149.77 341.6 150.2 341.57 150.96 341.51 151.95 341.43 156.6
341.08
157.6 341 161.86 340.67 165.69 340.39 166.56 340.32 168.46
340.24
169.68 340.2 178.13 339.85 182.99 339.63 186.66 339.45 191.18
339.14
194.09 338.92 197.37 338.66 198.65 338.56 200.8 338.41 204.07
338.26
209.52 337.94 212.21 337.81 217.39 337.65 217.66 337.64 224.88
337.37
225.98 337.3 239.91 335.92 242.58 335.58 245.68 335.45 247.44
335.38
252.95 335.17 256.5 335.02 260.23 334.87 263.86 334.71 272.72
334.32
274.04 334.27 275.4 334.21 279.29 334.04 282.03 333.62 282.15
333.6
284.19 333.33 285.42 333.17 285.53 333.15 285.79 333.14 285.84
333.14
287.36 333.07 290.01 332.96 295.19 332.7 297.36 332.59 303.38
332.32
324.26 331.35 331.29 331.03 333.01 330.88 333.36 330.77 333.64
330.67
334.67 330.31 337.69 329.2 338.1 329.05 338.96 328.74 339
328.72
343.56 327.06 343.91 326.92 343.98 326.9 344.54 326.7 348.94
325.1
349.02 325.06 349.17 325.01 350.08 324.67 350.26 324.61 354.09
323.21
354.47 323.06 355.54 322.67 356.74 322.22 357.25 322.04 358.44
321.59
359.85 321.07 360.49 320.9 360.97 320.76 364.25 319.83 367.09
319
394.89 319.47 399.46 320.94 401.07 321.46 401.56 321.61 404.76
322.65
406.42 323.19 406.45 323.2 406.47 323.21 406.86 323.38 408.61
324.15
408.92 324.29 409.15 324.39 409.4 324.49 410.05 324.78 411.86
325.57
412.73 325.95 413.45 326.27 414.56 326.76 415.32 327.09 416.27
327.52
416.84 327.77 417.23 327.95 420.54 329.07 423.9 330.22 425.75
330.85
429.51 332.13 431.04 332.62 431.8 332.67 432.82 332.71 441.64
332.97
446.53 333.14 451.05 333.29 451.61 333.3 453.66 333.35 456.33
333.43

```
  460.95  333.63  461.21  333.64   466.1  333.75  470.99  333.85  471.53
333.89
  481.26  334.61  482.73  334.72  484.31  334.74  485.01  334.83  485.85
334.91
   487.9  335.11  490.01   335.5  490.19  335.54  494.61  336.36  497.99
336.94
   501.3  337.08  512.17   337.5  523.17  337.93  535.28  338.37   543.8
338.68
  549.61  338.87  571.23  338.97  571.24  338.97  572.83  338.85  574.51
339.11
  574.79  339.15   575.1  339.21  577.11  339.57  578.04  339.75  579.51
340.05
  580.38  340.22  581.55  340.45  582.15  340.57   583.8  340.89  583.82
340.89
  586.19  341.44  588.67     342   589.1   342.1  589.53  342.19  589.73
342.23
  589.87  342.27  589.99  342.29  591.58  342.68  592.86     343  597.02
344.06
  599.54  344.69  607.72   345.3  611.59  345.62  612.76  345.72  615.68
346.01
  618.77   346.3  621.96  346.61  625.58   346.8  631.36  347.07  639.13
347.41
  647.38  347.78  649.66  347.97   649.8  347.98  651.47  348.11  655.89
348.51
  657.22  348.63  657.96  348.69  658.96  348.79  663.39  349.22  664.73
349.42
  666.31  349.64  666.53  349.67  669.02  349.98  669.66  350.06  672.54
350.42
  672.88  350.46  678.55  350.65  678.62  350.65  681.86  350.77  683.65
350.83
  685.74   350.9  686.18  350.91  690.03  351.04  695.91  351.24

Manning's n Values          num=        8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .028   331.29    .035   357.23    .035   357.52    .035   401.24
.035
  405.86    .034   431.04    .025   695.91    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        331.29  431.04             48.87   50.94   52.85              .1
.3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
        0331.2917                F
  431.04  695.91                F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 1126.981

INPUT
Description: Approx. local of old drop strucure (no plans available)
Station Elevation Data    num=     110
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.26	8.34	356.12	16.72	356	20.79	355.76	23.82	355.4
31.25	354.85	35.62	354	38.94	352.15	39.21	352	39.55	351.81
42.81	350	44.6	349	46.43	348	48.45	346.91	50.12	346
51.14	345.45	53.88	344	57.63	343.59	60.05	343.52	78.32	342.8
85.89	342.69	88.55	342.73	90.46	342.76	100.83	342.61	101.59	342.6
102.59	342.57	102.9	342.56	110.1	342	122.34	341.33	143.92	340.14
147.12	340	169.65	338.35	174.57	338	208.21	336.95	213.89	336.81
222.42	336.48	228.13	336.37	235.7	336.08	236.85	336	251.45	334.4
254.25	334	257.5	333.86	285.84	332.72	299.59	332.17	301.18	332.11
303.96	332	309.39	331.74	347.23	330	348.92	329.85	349.54	329.63
350.55	329.26	353.92	328	354.81	327.67	359.29	326	359.7	325.84
364.66	324	364.81	323.94	369.64	322.14	370.02	322	372.75	320.97
375.3	320	375.93	319.85	382.42	318	409.31	318.28	413.73	320
415.29	320.61	415.76	320.79	418.86	322	422.58	323.46	423.98	324
427.27	325.29	429.07	326	429.99	326.37	434.12	328	437.37	329.29
439.16	330	442.8	331.45	444.28	332	460.94	332.52	465.33	332.6
469.4	332.76	473.47	332.8	477.54	332.82	487.31	333.64	488.63	333.63
489.21	333.72	489.91	333.8	491.62	334	493.37	334.43	497.2	335.37
500.02	336	538.15	337.3	562.32	338	566.66	339.56	567.88	340
570.08	340.79	571.45	341.28	573.44	342	575.51	342.74	579	344
582.46	345.25	584.56	346	595.56	347.12	603.22	348	611.05	348.43
617.52	348.78	640.14	350	650.33	350.28	659.89	350.55	664.79	350.69

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	347.23	.035	372.75	.035	415.29	.035	444.28	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
347.23	444.28	215.16	233.86	259.36	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	347.23		F
444.28	664.79		F

CROSS SECTION

RIVER: Avarado Ck
REACH: Upper RS: 893.1187

INPUT
Description: u/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.07	.61	341.05	4.28	340.98	8.27	340.96	35.41	340.58
42.9	340.06	43.69	340	49.77	338.48	51.67	338	56.19	336.87
59.66	336	62.75	335.23	66.32	334.36	67.69	334	75.11	332.86
80.74	332	84.11	331.89	85.87	331.83	112.84	330.97	115.86	330.88
125.01	330.59	127.52	330.52	131.75	330.39	139	330.16	139.98	330.13
142.53	330.08	143.04	330.09	145.27	330	155.28	329.62	160.35	329.73
164.89	329.74	165.91	329.52	168.88	329.36	170.54	329.17	172.21	328.91
173.36	328.79	176.53	328.57	177.33	328.52	178.07	328.51	182.26	328.33
183.77	328.34	188.66	328.25	189.44	328.26	192.99	328.17	195.25	328.09
195.82	328	196.64	327.88	197.1	327.67	197.75	327.32	198.21	327.02
198.98	326.67	200.42	326	201.52	325.46	203.22	324.74	204.27	324.29
204.58	324	206.21	322.11	206.25	322	206.31	321.83	206.57	321.06
206.94	320	207.14	319.28	207.49	318	207.55	317.65	207.92	316
207.94	315.91	208.06	315.25	208.3	314	237.41	315.82	237.57	316
238.09	316.62	238.61	317.21	239.1	317.78	239.29	318	239.83	318.6
241.08	320	241.77	320.75	243.11	322	243.86	322.66	244.94	323.31
245.44	323.62	245.94	324	247.56	325.25	248.53	326	248.91	326.29
250.97	328	251.9	328.77	253.38	330	255.09	331.42	255.78	332
267.66	332.51	299.68	334	308.07	334.78	314.73	335.51	319.19	336
321.68	337.29	323.02	338	326.46	339.81	326.82	340	327.22	340.21

```
  330.62     342  331.45  342.44  332.97  343.23  334.42     344  343.82
344.63
  344.55  344.68   345.2  344.72  345.73  344.75  346.14  344.78   346.4
344.79
  358.71  345.53  366.61     346  398.47  347.31  415.46     348   416.2
348.02

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0     .05  192.99    .025  207.94    .035  237.57    .035  255.78
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
        164.89  255.78            49.65   50.12   51.56              .1
.3
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
       0  164.89               F
  255.78   416.2               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 843.0025

INPUT
Description: d/s Entrance into Parking Lot from Alvarado Road
Station Elevation Data     num=      156
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0  343.42     2.76    343.4    12.36  343.22    12.94    343.2    16.73
343.21
    19.9  343.22    24.77  343.07    30.96  342.92    49.04  342.66    53.21
342.53
   64.01  342.14    67.44     342    73.11  340.59     75.5     340    82.22
338.32
   83.53     338     91.1  336.11    91.52     336    91.58  335.98    99.41
334
  100.38  333.75   105.16   332.6   107.01  332.15   107.77     332   113.88
332.03
  120.46  332.21   128.03  332.41   129.28  332.35   133.87   332.5   135.07
332.59
  140.71  332.75   143.64  332.84   144.21  332.87   144.92  332.89   145.97
332.94
   148.3  332.98    149.8  332.99   150.42     333   151.43  333.01   152.47
333.03
  153.57  333.06   154.78  333.11    155.4  333.13   157.09  333.15   158.91
333.08
  159.86  333.12   160.78  333.16   163.48  332.99   164.13  333.03   165.29
333.06
  167.93  332.89    169.3  332.92   171.18  332.95   173.26   332.8   175.06
332.75
  176.14   332.7   178.05  332.64   178.68  332.56   180.77   332.5   183.37
332
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     194   331.97   194.16   331.89    194.8   331.72   196.28   331.23   198.22
330
   199.21   329.16    199.4   329.08   199.71   328.96   199.85    328.9    200.2
328.76
   200.51   328.64   201.11   328.39    201.7      328   202.15   327.69   202.44
327.44
   203.94      326   204.75   325.33   205.76   324.66   207.12      324   207.57
323.78
    207.9   323.65   209.66   322.99   210.39      322   211.31   320.42   211.48
320
   211.76   318.94   212.01      318   212.28   316.86   212.47      316   212.56
315.56
   212.88      314   213.08   312.93   213.13   312.65   213.18   312.38   213.25
312
   231.31   312.59    231.8   312.68   234.12    313.1   239.04      314   239.96
315.3
   240.47      316   240.86   316.54   241.46   317.38   241.92      318   243.26
319.75
   243.45      320   243.58   320.17   245.04      322   245.52   322.46   246.49
323.24
   247.55      324   248.56   324.72   249.47   325.32    250.5      326   251.08
326.38
   251.88   326.91   252.88   327.53   253.62      328   254.86   328.78   256.81
330
   257.02   330.13   257.52   330.44   259.27   331.67   259.76      332   263.82
332.43
   264.57   332.49   265.21   332.53   265.61   332.56   270.08   333.03   270.29
333.04
    272.8   333.32   273.94   333.43   274.94   333.49   307.07   333.53   308.37
333.58
   320.33      334   324.19   334.49   327.75      336   328.78   336.56   331.41
338
   332.95   338.85      335      340   337.92   341.63   338.57      342   339.03
342.16
   347.36      344   349.55   344.09   351.48   344.18   367.08   344.83   382.17
345.64
   385.33    345.8   388.81      346   400.98   346.51   410.17   346.87   422.67
347.37
    427.2   347.55

Manning's n Values          num=        5
      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n Val      Sta    n
Val
        0     .025      194     .035   213.13     .035   240.86     .035   274.94
.025

Bank Sta: Left    Right    Lengths: Left Channel    Right      Coeff Contr.
Expan.
            194   274.94            356.37   364.33   373.23              .1
.3
Ineffective Flow      num=        2
   Sta L    Sta R     Elev   Permanent
        0      194                 F
   274.94    427.2                 F

CROSS SECTION
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RIVER: Avarado Ck
REACH: Upper RS: 478.6733

INPUT
Description:
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.87	47.84	358	56.98	357.46	60.13	356	61.62	355.3
64.42	354	66.28	353.13	68.72	352	71.24	350.83	73.01	350
74.53	349.29	77.3	348	80.4	346.56	81.59	346	85.16	344.34
85.88	344	89.95	342.1	90.17	342	91.96	341.17	94.31	340.07
94.46	340	98.02	339.83	137.21	338	163.74	336.71	177.67	336
178.99	335.16	180.08	334.5	180.89	334	181.42	333.66	183.94	332
184.56	331.59	186.93	330	188.11	329.21	189.91	328	191.49	326.94
192.88	326	194.66	324.8	195.86	324	198.23	322.43	198.88	322
199.88	321.34	201.93	320	203.63	318.89	204.98	318	205.14	317.89
208.01	316	208.71	315.54	211.05	314	212.78	312.85	214.08	312
215.9	310.8	216.82	310.18	217.1	310	217.7	309.66	220.29	308
225.13	307.28	226.2	307.12	227.04	307	233.99	306	243.37	305.4
249.15	305.07	255.69	304.67	267.57	304	301.99	305.35	303.99	305.99
304.03	306	310.1	307.95	310.25	308	310.65	308.13	316.08	310
320.93	311.79	321.52	312	322	312.18	326.14	314	327.11	314.44
330.44	316	332.55	316.94	334.84	318	339.33	319.69	340.14	320
341.39	320.46	345.91	322	347.4	322.49	352.62	324	354.42	324.52
359.24	326	366.15	327	369.19	327.2	376.25	327.85	377.77	328
382.49	328.17	384.27	328.22	392.42	328.5	399.62	328.75	403.49	328.85
409.64	329.05	414.47	329.2	441.62	330	448.33	330.93	451.03	332
453.44	333.04	455.81	334	459.99	335.81	460.42	336	460.73	336.13
461.17	336.32	465.65	338	475.52	338.29	482.26	338.46	483.8	338.5
489.23	338.66	490.59	338.69	494.76	338.76	499.49	338.91	518.63	339.3
527.91	339.45	544.8	339.71	548.1	339.73	548.82	339.74	565.18	339.99

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  566.16     340

Manning's n Values          num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   177.67    .035   216.82    .035   303.99    .035   376.25
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        177.67  376.25           263.01  282.17   291.3              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  177.67               F
  376.25  566.16               F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 196.5054

INPUT
Description:
Station Elevation Data     num=      148
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta
Elev
       0   361.57    13.89   360.66    20.01      360     22.8   358.47    23.36
358.18
    23.7      358    24.06   357.81    27.45      356    29.87   354.71     31.2
354
   32.34   353.39    34.95      352    38.53   350.09     38.7      350    39.78
349.42
   42.46      348    42.66    347.9    46.29      346    46.47    345.9    50.12
344
   50.28   343.92    53.95      342    54.07   341.94    57.78      340    57.83
339.97
   59.41   339.15     61.6      338    61.71   337.94    65.43      336    66.12
335.64
   67.23   335.06    69.26      334    87.67   333.02    91.15    332.9    96.79
332.76
   99.06    332.7   104.37   332.57   115.16    332.6   118.43   332.53   122.53
332.56
  124.74   332.63   133.39    332.7   136.91   332.82   142.54   332.88   154.09
332
  156.48   331.51   158.27    330.4   158.91      330   159.16   329.85   162.09
328
  163.72   326.97    165.2      326   167.64   324.39   168.23      324    169.1
323.42
  171.23      322   172.95   320.84    174.2      320   176.62   318.69   177.61
318.16
  177.95      318   183.93   316.11   184.28      316   187.09   315.12   190.19
314.14
  190.63      314   191.07   313.86   196.98      312   198.77   311.43   203.32
310
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  208.74  308.29  209.66     308  210.45  307.75  216.44     306  219.05
305.56
  219.58  305.47  228.46     304  249.87  302.01  249.97     302  311.64
303.39
   313.2  303.68  314.95     304  317.39  304.38  328.22     306  335.63
307.21
  340.86     308  344.52  309.88  344.74     310  344.93   310.1  348.49
312
  348.58  312.05  350.53  313.08  352.25     314  352.38  314.07     356
316
  358.18  317.16  359.75     318  361.34  318.87  362.11  319.28  363.45
320
  364.29  320.52  364.86  320.89  366.56     322  368.37  323.18  369.63
324
  371.52  325.24  372.69     326  374.73  327.33  375.76     328  379.79
328.4
  380.58  328.42  382.12  328.46  385.05  328.55  410.07  329.71  415.78
330
  416.23  331.48  416.39     332  416.84  333.51  416.99     334  417.09
334.32
  417.59     336  418.15  337.87  418.19     338  418.68  339.69  418.77
340
  419.27  341.68  419.36     342  419.78   343.3  420.01     344  430.88
344.29
  435.08   344.7  448.65     346  463.87  346.83  487.74     348  544.46
347.54
  548.06  347.24  556.42   346.5  559.66  346.24   562.4     346  564.14
345.65
  569.42  344.57  572.14     344  575.15  343.33   581.2     342  584.36
341.28
  588.47  340.35  590.08     340  592.51   339.4

Manning's n Values         num=        5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n
Val
       0    .025   20.01     .05  219.05    .035   313.2     .05  487.74
.025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.
Expan.
        142.54  379.79           225.51   190.7  180.22              .1
.3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev  Permanent
       0  142.54             F
  379.79  592.51             F

CROSS SECTION


RIVER: Avarado Ck
REACH: Upper               RS: 5.802783

INPUT
Description: u/s face of Alvarado Road Crossing
Station Elevation Data    num=     201
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.76	1.15	342.36	1.9	342.17	2.32	342	16.02	340.49
17.61	340.36	19.05	340	30.76	338.79	31.07	338.72	32.63	338.54
33.27	338.48	33.96	338.41	34.71	338.32	35.54	338.21	35.96	338.16
37.07	338	49.83	336.52	51.17	336.24	52.37	336	62.46	334.46
64.12	334	73.81	332.59	74.03	332.53	74.89	332.4	75.32	332.34
75.75	332.27	76.17	332.21	76.58	332.15	76.8	332.12	77.56	332
94.75	330.52	97.74	330	108.92	328.71	110.44	328.16	110.95	328.1
111.98	328	118.11	327.48	118.61	327.36	122.35	326.97	124.09	326.81
125.85	326.6	127.73	326.42	129.89	326.17	131.16	326	132.29	325.84
133.38	325.59	137.89	324.62	140.44	324	148.67	322.76	151.57	322
162.45	320.52	165.25	320.16	165.98	320	167.04	319.84	168.34	319.71
177.69	318.66	181.47	318.39	186.04	318	204.84	317.28	212.3	317.06
221.66	316.46	224.29	316.4	228.7	316	233.63	315.37	240.31	314.71
243.05	314.4	244.97	314.27	248.46	314	253.32	313.64	254.46	313.58
261.21	313.24	263.52	313.11	267.01	312.92	270.54	312.76	272.63	312.7
276.97	312.4	281.46	312	281.91	311.9	282.48	311.5	284.62	310
285.74	308.06	285.78	308	285.82	307.93	286.93	306	287.26	305.45
287.51	305.02	288.09	304	288.89	302.65	289.29	302	289.61	301.51
290.56	300	291.66	298.35	291.91	298	292.07	297.77	292.1	297.73
293.33	296	307.28	296.23	308.28	297.51	308.67	298	308.89	298.27
310.28	300	310.44	300.2	311.76	301.84	311.89	302	312	302.14
313.02	304	313.68	305.49	313.94	306	314.34	307.3	314.63	308
314.97	309.13	315.16	309.75	315.22	310	315.5	310.49	316.4	312
317.97	313.13	319.19	314	321.45	315.61	322	316	322.37	316.26
324.82	318	327.16	319.66	327.65	320	328.35	320.5	330.47	322
332.04	323.11	333.3	324	334.77	325.04	336.12	326	337.6	327.04
338.91	328	341.25	329.73	341.63	330	343.48	331.42	344.25	332

```
  345.15   332.7  346.84     334  348.83  335.46  349.54     336  351.35
336.25
  353.83  336.45     362   337.3   368.9  337.75  369.76  337.82  372.93
338
  375.05  338.07  375.57  338.11  376.42  338.18  380.73  338.42     382
338.5
  385.92  338.73  396.28     340  396.64  340.53   397.6     342  397.91
342.49
  398.85     344  399.12  344.41   415.3     346  473.91  347.62  476.83
347.27
  477.02  347.19  477.22  347.12   477.4  347.08   477.7  347.13  478.68
346.94
  482.66  346.63  484.13  346.55  484.71  346.49  490.41     346  493.45
345.96
  506.78  345.79  507.71  345.76  507.76  345.75  508.59  345.73  516.71
345.61
  517.78  345.58  521.56  345.52  522.54  345.49  523.29  345.47  523.71
345.45
  524.12  345.44  524.46  345.43  524.83  345.42  524.95  345.41  525.61
345.39
  526.52  345.35  526.91  345.34  527.41  345.32  528.95  345.27  529.36
345.25
  535.06  345.09  539.77  344.87  542.14  344.81  543.79  344.77  555.55
344.13
  555.77  344.12  555.89  344.11  556.15   344.1  557.82     344  574.08
342.79
   579.5  342.38

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .05  292.07    .035  310.44     .05   415.3    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.
Expan.
          1.15     362             8.78     5.8       0            .1
.3


SUMMARY OF MANNING'S N VALUES

River:Avarado Ck

      Reach          River Sta.       n1        n2        n3        n4
n5        n6        n7        n8

 Upper                3975.018          .025      .018      .02       .018
.025
 Upper                3918.558          .025      .018      .02       .018
.025
 Upper                3881.736          .025      .018      .02       .018
.025
 Upper                3870.768          .025      .018      .02       .018
.025
 Upper                3690.298          .025      .018      .02       .018
.025
```

Upper		3362.059	.025	.018	.02	.018				
.025										
Upper		3046.513	.025	.018	.02	.018				
.025										
Upper		2808.985	.018	.018	.035	.018				
.025										
Upper		2292.941	.04	.035	.018	.025				
Upper		1897.670	.045	.035	.018	.025				
Upper		1432.619	.045	.045	.035	.045				
.025										
Upper		1381.67*	.042	.035	.035	.035				
.035	.035	.025	.025							
Upper		1330.74*	.038	.035	.035	.035				
.035	.034	.025	.025							
Upper		1279.8*	.035	.035	.035	.035				
.035	.034	.025	.025							
Upper		1228.86*	.032	.035	.035	.035				
.035	.034	.025	.025							
Upper		1177.92*	.028	.035	.035	.035				
.035	.034	.025	.025							
Upper		1126.981	.025	.035	.035	.035				
.025										
Upper		893.1187	.05	.025	.035	.035				
.025										
Upper		843.0025	.025	.035	.035	.035				
.025										
Upper		478.6733	.025	.035	.035	.035				
.025										
Upper		196.5054	.025	.05	.035	.05				
.025										
Upper		5.802783	.05	.035	.05	.025				

SUMMARY OF REACH LENGTHS

River: Avarado Ck

Reach	River Sta.	Left	Channel	Right
Upper	3975.018	56.06	56.46	57.46
Upper	3918.558	36.89	36.82	36.86
Upper	3881.736	11.11	10.97	10.38
Upper	3870.768	179.97	180.47	180.91
Upper	3690.298	344.53	328.24	316.06
Upper	3362.059	323.3	315.55	308.79
Upper	3046.513	240.61	237.53	235.74
Upper	2808.985	519.53	516.04	514.95
Upper	2292.941	410.33	395.27	385.35
Upper	1897.670	469.57	465.05	461.75
Upper	1432.619	48.87	50.94	52.85
Upper	1381.67*	48.87	50.94	52.85
Upper	1330.74*	48.87	50.94	52.85
Upper	1279.8*	48.87	50.94	52.85
Upper	1228.86*	48.87	50.94	52.85
Upper	1177.92*	48.87	50.94	52.85

Upper	1126.981	215.16	233.86	259.36
Upper	893.1187	49.65	50.12	51.56
Upper	843.0025	356.37	364.33	373.23
Upper	478.6733	263.01	282.17	291.3
Upper	196.5054	225.51	190.7	180.22
Upper	5.802783	8.78	5.8	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Avarado Ck

Reach	River Sta.	Contr.	Expan.
Upper	3975.018	.1	.3
Upper	3918.558	.1	.3
Upper	3881.736	.1	.3
Upper	3870.768	.1	.3
Upper	3690.298	.1	.3
Upper	3362.059	.1	.3
Upper	3046.513	.1	.3
Upper	2808.985	.1	.3
Upper	2292.941	.1	.3
Upper	1897.670	.1	.3
Upper	1432.619	.1	.3
Upper	1381.67*	.1	.3
Upper	1330.74*	.1	.3
Upper	1279.8*	.1	.3
Upper	1228.86*	.1	.3
Upper	1177.92*	.1	.3
Upper	1126.981	.1	.3
Upper	893.1187	.1	.3
Upper	843.0025	.1	.3
Upper	478.6733	.1	.3
Upper	196.5054	.1	.3
Upper	5.802783	.1	.3