INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT

Site Name/Facility:	**Alvarado Creek Channel (Lower Portion)**
Master Program Map No.:	**Maps 59 and 60**
Date:	**January 23, 2015**
Civil Engineer (name, company, phone number):	**Jayne Janda-Timba, R.C.E.** **Rick Engineering Company** **5620 Friars Road,** **San Diego, CA 92110** **(619) 291-0707**
Register Civil Engineer Number & Expiration Date (place stamp here):	**RCE# 70649** **Exp. 06/2015**

REGISTERED PROFESSIONAL ENGINEER
JAYNE MARIE JANDA-TIMBA
NO. 70649
EXP. 6/17
CIVIL
STATE OF CALIFORNIA

• **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.

EXISTING CONDITIONS

Executive Summary:

This IHHA concludes that sediment and vegetation removal in portions of the Lower Alvarado Channel will increase conveyance in Reach 2a by 2300 cfs (135%), in Reach 2b by 550 cfs (44%), and in Reach 4 by 350 cfs (37%).

Based on the analyses presented in this Individual Hydrologic and Hydraulic Assessment (IHHA), maintenance will assist in reducing the flooding issues, but the maintenance will not eliminate the occurrence of flooding in this area. This IHHA report, and the corresponding analyses, concludes that the proposed maintenance method, sediment and vegetation removal in City of San Diego maintained portions of the Lower Alvarado Channel will not increase the capacity of the channel to be above a 2-year storm capacity throughout the length of the channel. The proposed maintenance method will include sediment and vegetation removal in the bottom of the concrete lined channel, and bank to bank in the rock lined channel at HEC-RAS cross section 819.1344.

Introduction:
The City of San Diego developed the Master Storm Water System Maintenance Program to optimize its business processes and environmental protection practices related to channel operation and maintenance activities. The Master Maintenance Program is intended to integrate operation and maintenance planning, implementation and assessment activities with its water quality protection programs.

This document provides a summary of the Individual Hydrologic and Hydraulic Assessment (IHHA) activities conducted within Lower Alvarado Channel located from the confluence of the Alvarado Creek with San Diego River to the underground culvert located north east of Fairmount Avenue. The maintenance proposed in the Lower Alvarado Channel is part of a larger maintenance activity which includes maintenance of an upstream portion of Alvarado Creek. The upstream maintenance area is referred to as "Upper Alvarado Creek" and is the subject of a separate IHHA. The relationship of the Lower Alvarado Creek to the Upper Alvarado Creek maintenance areas is depicted in the attachments to this assessment.

Based on the IHHA assessment, the Lower Alvarado Channel is subject to sediment deposition and vegetation establishment in the central earthen portion and central and upper concrete portion, and vegetation establishment in the lower earthen portion of the channel.

Maintenance will not solve the flooding issues throughout the entire length of the channel, but will significantly assist in minimizing the affected flooding area limits for the same storm event throughout portions of the channel maintained by the City of San Diego. It was determined, despite maintenance activities, for larger storm events the Lower Alvarado Channel hydraulics are governed by the capacity of the existing triple RCB under Fairmount Avenue and the severely undersized central earthen portion of the channel.

The Current Vegetated results of this IHHA show that the conveyance capacity of the Lower Alvarado Channel located upstream of the RCB under Fairmount Avenue is between a 2- to 5- year storm event directly upstream of the RCB, and less than a 2-year storm for the remaining upstream channel. Based on the proposed maintenance method to remove sediment and vegetation, the capacity of the channel will increase in Reaches 2a, 2b, 3a, and Reach 4. Reaches 1 and 3b will remain the same as per the current vegetated condition. The chosen maintenance method to remove sediment and vegetation within the City owned properties, the only area which the City is legally allowed to work, will significantly assist in minimizing the affected flooding area limits for the same storm event.

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 Alvarado Creek channel transitions from an underground culvert north east of Fairmount Avenue and flows in an westerly direction for approximately 3,520 feet to a point where the channel confluences with San Diego River west of Mission Gorge Road (see hydraulic workmap located in the Attachments). The lower portion of the channel is aligned north of Alvarado Canyon Road just west of Fairmount Avenue. The central and upper portions of the channel are bounded by Mission Gorge Road and Mission Gorge Place to the north and Alvarado Canyon Road to the south.

For the purposes of this assessment, the area of study has been divided into four reaches (Reaches 2 and 3 are subdivided into Reaches 2a and b and Reaches 3a and b): Reach 1 (HEC-RAS Cross Sections 415.47 to approximately 80' downstream of HEC-RAS Cross Section 819.1344 at the City of San Diego maintenance boundary), Reach 2a (approximately 80' downstream of HEC-RAS Cross Section 819.1344 to 1155.558), Reach 2b (HEC-RAS Cross Section 1305.41 to approximately 40' upstream of HEC-RAS Cross Section 1742.873 at the City of San Diego Maintenance boundary), Reach 3a (from HEC-RAS Cross Section 1742.873 to 2266.686), Reach 3b (HEC-RAS Cross Section 2266.686 to approximately 140' upstream of HEC-RAS Cross Section 2847.761), and Reach 4 (approximately 140' upstream of HEC-RAS Cross Section 2847.761 to 3519.101). Reach 1 is the most downstream reach. Reaches 2 and 4 are maintained by the City of San Diego. The channel geometry is generally trapezoidal in shape throughout the area of study.

Reach 1 extends from the downstream limits of the area of study (at the confluence with the San Diego River), and continues upstream for approximately 350 feet. The downstream portion of Reach 1 consists of an earthen portion with rock lined slopes (approximately 180 feet), and a naturally lined portion (approximately 250 feet), that confluences with San Diego River. Reach 1 consists of very dense vegetation and is bounded by parking lots and commercial buildings to the north and south. Reach 1 is maintained by Willis Enterprises Incorporated.

Reach 2 is subdivided into Reaches 2a and 2b. Reach 2a consists of approximately 100 feet of earthen channel with rock lined slopes downstream, and 300 feet of concrete lined channel upstream. Reach 2a is bounded by parking lots and commercial buildings to the north and south. At the downstream limits of Reach 2b, there is a triple 8'W x12'H Reinforced Concrete Box (RCB) culvert crossing under Fairmount Avenue. Reach 2b consists of approximately 220' of concrete lined channel. Reach 2b has moderate vegetation and is bounded by commercial buildings to the north and Alvarado Canyon Road to the south. Reach 2 (2a and 2b) is maintained by the City of San Diego.

Reach 3 is subdivided into Reaches 3a and 3b. Reach 3a is approximately 530 feet in length with moderate vegetation and is bounded by the commercial buildings and parking lot to the north and south. Reach 3b is an earthen channel approximately 770 feet in length with very dense vegetation. It is bounded by the commercial buildings and parking lot to the north and south. Reach 3 (3a and 3b) is maintained by the San Diego Metropolitan Transit Development Board.

Reach 4 is the most upstream reach with moderate to dense vegetation growth, and extends for approximately 500 feet in length. Reach 4 is concrete lined and maintained by the City of San Diego. Reach 4 is bounded by the commercial buildings to the north and south, Mission George and Mission Gorge Place to the north, and Alvarado Canyon Road to the south.

Table 1: Referenced As-Built Plans

Plan Number	Reach	Description
21772-D	Reach 1 and Reach 2a	"Grading Plans for Portion of Lot 47 of Rancho Mission of San Diego" – City of San Diego, California, As-Built March 6, 1981
I-172 (12) –	Reach 2a and Reach 2b	"Plan and Profile of State Highway in San Diego County, at Fairmount Avenue" - State of California Department of Public Works Division of Highway, approved February 18, 1957
21647-D –	Reach 2b and Reach 3a	"Plans for the improvement of Alvarado Channel" – City of San Diego, As-built January 26, 1990.
16540-D –	Reach 4	"Plans for the Improvement of Drainage Channel in East Mission Valley Industrial Center" City of San Diego, As-built February 12, 1976

Note: See attached pictures

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

The hydrologic information is based on the Federal Emergency Management Agency's (FEMA's) 2012 Flood Insurance Study (FIS) for San Diego County. The FIS provided the 10-, 50-, and 100-year flow rate information for Alvarado Creek. 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 return frequency storm event.

Table 2: Flow Rates

Storm Event	Q (cfs)	Source
2-Year	1,180	Extrapolated
5-Year	2,050	Extrapolated
10-Year	2,700	2012 San Diego FIS
25-Year	3,800	Interpolated
50-Year	4,500	2012 San Diego FIS
100-Year	5,100	2012 San Diego FIS

Noted flowrates were interpolated or extrapolated from the 2012 FIS using a log-probability relationship

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

The US Army Corps of Engineers Hydraulic Engineering Center River Analysis System (HEC-RAS) Version 4.1 was used to analyze the hydraulic characteristics of Alvarado Creek 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, Maintained Condition-Vegetation Only (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 Creek 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 August 6, 2014 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 a n-value of 0.016 for the concrete portion to a n-value of 0.15, reflecting moderate to dense vegetation in the earthen or sediment laden portions.

Table 3: Manning's Roughness Coefficients

Reach	Description	Observed Sediment Depth (ft)	Observed Standing Water	N-Value		
				Bottom	Sides	
					Right Bank	Left Bank
Reach 1	Concrete/ Earthen/ Rock	NA	NA	0.15	0.15	0.15
Reach 2a	Concrete	0.1	YES	0.1 and 0.2	0.016	0.016
Reach 2b	Concrete	0.2-0.9	YES	0.02-0.07	0.016-0.07	0.016-0.07
Reach 3a	Earthen	NA	NA	0.05-0.10	0.025-0.1	0.025-0.15
Reach 3b	Earthen	NA	NA	0.025-0.10	0.05-0.15	0.025-0.1
Reach 4	Concrete	0.5-1.1	YES	0.06-0.10	0.016-0.15	0.016-0.15

Note: Attach Model Output & 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 denser. 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 for earthen portions and 0.15 for the bottom of the channel only for the concrete-lined portions.

Note: Attach Model Output & Workmap

Maintained Condition – Vegetation Only (no sediment removed):

1. Maintained Condition (bank to bank):

This Maintained Condition (bank to bank) assumes vegetation-only maintenance in portions of the channel maintained by the City of San Diego. This maintained condition models vegetation removal in the channel bottom in the portions of the channel that are entirely concrete, and bank to bank vegetation removal at cross section 819.1344 in Reach 2a, the only earthen portion of the channel maintained by the City of San Diego. This maintained condition consists of City of San Diego maintained portions of the channel, Reach 2a and 2b downstream, and Reach 4 upstream. Portions of the channel maintained by others are included only for modeling purposes

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 of the concrete lined channel where sediment and vegetation was identified. A Manning's Roughness Coefficient of 0.035 was utilized for the bottom and banks of the earthen channel at cross section 819.1344. For the portions of the channel that are concrete lined and free of sediment and vegetation, the Manning's Roughness Coefficient of 0.016 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 in the portions of the channel currently maintained by the City of San Diego. This maintained condition models vegetation removal in the channel bottom in Reaches 2a, 2b, and 4. Portions of the channel maintained by others are included only for modeling purposes

Note: Attach Model Output & Workmap

Maintained Condition - Sediment and Vegetation removed:

In addition to the vegetation-only maintenance a Maintained Condition model was also prepared that analyzed the removal of sediment and vegetation from the bottom of the channel that has deposited over the years for the concrete lined and earthen portion within Reach 2a of the channel maintained by the City of San Diego. This maintained condition consists of City of San Diego maintained portions of the channel in Reaches 2a, 2b and 4, as stated previously; all maintained portions of the channel are entirely concrete lined with the exception of cross section 819.1344 (Reach 2a), the only earthen portion of the channel maintained by the City of San Diego.

For the concrete lined channel in Reach 2b, sediment removal ranged from 0.2' at cross section 1705.846 to 0.9' at cross section 13505.41. For the concrete lined channel in Reach 4, sediment removal ranged from 0.5' at cross section 3034.592, to 1.1' at the upstream end of the channel at cross section 3381.792.

In the hydraulic analysis, the 30' channel bottom and longitudinal channel slope were adjusted to reflect the historic flowlines based on 1999 City of San Diego 2-foot contour topographic information and as-built information.

The following As-Built plans has been used for the sediment removed maintained condition:

- I-172 (12) – "Plan and Profile of State Highway in San Diego County, at Fairmount Avenue" - State of California Department of Public Works Division of Highway, approved February 18, 1957,
- 21647-D – "Plans for the improvement of Alvarado Channel" – City of San Diego, As-built January 26, 1990.
- 16540-D – "Plans for the Improvement of Drainage Channel in East Mission Valley Industrial Center" City of San Diego, As-built February 12, 1976.

Note: Attach Model Output & Workmap

MAINTENANCE IMPACTS

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

Current Vegetated Condition:

Table 4: Current Vegetation Condition Capacity

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	1,100	<2-year	<1.25"
2a	1,700	2- to 5-year	1.25"-1.62"
2b	1,250	2- to 5-year	1.25"-1.62"
3a	900	<2-year	<1.25"
3b	250	<2-year	<1.25"
4	950	<2-year	<1.25"

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 design storm (100-year).

Note: Reference Detailed Hydraulic Results for Current Vegetated Condition Model

Ultimate Vegetated Condition:

Table 5: Ultimate Vegetated Condition Capacity

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	1,100	<2-year	<1.25”
2a	1,300	2- to 5-year	1.25”-1.62”
2b	600	<2-year	<1.25”
3a	340	<2-year	<1.25”
3b	175	<2-year	<1.25”
4	950	<2-year	<1.25”

Due to the moderate to dense vegetation that currently exists today in the channel, and due to the undersized channel and crossing at Fairmount Avenue, there is no change in the capacity of the channel in Reaches 1, 2a, 3a, 3b and 4 when comparing the Ultimate Vegetated Condition model to the Current Vegetated Condition model.

Note: Reference Detailed Hydraulic Results for Current Vegetated Condition Model

Maintained Condition-Vegetation Only (no sediment removed):

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

This Maintained Condition (bottom of the channel only) assumes vegetation-only maintenance of the channel bottom within the concrete and earthen channel.

Table 6a: Bottom Only Maintained Condition Capacity – Vegetation Only (no sediment removed)

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	1,100	<2-year	<1.25”
2a	2,050	5-year	1.62”
2b	1,400	2- to 5-year	1.25”-1.62”
3a	875	<2-year	<1.25”
3b	250	<2-year	<1.25”
4	1,300	2- to 5-year	1.25”-1.62”

By removing the moderate vegetation in Reach 2, the capacity increases in Reach 2a from a 1,700 cfs to 2.500 cfs. Removing vegetation from Reach 4 increases the capacity of the channel in Reach 4 from 950 cfs to 1,300 cfs (less than a 2-year storm event to a 2- to 5- year storm event).

2. Maintained Condition (bank to bank):

This Maintained Condition (Bank to Bank) assumes vegetation-only maintenance of the channel in City of San Diego maintained portions of the channel. These portions include Reaches 2 (2a and 2b) and 4. With this model, maintenance was proposed for the bottom only in the concrete lined portions of the channel, and the bottom and banks of the channel for earthen portions of the channel. The only earthen channel within the City of San Diego maintenance boundary is 100 feet of channel with an earthen bottom and rock lined slopes at HEC-RAS cross section 819.1344.

Table 6b: Bank to Bank Maintained Condition Capacity – Vegetation Only (no sediment removed)

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	1,100	<2-year	<1.25”
2a	4,000	25- to 50 year	2.1”-2.3”
2b	1,400	2- to 5-year	1.25”-1.62”
3a	950	<2-year	<1.25”
3b	250	<2-year	<1.25”
4	1,300	2- to 5-year	1.25”-1.62”

By removing the moderate vegetation in the bottom of the concrete lined channels in Reach 2 and the bank to bank vegetation at cross section 819.1344, the capacity increases in Reaches 2a, 2b, and 4. In Reach 2a, the capacity increases significantly from 1,700 cfs to 4,000 cfs (from between a 2- to 5-year storm, to between a 25- and 50-year storm). In Reach 2b the capacity increases from 1,250 cfs to 1,400 cfs (both capacities are between a 2- to 5-year storm). Removing vegetation from Reach 4 increases the capacity of the channel in that reach from 900 cfs to 1,300 cfs (from less than a 2-year storm event to a 2- to 5- year storm event).

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed) Bottom of the channel only vegetation removal

Maintained Condition (Sediment and vegetation removed): Based on the profiles and the available As-Built plans, there was evidence of deposition in portions of the channel maintained by the City of San Diego in Reach 2a, Reach 2b and Reach 4. This hydraulic analysis modeled the removal of sediment and vegetation from cross section 819.1344 to cross section 1849.924, and from cross section 2847.761 to cross section 3519.101 , within the City of San Diego maintained portion of the channel only

Table 7: Maintained Condition Capacity – Sediment Removed

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	1,100	<2-year	<1.25”
2a	4,000	25- to 50 year	2.1”-2.3”
2b	1,800	2- to 5-year	1.25”-1.62”
3a	950	<2-year	<1.25”
3b	250	<2-year	<1.25”
4	1,300	2- to 5-year	1.25”-1.62”

Capacities in the channel do not increase significantly compared to that of the maintained bank to bank vegetation removal condition; however, removal of sediment and vegetation within the channel increases the capacity of Reach 2b to 1,800 cfs (between a 2- to 5-year storm). The sediment and vegetation removed maintenance method within Reaches 2a, 2b, and 4 will bring the channel back to the original (historic) design, lower the area of flooding further in Reach 2b from that of the vegetation removal only condition, and prevent siltation of the underground culvert located upstream of Reach 4. Additionally, areas of shallow sediment deposition that occur along the bottom of the concrete lined channel within Reach 2b, allows for vegetation growth. High flow velocities for storm flows in the channel may cause this vegetation and accumulated sediment to peel off the channel bottom and clog the downstream culvert at Fairmount Avenue, leading to a loss of flood capacity within the channel. Therefore, removal of sediment and vegetation is the recommended approach.

See Table 8 below for a comparison of Existing, Ultimate Vegetated, and Maintained Condition capacities throughout the channel.

Table 8: Comparison of Capacities

Green= City Property

Pink =Private Property

LOWER ALVARADO CHANNEL

Reach	EXISTING CHANNEL CAPACITY				CHANNEL CAPACITY AFTER CHANNEL MAINTENANCE IN CITY PROPERTY ONLY						MAINTENANCE IN CITY + PRIVATE PROPERTY	
	Current vegetation (cfs)	Storm Event (year)	Ultimate vegetation (cfs)	Storm Event (year)	Vegetation only (bottom only) (cfs)	Storm Event (year)	Vegetation only (bank to bank) (cfs)	Storm Event (year)	Sediment + Vegetation (cfs)	Storm Event (year)	Sediment + Vegetation (cfs)	Storm Event (year)
(Wills Property) 1	1100	<2	1100	<2	1100	<2	1100	<2	1100	<2	5100	>100
(MAP 59) 2a	1700	2 to 5	1300	2 to 5	2050	2 to 5	4,000	25 to 50	4000	25 to 50	5100	>100
(MAP 59) 2b	1250	2 to 5	600	<2	1400	2 to 5	1400	2 to 5	1800	2 to 5	1800	2 to 5
(MTS) 3a	900	<2	340	<2	875	<2	950	<2	950	<2	1400	2 to 5
(MTS) 3b	250	<2	175	<2	250	<2	250	<2	250	<2	450	<2
(MAP 60) 4	950	<2	950	<2	1300	2 to 5	1300	2 to 5	1300	2 to 5	1600	2 to 5

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

Areas within channel that can be avoided (this section can be completed upon completion of Individual Biological Assessment Form):

Vegetation present within the Lower Alvarado Creek Channel (Map #'s 59 and 60) is comprised of patches of disturbed freshwater marsh dominated by cattails, bulrushes, and giant reed, disturbed southern willow scrub dominated by willow and giant reed, disturbed wetland composed primarily of giant reed and fan palm monocultures, and open water within a concrete-lined channel. Sensitive plant species include 7 individuals of southwestern spiny rush and a patch of Palmer's sagewort mixed in with freshwater marsh. The sensitive plant species do not warrant avoidance due to their small population size within the channel and low sensitivity rating. No sensitive animal species were detected; however, least Bell's vireo is known from downstream locations, and has the potential to occur in the disturbed southern willow scrub within the channel. Work cannot be conducted during the avian breeding season without pre-construction nesting surveys. No modifications to the proposed maintenance or maintenance protocols are recommended for the Lower Alvarado Creek Channel.

Would the velocity of storm water during a "bank-full" storm event exceed the velocities identified for unlined channels per Table 1-104.108 of the City's Design Manual? If so, describe the appropriate form

of erosion control (e.g., check dam or comparable mechanism).

As stated previously, the Lower Alvarado Channel reach has very little capacity. This channel is subject to frequent flooding and failures. Pending soils analyses, the following results utilize an assumed permissible velocity of 9.0 feet per second (fps) based on multiple site visits. Velocities in the Current Vegetated Condition or Maintained Sediment and Vegetation Removed Conditions are not erosive and do not exceed the permissible velocity of 9.0 fps; therefore, additional velocity decreasing measures such as check dams are not necessary per the PEIR as part of the proposed maintenance for the Lower Alvarado Channel. If future soils analyses yield a different permissible velocity, the following analyses will be updated. See Table 9 for a comparison of Current Vegetated Condition or Maintained Sediment and Vegetation Removed Condition velocities.

Table 9 : Comparison of Bank Full Velocities

	HEC-RAS Cross Section	Current Vegetated Condition 2 Yr (FPS)	Maintained Condition 2-Year Storm Event (FPS)	Change in Velocity for 2-Year Storm Event (Maintained)-(Current Vegetated) (FPS)
Reach 4 (Concrete Lined)	3519.101	3.8	5	1.2
	3381.792	4.6	4.5	-0.1
	3171.448	3.3	3.1	-0.2
	3140.066	2.8	2.9	0.1
	3034.592	3.3	3.3	0
Reach 3b (Earthen)	2847.761	1.5	1.5	0
	2677.801	10.9	10.9	0
	2514.866	1.4	1.4	0
	2360.635	4.7	4.6	-0.1
	2340.973	1.5	1.5	0
	2309.739	3.5	3.5	0
Reach 3a (Earthen)	2266.686	4	3.9	-0.1
	2090.444	4.2	4.7	0.5
	1904.254	6.2	8.4	2.2
	1849.924	4.4	5.6	1.2
	1742.873	4.2	7.5	3.3
Reach 2b (Concrete)	1705.846	4.2	6.7	2.5
	1573.644	4.4	5.8	1.4
	1305.41	4.3	4.9	0.6
Reach 2a (Concrete)	1155.558	3.6	7.5	3.9
	1036.821	4.3	7.2	2.9
	819.1344 [1]	3.3	4.3	1
Reach 1 (Earthen)	415.466	2.1	2.1	0

1) Cross Section 819.1344 is rock lined

MITIGATION

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

The Program Environmental Impact Report (PEIR) for the Master Maintenance Program lists 4 alternatives that would help reduce the need for regular channel maintenance. The alternatives are listed below, followed by a response applicable to the Lower Alvarado Channel. Responses are based solely on the hydrologic and hydraulic analyses completed in this IHHA, additional studies may be necessary to fully assess the feasibility of these alternatives.

Raising the channel banks and constructing walls or berms along the top of the channels:
The Lower Alvarado Channel is bound by commercial properties. The City only maintains portions of the Lower Alvarado Channel; therefore, construction of walls or berms along the City maintained portions of the channel could raise water surface elevations in the areas maintained by the City, causing additional flooding potential upstream of the channel and along the channel in areas not maintained by the City. Additional sediment and vegetation growth within the channel would further decrease the capacity of the channel and increase the water surface elevations, causing increased flooding potential and negative impacts to adjacent properties.

Diverting storm water in pipes around constrained segments:
The Lower Alvarado Channel is bound by commercial properties; no space is available to construct a storm drain to divert flows.

Widening the channels to accommodate vegetation:
The Lower Alvarado Channel is bound by commercial properties; no space is available to construct to widen the channel.

Reducing off-site runoff generation through use of low impact development measures:
Low impact development measures are based on the 85th percentile flow and would not impact the flood flow rates in the channel.

Several hydraulic models were created to determine the limits of maintenance. Throughout the limit of study there are two kinds of maintenance proposed: "vegetation removal" and "sediment and vegetation removal" from the channel bottom. Our recommendation is that sediment and vegetation removal take place in City of San Diego maintained portions of the channel. The proposed maintenance method will include sediment and vegetation removal in the bottom of the concrete lined channel, and bank to bank in the rock lined channel at HEC-RAS cross section 819.1344. Conveyance capacities within portions maintained by the City of San Diego would increase in Reach 2a by 2300 cfs, in Reach 2b by 550 cfs, and in Reach 4 by 350 cfs. The Lower Alvarado Channel does not convey the 100-year storm. The following summarizes the recommended limits of maintenance:

Table 10: Proposed Maintenance

Reach	Proposed Maintenance Activity
1	None-Maintained by Willis Enterprises Inc.
2a	Sediment and Vegetation Removal for Approximately 340 Feet
2b	Sediment and Vegetation Removal for Approximately 555 Feet
3a	None-Maintained by San Diego Metropolitan Transit Development Board
3b	None-Maintained by San Diego Metropolitan Transit Development Board
4	Sediment and Vegetation Removal for an Approximate Length of 670 Feet

Please refer to the hydraulic workmap for limits of maintenance.

ADDITIONAL COMMENTS OR RECOMMENDATIONS

It is important to note that the frequency of flooding will be more frequent and the capacity of the channel will be reduced should maintenance be neglected in the channel. The City of San Diego is not responsible for maintenance on properties owned by others. If the City maintains its portion, 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 portions of the channel maintained by others are also maintained. It would be beneficial for the City to notify and request the responsible parties to maintain these offsite areas to minimize the backwater effect that could contribute to the frequency of flooding of adjacent properties.

Additionally, flooding due to larger storm events occurs as a result of the severely undersized channel upstream of Fairmount Avenue and undersized triple Reinforced Concrete Box (RCB) crossing at Fairmount Avenue that causes backwater effect. The backwater effect continues in larger storm events regardless of maintenance activities within the channel.

Additional analysis was performed to examine the effects of maintenance performed over the entire length of channel including portions of the channel not maintained by the City of San Diego.

Reach 1, maintained by Willis Enterprises Incorporated is modeled with vegetation removal only and does not include removal of sediment. Within the earthen portion of the channel (Reaches 3a and 3b) located between the downstream and upstream concrete lined portions of the channel, sediment and vegetation was removed to coincide with the historic flowlines of the upstream and downstream concrete lined channels. The bottom width of the sediment removal in Reach 3 was assumed to be 10 feet with a 1.5:1 side slopes and was based on the natural width of the current channel configuration. The longitudinal slope within the earthen portion of the channel was governed by the historic flow line of the concrete lined channels on either end of Reach 3 and the private road crossing between cross sections 2309.739 and 2360.635. Sediment removal depths in the earthen channel ranged from 1.08' at the downstream end where sediment removal daylights to the flow line at cross section 1904.254 per the As-Built plan, to maximum 2.03' at cross section 2847.761. The removal of sediment, to the historic flow line from the bottom of the concrete lined channel, will increase the capacity of the channel compared to the current vegetated condition, and thus reduce the flooding potential.

Table 11: Maintained Condition Capacity – Sediment Removed Over Entire Length of Channel

Reach	Capacity Flow Rate (cfs)	Equivalent Storm Event	6-Hour Precipitation
1	5,100	>100 cfs	>2.6"
2a	5,100	>100 cfs	>2.6"
2b	1,800	2- to 5-year	1.25"-1.62"
3a	1,400	2- to 5-year	1.25"-1.62"
3b	450	<2-year	<1.25"
4	1,600	2- to 5-year	1.25"-1.62"

It should be noted that increased capacities identified above would only be realized if non-City maintained portions of the Reach 1 and Reach 3a and 3b are maintained as assumed (see the hydraulic workmap for the location of the City owned portions of the channel). Additionally, due to the low capacity of this channel, future improvements should be considered; however these future improvements are not a part of the scope of this individual permit. These improvements can be, but not limited to widening and re-alignment of portion of the channel within Reach 3, and/or upsizing the culvert crossing under Fairmount Avenue.

LIST OF ATTACHMENTS (Check All That Apply):

- ✓ 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)
    - o Maintenance in City Maintained Portions of the Channel Only
    - o Maintenance in All Portions of the Channel
- ✓ Compact Disc CD: Digital Files and PDF Version of Full Report

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

1.

Reach 1, from south side of channel looking north

2.

Downstream end of Reach 2a, from the south side of the channel, looking upstream

3.

Upstream end of Reach 2a, at the downstream culvert crossing at Fairmount Avenue

4.

Upstream end of Reach 2a, at the downstream side of the culvert crossing at Fairmount Avenue, vegetation just downstream of culvert

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

5.

Reach 2b, at upstream side of culvert crossing at Fairmount Avenue

6.

Reach 2b, north of channel, looking downstream

7.

Downstream end of Reach 3a, from the north side of the channel, looking downstream

8.

Reach 3a, from the north side of the channel, looking upstream

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

9.

Downstream end of Reach 3a, from the south side of the channel at the concrete road crossing with corrugated metal pipe for low flow, looking downstream

10.

Downstream end of Reach 3a, from the south side of the concrete road crossing with corrugated metal pipe for low flow, looking north

11.

Upstream end of Reach 3a, from north side of channel, looking south

12.

Middle of Reach 4, from the south side of the channel, looking downstream

SITE PHOTOS:

Date of Site Visit: August 6, 2014

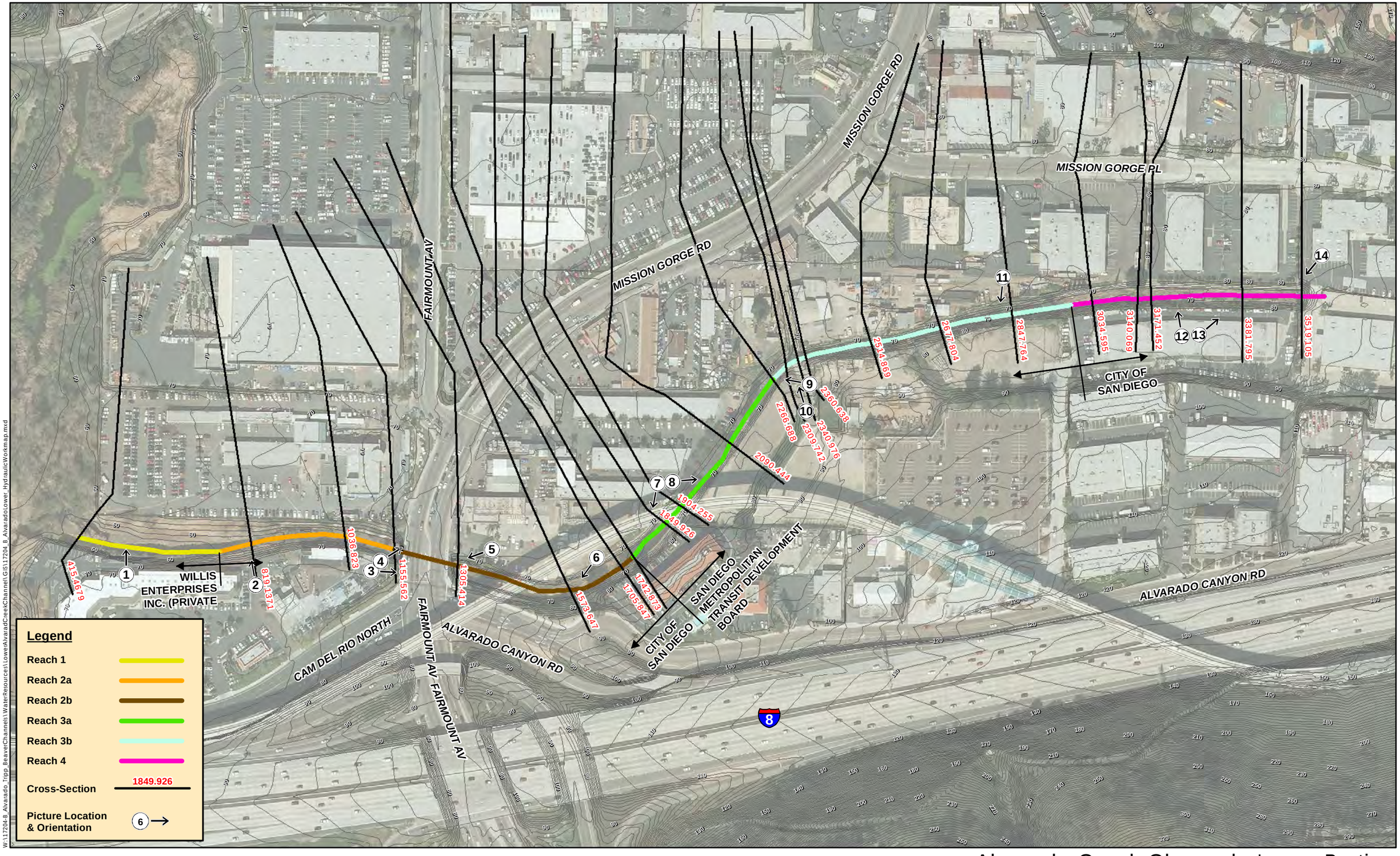
See Hydraulic Workmap for picture locations and orientation.

13. Middle of Reach 4, from the south side of the channel, looking upstream	14. Upstream end of Reach 4, upstream end of the channel, looking downstream

I:\PROJECTS\SSDD\SDD-24 07_Alvarado_Tripp_BeaverMap\Misc\IIIA_Figure.mxd SDD-24 16 04/6/15 -CL

RICK ENGINEERING COMPANY

Upper/Lower Alvarado Creek Channels
Map Numbers 59, 60 & 64-Overview of Reaches



W:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\Lowe\AlvaradCreekChannel\GIS\17204_B_AlvaradoLower_HydraulicWorkmap.mxd

RICK ENGINEERING COMPANY

Scale in Feet
0 200 400
North

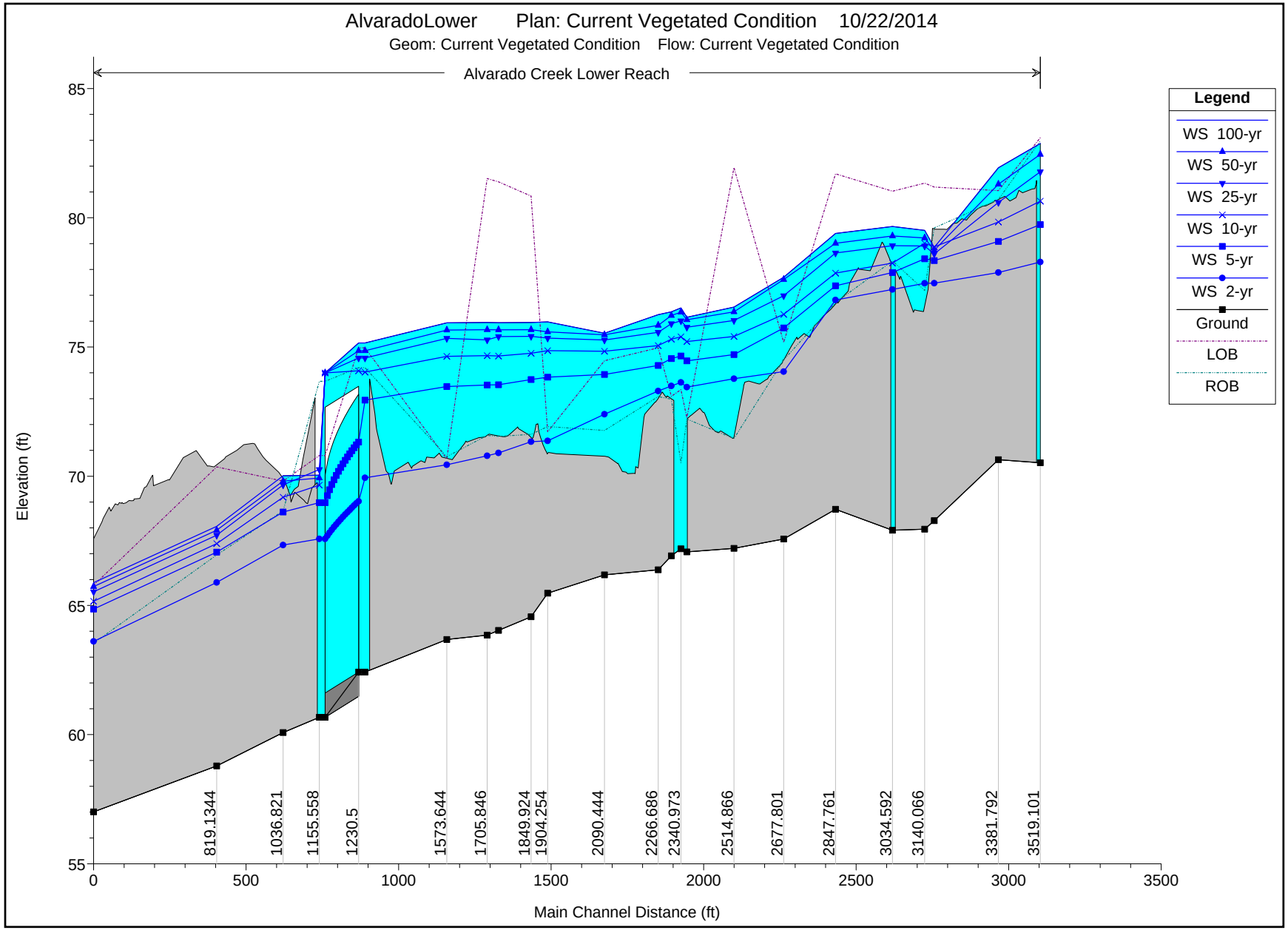
Date of Exhibit: 10.15.2014
DigitalGlobe Aerial Image: 04.2013

Alvarado Creek Channel - Lower Portion

Maps Numbers 59 and 60 - Hydraulic Workmap

17204-B

1. Current Vegetated Condition Profile with FEMA Flow Rates
2. Current Vegetated Condition Profile with Multiple Flow Rates


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
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3500
819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
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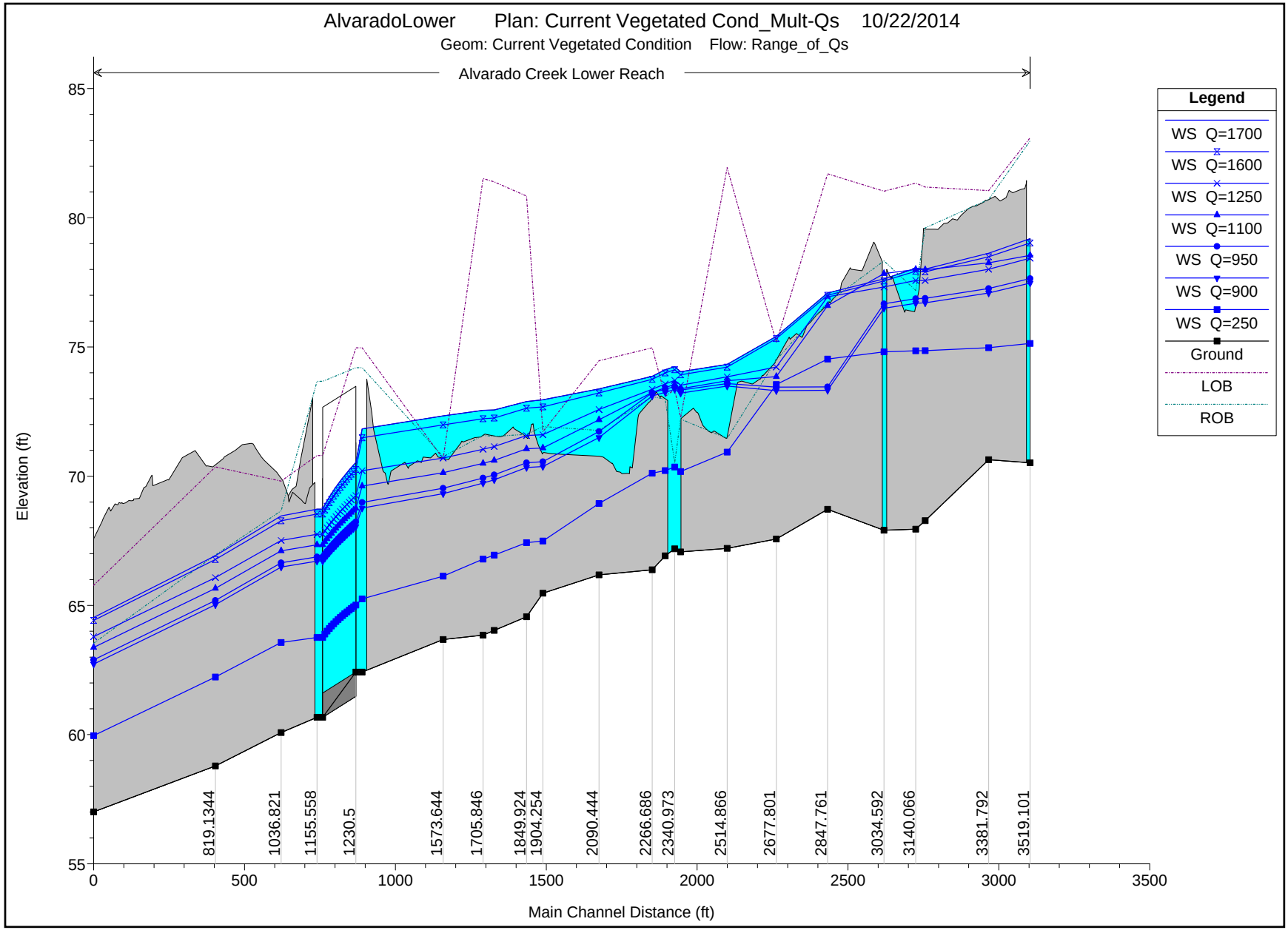
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
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1036.821
1155.558
1230.5
1573.644
1705.846
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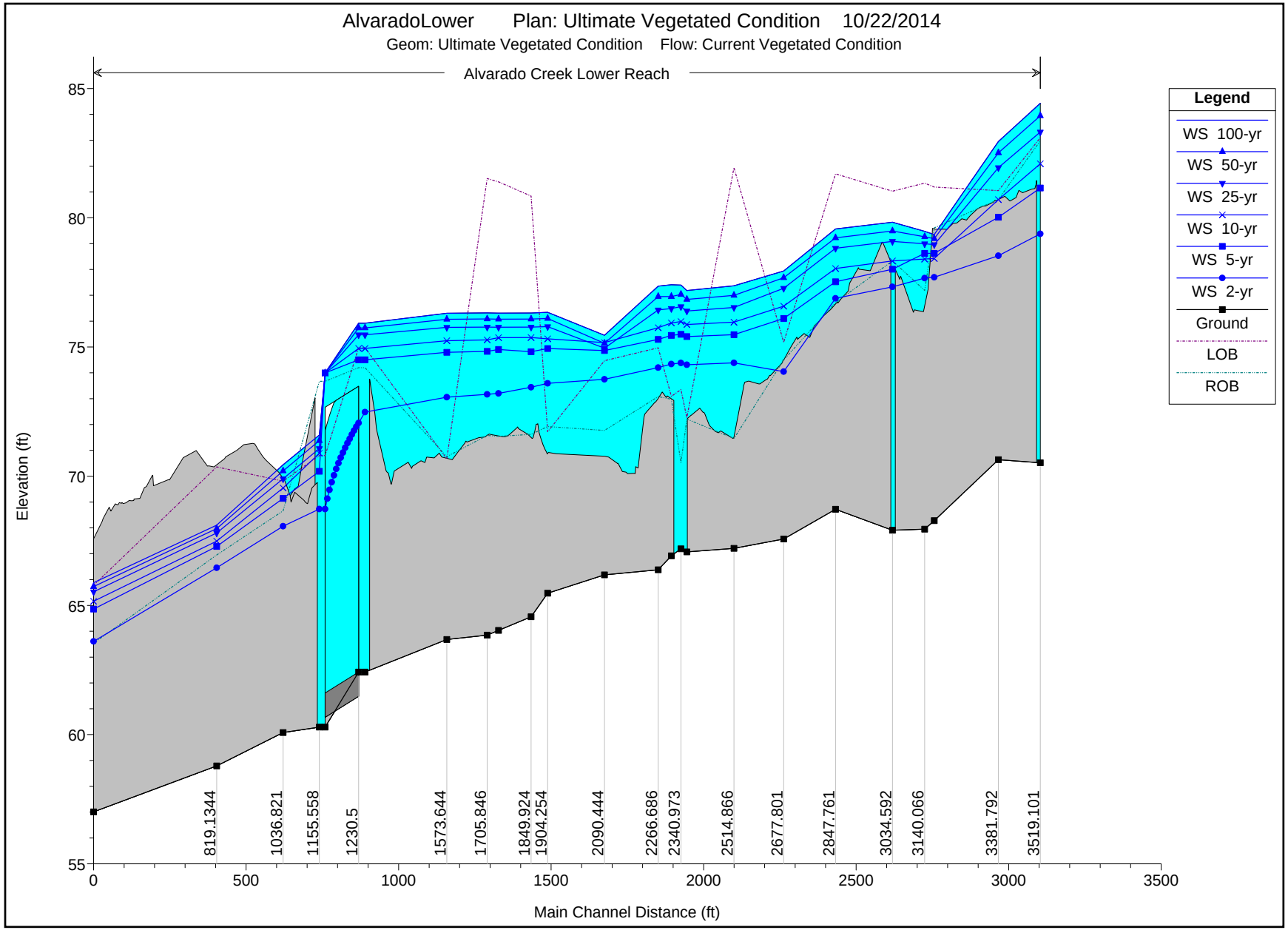
2090.444
2266.686
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101

1. Ultimate Vegetated Condition Profile with FEMA Flow Rates
2. Ultimate Vegetated Condition Profile with Multiple Flow Rates


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
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ROB
Elevation (ft)
Main Channel Distance (ft)
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819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
2266.686
2340.973
2514.866
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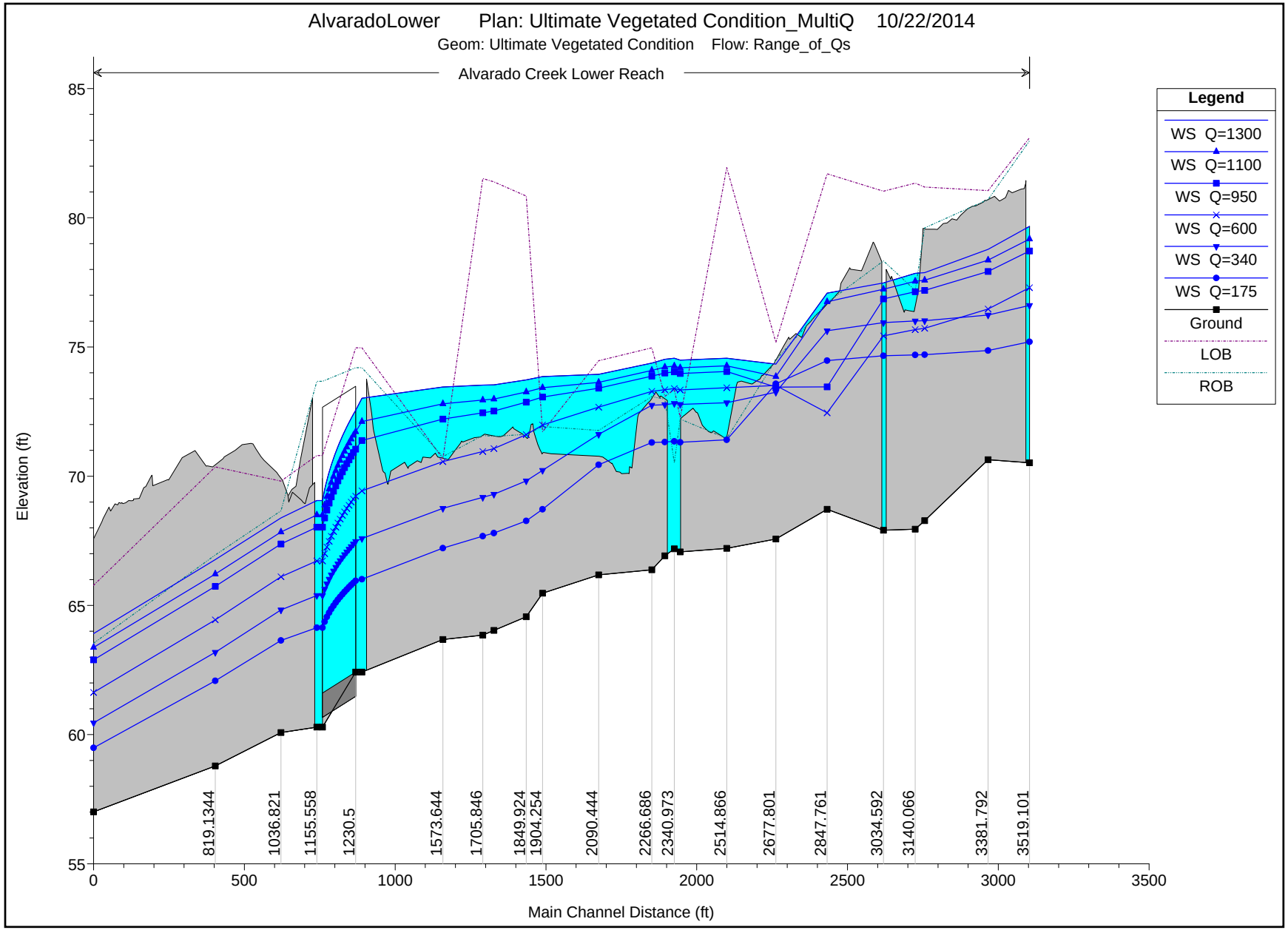
3034.592
3140.066
3381.792
3519.101


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
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819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
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2340.973
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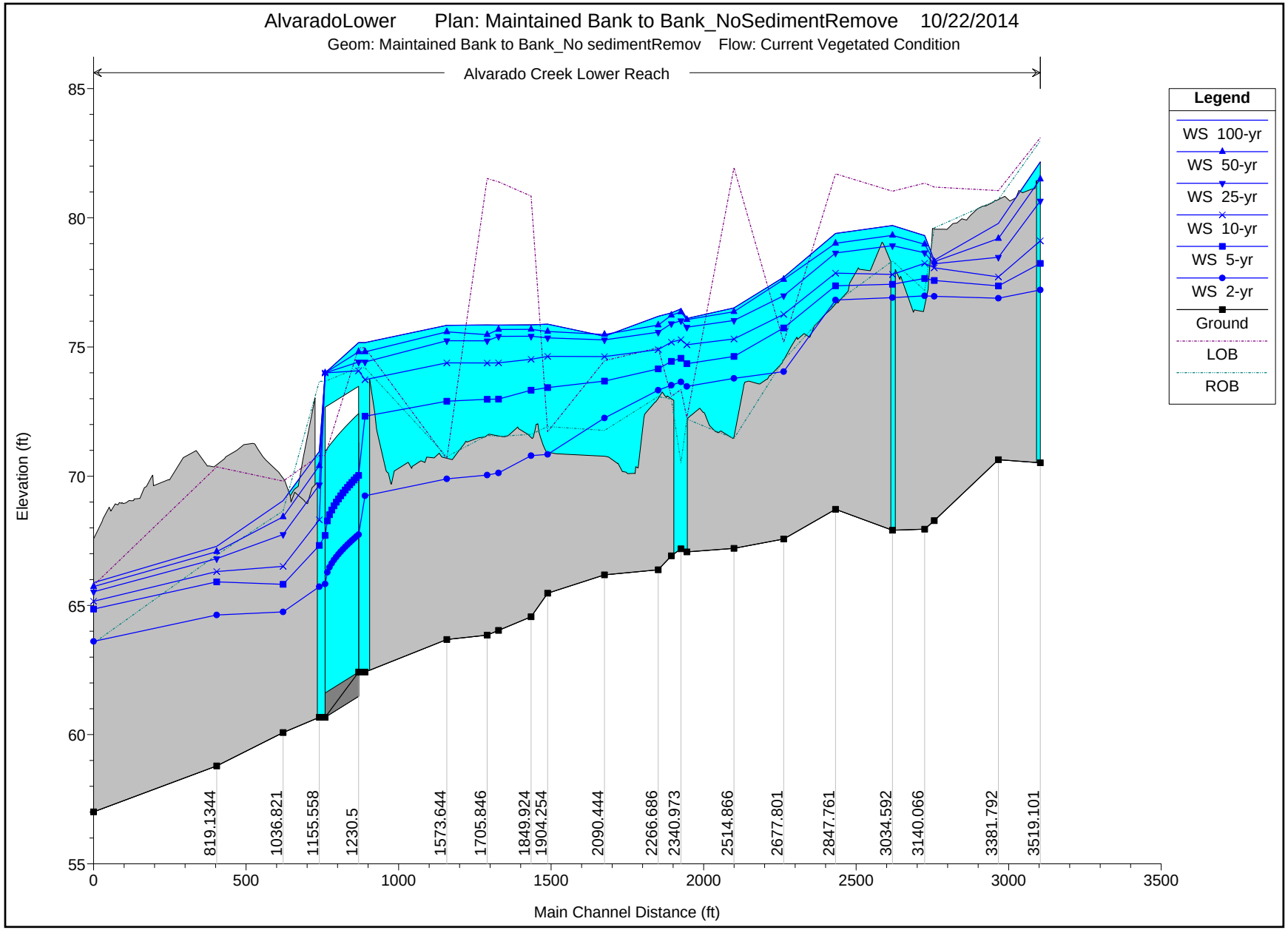
3034.592
3140.066
3381.792
3519.101

1. Maintained Condition (Bank to Bank)
    a. FEMA Flow Rates
    b. Multiple Flow Rates
2. Maintained Condition (Bottom Only)
    a. FEMA Flow Rates
    b. Multiple Flow Rates


AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
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1573.644
1705.846
1849.924
1904.254
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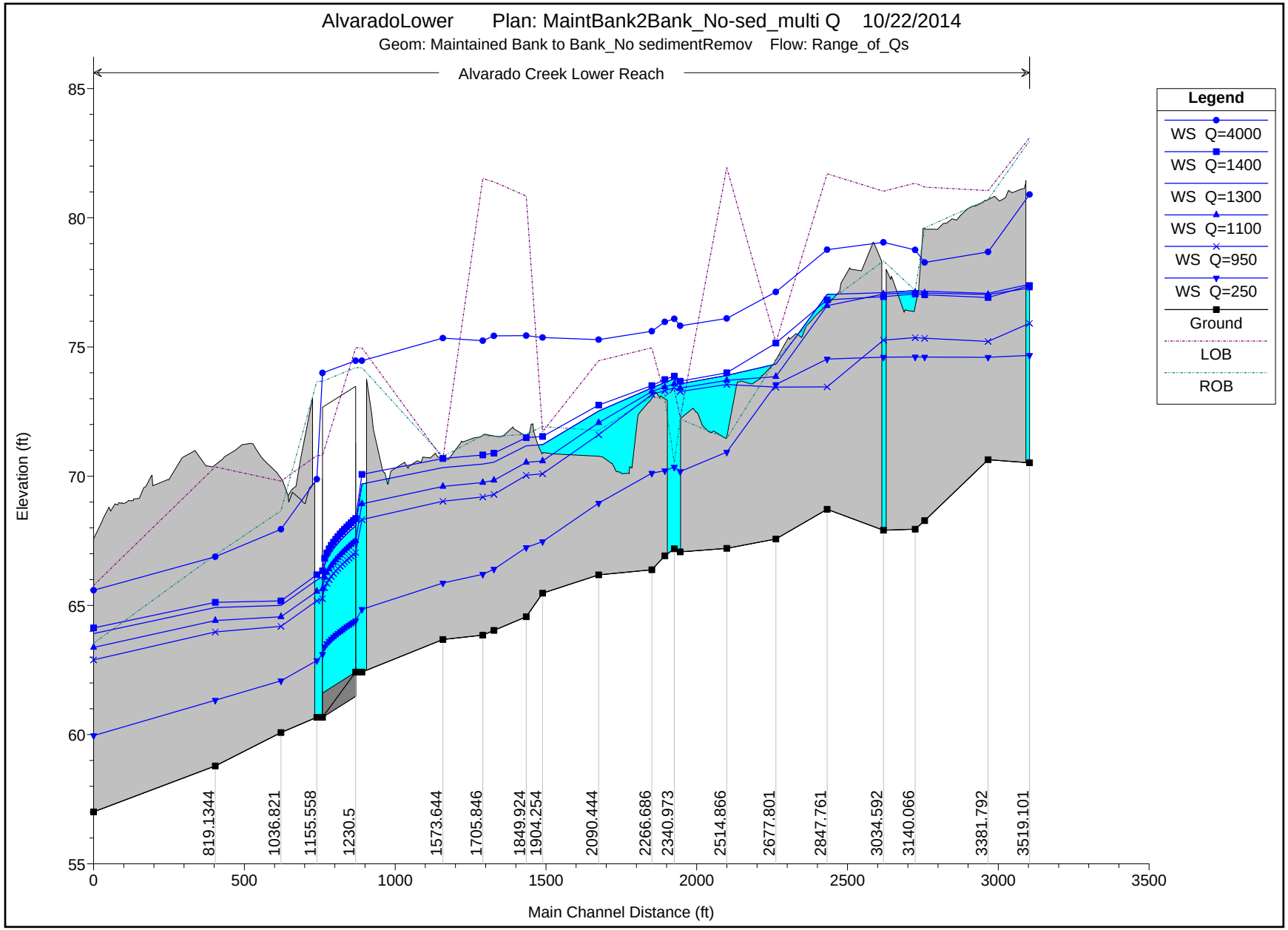
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
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Elevation (ft)
Main Channel Distance (ft)
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3034.592
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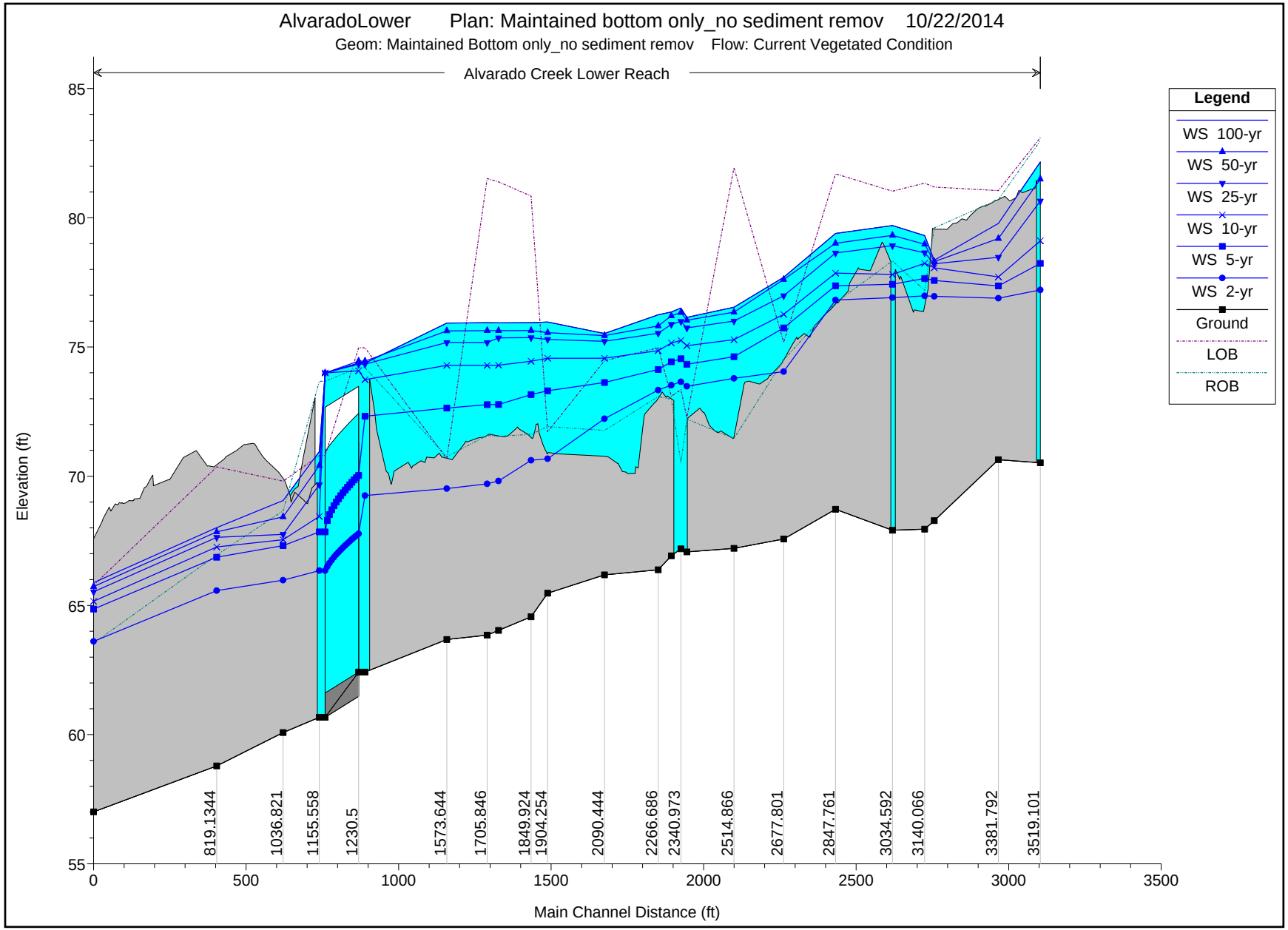
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
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ROB
Elevation (ft)
Main Channel Distance (ft)
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2847.761
3034.592
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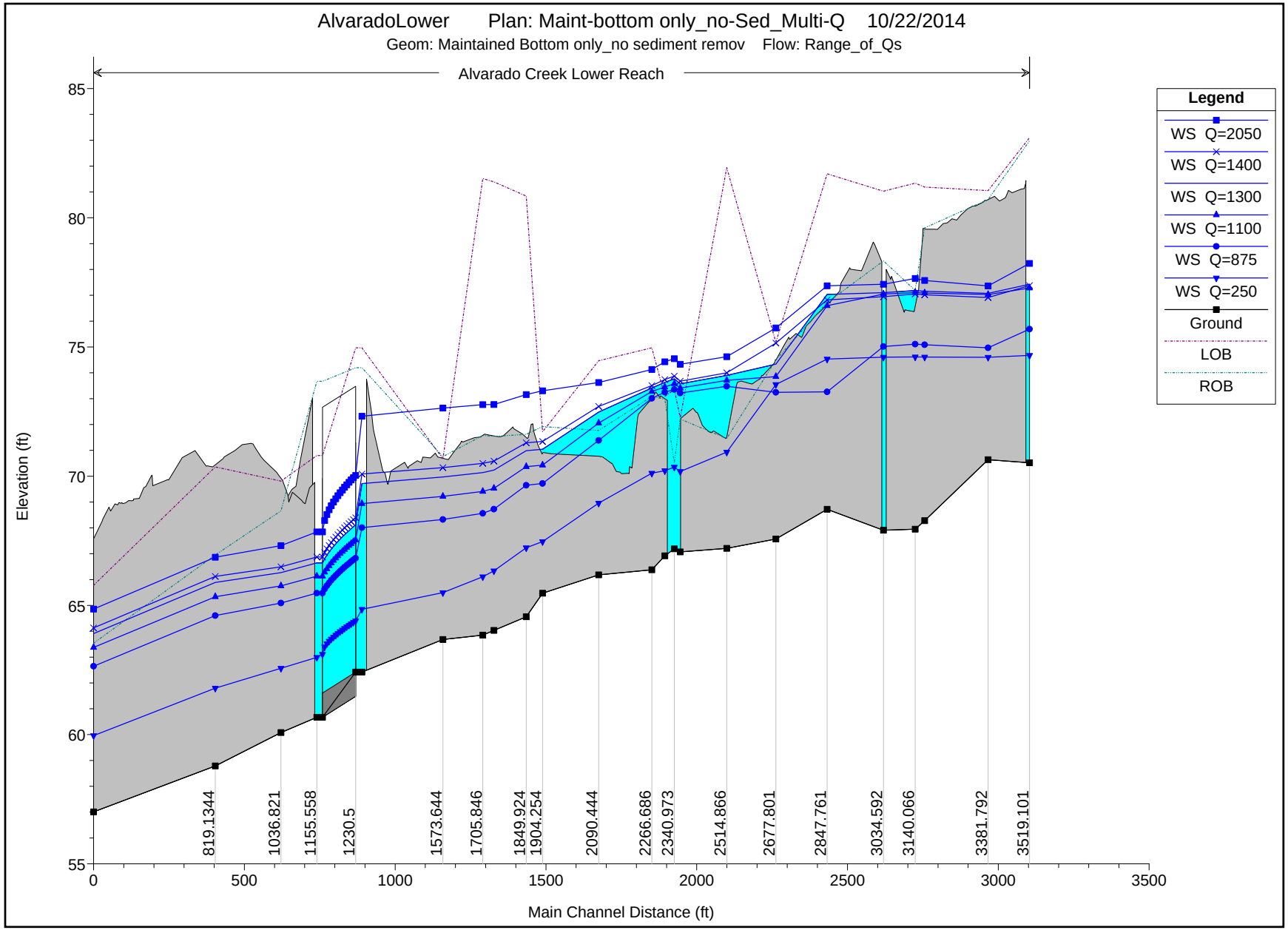
3381.792
3519.101


AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
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Elevation (ft)
Main Channel Distance (ft)
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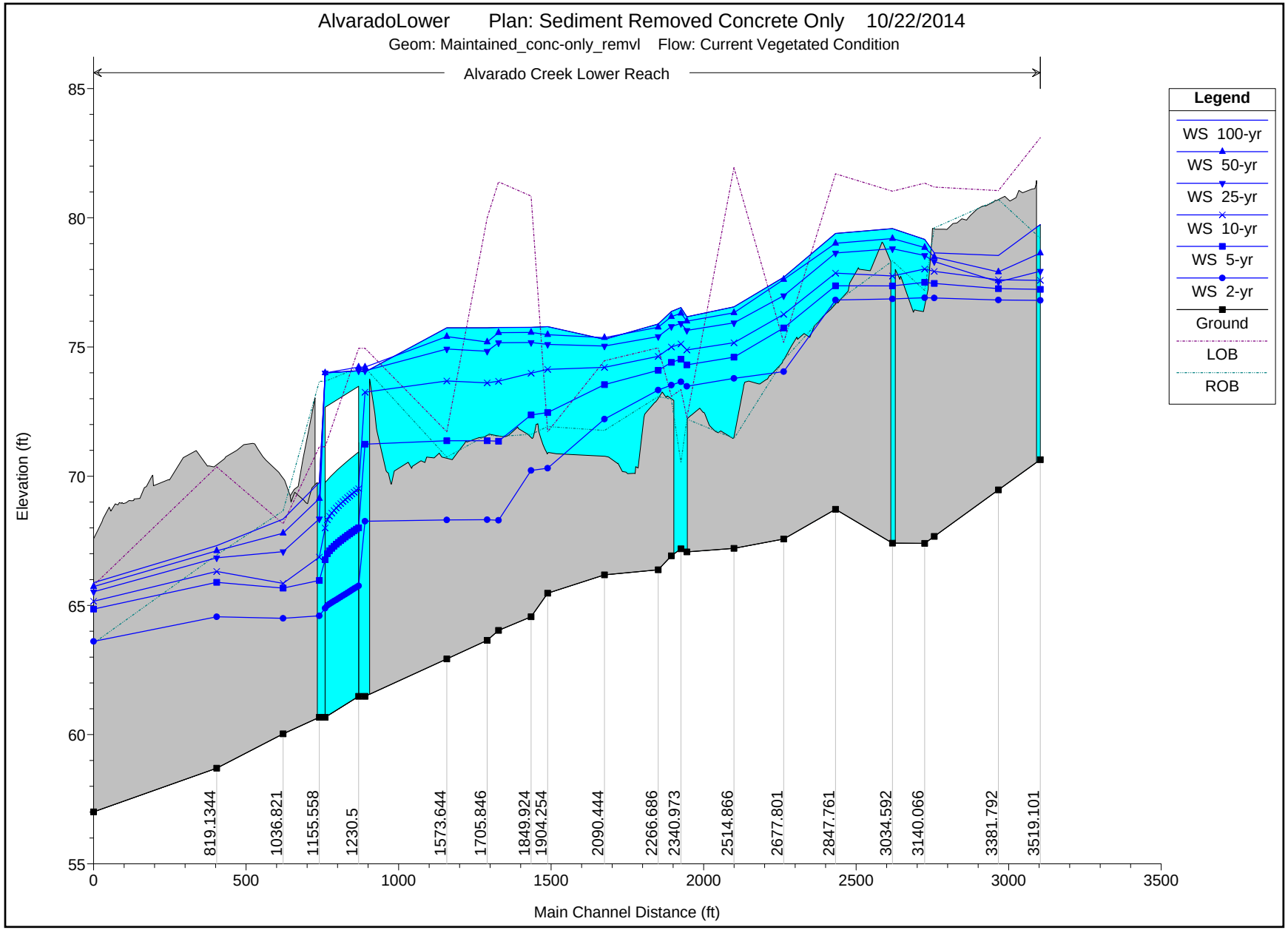
3500
819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
2266.686
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101

1. Maintained Condition (Sediment Removed) Profile with FEMA Flow Rates
2. Maintained Condition (Sediment Removed) Profile with Multiple Flow Rates


AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
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Elevation (ft)
Main Channel Distance (ft)
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819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
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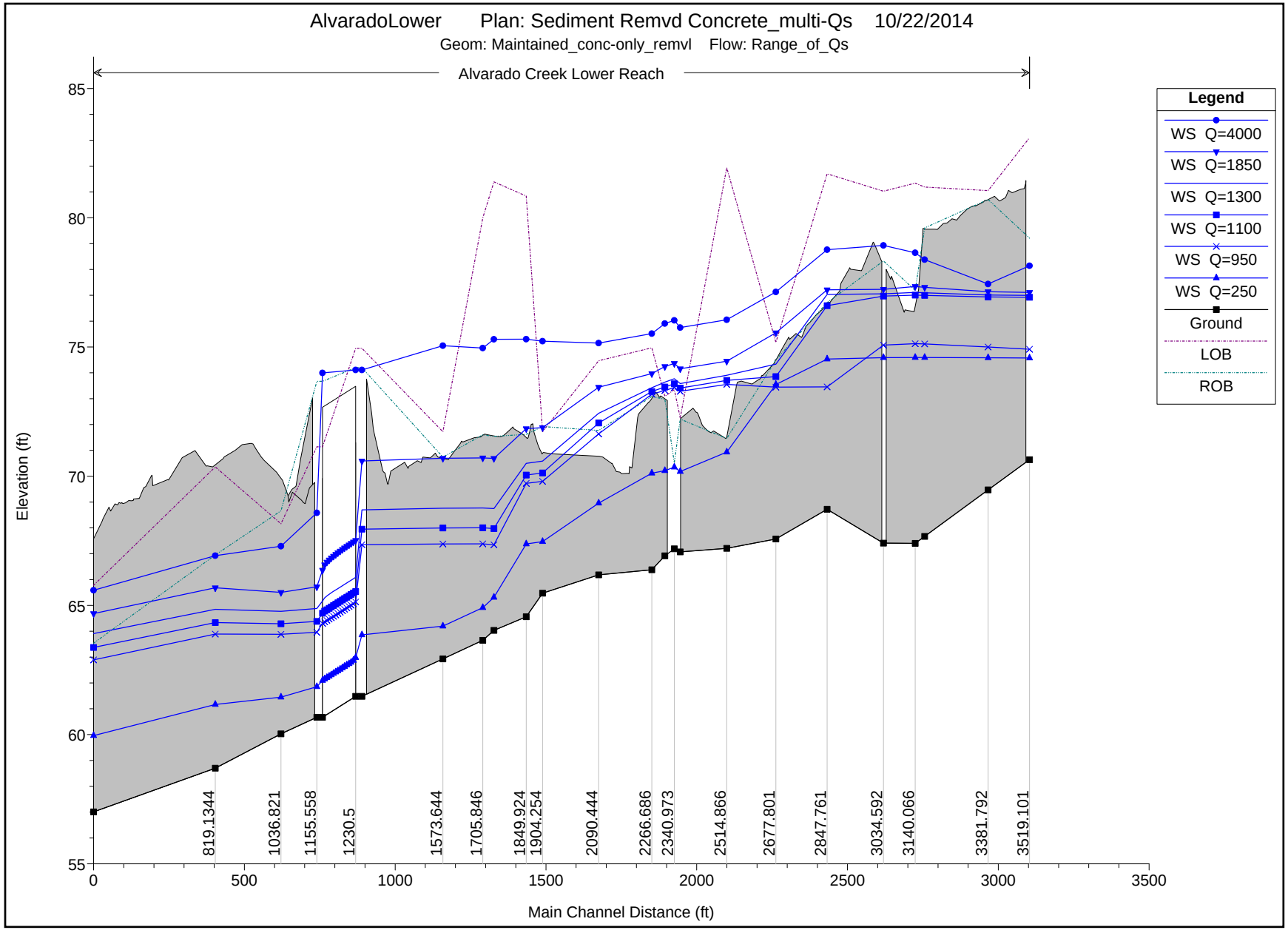
3381.792
3519.101


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
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ROB
Elevation (ft)
Main Channel Distance (ft)
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819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
2266.686
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101

1. Current Vegetated Condition Results with FEMA Flow Rates
2. Current Vegetated Condition Results with Multiple Flow Rates

HEC-RAS Plan: Current Vegetate River: Alvarado Creek Reach: Lower Reach

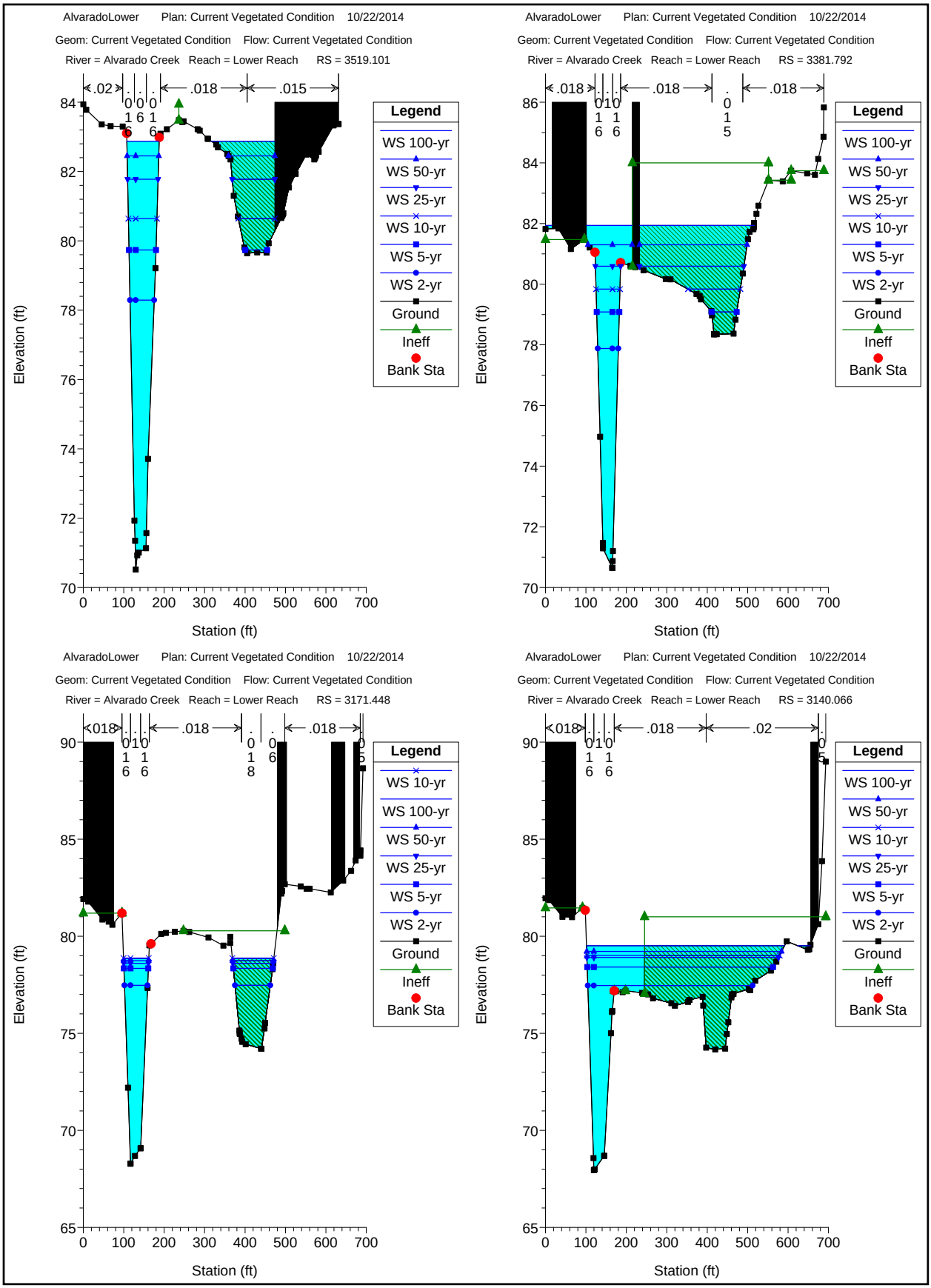
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	100-yr	5100.00	70.52	82.88		83.89	0.002499	8.1	629.48	237.39	0.51
Lower Reach	3519.101	50-yr	4500.00	70.52	82.45		83.34	0.002313	7.6	595.90	193.19	0.48
Lower Reach	3519.101	25-yr	3800.00	70.52	81.78		82.54	0.002199	7.0	544.08	180.88	0.46
Lower Reach	3519.101	10-yr	2700.00	70.52	80.64		81.18	0.001877	5.9	461.00	161.03	0.40
Lower Reach	3519.101	5-yr	2050.00	70.52	79.74		80.15	0.001717	5.1	398.78	121.11	0.37
Lower Reach	3519.101	2-yr	1180.00	70.52	78.29		78.52	0.001311	3.8	306.77	59.91	0.30
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	70.64	81.94	79.78	83.29	0.008382	9.4	550.81	412.94	0.59
Lower Reach	3381.792	50-yr	4500.00	70.64	81.30	79.20	82.71	0.009755	9.6	476.79	375.48	0.63
Lower Reach	3381.792	25-yr	3800.00	70.64	80.59	78.47	81.92	0.010276	9.2	411.55	320.51	0.63
Lower Reach	3381.792	10-yr	2700.00	70.64	79.84	77.15	80.68	0.007597	7.4	365.87	188.72	0.52
Lower Reach	3381.792	5-yr	2050.00	70.64	79.09	76.25	79.71	0.006596	6.4	322.51	118.31	0.47
Lower Reach	3381.792	2-yr	1180.00	70.64	77.88	74.78	78.21	0.004528	4.6	257.84	51.17	0.36
Lower Reach	3171.448	100-yr	5100.00	68.28	78.85	77.44	80.91	0.014926	11.5	443.03	164.65	0.76
Lower Reach	3171.448	50-yr	4500.00	68.28	78.74	76.85	80.40	0.012227	10.3	436.14	163.10	0.68
Lower Reach	3171.448	25-yr	3800.00	68.28	78.60	76.11	79.83	0.009315	8.9	427.34	161.15	0.59
Lower Reach	3171.448	10-yr	2700.00	68.28	78.88	74.79	79.45	0.004143	6.1	444.35	164.94	0.40
Lower Reach	3171.448	5-yr	2050.00	68.28	78.35	73.89	78.73	0.003056	5.0	411.84	157.83	0.34
Lower Reach	3171.448	2-yr	1180.00	68.28	77.47	72.42	77.64	0.001562	3.3	360.35	144.66	0.23
Lower Reach	3140.066	100-yr	5100.00	67.95	79.51	76.84	80.34	0.003697	6.4	724.69	520.78	0.40
Lower Reach	3140.066	50-yr	4500.00	67.95	79.22	76.25	79.93	0.003568	6.2	682.95	482.07	0.39
Lower Reach	3140.066	25-yr	3800.00	67.95	78.91	75.51	79.47	0.003241	5.7	638.03	473.83	0.37
Lower Reach	3140.066	10-yr	2700.00	67.95	79.01	74.25	79.29	0.001505	3.9	653.31	476.64	0.25
Lower Reach	3140.066	5-yr	2050.00	67.95	78.41	73.38	78.61	0.001409	3.6	567.57	459.67	0.24
Lower Reach	3140.066	2-yr	1180.00	67.95	77.46	71.96	77.58	0.001026	2.8	433.84	407.64	0.20
Lower Reach	3034.592	100-yr	5100.00	67.91	79.66	77.21	80.03	0.000860	2.1	1253.19	295.68	0.13
Lower Reach	3034.592	50-yr	4500.00	67.91	79.30	76.61	79.64	0.000901	2.1	1146.88	290.67	0.13
Lower Reach	3034.592	25-yr	3800.00	67.91	78.92	75.86	79.22	0.000902	2.0	1037.87	285.44	0.13
Lower Reach	3034.592	10-yr	2700.00	67.91	78.25	74.51	78.91	0.010455	6.5	413.95	273.33	0.43
Lower Reach	3034.592	5-yr	2050.00	67.91	77.88	73.58	78.30	0.007181	5.2	392.44	263.76	0.35
Lower Reach	3034.592	2-yr	1180.00	67.91	77.23	72.08	77.40	0.003288	3.3	355.62	246.87	0.23
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	68.72	79.39	77.68	79.83	0.001230	1.6	1151.03	286.89	0.11
Lower Reach	2847.761	50-yr	4500.00	68.72	79.01	77.45	79.43	0.001330	1.6	1043.35	279.86	0.11
Lower Reach	2847.761	25-yr	3800.00	68.72	78.64	77.17	79.01	0.001352	1.6	939.47	272.92	0.11
Lower Reach	2847.761	10-yr	2700.00	68.72	77.86	76.72	78.17	0.001656	1.7	731.08	263.62	0.12
Lower Reach	2847.761	5-yr	2050.00	68.72	77.37	75.68	77.63	0.001921	1.7	602.40	258.48	0.13
Lower Reach	2847.761	2-yr	1180.00	68.72	76.82	74.01	76.97	0.001660	1.5	462.37	254.01	0.12
Lower Reach	2677.801	100-yr	5100.00	67.57	77.70	77.70	79.31	0.005583	3.8	617.40	262.89	0.25
Lower Reach	2677.801	50-yr	4500.00	67.57	77.61	77.61	78.94	0.004833	3.5	600.12	257.74	0.23
Lower Reach	2677.801	25-yr	3800.00	67.57	76.98	76.98	78.46	0.006099	3.7	491.82	213.12	0.26
Lower Reach	2677.801	10-yr	2700.00	67.57	76.27	76.27	77.53	0.008177	3.9	376.89	155.49	0.29
Lower Reach	2677.801	5-yr	2050.00	67.57	75.74	75.74	76.87	0.011681	4.3	296.46	148.83	0.35
Lower Reach	2677.801	2-yr	1180.00	67.57	74.05	74.05	75.88	0.107686	10.9	108.51	49.44	1.00
Lower Reach	2514.866	100-yr	5100.00	67.21	76.54	74.91	77.04	0.001189	1.6	1042.76	270.13	0.12
Lower Reach	2514.866	50-yr	4500.00	67.21	76.36	74.66	76.79	0.001067	1.5	994.57	265.02	0.11
Lower Reach	2514.866	25-yr	3800.00	67.21	76.02	74.31	76.39	0.001009	1.5	906.65	255.43	0.11
Lower Reach	2514.866	10-yr	2700.00	67.21	75.41	73.77	75.68	0.000896	1.3	754.76	237.96	0.10
Lower Reach	2514.866	5-yr	2050.00	67.21	74.71	73.39	74.97	0.001092	1.3	595.25	218.11	0.11
Lower Reach	2514.866	2-yr	1180.00	67.21	73.77	72.84	73.96	0.001459	1.4	399.40	202.24	0.12
Lower Reach	2360.635	100-yr	5100.00	67.07	76.15	74.99	76.83	0.001336	7.3	806.11	517.94	0.52
Lower Reach	2360.635	50-yr	4500.00	67.07	76.05	74.73	76.61	0.001120	6.6	785.97	443.43	0.47
Lower Reach	2360.635	25-yr	3800.00	67.07	75.76	74.42	76.23	0.001005	6.1	726.15	381.19	0.44
Lower Reach	2360.635	10-yr	2700.00	67.07	75.21	73.89	75.54	0.000821	5.1	612.58	309.23	0.39
Lower Reach	2360.635	5-yr	2050.00	67.07	74.46	73.48	74.80	0.001003	5.1	466.59	176.04	0.42
Lower Reach	2360.635	2-yr	1180.00	67.07	73.45	72.20	73.75	0.001180	4.7	291.02	167.83	0.44
Lower Reach	2340.973	100-yr	5100.00	67.19	76.51	72.36	76.66	0.000221	3.3	1752.23	785.06	0.22
Lower Reach	2340.973	50-yr	4500.00	67.19	76.35	72.10	76.47	0.000189	3.0	1696.73	773.47	0.20
Lower Reach	2340.973	25-yr	3800.00	67.19	76.01	71.75	76.11	0.000164	2.7	1584.34	620.27	0.18
Lower Reach	2340.973	10-yr	2700.00	67.19	75.39	71.13	75.46	0.000122	2.2	1382.01	414.61	0.16
Lower Reach	2340.973	5-yr	2050.00	67.19	74.65	70.71	74.71	0.000118	2.0	1149.43	318.03	0.15
Lower Reach	2340.973	2-yr	1180.00	67.19	73.63	70.05	73.66	0.000090	1.5	845.96	286.18	0.13
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	76.36	74.37	76.64	0.000487	4.8	1259.67	756.93	0.31
Lower Reach	2309.739	50-yr	4500.00	66.92	76.22	74.18	76.45	0.000421	4.4	1216.23	750.51	0.29
Lower Reach	2309.739	25-yr	3800.00	66.92	75.90	73.96	76.10	0.000385	4.1	1117.89	708.20	0.27
Lower Reach	2309.739	10-yr	2700.00	66.92	75.30	73.47	75.45	0.000326	3.5	940.05	375.47	0.25
Lower Reach	2309.739	5-yr	2050.00	66.92	74.55	72.56	74.69	0.000407	3.6	723.21	281.09	0.27

HEC-RAS Plan: Current Vegetate River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2309.739	2-yr	1180.00	66.92	73.49	71.17	73.65	0.000525	3.5	425.85	249.60	0.30
Lower Reach	2266.686	100-yr	5100.00	66.38	76.25	74.89	76.59	0.001486	2.0	1252.18	656.88	0.13
Lower Reach	2266.686	50-yr	4500.00	66.38	75.84	74.48	76.38	0.002111	2.3	928.00	451.25	0.16
Lower Reach	2266.686	25-yr	3800.00	66.38	75.57	74.07	76.03	0.002077	2.2	845.94	407.28	0.16
Lower Reach	2266.686	10-yr	2700.00	66.38	75.05	73.58	75.39	0.002069	2.1	701.25	301.26	0.15
Lower Reach	2266.686	5-yr	2050.00	66.38	74.29	72.53	74.63	0.004285	2.8	504.59	246.39	0.22
Lower Reach	2266.686	2-yr	1180.00	66.38	73.30	71.08	73.57	0.010911	4.0	283.19	184.15	0.34
Lower Reach	2090.444	100-yr	5100.00	66.18	75.53	73.80	76.24	0.001976	5.1	847.43	764.14	0.36
Lower Reach	2090.444	50-yr	4500.00	66.18	75.47	73.50	76.04	0.001613	4.6	834.04	758.58	0.32
Lower Reach	2090.444	25-yr	3800.00	66.18	75.27	73.16	75.72	0.001360	4.1	788.45	739.29	0.30
Lower Reach	2090.444	10-yr	2700.00	66.18	74.84	72.62	75.12	0.000984	3.3	692.12	700.91	0.25
Lower Reach	2090.444	5-yr	2050.00	66.18	73.94	72.27	74.21	0.001296	3.5	511.84	395.47	0.28
Lower Reach	2090.444	2-yr	1180.00	66.18	72.40	70.60	72.66	0.002894	4.2	284.95	141.96	0.40
Lower Reach	1904.254	100-yr	5100.00	65.47	75.97	73.90	76.00	0.000064	1.2	4062.55	1223.74	0.07
Lower Reach	1904.254	50-yr	4500.00	65.47	75.59	73.78	75.76	0.000507	3.2	1342.91	1207.78	0.20
Lower Reach	1904.254	25-yr	3800.00	65.47	75.34	73.50	75.49	0.000455	3.0	1252.56	1183.87	0.19
Lower Reach	1904.254	10-yr	2700.00	65.47	74.86	72.80	74.96	0.000383	2.6	1071.60	1135.96	0.17
Lower Reach	1904.254	5-yr	2050.00	65.47	73.83	71.26	73.98	0.000853	3.5	694.91	917.96	0.25
Lower Reach	1904.254	2-yr	1180.00	65.47	71.37	69.83	71.97	0.004438	6.2	189.70	154.58	0.55
Lower Reach	1849.924	100-yr	5100.00	64.56	75.95	73.57	75.99	0.000122	1.1	3152.48	923.33	0.07
Lower Reach	1849.924	50-yr	4500.00	64.56	75.67	72.73	75.71	0.000124	1.1	2897.02	922.91	0.07
Lower Reach	1849.924	25-yr	3800.00	64.56	75.41	72.44	75.44	0.000117	1.0	2657.42	922.51	0.06
Lower Reach	1849.924	10-yr	2700.00	64.56	74.76	70.48	74.92	0.000869	2.7	863.36	825.89	0.17
Lower Reach	1849.924	5-yr	2050.00	64.56	73.74	69.62	73.92	0.001496	3.2	612.96	653.03	0.21
Lower Reach	1849.924	2-yr	1180.00	64.56	71.34	68.25	71.63	0.004593	4.4	269.94	109.24	0.34
Lower Reach	1742.873	100-yr	5100.00	64.03	75.94	73.41	75.98	0.000100	1.0	3379.75	934.77	0.06
Lower Reach	1742.873	50-yr	4500.00	64.03	75.66	72.94	75.70	0.000101	1.0	3120.87	934.38	0.06
Lower Reach	1742.873	25-yr	3800.00	64.03	75.40	70.98	75.43	0.000095	0.9	2878.59	934.01	0.05
Lower Reach	1742.873	10-yr	2700.00	64.03	74.65	69.71	74.82	0.001053	2.9	828.73	873.35	0.18
Lower Reach	1742.873	5-yr	2050.00	64.03	73.54	68.84	73.74	0.001938	3.6	571.55	696.38	0.24
Lower Reach	1742.873	2-yr	1180.00	64.03	70.90	67.47	71.17	0.003940	4.2	284.13	92.45	0.32
Lower Reach	1705.846	100-yr	5100.00	63.85	75.95	72.82	75.97	0.000064	1.1	4193.35	1269.72	0.07
Lower Reach	1705.846	50-yr	4500.00	63.85	75.67	72.54	75.69	0.000067	1.1	3840.03	1269.37	0.07
Lower Reach	1705.846	25-yr	3800.00	63.85	75.27	70.93	75.41	0.000505	3.0	1257.86	1259.39	0.18
Lower Reach	1705.846	10-yr	2700.00	63.85	74.66	69.69	74.78	0.000464	2.8	984.23	1140.42	0.17
Lower Reach	1705.846	5-yr	2050.00	63.85	73.53	68.85	73.68	0.000759	3.2	663.37	849.09	0.21
Lower Reach	1705.846	2-yr	1180.00	63.85	70.79	67.48	71.06	0.002236	4.2	282.98	54.34	0.32
Lower Reach	1573.644	100-yr	5100.00	63.68	75.93	72.31	75.96	0.000075	1.2	3817.20	1099.05	0.06
Lower Reach	1573.644	50-yr	4500.00	63.68	75.66	72.27	75.68	0.000077	1.2	3511.95	1098.22	0.06
Lower Reach	1573.644	25-yr	3800.00	63.68	75.34	71.61	75.36	0.000077	1.1	3161.06	1097.28	0.06
Lower Reach	1573.644	10-yr	2700.00	63.68	74.64	69.37	74.72	0.000322	2.2	1157.77	976.74	0.13
Lower Reach	1573.644	5-yr	2050.00	63.68	73.47	68.50	73.58	0.000640	2.9	786.06	753.59	0.17
Lower Reach	1573.644	2-yr	1180.00	63.68	70.44	67.13	70.74	0.002627	4.4	270.48	66.37	0.33
Lower Reach	1305.41	100-yr	5100.00	62.42	75.16	71.16	75.84	0.001967	7.3	886.50	949.17	0.44
Lower Reach	1305.41	50-yr	4500.00	62.42	74.85	70.49	75.56	0.002002	7.2	739.38	890.96	0.44
Lower Reach	1305.41	25-yr	3800.00	62.42	74.57	69.68	75.24	0.001852	6.8	615.82	799.96	0.42
Lower Reach	1305.41	10-yr	2700.00	62.42	74.03	68.27	74.53	0.001400	5.7	475.96	639.55	0.36
Lower Reach	1305.41	5-yr	2050.00	62.42	72.94	67.32	73.32	0.001231	5.0	413.77	461.52	0.32
Lower Reach	1305.41	2-yr	1180.00	62.42	69.94	65.86	70.22	0.001447	4.3	275.51	41.62	0.29
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.67	70.04	68.38	71.72	0.002643	10.4	490.15	81.11	0.70
Lower Reach	1155.558	50-yr	4500.00	60.67	69.93	67.87	71.28	0.002161	9.3	482.40	72.58	0.63
Lower Reach	1155.558	25-yr	3800.00	60.67	70.26	67.23	71.14	0.001328	7.5	506.34	100.43	0.50
Lower Reach	1155.558	10-yr	2700.00	60.67	69.66	66.06	70.18	0.000883	5.8	462.91	70.69	0.40
Lower Reach	1155.558	5-yr	2050.00	60.67	68.98	65.24	69.35	0.000709	4.9	415.77	68.14	0.35
Lower Reach	1155.558	2-yr	1180.00	60.67	67.57	63.92	67.78	0.000510	3.6	323.75	62.85	0.28
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.08	70.02	69.68	70.92	0.010897	7.1	676.13	257.39	0.49
Lower Reach	1036.821	50-yr	4500.00	60.08	69.81	68.43	70.62	0.010981	7.0	624.13	249.31	0.49
Lower Reach	1036.821	25-yr	3800.00	60.08	69.67	67.75	70.73	0.016419	8.5	470.58	246.58	0.59
Lower Reach	1036.821	10-yr	2700.00	60.08	69.19	66.51	69.91	0.011778	6.8	403.12	202.59	0.49
Lower Reach	1036.821	5-yr	2050.00	60.08	68.62	65.66	69.13	0.009573	5.8	355.29	123.65	0.44
Lower Reach	1036.821	2-yr	1180.00	60.08	67.34	64.24	67.62	0.007152	4.3	276.26	58.32	0.35
Lower Reach	819.1344	100-yr	5100.00	58.79	68.06	66.51	68.82	0.008209	4.4	857.03	299.56	0.32
Lower Reach	819.1344	50-yr	4500.00	58.79	67.91	66.04	68.54	0.007951	4.3	811.81	298.46	0.31
Lower Reach	819.1344	25-yr	3800.00	58.79	67.71	65.46	68.21	0.007637	4.1	753.76	297.03	0.30

HEC-RAS Plan: Current Vegetate River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	819.1344	10-yr	2700.00	58.79	67.39	64.42	67.74	0.007714	4.0	607.86	290.12	0.30
Lower Reach	819.1344	5-yr	2050.00	58.79	67.06	63.68	67.30	0.006839	3.6	539.77	277.85	0.28
Lower Reach	819.1344	2-yr	1180.00	58.79	65.89	62.47	66.06	0.006867	3.3	358.70	97.20	0.27
Lower Reach	415.466	100-yr	5100.00	57.01	65.88	62.35	66.41	0.005005	2.6	1220.96	401.54	0.17
Lower Reach	415.466	50-yr	4500.00	57.01	65.73	61.99	66.16	0.005000	2.6	1158.92	400.93	0.17
Lower Reach	415.466	25-yr	3800.00	57.01	65.53	61.53	65.85	0.005009	2.5	1079.23	400.14	0.17
Lower Reach	415.466	10-yr	2700.00	57.01	65.16	60.74	65.33	0.005005	2.4	932.74	398.69	0.17
Lower Reach	415.466	5-yr	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	2-yr	1180.00	57.01	63.61	59.38	63.68	0.005009	2.1	565.44	112.07	0.16


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
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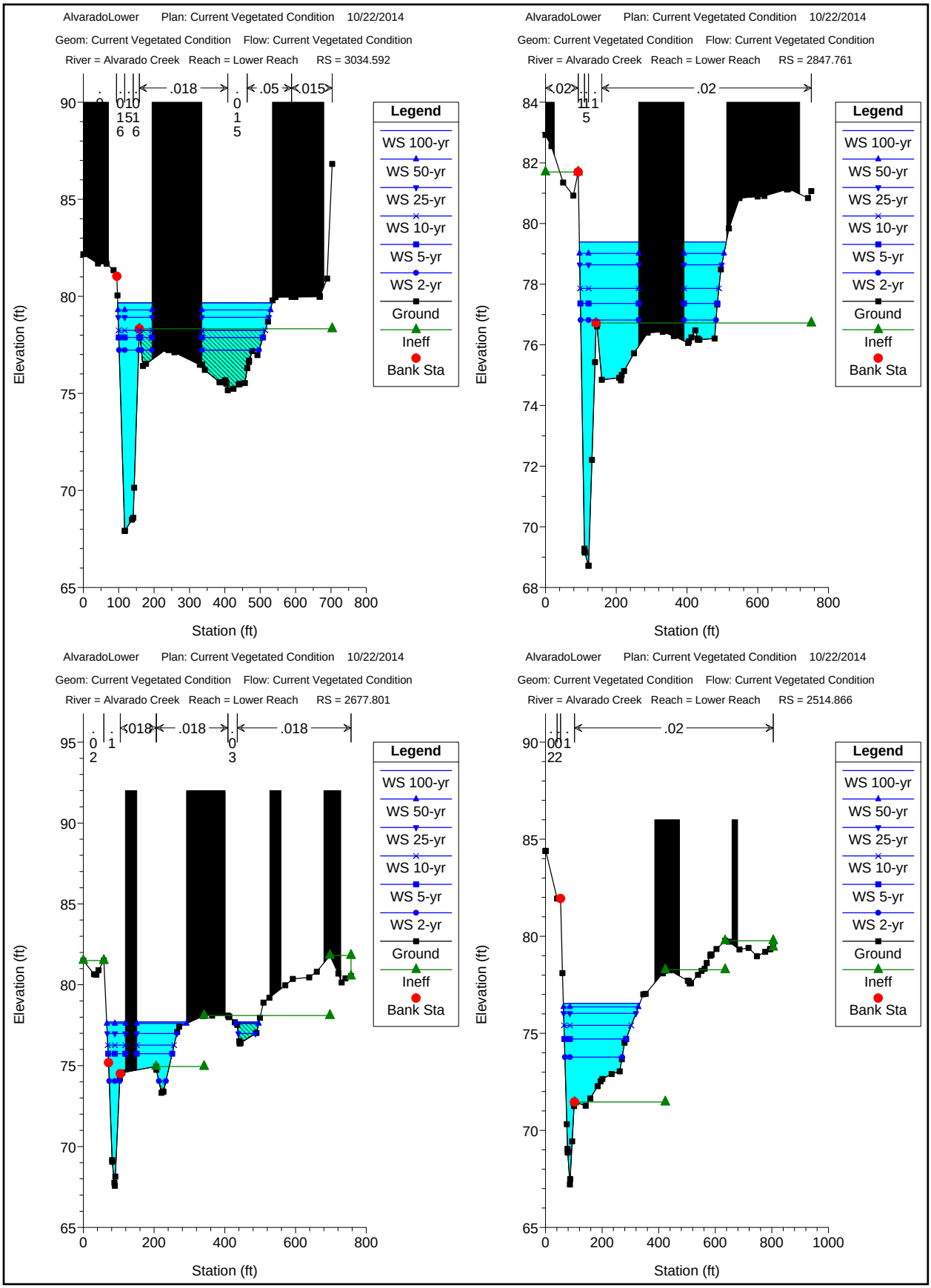
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018 .018 .018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018 .018 .018
Legend
WS 10-yr
WS 100-yr
WS 50-yr
WS 25-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018 .018 .02
Legend
WS 100-yr
WS 50-yr
WS 10-yr
WS 25-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
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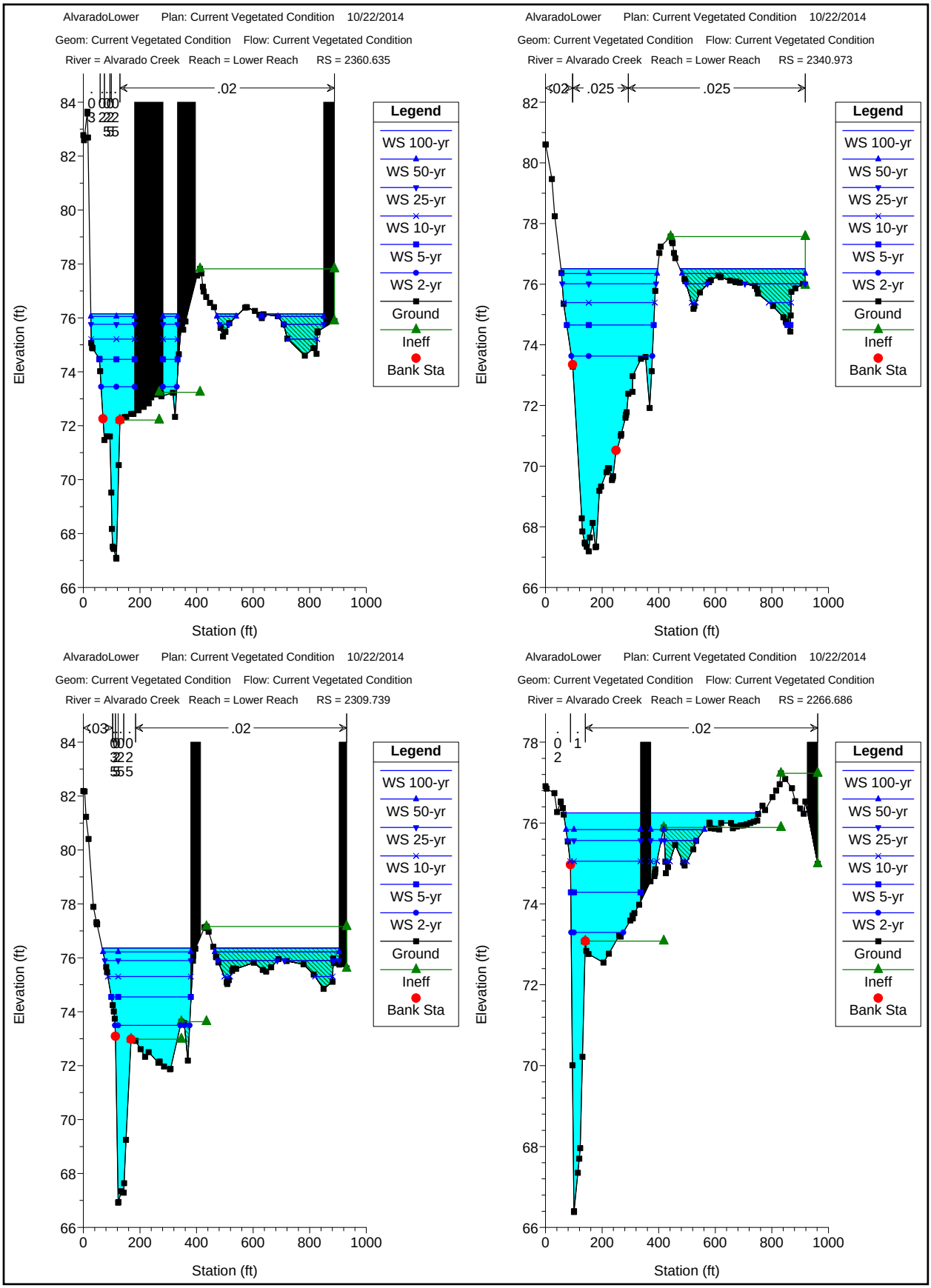
.018
.05
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
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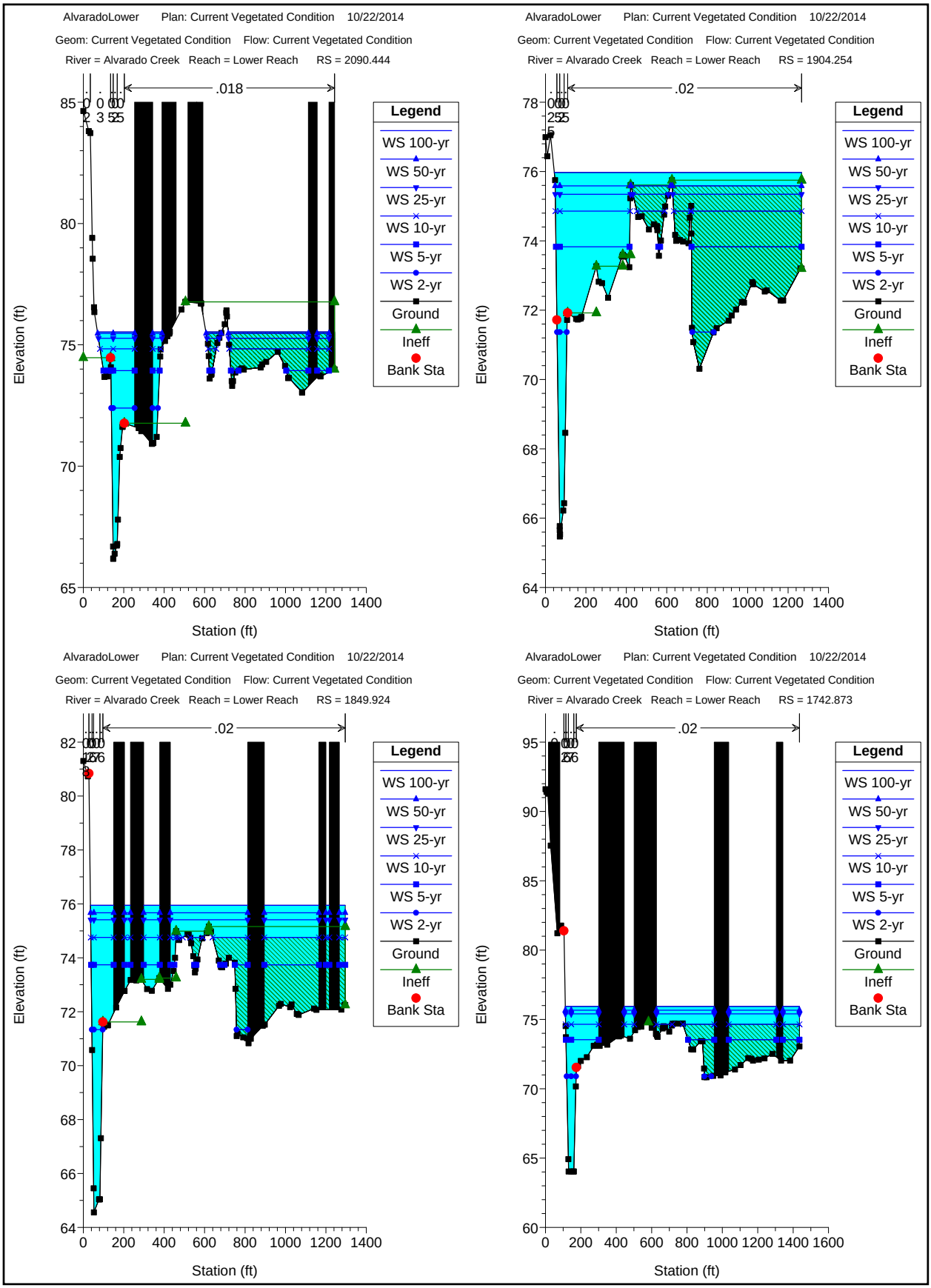
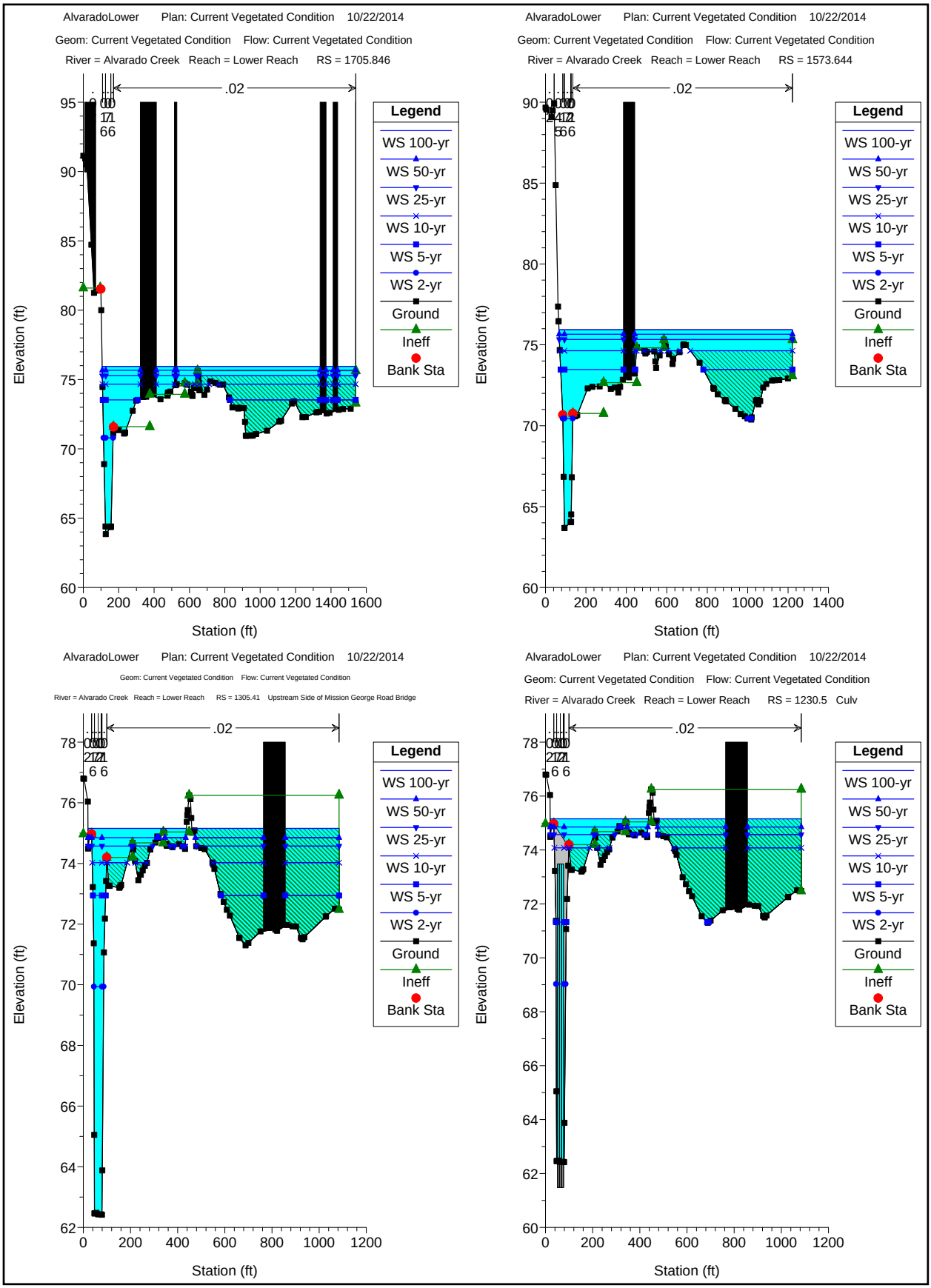
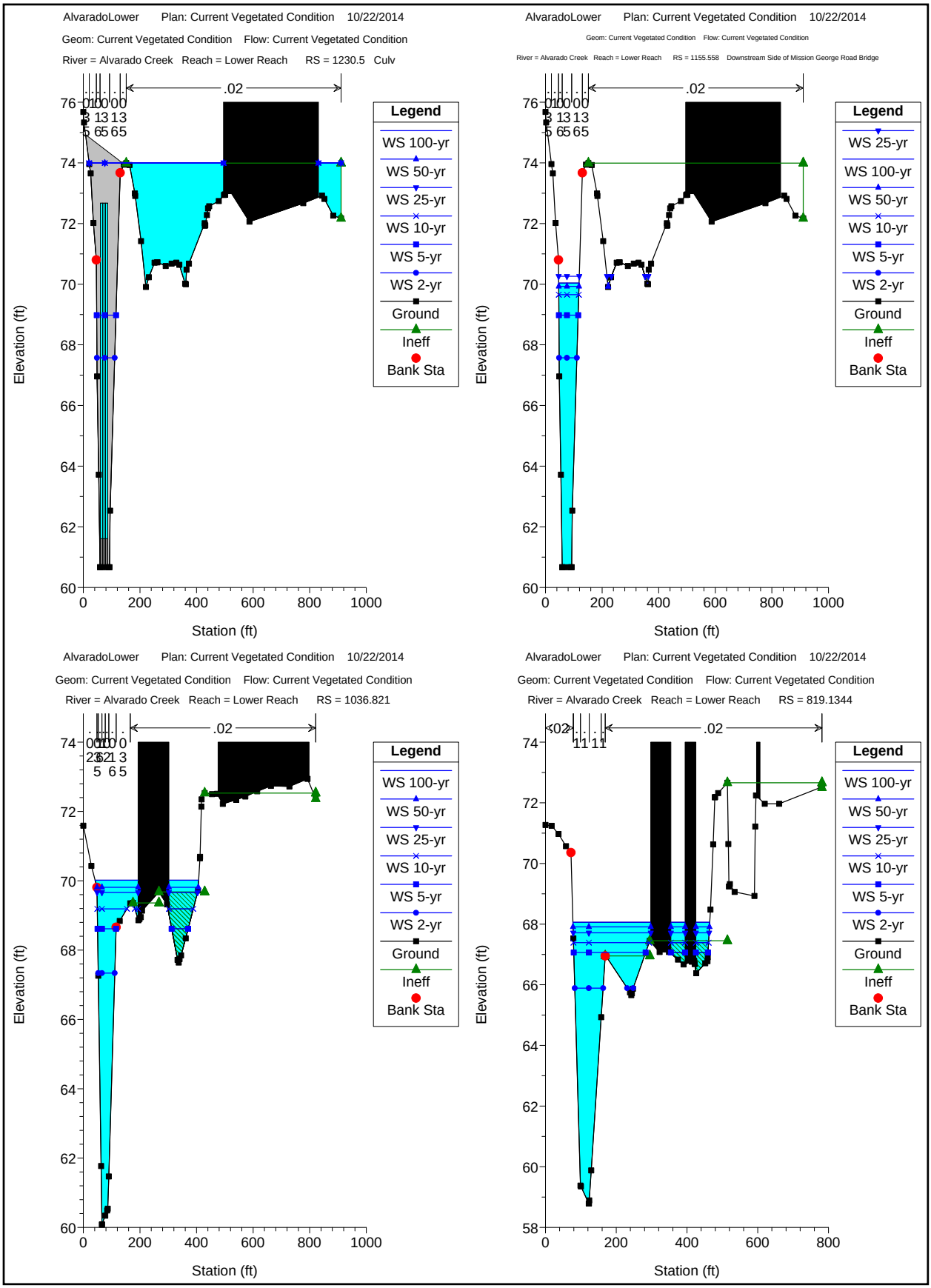
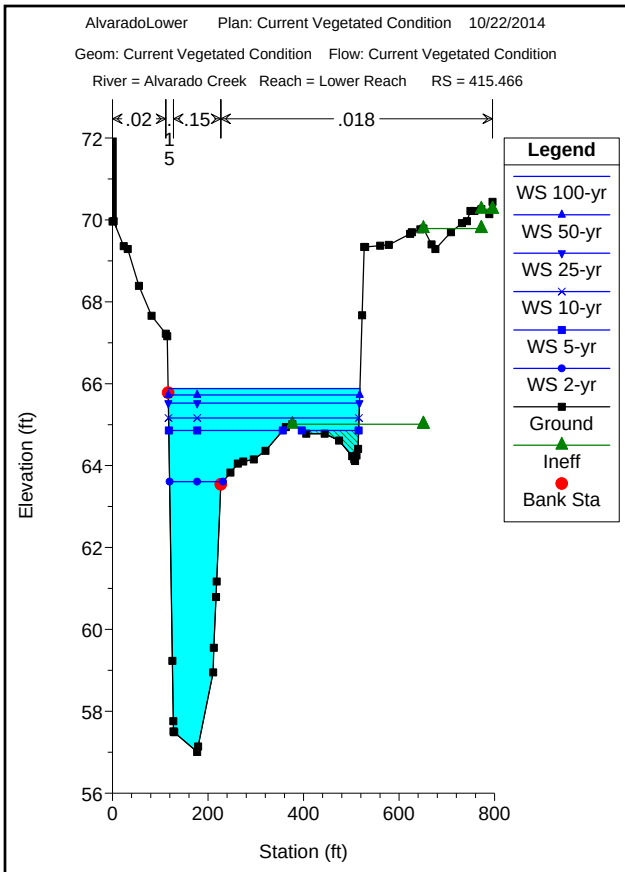
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS 25-yr
WS 100-yr
WS 50-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Condition 10/22/2014
Geom: Current Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 10:43:06 AM

Project in English units

PLAN DATA

Plan Title: Current Vegetated Condition
Plan File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.p01

Geometry Title: Current Vegetated Condition
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g02

Flow Title : Current Vegetated Condition
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f01

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Current Vegetated Condition
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f01

Flow Data (cfs)

River	Reach	RS	100-yr	50-yr	25-yr	10-yr	5-yr	2-yr
Alvarado Creek	Lower Reach	3519.101	5100	4500	3800	2700	2050	1180

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	100-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	50-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	25-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	10-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	5-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	2-yr	Normal S = 0.005	

GEOMETRY DATA

Geometry Title: Current Vegetated Condition
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g02

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94
328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64
430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.016	126.44	.06	155.92	.016	190.95	.018
405.16	.015								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
107.14	188.01	137.3	137.31	137.44	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent

```
  236.14   631.5              F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  473.62   631.5      84
```

LATERAL STRUCTURE

```
RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3506.967

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.44     .54   81.34    5.52   81.13   15.16   81.11   45.52   80.97
   57.61   81.06   60.29   80.98   67.08   80.78   77.87   80.71   87.14   80.65
  103.56   80.83  107.18   80.81  118.93   80.74  131.34   80.66  135.42   80.68
  139.97   80.61  157.29   80.51  165.59   80.46   176.5   80.45  193.52   80.34
  215.72    80.1  223.61   79.99  228.63   79.91  244.19   79.96  252.53   79.88
  260.39    79.8   273.3   79.78  293.11   79.55  302.58   79.56   316.4   79.56
  331.68   79.56   341.8   79.59   343.2   79.34  343.49   79.29  358.82   77.39
  359.99   77.22  360.28   77.21   377.6   76.37  397.84   76.41  407.72   76.44
   410.6   76.34  430.83   77.02  452.14   77.73  453.48   77.73  455.44   77.62
  470.17      78

Weir crest shape                          = Broad Crested
```

CROSS SECTION

```
RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3381.792

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.82   32.03   81.84   62.76   81.16   96.23   81.47  109.42   81.21
   122.6   81.05  135.12   74.97  141.89   71.47  142.23   71.29  165.14   70.65
  165.47   70.64  165.73   70.64  166.19   70.87  166.87    71.2  185.99   80.71
  210.05   80.61  221.99   80.56  242.35   80.46  297.45   80.17  309.35   80.16
  373.54   79.68  381.29   79.61   384.5    79.5  410.52   79.11  411.74   78.97
  416.74   78.36  416.89   78.34  423.53   78.35  465.23   78.37  469.91   78.83
  488.01   80.35  500.64   81.48  504.86   81.73  514.07   81.81  515.55   82.02
  515.73   81.88  521.84   82.32  526.82   82.59  551.59   83.43  586.82   83.39
  607.56   83.74  647.33   83.65  666.66   83.61  674.54   84.13  687.77   84.86
  688.54   85.83

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   122.6    .016  141.89      .1  166.19    .016  185.99    .018
  411.74    .015  488.01    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        122.6  185.99           209.35  210.34   211.8             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  607.56  688.54   83.74       F
  551.59  607.56   83.43       F
       0   96.23   81.47       F
     215  551.59      84       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  214.24  232.41      86   16.29  101.01      86
```

CROSS SECTION

```
RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3171.448

INPUT
Description:
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.91    11.9   81.78   47.16   80.86    62.8   80.75   71.89   80.59
   95.69   81.19  110.54    72.2  116.71   68.28  116.75   68.29  127.82   68.68
  141.72   69.08  141.98   69.08  158.74   77.34  163.16   79.53   164.4   79.54
  167.68   79.61  192.51   80.12  204.24   80.17  226.22   80.23   247.8   80.28
  262.03   80.22  309.68   79.94  346.41   79.52  363.13   79.65  363.46   79.97
  385.92   75.14  386.67   75.01     387   74.97  391.37   74.72  393.12   74.56
  401.53   74.44  439.47   74.21  440.47    74.2   448.3   75.25  449.63   75.54
  468.16    78.3  468.82    78.4  469.79   78.63  489.77    82.2  491.15   82.34
   491.2   82.34  498.23   82.68   537.5   82.57  552.22   82.45  560.01   82.45
  612.04   82.26  642.71   82.87  662.61   83.37  673.58   83.91  685.09   84.15
  685.14   84.15  685.54   84.42  691.85   88.65

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   95.69    .016  116.71      .1  141.72    .016  163.16    .018
  391.37    .018  439.47     .06  498.23    .018  685.09     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         95.69  167.68            32.79   31.38   28.21             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   95.69   81.19       F
  247.8  498.23   80.28       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  480.04  502.74      90   613.7  647.07      90  668.49  683.59      90
       0   75.03      90
```

CROSS SECTION

```
RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3140.066

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.96     8.74   81.86   42.06      81    65.8   80.98   91.59   81.46
   98.56   81.34   118.7   68.57  119.67   67.95  120.26   67.96  121.78   67.99
  145.21   68.69  145.46   68.69  161.99      75   164.4    76.1  165.21   76.15
  169.88   77.19  174.56   77.17  190.83   77.12   197.8    77.2  238.98   77.08
  253.88      77  265.89    76.8  311.18   76.55  320.11   76.42  352.63   76.62
   356.3   76.72  388.74   76.88  390.22   76.43  397.39   74.26  419.63   74.17
  444.35   74.21  448.51   74.97  452.16   75.57  459.93   76.85  460.97      77
  461.51   76.99   465.1   77.03  502.63   77.29  505.62   77.24  506.27   77.23
  518.73   77.71  557.63   78.23   570.9   78.69  596.76   79.74  648.95    79.3
  652.42   79.33  655.52   79.56  674.71   80.62  683.87   83.87  693.26   88.99

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   98.56    .016  119.67      .1  145.46    .016  169.88    .018
  397.39     .02  674.71     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         98.56  169.88           101.61  105.47  112.32             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0   91.59   81.46       F
     245  693.26      81       F
```

```
  169.88   197.8   77.19       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   656.1  675.15      90       0   74.95      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3034.592

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.17   41.57   81.69   65.68   81.67   85.26   81.35   93.68   81.06
   94.76   81.03   96.42   80.05  117.02   67.91  117.43   67.92  137.35    68.5
  140.94   68.59  140.98   68.59  143.73   70.14  158.51   78.33  168.47   76.41
  177.34   76.52  235.03   77.29  240.05   77.26  241.67   77.23  257.49   77.12
  329.16   76.48  336.01   76.48  343.31   76.21  385.02   75.58  387.61   75.57
  400.89   75.68  402.29   75.62  403.95   75.53  404.59   75.49   408.4   75.16
  424.44   75.24  439.37   75.46  441.01   75.48  441.88   75.49  456.66   75.53
  463.42    76.3  467.85   76.62  468.83   76.69  477.64   77.18  492.12   76.97
   521.9    78.7  535.11   79.79  543.17   79.96  588.58   79.97  599.19   79.97
   668.1   79.98  668.55   79.98     669   80.01  689.24   80.91  703.56   86.82

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   93.68    .016  117.02     .15  140.94    .016  158.51    .018
   408.4    .015  463.42     .05  588.58    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        94.76  158.51          187.47  186.83  186.24             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  158.51  703.56   78.33       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  194.38  335.17      90  534.53  679.65      90       0   71.12      90

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3029.094

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    78.3    8.27   78.53   24.08   78.97   27.46   79.04   29.05   79.06
   32.68   78.95   64.72   78.04   68.27   77.95  105.22   78.01  107.55   78.07
  109.84   78.02  137.03   77.47  141.61   77.16  163.84   76.88  166.62   76.84
   175.9    76.7  177.53   76.74  199.71   76.45  222.84   76.21  239.06   75.98
  253.17   75.82   267.4    75.4  268.16   75.39  268.52   75.38  268.91   75.37
  287.49   75.52  290.21   75.49  308.94    75.3  311.48   75.38   330.3   75.01
  354.72   74.49  356.27   74.51  357.22   74.47  358.77   74.39  398.52   73.89
  400.93    73.9  407.71   73.76  411.58   73.74  422.05   73.66  432.57   73.57
  432.74   73.57  435.41   73.57  438.91   73.58  469.01   73.68  481.53   73.64
  483.87   73.56  485.52    73.5  486.41   73.42  517.76   71.49  517.78   71.49
  520.34   71.46  561.12   71.75  566.99    71.7  569.05   71.68  578.17   71.73
  589.02   71.85  599.02   71.97  599.46   71.99  613.78   72.42  616.75   72.47
  619.29   72.47  619.96   72.48  630.11   72.63  657.92   72.36  659.77   72.35
 671.397   72.23

Weir crest shape                        = Broad Crested

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2847.761

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.92   16.76   82.55   49.95   81.35   78.58   80.92   92.48    81.7
  110.07   69.28  110.17    69.2  110.31   69.19  111.28   69.15   121.5   68.72
  121.55   68.72  131.16   72.21  140.04   75.43  143.16   76.72  145.57   76.61
  159.23   74.85  208.25   74.91  213.53   74.83  215.34   75.01  222.23   75.14
  249.85   75.72  288.72    76.4  331.44   76.43  362.93   76.29  403.25   76.06
   405.6   76.12   412.7   76.25  423.57   76.48  430.12   76.21  430.64   76.17
  435.34   76.17  477.89   76.21  485.28   77.33  495.73   78.49  518.76   79.84
  548.46   80.84  599.76   80.89  618.77   80.91  682.32   81.13  684.48   81.13
  687.11   81.15  742.11   80.84  751.33   81.07

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02   92.48     .1  110.07    .15   121.5     .1  159.23    .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        92.48  143.16          165.5  169.96   176.8             .1      .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   92.48    81.7       F
  143.16  751.33   76.72       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  263.23  391.75      84  512.38   718.6      84       0   24.64      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2677.801

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    81.5   30.52   80.65   36.77   80.62   42.89    80.9    58.1    81.5
   71.39   75.18    81.5   69.16   81.67   69.06   87.66   67.76   89.09   67.57
   90.29   68.14  103.25   74.21  103.93   74.52  104.55    74.5  110.68   74.57
   205.6   74.95  206.53   74.74  221.08   73.32  225.22    73.4  226.53   73.39
  265.25   77.08  271.06   77.41  338.32   78.06  339.78    78.1  341.36    78.1
  364.19   78.09  408.76   78.09  410.69      78  412.65   78.03     428   77.68
  435.25   77.52  440.78   76.52  441.72   76.36  444.58   76.41  489.46   77.02
  499.32   77.96  509.15    78.9   525.8    79.2  570.88   79.97   592.3   80.36
   638.5   80.46  660.12   80.81  697.06   81.81  720.99   80.69  730.29   80.14
  740.99    80.4  756.67   80.53

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    58.1     .1  104.55    .018  206.53    .018  408.76    .03
  435.25    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        71.39  104.55          162.85  162.93  162.56             .1      .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  697.06  756.67   81.81       F
       0    58.1    81.5       F
  341.36  697.06    78.1       F
   205.6  341.36   74.95       F
Blocked Obstructions     num=       4
```

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.1	102.77	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.2 102.77 158.36 154.23 152.81 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
69.46 129.21 19.33 19.66 19.62 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.77 249.12 34.23 31.23 27.43 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2

365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
27.83 96.83 119.68 107.05 93.87 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.06 174.16 35.7 37.03 38.3 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59

```
  527.93   74.67  573.35   74.74  584.49   74.63  587.62   74.63  608.51    74.1
     609   74.08  614.43   73.91  616.78   73.83  617.03   73.82  625.88   74.38
   645.8   75.63  650.57   75.18  650.85   75.16  653.22   74.76  654.71   74.51
  656.37   74.24  657.62   74.22  684.24    73.9  699.43   74.27  718.21   74.86
  746.25   74.76  771.58   74.62  790.23   74.63  823.59   73.71  842.73   72.98
   875.8   72.91  879.23   72.96  882.45   72.96  908.01   72.93  913.82   71.94
   918.4   70.94  923.37   70.94  944.94   70.95   956.3   70.95  959.07   70.98
  977.17   71.07 1038.22   71.31 1107.69   71.96 1115.86   72.02 1118.32   72.03
 1180.11   73.27 1189.97   73.42  1192.4   73.42 1238.94   72.28 1257.56   72.29
 1318.12   72.63 1332.62   72.67 1375.41   72.55 1391.96    72.6 1443.89   72.81
 1468.48   72.87 1511.38    72.9 1540.35   73.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  108.43    .016  125.33     .07  155.61    .016  171.11     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        99.12  171.11          136.62   132.2  123.01             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0   95.63    81.6       F
   645.8 1540.35   75.63       F
  573.35   645.8   74.74       F
   375.7  573.35   73.93       F
   170.1   375.7    71.6       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  322.16  412.72      95     7.5   69.77      95  514.93  528.44      95
1412.52 1438.18      95 1338.43 1372.34      95 1539.91 1540.35      95

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1573.644

INPUT
Description:
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   89.66    4.03   89.55   29.17   89.08   36.04   89.48   43.05   89.93
   50.48   84.87   61.87   77.37   64.86   76.47   70.17   74.68   85.63   70.67
   89.75   66.84   93.76   63.68   94.09   63.68  124.89   64.04  124.96   64.04
  126.79   64.06  127.33   64.52  130.23   66.81  135.25   70.76  145.46   70.58
  152.61   70.64  156.91   70.67  208.87   72.31  232.07    72.4  268.04   72.43
  287.13   72.67   322.8   72.28  342.36   72.36  359.71   72.05  369.42    72.4
   382.2   72.84  413.09   72.99  439.86    73.3  442.26   73.22  451.68   74.82
  451.93   74.85  489.05   74.62  492.33    74.6  494.22   74.46  496.02   74.55
  502.05   74.56  537.94   74.59  543.47   73.97  547.27   73.57   564.7   74.35
  585.61   75.32  589.03   75.19  595.39    74.9  610.65   74.42  628.48   73.82
  628.64   73.83  632.03   74.14   662.9   74.55  681.75   74.98  683.52   75.03
  694.87   74.98  762.03    73.9  829.96   72.34  834.17   72.28  852.61   71.94
  886.74   71.57  889.76    71.6  890.89   71.53  893.47   71.51  939.27   71.05
  964.87   70.72  985.97   70.58  999.54   70.45 1017.68   70.38  1019.9   70.52
 1040.58   71.55 1043.19   71.55 1044.08   71.56 1045.68    71.6 1053.71   71.31
 1062.36   71.53 1076.84   72.35 1092.33   72.58 1121.01    72.8 1135.54   72.81
 1156.84   72.83 1199.56   72.92 1221.53   73.08

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   43.05    .045   85.63    .016   93.76     .07  124.89     .02
  126.79    .016  135.25     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        85.63  135.25          286.27  268.23  249.58             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  585.61 1221.53   75.32       F
  451.68  585.61   74.82       F
  287.13  451.68   72.67       F
  135.25  287.13   70.76       F

Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  385.47   441.5      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.8    3.18   76.79   18.93   76.04   20.08   74.49   25.29   74.92
    35.1   74.97   40.35   73.22   44.03   71.37   46.28   65.05   47.46   62.46
   47.61   62.46   55.75   62.48   62.69   62.43   75.77   62.43   79.09   62.42
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57 1028.2    72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    35.1    .016   47.46     .07   62.69     .02   75.77     .07
   79.09    .016   99.47     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        35.1   99.47          148.68  149.85  158.44             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

CULVERT


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1230.5

INPUT
Description:
Distance from Upstream XS =      21
Deck/Roadway Width        =     110
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    35.1   74.97              99    74.1

Upstream Bridge Cross Section Data
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.8    3.18   76.79   18.93   76.04   20.08   74.49   25.29   74.92
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    35.1   74.97   40.35   73.22   44.03   71.37   46.28   65.05   47.46   62.46
   47.61   62.46   55.75   62.48   62.69   62.43   75.77   62.43   79.09   62.42
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57 1028.2    72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    35.1    .016   47.46    .07   62.69    .02   75.77    .07
   79.09    .016   99.47    .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47           .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97          124.06    74.1          143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96      .1   46.27    .016   59.22    .035   92.72    .016
  130.44    .035  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         46.27  130.44           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins        =    74.1
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss
Coef
                21     110     .018      .06      .94                    .4                1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96      .1   46.27    .016   59.22    .035   92.72    .016
  130.44    .035  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
```

Lateral structure position = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	52.88	.16	65.67	.1	77.5	.02
89.98	.016	115.82	.035	165.64	.02				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
48.23 115.82 217.42 217.69 218.99 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	78.67	.1	98.97	.1	123.52	.1	157.62	.1
168.96	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.14 168.96 431.18 403.67 344.14 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37

578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

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

116.54	226.72	420.92	415.47	422.02	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.016	.06	.016	.018	.015			
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.1	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.1	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.1	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.15	.016	.018	.015	.05	.015	
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.1	.15	.1	.02				
Lower Reach	2677.801	.02	.1	.018	.018	.03	.018			
Lower Reach	2514.866	.02	.02	.1	.02					
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								
Lower Reach	2309.739	.03	.035	.025	.025	.025	.02			
Lower Reach	2266.686	.02	.1	.02						
Lower Reach	2090.444	.02	.03	.05	.02	.05	.018			
Lower Reach	1904.254	.025	.05	.02	.05	.02				
Lower Reach	1849.924	.018	.02	.06	.07	.06	.02			
Lower Reach	1742.873	.018	.02	.06	.07	.06	.02			
Lower Reach	1705.846	.02	.016	.07	.016	.02				
Lower Reach	1573.644	.02	.045	.016	.07	.02	.016	.02		
Lower Reach	1305.41	.02	.016	.07	.02	.07	.016	.02		
Lower Reach	1230.5	Culvert								
Lower Reach	1155.558	.035	.1	.016	.035	.016	.035	.02		
Lower Reach	1149.024	Lat Struct								
Lower Reach	1121.496	Lat Struct								
Lower Reach	1036.821	.02	.035	.16	.1	.02	.016	.035	.02	
Lower Reach	819.1344	.02	.1	.1	.1	.1	.02			
Lower Reach	415.466	.02	.15	.15	.018					

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3

Lower Reach	415.466	.1	.3

HEC-RAS Plan: CV_Multi-Qs River: Alvarado Creek Reach: Lower Reach

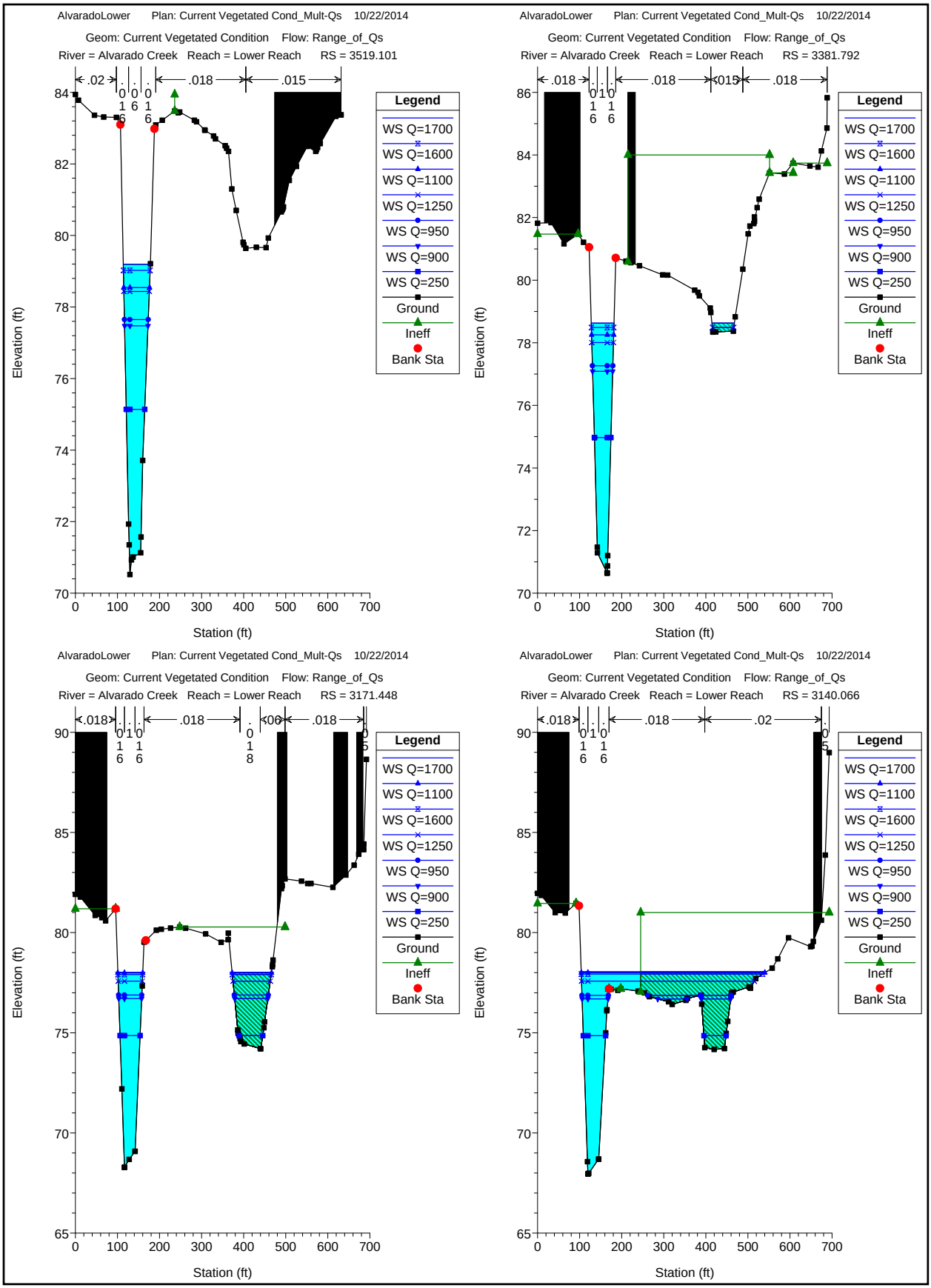
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1700	1700.00	70.52	79.19		79.53	0.001594	4.7	362.93	64.50	0.35
Lower Reach	3519.101	Q=1100	1100.00	70.52	78.54		78.73	0.000974	3.4	322.21	61.21	0.26
Lower Reach	3519.101	Q=900	900.00	70.52	77.47		77.66	0.001298	3.5	259.65	55.77	0.28
Lower Reach	3519.101	Q=1250	1250.00	70.52	78.44		78.68	0.001344	4.0	315.56	60.65	0.31
Lower Reach	3519.101	Q=250	250.00	70.52	75.14		75.19	0.000677	1.7	143.26	43.90	0.17
Lower Reach	3519.101	Q=950	950.00	70.52	77.65		77.84	0.001284	3.5	269.46	56.66	0.28
Lower Reach	3519.101	Q=1600	1600.00	70.52	79.03		79.35	0.001553	4.5	352.25	63.65	0.34
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1700	1700.00	70.64	78.63	75.70	79.14	0.005909	5.7	297.33	107.56	0.43
Lower Reach	3381.792	Q=1100	1100.00	70.64	78.25	74.62	78.50	0.003104	4.0	277.31	52.70	0.30
Lower Reach	3381.792	Q=900	900.00	70.64	77.09	74.20	77.35	0.004513	4.1	218.61	47.95	0.34
Lower Reach	3381.792	Q=1250	1250.00	70.64	78.01	74.91	78.36	0.004678	4.7	264.46	51.70	0.37
Lower Reach	3381.792	Q=250	250.00	70.64	74.97	72.41	75.03	0.002102	2.0	126.28	39.34	0.19
Lower Reach	3381.792	Q=950	950.00	70.64	77.26	74.31	77.54	0.004440	4.2	227.11	48.67	0.34
Lower Reach	3381.792	Q=1600	1600.00	70.64	78.49	75.53	78.96	0.005691	5.5	289.77	104.41	0.42
Lower Reach	3171.448	Q=1700	1700.00	68.28	78.01	73.34	78.31	0.002466	4.3	392.06	152.86	0.30
Lower Reach	3171.448	Q=1100	1100.00	68.28	77.99	72.27	78.11	0.001046	2.8	390.44	152.45	0.19
Lower Reach	3171.448	Q=900	900.00	68.28	76.71	71.85	76.83	0.001368	2.8	317.82	133.19	0.21
Lower Reach	3171.448	Q=1250	1250.00	68.28	77.58	72.54	77.76	0.001660	3.4	366.49	146.27	0.24
Lower Reach	3171.448	Q=250	250.00	68.28	74.86	70.10	74.88	0.000332	1.1	223.64	103.99	0.09
Lower Reach	3171.448	Q=950	950.00	68.28	76.88	71.96	77.01	0.001382	2.9	327.51	135.86	0.21
Lower Reach	3171.448	Q=1600	1600.00	68.28	77.91	73.17	78.18	0.002299	4.1	385.94	151.30	0.29
Lower Reach	3140.066	Q=1700	1700.00	67.95	78.04	72.85	78.22	0.001318	3.4	515.78	440.03	0.23
Lower Reach	3140.066	Q=1100	1100.00	67.95	78.00	71.81	78.07	0.000574	2.2	509.22	436.48	0.15
Lower Reach	3140.066	Q=900	900.00	67.95	76.69	71.41	76.79	0.000954	2.5	360.20	200.87	0.18
Lower Reach	3140.066	Q=1250	1250.00	67.95	77.57	72.08	77.70	0.001054	2.9	449.54	410.72	0.20
Lower Reach	3140.066	Q=250	250.00	67.95	74.85	69.69	74.87	0.000223	1.0	255.97	105.26	0.08
Lower Reach	3140.066	Q=950	950.00	67.95	76.87	71.51	76.97	0.000964	2.6	371.27	258.73	0.19
Lower Reach	3140.066	Q=1600	1600.00	67.95	77.93	72.69	78.09	0.001284	3.3	499.83	431.40	0.22
Lower Reach	3034.592	Q=1700	1700.00	67.91	77.64	73.02	77.95	0.005566	4.5	378.40	257.40	0.31
Lower Reach	3034.592	Q=1100	1100.00	67.91	77.84	71.92	77.96	0.002110	2.8	390.01	262.67	0.19
Lower Reach	3034.592	Q=900	900.00	67.91	76.50	71.50	76.62	0.002816	2.8	316.15	191.31	0.20
Lower Reach	3034.592	Q=1250	1250.00	67.91	77.32	72.22	77.51	0.003520	3.5	360.76	249.27	0.24
Lower Reach	3034.592	Q=250	250.00	67.91	74.81	69.70	74.83	0.000600	1.1	232.26	46.86	0.09
Lower Reach	3034.592	Q=950	950.00	67.91	76.67	71.61	76.80	0.002854	2.9	325.38	208.39	0.21
Lower Reach	3034.592	Q=1600	1600.00	67.91	77.56	72.85	77.84	0.005127	4.3	373.91	255.35	0.29
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1700	1700.00	68.72	77.09	75.08	77.33	0.002092	1.7	530.90	256.16	0.13
Lower Reach	2847.761	Q=1100	1100.00	68.72	76.60	73.82	77.02	0.021325	5.2	210.80	249.40	0.42
Lower Reach	2847.761	Q=900	900.00	68.72	73.32	73.32	74.85	0.156875	9.9	90.87	29.89	1.00
Lower Reach	2847.761	Q=1250	1250.00	68.72	76.94	74.17	77.09	0.001472	1.4	493.65	254.99	0.11
Lower Reach	2847.761	Q=250	250.00	68.72	74.53	71.06	74.59	0.004344	1.9	130.01	34.93	0.18
Lower Reach	2847.761	Q=950	950.00	68.72	73.46	73.46	75.01	0.154443	10.0	94.86	30.44	1.00
Lower Reach	2847.761	Q=1600	1600.00	68.72	77.00	74.88	77.23	0.002166	1.7	508.52	255.46	0.13
Lower Reach	2677.801	Q=1700	1700.00	67.57	75.41	75.41	76.46	0.015528	4.8	249.02	144.76	0.39
Lower Reach	2677.801	Q=1100	1100.00	67.57	73.85	73.85	75.63	0.108107	10.7	102.84	44.68	1.00
Lower Reach	2677.801	Q=900	900.00	67.57	73.31	73.31	74.95	0.111085	10.3	87.70	26.80	1.00
Lower Reach	2677.801	Q=1250	1250.00	67.57	74.22	74.22	76.10	0.106425	11.0	113.77	53.75	1.00
Lower Reach	2677.801	Q=250	250.00	67.57	73.55	70.79	73.66	0.007091	2.7	94.10	37.09	0.25
Lower Reach	2677.801	Q=950	950.00	67.57	73.45	73.45	75.13	0.110662	10.4	91.42	34.70	1.00
Lower Reach	2677.801	Q=1600	1600.00	67.57	75.32	75.32	76.33	0.016761	4.9	236.09	143.63	0.41
Lower Reach	2514.866	Q=1700	1700.00	67.21	74.33	73.14	74.57	0.001227	1.4	514.00	209.73	0.11
Lower Reach	2514.866	Q=1100	1100.00	67.21	73.69	72.76	73.87	0.001469	1.4	383.64	201.19	0.12
Lower Reach	2514.866	Q=900	900.00	67.21	73.49	72.25	73.64	0.001484	1.4	343.07	198.31	0.12
Lower Reach	2514.866	Q=1250	1250.00	67.21	73.85	72.97	74.05	0.001428	1.4	414.68	203.26	0.12
Lower Reach	2514.866	Q=250	250.00	67.21	70.93	70.19	71.29	0.043034	4.8	51.98	25.52	0.59
Lower Reach	2514.866	Q=950	950.00	67.21	73.58	72.36	73.73	0.001360	1.3	361.69	199.65	0.12
Lower Reach	2514.866	Q=1600	1600.00	67.21	74.22	73.06	74.45	0.001268	1.4	492.02	208.31	0.12
Lower Reach	2360.635	Q=1700	1700.00	67.07	74.04	73.09	74.38	0.001124	5.1	392.82	173.72	0.44
Lower Reach	2360.635	Q=1100	1100.00	67.07	73.38	72.08	73.67	0.001123	4.5	280.13	167.07	0.43
Lower Reach	2360.635	Q=900	900.00	67.07	73.21	71.34	73.45	0.000968	4.1	244.59	162.33	0.39
Lower Reach	2360.635	Q=1250	1250.00	67.07	73.52	72.42	73.83	0.001194	4.8	303.60	168.69	0.45
Lower Reach	2360.635	Q=250	250.00	67.07	70.18	69.23	70.46	0.001920	4.2	58.97	27.15	0.51
Lower Reach	2360.635	Q=950	950.00	67.07	73.33	71.84	73.56	0.000895	4.0	272.36	166.53	0.38
Lower Reach	2360.635	Q=1600	1600.00	67.07	73.93	72.99	74.26	0.001150	5.1	372.70	173.06	0.44
Lower Reach	2340.973	Q=1700	1700.00	67.19	74.24	70.46	74.29	0.000112	1.9	1023.35	298.66	0.14
Lower Reach	2340.973	Q=1100	1100.00	67.19	73.55	69.99	73.59	0.000083	1.5	824.57	272.42	0.12
Lower Reach	2340.973	Q=900	900.00	67.19	73.36	69.72	73.38	0.000066	1.3	773.09	253.31	0.11
Lower Reach	2340.973	Q=1250	1250.00	67.19	73.71	70.11	73.75	0.000094	1.6	868.78	287.81	0.13
Lower Reach	2340.973	Q=250	250.00	67.19	70.35	68.48	70.37	0.000201	1.2	214.85	132.05	0.16

HEC-RAS Plan: CV_Multi-Qs River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2340.973	Q=950	950.00	67.19	73.47	69.79	73.50	0.000067	1.3	802.41	262.55	0.11
Lower Reach	2340.973	Q=1600	1600.00	67.19	74.12	70.39	74.17	0.000109	1.8	988.85	296.27	0.14
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1700	1700.00	66.92	74.12	72.05	74.27	0.000468	3.6	603.75	273.02	0.29
Lower Reach	2309.739	Q=1100	1100.00	66.92	73.42	71.02	73.57	0.000502	3.4	409.79	246.83	0.29
Lower Reach	2309.739	Q=900	900.00	66.92	73.25	70.62	73.37	0.000433	3.1	369.28	239.75	0.27
Lower Reach	2309.739	Q=1250	1250.00	66.92	73.57	71.30	73.73	0.000531	3.6	443.90	252.68	0.30
Lower Reach	2309.739	Q=250	250.00	66.92	70.22	68.79	70.35	0.000864	3.0	84.67	37.24	0.35
Lower Reach	2309.739	Q=950	950.00	66.92	73.37	70.72	73.48	0.000406	3.0	396.59	244.54	0.26
Lower Reach	2309.739	Q=1600	1600.00	66.92	74.00	71.90	74.15	0.000483	3.6	571.15	270.54	0.29
Lower Reach	2266.686	Q=1700	1700.00	66.38	73.87	72.00	74.19	0.006914	3.4	402.07	231.74	0.27
Lower Reach	2266.686	Q=1100	1100.00	66.38	73.24	70.92	73.49	0.010597	3.9	273.53	179.60	0.33
Lower Reach	2266.686	Q=900	900.00	66.38	73.10	70.50	73.31	0.009177	3.6	250.44	160.19	0.31
Lower Reach	2266.686	Q=1250	1250.00	66.38	73.36	71.21	73.65	0.010595	4.0	296.02	190.02	0.33
Lower Reach	2266.686	Q=250	250.00	66.38	70.12	68.66	70.26	0.013367	3.0	83.89	35.22	0.34
Lower Reach	2266.686	Q=950	950.00	66.38	73.23	70.61	73.42	0.008038	3.4	272.09	178.91	0.29
Lower Reach	2266.686	Q=1600	1600.00	66.38	73.75	71.83	74.07	0.007730	3.6	376.08	223.09	0.29
Lower Reach	2090.444	Q=1700	1700.00	66.18	73.38	72.06	73.64	0.001617	3.6	427.69	217.94	0.31
Lower Reach	2090.444	Q=1100	1100.00	66.18	72.18	70.40	72.47	0.003519	4.4	254.84	140.52	0.44
Lower Reach	2090.444	Q=900	900.00	66.18	71.50	69.97	71.97	0.005315	5.5	162.95	74.61	0.55
Lower Reach	2090.444	Q=1250	1250.00	66.18	72.58	70.77	72.83	0.002461	4.0	311.37	143.21	0.37
Lower Reach	2090.444	Q=250	250.00	66.18	68.94	68.09	69.19	0.003366	4.0	62.38	31.25	0.50
Lower Reach	2090.444	Q=950	950.00	66.18	71.73	70.08	72.18	0.005881	5.4	175.92	121.04	0.56
Lower Reach	2090.444	Q=1600	1600.00	66.18	73.22	71.45	73.47	0.001724	3.7	404.38	188.53	0.32
Lower Reach	1904.254	Q=1700	1700.00	65.47	72.95	70.72	73.29	0.002067	5.0	385.43	781.45	0.39
Lower Reach	1904.254	Q=1100	1100.00	65.47	71.09	69.67	71.70	0.004618	6.2	176.60	129.74	0.57
Lower Reach	1904.254	Q=900	900.00	65.47	70.37	69.25	70.98	0.005168	6.2	144.03	50.32	0.61
Lower Reach	1904.254	Q=1250	1250.00	65.47	71.60	69.96	72.20	0.004291	6.2	201.25	205.34	0.54
Lower Reach	1904.254	Q=250	250.00	65.47	67.49	67.47	68.12	0.010824	6.4	39.15	29.02	0.97
Lower Reach	1904.254	Q=950	950.00	65.47	70.56	69.36	71.16	0.005015	6.2	152.15	70.77	0.59
Lower Reach	1904.254	Q=1600	1600.00	65.47	72.68	70.56	73.07	0.002528	5.3	338.08	668.01	0.42
Lower Reach	1849.924	Q=1700	1700.00	64.56	72.89	69.11	73.14	0.002640	3.9	424.14	530.87	0.28
Lower Reach	1849.924	Q=1100	1100.00	64.56	71.06	68.10	71.35	0.004735	4.3	255.17	76.68	0.35
Lower Reach	1849.924	Q=900	900.00	64.56	70.34	67.71	70.60	0.005078	4.1	218.08	49.92	0.35
Lower Reach	1849.924	Q=1250	1250.00	64.56	71.57	68.37	71.88	0.004476	4.4	282.81	146.03	0.34
Lower Reach	1849.924	Q=250	250.00	64.56	67.43	66.10	67.55	0.005738	2.8	88.93	38.93	0.33
Lower Reach	1849.924	Q=950	950.00	64.56	70.52	67.82	70.79	0.005007	4.2	227.40	50.62	0.35
Lower Reach	1849.924	Q=1600	1600.00	64.56	72.63	68.95	72.89	0.002947	4.0	395.49	485.38	0.29
Lower Reach	1742.873	Q=1700	1700.00	64.03	72.57	68.33	72.84	0.003091	4.2	414.60	530.48	0.29
Lower Reach	1742.873	Q=1100	1100.00	64.03	70.61	67.32	70.87	0.004018	4.1	268.87	52.30	0.32
Lower Reach	1742.873	Q=900	900.00	64.03	69.86	66.93	70.10	0.004211	3.9	230.55	49.69	0.32
Lower Reach	1742.873	Q=1250	1250.00	64.03	71.15	67.58	71.42	0.003874	4.2	297.40	110.80	0.32
Lower Reach	1742.873	Q=250	250.00	64.03	66.95	65.31	67.04	0.003887	2.5	100.55	39.56	0.27
Lower Reach	1742.873	Q=950	950.00	64.03	70.05	67.03	70.30	0.004165	4.0	240.14	50.36	0.32
Lower Reach	1742.873	Q=1600	1600.00	64.03	72.25	68.17	72.54	0.003444	4.4	376.13	437.27	0.31
Lower Reach	1705.846	Q=1700	1700.00	63.85	72.55	68.34	72.74	0.001205	3.7	489.79	472.22	0.26
Lower Reach	1705.846	Q=1100	1100.00	63.85	70.50	67.34	70.76	0.002342	4.1	267.14	53.32	0.32
Lower Reach	1705.846	Q=900	900.00	63.85	69.73	66.96	69.97	0.002649	4.0	227.34	50.67	0.33
Lower Reach	1705.846	Q=1250	1250.00	63.85	71.04	67.61	71.32	0.002151	4.2	296.74	108.88	0.32
Lower Reach	1705.846	Q=250	250.00	63.85	66.79	65.37	66.90	0.003689	2.7	93.88	40.02	0.31
Lower Reach	1705.846	Q=950	950.00	63.85	69.93	67.06	70.18	0.002567	4.0	237.31	51.34	0.33
Lower Reach	1705.846	Q=1600	1600.00	63.85	72.22	68.18	72.44	0.001430	3.9	438.51	368.92	0.28
Lower Reach	1573.644	Q=1700	1700.00	63.68	72.33	67.98	72.57	0.001500	4.0	449.98	423.75	0.26
Lower Reach	1573.644	Q=1100	1100.00	63.68	70.14	66.99	70.42	0.002749	4.3	255.50	48.25	0.33
Lower Reach	1573.644	Q=900	900.00	63.68	69.33	66.61	69.59	0.003126	4.1	217.24	46.35	0.34
Lower Reach	1573.644	Q=1250	1250.00	63.68	70.71	67.25	71.01	0.002532	4.4	283.39	125.84	0.33
Lower Reach	1573.644	Q=250	250.00	63.68	66.13	65.06	66.28	0.006144	3.1	81.16	38.72	0.37
Lower Reach	1573.644	Q=950	950.00	63.68	69.53	66.71	69.81	0.003021	4.2	226.90	46.84	0.34
Lower Reach	1573.644	Q=1600	1600.00	63.68	71.99	67.83	72.24	0.001705	4.1	406.61	338.25	0.28
Lower Reach	1305.41	Q=1700	1700.00	62.42	71.83	66.76	72.18	0.001320	4.8	357.47	229.24	0.30
Lower Reach	1305.41	Q=1100	1100.00	62.42	69.62	65.71	69.89	0.001476	4.2	262.20	41.20	0.29
Lower Reach	1305.41	Q=900	900.00	62.42	68.77	65.31	69.01	0.001562	4.0	227.62	40.12	0.29
Lower Reach	1305.41	Q=1250	1250.00	62.42	70.21	65.99	70.51	0.001425	4.4	286.87	41.96	0.29
Lower Reach	1305.41	Q=250	250.00	62.42	65.25	63.68	65.36	0.002130	2.6	94.52	35.62	0.29
Lower Reach	1305.41	Q=950	950.00	62.42	68.99	65.41	69.24	0.001539	4.0	236.43	40.40	0.29
Lower Reach	1305.41	Q=1600	1600.00	62.42	71.48	66.60	71.83	0.001341	4.7	341.63	90.98	0.30
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1700	1700.00	60.67	68.73	64.74	69.01	0.000554	4.3	398.80	67.20	0.31
Lower Reach	1155.558	Q=1100	1100.00	60.67	67.34	63.78	67.54	0.000509	3.6	309.56	62.00	0.28

HEC-RAS Plan: CV_Multi-Qs River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	1155.558	Q=900	900.00	60.67	66.71	63.40	66.88	0.000515	3.3	271.20	59.31	0.27
Lower Reach	1155.558	Q=1250	1250.00	60.67	67.75	64.04	67.97	0.000514	3.7	335.18	63.53	0.29
Lower Reach	1155.558	Q=250	250.00	60.67	63.76	61.85	63.83	0.000539	2.1	118.00	44.42	0.23
Lower Reach	1155.558	Q=950	950.00	60.67	66.88	63.49	67.06	0.000514	3.4	281.05	60.14	0.28
Lower Reach	1155.558	Q=1600	1600.00	60.67	68.53	64.60	68.80	0.000543	4.1	386.01	66.48	0.30
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1700	1700.00	60.08	68.46	65.13	68.84	0.007220	4.9	345.28	114.27	0.37
Lower Reach	1036.821	Q=1100	1100.00	60.08	67.11	64.08	67.38	0.007140	4.2	263.27	57.10	0.34
Lower Reach	1036.821	Q=900	900.00	60.08	66.49	63.67	66.73	0.007007	3.9	228.58	53.71	0.34
Lower Reach	1036.821	Q=1250	1250.00	60.08	67.51	64.37	67.81	0.007117	4.4	286.71	59.29	0.35
Lower Reach	1036.821	Q=250	250.00	60.08	63.57	61.87	63.67	0.006070	2.6	94.84	37.89	0.29
Lower Reach	1036.821	Q=950	950.00	60.08	66.65	63.78	66.90	0.007044	4.0	237.42	54.60	0.34
Lower Reach	1036.821	Q=1600	1600.00	60.08	68.28	64.97	68.63	0.007154	4.8	333.49	103.03	0.37
Lower Reach	819.1344	Q=1700	1700.00	58.79	66.93	63.23	67.15	0.007875	3.8	446.15	258.75	0.30
Lower Reach	819.1344	Q=1100	1100.00	58.79	65.66	62.33	65.82	0.006888	3.2	340.31	78.37	0.27
Lower Reach	819.1344	Q=900	900.00	58.79	65.03	61.98	65.18	0.006961	3.1	292.68	73.28	0.27
Lower Reach	819.1344	Q=1250	1250.00	58.79	66.07	62.57	66.25	0.006893	3.3	373.68	114.75	0.28
Lower Reach	819.1344	Q=250	250.00	58.79	62.23	60.42	62.30	0.006484	2.1	119.23	50.54	0.24
Lower Reach	819.1344	Q=950	950.00	58.79	65.19	62.07	65.34	0.006946	3.1	304.73	74.60	0.27
Lower Reach	819.1344	Q=1600	1600.00	58.79	66.78	63.09	66.99	0.007564	3.7	433.04	228.44	0.29
Lower Reach	415.466	Q=1700	1700.00	57.01	64.53	59.89	64.63	0.005009	2.3	713.40	249.18	0.16
Lower Reach	415.466	Q=1100	1100.00	57.01	63.37	59.30	63.44	0.005009	2.0	539.97	106.36	0.16
Lower Reach	415.466	Q=900	900.00	57.01	62.73	59.09	62.79	0.005009	1.9	472.60	103.20	0.16
Lower Reach	415.466	Q=1250	1250.00	57.01	63.79	59.45	63.86	0.005008	2.1	587.20	125.15	0.16
Lower Reach	415.466	Q=250	250.00	57.01	59.96	58.08	59.98	0.005006	1.2	205.99	89.34	0.14
Lower Reach	415.466	Q=950	950.00	57.01	62.89	59.14	62.95	0.005010	1.9	489.81	104.02	0.16
Lower Reach	415.466	Q=1600	1600.00	57.01	64.42	59.80	64.51	0.005009	2.3	689.69	232.40	0.16


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS Q=1700
WS Q=1600
WS Q=1100
WS Q=1250
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.015
.018
Legend
WS Q=1700
WS Q=1600
WS Q=1100
WS Q=1250
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
.018
Legend
WS Q=1700
WS Q=1100
WS Q=1600
WS Q=1250
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=1700
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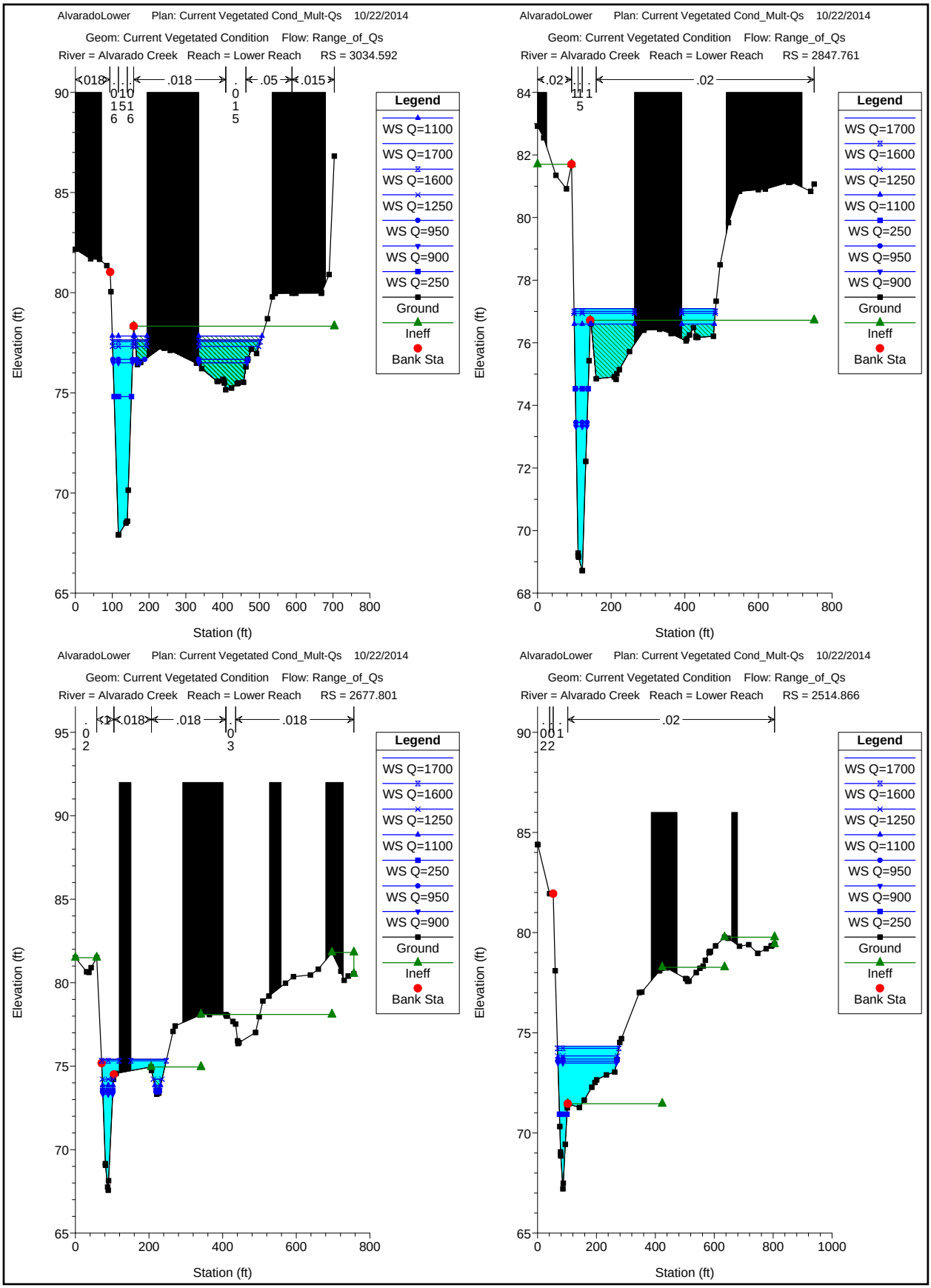
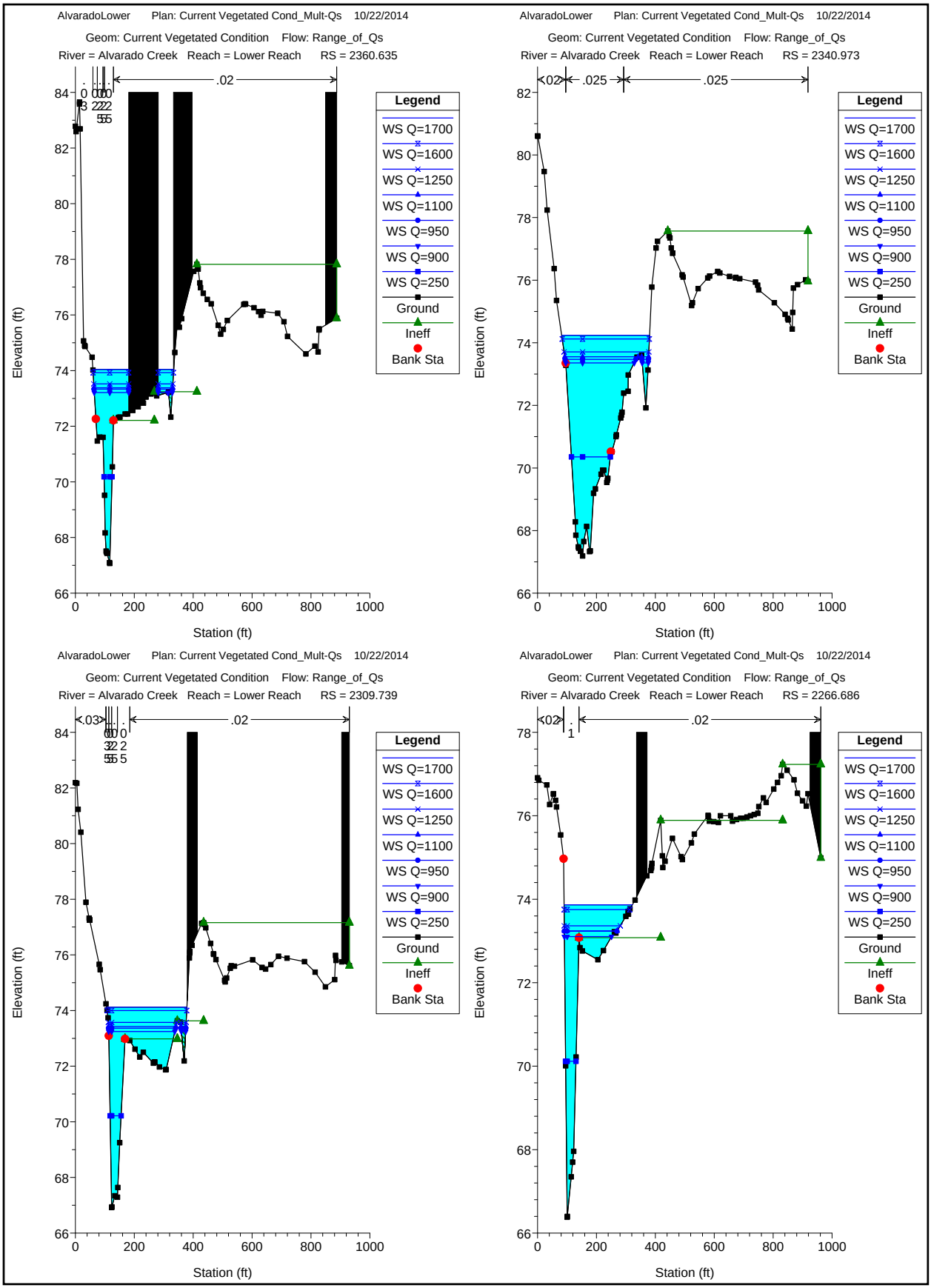
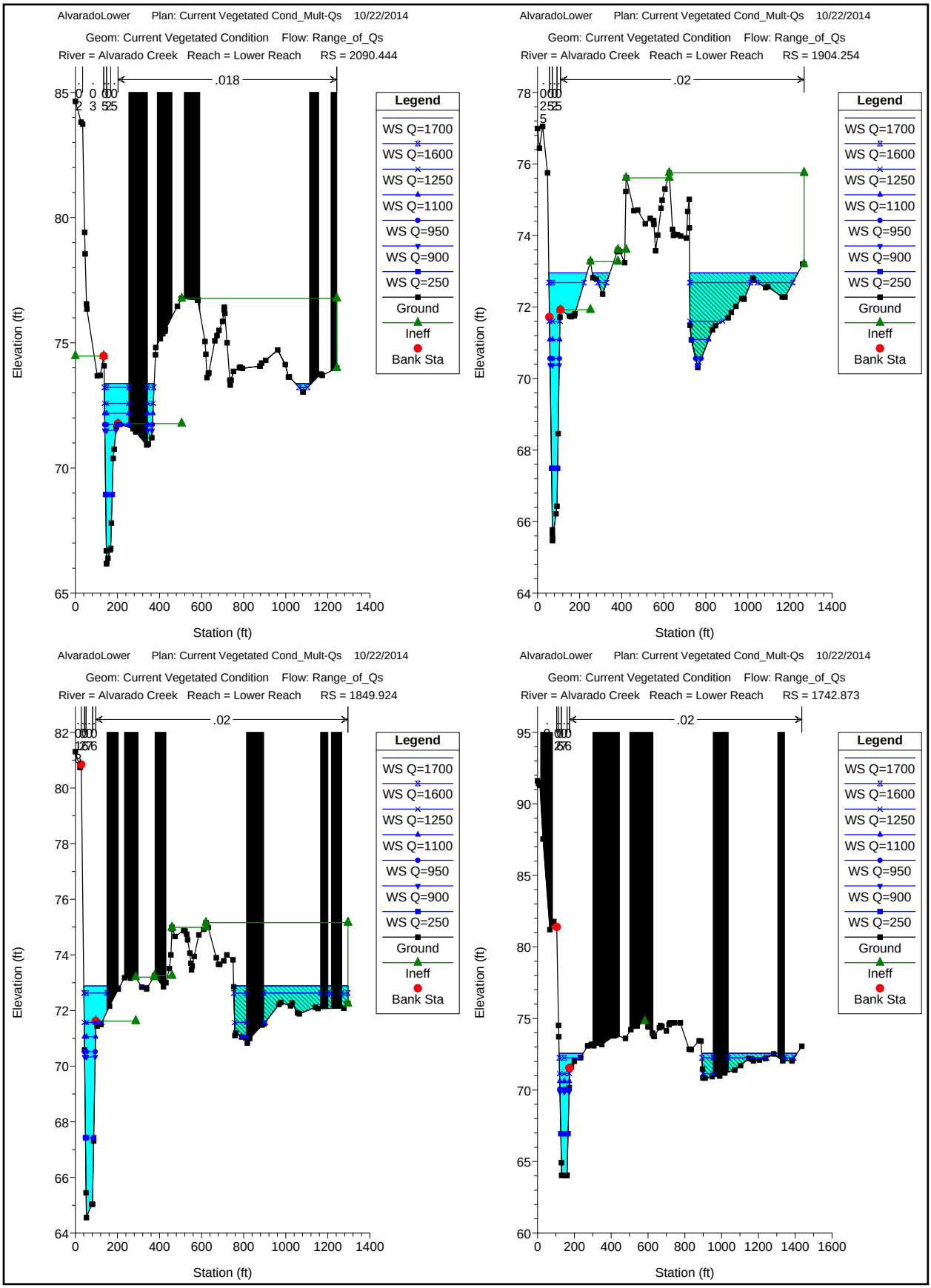
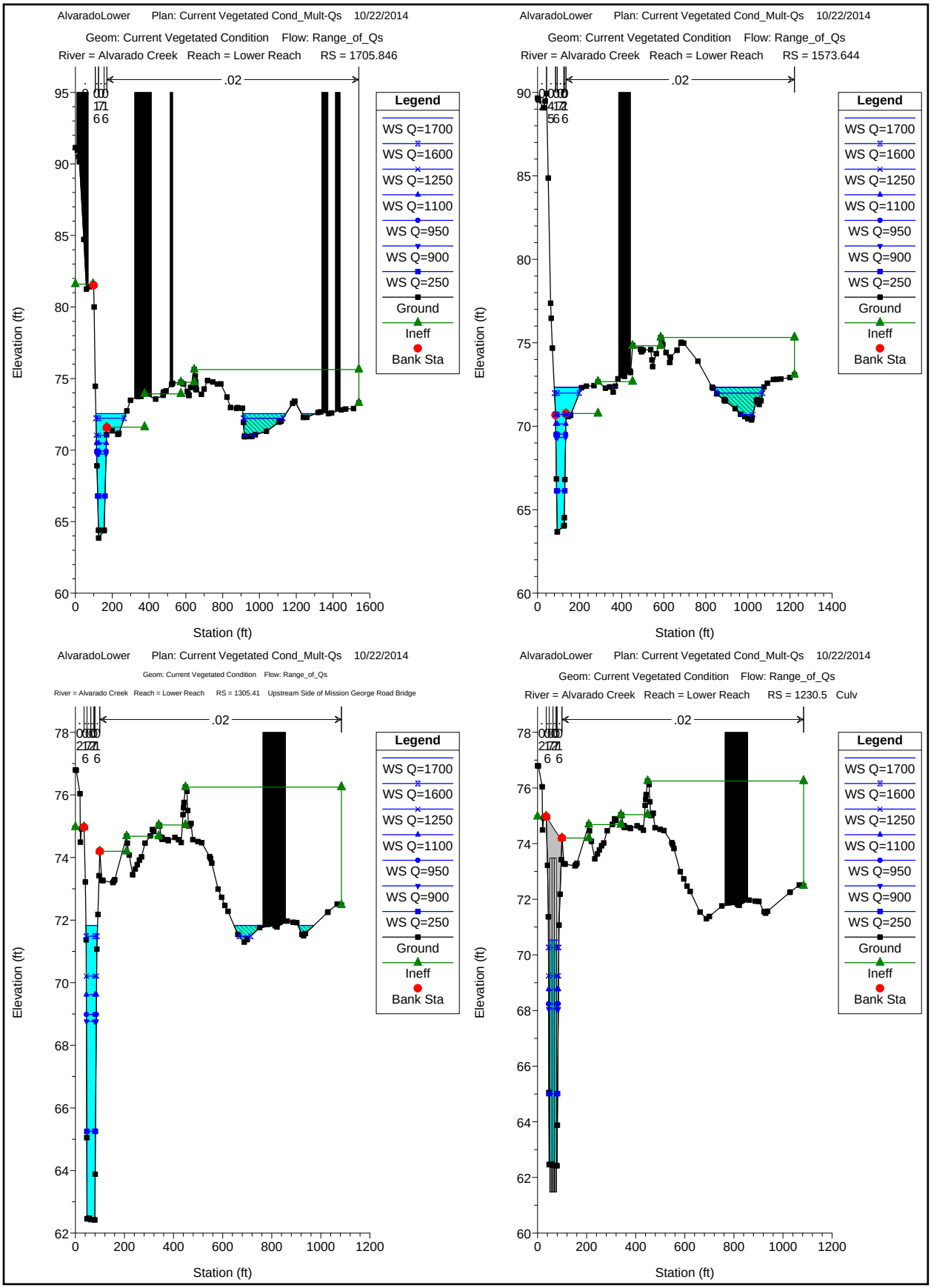
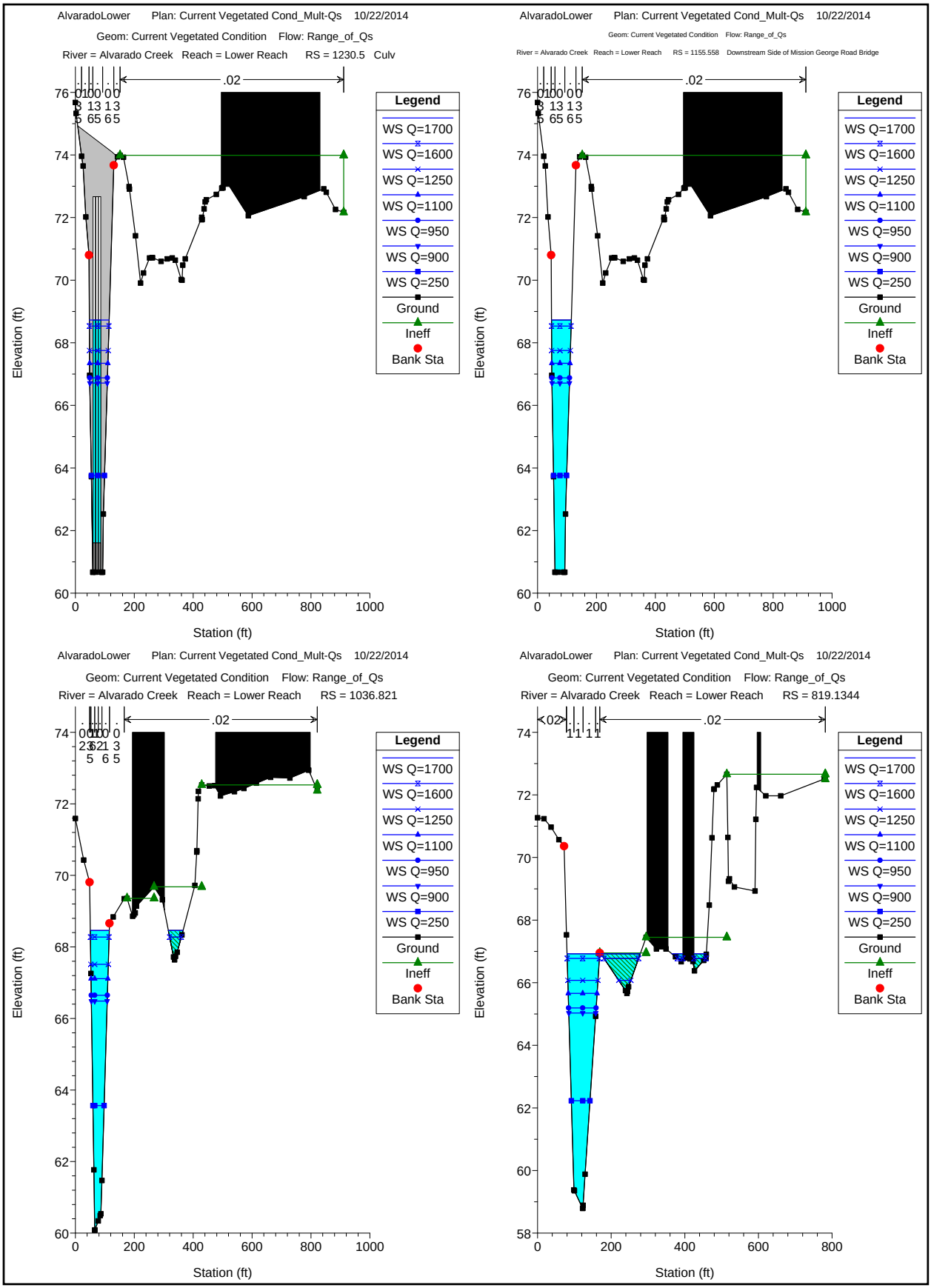
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

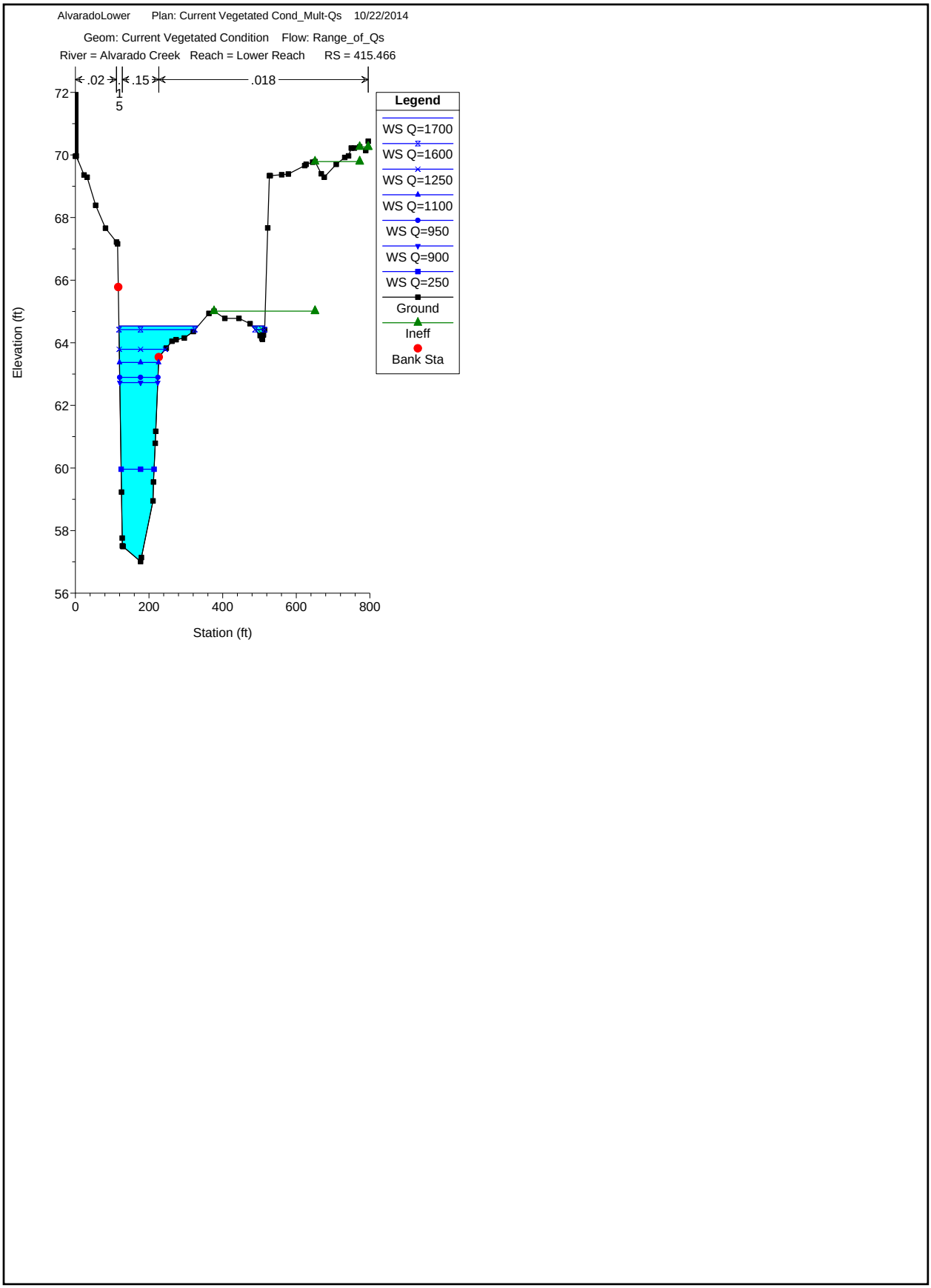

AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.018
.05
.015
Legend
WS Q=1100
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=250
WS Q=950
WS Q=900
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=250
WS Q=950
WS Q=900
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
.1
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Current Vegetated Cond_Mult-Qs 10/22/2014
Geom: Current Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
Legend
WS Q=1700
WS Q=1600
WS Q=1250
WS Q=1100
WS Q=950
WS Q=900
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 11:36:36 AM

Project in English units

PLAN DATA

Plan Title: Current Vegetated Cond_Mult-Qs
Plan File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.p13

Geometry Title: Current Vegetated Condition
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g02

Flow Title : Range_of_Qs
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f02

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Range_of_Qs
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f02

Flow Data (cfs)

River	Reach	RS	Q=1700	Q=1300	Q=1100	Q=900	Q=500	Q=340	Q=1250	Q=800
Alvarado Creek	Lower Reach	3519.101	1700	1300	1100	900	500	340	1250	800

River	Reach	RS	Q=250	Q=600	Q=1850	Q=950	Q=1180	Q=1400	Q=1600	Q=450
Alvarado Creek	Lower Reach	3519.101	250	600	1850	950	1180	1400	1600	450

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	Q=1700		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=1300		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=1100		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=900		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=500		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=340		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=1250		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=800		Normal S = 0.005
Alvarado Creek	Lower Reach	Q=250		Normal S = 0.005

GEOMETRY DATA

Geometry Title: Current Vegetated Condition
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g02

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94
328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64
430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.016	126.44	.06	155.92	.016	190.95	.018
405.16	.015								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
107.14 188.01 137.3 137.31 137.44 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.1	166.19	.016	185.99	.018
411.74	.015	488.01	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
122.6 185.99 209.35 210.34 211.8 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.1	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.69 167.68 32.79 31.38 28.21 .1 .3
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 95.69 81.19 F
247.8 498.23 80.28 F
Blocked Obstructions num= 4
Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
480.04 502.74 90 613.7 647.07 90 668.49 683.59 90
0 75.03 90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 81.96 8.74 81.86 42.06 81 65.8 80.98 91.59 81.46
98.56 81.34 118.7 68.57 119.67 67.95 120.26 67.96 121.78 67.99
145.21 68.69 145.46 68.69 161.99 75 164.4 76.1 165.21 76.15
169.88 77.19 174.56 77.17 190.83 77.12 197.8 77.2 238.98 77.08
253.88 77 265.89 76.8 311.18 76.55 320.11 76.42 352.63 76.62
356.3 76.72 388.74 76.88 390.22 76.43 397.39 74.26 419.63 74.17
444.35 74.21 448.51 74.97 452.16 75.57 459.93 76.85 460.97 77
461.51 76.99 465.1 77.03 502.63 77.29 505.62 77.24 506.27 77.23
518.73 77.71 557.63 78.23 570.9 78.69 596.76 79.74 648.95 79.3
652.42 79.33 655.52 79.56 674.71 80.62 683.87 83.87 693.26 88.99

Manning's n Values num= 7
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 98.56 .016 119.67 .1 145.46 .016 169.88 .018
397.39 .02 674.71 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3
Ineffective Flow num= 3
Sta L Sta R Elev Permanent
0 91.59 81.46 F
245 693.26 81 F
169.88 197.8 77.19 F
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
656.1 675.15 90 0 74.95 90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 50
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 82.17 41.57 81.69 65.68 81.67 85.26 81.35 93.68 81.06
94.76 81.03 96.42 80.05 117.02 67.91 117.43 67.92 137.35 68.5
140.94 68.59 140.98 68.59 143.73 70.14 158.51 78.33 168.47 76.41
177.34 76.52 235.03 77.29 240.05 77.26 241.67 77.23 257.49 77.12
329.16 76.48 336.01 76.48 343.31 76.21 385.02 75.58 387.61 75.57
400.89 75.68 402.29 75.62 403.95 75.53 404.59 75.49 408.4 75.16
424.44 75.24 439.37 75.46 441.01 75.48 441.88 75.49 456.66 75.53
463.42 76.3 467.85 76.62 468.83 76.69 477.64 77.18 492.12 76.97
521.9 78.7 535.11 79.79 543.17 79.96 588.58 79.97 599.19 79.97
668.1 79.98 668.55 79.98 669 80.01 689.24 80.91 703.56 86.82

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 93.68 .016 117.02 .15 140.94 .016 158.51 .018
408.4 .015 463.42 .05 588.58 .015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
158.51 703.56 78.33 F
Blocked Obstructions num= 3
Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
194.38 335.17 90 534.53 679.65 90 0 71.12 90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 78.3 8.27 78.53 24.08 78.97 27.46 79.04 29.05 79.06
32.68 78.95 64.72 78.04 68.27 77.95 105.22 78.01 107.55 78.07
109.84 78.02 137.03 77.47 141.61 77.16 163.84 76.88 166.62 76.84
175.9 76.7 177.53 76.74 199.71 76.45 222.84 76.21 239.06 75.98
253.17 75.82 267.4 75.4 268.16 75.39 268.52 75.38 268.91 75.37
287.49 75.52 290.21 75.49 308.94 75.3 311.48 75.38 330.3 75.01
354.72 74.49 356.27 74.51 357.22 74.47 358.77 74.39 398.52 73.89
400.93 73.9 407.71 73.76 411.58 73.74 422.05 73.66 432.57 73.57
432.74 73.57 435.41 73.57 438.91 73.58 469.01 73.68 481.53 73.64
483.87 73.56 485.52 73.5 486.41 73.42 517.76 71.49 517.78 71.49
520.34 71.46 561.12 71.75 566.99 71.7 569.05 71.68 578.17 71.73
589.02 71.85 599.02 71.97 599.46 71.99 613.78 72.42 616.75 72.47
619.29 72.47 619.96 72.48 630.11 72.63 657.92 72.36 659.77 72.35
671.397 72.23

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.1	110.07	.15	121.5	.1	159.23	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
92.48	143.16	165.5	169.96	176.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.1	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
71.39	104.55	162.85	162.93	162.56	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.1	102.77	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
53.2	102.77	158.36	154.23	152.81	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5

887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.46	129.21	19.33	19.66	19.62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113.57	168.74	21.27	43.05	56.67	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent

```
  435.27  930.56   77.16       F
  346.13  435.27   73.63       F
  168.74  346.13   72.98       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  904.29  930.56      84  379.91  413.97      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2266.686

INPUT
Description:
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.91    3.86   76.85   31.22   76.74   40.97   76.27    53.8   76.53
   54.07   76.52      61   76.37   64.32   76.21   78.65   75.54   88.53   74.97
    95.2   70.01  100.62   66.38  100.93    66.4  114.32   67.35  119.16    67.7
  122.73   67.96  130.63   70.22  140.68   73.08  144.05   72.84  151.96   72.76
  204.76   72.55  223.94   72.77  260.65   73.22  266.07   73.19  299.79   73.59
  307.52   73.71  308.78   73.64  314.02   73.77  331.03   73.98  370.85   74.56
  384.82   74.69  386.63   74.75  387.16   74.78  388.38   74.86  418.11   75.89
  423.92   75.04  425.39   74.76  432.85   74.91  457.95   75.46   487.2   75.02
  491.57   74.95   522.3   75.35  532.27   75.56  579.27   76.01  580.21   75.98
  583.51   75.87  598.45   75.86  614.06   75.84  620.75      76  655.82      76
  662.16   75.87  675.83   75.91  689.65   75.94  698.62   75.94   710.9   75.97
  723.26      76  735.67   76.03  748.15   76.06  751.43   76.22  766.94   76.43
  776.08   76.32  801.97   76.64  814.86    76.8  827.37   76.96  832.12   77.23
  847.31   77.09  870.84   76.86  882.44   76.54  899.87   76.36  912.59   76.23
   918.5   76.53  961.83   74.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   88.53      .1  140.68     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        88.53  140.68           166.7  176.24  190.03            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  832.12  961.83   77.23       F
  418.11  832.12   75.89       F
  140.68  418.11   73.08       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  925.08  961.83      78  335.84  371.85      78

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2090.444

INPUT
Description:
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   84.64   26.94   83.81   34.56   83.73    43.9   79.41   46.03   78.55
   52.86   76.55   54.74   76.35  104.35   73.68  118.15    73.7  134.84   74.47
  135.36    74.5  136.09   74.08  147.13   66.69   147.9   66.18  148.39   66.19
  154.75   66.39  165.88   66.73  167.71   66.79  171.16    67.8  179.85   70.38
  184.02   70.75  194.03   71.62  194.27   71.63  202.76   71.77  273.69   71.57
  286.93   71.44   339.3   70.92  341.41   70.93  346.27   70.96  363.18   71.21
  380.58   74.52  382.15   74.81  403.82   75.16  415.99   75.36  424.89   75.46
  426.22    75.5   428.2   75.54  485.28   76.46  504.11   76.75  504.86   76.77
  505.61   76.77  581.94   76.71  581.99   76.71  582.19    76.7  616.27   75.05
  620.06   74.54  625.23   73.61  632.37   73.76  634.32    73.8  662.88   75.08
  673.19   75.29  682.75   75.49  699.59   75.85  706.79   76.32  708.21   76.42
   710.5   76.17  721.06      75  733.86   73.51  736.35   73.31  740.23   73.51
  751.82   73.86  779.52      74  784.48   74.03   793.6   73.98  877.01   74.07
  877.93   74.07  884.82   74.19  904.52    74.3  961.49   74.71  997.84   74.13
 1012.87   73.63 1017.1   73.64 1082.33   73.05 1082.5   73.03 1164.82   73.75
 1168.93   73.73 1173.57    73.7 1242.67   73.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   34.56     .03  134.84     .05   147.9     .02  167.71     .05
  202.76    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        134.84  202.76           183.41  186.19  187.45            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  505.61 1242.67   76.77       F
       0  134.84   74.47       F
  202.76  505.61   71.77       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  253.88  342.73      85  389.09  459.09      85  517.66  561.05      85
  561.05  591.44      85 1113.13 1156.42      85 1215.17 1242.67      85

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1904.254

INPUT
Description:
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   76.99    8.79   76.44   24.35   77.05   47.31   75.75   56.56   71.72
   70.25   65.77   70.48   65.65   70.85   65.47   72.27   65.53   87.65   66.22
   92.18   66.43   98.17   68.46  106.67   71.72  109.43   71.92  151.01   71.75
  159.27   71.73  168.23   71.75  173.16   71.77  174.73   71.76  177.55   71.81
  251.31   73.27   263.3   72.82  279.78   72.78  309.56   72.36  378.72   73.55
  382.13    73.6  384.52   73.57  390.88   73.55  414.28   73.24  419.89   75.23
   420.9   75.61  422.68   75.61  458.26   74.69  476.08   74.71  512.04   74.33
  535.68   74.48  550.94   74.42     552   74.42  553.17   74.31  560.93   73.57
  571.04   74.01  586.99   74.76  592.36   74.99  605.54    75.3  625.78   75.75
  641.58   74.17  646.46      74  651.36   74.03  665.28   74.02  680.67   73.98
  707.41   73.93  713.85   74.67  720.98   75.01  721.72   74.21  724.33   71.49
  731.33   71.08  761.41   70.31  831.59   71.36  846.38   71.48  905.94    71.7
  921.23   71.85  942.82   72.02  971.41   72.24  981.91   72.22 1023.02   72.81
 1027.24   72.75 1084.74   72.54 1094.89   72.57 1163.16   72.28 1176.32   72.28
 1260.8    73.2 1264.92    73.2 1267.13    73.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .025   56.56     .05   70.25     .02   92.18     .05  109.43     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        56.56  109.43            55.48   54.33   52.65            .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
```

109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.83	96.83	119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
104.06	174.16	35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.07	155.61	.016	171.11	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.12	171.11	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	85.63	.016	93.76	.07	124.89	.02
126.79	.016	135.25	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
85.63	135.25	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	47.46	.07	62.69	.02	75.77	.07
79.09	.016	99.47	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.1	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
35.1	74.97	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42

```
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57  1028.2   72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    35.1    .016   47.46    .07   62.69    .02   75.77    .07
   79.09    .016   99.47    .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47           .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97          124.06    74.1          143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96      .1   46.27    .016   59.22    .035   92.72    .016
  130.44    .035  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         46.27  130.44           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins        =    74.1
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 21     110     .018      .06      .94                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96      .1   46.27    .016   59.22    .035   92.72    .016
  130.44    .035  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.27  130.44           118.42  118.74  122.35             .1       .3
```

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.67	910.92	73.99	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
495.28	830.64	76

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1149.024

INPUT
Description:
Lateral structure position = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	52.88	.16	65.67	.1	77.5	.02
89.98	.016	115.82	.035	165.64	.02				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	78.67	.1	98.97	.1	123.52	.1	157.62	.1

```
  168.96     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        72.14  168.96           431.18  403.67  344.14            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  168.96   294.8   66.95       F
   294.8  514.26   67.45       F
  514.26  781.74   72.66       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  297.49  354.31      74  394.55  425.01      74  596.65   606.2      74

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 415.466

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   69.96    2.41   69.97   23.36   69.36   31.97   69.29    55.2   68.39
   81.79   67.66  111.71   67.22  114.72   67.16  116.54   65.78  125.28   59.23
  127.25   57.76  127.59   57.51  129.08    57.5  129.13   57.49  177.09   57.01
  179.36   57.14  210.85   58.95  212.04   59.55  216.85   60.79  218.23   61.17
  226.72   63.54     247   63.83  262.38   64.05   273.7    64.1  295.93   64.15
  320.34   64.36  362.69   64.94  376.62   65.01  405.84   64.78  444.15   64.78
   474.4   64.61  501.78   64.23  506.26   64.15  507.99   64.11  510.79   64.25
  514.09   64.41  522.63   67.67  526.99   69.34  529.14   69.34  560.37   69.37
  578.57   69.39     623   69.66  626.91    69.7   644.4   69.77  650.98   69.79
  667.97    69.4  676.04   69.29  708.55    69.7  731.78   69.92  742.21   69.97
  749.38   70.22  757.73   70.22  772.23   70.26   788.8   70.14  795.52   70.44

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  111.71     .15  127.59     .15  226.72    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       116.54  226.72           420.92  415.47  422.02            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0    7.54      72


SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

      Reach          River Sta.       n1        n2        n3        n4        n5
n6        n7        n8        n9

 Lower Reach          3519.101           .02      .016       .06      .016      .018
.015
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792           .018      .016        .1      .016      .018
.015      .018
 Lower Reach          3171.448           .018      .016        .1      .016      .018
.018       .06      .018       .05
 Lower Reach          3140.066           .018      .016        .1      .016      .018
.02       .05
 Lower Reach          3034.592           .018      .016       .15      .016      .018
.015       .05      .015
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761            .02        .1       .15        .1       .02
 Lower Reach          2677.801            .02        .1      .018      .018       .03
.018
 Lower Reach          2514.866            .02       .02        .1       .02
 Lower Reach          2360.635            .03       .02      .025      .025      .025
.02
 Lower Reach          2340.973            .02      .025      .025
 Lower Reach          2332.283     Lat Struct
 Lower Reach          2309.739            .03      .035      .025      .025      .025
.02
 Lower Reach          2266.686            .02        .1       .02
 Lower Reach          2090.444            .02       .03       .05       .02       .05
.018
 Lower Reach          1904.254           .025       .05       .02       .05       .02
 Lower Reach          1849.924           .018       .02       .06       .07       .06
.02
 Lower Reach          1742.873           .018       .02       .06       .07       .06
.02
 Lower Reach          1705.846            .02      .016       .07      .016       .02
 Lower Reach          1573.644            .02      .045      .016       .07       .02
.016       .02
 Lower Reach          1305.41             .02      .016       .07       .02       .07
.016       .02
 Lower Reach          1230.5       Culvert
 Lower Reach          1155.558           .035        .1      .016      .035      .016
.035       .02
 Lower Reach          1149.024     Lat Struct
 Lower Reach          1121.496     Lat Struct
 Lower Reach          1036.821            .02      .035       .16        .1       .02
.016      .035       .02
 Lower Reach          819.1344            .02        .1        .1        .1        .1
.02
 Lower Reach          415.466             .02       .15       .15      .018


SUMMARY OF REACH LENGTHS

River: Alvarado Creek

      Reach          River Sta.      Left     Channel    Right

 Lower Reach          3519.101         137.3    137.31    137.44
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792        209.35    210.34     211.8
 Lower Reach          3171.448         32.79     31.38     28.21
 Lower Reach          3140.066        101.61    105.47    112.32
 Lower Reach          3034.592        187.47    186.83    186.24
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761         165.5    169.96     176.8
 Lower Reach          2677.801        162.85    162.93    162.56
 Lower Reach          2514.866        158.36    154.23    152.81
 Lower Reach          2360.635         19.33     19.66     19.62
```

Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3

1. Ultimate Vegetated Condition Results with FEMA Flow Rates
2. Ultimate Vegetated Condition Results with Multiple Flow Rates

HEC-RAS Plan: Ultimate Vegetat River: Alvarado Creek Reach: Lower Reach

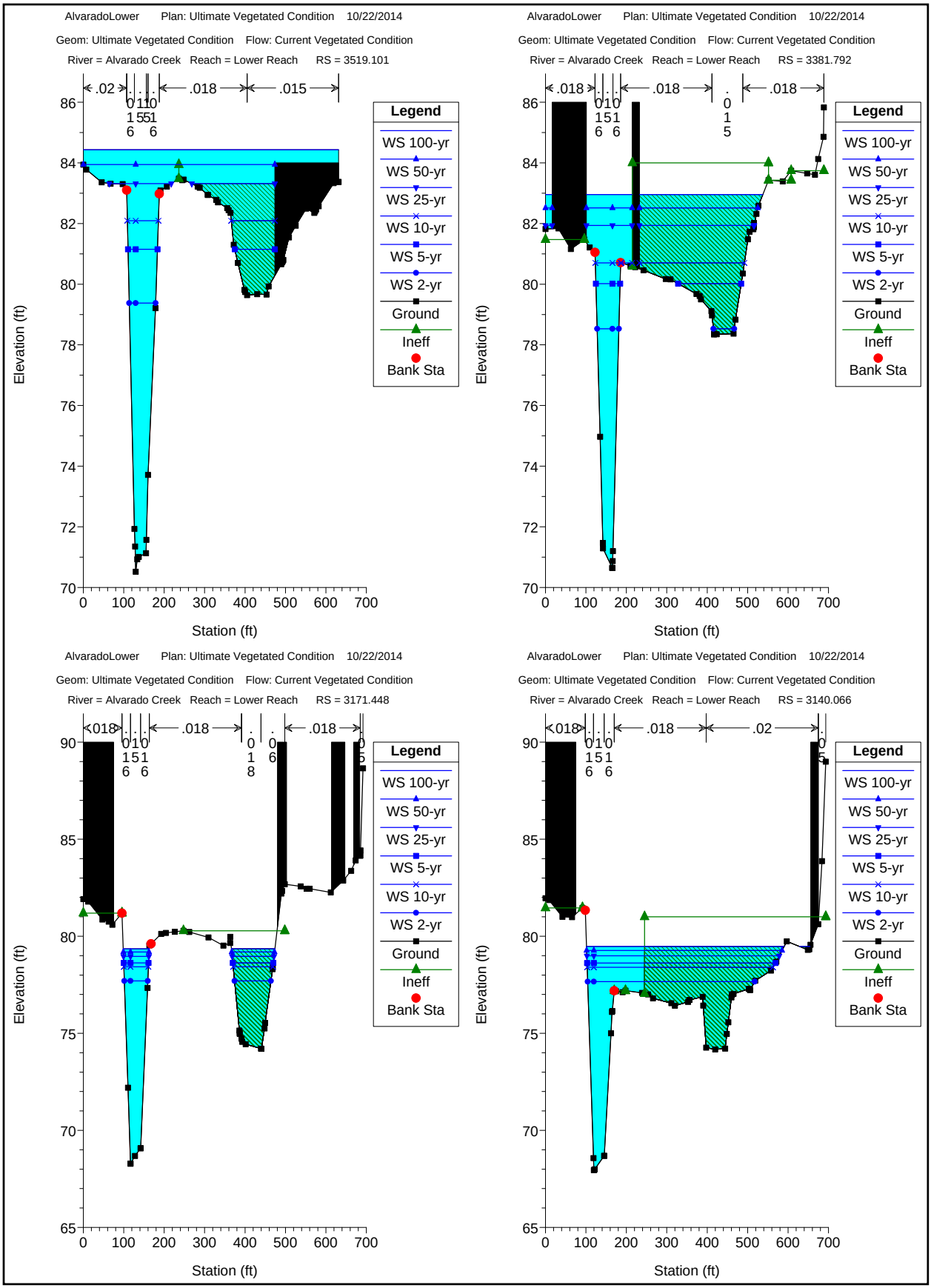
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	100-yr	5100.00	70.52	84.43		84.92	0.005361	5.5	918.78	631.50	0.32
Lower Reach	3519.101	50-yr	4500.00	70.52	83.94		84.44	0.006366	5.8	803.24	473.62	0.34
Lower Reach	3519.101	25-yr	3800.00	70.52	83.32		83.82	0.006869	5.7	670.50	358.75	0.35
Lower Reach	3519.101	10-yr	2700.00	70.52	82.09		82.44	0.005862	4.8	567.92	184.58	0.31
Lower Reach	3519.101	5-yr	2050.00	70.52	81.15		81.41	0.005226	4.1	497.43	172.00	0.28
Lower Reach	3519.101	2-yr	1180.00	70.52	79.38		79.53	0.004394	3.1	374.98	65.30	0.23
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	70.64	82.95	79.78	83.97	0.007968	6.7	682.62	434.68	0.40
Lower Reach	3381.792	50-yr	4500.00	70.64	82.51	79.20	83.40	0.008557	6.8	625.64	422.54	0.41
Lower Reach	3381.792	25-yr	3800.00	70.64	81.94	78.47	82.70	0.009430	6.8	550.99	412.97	0.43
Lower Reach	3381.792	10-yr	2700.00	70.64	80.70	77.15	81.35	0.010763	6.4	419.92	348.58	0.44
Lower Reach	3381.792	5-yr	2050.00	70.64	80.02	76.25	80.48	0.008776	5.4	376.67	215.88	0.38
Lower Reach	3381.792	2-yr	1180.00	70.64	78.53	74.78	78.78	0.006716	4.0	291.98	105.34	0.31
Lower Reach	3171.448	100-yr	5100.00	68.28	79.35	77.44	81.15	0.025243	10.7	474.42	171.56	0.70
Lower Reach	3171.448	50-yr	4500.00	68.28	79.19	76.85	80.65	0.021120	9.7	464.12	169.31	0.63
Lower Reach	3171.448	25-yr	3800.00	68.28	78.96	76.11	80.07	0.016701	8.4	449.71	166.14	0.56
Lower Reach	3171.448	10-yr	2700.00	68.28	78.43	74.79	79.08	0.010828	6.5	416.71	158.97	0.44
Lower Reach	3171.448	5-yr	2050.00	68.28	78.63	73.89	78.98	0.005679	4.8	428.89	161.47	0.32
Lower Reach	3171.448	2-yr	1180.00	68.28	77.70	72.42	77.85	0.002961	3.2	373.56	148.11	0.22
Lower Reach	3140.066	100-yr	5100.00	67.95	79.48	76.84	80.60	0.006318	5.6	719.51	515.06	0.35
Lower Reach	3140.066	50-yr	4500.00	67.95	79.27	76.25	80.17	0.005860	5.3	689.39	483.25	0.34
Lower Reach	3140.066	25-yr	3800.00	67.95	78.99	75.52	79.67	0.005293	5.0	650.54	476.13	0.32
Lower Reach	3140.066	10-yr	2700.00	67.95	78.40	74.25	78.79	0.004641	4.4	566.24	459.38	0.29
Lower Reach	3140.066	5-yr	2050.00	67.95	78.62	73.38	78.84	0.002164	3.1	597.70	466.13	0.20
Lower Reach	3140.066	2-yr	1180.00	67.95	77.66	71.96	77.77	0.001831	2.6	462.17	413.20	0.18
Lower Reach	3034.592	100-yr	5100.00	67.91	79.83	77.21	80.18	0.000779	1.9	1302.37	296.94	0.12
Lower Reach	3034.592	50-yr	4500.00	67.91	79.49	76.61	79.81	0.000794	1.9	1202.13	293.29	0.12
Lower Reach	3034.592	25-yr	3800.00	67.91	79.09	75.86	79.37	0.000800	1.8	1085.90	287.76	0.11
Lower Reach	3034.592	10-yr	2700.00	67.91	78.33	74.51	78.56	0.000862	1.7	872.30	275.42	0.12
Lower Reach	3034.592	5-yr	2050.00	67.91	78.01	73.58	78.42	0.007864	5.1	399.99	267.14	0.34
Lower Reach	3034.592	2-yr	1180.00	67.91	77.33	72.08	77.49	0.003645	3.3	361.18	249.47	0.23
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	68.72	79.57	77.83	80.00	0.001132	1.2	1200.72	288.36	0.08
Lower Reach	2847.761	50-yr	4500.00	68.72	79.22	77.61	79.63	0.001184	1.2	1101.81	283.70	0.08
Lower Reach	2847.761	25-yr	3800.00	68.72	78.82	77.33	79.18	0.001217	1.2	989.68	276.30	0.08
Lower Reach	2847.761	10-yr	2700.00	68.72	78.04	76.86	78.34	0.001447	1.2	777.65	265.45	0.08
Lower Reach	2847.761	5-yr	2050.00	68.72	77.52	75.68	77.79	0.001680	1.2	643.08	260.11	0.09
Lower Reach	2847.761	2-yr	1180.00	68.72	76.88	74.01	77.05	0.001701	1.1	477.77	254.49	0.09
Lower Reach	2677.801	100-yr	5100.00	67.57	77.94	77.94	79.53	0.004656	2.3	664.50	276.62	0.15
Lower Reach	2677.801	50-yr	4500.00	67.57	77.68	77.68	79.15	0.004925	2.4	613.76	261.83	0.16
Lower Reach	2677.801	25-yr	3800.00	67.57	77.27	77.27	78.70	0.004949	2.3	540.14	225.06	0.16
Lower Reach	2677.801	10-yr	2700.00	67.57	76.58	76.58	77.80	0.006009	2.3	426.70	176.26	0.17
Lower Reach	2677.801	5-yr	2050.00	67.57	76.10	76.10	77.17	0.007419	2.4	351.78	153.44	0.19
Lower Reach	2677.801	2-yr	1180.00	67.57	74.05	74.05	75.88	0.242293	10.9	108.51	49.44	1.00
Lower Reach	2514.866	100-yr	5100.00	67.21	77.37	75.05	77.71	0.000733	0.9	1280.57	311.62	0.06
Lower Reach	2514.866	50-yr	4500.00	67.21	77.00	74.80	77.32	0.000691	0.9	1168.39	283.02	0.06
Lower Reach	2514.866	25-yr	3800.00	67.21	76.53	74.47	76.83	0.000703	0.8	1038.97	269.73	0.06
Lower Reach	2514.866	10-yr	2700.00	67.21	75.96	73.93	76.17	0.000570	0.7	890.43	253.62	0.05
Lower Reach	2514.866	5-yr	2050.00	67.21	75.48	73.56	75.64	0.000515	0.7	770.95	239.88	0.05
Lower Reach	2514.866	2-yr	1180.00	67.21	74.39	73.04	74.51	0.000591	0.6	526.56	210.53	0.05
Lower Reach	2360.635	100-yr	5100.00	67.07	77.19	74.98	77.60	0.000672	5.7	1020.73	635.66	0.37
Lower Reach	2360.635	50-yr	4500.00	67.07	76.84	74.73	77.22	0.000650	5.4	949.55	625.87	0.36
Lower Reach	2360.635	25-yr	3800.00	67.07	76.39	74.42	76.72	0.000632	5.1	855.93	591.62	0.35
Lower Reach	2360.635	10-yr	2700.00	67.07	75.87	73.88	76.09	0.000474	4.2	748.12	400.37	0.30
Lower Reach	2360.635	5-yr	2050.00	67.07	75.40	73.49	75.57	0.000405	3.6	651.90	323.54	0.27
Lower Reach	2360.635	2-yr	1180.00	67.07	74.31	72.20	74.44	0.000402	3.1	439.92	175.20	0.26
Lower Reach	2340.973	100-yr	5100.00	67.19	77.39	72.35	77.50	0.000142	2.9	2065.34	850.81	0.18
Lower Reach	2340.973	50-yr	4500.00	67.19	77.03	72.10	77.13	0.000130	2.7	1934.22	818.79	0.17
Lower Reach	2340.973	25-yr	3800.00	67.19	76.56	71.75	76.64	0.000119	2.5	1769.52	788.68	0.16
Lower Reach	2340.973	10-yr	2700.00	67.19	75.98	71.14	76.04	0.000084	2.0	1575.15	594.13	0.13
Lower Reach	2340.973	5-yr	2050.00	67.19	75.49	70.71	75.53	0.000066	1.6	1414.13	436.50	0.12
Lower Reach	2340.973	2-yr	1180.00	67.19	74.38	70.05	74.40	0.000048	1.2	1066.78	301.63	0.10
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	77.41	74.37	77.49	0.000148	2.9	2430.25	825.41	0.18
Lower Reach	2309.739	50-yr	4500.00	66.92	76.95	74.18	77.12	0.000246	3.6	1449.79	793.71	0.23
Lower Reach	2309.739	25-yr	3800.00	66.92	76.49	73.96	76.63	0.000242	3.4	1299.68	763.11	0.22
Lower Reach	2309.739	10-yr	2700.00	66.92	75.93	73.49	76.03	0.000187	2.8	1127.22	725.70	0.19
Lower Reach	2309.739	5-yr	2050.00	66.92	75.45	72.56	75.52	0.000163	2.5	982.32	400.37	0.18

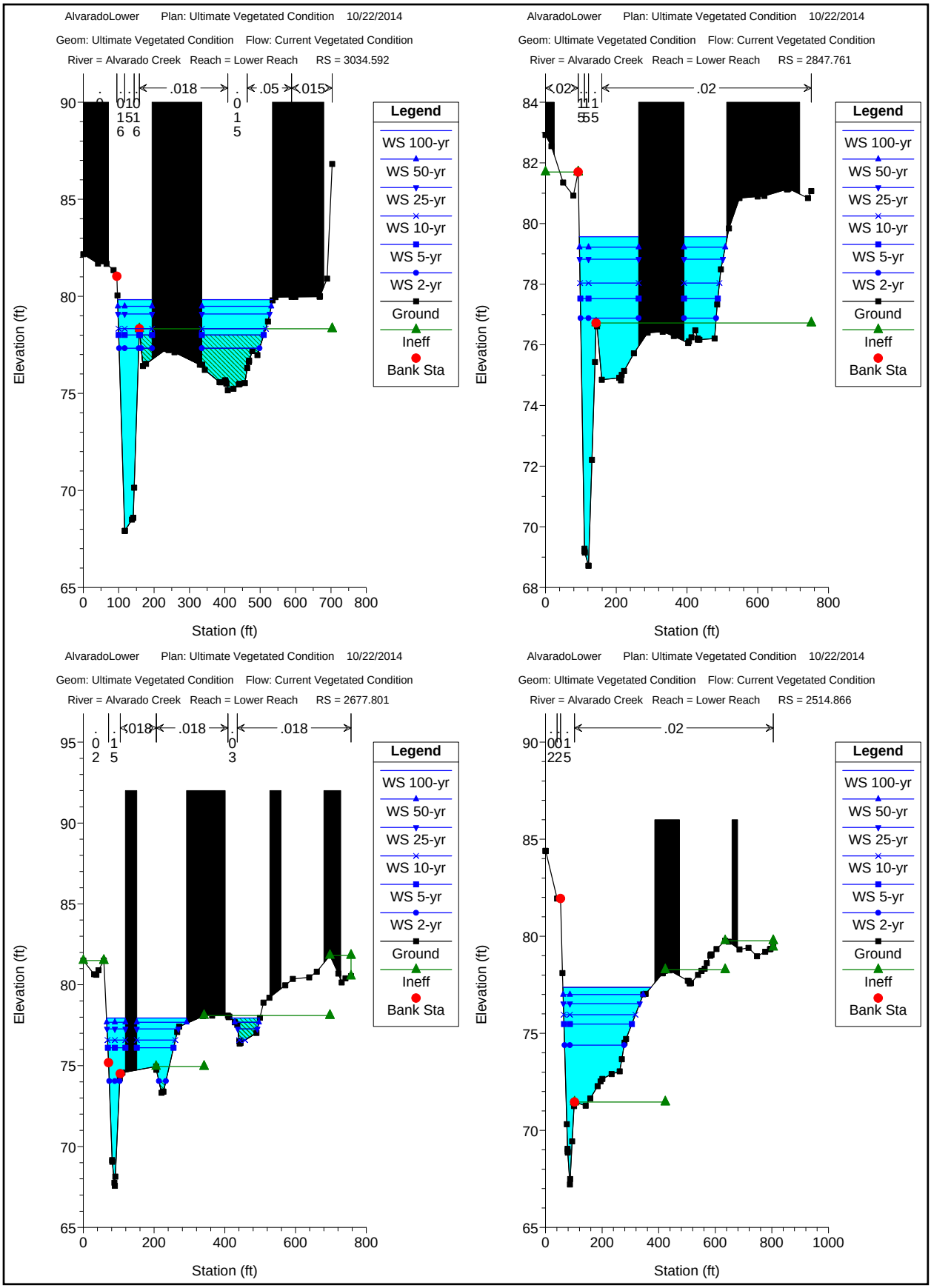
HEC-RAS Plan: Ultimate Vegetat River: Alvarado Creek Reach: Lower Reach (Continued)

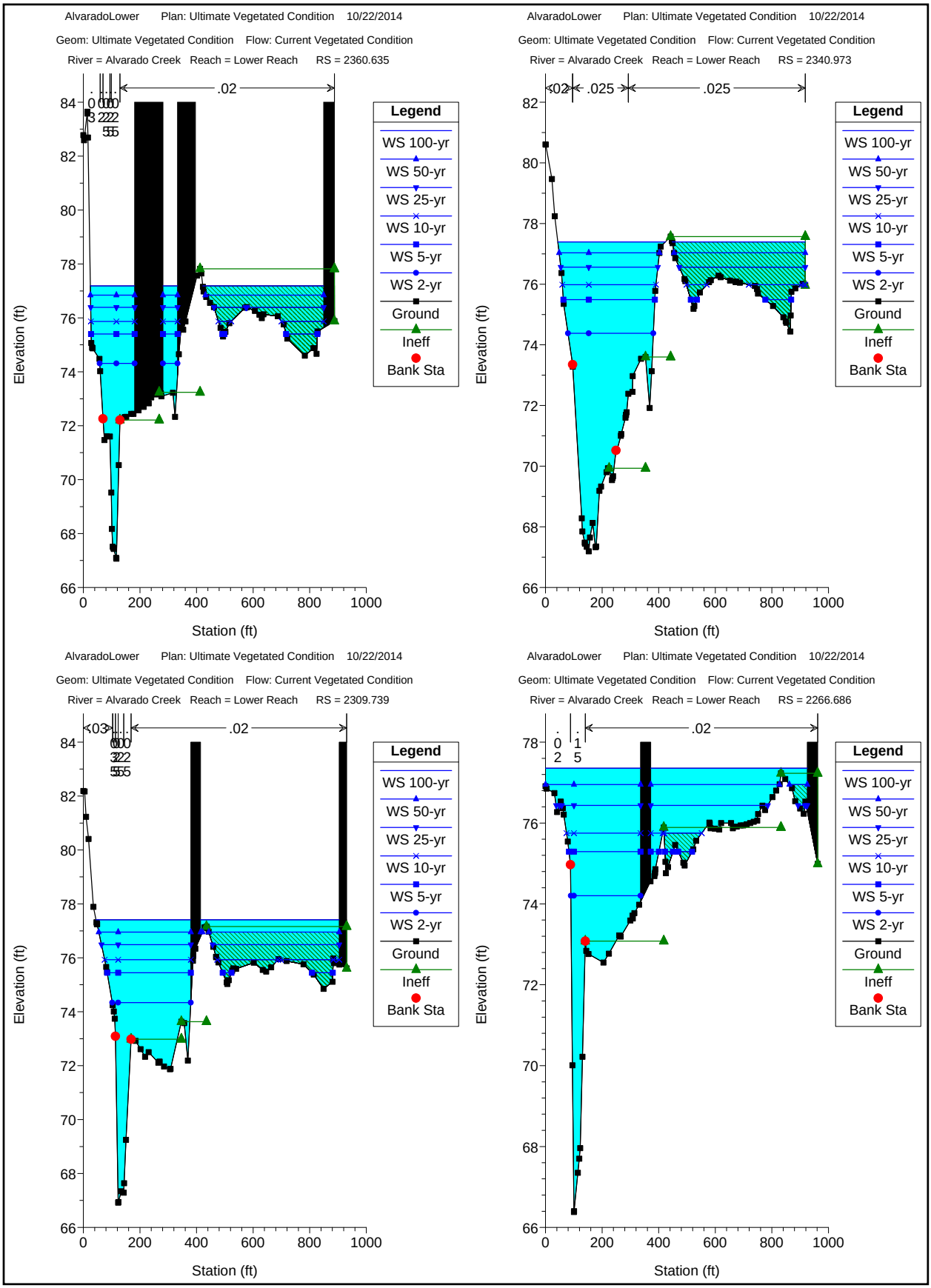
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	2309.739	2-yr	1180.00	66.92	74.34	71.17	74.40	0.000171	2.3	664.54	277.64	0.18
Lower Reach	2266.686	100-yr	5100.00	66.38	77.36	75.26	77.47	0.000389	0.8	2142.53	889.07	0.05
Lower Reach	2266.686	50-yr	4500.00	66.38	76.95	75.01	77.09	0.000507	0.8	1759.35	854.02	0.05
Lower Reach	2266.686	25-yr	3800.00	66.38	76.44	74.61	76.61	0.000711	1.0	1375.88	730.95	0.06
Lower Reach	2266.686	10-yr	2700.00	66.38	75.75	73.24	75.99	0.000959	1.0	900.51	436.74	0.07
Lower Reach	2266.686	5-yr	2050.00	66.38	75.29	72.53	75.49	0.001000	1.0	766.95	358.77	0.07
Lower Reach	2266.686	2-yr	1180.00	66.38	74.20	71.08	74.37	0.002227	1.3	483.93	246.28	0.10
Lower Reach	2090.444	100-yr	5100.00	66.18	75.46	75.46	77.14	0.004414	2.1	830.26	756.99	0.15
Lower Reach	2090.444	50-yr	4500.00	66.18	75.14	75.14	76.73	0.004679	2.1	759.09	726.54	0.15
Lower Reach	2090.444	25-yr	3800.00	66.18	74.95	74.92	76.23	0.004063	1.9	717.46	712.96	0.14
Lower Reach	2090.444	10-yr	2700.00	66.18	75.17	71.95	75.73	0.001636	1.3	765.47	729.32	0.09
Lower Reach	2090.444	5-yr	2050.00	66.18	74.86	71.88	75.26	0.001266	1.1	698.06	704.22	0.08
Lower Reach	2090.444	2-yr	1180.00	66.18	73.75	70.60	74.03	0.001426	1.0	483.37	324.21	0.08
Lower Reach	1904.254	100-yr	5100.00	65.47	76.34	73.83	76.36	0.000080	0.4	4514.80	1230.25	0.02
Lower Reach	1904.254	50-yr	4500.00	65.47	76.10	73.62	76.12	0.000078	0.3	4225.08	1226.09	0.02
Lower Reach	1904.254	25-yr	3800.00	65.47	75.79	73.28	75.81	0.000078	0.3	3839.54	1220.52	0.02
Lower Reach	1904.254	10-yr	2700.00	65.47	75.32	72.35	75.42	0.000594	0.9	1241.67	1180.98	0.06
Lower Reach	1904.254	5-yr	2050.00	65.47	74.94	71.26	75.02	0.000539	0.8	1102.51	1144.25	0.05
Lower Reach	1904.254	2-yr	1180.00	65.47	73.59	69.83	73.67	0.001770	1.3	603.26	907.28	0.10
Lower Reach	1849.924	100-yr	5100.00	64.56	76.32	72.07	76.36	0.000098	0.5	3493.09	923.90	0.03
Lower Reach	1849.924	50-yr	4500.00	64.56	76.08	72.04	76.12	0.000095	0.4	3277.41	923.54	0.03
Lower Reach	1849.924	25-yr	3800.00	64.56	75.77	71.98	75.80	0.000092	0.4	2988.74	923.06	0.03
Lower Reach	1849.924	10-yr	2700.00	64.56	75.37	70.48	75.39	0.000073	0.4	2616.39	922.44	0.02
Lower Reach	1849.924	5-yr	2050.00	64.56	74.82	69.62	74.97	0.000848	1.2	878.28	852.89	0.07
Lower Reach	1849.924	2-yr	1180.00	64.56	73.44	68.25	73.57	0.001914	1.6	542.10	613.42	0.11
Lower Reach	1742.873	100-yr	5100.00	64.03	76.31	72.49	76.35	0.000081	0.4	3725.89	935.29	0.02
Lower Reach	1742.873	50-yr	4500.00	64.03	76.08	72.39	76.11	0.000078	0.4	3507.66	934.96	0.02
Lower Reach	1742.873	25-yr	3800.00	64.03	75.76	70.98	75.79	0.000075	0.4	3215.47	934.52	0.02
Lower Reach	1742.873	10-yr	2700.00	64.03	75.36	69.71	75.38	0.000059	0.3	2839.44	933.96	0.02
Lower Reach	1742.873	5-yr	2050.00	64.03	74.90	68.84	74.92	0.000060	0.3	2409.98	933.31	0.02
Lower Reach	1742.873	2-yr	1180.00	64.03	73.21	67.47	73.31	0.003362	2.0	509.71	659.93	0.13
Lower Reach	1705.846	100-yr	5100.00	63.85	76.32	72.37	76.34	0.000051	0.5	4664.97	1270.19	0.03
Lower Reach	1705.846	50-yr	4500.00	63.85	76.08	72.17	76.10	0.000050	0.5	4366.94	1269.89	0.03
Lower Reach	1705.846	25-yr	3800.00	63.85	75.77	70.93	75.79	0.000049	0.5	3968.21	1269.50	0.03
Lower Reach	1705.846	10-yr	2700.00	63.85	75.27	69.69	75.37	0.000418	1.4	1258.81	1259.45	0.08
Lower Reach	1705.846	5-yr	2050.00	63.85	74.83	68.85	74.91	0.000402	1.3	1070.60	1239.82	0.08
Lower Reach	1705.846	2-yr	1180.00	63.85	73.17	67.48	73.24	0.000858	1.6	595.90	786.55	0.11
Lower Reach	1573.644	100-yr	5100.00	63.68	76.31	71.68	76.33	0.000060	0.4	4227.08	1100.15	0.02
Lower Reach	1573.644	50-yr	4500.00	63.68	76.07	71.49	76.10	0.000058	0.4	3970.06	1099.46	0.02
Lower Reach	1573.644	25-yr	3800.00	63.68	75.76	71.25	75.78	0.000057	0.4	3625.98	1098.53	0.02
Lower Reach	1573.644	10-yr	2700.00	63.68	75.24	69.37	75.32	0.000264	0.8	1449.90	1093.36	0.05
Lower Reach	1573.644	5-yr	2050.00	63.68	74.80	68.50	74.86	0.000256	0.8	1209.84	1029.60	0.04
Lower Reach	1573.644	2-yr	1180.00	63.68	73.06	67.13	73.12	0.001025	1.4	658.16	728.74	0.09
Lower Reach	1305.41	100-yr	5100.00	62.42	75.92	71.16	76.26	0.002501	3.1	1208.72	961.75	0.18
Lower Reach	1305.41	50-yr	4500.00	62.42	75.74	70.49	76.02	0.002521	3.1	1129.54	958.38	0.18
Lower Reach	1305.41	25-yr	3800.00	62.42	75.47	69.68	75.71	0.002663	3.1	1018.39	954.10	0.18
Lower Reach	1305.41	10-yr	2700.00	62.42	74.94	68.27	75.15	0.003143	3.2	766.10	914.86	0.20
Lower Reach	1305.41	5-yr	2050.00	62.42	74.50	67.32	74.69	0.003368	3.2	604.30	736.67	0.20
Lower Reach	1305.41	2-yr	1180.00	62.42	72.48	65.86	72.63	0.004110	3.0	389.63	414.96	0.19
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.29	71.59	68.17	72.64	0.020137	8.2	621.85	294.16	0.51
Lower Reach	1155.558	50-yr	4500.00	60.29	71.37	67.65	72.24	0.017232	7.5	603.86	279.65	0.47
Lower Reach	1155.558	25-yr	3800.00	60.29	71.07	67.00	71.74	0.014038	6.6	579.46	259.74	0.42
Lower Reach	1155.558	10-yr	2700.00	60.29	70.89	65.80	71.24	0.007678	4.8	565.41	247.84	0.31
Lower Reach	1155.558	5-yr	2050.00	60.29	70.19	64.96	70.44	0.006068	4.0	513.82	94.16	0.26
Lower Reach	1155.558	2-yr	1180.00	60.29	68.73	63.60	68.86	0.004181	2.9	411.61	67.21	0.20
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.08	70.44	69.68	71.17	0.007376	5.5	789.09	274.03	0.36
Lower Reach	1036.821	50-yr	4500.00	60.08	70.20	68.43	70.85	0.007689	5.5	724.39	264.67	0.37
Lower Reach	1036.821	25-yr	3800.00	60.08	69.90	67.75	70.46	0.008075	5.4	646.15	252.76	0.38
Lower Reach	1036.821	10-yr	2700.00	60.08	69.54	66.51	70.12	0.011305	6.2	453.05	242.52	0.44
Lower Reach	1036.821	5-yr	2050.00	60.08	69.14	65.66	69.56	0.008762	5.2	398.24	195.71	0.38
Lower Reach	1036.821	2-yr	1180.00	60.08	68.07	64.24	68.28	0.005629	3.7	320.20	90.05	0.29
Lower Reach	819.1344	100-yr	5100.00	58.79	68.10	66.51	69.20	0.010884	3.4	870.21	299.89	0.24
Lower Reach	819.1344	50-yr	4500.00	58.79	67.97	66.04	68.88	0.010441	3.3	830.53	298.92	0.24
Lower Reach	819.1344	25-yr	3800.00	58.79	67.81	65.46	68.51	0.009836	3.1	780.79	297.70	0.23

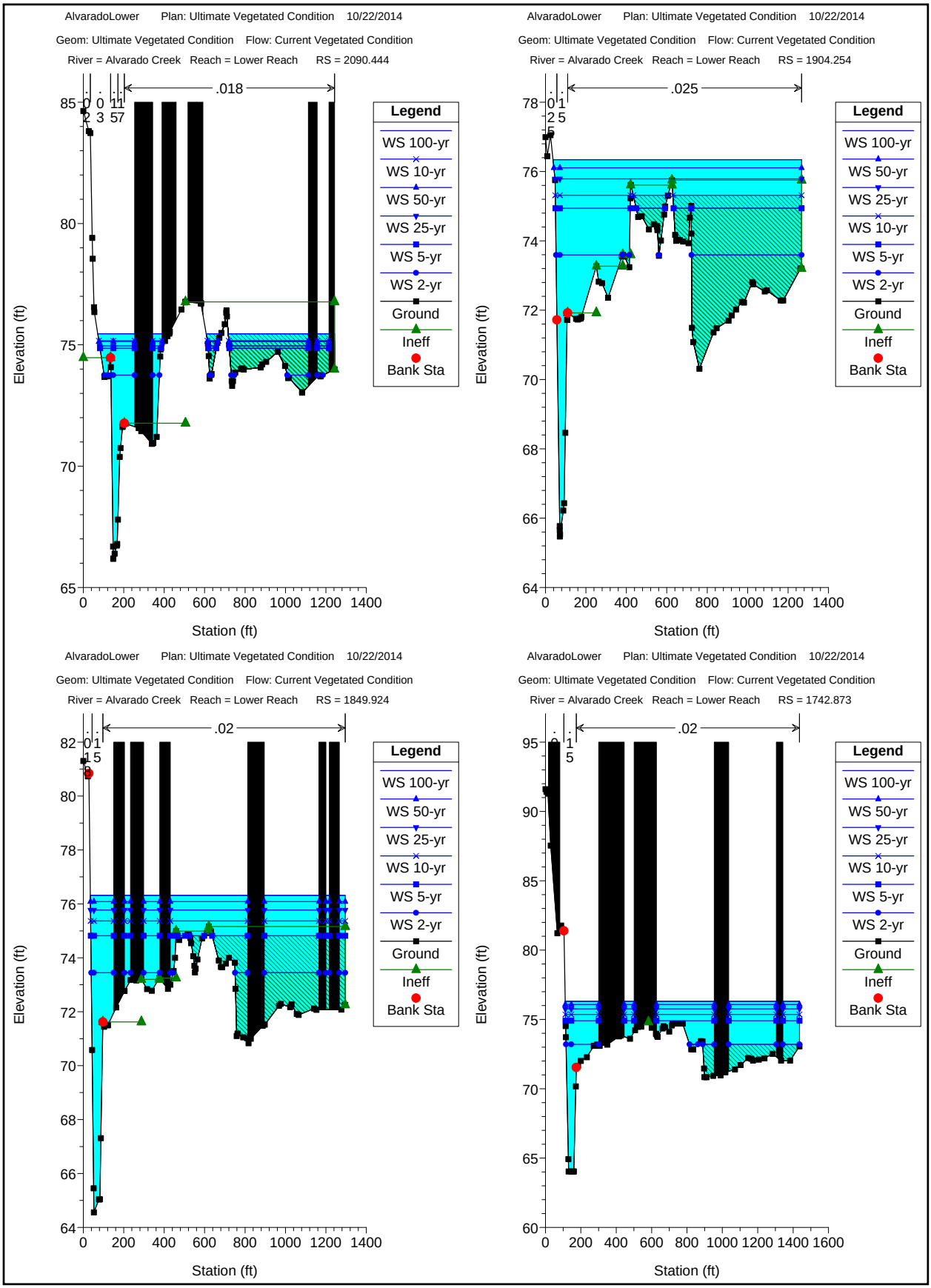
HEC-RAS Plan: Ultimate Vegetat River: Alvarado Creek Reach: Lower Reach (Continued)

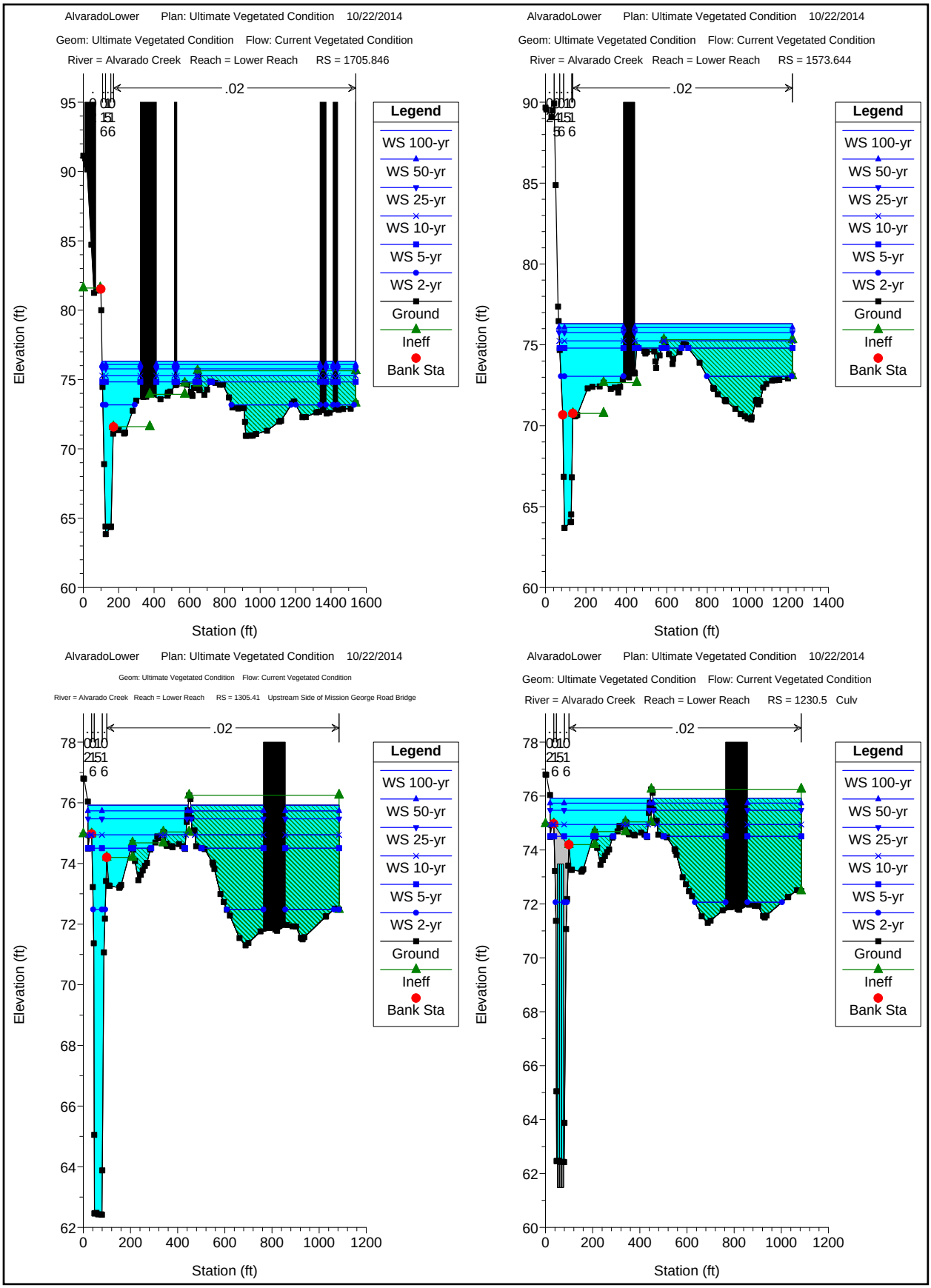
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	819.1344	10-yr	2700.00	58.79	67.49	64.42	67.89	0.008926	2.9	686.09	295.35	0.22
Lower Reach	819.1344	5-yr	2050.00	58.79	67.28	63.68	67.59	0.009045	2.8	585.10	286.09	0.22
Lower Reach	819.1344	2-yr	1180.00	58.79	66.46	62.47	66.59	0.011075	2.9	405.38	157.68	0.23
Lower Reach	415.466	100-yr	5100.00	57.01	65.88	62.35	66.41	0.005005	2.6	1220.96	401.54	0.17
Lower Reach	415.466	50-yr	4500.00	57.01	65.73	61.99	66.16	0.005000	2.6	1158.92	400.93	0.17
Lower Reach	415.466	25-yr	3800.00	57.01	65.53	61.53	65.85	0.005009	2.5	1079.23	400.14	0.17
Lower Reach	415.466	10-yr	2700.00	57.01	65.16	60.74	65.33	0.005005	2.4	932.74	398.69	0.17
Lower Reach	415.466	5-yr	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	2-yr	1180.00	57.01	63.61	59.38	63.68	0.005009	2.1	565.44	112.07	0.16


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 5-yr
WS 10-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 5-yr
WS 10-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.05
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

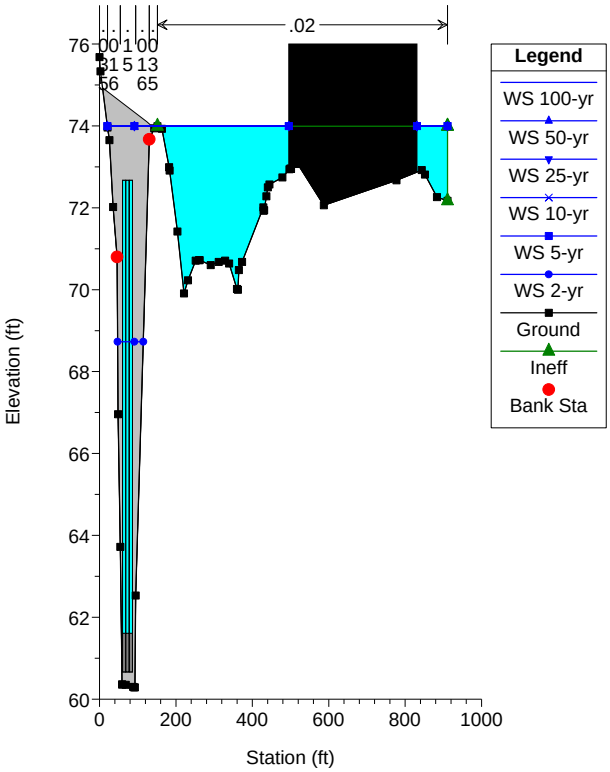

AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 100-yr
WS 10-yr
WS 50-yr
WS 25-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014

Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition

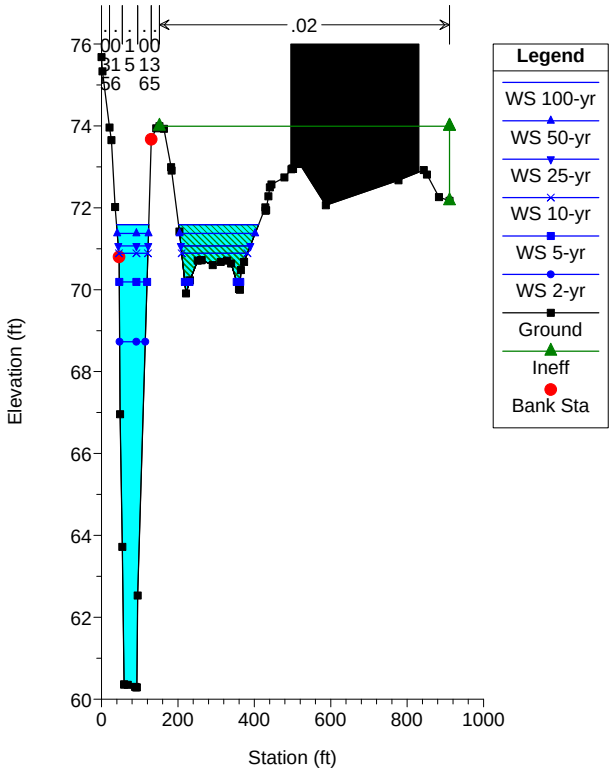
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014

Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition

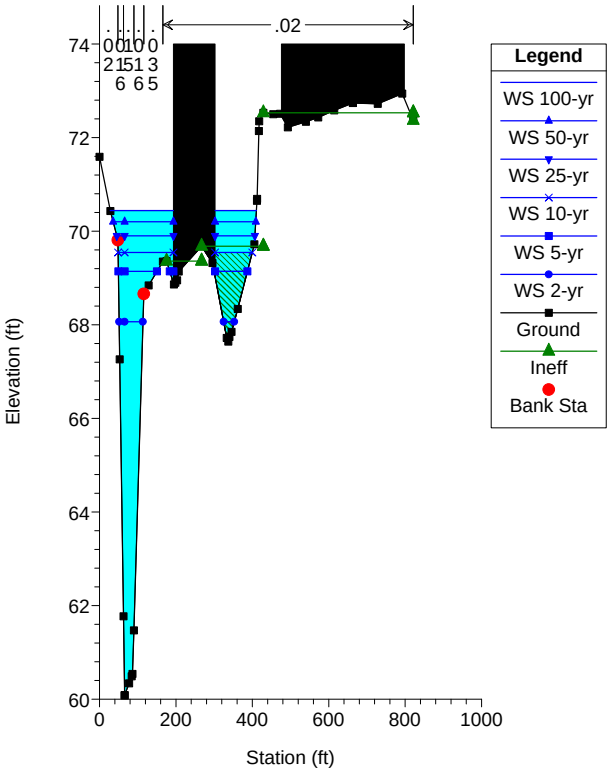
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge



AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014

Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition

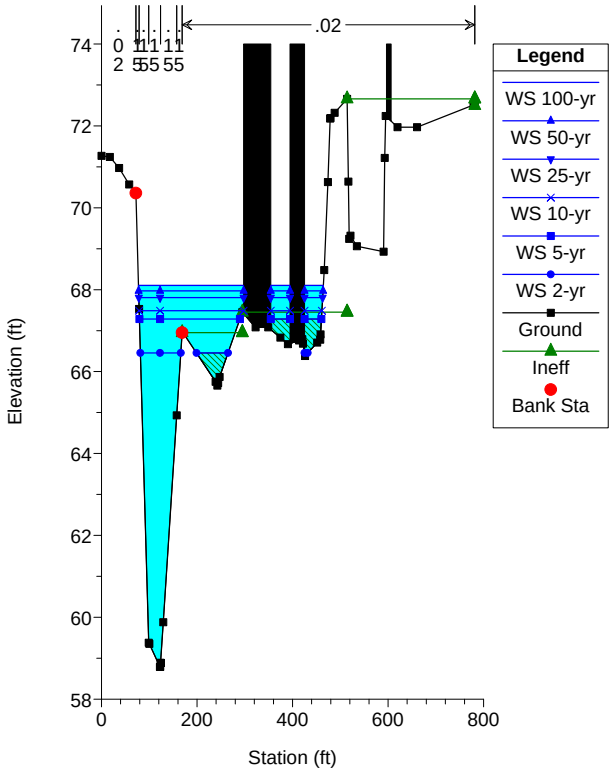
River = Alvarado Creek Reach = Lower Reach RS = 1036.821

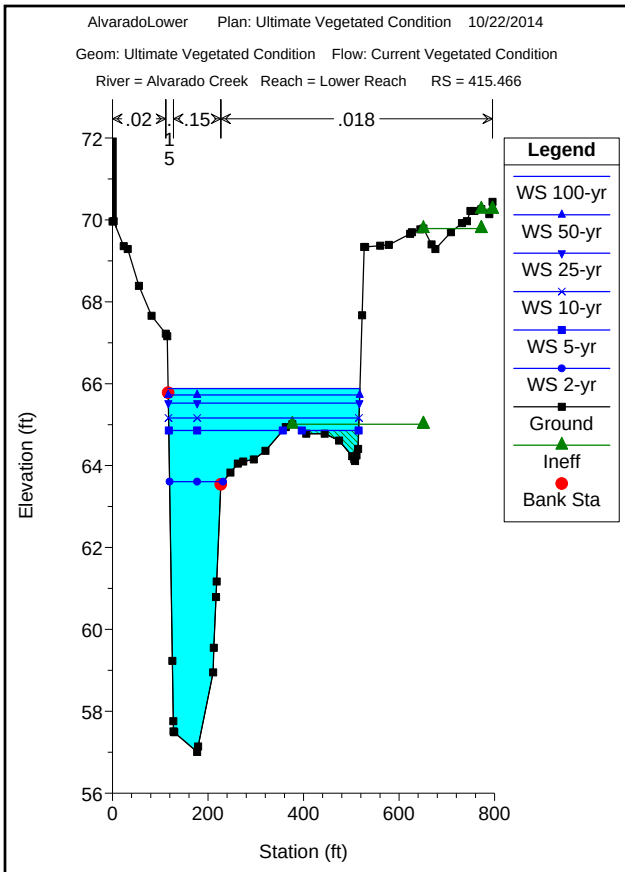


AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014

Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 819.1344




AlvaradoLower Plan: Ultimate Vegetated Condition 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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
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PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 10:54:13 AM

Project in English units

PLAN DATA

Plan Title: Ultimate Vegetated Condition
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p04

Geometry Title: Ultimate Vegetated Condition
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g05

Flow Title : Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Flow Data (cfs)

River	Reach	RS	100-yr	50-yr	25-yr	10-yr	5-yr	2-yr
Alvarado Creek	Lower Reach	3519.101	5100	4500	3800	2700	2050	1180

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	100-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	50-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	25-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	10-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	5-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	2-yr		Normal S = 0.005

GEOMETRY DATA

Geometry Title: Ultimate Vegetated Condition
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g05

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94
328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64

430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	107.14	.016	126.44	.15	155.92	.15	160	.016
188.01	.018	405.16	.015						

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

107.14	188.01		137.3	137.31	137.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.15	166.87	.016	185.99	.018
411.74	.015	488.01	.018						

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

122.6	185.99		209.35	210.34	211.8	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.15	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

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

95.69	167.68		32.79	31.38	28.21	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	95.69	81.19	F
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	121.78	67.99
145.21	68.69	145.46	68.69	161.99	75	164.4	76.1	165.21	76.15
169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2	238.98	77.08
253.88	77	265.89	76.8	311.18	76.55	320.11	76.42	352.63	76.62
356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26	419.63	74.17
444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85	460.97	77
461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24	506.27	77.23
518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74	648.95	79.3
652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87	693.26	88.99

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	118.7	.15	145.21	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.91	117.43	67.92	137.35	68.5
140.94	68.59	140.98	68.59	143.73	70.14	158.51	78.33	168.47	76.41
177.34	76.52	235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12
329.16	76.48	336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57
400.89	75.68	402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16
424.44	75.24	439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53
463.42	76.3	467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97
521.9	78.7	535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97
668.1	79.98	668.55	79.98	669	80.01	689.24	80.91	703.56	86.82

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	94.76	.016	117.02	.15	143.73	.016	158.51	.018
408.4	.015	463.42	.05	588.58	.015				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.15	110.07	.15	121.5	.15	159.23	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
92.48 143.16 165.5 169.96 176.8 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	71.39	.15	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
71.39 104.55 162.85 162.93 162.56 .1 .3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.15	102.77	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.2 102.77 158.36 154.23 152.81 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	69.46	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
69.46 129.21 19.33 19.66 19.62 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
224.96	353.4	69.93	F
353.4	442.2	73.6	F
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
168.74	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113.57	168.74	21.27	43.05	56.67	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.15	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.15	171.16	.17	202.76	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.15	109.43	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT

Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	43.55	.15	96.83	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
27.83 96.83 119.68 107.05 93.87 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.15	174.16	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.06 174.16 35.7 37.03 38.3 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.15	155.3	.016	171.11	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.12 171.11 136.62 132.2 123.01 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	70.17	.016	89.75	.15	130.23	.016
135.25	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
85.63	135.25	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	46.28	.15	80.56	.016	99.47	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.1	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
35.1	74.97	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

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Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    35.1    .016   46.28     .15   80.56    .016   99.47     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47            .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97          124.06    74.1          143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.36   59.37   60.36
   68.77   60.35   87.93    60.3   90.19   60.29   92.72   60.29   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96    .016   54.41     .15   94.83    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          46.27  130.44            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 21     110     .018      .17      .94                    .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.36   59.37   60.36
   68.77   60.35   87.93    60.3   90.19   60.29   92.72   60.29   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96    .016   54.41     .15   94.83    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
```

Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.016	62.89	.15	89.98	.016	115.82	.035
165.64	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.15	78.67	.15	98.97	.15	123.52	.15
157.62	.15	168.96	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek

REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
116.54 226.72 420.92 415.47 422.02 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.016	.15	.15	.016	.018	.015		
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.15	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.15	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.15	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.15	.016	.018	.015	.05	.015	
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.15	.15	.15	.02				
Lower Reach	2677.801	.02	.15	.018	.018	.03	.018			
Lower Reach	2514.866	.02	.02	.15	.02					
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								
Lower Reach	2309.739	.03	.035	.025	.025	.025	.02			
Lower Reach	2266.686	.02	.15	.02						
Lower Reach	2090.444	.02	.03	.15	.17	.018				
Lower Reach	1904.254	.025	.15	.025						
Lower Reach	1849.924	.018	.15	.02						
Lower Reach	1742.873	.018	.15	.02						
Lower Reach	1705.846	.02	.016	.15	.016	.02				
Lower Reach	1573.644	.02	.045	.016	.15	.016	.02			
Lower Reach	1305.41	.02	.016	.15	.016	.02				
Lower Reach	1230.5	Culvert								
Lower Reach	1155.558	.035	.016	.15	.016	.035	.02			
Lower Reach	1149.024	Lat Struct								
Lower Reach	1121.496	Lat Struct								
Lower Reach	1036.821	.02	.016	.15	.016	.035	.02			
Lower Reach	819.1344	.02	.15	.15	.15	.15	.15	.02		
Lower Reach	415.466	.02	.15	.15	.018					

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3

HEC-RAS Plan: Ultimate_Multi Q River: Alvarado Creek Reach: Lower Reach

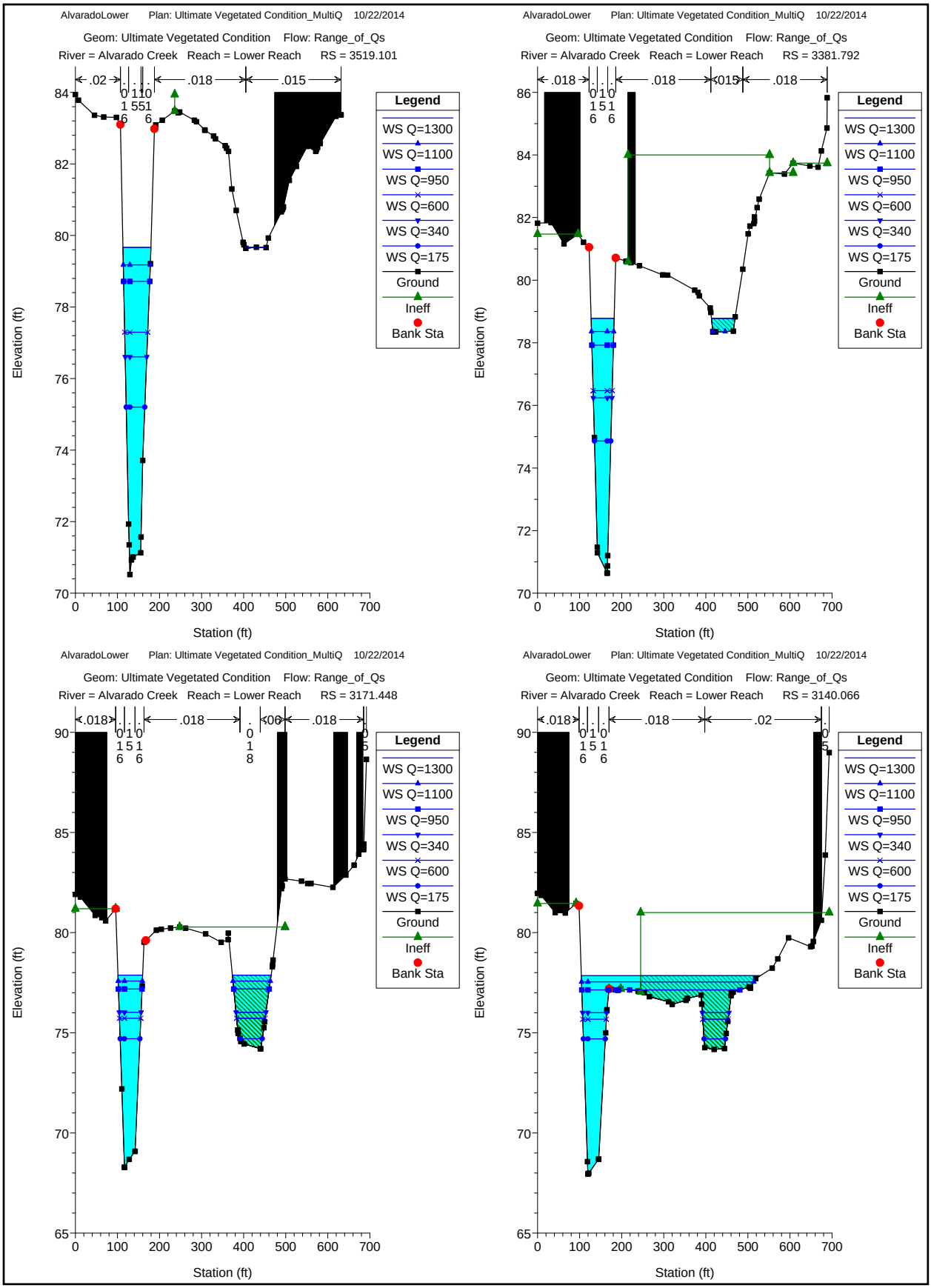
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1300	1300.00	70.52	79.67		79.84	0.004525	3.3	394.14	111.38	0.24
Lower Reach	3519.101	Q=1100	1100.00	70.52	79.18		79.32	0.004290	3.0	361.97	64.42	0.23
Lower Reach	3519.101	Q=340	340.00	70.52	76.61		76.65	0.002351	1.6	213.15	51.36	0.14
Lower Reach	3519.101	Q=600	600.00	70.52	77.30		77.39	0.004337	2.4	249.77	54.86	0.20
Lower Reach	3519.101	Q=950	950.00	70.52	78.72		78.84	0.004219	2.9	332.81	62.08	0.22
Lower Reach	3519.101	Q=175	175.00	70.52	75.20		75.22	0.002179	1.2	145.93	44.21	0.12
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1300	1300.00	70.64	78.78	75.01	79.06	0.007017	4.3	305.58	110.95	0.32
Lower Reach	3381.792	Q=1100	1100.00	70.64	78.36	74.62	78.60	0.006474	3.9	282.92	82.37	0.30
Lower Reach	3381.792	Q=340	340.00	70.64	76.24	72.72	76.29	0.002780	1.9	179.31	44.49	0.17
Lower Reach	3381.792	Q=600	600.00	70.64	76.47	73.48	76.62	0.007191	3.2	189.69	45.43	0.27
Lower Reach	3381.792	Q=950	950.00	70.64	77.92	74.31	78.13	0.006373	3.7	260.05	51.35	0.29
Lower Reach	3381.792	Q=175	175.00	70.64	74.86	72.11	74.89	0.002638	1.4	121.88	38.90	0.14
Lower Reach	3171.448	Q=1300	1300.00	68.28	77.88	72.64	78.06	0.003283	3.4	384.02	150.81	0.23
Lower Reach	3171.448	Q=1100	1100.00	68.28	77.58	72.27	77.72	0.002733	3.0	366.79	146.35	0.21
Lower Reach	3171.448	Q=340	340.00	68.28	76.02	70.40	76.04	0.000625	1.2	281.30	122.84	0.09
Lower Reach	3171.448	Q=600	600.00	68.28	75.73	71.14	75.80	0.002333	2.3	266.26	118.43	0.17
Lower Reach	3171.448	Q=950	950.00	68.28	77.19	71.96	77.31	0.002507	2.8	344.39	140.43	0.20
Lower Reach	3171.448	Q=175	175.00	68.28	74.70	69.81	74.71	0.000394	0.8	216.29	99.65	0.07
Lower Reach	3140.066	Q=1300	1300.00	67.95	77.85	72.18	77.96	0.001854	2.6	488.30	425.15	0.18
Lower Reach	3140.066	Q=1100	1100.00	67.95	77.54	71.81	77.64	0.001783	2.5	445.25	409.88	0.18
Lower Reach	3140.066	Q=340	340.00	67.95	76.01	70.00	76.02	0.000447	1.1	319.41	120.41	0.08
Lower Reach	3140.066	Q=600	600.00	67.95	75.68	70.72	75.74	0.001700	2.0	300.71	116.07	0.15
Lower Reach	3140.066	Q=950	950.00	67.95	77.14	71.51	77.23	0.001841	2.4	389.51	334.05	0.18
Lower Reach	3140.066	Q=175	175.00	67.95	74.69	69.41	74.70	0.000274	0.7	247.63	103.20	0.06
Lower Reach	3034.592	Q=1300	1300.00	67.91	77.48	72.31	77.67	0.004101	3.5	369.62	253.37	0.24
Lower Reach	3034.592	Q=1100	1100.00	67.91	77.24	71.92	77.38	0.003321	3.1	356.01	247.05	0.21
Lower Reach	3034.592	Q=340	340.00	67.91	75.95	70.01	75.97	0.000641	1.2	287.54	150.31	0.09
Lower Reach	3034.592	Q=600	600.00	67.91	75.43	70.77	75.51	0.002720	2.3	261.81	81.09	0.17
Lower Reach	3034.592	Q=950	950.00	67.91	76.86	71.61	76.98	0.003014	2.8	335.42	218.96	0.20
Lower Reach	3034.592	Q=175	175.00	67.91	74.66	69.40	74.67	0.000381	0.8	225.05	46.32	0.06
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1300	1300.00	68.72	77.09	74.27	77.25	0.001397	1.1	529.91	256.13	0.08
Lower Reach	2847.761	Q=1100	1100.00	68.72	76.75	73.82	76.92	0.001932	1.2	444.78	253.45	0.09
Lower Reach	2847.761	Q=340	340.00	68.72	75.63	71.49	75.69	0.006371	2.0	170.71	131.57	0.17
Lower Reach	2847.761	Q=600	600.00	68.72	72.45	72.45	73.72	0.261924	9.0	66.46	26.26	1.00
Lower Reach	2847.761	Q=950	950.00	68.72	73.46	73.46	75.01	0.246402	10.0	94.86	30.44	1.00
Lower Reach	2847.761	Q=175	175.00	68.72	74.47	70.67	74.50	0.003692	1.4	128.00	34.69	0.13
Lower Reach	2677.801	Q=1300	1300.00	67.57	74.34	74.34	76.25	0.239196	11.1	117.20	56.52	1.00
Lower Reach	2677.801	Q=1100	1100.00	67.57	73.85	73.85	75.63	0.243241	10.7	102.84	44.68	1.00
Lower Reach	2677.801	Q=340	340.00	67.57	73.25	71.26	73.49	0.037576	4.0	86.02	26.56	0.39
Lower Reach	2677.801	Q=600	600.00	67.57	73.51	72.35	74.15	0.094578	6.4	93.10	36.20	0.62
Lower Reach	2677.801	Q=950	950.00	67.57	73.45	73.45	75.13	0.248989	10.4	91.42	34.70	1.00
Lower Reach	2677.801	Q=175	175.00	67.57	73.57	70.31	73.63	0.007640	1.8	94.91	37.81	0.18
Lower Reach	2514.866	Q=1300	1300.00	67.21	74.56	73.04	74.69	0.000564	0.6	564.04	213.67	0.05
Lower Reach	2514.866	Q=1100	1100.00	67.21	74.27	73.00	74.39	0.000608	0.6	502.51	208.99	0.05
Lower Reach	2514.866	Q=340	340.00	67.21	72.84	70.61	72.91	0.001115	0.7	221.26	155.73	0.07
Lower Reach	2514.866	Q=600	600.00	67.21	73.42	71.55	73.51	0.000881	0.7	329.82	197.35	0.06
Lower Reach	2514.866	Q=950	950.00	67.21	74.05	72.79	74.16	0.000644	0.6	456.48	206.00	0.05
Lower Reach	2514.866	Q=175	175.00	67.21	71.41	69.78	71.52	0.026046	2.7	64.76	63.02	0.31
Lower Reach	2360.635	Q=1300	1300.00	67.07	74.49	72.65	74.62	0.000400	3.2	471.42	176.79	0.26
Lower Reach	2360.635	Q=1100	1100.00	67.07	74.20	72.08	74.32	0.000400	3.1	419.66	174.56	0.26
Lower Reach	2360.635	Q=340	340.00	67.07	72.78	69.61	72.83	0.000259	1.9	194.53	121.13	0.20
Lower Reach	2360.635	Q=600	600.00	67.07	73.34	70.53	73.43	0.000365	2.5	272.70	166.56	0.24
Lower Reach	2360.635	Q=950	950.00	67.07	73.97	71.84	74.08	0.000392	2.9	380.75	173.32	0.26
Lower Reach	2360.635	Q=175	175.00	67.07	71.31	68.86	71.37	0.000267	1.9	92.82	32.61	0.20
Lower Reach	2340.973	Q=1300	1300.00	67.19	74.56	70.16	74.59	0.000051	1.3	1121.88	311.62	0.10
Lower Reach	2340.973	Q=1100	1100.00	67.19	74.26	69.99	74.28	0.000046	1.2	1031.36	299.21	0.09
Lower Reach	2340.973	Q=340	340.00	67.19	72.81	68.68	72.82	0.000015	0.6	639.37	221.52	0.05
Lower Reach	2340.973	Q=600	600.00	67.19	73.39	69.15	73.40	0.000029	0.8	765.64	255.95	0.07
Lower Reach	2340.973	Q=950	950.00	67.19	74.04	69.74	74.05	0.000041	1.1	963.67	294.52	0.09
Lower Reach	2340.973	Q=175	175.00	67.19	71.35	68.29	71.35	0.000020	0.5	363.94	167.04	0.05
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1300	1300.00	66.92	74.52	71.39	74.58	0.000167	2.3	715.40	280.64	0.17
Lower Reach	2309.739	Q=1100	1100.00	66.92	74.22	71.02	74.28	0.000171	2.2	631.95	275.17	0.17
Lower Reach	2309.739	Q=340	340.00	66.92	72.77	69.12	72.81	0.000148	1.7	200.59	195.82	0.15
Lower Reach	2309.739	Q=600	600.00	66.92	73.35	69.90	73.40	0.000168	2.0	392.36	243.80	0.17
Lower Reach	2309.739	Q=950	950.00	66.92	73.99	70.72	74.05	0.000171	2.2	569.77	270.45	0.17

HEC-RAS Plan: Ultimate_Multi Q River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2309.739	Q=175	175.00	66.92	71.32	68.48	71.35	0.000130	1.3	129.72	44.33	0.14
Lower Reach	2266.686	Q=1300	1300.00	66.38	74.38	71.31	74.55	0.001852	1.3	527.29	246.52	0.10
Lower Reach	2266.686	Q=1100	1100.00	66.38	74.09	70.92	74.25	0.002508	1.4	456.55	246.13	0.11
Lower Reach	2266.686	Q=340	340.00	66.38	72.75	68.99	72.79	0.005309	1.8	193.15	114.02	0.15
Lower Reach	2266.686	Q=600	600.00	66.38	73.28	69.77	73.37	0.005191	1.8	280.71	182.99	0.15
Lower Reach	2266.686	Q=950	950.00	66.38	73.87	70.61	74.02	0.003048	1.5	404.28	232.52	0.12
Lower Reach	2266.686	Q=175	175.00	66.38	71.30	68.34	71.33	0.004333	1.4	129.06	40.98	0.13
Lower Reach	2090.444	Q=1300	1300.00	66.18	73.94	70.87	74.24	0.001367	1.0	512.74	397.31	0.08
Lower Reach	2090.444	Q=1100	1100.00	66.18	73.63	70.40	73.89	0.001445	1.0	465.32	258.05	0.08
Lower Reach	2090.444	Q=340	340.00	66.18	71.62	68.43	71.68	0.007627	2.0	169.58	76.87	0.20
Lower Reach	2090.444	Q=600	600.00	66.18	72.67	69.23	72.81	0.001949	1.1	324.61	143.83	0.10
Lower Reach	2090.444	Q=950	950.00	66.18	73.41	70.08	73.63	0.001461	1.0	431.99	222.26	0.09
Lower Reach	2090.444	Q=175	175.00	66.18	70.44	67.77	70.48	0.005400	1.5	114.70	39.04	0.16
Lower Reach	1904.254	Q=1300	1300.00	65.47	73.86	70.05	73.93	0.001267	1.1	704.41	919.00	0.08
Lower Reach	1904.254	Q=1100	1100.00	65.47	73.43	69.67	73.51	0.002183	1.4	549.67	878.09	0.11
Lower Reach	1904.254	Q=340	340.00	65.47	70.23	67.78	70.32	0.013766	2.5	137.69	42.78	0.24
Lower Reach	1904.254	Q=600	600.00	65.47	71.98	68.55	72.09	0.010905	2.6	233.72	344.45	0.22
Lower Reach	1904.254	Q=950	950.00	65.47	73.06	69.36	73.18	0.003795	1.8	405.49	806.50	0.14
Lower Reach	1904.254	Q=175	175.00	65.47	68.72	67.15	68.80	0.018007	2.2	78.79	35.39	0.26
Lower Reach	1849.924	Q=1300	1300.00	64.56	73.73	68.46	73.85	0.001484	1.4	609.18	649.22	0.09
Lower Reach	1849.924	Q=1100	1100.00	64.56	73.26	68.10	73.38	0.002244	1.7	499.02	606.61	0.11
Lower Reach	1849.924	Q=340	340.00	64.56	69.82	66.38	69.87	0.005326	1.8	192.85	47.97	0.15
Lower Reach	1849.924	Q=600	600.00	64.56	71.61	67.06	71.68	0.005246	2.1	284.82	153.45	0.16
Lower Reach	1849.924	Q=950	950.00	64.56	72.86	67.82	73.00	0.002927	1.8	421.31	525.19	0.13
Lower Reach	1849.924	Q=175	175.00	64.56	68.27	65.84	68.30	0.005214	1.4	123.17	42.12	0.15
Lower Reach	1742.873	Q=1300	1300.00	64.03	73.54	67.68	73.66	0.002446	1.8	570.93	696.29	0.11
Lower Reach	1742.873	Q=1100	1100.00	64.03	72.99	67.32	73.09	0.003592	2.1	473.88	600.02	0.14
Lower Reach	1742.873	Q=340	340.00	64.03	69.30	65.59	69.35	0.004453	1.7	203.39	47.76	0.14
Lower Reach	1742.873	Q=600	600.00	64.03	71.07	66.28	71.14	0.004879	2.0	293.21	110.24	0.15
Lower Reach	1742.873	Q=950	950.00	64.03	72.52	67.03	72.61	0.004631	2.2	408.87	525.89	0.15
Lower Reach	1742.873	Q=175	175.00	64.03	67.80	65.05	67.83	0.003856	1.3	135.50	42.53	0.13
Lower Reach	1705.846	Q=1300	1300.00	63.85	73.52	67.69	73.60	0.000729	1.6	661.96	847.79	0.10
Lower Reach	1705.846	Q=1100	1100.00	63.85	72.95	67.34	73.02	0.000955	1.7	556.64	707.37	0.11
Lower Reach	1705.846	Q=340	340.00	63.85	69.18	65.64	69.23	0.002435	1.7	200.06	48.76	0.15
Lower Reach	1705.846	Q=600	600.00	63.85	70.95	66.32	71.02	0.002176	2.1	291.88	93.25	0.16
Lower Reach	1705.846	Q=950	950.00	63.85	72.45	67.06	72.52	0.001267	1.9	474.45	443.31	0.13
Lower Reach	1705.846	Q=175	175.00	63.85	67.68	65.11	67.71	0.002628	1.3	130.89	43.29	0.14
Lower Reach	1573.644	Q=1300	1300.00	63.68	73.45	67.34	73.51	0.000614	1.1	780.25	752.60	0.07
Lower Reach	1573.644	Q=1100	1100.00	63.68	72.80	66.99	72.86	0.001476	1.6	579.21	616.11	0.10
Lower Reach	1573.644	Q=340	340.00	63.68	68.76	65.33	68.80	0.004375	1.8	191.17	45.01	0.15
Lower Reach	1573.644	Q=600	600.00	63.68	70.56	65.98	70.64	0.004010	2.2	276.43	82.45	0.16
Lower Reach	1573.644	Q=950	950.00	63.68	72.21	66.71	72.31	0.002192	1.9	434.13	375.93	0.13
Lower Reach	1573.644	Q=175	175.00	63.68	67.22	64.81	67.25	0.004780	1.4	124.78	41.41	0.14
Lower Reach	1305.41	Q=1300	1300.00	62.42	73.02	66.08	73.17	0.003968	3.1	417.85	465.41	0.20
Lower Reach	1305.41	Q=1100	1100.00	62.42	72.11	65.71	72.25	0.004189	3.0	371.10	335.14	0.19
Lower Reach	1305.41	Q=340	340.00	62.42	67.59	63.95	67.64	0.004284	1.9	181.23	38.61	0.15
Lower Reach	1305.41	Q=600	600.00	62.42	69.43	64.64	69.52	0.004316	2.4	254.68	40.97	0.17
Lower Reach	1305.41	Q=950	950.00	62.42	71.38	65.41	71.51	0.004281	2.8	337.05	65.70	0.18
Lower Reach	1305.41	Q=175	175.00	62.42	66.01	63.42	66.05	0.004222	1.4	122.02	36.59	0.14
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1300	1300.00	60.29	69.06	63.81	69.20	0.004267	3.0	433.81	68.44	0.21
Lower Reach	1155.558	Q=1100	1100.00	60.29	68.50	63.46	68.62	0.004125	2.8	396.12	66.34	0.20
Lower Reach	1155.558	Q=340	340.00	60.29	65.39	61.77	65.43	0.003239	1.6	209.50	52.62	0.14
Lower Reach	1155.558	Q=600	600.00	60.29	66.72	62.42	66.79	0.003680	2.1	284.19	59.34	0.17
Lower Reach	1155.558	Q=950	950.00	60.29	68.03	63.17	68.13	0.004017	2.6	365.42	64.57	0.19
Lower Reach	1155.558	Q=175	175.00	60.29	64.14	61.27	64.16	0.002721	1.2	147.88	46.34	0.12
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1300	1300.00	60.08	68.38	64.46	68.61	0.005593	3.8	340.32	109.58	0.29
Lower Reach	1036.821	Q=1100	1100.00	60.08	67.84	64.08	68.04	0.005664	3.6	306.23	75.91	0.28
Lower Reach	1036.821	Q=340	340.00	60.08	64.82	62.19	64.91	0.006093	2.3	146.86	44.72	0.23
Lower Reach	1036.821	Q=600	600.00	60.08	66.11	62.96	66.24	0.005956	2.9	208.66	51.66	0.25
Lower Reach	1036.821	Q=950	950.00	60.08	67.38	63.78	67.56	0.005753	3.4	278.77	58.56	0.28
Lower Reach	1036.821	Q=175	175.00	60.08	63.64	61.55	63.69	0.006196	1.8	97.76	38.31	0.20
Lower Reach	819.1344	Q=1300	1300.00	58.79	66.77	62.65	66.91	0.011263	3.0	432.65	227.17	0.24
Lower Reach	819.1344	Q=1100	1100.00	58.79	66.22	62.33	66.34	0.011052	2.9	385.28	128.12	0.23
Lower Reach	819.1344	Q=340	340.00	58.79	63.18	60.71	63.25	0.009793	2.0	171.26	58.30	0.20

HEC-RAS Plan: Ultimate_Multi Q River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	819.1344	Q=600	600.00	58.79	64.44	61.37	64.53	0.010625	2.4	250.86	68.49	0.22
Lower Reach	819.1344	Q=950	950.00	58.79	65.74	62.07	65.85	0.010999	2.7	346.57	84.24	0.23
Lower Reach	819.1344	Q=175	175.00	58.79	62.08	60.15	62.12	0.008561	1.6	111.85	49.34	0.18
Lower Reach	415.466	Q=1300	1300.00	57.01	63.91	59.51	63.98	0.005008	2.2	602.55	133.60	0.16
Lower Reach	415.466	Q=1100	1100.00	57.01	63.37	59.30	63.44	0.005009	2.0	539.97	106.36	0.16
Lower Reach	415.466	Q=340	340.00	57.01	60.46	58.27	60.48	0.005006	1.4	250.76	91.91	0.14
Lower Reach	415.466	Q=600	600.00	57.01	61.63	58.69	61.67	0.005001	1.7	362.27	97.81	0.15
Lower Reach	415.466	Q=950	950.00	57.01	62.89	59.14	62.95	0.005010	1.9	489.81	104.02	0.16
Lower Reach	415.466	Q=175	175.00	57.01	59.49	57.92	59.51	0.005000	1.1	164.45	86.99	0.14


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
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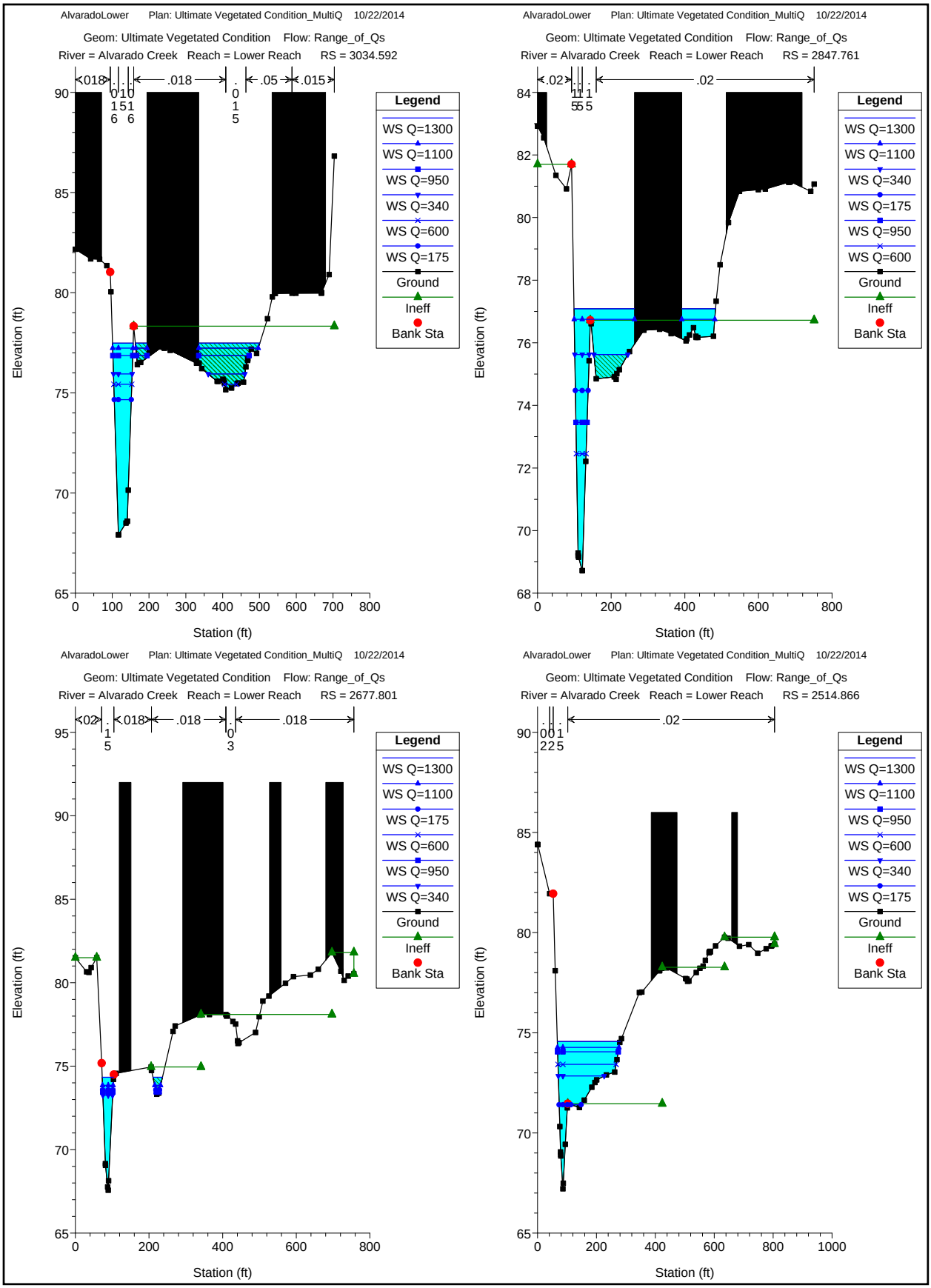
.018
.015
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.015
.018
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=340
WS Q=600
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=340
WS Q=600
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
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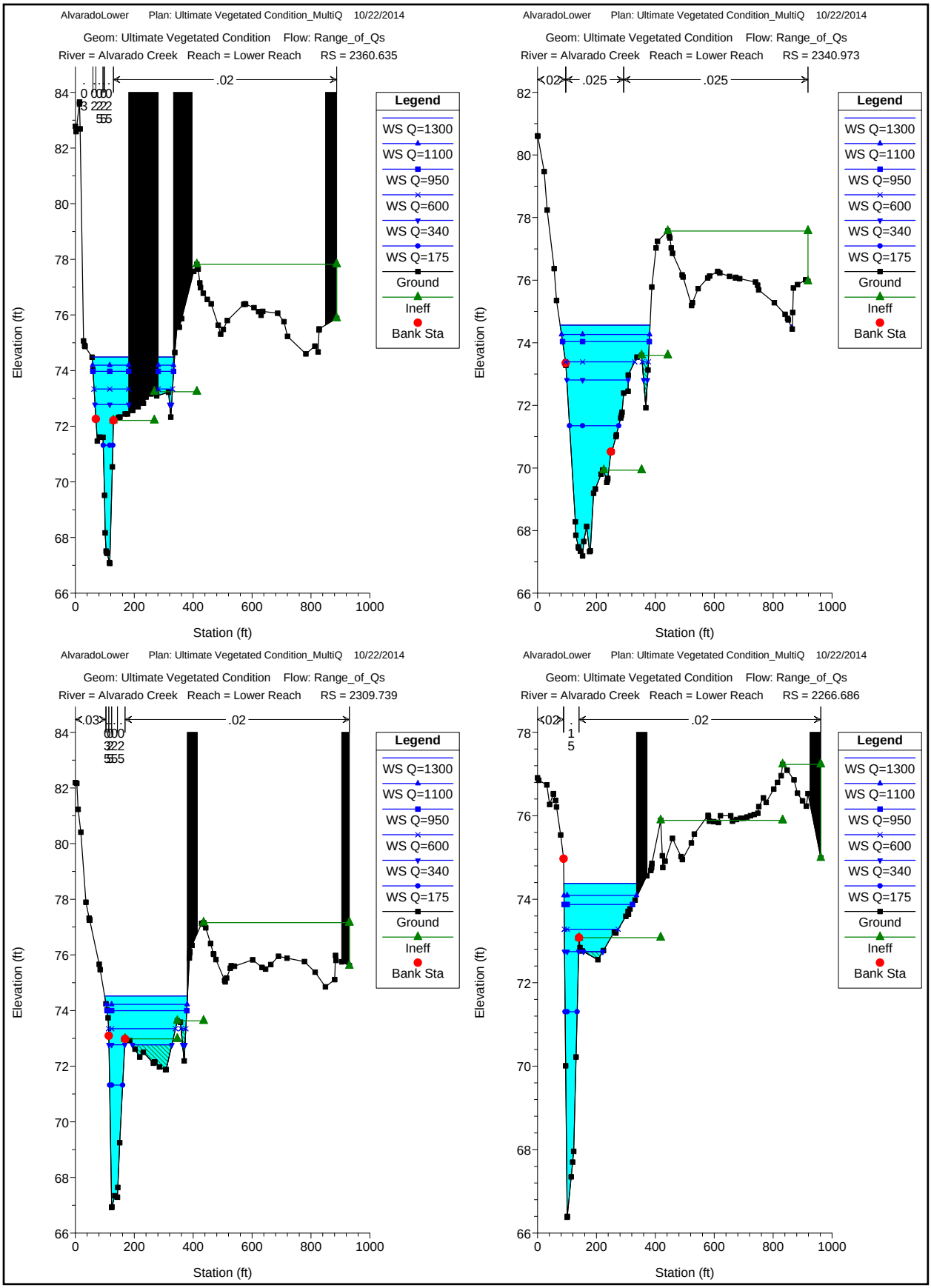
.018
.05
.015
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=340
WS Q=600
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=1300
WS Q=1100
WS Q=340
WS Q=175
WS Q=950
WS Q=600
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.02
.018
.018
.018
Legend
WS Q=1300
WS Q=1100
WS Q=175
WS Q=600
WS Q=950
WS Q=340
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
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Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
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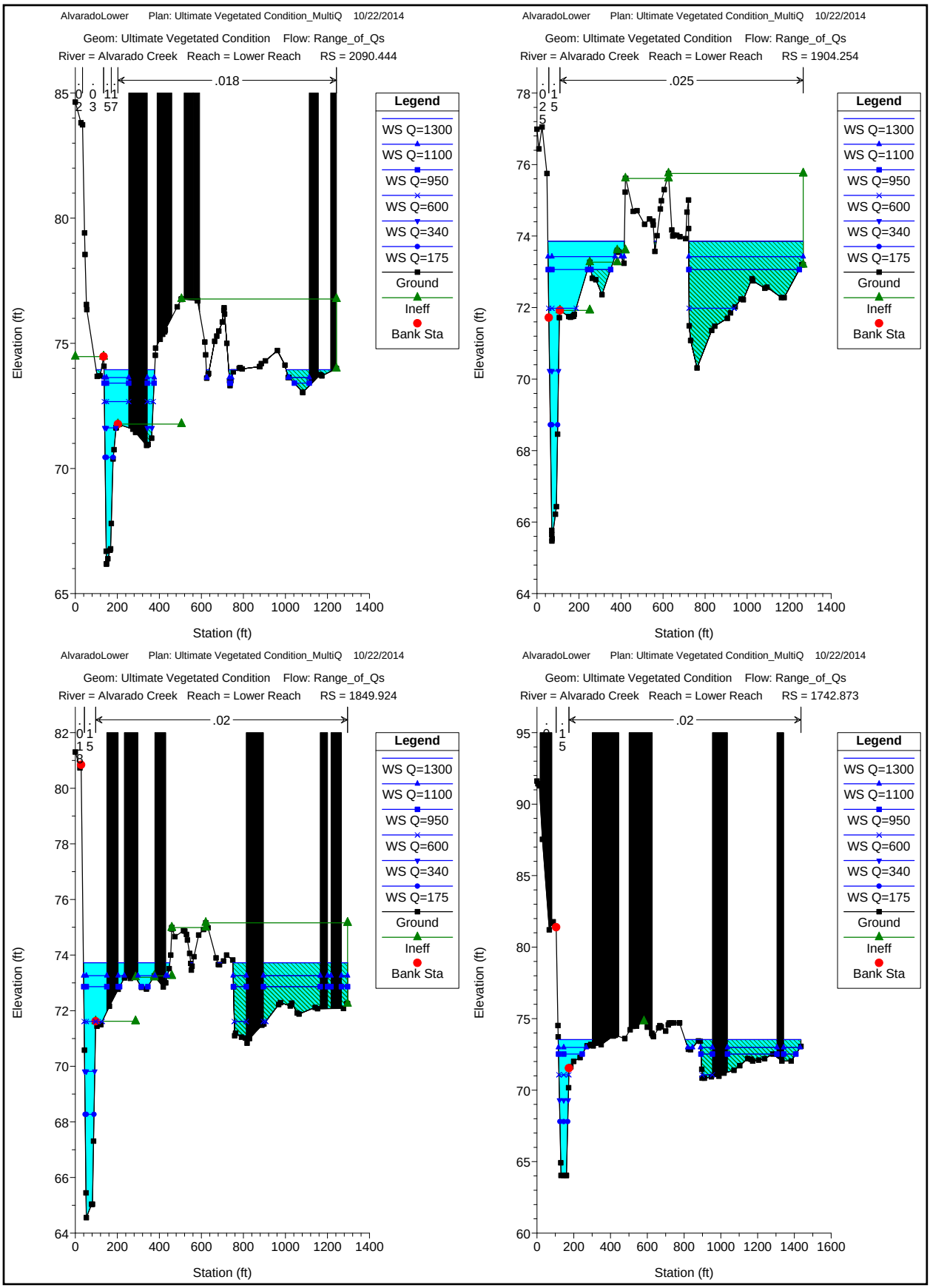
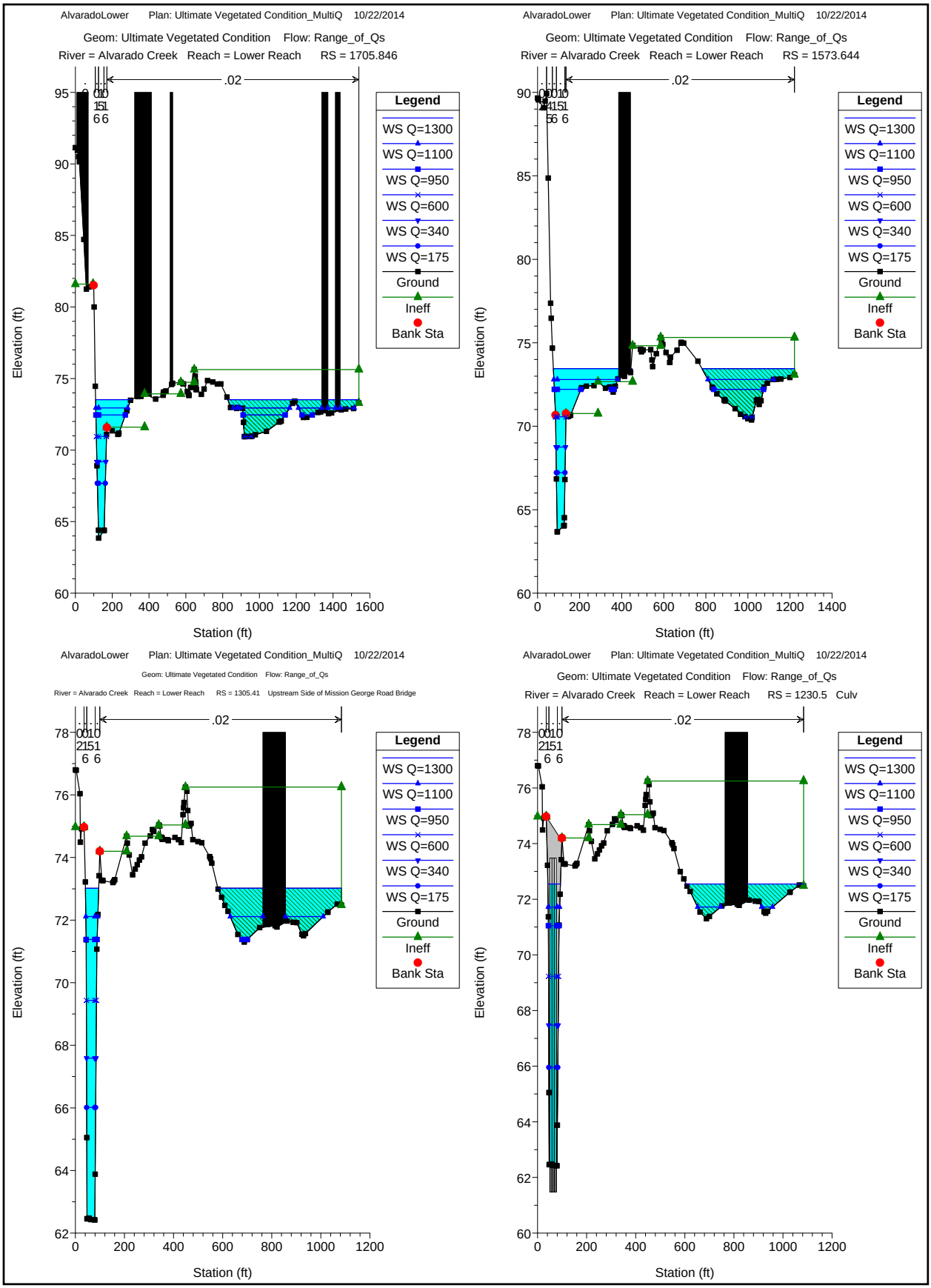
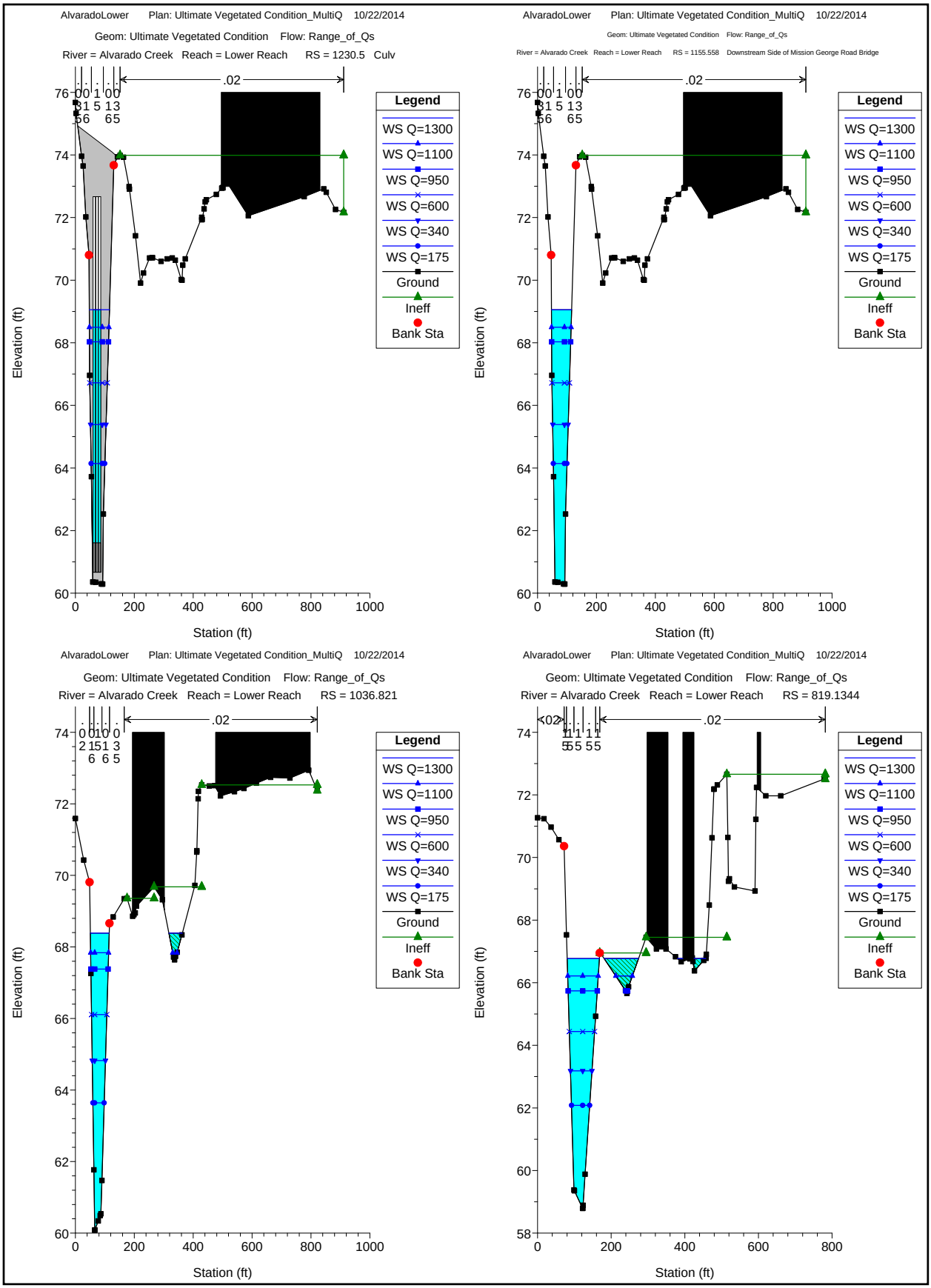
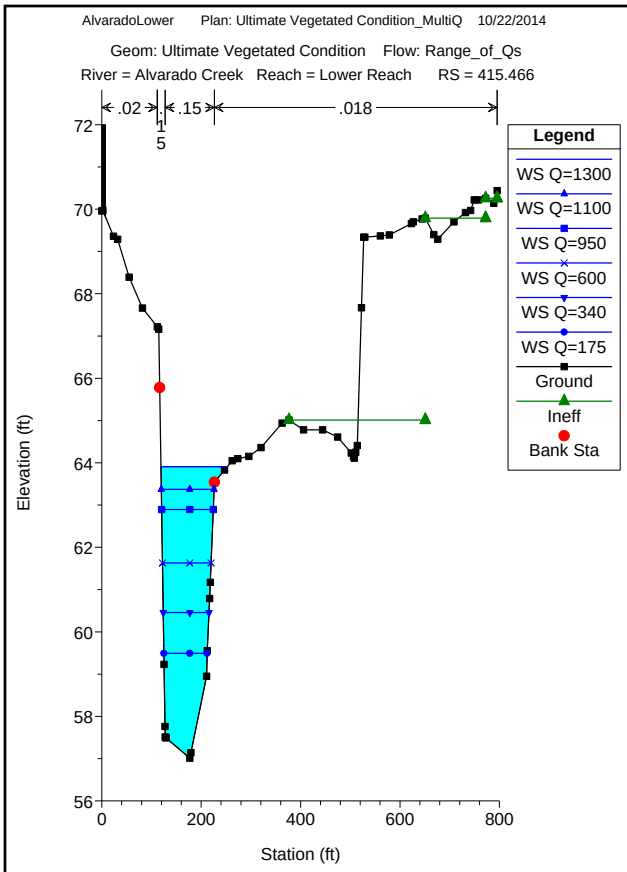
.025
.025
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.025
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Ultimate Vegetated Condition_MultiQ 10/22/2014
Geom: Ultimate Vegetated Condition Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS Q=1300
WS Q=1100
WS Q=950
WS Q=600
WS Q=340
WS Q=175
Ground
Ineff
Bank Sta
Elevation (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800
Station (ft)

HEC-RAS Version 4.1.0 Jan 2010
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
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PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 11:43:03 AM

Project in English units

PLAN DATA

Plan Title: Ultimate Vegetated Condition_MultiQ
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p17

Geometry Title: Ultimate Vegetated Condition
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g05

Flow Title : Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Flow Data (cfs)

River	Reach	RS	Q=1700	Q=1300	Q=1100	Q=900	Q=500	Q=340	Q=1250	Q=800
Alvarado Creek	Lower Reach	3519.101	1700	1300	1100	900	500	340	1250	800

River	Reach	RS	Q=250	Q=600	Q=1850	Q=950	Q=1180	Q=1400	Q=1600	Q=450
Alvarado Creek	Lower Reach	3519.101	250	600	1850	950	1180	1400	1600	450

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	Q=1700	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1300	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1100	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=900	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=500	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=340	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1250	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=800	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=250	Normal S = 0.005	

GEOMETRY DATA

Geometry Title: Ultimate Vegetated Condition
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g05

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94
328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64
430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	107.14	.016	126.44	.15	155.92	.15	160	.016
188.01	.018	405.16	.015						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
107.14 188.01 137.3 137.31 137.44 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.15	166.87	.016	185.99	.018
411.74	.015	488.01	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
122.6 185.99 209.35 210.34 211.8 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.15	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        95.69  167.68           32.79   31.38   28.21             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   95.69   81.19       F
   247.8  498.23   80.28       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  480.04  502.74      90   613.7  647.07      90  668.49  683.59      90
       0   75.03      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3140.066

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   81.96    8.74   81.86   42.06      81    65.8   80.98   91.59   81.46
   98.56   81.34   118.7   68.57  119.67   67.95  120.26   67.96  121.78   67.99
  145.21   68.69  145.46   68.69  161.99      75   164.4    76.1  165.21   76.15
  169.88   77.19  174.56   77.17  190.83   77.12   197.8    77.2  238.98   77.08
  253.88      77  265.89    76.8  311.18   76.55  320.11   76.42  352.63   76.62
   356.3   76.72  388.74   76.88  390.22   76.43  397.39   74.26  419.63   74.17
  444.35   74.21  448.51   74.97  452.16   75.57  459.93   76.85  460.97      77
  461.51   76.99   465.1   77.03  502.63   77.29  505.62   77.24  506.27   77.23
  518.73   77.71  557.63   78.23   570.9   78.69  596.76   79.74  648.95    79.3
  652.42   79.33  655.52   79.56  674.71   80.62  683.87   83.87  693.26   88.99

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   98.56    .016   118.7    .15  145.21    .016  169.88    .018
  397.39     .02  674.71     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        98.56  169.88          101.61  105.47  112.32             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0   91.59   81.46       F
     245  693.26      81       F
  169.88   197.8   77.19       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   656.1  675.15      90       0   74.95      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3034.592

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.17   41.57   81.69   65.68   81.67   85.26   81.35   93.68   81.06
   94.76   81.03   96.42   80.05  117.02   67.91  117.43   67.92  137.35    68.5
  140.94   68.59  140.98   68.59  143.73   70.14  158.51   78.33  168.47   76.41
  177.34   76.52  235.03   77.29  240.05   77.26  241.67   77.23  257.49   77.12
  329.16   76.48  336.01   76.48  343.31   76.21  385.02   75.58  387.61   75.57
  400.89   75.68  402.29   75.62  403.95   75.53  404.59   75.49   408.4   75.16
  424.44   75.24  439.37   75.46  441.01   75.48  441.88   75.49  456.66   75.53
  463.42    76.3  467.85   76.62  468.83   76.69  477.64   77.18  492.12   76.97
   521.9    78.7  535.11   79.79  543.17   79.96  588.58   79.97  599.19   79.97
   668.1   79.98  668.55   79.98     669   80.01  689.24   80.91  703.56   86.82

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   94.76    .016  117.02     .15  143.73    .016  158.51    .018
   408.4    .015  463.42     .05  588.58    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        94.76  158.51          187.47  186.83  186.24             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  158.51  703.56   78.33       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  194.38  335.17      90  534.53  679.65      90       0   71.12      90

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3029.094

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    78.3    8.27   78.53   24.08   78.97   27.46   79.04   29.05   79.06
   32.68   78.95   64.72   78.04   68.27   77.95  105.22   78.01  107.55   78.07
  109.84   78.02  137.03   77.47  141.61   77.16  163.84   76.88  166.62   76.84
   175.9    76.7  177.53   76.74  199.71   76.45  222.84   76.21  239.06   75.98
  253.17   75.82   267.4    75.4  268.16   75.39  268.52   75.38  268.91   75.37
  287.49   75.52  290.21   75.49  308.94    75.3  311.48   75.38   330.3   75.01
  354.72   74.49  356.27   74.51  357.22   74.47  358.77   74.39  398.52   73.89
  400.93    73.9  407.71   73.76  411.58   73.74  422.05   73.66  432.57   73.57
  432.74   73.57  435.41   73.57  438.91   73.58  469.01   73.68  481.53   73.64
  483.87   73.56  485.52    73.5  486.41   73.42  517.76   71.49  517.78   71.49
  520.34   71.46  561.12   71.75  566.99    71.7  569.05   71.68  578.17   71.73
  589.02   71.85  599.02   71.97  599.46   71.99  613.78   72.42  616.75   72.47
  619.29   72.47  619.96   72.48  630.11   72.63  657.92   72.36  659.77   72.35
 671.397   72.23

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2847.761

INPUT
Description:
Station Elevation Data    num=      43
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.15	110.07	.15	121.5	.15	159.23	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
92.48	143.16	165.5	169.96	176.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	71.39	.15	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
71.39	104.55	162.85	162.93	162.56	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.15	102.77	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
53.2	102.77	158.36	154.23	152.81	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5

887.31 75.88

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	69.46	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.46	129.21	19.33	19.66	19.62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
224.96	353.4	69.93	F
353.4	442.2	73.6	F
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
168.74	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113.57	168.74	21.27	43.05	56.67	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.15	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.15	171.16	.17	202.76	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.15	109.43	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	43.55	.15	96.83	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.83	96.83	119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.15	174.16	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
104.06	174.16	35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.15	155.3	.016	171.11	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.12	171.11	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	70.17	.016	89.75	.15	130.23	.016
135.25	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
85.63	135.25	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT

Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	46.28	.15	80.56	.016	99.47	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
35.1	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
35.1	74.97	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24

```
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57  1028.2   72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    35.1    .016   46.28    .15   80.56    .016   99.47    .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97          124.06    74.1          143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.36   59.37   60.36
   68.77   60.35   87.93    60.3   90.19   60.29   92.72   60.29   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96    .016   54.41    .15   94.83    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         46.27  130.44             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                21     110     .018      .17      .94                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.36   59.37   60.36
   68.77   60.35   87.93    60.3   90.19   60.29   92.72   60.29   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   20.96    .016   54.41    .15   94.83    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
```

Blocked Obstructions num= 1

Sta L	Sta R	Elev
495.28	830.64	76

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1149.024

INPUT
Description:
Lateral structure position = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.016	62.89	.15	89.98	.016	115.82	.035
165.64	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.15	78.67	.15	98.97	.15	123.52	.15
157.62	.15	168.96	.02						

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

```
        72.14  168.96          431.18  403.67  344.14            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  168.96   294.8   66.95       F
   294.8  514.26   67.45       F
  514.26  781.74   72.66       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  297.49  354.31      74  394.55  425.01      74  596.65   606.2      74

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 415.466

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   69.96    2.41   69.97   23.36   69.36   31.97   69.29    55.2   68.39
   81.79   67.66  111.71   67.22  114.72   67.16  116.54   65.78  125.28   59.23
  127.25   57.76  127.59   57.51  129.08    57.5  129.13   57.49  177.09   57.01
  179.36   57.14  210.85   58.95  212.04   59.55  216.85   60.79  218.23   61.17
  226.72   63.54     247   63.83  262.38   64.05   273.7    64.1  295.93   64.15
  320.34   64.36  362.69   64.94  376.62   65.01  405.84   64.78  444.15   64.78
   474.4   64.61  501.78   64.23  506.26   64.15  507.99   64.11  510.79   64.25
  514.09   64.41  522.63   67.67  526.99   69.34  529.14   69.34  560.37   69.37
  578.57   69.39     623   69.66  626.91    69.7   644.4   69.77  650.98   69.79
  667.97    69.4  676.04   69.29  708.55    69.7  731.78   69.92  742.21   69.97
  749.38   70.22  757.73   70.22  772.23   70.26   788.8   70.14  795.52   70.44

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  111.71     .15  127.59     .15  226.72    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       116.54  226.72          420.92  415.47  422.02            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0    7.54      72



SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

      Reach          River Sta.       n1        n2        n3        n4        n5
n6        n7        n8        n9

 Lower Reach          3519.101           .02      .016       .15       .15      .016
.018      .015
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792          .018      .016       .15      .016      .018
.015      .018
 Lower Reach          3171.448          .018      .016       .15      .016      .018
.018       .06      .018       .05
 Lower Reach          3140.066          .018      .016       .15      .016      .018
.02       .05
 Lower Reach          3034.592          .018      .016       .15      .016      .018
.015       .05      .015
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761           .02       .15       .15       .15       .02
 Lower Reach          2677.801           .02       .15      .018      .018       .03
.018
 Lower Reach          2514.866           .02       .02       .15       .02
 Lower Reach          2360.635           .03       .02      .025      .025      .025
.02
 Lower Reach          2340.973           .02      .025      .025
 Lower Reach          2332.283     Lat Struct
 Lower Reach          2309.739           .03      .035      .025      .025      .025
.02
 Lower Reach          2266.686           .02       .15       .02
 Lower Reach          2090.444           .02       .03       .15       .17      .018
 Lower Reach          1904.254          .025       .15      .025
 Lower Reach          1849.924          .018       .15       .02
 Lower Reach          1742.873          .018       .15       .02
 Lower Reach          1705.846           .02      .016       .15      .016       .02
 Lower Reach          1573.644           .02      .045      .016       .15      .016
.02
 Lower Reach          1305.41            .02      .016       .15      .016       .02
 Lower Reach          1230.5       Culvert
 Lower Reach          1155.558          .035      .016       .15      .016      .035
.02
 Lower Reach          1149.024     Lat Struct
 Lower Reach          1121.496     Lat Struct
 Lower Reach          1036.821           .02      .016       .15      .016      .035
.02
 Lower Reach          819.1344           .02       .15       .15       .15       .15
.15       .02
 Lower Reach          415.466            .02       .15       .15      .018



SUMMARY OF REACH LENGTHS

River: Alvarado Creek

      Reach          River Sta.      Left     Channel    Right

 Lower Reach          3519.101         137.3    137.31    137.44
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792        209.35    210.34     211.8
 Lower Reach          3171.448         32.79     31.38     28.21
 Lower Reach          3140.066        101.61    105.47    112.32
 Lower Reach          3034.592        187.47    186.83    186.24
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761         165.5    169.96     176.8
 Lower Reach          2677.801        162.85    162.93    162.56
 Lower Reach          2514.866        158.36    154.23    152.81
 Lower Reach          2360.635         19.33     19.66     19.62
 Lower Reach          2340.973         34.23     31.23     27.43
 Lower Reach          2332.283     Lat Struct
 Lower Reach          2309.739         21.27     43.05     56.67
 Lower Reach          2266.686         166.7    176.24    190.03
 Lower Reach          2090.444        183.41    186.19    187.45
 Lower Reach          1904.254         55.48     54.33     52.65
 Lower Reach          1849.924        119.68    107.05     93.87
 Lower Reach          1742.873          35.7     37.03      38.3
```

Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3

1. Maintained Condition (Bank to Bank)
    a. FEMA Flow Rates
    b. Multiple Flow Rates
2. Maintained Condition (Bottom Only)
    a. FEMA Flow Rates
    b. Multiple Flow Rates

HEC-RAS Plan: VegBankBank_Nose River: Alvarado Creek Reach: Lower Reach

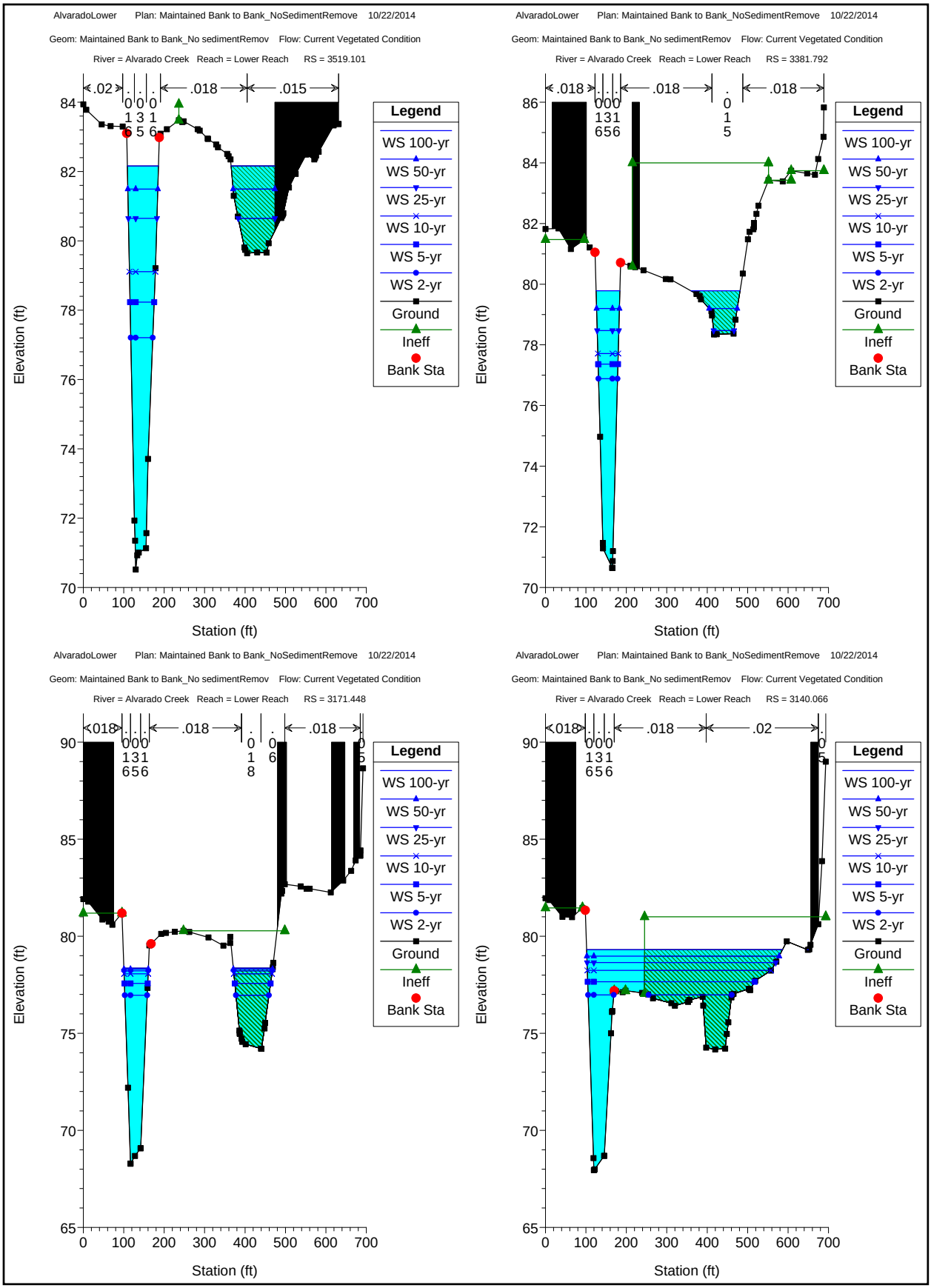
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	100-yr	5100.00	70.52	82.16		83.39	0.001525	8.9	573.20	185.39	0.58
Lower Reach	3519.101	50-yr	4500.00	70.52	81.49		82.64	0.001569	8.6	522.69	177.51	0.57
Lower Reach	3519.101	25-yr	3800.00	70.52	80.65		81.70	0.001634	8.2	461.48	161.18	0.57
Lower Reach	3519.101	10-yr	2700.00	70.52	79.11		80.00	0.001796	7.5	357.72	64.09	0.56
Lower Reach	3519.101	5-yr	2050.00	70.52	78.23		78.94	0.001708	6.8	303.34	59.62	0.53
Lower Reach	3519.101	2-yr	1180.00	70.52	77.21		77.57	0.001090	4.8	244.85	54.40	0.40
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	70.64	79.78	79.78	82.85	0.005116	14.1	362.54	180.26	1.00
Lower Reach	3381.792	50-yr	4500.00	70.64	79.20	79.20	82.11	0.005351	13.7	328.80	126.14	1.00
Lower Reach	3381.792	25-yr	3800.00	70.64	78.47	78.47	81.16	0.005656	13.2	288.80	104.01	1.00
Lower Reach	3381.792	10-yr	2700.00	70.64	77.71	77.15	79.53	0.004468	10.8	249.37	50.49	0.86
Lower Reach	3381.792	5-yr	2050.00	70.64	77.37	76.25	78.58	0.003211	8.8	232.05	49.08	0.72
Lower Reach	3381.792	2-yr	1180.00	70.64	76.89	74.78	77.38	0.001468	5.6	208.95	47.12	0.47
Lower Reach	3171.448	100-yr	5100.00	68.28	78.36	77.44	80.73	0.003471	12.4	412.44	157.98	0.83
Lower Reach	3171.448	50-yr	4500.00	68.28	78.30	76.85	80.18	0.002768	11.0	409.16	157.16	0.74
Lower Reach	3171.448	25-yr	3800.00	68.28	78.22	76.11	79.59	0.002046	9.4	404.30	155.95	0.64
Lower Reach	3171.448	10-yr	2700.00	68.28	78.06	74.79	78.79	0.001109	6.8	394.95	153.59	0.47
Lower Reach	3171.448	5-yr	2050.00	68.28	77.57	73.89	78.06	0.000803	5.6	366.27	146.22	0.39
Lower Reach	3171.448	2-yr	1180.00	68.28	76.96	72.42	77.15	0.000360	3.6	331.61	136.97	0.26
Lower Reach	3140.066	100-yr	5100.00	67.95	79.31	76.84	80.23	0.001173	8.1	695.99	487.24	0.51
Lower Reach	3140.066	50-yr	4500.00	67.95	78.98	76.25	79.82	0.001113	7.7	647.99	475.66	0.49
Lower Reach	3140.066	25-yr	3800.00	67.95	78.65	75.51	79.35	0.000970	7.0	600.87	466.80	0.46
Lower Reach	3140.066	10-yr	2700.00	67.95	78.24	74.25	78.68	0.000632	5.5	543.22	454.44	0.37
Lower Reach	3140.066	5-yr	2050.00	67.95	77.65	73.38	78.00	0.000530	4.7	460.58	412.88	0.33
Lower Reach	3140.066	2-yr	1180.00	67.95	76.98	71.96	77.13	0.000258	3.1	378.37	269.31	0.23
Lower Reach	3034.592	100-yr	5100.00	67.91	79.70	77.21	79.97	0.000383	4.7	1265.15	296.24	0.29
Lower Reach	3034.592	50-yr	4500.00	67.91	79.32	76.61	79.57	0.000385	4.6	1152.98	290.96	0.29
Lower Reach	3034.592	25-yr	3800.00	67.91	78.92	75.86	79.14	0.000366	4.3	1037.56	285.43	0.28
Lower Reach	3034.592	10-yr	2700.00	67.91	77.81	74.51	78.56	0.001120	7.0	388.16	261.83	0.47
Lower Reach	3034.592	5-yr	2050.00	67.91	77.43	73.58	77.91	0.000766	5.6	366.83	252.08	0.38
Lower Reach	3034.592	2-yr	1180.00	67.91	76.91	72.08	77.10	0.000325	3.5	338.11	220.28	0.25
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	68.72	79.39	77.68	79.83	0.001230	1.6	1151.03	286.89	0.11
Lower Reach	2847.761	50-yr	4500.00	68.72	79.01	77.45	79.43	0.001330	1.6	1043.35	279.86	0.11
Lower Reach	2847.761	25-yr	3800.00	68.72	78.64	77.17	79.01	0.001352	1.6	939.47	272.92	0.11
Lower Reach	2847.761	10-yr	2700.00	68.72	77.86	76.72	78.17	0.001656	1.7	731.08	263.62	0.12
Lower Reach	2847.761	5-yr	2050.00	68.72	77.37	75.68	77.63	0.001921	1.7	602.40	258.48	0.13
Lower Reach	2847.761	2-yr	1180.00	68.72	76.82	74.01	76.97	0.001660	1.5	462.37	254.01	0.12
Lower Reach	2677.801	100-yr	5100.00	67.57	77.70	77.70	79.31	0.005583	3.8	617.40	262.89	0.25
Lower Reach	2677.801	50-yr	4500.00	67.57	77.61	77.61	78.94	0.004833	3.5	600.12	257.74	0.23
Lower Reach	2677.801	25-yr	3800.00	67.57	76.98	76.98	78.46	0.006099	3.7	491.82	213.12	0.26
Lower Reach	2677.801	10-yr	2700.00	67.57	76.27	76.27	77.53	0.008177	3.9	376.89	155.49	0.29
Lower Reach	2677.801	5-yr	2050.00	67.57	75.74	75.74	76.87	0.011681	4.3	296.46	148.83	0.35
Lower Reach	2677.801	2-yr	1180.00	67.57	74.05	74.05	75.88	0.107686	10.9	108.51	49.44	1.00
Lower Reach	2514.866	100-yr	5100.00	67.21	76.51	74.91	77.02	0.001218	1.7	1034.30	269.24	0.12
Lower Reach	2514.866	50-yr	4500.00	67.21	76.37	74.66	76.79	0.001063	1.5	995.99	265.17	0.11
Lower Reach	2514.866	25-yr	3800.00	67.21	76.03	74.31	76.40	0.001006	1.5	907.31	255.51	0.11
Lower Reach	2514.866	10-yr	2700.00	67.21	75.31	73.77	75.60	0.000987	1.4	731.75	235.20	0.10
Lower Reach	2514.866	5-yr	2050.00	67.21	74.64	73.39	74.91	0.001190	1.4	579.30	215.85	0.11
Lower Reach	2514.866	2-yr	1180.00	67.21	73.78	72.84	73.97	0.001425	1.4	402.00	202.42	0.12
Lower Reach	2360.635	100-yr	5100.00	67.07	76.10	74.99	76.80	0.001384	7.4	796.48	487.68	0.52
Lower Reach	2360.635	50-yr	4500.00	67.07	76.06	74.73	76.61	0.001114	6.6	787.45	445.88	0.47
Lower Reach	2360.635	25-yr	3800.00	67.07	75.77	74.42	76.23	0.001003	6.1	726.85	381.68	0.44
Lower Reach	2360.635	10-yr	2700.00	67.07	75.09	73.89	75.45	0.000923	5.4	586.88	296.14	0.42
Lower Reach	2360.635	5-yr	2050.00	67.07	74.35	73.48	74.72	0.001134	5.4	447.14	175.43	0.45
Lower Reach	2360.635	2-yr	1180.00	67.07	73.47	72.20	73.77	0.001138	4.6	295.37	168.13	0.43
Lower Reach	2340.973	100-yr	5100.00	67.19	76.48	72.36	76.62	0.000226	3.4	1739.73	782.44	0.22
Lower Reach	2340.973	50-yr	4500.00	67.19	76.35	72.10	76.48	0.000188	3.0	1698.73	773.87	0.20
Lower Reach	2340.973	25-yr	3800.00	67.19	76.02	71.75	76.12	0.000163	2.7	1585.28	622.06	0.18
Lower Reach	2340.973	10-yr	2700.00	67.19	75.29	71.13	75.36	0.000131	2.3	1347.59	390.53	0.16
Lower Reach	2340.973	5-yr	2050.00	67.19	74.56	70.71	74.62	0.000126	2.1	1121.75	311.59	0.16
Lower Reach	2340.973	2-yr	1180.00	67.19	73.65	70.05	73.68	0.000088	1.5	851.73	286.59	0.13
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	76.32	74.37	76.60	0.000502	4.8	1246.92	755.05	0.32
Lower Reach	2309.739	50-yr	4500.00	66.92	76.23	74.18	76.46	0.000418	4.4	1218.23	750.80	0.29
Lower Reach	2309.739	25-yr	3800.00	66.92	75.90	73.96	76.10	0.000384	4.1	1118.83	709.97	0.27
Lower Reach	2309.739	10-yr	2700.00	66.92	75.19	73.47	75.34	0.000364	3.7	905.96	356.93	0.26
Lower Reach	2309.739	5-yr	2050.00	66.92	74.45	72.56	74.61	0.000458	3.8	694.24	279.42	0.29

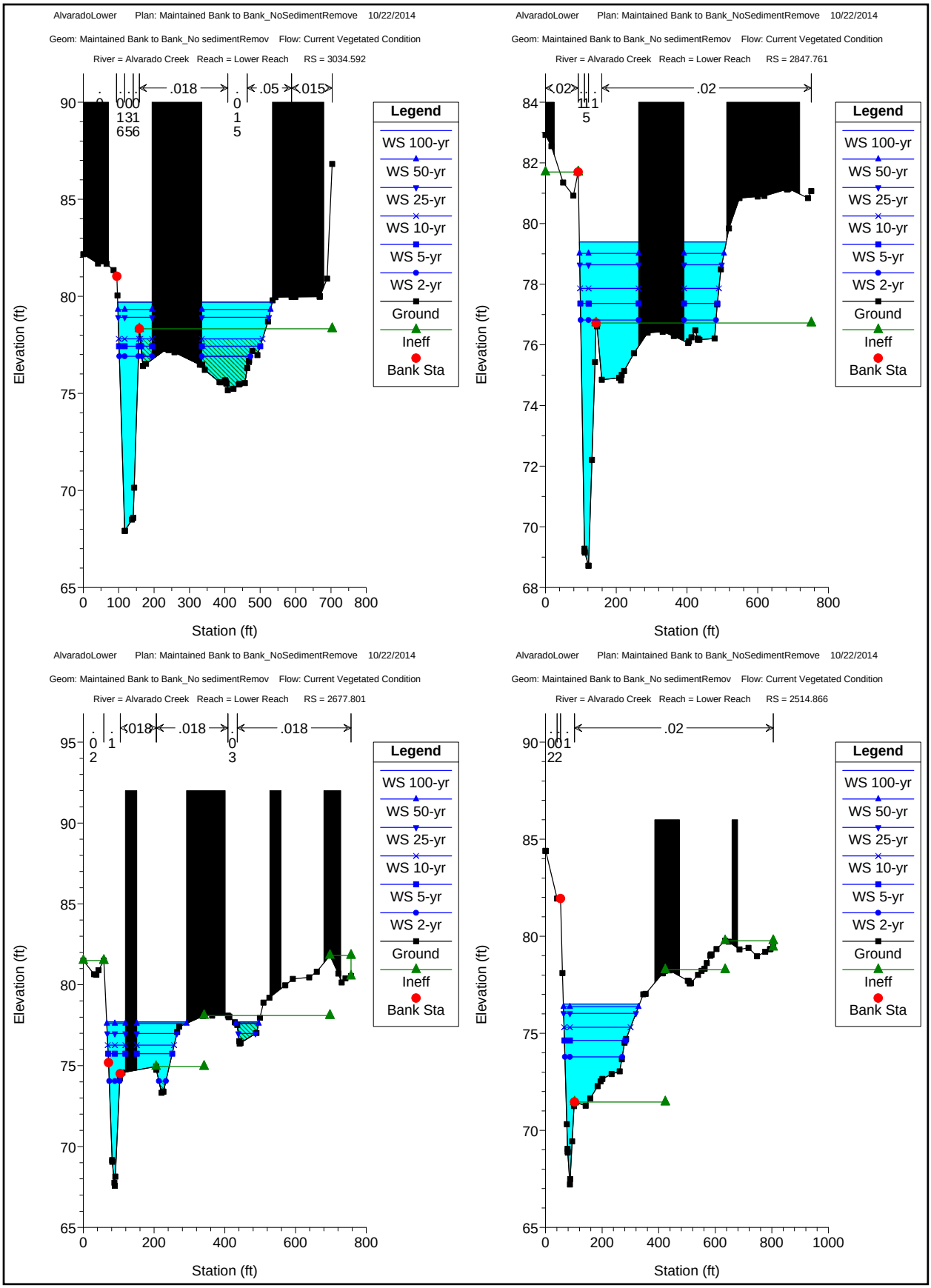
HEC-RAS Plan: VegBankBank_Nose River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	2309.739	2-yr	1180.00	66.92	73.52	71.17	73.67	0.000508	3.5	431.57	250.57	0.29
Lower Reach	2266.686	100-yr	5100.00	66.38	76.19	74.89	76.55	0.001630	2.1	1209.07	649.88	0.14
Lower Reach	2266.686	50-yr	4500.00	66.38	75.85	74.48	76.38	0.002088	2.3	931.02	459.65	0.16
Lower Reach	2266.686	25-yr	3800.00	66.38	75.57	74.07	76.03	0.002066	2.2	847.23	407.99	0.16
Lower Reach	2266.686	10-yr	2700.00	66.38	74.90	73.58	75.28	0.002594	2.3	660.24	272.71	0.17
Lower Reach	2266.686	5-yr	2050.00	66.38	74.15	72.53	74.53	0.005606	3.2	471.83	246.21	0.25
Lower Reach	2266.686	2-yr	1180.00	66.38	73.33	71.08	73.59	0.010180	3.9	289.30	186.97	0.33
Lower Reach	2090.444	100-yr	5100.00	66.18	75.42	73.80	76.16	0.002169	5.3	821.28	753.21	0.37
Lower Reach	2090.444	50-yr	4500.00	66.18	75.49	73.50	76.05	0.001595	4.6	837.20	759.90	0.32
Lower Reach	2090.444	25-yr	3800.00	66.18	75.28	73.16	75.72	0.001353	4.1	789.79	739.86	0.29
Lower Reach	2090.444	10-yr	2700.00	66.18	74.63	72.62	74.95	0.001172	3.5	649.44	670.58	0.27
Lower Reach	2090.444	5-yr	2050.00	66.18	73.68	72.27	73.99	0.001683	3.8	473.08	272.07	0.32
Lower Reach	2090.444	2-yr	1180.00	66.18	72.25	70.60	72.56	0.003620	4.5	264.69	140.99	0.44
Lower Reach	1904.254	100-yr	5100.00	65.47	75.88	73.90	75.91	0.000070	1.2	3952.30	1222.15	0.08
Lower Reach	1904.254	50-yr	4500.00	65.47	75.60	73.78	75.78	0.000501	3.2	1348.13	1209.16	0.20
Lower Reach	1904.254	25-yr	3800.00	65.47	75.35	73.50	75.49	0.000453	3.0	1254.83	1184.47	0.19
Lower Reach	1904.254	10-yr	2700.00	65.47	74.64	72.80	74.75	0.000494	2.9	990.78	1092.28	0.20
Lower Reach	1904.254	5-yr	2050.00	65.47	73.43	71.26	73.68	0.001526	4.5	550.08	878.27	0.34
Lower Reach	1904.254	2-yr	1180.00	65.47	70.84	69.83	71.64	0.006303	7.1	165.04	102.44	0.66
Lower Reach	1849.924	100-yr	5100.00	64.56	75.86	73.57	75.90	0.000133	1.1	3067.85	923.19	0.07
Lower Reach	1849.924	50-yr	4500.00	64.56	75.68	72.73	75.72	0.000123	1.1	2909.46	922.93	0.07
Lower Reach	1849.924	25-yr	3800.00	64.56	75.42	72.44	75.45	0.000116	1.0	2662.89	922.52	0.06
Lower Reach	1849.924	10-yr	2700.00	64.56	74.53	70.48	74.71	0.001094	2.9	805.56	777.73	0.19
Lower Reach	1849.924	5-yr	2050.00	64.56	73.33	69.62	73.57	0.002428	3.9	514.85	609.13	0.27
Lower Reach	1849.924	2-yr	1180.00	64.56	70.79	68.25	71.17	0.006452	4.9	241.38	51.67	0.40
Lower Reach	1742.873	100-yr	5100.00	64.03	75.85	73.41	75.89	0.000109	1.0	3293.44	934.64	0.06
Lower Reach	1742.873	50-yr	4500.00	64.03	75.68	72.94	75.71	0.000100	1.0	3133.56	934.40	0.06
Lower Reach	1742.873	25-yr	3800.00	64.03	75.41	70.98	75.44	0.000094	0.9	2884.17	934.02	0.05
Lower Reach	1742.873	10-yr	2700.00	64.03	74.39	69.71	74.58	0.001379	3.3	764.35	840.97	0.20
Lower Reach	1742.873	5-yr	2050.00	64.03	72.98	68.84	73.28	0.003201	4.5	473.47	599.47	0.30
Lower Reach	1742.873	2-yr	1180.00	64.03	70.13	67.47	70.49	0.006148	4.8	243.80	50.61	0.39
Lower Reach	1705.846	100-yr	5100.00	63.85	75.85	72.93	75.88	0.000058	1.9	4073.82	1269.60	0.11
Lower Reach	1705.846	50-yr	4500.00	63.85	75.47	72.55	75.69	0.000342	4.4	1344.57	1264.99	0.26
Lower Reach	1705.846	25-yr	3800.00	63.85	75.24	70.93	75.42	0.000294	4.0	1242.68	1258.40	0.24
Lower Reach	1705.846	10-yr	2700.00	63.85	74.38	69.69	74.56	0.000296	3.8	894.96	1066.33	0.24
Lower Reach	1705.846	5-yr	2050.00	63.85	72.98	68.85	73.23	0.000472	4.3	561.93	743.13	0.29
Lower Reach	1705.846	2-yr	1180.00	63.85	70.04	67.48	70.41	0.001096	4.8	243.31	51.75	0.39
Lower Reach	1573.644	100-yr	5100.00	63.68	75.84	72.31	75.87	0.000067	2.0	3714.70	1098.77	0.11
Lower Reach	1573.644	50-yr	4500.00	63.68	75.59	72.22	75.62	0.000067	1.9	3434.78	1098.02	0.11
Lower Reach	1573.644	25-yr	3800.00	63.68	75.24	71.23	75.37	0.000225	3.5	1448.49	1093.21	0.19
Lower Reach	1573.644	10-yr	2700.00	63.68	74.38	69.37	74.51	0.000228	3.3	1076.65	875.86	0.19
Lower Reach	1573.644	5-yr	2050.00	63.68	72.90	68.50	73.16	0.000510	4.4	610.14	693.89	0.28
Lower Reach	1573.644	2-yr	1180.00	63.68	69.90	67.13	70.26	0.001120	4.8	244.15	47.70	0.38
Lower Reach	1305.41	100-yr	5100.00	62.42	75.17	71.16	75.76	0.009751	4.7	892.32	949.38	0.28
Lower Reach	1305.41	50-yr	4500.00	62.42	74.81	70.49	75.49	0.013137	5.4	728.16	882.63	0.33
Lower Reach	1305.41	25-yr	3800.00	62.42	74.42	69.68	75.12	0.016832	6.0	590.16	706.12	0.37
Lower Reach	1305.41	10-yr	2700.00	62.42	73.73	68.27	74.27	0.016268	5.9	458.35	587.01	0.37
Lower Reach	1305.41	5-yr	2050.00	62.42	72.32	67.32	72.77	0.012285	5.4	381.40	376.74	0.34
Lower Reach	1305.41	2-yr	1180.00	62.42	69.24	65.86	69.60	0.009234	4.8	246.80	40.72	0.34
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.67	70.96	68.38	72.25	0.001776	9.1	558.00	252.25	0.59
Lower Reach	1155.558	50-yr	4500.00	60.67	70.40	67.87	71.58	0.001749	8.7	516.84	114.16	0.58
Lower Reach	1155.558	25-yr	3800.00	60.67	69.66	67.23	70.71	0.001742	8.2	463.47	70.72	0.56
Lower Reach	1155.558	10-yr	2700.00	60.67	68.31	66.06	69.13	0.001744	7.3	371.28	65.64	0.54
Lower Reach	1155.558	5-yr	2050.00	60.67	67.32	65.24	68.01	0.001792	6.6	308.30	61.92	0.53
Lower Reach	1155.558	2-yr	1180.00	60.67	65.72	63.92	66.19	0.001820	5.5	214.96	54.32	0.49
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.08	69.05	69.05	71.78	0.004939	13.3	389.64	182.98	0.97
Lower Reach	1036.821	50-yr	4500.00	60.08	68.43	68.43	71.10	0.005327	13.1	343.17	112.29	1.00
Lower Reach	1036.821	25-yr	3800.00	60.08	67.75	67.75	70.23	0.005471	12.6	300.61	68.42	1.00
Lower Reach	1036.821	10-yr	2700.00	60.08	66.51	66.51	68.65	0.006037	11.7	230.12	53.87	1.00
Lower Reach	1036.821	5-yr	2050.00	60.08	65.81	65.66	67.55	0.005880	10.6	193.70	50.07	0.95
Lower Reach	1036.821	2-yr	1180.00	60.08	64.75	64.24	65.80	0.004890	8.2	143.51	44.31	0.81
Lower Reach	819.1344	100-yr	5100.00	58.79	67.29	66.51	68.59	0.005180	9.5	586.17	286.28	0.73
Lower Reach	819.1344	50-yr	4500.00	58.79	67.08	66.04	68.27	0.004783	9.0	543.51	278.54	0.70
Lower Reach	819.1344	25-yr	3800.00	58.79	66.81	65.46	67.99	0.004656	8.7	435.89	235.22	0.69

HEC-RAS Plan: VegBankBank_Nose River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	819.1344	10-yr	2700.00	58.79	66.31	64.42	67.04	0.003151	6.9	393.12	137.06	0.56
Lower Reach	819.1344	5-yr	2050.00	58.79	65.91	63.68	66.41	0.002339	5.7	360.30	99.09	0.47
Lower Reach	819.1344	2-yr	1180.00	58.79	64.63	62.47	64.94	0.001943	4.5	264.08	70.04	0.41
Lower Reach	415.466	100-yr	5100.00	57.01	65.88	62.35	66.41	0.005005	2.6	1220.96	401.54	0.17
Lower Reach	415.466	50-yr	4500.00	57.01	65.73	61.99	66.16	0.005000	2.6	1158.92	400.93	0.17
Lower Reach	415.466	25-yr	3800.00	57.01	65.53	61.53	65.85	0.005009	2.5	1079.23	400.14	0.17
Lower Reach	415.466	10-yr	2700.00	57.01	65.16	60.74	65.33	0.005005	2.4	932.74	398.69	0.17
Lower Reach	415.466	5-yr	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	2-yr	1180.00	57.01	63.61	59.38	63.68	0.005009	2.1	565.44	112.07	0.16

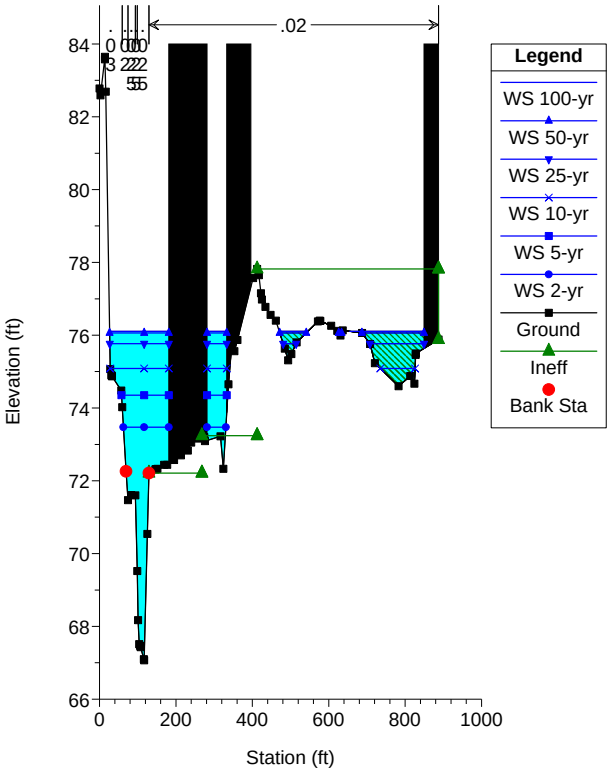

AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02 .018 .015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018 .018 .018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018 .018 .018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018 .018 .02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.05
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

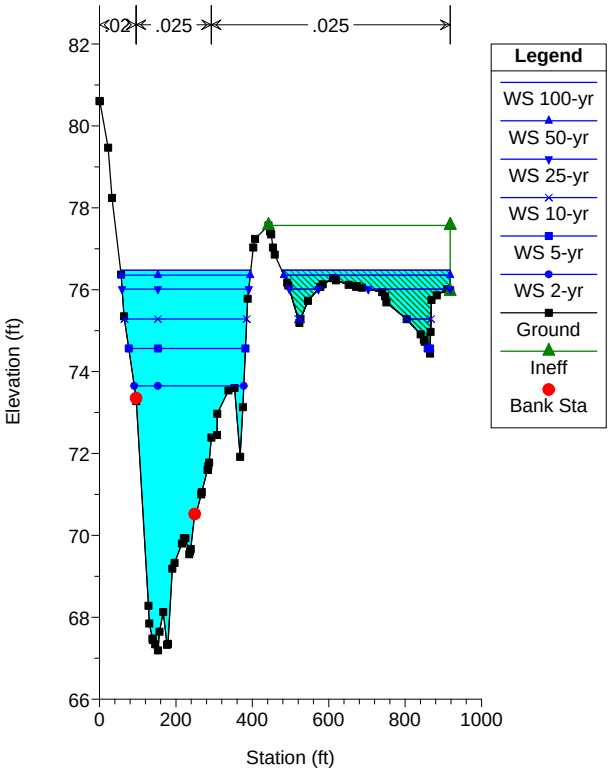
River = Alvarado Creek Reach = Lower Reach RS = 2360.635



AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

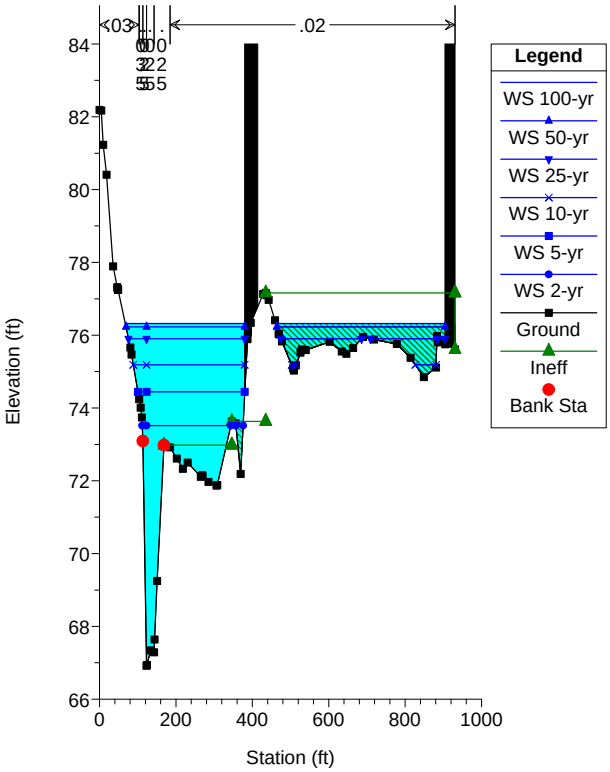
River = Alvarado Creek Reach = Lower Reach RS = 2340.973



AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

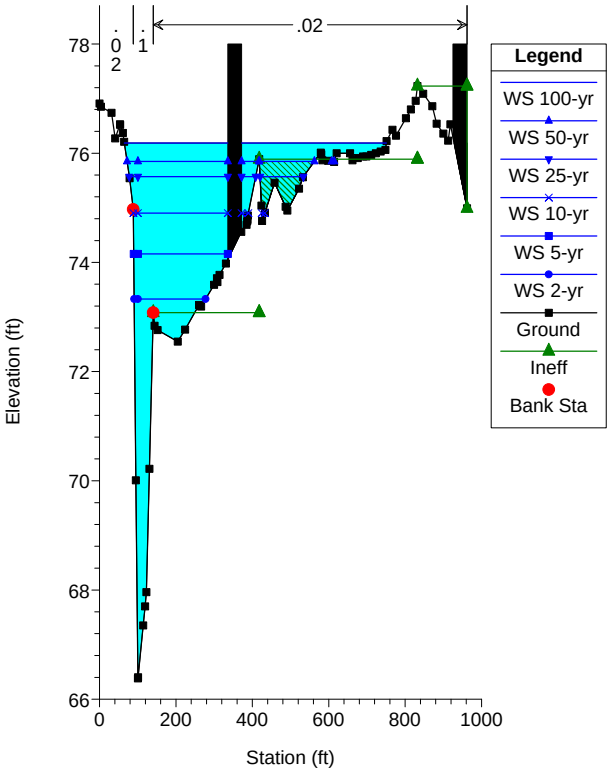
River = Alvarado Creek Reach = Lower Reach RS = 2309.739

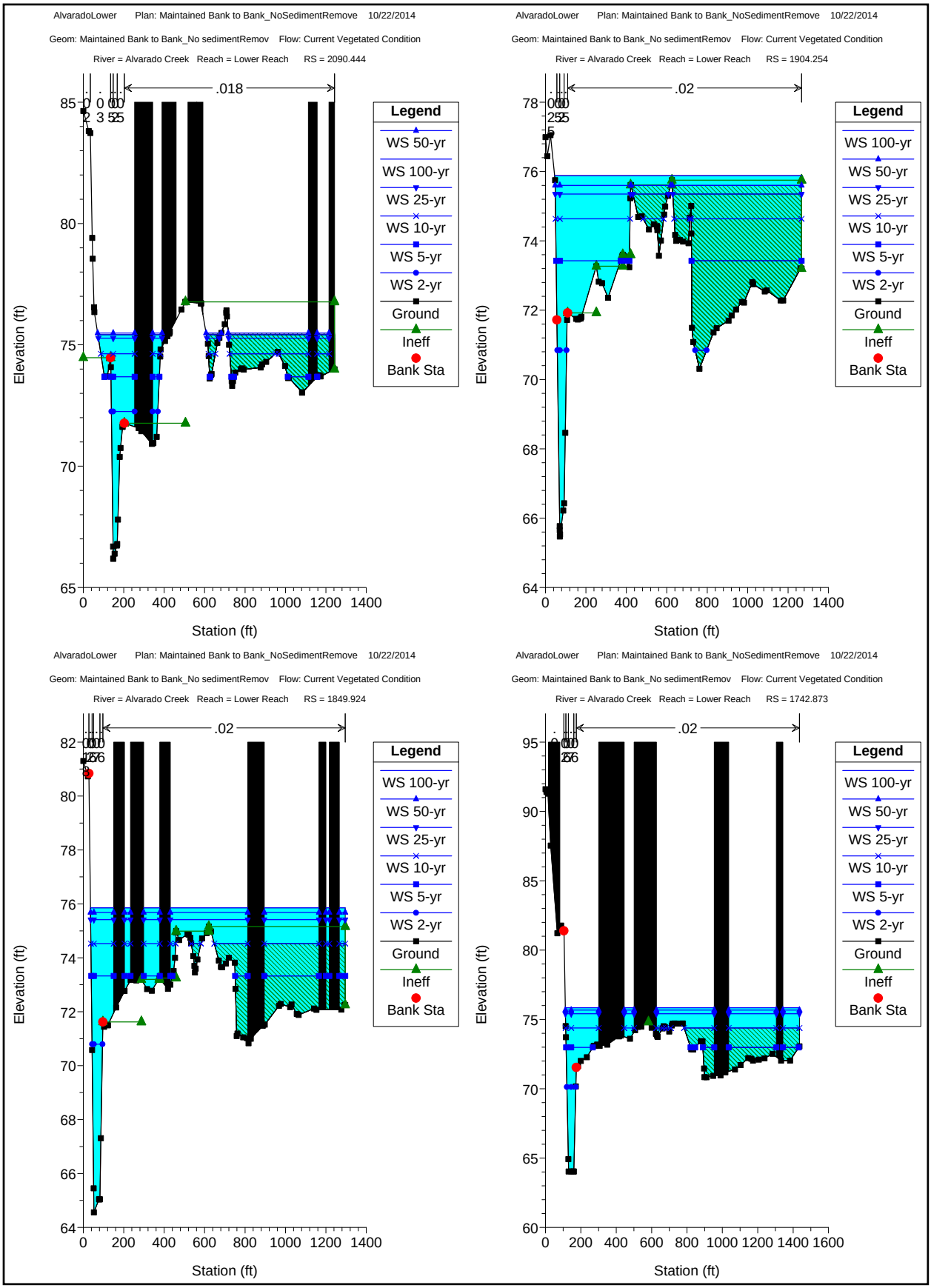


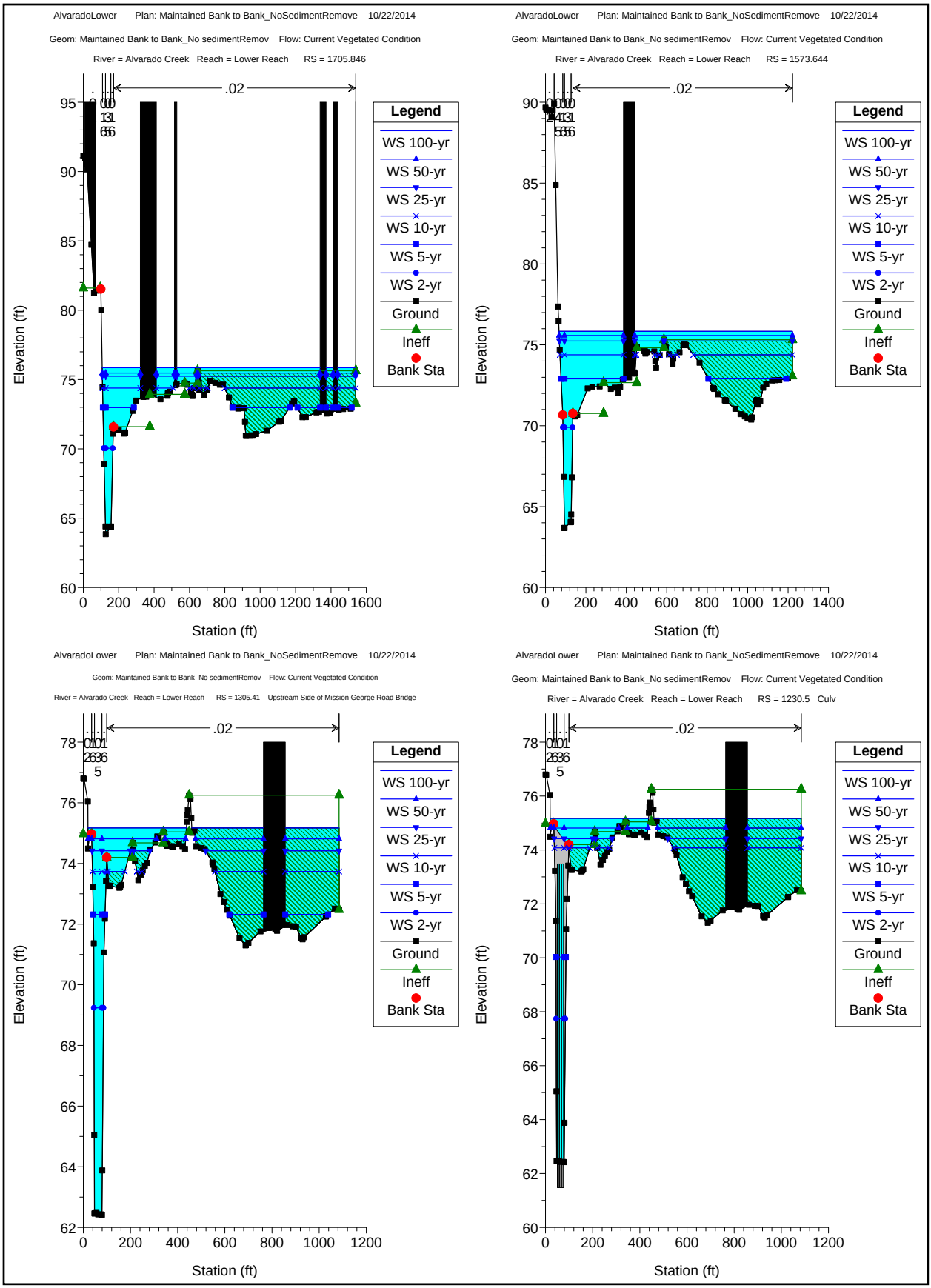
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 2266.686



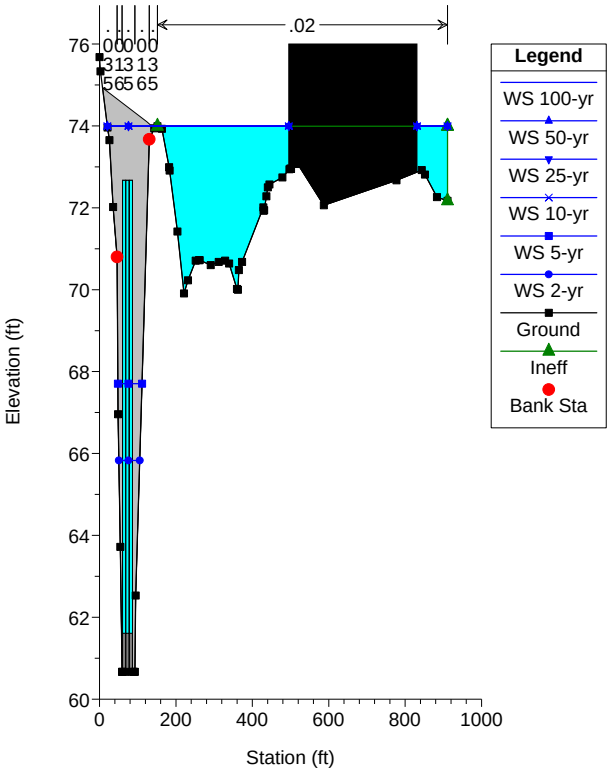

AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 50-yr
WS 100-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

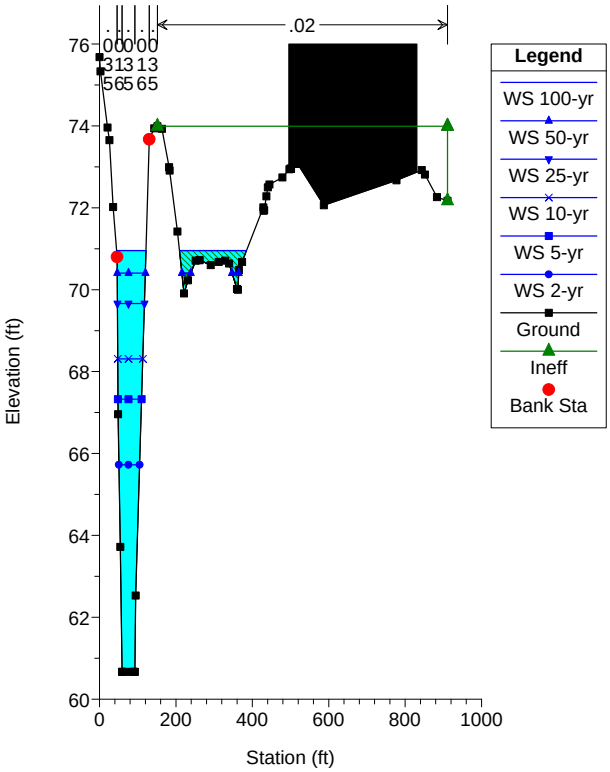
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

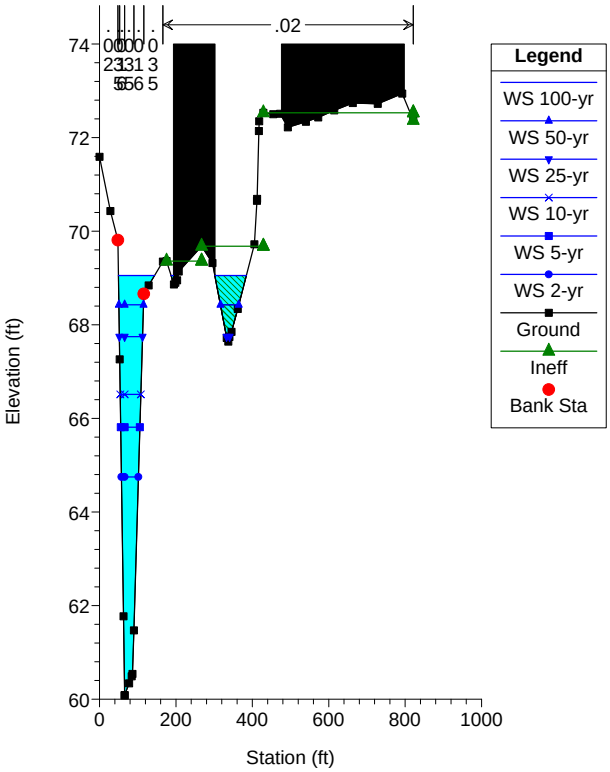
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge



AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

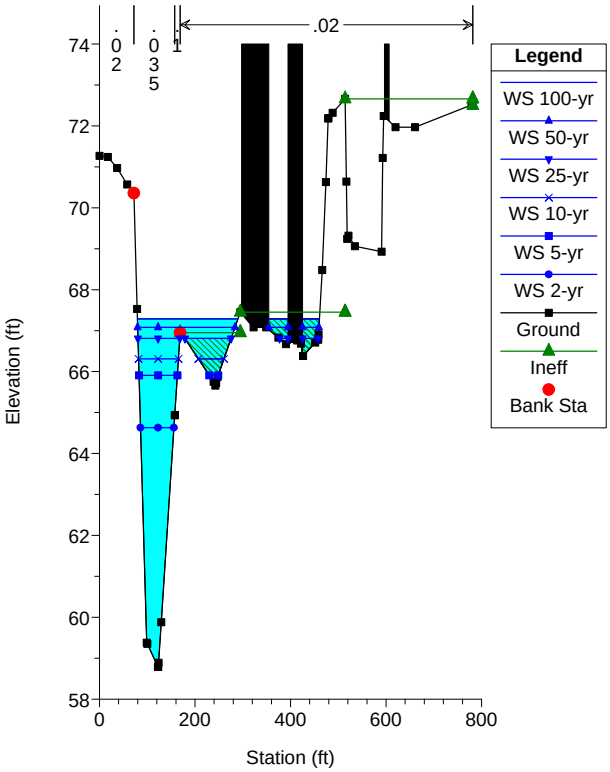
River = Alvarado Creek Reach = Lower Reach RS = 1036.821

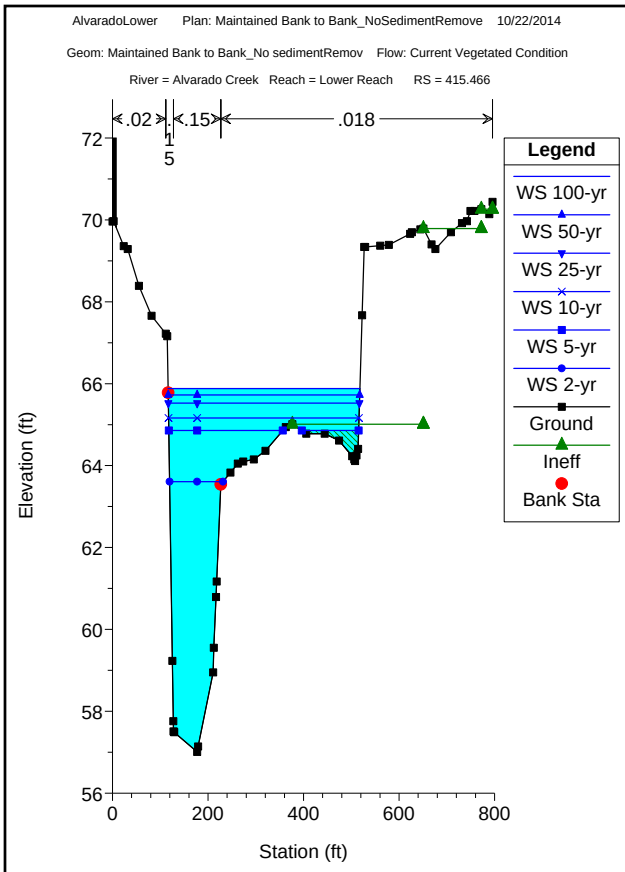


AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014

Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 819.1344




AlvaradoLower Plan: Maintained Bank to Bank_NoSedimentRemove 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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
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PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 10:57:44 AM

Project in English units

PLAN DATA

Plan Title: Maintained Bank to Bank_NoSedimentRemove
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p11

Geometry Title: Maintained Bank to Bank_No sedimentRemov
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g11

Flow Title : Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Plan Description:
Maintained: Vegetation only removal from bank to bank in City of San Diego
maintained portions only. Only cross section 819 is affected by this model as
it is the only earthen portion maintained by the City of San Diego.

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Flow Data (cfs)

River	Reach	RS	100-yr	50-yr	25-yr	10-yr	5-yr	2-yr
Alvarado Creek	Lower Reach	3519.101	5100	4500	3800	2700	2050	1180

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	100-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	50-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	25-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	10-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	5-yr		Normal S = 0.005
Alvarado Creek	Lower Reach	2-yr		Normal S = 0.005

GEOMETRY DATA

Geometry Title: Maintained Bank to Bank_No sedimentRemov
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g11

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3

107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94
328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64
430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.016	126.44	.035	155.92	.016	190.95	.018
405.16	.015								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
107.14	188.01	137.3	137.31	137.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.035	166.19	.016	185.99	.018
411.74	.015	488.01	.018						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
122.6	185.99	209.35	210.34	211.8	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.035	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.69	167.68	32.79	31.38	28.21	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	95.69	81.19	F
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	121.78	67.99
145.21	68.69	145.46	68.69	161.99	75	164.4	76.1	165.21	76.15
169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2	238.98	77.08
253.88	77	265.89	76.8	311.18	76.55	320.11	76.42	352.63	76.62
356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26	419.63	74.17
444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85	460.97	77
461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24	506.27	77.23
518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74	648.95	79.3
652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87	693.26	88.99

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	119.67	.035	145.46	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
98.56	169.88	101.61	105.47	112.32	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.91	117.43	67.92	137.35	68.5
140.94	68.59	140.98	68.59	143.73	70.14	158.51	78.33	168.47	76.41
177.34	76.52	235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12
329.16	76.48	336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57
400.89	75.68	402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16
424.44	75.24	439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53
463.42	76.3	467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97
521.9	78.7	535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97
668.1	79.98	668.55	79.98	669	80.01	689.24	80.91	703.56	86.82

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	93.68	.016	117.02	.035	140.94	.016	158.51	.018
408.4	.015	463.42	.05	588.58	.015				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
94.76	158.51	187.47	186.83	186.24	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84

```
  548.46   80.84  599.76   80.89  618.77   80.91  682.32   81.13  684.48   81.13
  687.11   81.15  742.11   80.84  751.33   81.07

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   92.48      .1  110.07     .15   121.5      .1  159.23     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        92.48  143.16           165.5  169.96   176.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   92.48    81.7       F
  143.16  751.33   76.72       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  263.23  391.75      84  512.38   718.6      84       0   24.64      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2677.801

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    81.5   30.52   80.65   36.77   80.62   42.89    80.9    58.1    81.5
   71.39   75.18    81.5   69.16   81.67   69.06   87.66   67.76   89.09   67.57
   90.29   68.14  103.25   74.21  103.93   74.52  104.55    74.5  110.68   74.57
   205.6   74.95  206.53   74.74  221.08   73.32  225.22    73.4  226.53   73.39
  265.25   77.08  271.06   77.41  338.32   78.06  339.78    78.1  341.36    78.1
  364.19   78.09  408.76   78.09  410.69      78  412.65   78.03     428   77.68
  435.25   77.52  440.78   76.52  441.72   76.36  444.58   76.41  489.46   77.02
  499.32   77.96  509.15    78.9   525.8    79.2  570.88   79.97   592.3   80.36
   638.5   80.46  660.12   80.81  697.06   81.81  720.99   80.69  730.29   80.14
  740.99    80.4  756.67   80.53

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    58.1      .1  104.55    .018  206.53    .018  408.76     .03
  435.25    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        71.39  104.55           162.85  162.93  162.56             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  697.06  756.67   81.81       F
       0    58.1    81.5       F
  341.36  697.06    78.1       F
   205.6  341.36   74.95       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  527.26  558.86      92  680.09  727.68      92  291.63  401.11      92
  118.99   151.1      92

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2514.866

INPUT
Description:
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    84.4     .06   84.39     .79   84.39    41.1   81.94    53.2   81.94
   60.02    78.1   75.48   70.32   78.01   69.05   78.49   68.92   78.81   68.85
   86.26   67.21   87.29   67.49   94.35   69.43  100.93   71.25  101.72   71.49
  102.77   71.46  142.03   71.27  158.47   71.64  184.44   72.28   194.7   72.52
  200.88   72.65  233.74    72.9  261.94   73.04  269.59   73.66  279.45   74.52
   284.9   74.71   345.6   77.01  353.93   77.03  413.72   78.09  414.74   78.11
  421.74   78.22  423.21   78.27  438.25   78.24  502.84   77.71  507.32   77.68
  509.47   77.57  514.04   77.58  538.77   78.01  551.49   78.22  562.23   78.33
  569.85   78.62  582.46   78.99  583.62   79.04  584.62   79.06  585.59   79.06
  586.66   79.04  604.37   79.34  634.88   79.77  647.22   79.72   685.7   79.32
  717.19    79.4  747.64   78.97  776.38    79.2  793.01   79.33   795.4   79.35
  804.92   79.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    41.1     .02    53.2      .1  102.77     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        53.2  102.77           158.36  154.23  152.81             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  634.88  804.92   79.77       F
  423.21  634.88   78.27       F
  102.77  423.21   71.46       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  659.03     679      86  386.11   473.7      86

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2360.635

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.78    2.38   82.59   14.12   83.65   14.25   83.58   16.28   82.69
   27.93   75.07   31.19    74.9   32.22   74.88   32.55   74.87   56.86   74.48
   59.39   74.02   69.46   72.26   74.34   71.47    82.9   71.61   93.85    71.6
   98.97   69.52  100.84   68.17  104.05   67.51  105.82   67.47  107.64   67.43
  116.02    67.1   116.7   67.07  125.39   70.54  129.21   72.21  146.27   72.31
  147.82   72.32  151.45   72.33  169.17   72.44  177.04   72.44  194.94   72.57
  213.19    72.7  231.11   72.83  239.86   73.05  256.64   73.16  268.08   73.24
  274.44    73.2  275.92   73.09  316.41   73.22  324.05   72.33  337.68   74.65
  345.19   75.59  353.05   75.56  360.81   75.87  401.93   77.57  412.48   77.82
  416.98   77.65  422.38   77.15  424.89   76.98  434.19   76.78  447.79   76.56
  461.33    76.4  484.88   75.63  493.56   75.31   502.3   75.48  515.87    75.8
  571.75   76.38  576.32    76.4  577.86   76.39  606.49   76.26  622.33   76.12
  630.75   75.99  636.37   76.13  687.01   76.06  708.05   75.76  720.51   75.23
  782.65    74.6  813.1    74.88  823.95   74.67   827.4   75.46  827.87    75.5
  887.31   75.88

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   59.39     .02   74.34    .025   93.85    .025   98.97    .025
  129.21     .02

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

	69.46	129.21		19.33	19.66	19.62		.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113.57	168.74	21.27	43.05	56.67	.1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

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

27.83	96.83	119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

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

104.06	174.16	35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.035	155.61	.016	171.11	.02

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

99.12	171.11	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

```
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  322.16  412.72      95     7.5   69.77      95  514.93  528.44      95
 1412.52 1438.18      95 1338.43 1372.34      95 1539.91 1540.35      95

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1573.644

INPUT
Description:
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   89.66    4.03   89.55   29.17   89.08   36.04   89.48   43.05   89.93
   50.48   84.87   61.87   77.37   64.86   76.47   70.17   74.68   85.63   70.67
   89.75   66.84   93.76   63.68   94.09   63.68  124.89   64.04  124.96   64.04
  126.79   64.06  127.33   64.52  130.23   66.81  135.25   70.76  145.46   70.58
  152.61   70.64  156.91   70.67  208.87   72.31  232.07    72.4  268.04   72.43
  287.13   72.67   322.8   72.28  342.36   72.36  359.71   72.05  369.42    72.4
   382.2   72.84  413.09   72.99  439.86    73.3  442.26   73.22  451.68   74.82
  451.93   74.85  489.05   74.62  492.33    74.6  494.22   74.46  496.02   74.55
  502.05   74.56  537.94   74.59  543.47   73.97  547.27   73.57   564.7   74.35
  585.61   75.32  589.03   75.19  595.39    74.9  610.65   74.42  628.48   73.82
  628.64   73.83  632.03   74.14   662.9   74.55  681.75   74.98  683.52   75.03
  694.87   74.98  762.03    73.9  829.96   72.34  834.17   72.28  852.61   71.94
  886.74   71.57  889.76    71.6  890.89   71.53  893.47   71.51  939.27   71.05
  964.87   70.72  985.97   70.58  999.54   70.45 1017.68   70.38  1019.9   70.52
 1040.58   71.55 1043.19   71.55 1044.08   71.56 1045.68    71.6 1053.71   71.31
 1062.36   71.53 1076.84   72.35 1092.33   72.58 1121.01    72.8 1135.54   72.81
 1156.84   72.83 1199.56   72.92 1221.53   73.08

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   43.05    .045   85.63    .016   93.76    .035  126.79    .016
  135.25     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        85.63  135.25          286.27  268.23  249.58             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  585.61 1221.53   75.32       F
  451.68  585.61   74.82       F
  287.13  451.68   72.67       F
  135.25  287.13   70.76       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  385.47   441.5      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.8    3.18   76.79   18.93   76.04   20.08   74.49   25.29   74.92
    35.1   74.97   40.35   73.22   44.03   71.37   46.28   65.05   47.46   62.46
   47.61   62.46   55.75   62.48   62.69   62.43   75.77   62.43   79.09   62.42
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57  1028.2   72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    35.1     .16   47.46    .035   79.09     .16   99.47     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        35.1   99.47          148.68  149.85  158.44             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

CULVERT


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1230.5

INPUT
Description:
Distance from Upstream XS =      21
Deck/Roadway Width        =     110
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   31.29   74.95              99    74.1

Upstream Bridge Cross Section Data
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.8    3.18   76.79   18.93   76.04   20.08   74.49   25.29   74.92
    35.1   74.97   40.35   73.22   44.03   71.37   46.28   65.05   47.46   62.46
   47.61   62.46   55.75   62.48   62.69   62.43   75.77   62.43   79.09   62.42
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
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  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57  1028.2   72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    35.1     .16   47.46    .035   79.09     .16   99.47    .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47            .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97          124.06    74.1          143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         46.27  130.44            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 21     110     .018     .035      .94                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

LATERAL STRUCTURE
```

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1149.024

INPUT
Description:
Lateral structure position = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	52.88	.016	65.67	.035	89.98	.016
115.82	.035	165.64	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	157.62	.1	168.96	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev

```
  297.49  354.31      74  394.55  425.01      74  596.65   606.2      74

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 415.466

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   69.96    2.41   69.97   23.36   69.36   31.97   69.29    55.2   68.39
   81.79   67.66  111.71   67.22  114.72   67.16  116.54   65.78  125.28   59.23
  127.25   57.76  127.59   57.51  129.08    57.5  129.13   57.49  177.09   57.01
  179.36   57.14  210.85   58.95  212.04   59.55  216.85   60.79  218.23   61.17
  226.72   63.54     247   63.83  262.38   64.05   273.7    64.1  295.93   64.15
  320.34   64.36  362.69   64.94  376.62   65.01  405.84   64.78  444.15   64.78
   474.4   64.61  501.78   64.23  506.26   64.15  507.99   64.11  510.79   64.25
  514.09   64.41  522.63   67.67  526.99   69.34  529.14   69.34  560.37   69.37
  578.57   69.39     623   69.66  626.91    69.7   644.4   69.77  650.98   69.79
  667.97    69.4  676.04   69.29  708.55    69.7  731.78   69.92  742.21   69.97
  749.38   70.22  757.73   70.22  772.23   70.26   788.8   70.14  795.52   70.44

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02  111.71     .15  127.59     .15  226.72    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        116.54  226.72           420.92  415.47  422.02            .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
       0    7.54      72


SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

      Reach          River Sta.       n1        n2        n3        n4        n5
n6        n7        n8        n9

 Lower Reach          3519.101           .02      .016      .035      .016      .018
.015
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792           .018      .016      .035      .016      .018
.015      .018
 Lower Reach          3171.448           .018      .016      .035      .016      .018
.018       .06      .018       .05
 Lower Reach          3140.066           .018      .016      .035      .016      .018
.02       .05
 Lower Reach          3034.592           .018      .016      .035      .016      .018
.015      .05      .015
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761           .02        .1       .15        .1       .02
 Lower Reach          2677.801           .02        .1      .018      .018       .03
.018
 Lower Reach          2514.866           .02       .02        .1       .02
 Lower Reach          2360.635           .03       .02      .025      .025      .025
.02
 Lower Reach          2340.973           .02      .025      .025
 Lower Reach          2332.283     Lat Struct
 Lower Reach          2309.739           .03      .035      .025      .025      .025
.02
 Lower Reach          2266.686           .02        .1       .02
 Lower Reach          2090.444           .02       .03       .05       .02       .05
.018
 Lower Reach          1904.254          .025       .05       .02       .05       .02
 Lower Reach          1849.924          .018       .02       .06       .07       .06
.02
 Lower Reach          1742.873          .018       .02       .06       .07       .06
.02
 Lower Reach          1705.846           .02      .016      .035      .016       .02
 Lower Reach          1573.644           .02      .045      .016      .035      .016
.02
 Lower Reach          1305.41            .02       .16      .035       .16       .02
 Lower Reach          1230.5       Culvert
 Lower Reach          1155.558          .035      .016      .035      .016      .035
.02
 Lower Reach          1149.024     Lat Struct
 Lower Reach          1121.496     Lat Struct
 Lower Reach          1036.821           .02      .035      .016      .035      .016
.035       .02
 Lower Reach          819.1344           .02      .035        .1       .02
 Lower Reach          415.466            .02       .15       .15      .018


SUMMARY OF REACH LENGTHS

River: Alvarado Creek

      Reach          River Sta.      Left     Channel    Right

 Lower Reach          3519.101         137.3    137.31    137.44
 Lower Reach          3506.967     Lat Struct
 Lower Reach          3381.792        209.35    210.34     211.8
 Lower Reach          3171.448         32.79     31.38     28.21
 Lower Reach          3140.066        101.61    105.47    112.32
 Lower Reach          3034.592        187.47    186.83    186.24
 Lower Reach          3029.094     Lat Struct
 Lower Reach          2847.761         165.5    169.96     176.8
 Lower Reach          2677.801        162.85    162.93    162.56
 Lower Reach          2514.866        158.36    154.23    152.81
 Lower Reach          2360.635         19.33     19.66     19.62
 Lower Reach          2340.973         34.23     31.23     27.43
 Lower Reach          2332.283     Lat Struct
 Lower Reach          2309.739         21.27     43.05     56.67
 Lower Reach          2266.686         166.7    176.24    190.03
 Lower Reach          2090.444        183.41    186.19    187.45
 Lower Reach          1904.254         55.48     54.33     52.65
 Lower Reach          1849.924        119.68    107.05     93.87
 Lower Reach          1742.873          35.7     37.03      38.3
 Lower Reach          1705.846        136.62     132.2    123.01
 Lower Reach          1573.644        286.27    268.23    249.58
 Lower Reach          1305.41         148.68    149.85    158.44
 Lower Reach          1230.5       Culvert
 Lower Reach          1155.558        118.42    118.74    122.35
 Lower Reach          1149.024     Lat Struct
```

Lower Reach	1121.496	Lat Struct			
Lower Reach	1036.821		217.42	217.69	218.99
Lower Reach	819.1344		431.18	403.67	344.14
Lower Reach	415.466		420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3

HEC-RAS Plan: VegB2B_nosed_Qs River: Alvarado Creek Reach: Lower Reach

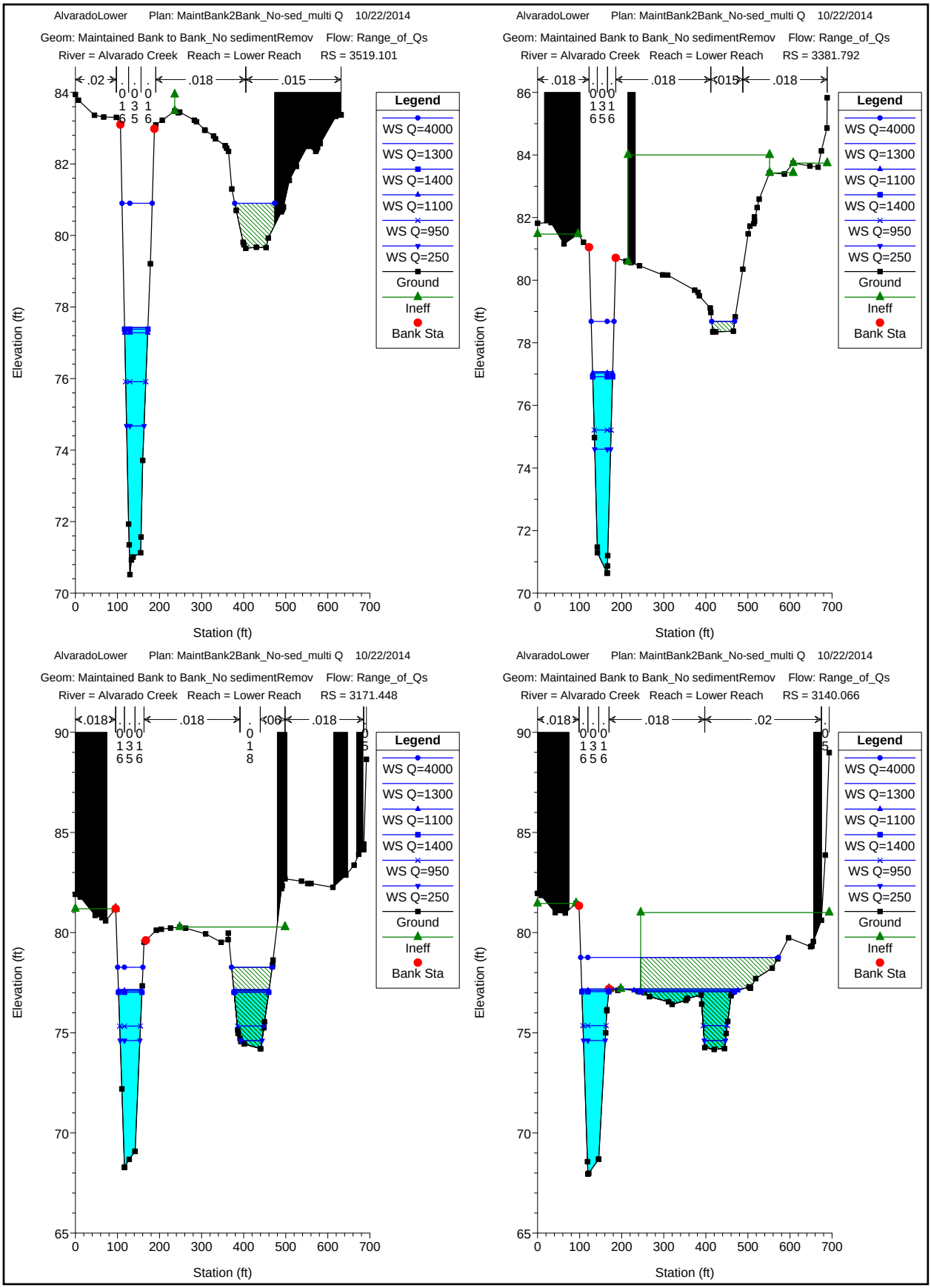
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1300	1300.00	70.52	77.43		77.83	0.001139	5.1	257.06	55.53	0.41
Lower Reach	3519.101	Q=1100	1100.00	70.52	77.28		77.58	0.000900	4.4	248.90	54.78	0.37
Lower Reach	3519.101	Q=250	250.00	70.52	74.68		74.74	0.000409	2.0	123.47	41.54	0.21
Lower Reach	3519.101	Q=950	950.00	70.52	75.91		76.35	0.001861	5.3	178.81	47.84	0.48
Lower Reach	3519.101	Q=1400	1400.00	70.52	77.38		77.85	0.001365	5.5	254.36	55.28	0.45
Lower Reach	3519.101	Q=4000	4000.00	70.52	80.90		81.98	0.001613	8.3	479.31	166.61	0.57
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1300	1300.00	70.64	77.07	75.01	77.63	0.001564	6.0	217.97	47.90	0.49
Lower Reach	3381.792	Q=1100	1100.00	70.64	77.03	74.62	77.43	0.001154	5.1	215.85	47.72	0.42
Lower Reach	3381.792	Q=250	250.00	70.64	74.60	72.41	74.68	0.000460	2.2	111.92	37.87	0.23
Lower Reach	3381.792	Q=950	950.00	70.64	75.21	74.31	75.97	0.003609	7.0	135.91	40.33	0.67
Lower Reach	3381.792	Q=1400	1400.00	70.64	76.91	75.19	77.60	0.002027	6.7	210.27	47.24	0.56
Lower Reach	3381.792	Q=4000	4000.00	70.64	78.68	78.68	81.44	0.005576	13.3	300.11	108.71	1.00
Lower Reach	3171.448	Q=1300	1300.00	68.28	77.16	72.64	77.38	0.000395	3.8	342.70	139.97	0.27
Lower Reach	3171.448	Q=1100	1100.00	68.28	77.09	72.27	77.25	0.000293	3.2	338.89	138.95	0.23
Lower Reach	3171.448	Q=250	250.00	68.28	74.61	70.10	74.63	0.000064	1.2	212.00	97.63	0.10
Lower Reach	3171.448	Q=950	950.00	68.28	75.34	71.96	75.57	0.000576	3.8	246.82	113.02	0.30
Lower Reach	3171.448	Q=1400	1400.00	68.28	77.02	72.83	77.29	0.000491	4.2	334.95	137.88	0.30
Lower Reach	3171.448	Q=4000	4000.00	68.28	78.27	76.33	79.77	0.002217	9.8	407.30	156.70	0.66
Lower Reach	3140.066	Q=1300	1300.00	67.95	77.18	72.18	77.35	0.000284	3.3	393.96	373.72	0.24
Lower Reach	3140.066	Q=1100	1100.00	67.95	77.11	71.81	77.23	0.000211	2.8	386.91	311.35	0.20
Lower Reach	3140.066	Q=250	250.00	67.95	74.61	69.69	74.63	0.000044	1.0	243.42	102.15	0.08
Lower Reach	3140.066	Q=950	950.00	67.95	75.36	71.51	75.54	0.000396	3.4	283.29	111.93	0.26
Lower Reach	3140.066	Q=1400	1400.00	67.95	77.05	72.35	77.26	0.000352	3.7	382.80	287.43	0.26
Lower Reach	3140.066	Q=4000	4000.00	67.95	78.76	75.72	79.49	0.001004	7.2	616.84	469.93	0.47
Lower Reach	3034.592	Q=1300	1300.00	67.91	77.10	72.31	77.32	0.000359	3.7	348.61	236.72	0.26
Lower Reach	3034.592	Q=1100	1100.00	67.91	77.05	71.92	77.21	0.000264	3.2	345.72	230.76	0.22
Lower Reach	3034.592	Q=250	250.00	67.91	74.61	69.70	74.62	0.000052	1.1	222.56	46.13	0.09
Lower Reach	3034.592	Q=950	950.00	67.91	75.27	71.61	75.48	0.000505	3.7	253.86	67.56	0.29
Lower Reach	3034.592	Q=1400	1400.00	67.91	76.95	72.49	77.21	0.000449	4.1	340.25	221.33	0.29
Lower Reach	3034.592	Q=4000	4000.00	67.91	79.05	76.08	79.28	0.000369	4.4	1074.84	287.23	0.28
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1300	1300.00	68.72	77.03	74.27	77.18	0.001349	1.4	516.73	255.72	0.11
Lower Reach	2847.761	Q=1100	1100.00	68.72	76.60	73.82	77.02	0.021325	5.2	210.80	249.40	0.42
Lower Reach	2847.761	Q=250	250.00	68.72	74.53	71.06	74.59	0.004344	1.9	130.01	34.93	0.18
Lower Reach	2847.761	Q=950	950.00	68.72	73.46	73.46	75.01	0.154443	10.0	94.86	30.44	1.00
Lower Reach	2847.761	Q=1400	1400.00	68.72	76.82	74.49	77.03	0.002317	1.8	463.47	254.04	0.14
Lower Reach	2847.761	Q=4000	4000.00	68.72	78.77	77.25	79.15	0.001324	1.6	974.28	275.27	0.11
Lower Reach	2677.801	Q=1300	1300.00	67.57	74.34	74.34	76.25	0.106310	11.1	117.20	56.52	1.00
Lower Reach	2677.801	Q=1100	1100.00	67.57	73.85	73.85	75.63	0.108107	10.7	102.84	44.68	1.00
Lower Reach	2677.801	Q=250	250.00	67.57	73.55	70.79	73.66	0.007091	2.7	94.10	37.09	0.25
Lower Reach	2677.801	Q=950	950.00	67.57	73.45	73.45	75.13	0.110662	10.4	91.42	34.70	1.00
Lower Reach	2677.801	Q=1400	1400.00	67.57	75.15	75.15	76.08	0.019007	5.1	211.55	141.47	0.43
Lower Reach	2677.801	Q=4000	4000.00	67.57	77.13	77.13	78.61	0.005717	3.6	515.76	219.88	0.25
Lower Reach	2514.866	Q=1300	1300.00	67.21	73.90	73.01	74.10	0.001406	1.4	425.62	203.98	0.12
Lower Reach	2514.866	Q=1100	1100.00	67.21	73.71	72.76	73.88	0.001430	1.4	386.48	201.38	0.12
Lower Reach	2514.866	Q=250	250.00	67.21	70.93	70.19	71.29	0.043031	4.8	51.98	25.52	0.59
Lower Reach	2514.866	Q=950	950.00	67.21	73.55	72.36	73.71	0.001459	1.4	354.90	199.16	0.12
Lower Reach	2514.866	Q=1400	1400.00	67.21	74.00	73.04	74.22	0.001374	1.4	446.36	205.34	0.12
Lower Reach	2514.866	Q=4000	4000.00	67.21	76.10	74.41	76.49	0.001045	1.5	926.72	257.65	0.11
Lower Reach	2360.635	Q=1300	1300.00	67.07	73.58	72.66	73.89	0.001198	4.9	312.92	169.33	0.45
Lower Reach	2360.635	Q=1100	1100.00	67.07	73.41	72.08	73.68	0.001081	4.5	284.74	167.39	0.42
Lower Reach	2360.635	Q=250	250.00	67.07	70.18	69.23	70.46	0.001923	4.2	58.93	27.15	0.51
Lower Reach	2360.635	Q=950	950.00	67.07	73.28	71.84	73.52	0.000973	4.1	262.53	165.85	0.40
Lower Reach	2360.635	Q=1400	1400.00	67.07	73.68	72.78	74.01	0.001212	5.0	330.18	170.51	0.45
Lower Reach	2360.635	Q=4000	4000.00	67.07	75.82	74.50	76.32	0.001062	6.3	738.17	390.79	0.46
Lower Reach	2340.973	Q=1300	1300.00	67.19	73.77	70.15	73.81	0.000097	1.6	885.39	289.00	0.13
Lower Reach	2340.973	Q=1100	1100.00	67.19	73.58	69.99	73.61	0.000082	1.4	830.55	278.73	0.12
Lower Reach	2340.973	Q=250	250.00	67.19	70.35	68.48	70.37	0.000202	1.2	214.71	132.03	0.16
Lower Reach	2340.973	Q=950	950.00	67.19	73.42	69.79	73.45	0.000070	1.3	789.74	258.60	0.11
Lower Reach	2340.973	Q=1400	1400.00	67.19	73.88	70.24	73.92	0.000102	1.7	916.57	291.21	0.14
Lower Reach	2340.973	Q=4000	4000.00	67.19	76.09	71.87	76.20	0.000173	2.8	1609.57	671.32	0.19
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1300	1300.00	66.92	73.63	71.39	73.79	0.000532	3.6	457.21	264.52	0.30
Lower Reach	2309.739	Q=1100	1100.00	66.92	73.45	71.02	73.59	0.000484	3.4	415.87	247.88	0.29
Lower Reach	2309.739	Q=250	250.00	66.92	70.21	68.79	70.35	0.000866	3.0	84.62	37.23	0.35
Lower Reach	2309.739	Q=950	950.00	66.92	73.31	70.72	73.43	0.000441	3.1	383.49	242.25	0.27
Lower Reach	2309.739	Q=1400	1400.00	66.92	73.74	71.57	73.90	0.000524	3.7	502.08	265.95	0.30

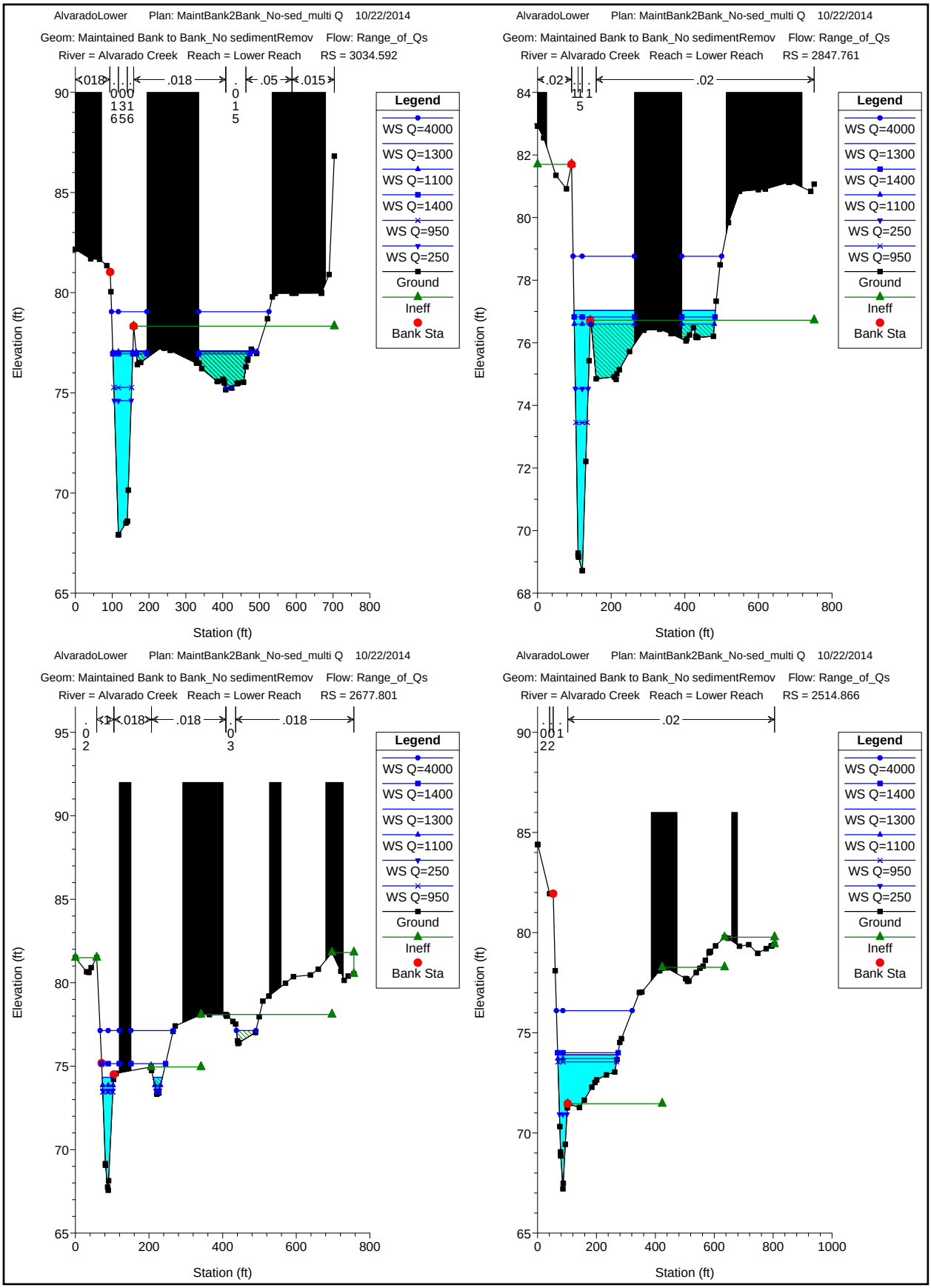
HEC-RAS Plan: VegB2B_nosed_Qs River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	2309.739	Q=4000	4000.00	66.92	75.97	74.03	76.18	0.000404	4.2	1139.02	737.92	0.28
Lower Reach	2266.686	Q=1300	1300.00	66.38	73.41	71.31	73.71	0.010294	4.0	305.78	194.37	0.33
Lower Reach	2266.686	Q=1100	1100.00	66.38	73.28	70.92	73.52	0.009848	3.8	279.88	182.60	0.32
Lower Reach	2266.686	Q=250	250.00	66.38	70.12	68.66	70.26	0.013391	3.0	83.84	35.21	0.34
Lower Reach	2266.686	Q=950	950.00	66.38	73.16	70.61	73.37	0.009139	3.6	259.74	164.94	0.31
Lower Reach	2266.686	Q=1400	1400.00	66.38	73.51	71.49	73.82	0.009816	3.9	324.18	202.32	0.32
Lower Reach	2266.686	Q=4000	4000.00	66.38	75.61	74.19	76.11	0.002183	2.3	858.72	414.26	0.16
Lower Reach	2090.444	Q=1300	1300.00	66.18	72.52	70.87	72.81	0.002906	4.3	302.82	142.81	0.40
Lower Reach	2090.444	Q=1100	1100.00	66.18	72.07	70.40	72.40	0.004231	4.8	238.98	139.76	0.48
Lower Reach	2090.444	Q=250	250.00	66.18	68.96	68.09	69.20	0.003314	4.0	62.76	31.31	0.50
Lower Reach	2090.444	Q=950	950.00	66.18	71.60	70.08	72.10	0.005529	5.6	168.72	76.58	0.56
Lower Reach	2090.444	Q=1400	1400.00	66.18	72.75	71.08	73.02	0.002427	4.0	335.66	144.35	0.37
Lower Reach	2090.444	Q=4000	4000.00	66.18	75.28	73.26	75.77	0.001490	4.3	791.38	740.55	0.31
Lower Reach	1904.254	Q=1300	1300.00	65.47	71.22	70.05	72.01	0.005920	7.1	182.72	141.22	0.64
Lower Reach	1904.254	Q=1100	1100.00	65.47	70.59	69.67	71.39	0.006578	7.2	153.47	74.08	0.68
Lower Reach	1904.254	Q=250	250.00	65.47	67.47	67.47	68.12	0.011310	6.5	38.49	28.90	0.99
Lower Reach	1904.254	Q=950	950.00	65.47	70.09	69.36	70.90	0.007176	7.2	131.99	42.12	0.72
Lower Reach	1904.254	Q=1400	1400.00	65.47	71.54	70.22	72.31	0.005617	7.1	197.88	186.45	0.62
Lower Reach	1904.254	Q=4000	4000.00	65.47	75.37	73.56	75.52	0.000494	3.1	1261.02	1186.11	0.20
Lower Reach	1849.924	Q=1300	1300.00	64.56	71.18	68.46	71.56	0.006143	5.0	261.44	104.81	0.40
Lower Reach	1849.924	Q=1100	1100.00	64.56	70.53	68.10	70.90	0.006651	4.8	228.12	50.67	0.40
Lower Reach	1849.924	Q=250	250.00	64.56	67.24	66.10	67.38	0.007479	3.1	81.59	38.23	0.37
Lower Reach	1849.924	Q=950	950.00	64.56	70.03	67.82	70.37	0.006953	4.7	203.25	48.78	0.40
Lower Reach	1849.924	Q=1400	1400.00	64.56	71.49	68.63	71.89	0.005886	5.0	278.43	128.00	0.39
Lower Reach	1849.924	Q=4000	4000.00	64.56	75.44	72.53	75.48	0.000126	1.1	2684.40	922.56	0.07
Lower Reach	1742.873	Q=1300	1300.00	64.03	70.54	67.68	70.92	0.005835	4.9	265.30	52.06	0.38
Lower Reach	1742.873	Q=1100	1100.00	64.03	69.84	67.32	70.20	0.006367	4.8	229.60	49.63	0.39
Lower Reach	1742.873	Q=250	250.00	64.03	66.40	65.31	66.55	0.008042	3.1	79.38	37.66	0.38
Lower Reach	1742.873	Q=950	950.00	64.03	69.30	67.03	69.64	0.006804	4.7	203.13	47.74	0.40
Lower Reach	1742.873	Q=1400	1400.00	64.03	70.89	67.84	71.27	0.005583	4.9	283.48	87.70	0.38
Lower Reach	1742.873	Q=4000	4000.00	64.03	75.43	71.20	75.46	0.000102	1.0	2905.45	934.05	0.06
Lower Reach	1705.846	Q=1300	1300.00	63.85	70.47	67.69	70.84	0.001010	4.9	265.71	53.22	0.39
Lower Reach	1705.846	Q=1100	1100.00	63.85	69.75	67.34	70.11	0.001160	4.8	228.45	50.74	0.40
Lower Reach	1705.846	Q=250	250.00	63.85	66.21	65.37	66.40	0.002473	3.5	71.07	37.86	0.45
Lower Reach	1705.846	Q=950	950.00	63.85	69.20	67.06	69.54	0.001300	4.7	200.69	48.81	0.41
Lower Reach	1705.846	Q=1400	1400.00	63.85	70.82	67.86	71.20	0.000946	4.9	284.60	54.44	0.38
Lower Reach	1705.846	Q=4000	4000.00	63.85	75.24	71.14	75.44	0.000325	4.2	1244.75	1258.54	0.25
Lower Reach	1573.644	Q=1300	1300.00	63.68	70.33	67.34	70.71	0.001048	4.9	265.04	48.71	0.37
Lower Reach	1573.644	Q=1100	1100.00	63.68	69.60	66.99	69.96	0.001173	4.8	230.15	47.00	0.38
Lower Reach	1573.644	Q=250	250.00	63.68	65.87	65.06	66.06	0.002686	3.5	70.96	38.05	0.45
Lower Reach	1573.644	Q=950	950.00	63.68	69.03	66.71	69.37	0.001290	4.7	203.69	45.66	0.39
Lower Reach	1573.644	Q=1400	1400.00	63.68	70.69	67.50	71.07	0.000994	5.0	282.45	120.87	0.37
Lower Reach	1573.644	Q=4000	4000.00	63.68	75.34	71.60	75.37	0.000067	1.9	3170.62	1097.30	0.11
Lower Reach	1305.41	Q=1300	1300.00	62.42	69.70	66.08	70.07	0.009435	4.9	265.59	41.31	0.34
Lower Reach	1305.41	Q=1100	1100.00	62.42	68.93	65.71	69.27	0.009087	4.7	234.09	40.32	0.34
Lower Reach	1305.41	Q=250	250.00	62.42	64.85	63.68	65.00	0.006329	3.1	80.17	35.08	0.36
Lower Reach	1305.41	Q=950	950.00	62.42	68.32	65.41	68.64	0.008775	4.5	209.80	39.54	0.35
Lower Reach	1305.41	Q=1400	1400.00	62.42	70.07	66.26	70.46	0.009585	5.0	281.03	41.79	0.34
Lower Reach	1305.41	Q=4000	4000.00	62.42	74.47	69.92	75.24	0.017792	6.2	598.29	714.75	0.38
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1300	1300.00	60.67	65.98	64.12	66.48	0.001807	5.7	229.27	55.63	0.49
Lower Reach	1155.558	Q=1100	1100.00	60.67	65.54	63.78	65.99	0.001831	5.4	205.08	53.40	0.48
Lower Reach	1155.558	Q=250	250.00	60.67	62.86	61.85	63.02	0.001854	3.1	80.17	40.14	0.39
Lower Reach	1155.558	Q=950	950.00	60.67	65.18	63.49	65.58	0.001852	5.1	186.04	51.57	0.47
Lower Reach	1155.558	Q=1400	1400.00	60.67	66.18	64.28	66.71	0.001805	5.8	240.56	56.65	0.50
Lower Reach	1155.558	Q=4000	4000.00	60.67	69.88	67.41	70.97	0.001743	8.3	479.14	71.55	0.57
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1300	1300.00	60.08	65.00	64.46	66.10	0.004697	8.4	154.84	45.67	0.80
Lower Reach	1036.821	Q=1100	1100.00	60.08	64.56	64.08	65.59	0.005101	8.1	135.27	43.29	0.81
Lower Reach	1036.821	Q=250	250.00	60.08	62.08	61.87	62.57	0.008681	5.6	44.54	29.85	0.81
Lower Reach	1036.821	Q=950	950.00	60.08	64.19	63.78	65.17	0.005574	7.9	119.57	41.28	0.82
Lower Reach	1036.821	Q=1400	1400.00	60.08	65.17	64.64	66.32	0.004677	8.6	162.71	46.60	0.81
Lower Reach	1036.821	Q=4000	4000.00	60.08	67.95	67.95	70.49	0.005432	12.8	312.80	82.70	1.00
Lower Reach	819.1344	Q=1300	1300.00	58.79	64.92	62.65	65.24	0.001922	4.6	284.53	72.37	0.41
Lower Reach	819.1344	Q=1100	1100.00	58.79	64.41	62.33	64.72	0.001985	4.4	248.98	68.27	0.41
Lower Reach	819.1344	Q=250	250.00	58.79	61.33	60.42	61.49	0.002751	3.2	77.07	43.24	0.43

HEC-RAS Plan: VegB2B_nosed_Qs River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	819.1344	Q=950	950.00	58.79	63.97	62.07	64.26	0.002085	4.3	219.86	64.71	0.41
Lower Reach	819.1344	Q=1400	1400.00	58.79	65.12	62.80	65.46	0.001905	4.7	299.36	74.02	0.41
Lower Reach	819.1344	Q=4000	4000.00	58.79	66.88	65.64	68.15	0.004951	9.0	442.36	250.03	0.71
Lower Reach	415.466	Q=1300	1300.00	57.01	63.91	59.51	63.98	0.005008	2.2	602.55	133.60	0.16
Lower Reach	415.466	Q=1100	1100.00	57.01	63.37	59.30	63.44	0.005009	2.0	539.97	106.36	0.16
Lower Reach	415.466	Q=250	250.00	57.01	59.96	58.08	59.98	0.005006	1.2	205.99	89.34	0.14
Lower Reach	415.466	Q=950	950.00	57.01	62.89	59.14	62.95	0.005010	1.9	489.81	104.02	0.16
Lower Reach	415.466	Q=1400	1400.00	57.01	64.13	59.61	64.20	0.005009	2.2	633.88	168.70	0.16
Lower Reach	415.466	Q=4000	4000.00	57.01	65.59	61.66	65.94	0.005006	2.5	1102.88	400.37	0.17


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS Q=4000
WS Q=1300
WS Q=1400
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.015
.018
Legend
WS Q=4000
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS Q=4000
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=4000
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
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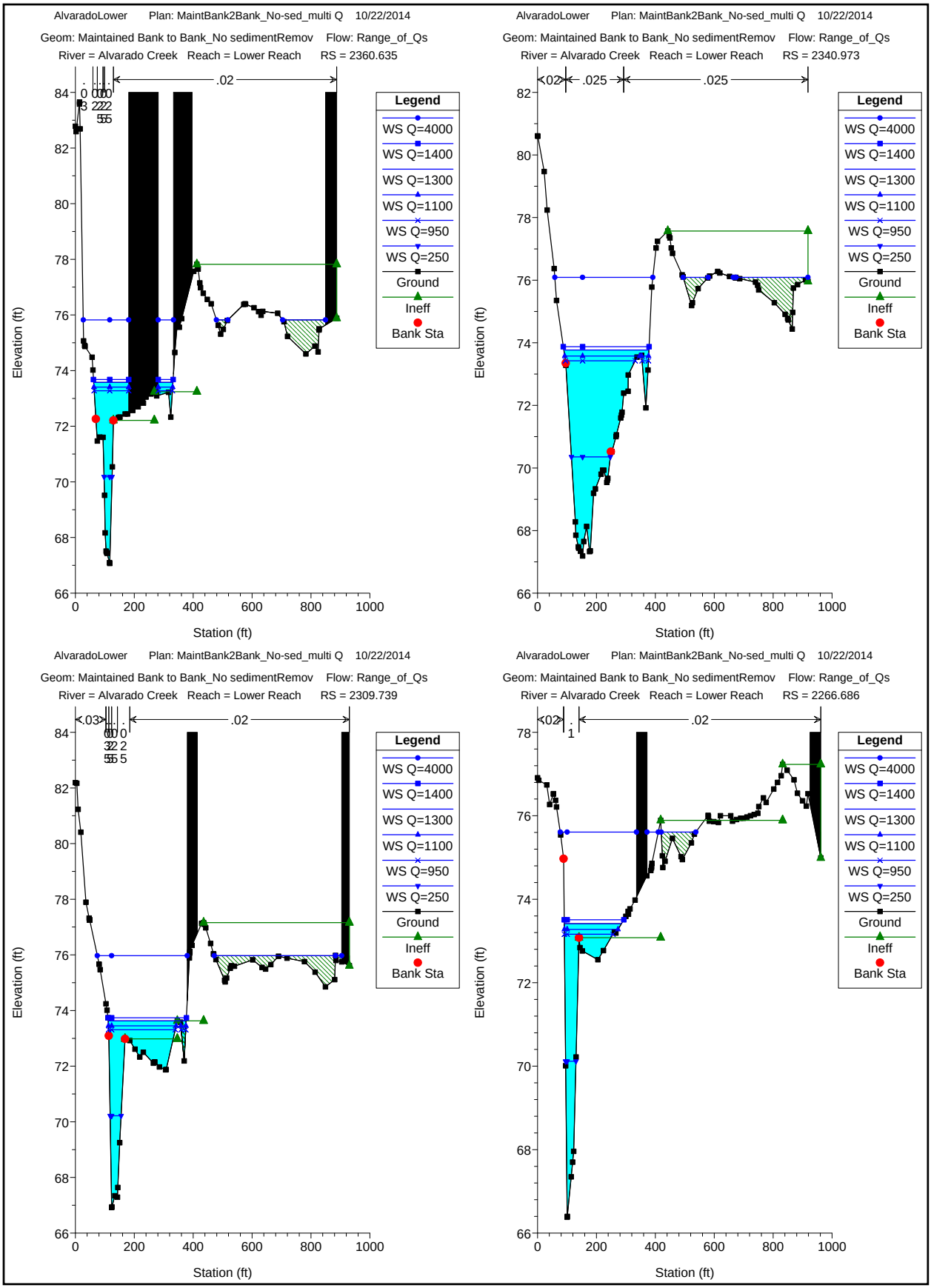
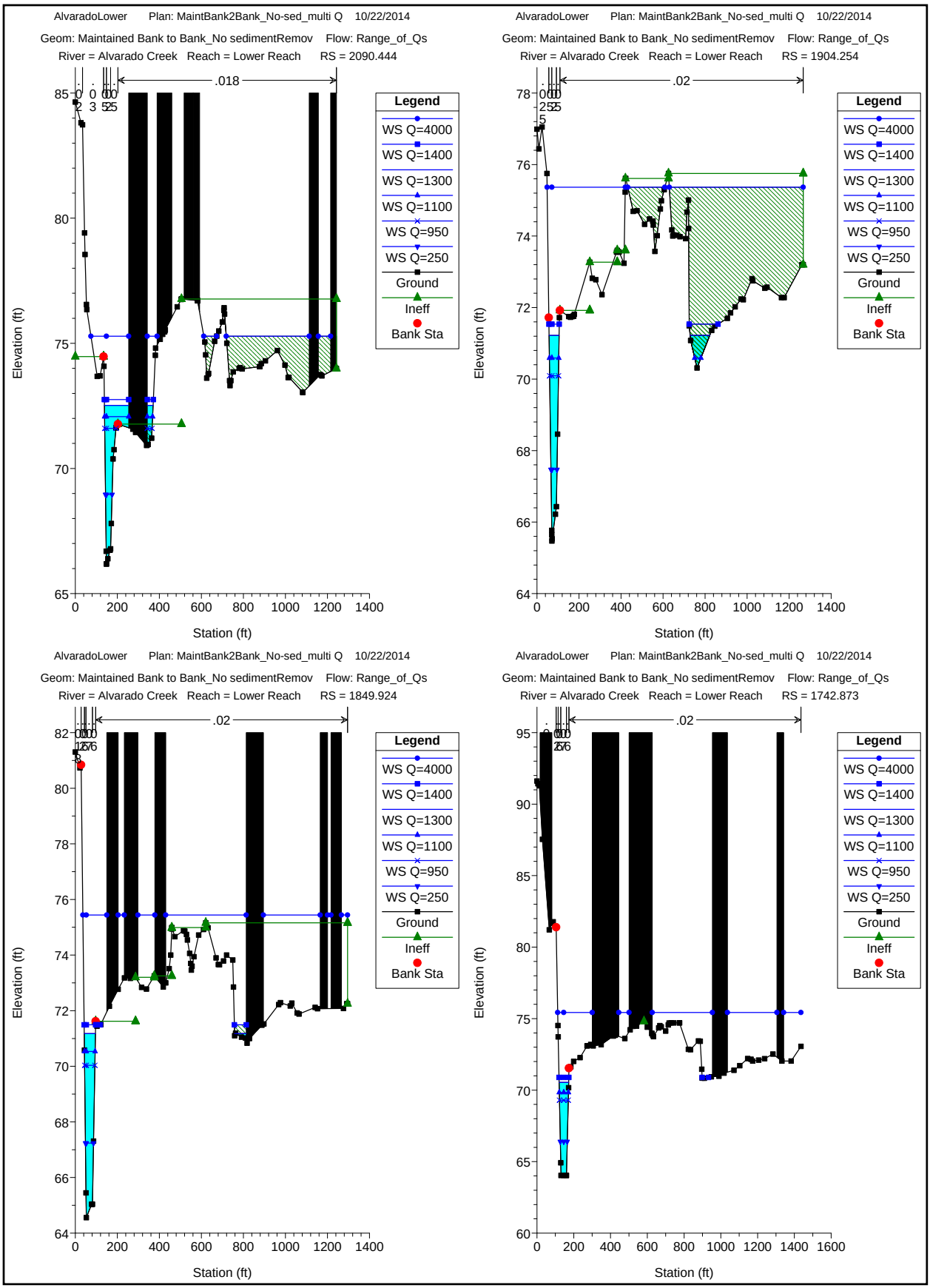
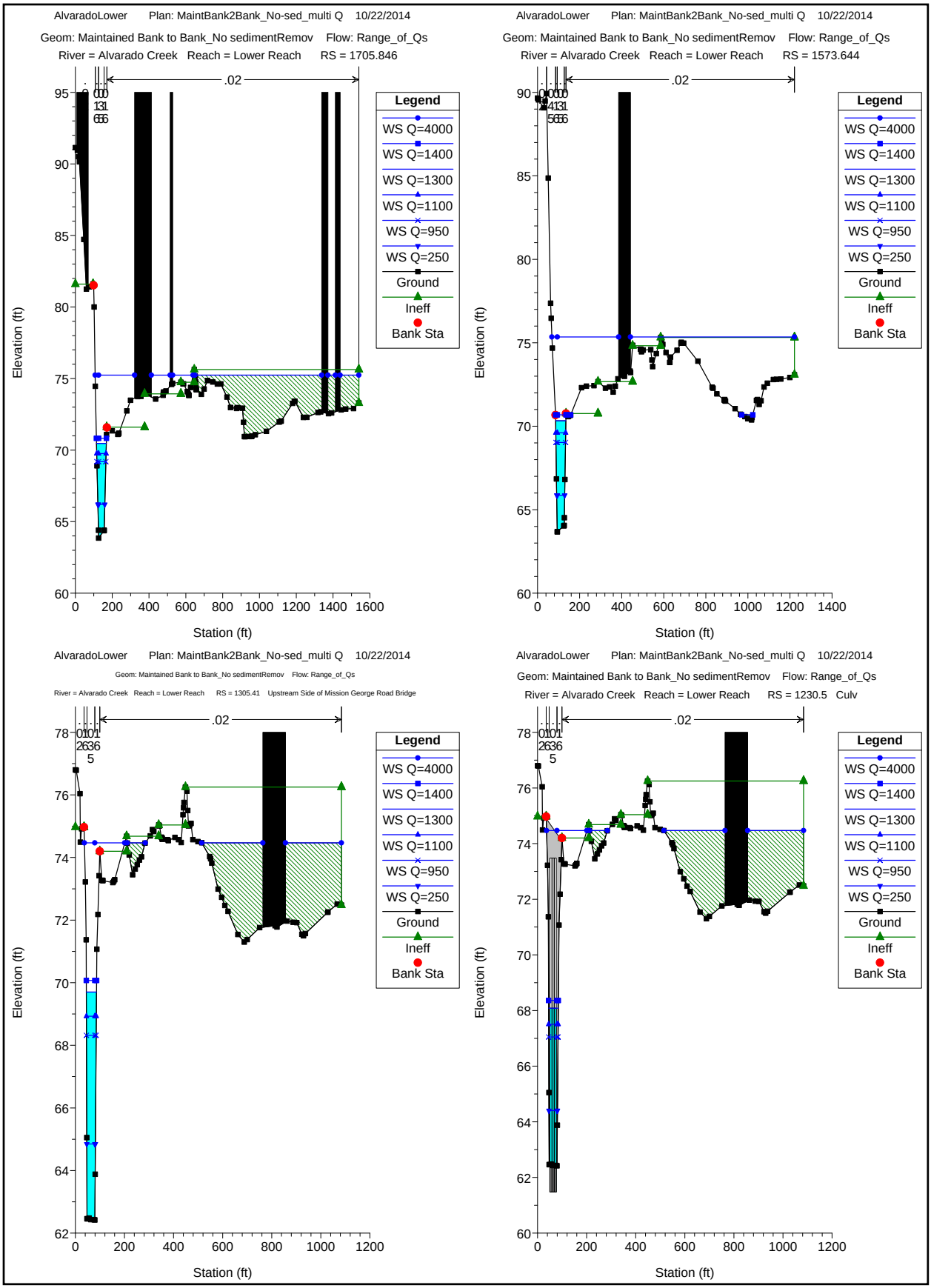
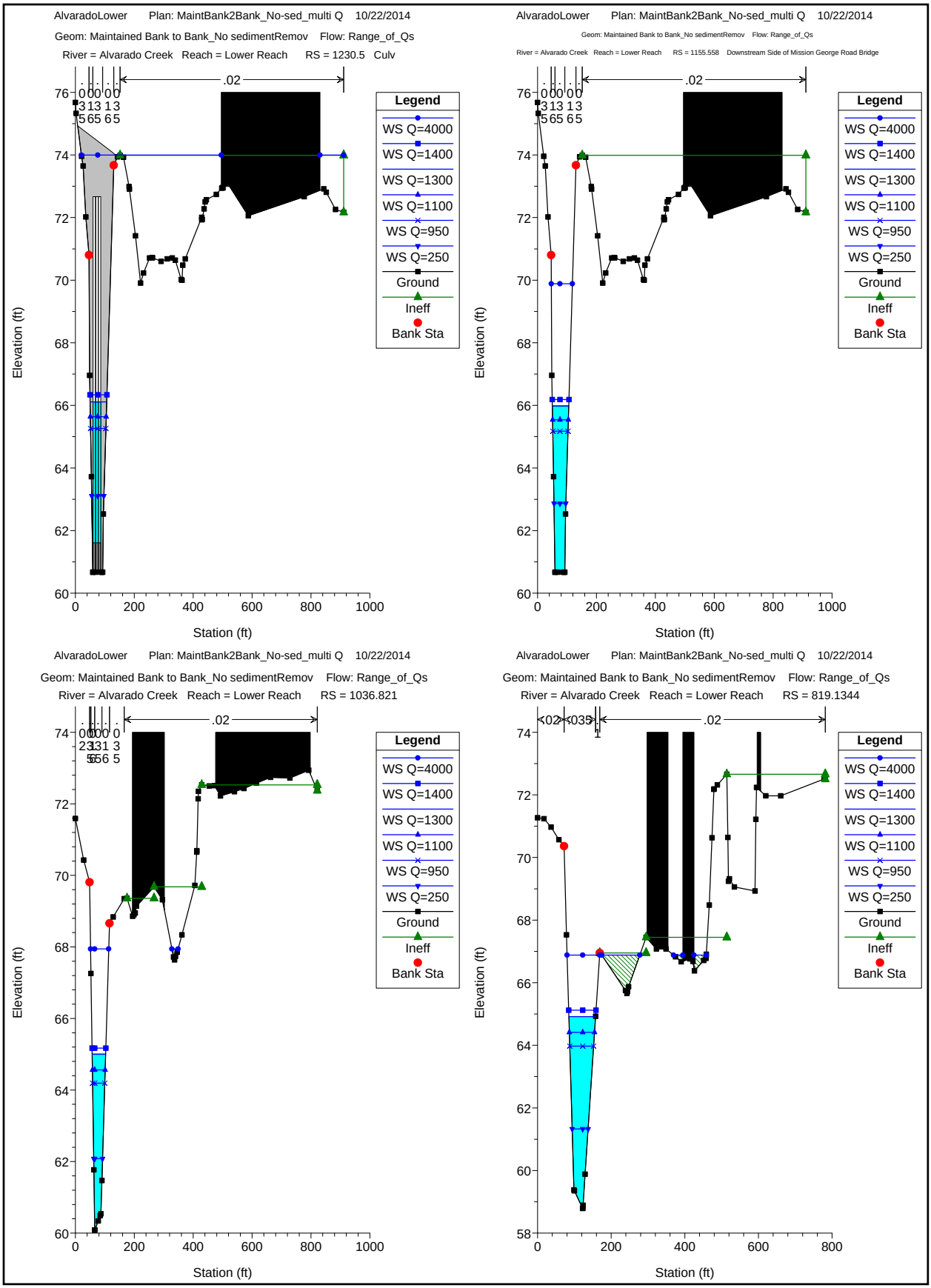
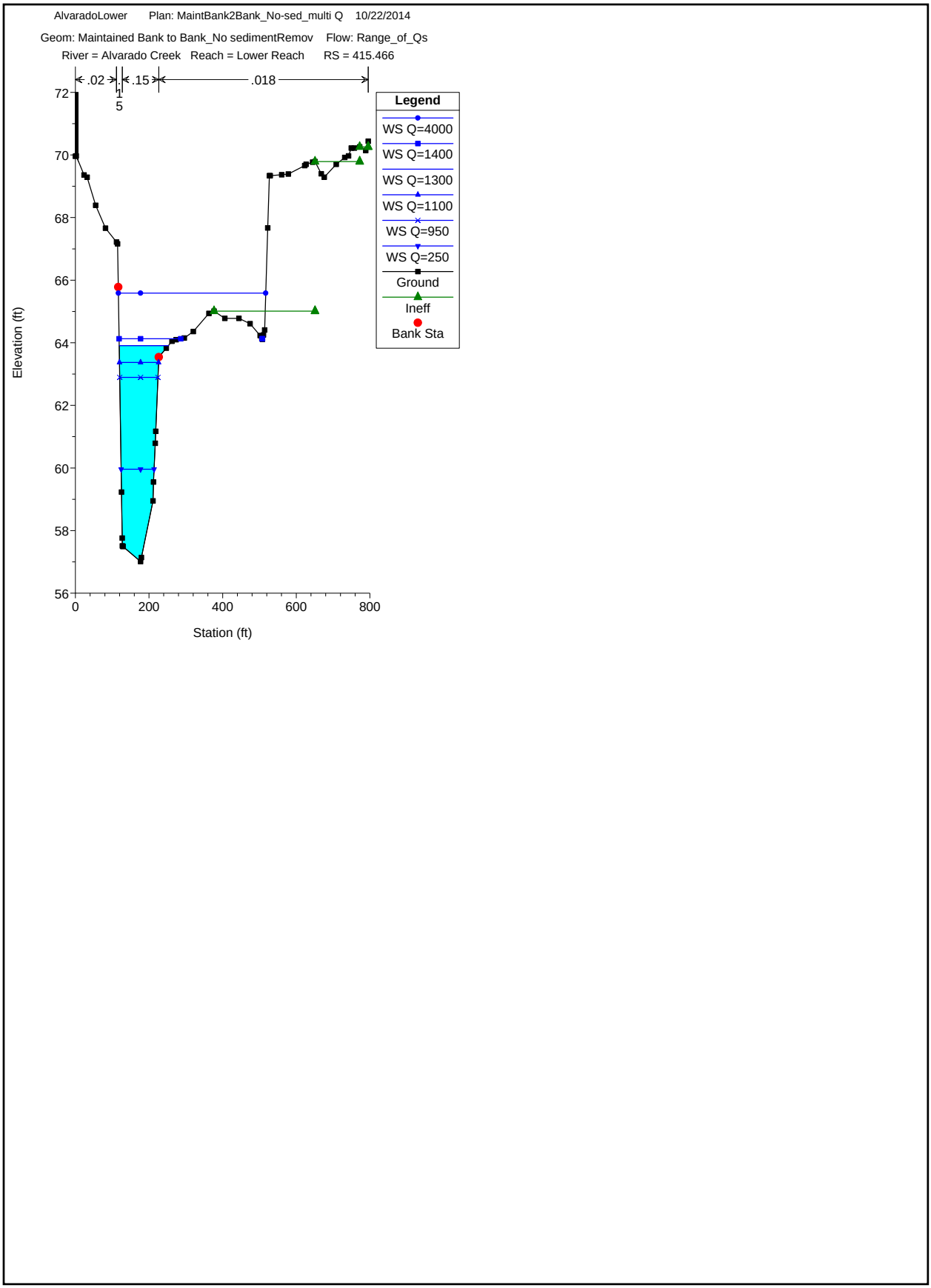
.018
.05
.015
Legend
WS Q=4000
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=4000
WS Q=1300
WS Q=1400
WS Q=1100
WS Q=250
WS Q=950
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=250
WS Q=950
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: MaintBank2Bank_No-sed_multi Q 10/22/2014
Geom: Maintained Bank to Bank_No sedimentRemov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS Q=4000
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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
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X     X  X        X           X  X     X    X       X
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PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 11:48:41 AM

Project in English units

PLAN DATA

Plan Title: MaintBank2Bank_No-sed_multi Q
Plan File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.p19

Geometry Title: Maintained Bank to Bank_No sedimentRemov
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g11

Flow Title : Range_of_Qs
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f02

Plan Description:
Maintained: Vegetation only removal from bank to bank in City of San Diego
maintained portions only. Only cross section 819 is affected by this model as
it is the only earthen portion maintained by the City of San Diego.

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Range_of_Qs
Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.f02

Flow Data (cfs)

River	Reach	RS	Q=1700	Q=1300	Q=1100	Q=900	Q=500	Q=340	Q=1250	Q=800
Alvarado Creek	Lower Reach	3519.101	1700	1300	1100	900	500	340	1250	800

River	Reach	RS	Q=250	Q=600	Q=1850	Q=950	Q=1180	Q=1400	Q=1600	Q=450
Alvarado Creek	Lower Reach	3519.101	250	600	1850	950	1180	1400	1600	450

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	Q=1700	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1300	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1100	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=900	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=500	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=340	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=1250	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=800	Normal S = 0.005	
Alvarado Creek	Lower Reach	Q=250	Normal S = 0.005	

GEOMETRY DATA

Geometry Title: Maintained Bank to Bank_No sedimentRemov
Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\AlvaradoLower.g11

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.52	133.27	70.93
137.17	71.01	155.09	71.13	155.92	71.57	160	73.71	178.45	79.21
188.01	82.98	190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43
248	83.45	282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94

328.59	82.78	333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35
371.9	81.3	382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64
430.03	79.67	453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72
493.29	80.76	494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49
571.25	82.35	573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33
631.18	83.37	631.5	83.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.016	126.44	.035	155.92	.016	190.95	.018
405.16	.015								

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

107.14	188.01	137.3	137.31	137.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.035	166.19	.016	185.99	.018
411.74	.015	488.01	.018						

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

122.6	185.99	209.35	210.34	211.8	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.035	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

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

95.69	167.68	32.79	31.38	28.21	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	95.69	81.19	F
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	121.78	67.99
145.21	68.69	145.46	68.69	161.99	75	164.4	76.1	165.21	76.15
169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2	238.98	77.08
253.88	77	265.89	76.8	311.18	76.55	320.11	76.42	352.63	76.62
356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26	419.63	74.17

```
  444.35   74.21  448.51   74.97  452.16   75.57  459.93   76.85  460.97     77
  461.51   76.99   465.1   77.03  502.63   77.29  505.62   77.24  506.27   77.23
  518.73   77.71  557.63   78.23   570.9   78.69  596.76   79.74  648.95    79.3
  652.42   79.33  655.52   79.56  674.71   80.62  683.87   83.87  693.26   88.99

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   98.56    .016  119.67    .035  145.46    .016  169.88    .018
  397.39     .02  674.71     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        98.56  169.88          101.61  105.47  112.32             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
       0   91.59   81.46       F
     245  693.26      81       F
  169.88   197.8   77.19       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
   656.1  675.15      90       0   74.95      90

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3034.592

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.17   41.57   81.69   65.68   81.67   85.26   81.35   93.68   81.06
   94.76   81.03   96.42   80.05  117.02   67.91  117.43   67.92  137.35    68.5
  140.94   68.59  140.98   68.59  143.73   70.14  158.51   78.33  168.47   76.41
  177.34   76.52  235.03   77.29  240.05   77.26  241.67   77.23  257.49   77.12
  329.16   76.48  336.01   76.48  343.31   76.21  385.02   75.58  387.61   75.57
  400.89   75.68  402.29   75.62  403.95   75.53  404.59   75.49   408.4   75.16
  424.44   75.24  439.37   75.46  441.01   75.48  441.88   75.49  456.66   75.53
  463.42    76.3  467.85   76.62  468.83   76.69  477.64   77.18  492.12   76.97
   521.9    78.7  535.11   79.79  543.17   79.96  588.58   79.97  599.19   79.97
   668.1   79.98  668.55   79.98     669   80.01  689.24   80.91  703.56   86.82

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .018   93.68    .016  117.02    .035  140.94    .016  158.51    .018
   408.4    .015  463.42     .05  588.58    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        94.76  158.51          187.47  186.83  186.24             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  158.51  703.56   78.33       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  194.38  335.17      90  534.53  679.65      90       0   71.12      90

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3029.094

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    78.3    8.27   78.53   24.08   78.97   27.46   79.04   29.05   79.06
   32.68   78.95   64.72   78.04   68.27   77.95  105.22   78.01  107.55   78.07
  109.84   78.02  137.03   77.47  141.61   77.16  163.84   76.88  166.62   76.84
   175.9    76.7  177.53   76.74  199.71   76.45  222.84   76.21  239.06   75.98
  253.17   75.82   267.4    75.4  268.16   75.39  268.52   75.38  268.91   75.37
  287.49   75.52  290.21   75.49  308.94    75.3  311.48   75.38   330.3   75.01
  354.72   74.49  356.27   74.51  357.22   74.47  358.77   74.39  398.52   73.89
  400.93    73.9  407.71   73.76  411.58   73.74  422.05   73.66  432.57   73.57
  432.74   73.57  435.41   73.57  438.91   73.58  469.01   73.68  481.53   73.64
  483.87   73.56  485.52    73.5  486.41   73.42  517.76   71.49  517.78   71.49
  520.34   71.46  561.12   71.75  566.99    71.7  569.05   71.68  578.17   71.73
  589.02   71.85  599.02   71.97  599.46   71.99  613.78   72.42  616.75   72.47
  619.29   72.47  619.96   72.48  630.11   72.63  657.92   72.36  659.77   72.35
671.397    72.23

Weir crest shape                  = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2847.761

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.92   16.76   82.55   49.95   81.35   78.58   80.92   92.48    81.7
  110.07   69.28  110.17    69.2  110.31   69.19  111.28   69.15   121.5   68.72
  121.55   68.72  131.16   72.21  140.04   75.43  143.16   76.72  145.57   76.61
  159.23   74.85  208.25   74.91  213.53   74.83  215.34   75.01  222.23   75.14
  249.85   75.72  288.72    76.4  331.44   76.43  362.93   76.29  403.25   76.06
   405.6   76.12   412.7   76.25  423.57   76.48  430.12   76.21  430.64   76.17
  435.34   76.17  477.89   76.21  485.28   77.33  495.73   78.49  518.76   79.84
  548.46   80.84  599.76   80.89  618.77   80.91  682.32   81.13  684.48   81.13
  687.11   81.15  742.11   80.84  751.33   81.07

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02   92.48     .1  110.07    .15   121.5     .1  159.23    .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        92.48  143.16          165.5  169.96   176.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   92.48    81.7       F
  143.16  751.33   76.72       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  263.23  391.75      84  512.38   718.6      84       0   24.64      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2677.801

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    81.5   30.52   80.65   36.77   80.62   42.89    80.9    58.1    81.5
   71.39   75.18    81.5   69.16   81.67   69.06   87.66   67.76   89.09   67.57
   90.29   68.14  103.25   74.21  103.93   74.52  104.55    74.5  110.68   74.57
   205.6   74.95  206.53   74.74  221.08   73.32  225.22    73.4  226.53   73.39
  265.25   77.08  271.06   77.41  338.32   78.06  339.78    78.1  341.36    78.1
  364.19   78.09  408.76   78.09  410.69      78  412.65   78.03     428   77.68
  435.25   77.52  440.78   76.52  441.72   76.36  444.58   76.41  489.46   77.02
  499.32   77.96  509.15    78.9   525.8    79.2  570.88   79.97   592.3   80.36
   638.5   80.46  660.12   80.81  697.06   81.81  720.99   80.69  730.29   80.14
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  740.99    80.4  756.67   80.53

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    58.1      .1  104.55    .018  206.53    .018  408.76     .03
  435.25    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         71.39  104.55           162.85  162.93  162.56             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  697.06  756.67   81.81       F
       0    58.1    81.5       F
  341.36  697.06    78.1       F
   205.6  341.36   74.95       F
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  527.26  558.86      92  680.09  727.68      92  291.63  401.11      92
  118.99   151.1      92

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2514.866

INPUT
Description:
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    84.4     .06   84.39     .79   84.39    41.1   81.94    53.2   81.94
   60.02    78.1   75.48   70.32   78.01   69.05   78.49   68.92   78.81   68.85
   86.26   67.21   87.29   67.49   94.35   69.43  100.93   71.25  101.72   71.49
  102.77   71.46  142.03   71.27  158.47   71.64  184.44   72.28   194.7   72.52
  200.88   72.65  233.74    72.9  261.94   73.04  269.59   73.66  279.45   74.52
   284.9   74.71   345.6   77.01  353.93   77.03  413.72   78.09  414.74   78.11
  421.74   78.22  423.21   78.27  438.25   78.24  502.84   77.71  507.32   77.68
  509.47   77.57  514.04   77.58  538.77   78.01  551.49   78.22  562.23   78.33
  569.85   78.62  582.46   78.99  583.62   79.04  584.62   79.06  585.59   79.06
  586.66   79.04  604.37   79.34  634.88   79.77  647.22   79.72   685.7   79.32
  717.19    79.4  747.64   78.97  776.38    79.2  793.01   79.33   795.4   79.35
  804.92   79.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02    41.1     .02    53.2      .1  102.77     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          53.2  102.77           158.36  154.23  152.81             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  634.88  804.92   79.77       F
  423.21  634.88   78.27       F
  102.77  423.21   71.46       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  659.03     679      86  386.11   473.7      86

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2360.635

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   82.78    2.38   82.59   14.12   83.65   14.25   83.58   16.28   82.69
   27.93   75.07   31.19    74.9   32.22   74.88   32.55   74.87   56.86   74.48
   59.39   74.02   69.46   72.26   74.34   71.47    82.9   71.61   93.85    71.6
   98.97   69.52  100.84   68.17  104.05   67.51  105.82   67.47  107.64   67.43
  116.02    67.1   116.7   67.07  125.39   70.54  129.21   72.21  146.27   72.31
  147.82   72.32  151.45   72.33  169.17   72.44  177.04   72.44  194.94   72.57
  213.19    72.7  231.11   72.83  239.86   73.05  256.64   73.16  268.08   73.24
  274.44    73.2  275.92   73.09  316.41   73.22  324.05   72.33  337.68   74.65
  345.19   75.59  353.05   75.56  360.81   75.87  401.93   77.57  412.48   77.82
  416.98   77.65  422.38   77.15  424.89   76.98  434.19   76.78  447.79   76.56
  461.33    76.4  484.88   75.63  493.56   75.31   502.3   75.48  515.87    75.8
  571.75   76.38  576.32    76.4  577.86   76.39  606.49   76.26  622.33   76.12
  630.75   75.99  636.37   76.13  687.01   76.06  708.05   75.76  720.51   75.23
  782.65    74.6   813.1   74.88  823.95   74.67   827.4   75.46  827.87    75.5
  887.31   75.88

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03    59.39     .02   74.34    .025   93.85    .025   98.97    .025
  129.21     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         69.46  129.21            19.33   19.66   19.62             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  412.48  887.31   77.82       F
  268.08  412.48   73.24       F
  129.21  268.08   72.21       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
  849.37  887.31      84   333.1  396.34      84  181.12  281.23      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2340.973

INPUT
Description:
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   80.61     .87   80.6    22.6   79.47    32.6   78.24   56.43   76.37
   64.23   75.35   95.77   73.35    95.9   73.35   95.96   73.33    96.3   73.28
  128.28   68.28  130.03   67.85  138.44   67.48  139.56   67.44  145.84   67.34
  152.75   67.19   156.9   67.65  166.58   68.13  176.76   67.33   179.2   67.35
  190.45   69.19  196.47   69.33   215.6    69.8  220.82   69.93  224.96   69.93
     235   69.54  237.01   69.61  238.67   69.67  249.12   70.52  252.71   70.52
  266.23      71  267.66   71.06  282.66    71.6  284.78   71.69  286.98   71.78
  292.56   72.39  307.25   72.45  308.01   72.97  337.72   73.54   353.4    73.6
  367.91   71.92  375.12   73.13  387.83   75.78  402.57   77.03  407.14   77.24
   442.2   77.57  446.53   77.42  449.33   77.35   454.1   77.03   458.5   76.86
     491   76.17   494.2    76.1  523.16   75.19  526.15   75.28  545.45   75.73
  578.04   76.07  584.36   76.13  611.54   76.28  618.89   76.23  652.11   76.12
  671.87   76.07  673.16   76.09  686.67   76.05  740.04   75.94  747.31   75.84
  750.97   75.69  804.08   75.28  840.64   74.91  848.96   74.78  851.12   74.73
  864.95   74.44  866.51   74.97  868.93   75.75  882.87   75.86  910.13   76.01
  918.13   75.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .02   95.77    .025  292.56    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         95.77  249.12            34.23   31.23   27.43             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   442.2  918.13   77.57       F

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2332.283
```

INPUT
Description:
Lateral structure position   = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width   =   10
Weir Coefficient   =   2
Weir Flow Reference   = Water Surface
 Weir Embankment Coordinates   num =   85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape   = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach   RS: 2309.739

INPUT
Description:
Station Elevation Data   num=   71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values   num=   6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
        113.57 168.74   21.27   43.05   56.67   .1   .3
Ineffective Flow   num=   3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions   num=   2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach   RS: 2266.686

INPUT
Description:
Station Elevation Data   num=   72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values   num=   3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
        88.53 140.68   166.7 176.24 190.03   .1   .3
Ineffective Flow   num=   3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions   num=   2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach   RS: 2090.444

INPUT
Description:
Station Elevation Data   num=   78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values   num=   6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
27.83 96.83 119.68 107.05 93.87 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.06 174.16 35.7 37.03 38.3 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.035	155.61	.016	171.11	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.12 171.11 136.62 132.2 123.01 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	85.63	.016	93.76	.035	126.79	.016
135.25	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
85.63 135.25 286.27 268.23 249.58 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.16	47.46	.035	79.09	.16	99.47	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
35.1 99.47 148.68 149.85 158.44 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

```
INPUT
Description:
Distance from Upstream XS =      21
Deck/Roadway Width        =     110
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   31.29   74.95              99    74.1

Upstream Bridge Cross Section Data
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0    76.8    3.18   76.79   18.93   76.04   20.08   74.49   25.29   74.92
    35.1   74.97   40.35   73.22   44.03   71.37   46.28   65.05   47.46   62.46
   47.61   62.46   55.75   62.48   62.69   62.43   75.77   62.43   79.09   62.42
   80.56   63.88    87.2   71.07   91.68   72.18   96.69   73.42   99.47    74.2
  107.55   73.27  111.04   73.27   111.8   73.26  152.75    73.2  156.26   73.24
  160.22   73.29  208.44   74.68  211.62   74.46  219.34   74.08  233.28   73.45
  243.72   73.63  251.87   73.77  260.77   73.92  269.63   74.02  283.97   74.46
   305.4   74.69  313.68   74.89  319.79   74.83  339.44   75.04  342.79   75.01
  350.26   74.65  353.09   74.63   353.6    74.6  354.11   74.58  375.45   74.57
  378.59   74.54  405.71   74.64  420.06   74.57  431.36   74.48  438.63   75.37
  440.77   75.59  442.53   75.76  448.54   76.25  448.64   76.24  454.45   76.12
  457.74    75.5   460.8   75.01  466.14   75.04  471.51   75.09  478.52   74.57
  499.53   74.51  514.59   74.47  547.16   74.03  550.96   73.96   555.9   73.82
  581.53   72.99   595.7   72.73  608.77   72.47  621.83   72.28  662.24   71.54
  687.91    71.3  700.08   71.38  751.01   71.76  813.92   71.82  821.41   71.78
  862.82   71.97  887.32   71.93  901.82   71.92  922.67   71.55  928.78   71.52
  929.65    71.5  937.18   71.57 1028.2    72.25    1029   72.26 1066.93   72.51
 1084.18   72.48

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .02    35.1     .16   47.46    .035   79.09     .16   99.47    .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          35.1   99.47          .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  448.54 1084.18   76.25       F
  339.44  448.54   75.04       F
       0    35.1   74.97       F
  208.44  339.44   74.68       F
   99.47  208.44    74.2       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  763.88  856.31      78

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    2.34   74.97           124.06    74.1           143.04   73.94

Downstream Bridge Cross Section Data
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2     70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
          46.27  130.44          .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss
Coef
                21     110     .018     .035      .94                    .4                1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2     70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          46.27  130.44          118.42  118.74  122.35            .1       .3
Ineffective Flow     num=       1
```

Sta L	Sta R	Elev	Permanent
151.67	910.92	73.99	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
495.28	830.64	76

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1149.024

INPUT
Description:
Lateral structure position = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.76	16.9	69.55	25.7	69.17	30.58	68.94	31.67	68.94
36.69	68.98	42.25	69.07	71.47	69.38	83.21	69	85.02	69.17
85.94	69.26	103.34	69.84	116.65	70.06	121.32	70.15	161.06	70.62
170.37	70.76	186.05	71.05	195.2	71.25	201.56	71.27	229.21	71.22
250.77	71	284.88	70.75	288.32	70.68	321.89	70.36	340.36	70.4
343.09	70.39	344.18	70.39	353.28	70.53	382.88	70.99	426.5	70.72
426.92	70.72	469.99	69.93	474.53	69.85	477.03	69.87	528.71	69.63
531.24	70.04	532.97	70.03	552.92	69.6	559.86	69.56	575.37	69.14
595.47	69.12	595.76	69.09	596.31	69.06	603.26	69.05	611.43	69.06
612	69.06	622.57	68.97	632.57	68.94	636.24	68.98	638.51	68.95
645.42	68.98	650.65	68.89	659.59	68.93	661.07	68.9	674.47	68.65
680.25	68.8	701	68.36	704.61	68.25	733.558	67.58		

Weir crest shape = Broad Crested

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	52.88	.016	65.67	.035	89.98	.016
115.82	.035	165.64	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	157.62	.1	168.96	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116.54	226.72	420.92	415.47	422.02	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.016	.035	.016	.018	.015			
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.035	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.035	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.035	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.035	.016	.018	.015	.05	.015	
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.1	.15	.1	.02				
Lower Reach	2677.801	.02	.1	.018	.018	.03	.018			
Lower Reach	2514.866	.02	.02	.1	.02					
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								
Lower Reach	2309.739	.03	.035	.025	.025	.025	.02			
Lower Reach	2266.686	.02	.1	.02						
Lower Reach	2090.444	.02	.03	.05	.02	.05	.018			
Lower Reach	1904.254	.025	.05	.02	.05	.02				
Lower Reach	1849.924	.018	.02	.06	.07	.06	.02			
Lower Reach	1742.873	.018	.02	.06	.07	.06	.02			
Lower Reach	1705.846	.02	.016	.035	.016	.02				
Lower Reach	1573.644	.02	.045	.016	.035	.016	.02			
Lower Reach	1305.41	.02	.16	.035	.16	.02				
Lower Reach	1230.5	Culvert								
Lower Reach	1155.558	.035	.016	.035	.016	.035	.02			
Lower Reach	1149.024	Lat Struct								
Lower Reach	1121.496	Lat Struct								
Lower Reach	1036.821	.02	.035	.016	.035	.016	.035	.02		
Lower Reach	819.1344	.02	.035	.1	.02					
Lower Reach	415.466	.02	.15	.15	.018					

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3

Lower Reach	1742.873		.1	.3
Lower Reach	1705.846		.1	.3
Lower Reach	1573.644		.1	.3
Lower Reach	1305.41		.1	.3
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558		.1	.3
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821		.1	.3
Lower Reach	819.1344		.1	.3
Lower Reach	415.466		.1	.3

HEC-RAS Plan: Botto_Only_NoSed River: Alvarado Creek Reach: Lower Reach

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)	
Lower Reach	3519.101	100-yr	5100.00	70.52	82.16		83.39	0.001525	8.9	573.20	185.39	0.58
Lower Reach	3519.101	50-yr	4500.00	70.52	81.49		82.64	0.001569	8.6	522.69	177.51	0.57
Lower Reach	3519.101	25-yr	3800.00	70.52	80.65		81.70	0.001634	8.2	461.48	161.18	0.57
Lower Reach	3519.101	10-yr	2700.00	70.52	79.11		80.00	0.001796	7.5	357.72	64.09	0.56
Lower Reach	3519.101	5-yr	2050.00	70.52	78.23		78.94	0.001708	6.8	303.34	59.62	0.53
Lower Reach	3519.101	2-yr	1180.00	70.52	77.21		77.57	0.001090	4.8	244.85	54.40	0.40
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	70.64	79.78	79.78	82.85	0.005116	14.1	362.54	180.26	1.00
Lower Reach	3381.792	50-yr	4500.00	70.64	79.20	79.20	82.11	0.005351	13.7	328.80	126.14	1.00
Lower Reach	3381.792	25-yr	3800.00	70.64	78.47	78.47	81.16	0.005656	13.2	288.80	104.01	1.00
Lower Reach	3381.792	10-yr	2700.00	70.64	77.71	77.15	79.53	0.004468	10.8	249.37	50.49	0.86
Lower Reach	3381.792	5-yr	2050.00	70.64	77.37	76.25	78.58	0.003211	8.8	232.05	49.08	0.72
Lower Reach	3381.792	2-yr	1180.00	70.64	76.89	74.78	77.38	0.001468	5.6	208.95	47.12	0.47
Lower Reach	3171.448	100-yr	5100.00	68.28	78.36	77.44	80.73	0.003471	12.4	412.44	157.98	0.83
Lower Reach	3171.448	50-yr	4500.00	68.28	78.30	76.85	80.18	0.002768	11.0	409.16	157.16	0.74
Lower Reach	3171.448	25-yr	3800.00	68.28	78.22	76.11	79.59	0.002046	9.4	404.30	155.95	0.64
Lower Reach	3171.448	10-yr	2700.00	68.28	78.06	74.79	78.79	0.001109	6.8	394.95	153.59	0.47
Lower Reach	3171.448	5-yr	2050.00	68.28	77.57	73.89	78.06	0.000803	5.6	366.27	146.22	0.39
Lower Reach	3171.448	2-yr	1180.00	68.28	76.96	72.42	77.15	0.000360	3.6	331.61	136.97	0.26
Lower Reach	3140.066	100-yr	5100.00	67.95	79.31	76.84	80.23	0.001173	8.1	695.99	487.24	0.51
Lower Reach	3140.066	50-yr	4500.00	67.95	78.98	76.25	79.82	0.001113	7.7	647.99	475.66	0.49
Lower Reach	3140.066	25-yr	3800.00	67.95	78.65	75.51	79.35	0.000970	7.0	600.87	466.80	0.46
Lower Reach	3140.066	10-yr	2700.00	67.95	78.24	74.25	78.68	0.000632	5.5	543.22	454.44	0.37
Lower Reach	3140.066	5-yr	2050.00	67.95	77.65	73.38	78.00	0.000530	4.7	460.58	412.88	0.33
Lower Reach	3140.066	2-yr	1180.00	67.95	76.98	71.96	77.13	0.000258	3.1	378.37	269.31	0.23
Lower Reach	3034.592	100-yr	5100.00	67.91	79.70	77.21	79.97	0.000383	4.7	1265.15	296.24	0.29
Lower Reach	3034.592	50-yr	4500.00	67.91	79.32	76.61	79.57	0.000385	4.6	1152.98	290.96	0.29
Lower Reach	3034.592	25-yr	3800.00	67.91	78.92	75.86	79.14	0.000366	4.3	1037.56	285.43	0.28
Lower Reach	3034.592	10-yr	2700.00	67.91	77.81	74.51	78.56	0.001120	7.0	388.16	261.83	0.47
Lower Reach	3034.592	5-yr	2050.00	67.91	77.43	73.58	77.91	0.000766	5.6	366.83	252.08	0.38
Lower Reach	3034.592	2-yr	1180.00	67.91	76.91	72.08	77.10	0.000325	3.5	338.11	220.28	0.25
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	68.72	79.39	77.68	79.83	0.001230	1.6	1151.03	286.89	0.11
Lower Reach	2847.761	50-yr	4500.00	68.72	79.01	77.45	79.43	0.001330	1.6	1043.35	279.86	0.11
Lower Reach	2847.761	25-yr	3800.00	68.72	78.64	77.17	79.01	0.001352	1.6	939.47	272.92	0.11
Lower Reach	2847.761	10-yr	2700.00	68.72	77.86	76.72	78.17	0.001656	1.7	731.08	263.62	0.12
Lower Reach	2847.761	5-yr	2050.00	68.72	77.37	75.68	77.63	0.001921	1.7	602.40	258.48	0.13
Lower Reach	2847.761	2-yr	1180.00	68.72	76.82	74.01	76.97	0.001660	1.5	462.37	254.01	0.12
Lower Reach	2677.801	100-yr	5100.00	67.57	77.70	77.70	79.31	0.005583	3.8	617.40	262.89	0.25
Lower Reach	2677.801	50-yr	4500.00	67.57	77.61	77.61	78.94	0.004833	3.5	600.12	257.74	0.23
Lower Reach	2677.801	25-yr	3800.00	67.57	76.98	76.98	78.46	0.006099	3.7	491.82	213.12	0.26
Lower Reach	2677.801	10-yr	2700.00	67.57	76.27	76.27	77.53	0.008177	3.9	376.89	155.49	0.29
Lower Reach	2677.801	5-yr	2050.00	67.57	75.74	75.74	76.87	0.011681	4.3	296.46	148.83	0.35
Lower Reach	2677.801	2-yr	1180.00	67.57	74.05	74.05	75.88	0.107686	10.9	108.51	49.44	1.00
Lower Reach	2514.866	100-yr	5100.00	67.21	76.54	74.91	77.04	0.001191	1.6	1042.06	270.06	0.12
Lower Reach	2514.866	50-yr	4500.00	67.21	76.35	74.66	76.78	0.001079	1.5	991.17	264.66	0.11
Lower Reach	2514.866	25-yr	3800.00	67.21	76.00	74.31	76.38	0.001027	1.5	901.23	254.83	0.11
Lower Reach	2514.866	10-yr	2700.00	67.21	75.28	73.77	75.58	0.001014	1.4	725.41	234.43	0.11
Lower Reach	2514.866	5-yr	2050.00	67.21	74.62	73.39	74.90	0.001208	1.4	576.55	215.46	0.11
Lower Reach	2514.866	2-yr	1180.00	67.21	73.79	72.84	73.97	0.001418	1.4	402.54	202.45	0.12
Lower Reach	2360.635	100-yr	5100.00	67.07	76.15	74.99	76.82	0.001340	7.3	805.33	517.02	0.52
Lower Reach	2360.635	50-yr	4500.00	67.07	76.04	74.73	76.60	0.001135	6.7	782.43	438.21	0.47
Lower Reach	2360.635	25-yr	3800.00	67.07	75.74	74.42	76.21	0.001029	6.1	720.43	378.31	0.45
Lower Reach	2360.635	10-yr	2700.00	67.07	75.05	73.89	75.42	0.000955	5.4	579.51	292.02	0.42
Lower Reach	2360.635	5-yr	2050.00	67.07	74.33	73.48	74.71	0.001160	5.4	443.58	175.32	0.45
Lower Reach	2360.635	2-yr	1180.00	67.07	73.48	72.20	73.77	0.001130	4.6	296.25	168.19	0.43
Lower Reach	2340.973	100-yr	5100.00	67.19	76.51	72.36	76.66	0.000222	3.3	1751.20	784.85	0.22
Lower Reach	2340.973	50-yr	4500.00	67.19	76.33	72.10	76.46	0.000190	3.0	1691.96	772.53	0.20
Lower Reach	2340.973	25-yr	3800.00	67.19	75.99	71.75	76.09	0.000166	2.8	1576.64	598.51	0.19
Lower Reach	2340.973	10-yr	2700.00	67.19	75.25	71.13	75.33	0.000134	2.3	1337.87	384.63	0.16
Lower Reach	2340.973	5-yr	2050.00	67.19	74.55	70.71	74.61	0.000128	2.1	1116.79	310.44	0.16
Lower Reach	2340.973	2-yr	1180.00	67.19	73.65	70.05	73.69	0.000088	1.5	852.90	286.68	0.13
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	76.36	74.37	76.63	0.000488	4.8	1258.63	756.77	0.31
Lower Reach	2309.739	50-yr	4500.00	66.92	76.21	74.18	76.44	0.000425	4.4	1211.43	749.79	0.29
Lower Reach	2309.739	25-yr	3800.00	66.92	75.88	73.96	76.07	0.000393	4.1	1110.20	693.32	0.28
Lower Reach	2309.739	10-yr	2700.00	66.92	75.15	73.47	75.31	0.000376	3.7	896.26	351.61	0.27
Lower Reach	2309.739	5-yr	2050.00	66.92	74.43	72.56	74.59	0.000468	3.8	688.97	279.11	0.29

HEC-RAS Plan: Botto_Only_NoSed River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2309.739	2-yr	1180.00	66.92	73.52	71.17	73.67	0.000505	3.5	432.72	250.77	0.29
Lower Reach	2266.686	100-yr	5100.00	66.38	76.25	74.89	76.59	0.001497	2.0	1248.76	655.77	0.13
Lower Reach	2266.686	50-yr	4500.00	66.38	75.81	74.48	76.36	0.002169	2.4	920.75	447.44	0.16
Lower Reach	2266.686	25-yr	3800.00	66.38	75.53	74.07	76.00	0.002172	2.3	835.24	403.15	0.16
Lower Reach	2266.686	10-yr	2700.00	66.38	74.86	73.58	75.25	0.002779	2.4	648.33	268.93	0.18
Lower Reach	2266.686	5-yr	2050.00	66.38	74.13	72.53	74.51	0.005906	3.3	465.73	246.18	0.25
Lower Reach	2266.686	2-yr	1180.00	66.38	73.33	71.08	73.60	0.010040	3.9	290.53	187.53	0.32
Lower Reach	2090.444	100-yr	5100.00	66.18	75.52	73.80	76.23	0.001990	5.1	845.48	763.33	0.36
Lower Reach	2090.444	50-yr	4500.00	66.18	75.44	73.50	76.01	0.001658	4.6	826.34	755.34	0.33
Lower Reach	2090.444	25-yr	3800.00	66.18	75.22	73.16	75.68	0.001419	4.2	777.26	734.45	0.30
Lower Reach	2090.444	10-yr	2700.00	66.18	74.57	72.62	74.90	0.001243	3.6	636.26	653.60	0.28
Lower Reach	2090.444	5-yr	2050.00	66.18	73.62	72.27	73.95	0.001790	3.9	464.40	256.49	0.33
Lower Reach	2090.444	2-yr	1180.00	66.18	72.22	70.60	72.54	0.003790	4.6	260.64	140.80	0.45
Lower Reach	1904.254	100-yr	5100.00	65.47	75.97	73.90	75.99	0.000065	1.2	4054.31	1223.62	0.07
Lower Reach	1904.254	50-yr	4500.00	65.47	75.55	73.78	75.73	0.000524	3.3	1330.12	1204.40	0.21
Lower Reach	1904.254	25-yr	3800.00	65.47	75.29	73.50	75.44	0.000479	3.1	1233.35	1178.79	0.20
Lower Reach	1904.254	10-yr	2700.00	65.47	74.57	72.80	74.69	0.000538	3.0	964.61	1082.28	0.21
Lower Reach	1904.254	5-yr	2050.00	65.47	73.31	71.26	73.60	0.001834	4.9	511.72	861.28	0.37
Lower Reach	1904.254	2-yr	1180.00	65.47	70.68	69.83	71.55	0.007098	7.5	157.44	83.90	0.71
Lower Reach	1849.924	100-yr	5100.00	64.56	75.94	73.57	75.98	0.000122	1.1	3146.16	923.32	0.07
Lower Reach	1849.924	50-yr	4500.00	64.56	75.64	72.73	75.68	0.000129	1.1	2866.62	922.86	0.07
Lower Reach	1849.924	25-yr	3800.00	64.56	75.36	72.44	75.40	0.000124	1.1	2611.32	922.43	0.06
Lower Reach	1849.924	10-yr	2700.00	64.56	74.45	70.48	74.64	0.001183	3.0	786.75	770.66	0.20
Lower Reach	1849.924	5-yr	2050.00	64.56	73.16	69.62	73.47	0.003006	4.3	459.18	592.31	0.30
Lower Reach	1849.924	2-yr	1180.00	64.56	70.62	68.25	71.02	0.007248	5.1	232.33	50.99	0.42
Lower Reach	1742.873	100-yr	5100.00	64.03	75.93	73.41	75.97	0.000100	1.0	3373.31	934.76	0.06
Lower Reach	1742.873	50-yr	4500.00	64.03	75.63	72.94	75.67	0.000105	1.0	3089.84	934.33	0.06
Lower Reach	1742.873	25-yr	3800.00	64.03	75.35	70.98	75.38	0.000100	0.9	2831.54	933.94	0.06
Lower Reach	1742.873	10-yr	2700.00	64.03	74.30	69.71	74.50	0.001515	3.4	742.50	824.46	0.21
Lower Reach	1742.873	5-yr	2050.00	64.03	72.78	68.84	73.12	0.003802	4.8	443.22	552.35	0.32
Lower Reach	1742.873	2-yr	1180.00	64.03	69.82	67.47	70.23	0.007452	5.2	228.28	49.53	0.42
Lower Reach	1705.846	100-yr	5100.00	63.85	75.94	72.93	75.97	0.000054	1.8	4182.46	1269.71	0.10
Lower Reach	1705.846	50-yr	4500.00	63.85	75.63	72.55	75.66	0.000056	1.8	3795.12	1269.32	0.11
Lower Reach	1705.846	25-yr	3800.00	63.85	75.17	70.93	75.36	0.000310	4.1	1214.75	1256.56	0.25
Lower Reach	1705.846	10-yr	2700.00	63.85	74.29	69.69	74.48	0.000318	3.9	866.56	1047.92	0.25
Lower Reach	1705.846	5-yr	2050.00	63.85	72.77	68.85	73.06	0.000548	4.5	526.51	574.90	0.31
Lower Reach	1705.846	2-yr	1180.00	63.85	69.71	67.48	70.13	0.001380	5.2	226.06	50.58	0.44
Lower Reach	1573.644	100-yr	5100.00	63.68	75.93	72.31	75.96	0.000062	1.9	3809.63	1099.03	0.10
Lower Reach	1573.644	50-yr	4500.00	63.68	75.62	72.22	75.65	0.000064	1.9	3474.82	1098.12	0.10
Lower Reach	1573.644	25-yr	3800.00	63.68	75.18	71.23	75.31	0.000237	3.6	1418.69	1089.97	0.20
Lower Reach	1573.644	10-yr	2700.00	63.68	74.29	69.37	74.42	0.000246	3.4	1046.81	856.56	0.20
Lower Reach	1573.644	5-yr	2050.00	63.68	72.64	68.50	72.97	0.000652	4.9	505.41	574.95	0.31
Lower Reach	1573.644	2-yr	1180.00	63.68	69.52	67.13	69.94	0.001423	5.2	226.36	46.81	0.42
Lower Reach	1305.41	100-yr	5100.00	62.42	74.38	71.16	75.77	0.002096	9.7	583.63	699.48	0.61
Lower Reach	1305.41	50-yr	4500.00	62.42	74.46	70.49	75.50	0.001564	8.4	596.32	712.33	0.53
Lower Reach	1305.41	25-yr	3800.00	62.42	74.33	69.68	75.13	0.001192	7.3	576.55	692.20	0.46
Lower Reach	1305.41	10-yr	2700.00	62.42	73.73	68.27	74.27	0.000831	5.9	458.36	587.02	0.37
Lower Reach	1305.41	5-yr	2050.00	62.42	72.32	67.32	72.77	0.000806	5.4	381.43	376.87	0.34
Lower Reach	1305.41	2-yr	1180.00	62.42	69.25	65.86	69.61	0.000996	4.8	247.27	40.74	0.34
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.67	70.95	68.38	72.25	0.001778	9.1	557.88	252.15	0.59
Lower Reach	1155.558	50-yr	4500.00	60.67	70.41	67.87	71.58	0.001746	8.7	517.16	114.57	0.58
Lower Reach	1155.558	25-yr	3800.00	60.67	69.67	67.23	70.71	0.001735	8.2	464.15	70.76	0.56
Lower Reach	1155.558	10-yr	2700.00	60.67	68.44	66.06	69.23	0.001622	7.1	380.04	66.14	0.52
Lower Reach	1155.558	5-yr	2050.00	60.67	67.84	65.24	68.41	0.001310	6.0	340.97	63.88	0.46
Lower Reach	1155.558	2-yr	1180.00	60.67	66.35	63.92	66.69	0.001140	4.7	249.89	57.47	0.40
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.08	69.06	69.06	71.78	0.004879	13.3	389.90	183.38	0.97
Lower Reach	1036.821	50-yr	4500.00	60.08	68.43	68.43	71.10	0.005429	13.1	343.19	112.30	1.00
Lower Reach	1036.821	25-yr	3800.00	60.08	67.75	67.75	70.23	0.005775	12.6	300.63	68.45	1.00
Lower Reach	1036.821	10-yr	2700.00	60.08	67.54	66.51	68.90	0.003305	9.4	288.42	59.44	0.75
Lower Reach	1036.821	5-yr	2050.00	60.08	67.31	65.66	68.18	0.002205	7.5	274.88	58.20	0.60
Lower Reach	1036.821	2-yr	1180.00	60.08	65.97	64.24	66.51	0.001874	5.8	201.84	50.94	0.52
Lower Reach	819.1344	100-yr	5100.00	58.79	68.01	66.51	68.68	0.007281	5.0	841.69	299.19	0.36
Lower Reach	819.1344	50-yr	4500.00	58.79	67.85	66.04	68.41	0.007077	4.8	792.97	298.00	0.35
Lower Reach	819.1344	25-yr	3800.00	58.79	67.64	65.46	68.09	0.006819	4.7	730.45	296.46	0.35

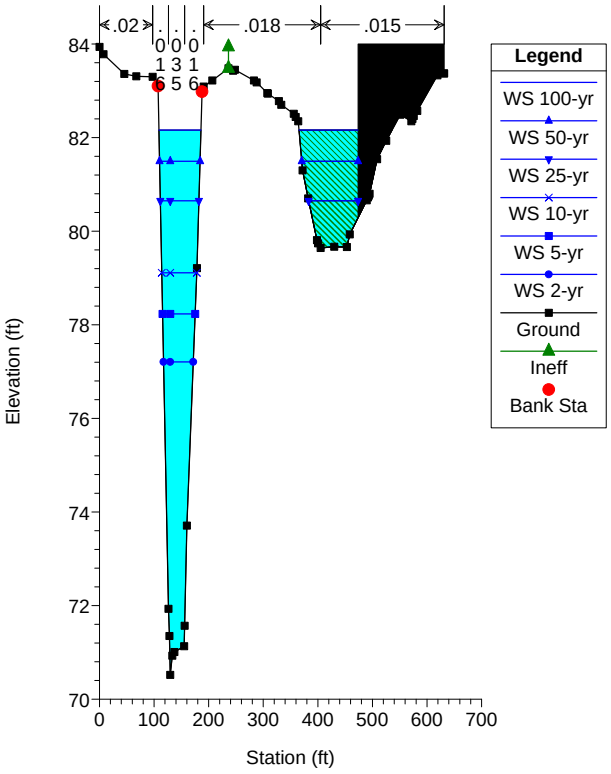
HEC-RAS Plan: Botto_Only_NoSed River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	819.1344	10-yr	2700.00	58.79	67.26	64.42	67.61	0.006676	4.5	580.96	285.35	0.34
Lower Reach	819.1344	5-yr	2050.00	58.79	66.86	63.68	67.20	0.007839	4.7	440.59	245.97	0.37
Lower Reach	819.1344	2-yr	1180.00	58.79	65.57	62.47	65.77	0.005169	3.5	333.77	77.69	0.30
Lower Reach	415.466	100-yr	5100.00	57.01	65.88	62.35	66.41	0.005005	2.6	1220.96	401.54	0.17
Lower Reach	415.466	50-yr	4500.00	57.01	65.73	61.99	66.16	0.005000	2.6	1158.92	400.93	0.17
Lower Reach	415.466	25-yr	3800.00	57.01	65.53	61.53	65.85	0.005009	2.5	1079.23	400.14	0.17
Lower Reach	415.466	10-yr	2700.00	57.01	65.16	60.74	65.33	0.005005	2.4	932.74	398.69	0.17
Lower Reach	415.466	5-yr	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	2-yr	1180.00	57.01	63.61	59.38	63.68	0.005009	2.1	565.44	112.07	0.16

AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

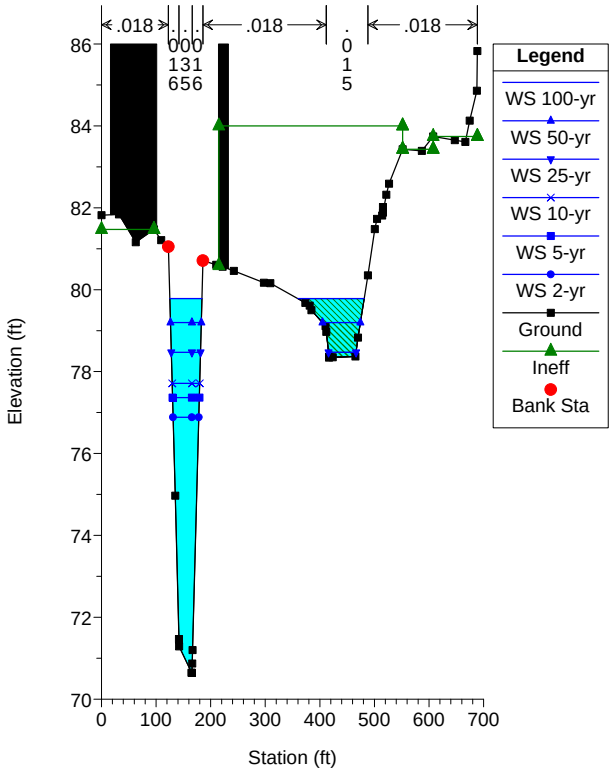
River = Alvarado Creek Reach = Lower Reach RS = 3519.101



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

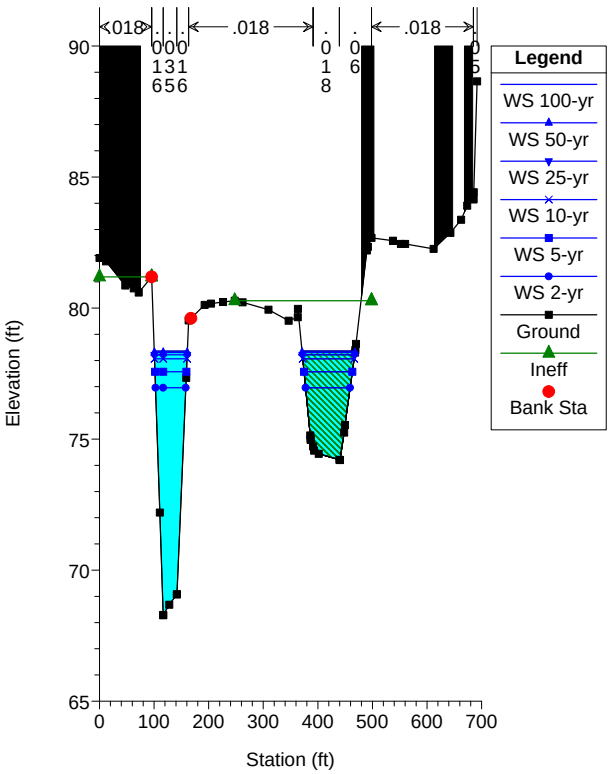
River = Alvarado Creek Reach = Lower Reach RS = 3381.792



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

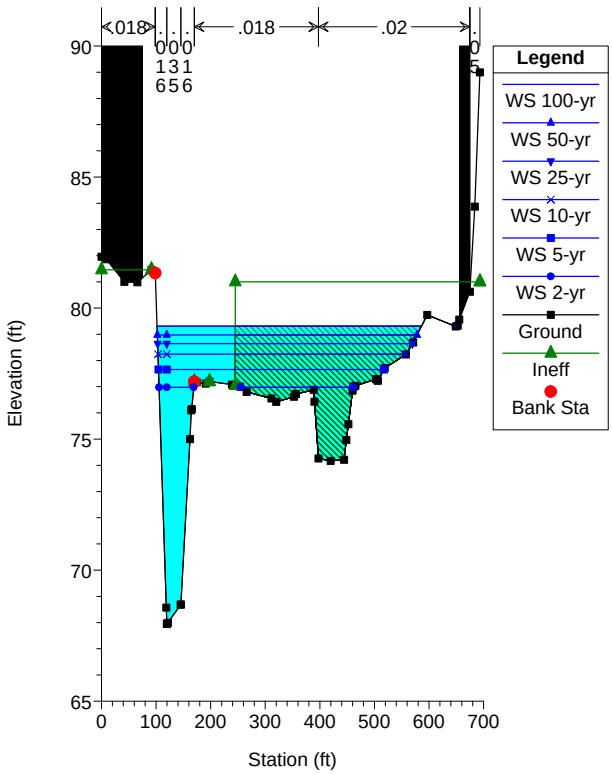
River = Alvarado Creek Reach = Lower Reach RS = 3171.448



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

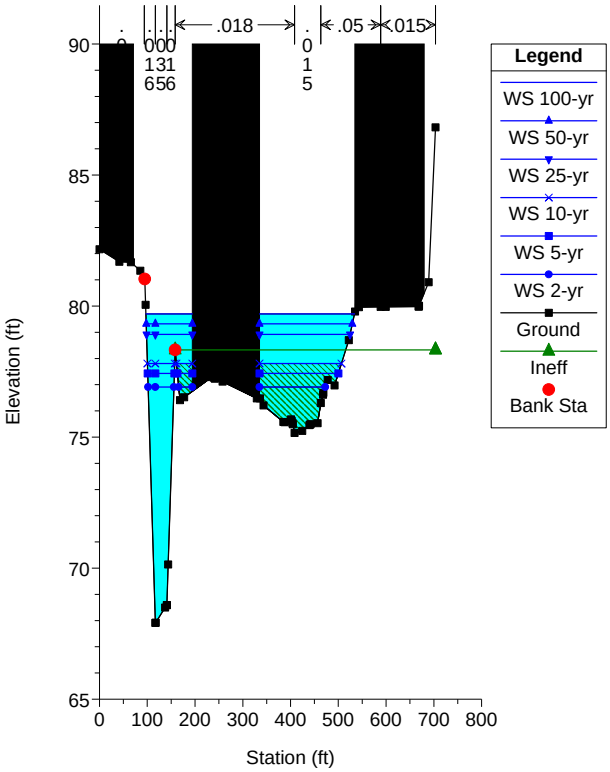
River = Alvarado Creek Reach = Lower Reach RS = 3140.066



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

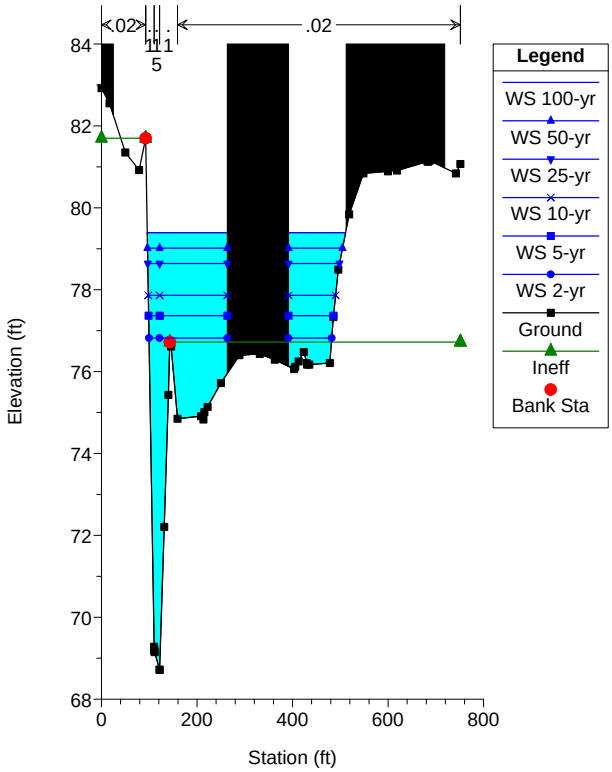
River = Alvarado Creek Reach = Lower Reach RS = 3034.592



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

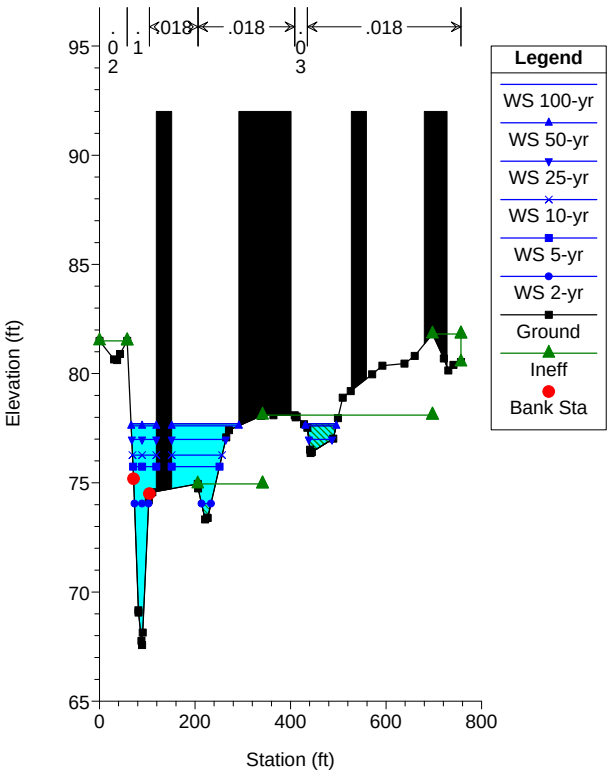
River = Alvarado Creek Reach = Lower Reach RS = 2847.761



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

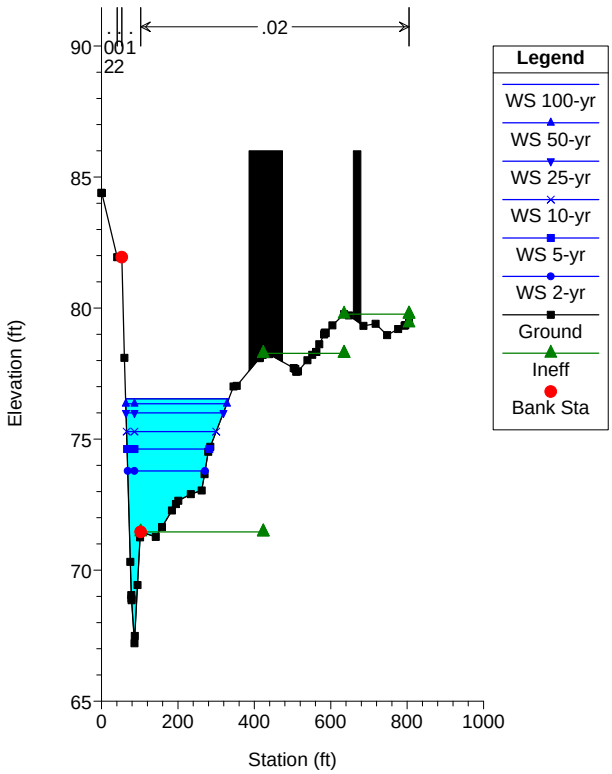
River = Alvarado Creek Reach = Lower Reach RS = 2677.801

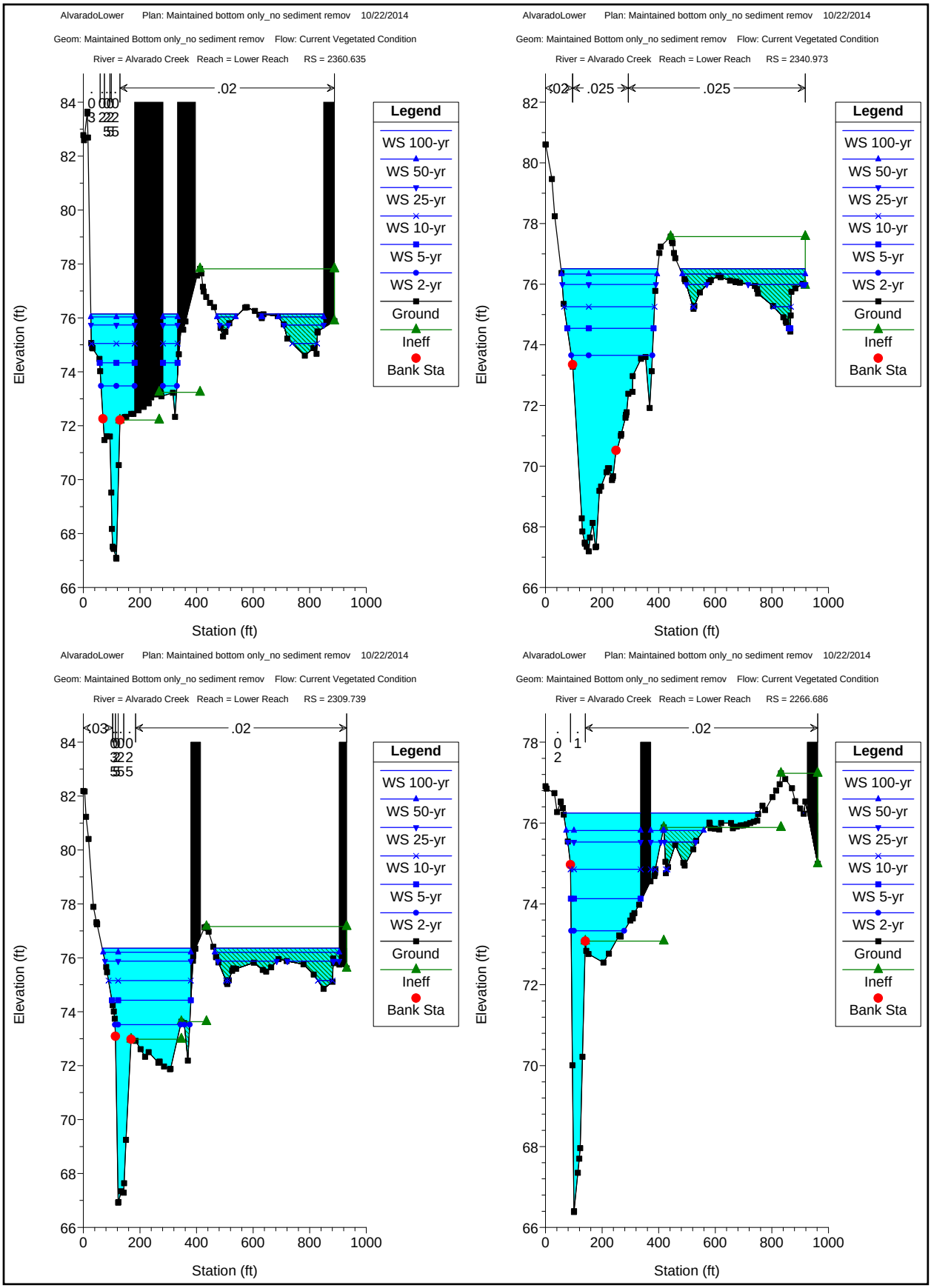


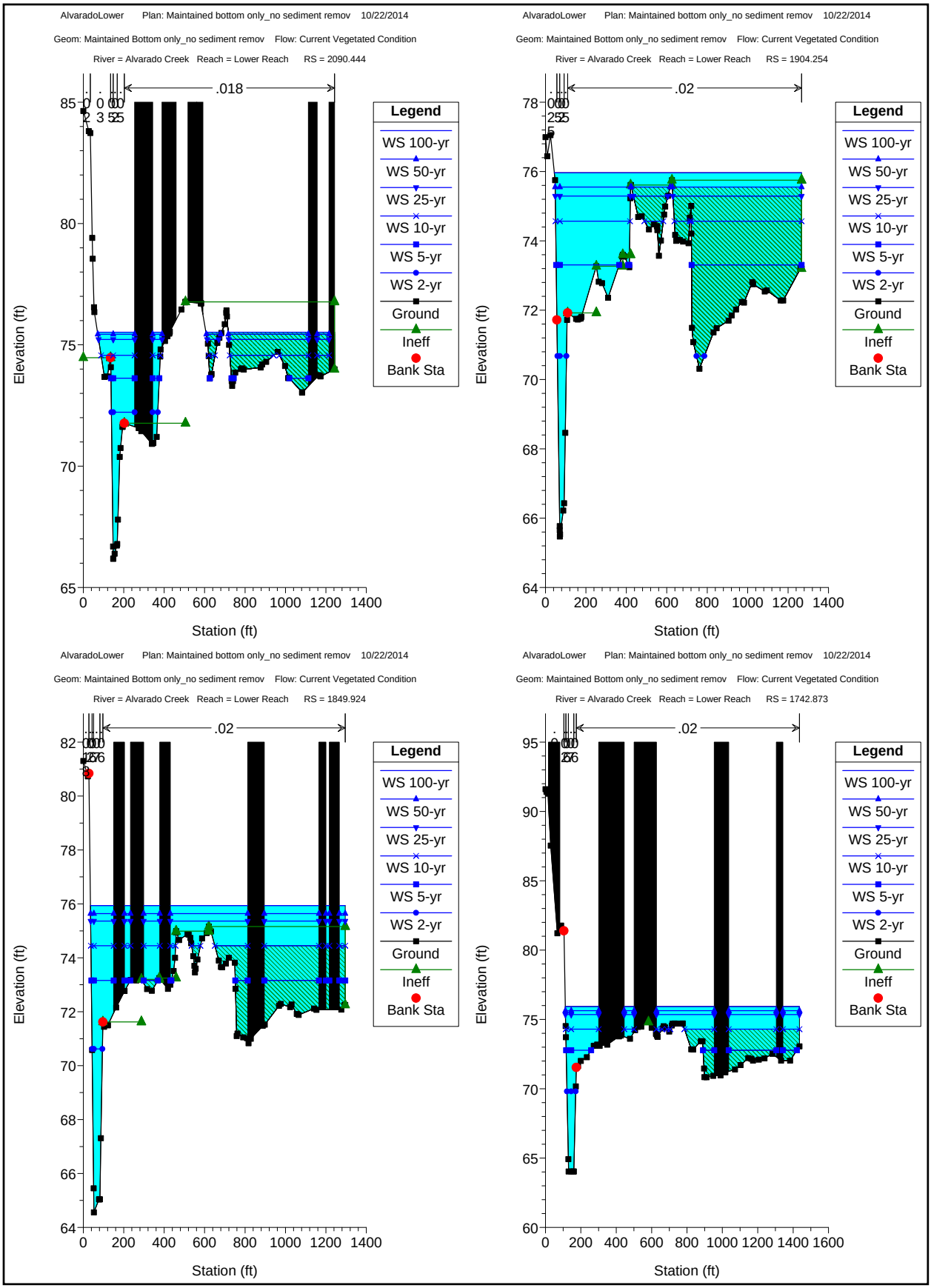
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014

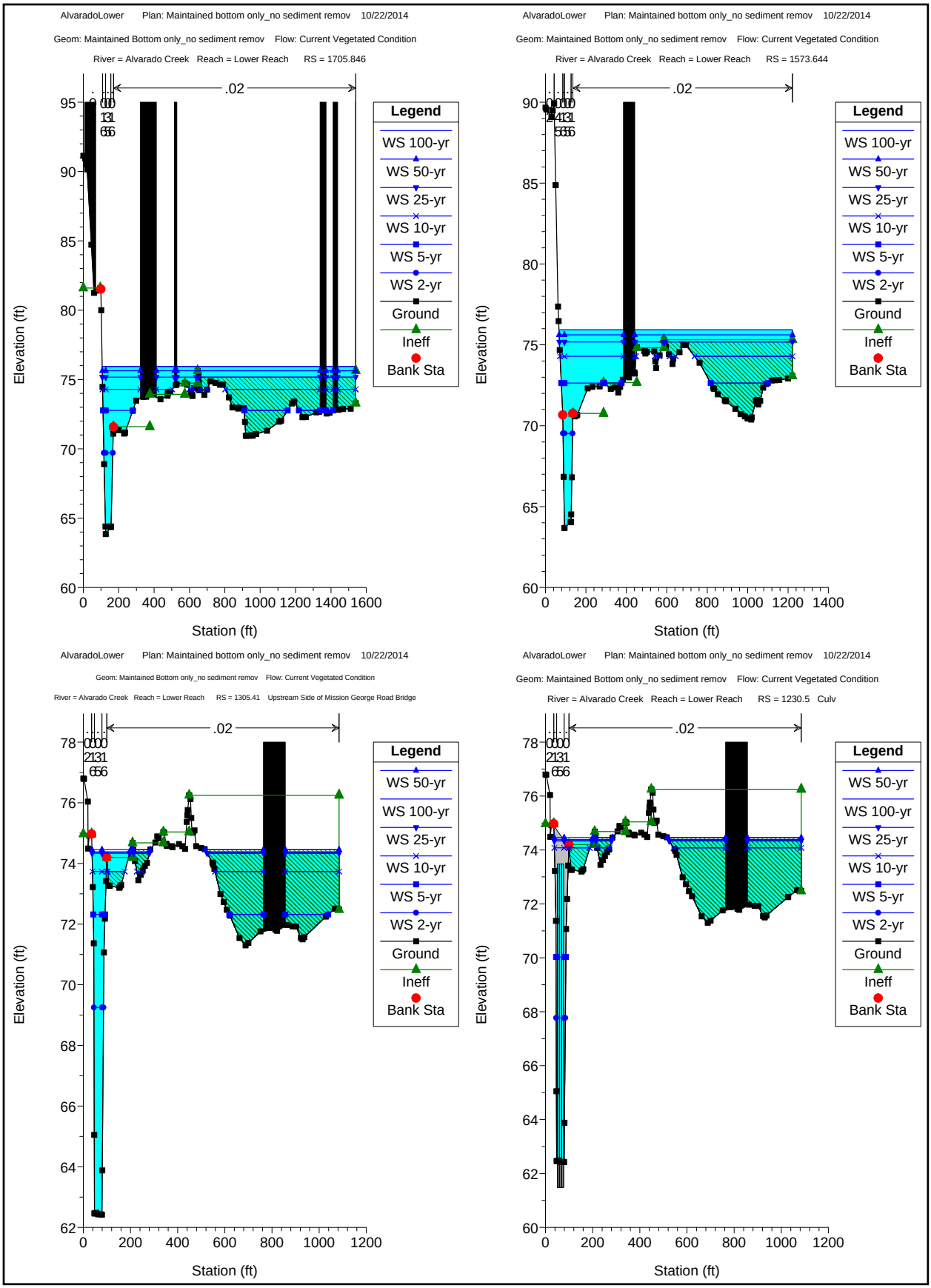
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition

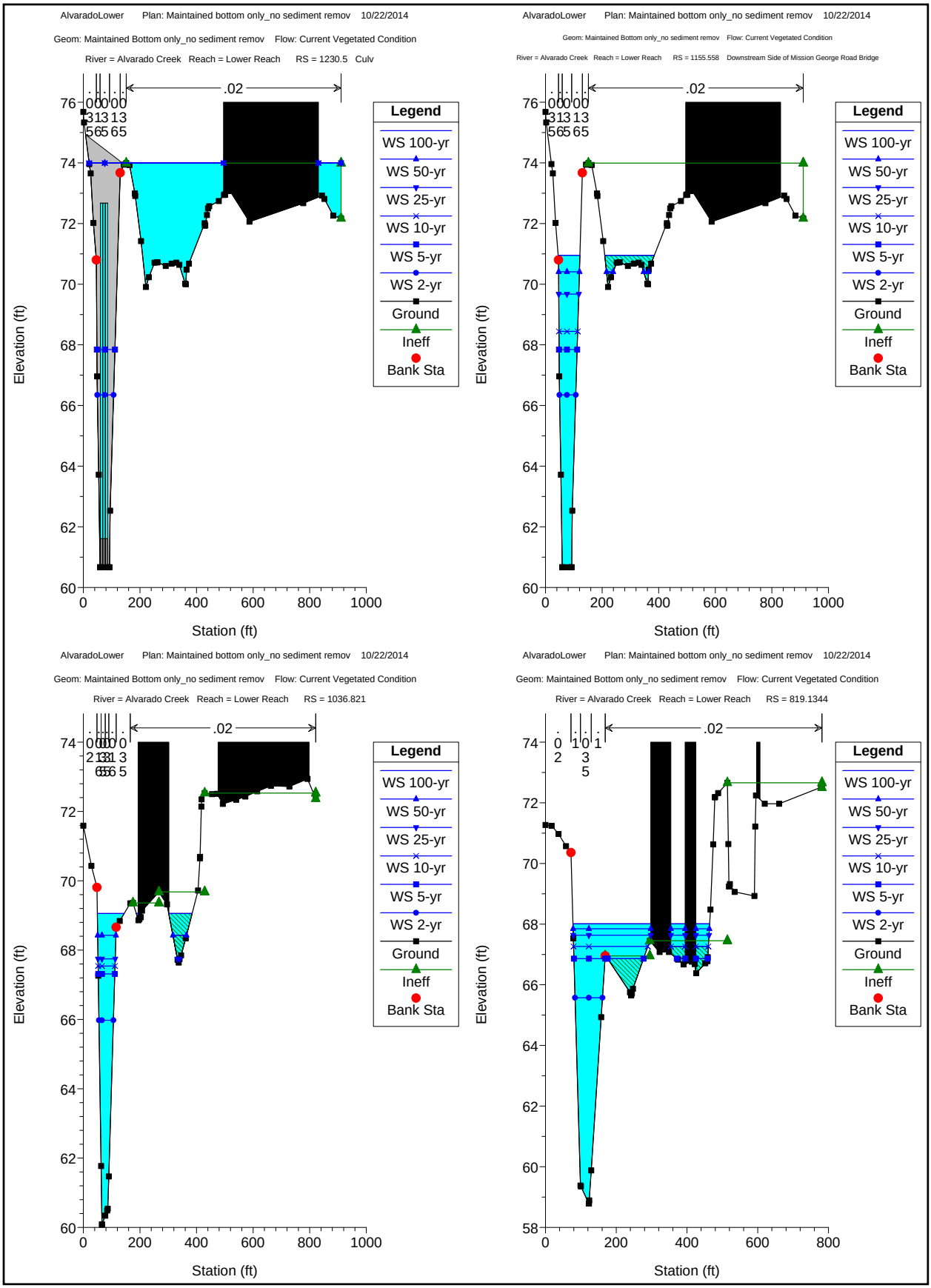
River = Alvarado Creek Reach = Lower Reach RS = 2514.866

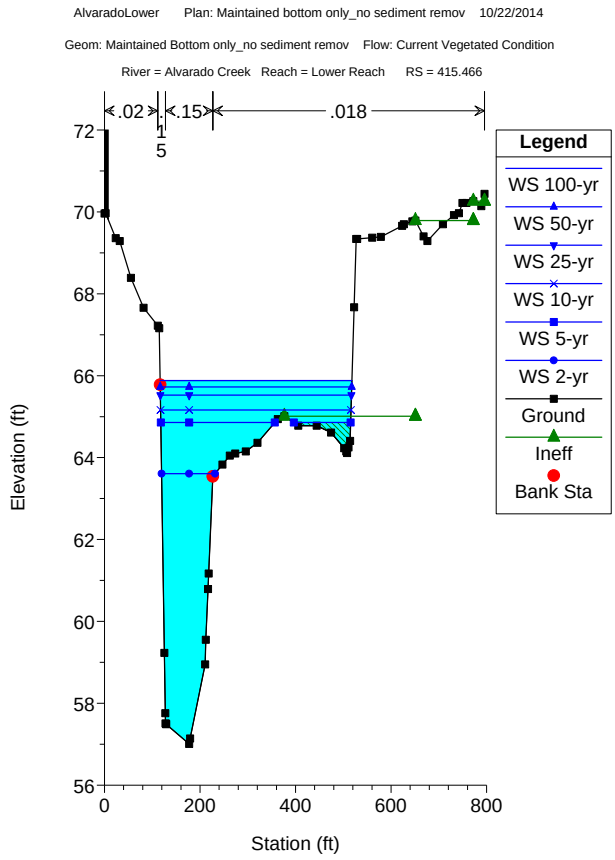



AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS 50-yr
WS 100-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 50-yr
WS 100-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maintained bottom only_no sediment remov 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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
```

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*****************************************************************************

PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 11:00:11 AM

Project in English units

*****************************************************************************

PLAN DATA

Plan Title: Maintained bottom only_no sediment remov
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\Alvara
doLower.p10

          Geometry Title: Maintained Bottom only_no sediment remov
          Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\Alvara
doLower.g10

          Flow Title    : Current Vegetated Condition
          Flow File     : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\Alvara
doLower.f01

Plan Description:
Maintained:vegetation only removal in City of San Diego maintained portions
only (no sediment removed)


Plan Summary Information:
Number of:  Cross Sections =   23    Multiple Openings  =    0
            Culverts       =    1    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    5

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: Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\Alvara
doLower.f01

Flow Data (cfs)
*****************************************************************************************************
**********************************************
* River           Reach           RS      *          100-yr           50-yr           25-yr
10-yr            5-yr            2-yr *
* Alvarado Creek  Lower Reach     3519.101*            5100            4500            3800
2700            2050            1180 *
*****************************************************************************************************
**********************************************

Boundary Conditions
*****************************************************************************************************
********
* River           Reach           Profile          *            Upstream
Downstream    *
*****************************************************************************************************
********
* Alvarado Creek  Lower Reach     100-yr           *                                 Normal S =
0.005 *
* Alvarado Creek  Lower Reach     50-yr            *                                 Normal S =
0.005 *
* Alvarado Creek  Lower Reach     25-yr            *                                 Normal S =
0.005 *
* Alvarado Creek  Lower Reach     10-yr            *                                 Normal S =
0.005 *
* Alvarado Creek  Lower Reach     5-yr             *                                 Normal S =
0.005 *
* Alvarado Creek  Lower Reach     2-yr             *                                 Normal S =
0.005 *
*****************************************************************************************************
********

*****************************************************************************

GEOMETRY DATA

Geometry Title: Maintained Bottom only_no sediment remov
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\HecRas\Alvara
doLower.g10

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3519.101

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************************
       0   83.94    7.23   83.78    45.4   83.36   67.28   83.31   97.34    83.3
  107.14    83.1  126.44   71.93  127.98   71.35   129.5   70.52  133.27   70.93
  137.17   71.01  155.09   71.13  155.92   71.57     160   73.71  178.45   79.21
  188.01   82.98  190.95   83.09  206.58   83.22  236.14   83.48  244.64   83.43
     248   83.45  282.79   83.22  287.79   83.18  307.35   82.95  308.27   82.94
  328.59   82.78  333.03    82.7  355.98   82.51  359.45   82.44  363.96   82.35
   371.9    81.3  382.25    80.7  398.46   79.81  400.43   79.74  405.16   79.64
  430.03   79.67  453.27   79.66  458.52   79.93  489.51   80.66  491.93   80.72
  493.29   80.76  494.77    80.8  508.53   81.54  525.25   81.93  550.96   82.49
  571.25   82.35  573.37    82.4  575.72   82.46  582.06   82.57  619.05   83.33
  631.18   83.37   631.5   83.37
```

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.016	126.44	.035	155.92	.016	190.95	.018
405.16	.015								

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

107.14	188.01	137.3	137.31	137.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	135.12	74.97	141.89	71.47	142.23	71.29	165.14	70.65
165.47	70.64	165.73	70.64	166.19	70.87	166.87	71.2	185.99	80.71
210.05	80.61	221.99	80.56	242.35	80.46	297.45	80.17	309.35	80.16
373.54	79.68	381.29	79.61	384.5	79.5	410.52	79.11	411.74	78.97
416.74	78.36	416.89	78.34	423.53	78.35	465.23	78.37	469.91	78.83
488.01	80.35	500.64	81.48	504.86	81.73	514.07	81.81	515.55	82.02
515.73	81.88	521.84	82.32	526.82	82.59	551.59	83.43	586.82	83.39
607.56	83.74	647.33	83.65	666.66	83.61	674.54	84.13	687.77	84.86
688.54	85.83								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	141.89	.035	166.19	.016	185.99	.018
411.74	.015	488.01	.018						

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

122.6	185.99	209.35	210.34	211.8	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
215	551.59	84	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.035	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

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

95.69	167.68	32.79	31.38	28.21	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	95.69	81.19	F
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	121.78	67.99
145.21	68.69	145.46	68.69	161.99	75	164.4	76.1	165.21	76.15

169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2	238.98	77.08
253.88	77	265.89	76.8	311.18	76.55	320.11	76.42	352.63	76.62
356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26	419.63	74.17
444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85	460.97	77
461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24	506.27	77.23
518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74	648.95	79.3
652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87	693.26	88.99

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	119.67	.035	145.46	.016	169.88	.018
397.39	.02	674.71	.05						

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

98.56	169.88	101.61	105.47	112.32	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.91	117.43	67.92	137.35	68.5
140.94	68.59	140.98	68.59	143.73	70.14	158.51	78.33	168.47	76.41
177.34	76.52	235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12
329.16	76.48	336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57
400.89	75.68	402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16
424.44	75.24	439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53
463.42	76.3	467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97
521.9	78.7	535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97
668.1	79.98	668.55	79.98	669	80.01	689.24	80.91	703.56	86.82

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	93.68	.016	117.02	.035	140.94	.016	158.51	.018
408.4	.015	463.42	.05	588.58	.015				

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

94.76	158.51	187.47	186.83	186.24	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT

Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.1	110.07	.15	121.5	.1	159.23	.02

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

92.48	143.16	165.5	169.96	176.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT

Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.1	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
71.39 104.55 162.85 162.93 162.56 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.1	102.77	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.2 102.77 158.36 154.23 152.81 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
69.46 129.21 19.33 19.66 19.62 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86

491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

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

95.77	249.12		34.23	31.23	27.43	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

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

113.57	168.74		21.27	43.05	56.67	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

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

88.53	140.68		166.7	176.24	190.03	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
27.83 96.83 119.68 107.05 93.87 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek

REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.06 174.16 35.7 37.03 38.3 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.035	155.61	.016	171.11	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.12 171.11 136.62 132.2 123.01 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	85.63	.016	93.76	.035	126.79	.016
135.25	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
85.63 135.25 286.27 268.23 249.58 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek

REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	47.46	.035	79.09	.016	99.47	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
35.1 99.47 148.68 149.85 158.44 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92		
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46		
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42		
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2		
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24		
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45		
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46		
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01		
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57		
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37		
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12		
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57		
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82		
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54		
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78		
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52		
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51		
1084.18	72.48										

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	47.46	.035	79.09	.016	99.47	.02

Bank Sta: Left Right Coeff Contr. Expan.
35.1 99.47 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02		
46.27	70.8	48.44	66.96	54.41	63.72	59.22	60.67	59.37	60.67		
68.77	60.67	87.93	60.67	90.19	60.67	92.72	60.67	94.83	62.53		
130.44	73.67	143.04	73.94	151.67	73.99	163.31	73.93	182.18	72.99		
183.46	72.91	203.9	71.42	221.2	69.91	231.4	70.23	251.76	70.71		
260.52	70.72	262.13	70.72	290.97	70.6	312.02	70.68	328.69	70.71		
339.11	70.64	359.52	70.02	362.2	70	364.66	70.48	373.11	70.68		
428.82	72.01	429.07	71.93	430.72	71.94	436.95	72.28	440.5	72.5		
444.65	72.57	478.56	72.74	497.03	72.94	499.73	72.96	501.14	72.95		
518.9	73.07	586.99	72.06	777.15	72.67	843.55	72.92	851.87	72.81		
883.14	72.26	910.92	72.17								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	46.27	.016	59.22	.035	92.72	.016	130.44	.035		
151.67	.02										

Bank Sta: Left Right Coeff Contr. Expan.
46.27 130.44 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.67	910.92	73.99	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
495.28	830.64	76

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss
Coef
                  21     110     .018     .035      .94                  .4                1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
**********************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1121.496

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   73.03   37.12   70.67   51.06   69.64   51.58   69.61    63.9   69.49
   77.77    69.2   78.42   69.18   78.99   69.18  105.92   68.64  109.54   68.56
  109.79   68.56  158.77   67.55  182.38    67.5  182.83    67.5  191.06    67.3
  213.81   67.27  221.88   67.33  272.16   67.24  310.99   67.01  325.37   66.93
   328.4    66.9  329.44    66.9  383.22   66.59  388.38   66.55  388.62   66.55
  440.14   66.56  493.79   66.58  495.22   66.56  498.92   66.51  541.93   65.88
  542.66   65.87  567.25   65.51  588.94   65.18  590.62   65.14  617.49   64.53
  626.74   64.24  627.45   64.29  639.24      64  657.35   63.57  661.52   63.47
  665.23   63.43  667.79   62.32 672.743  60.187

Weir crest shape                            = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1036.821

INPUT
Description:
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   71.59   28.31   70.43   48.23   69.81   52.88   67.26   62.89   61.77
   65.67   60.08   65.95   60.09    77.5   60.34   84.29   60.49    86.4   60.54
   89.98   61.47  115.82   68.66  128.53   68.84  165.64   69.35  175.37   69.36
```

194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.016	62.89	.035	77.5	.035	89.98	.016
115.82	.035	165.64	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.23	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.1	98.97	.035	129.2	.1	168.96	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116.54	226.72	420.92	415.47	422.02	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.016	.035	.016	.018	.015			
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.035	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.035	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.035	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.035	.016	.018	.015	.05	.015	
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.1	.15	.1	.02				
Lower Reach	2677.801	.02	.1	.018	.018	.03	.018			
Lower Reach	2514.866	.02	.02	.1	.02					
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								

Lower Reach	2309.739	.03	.035	.025	.025	.025	.02	
Lower Reach	2266.686	.02	.1	.02				
Lower Reach	2090.444	.02	.03	.05	.02	.05	.018	
Lower Reach	1904.254	.025	.05	.02	.05	.02		
Lower Reach	1849.924	.018	.02	.06	.07	.06	.02	
Lower Reach	1742.873	.018	.02	.06	.07	.06	.02	
Lower Reach	1705.846	.02	.016	.035	.016	.02		
Lower Reach	1573.644	.02	.045	.016	.035	.016	.02	
Lower Reach	1305.41	.02	.016	.035	.016	.02		
Lower Reach	1230.5	Culvert						
Lower Reach	1155.558	.035	.016	.035	.016	.035	.02	
Lower Reach	1149.024	Lat Struct						
Lower Reach	1121.496	Lat Struct						
Lower Reach	1036.821	.02	.016	.035	.035	.016	.035	.02
Lower Reach	819.1344	.02	.1	.035	.1	.02		
Lower Reach	415.466	.02	.15	.15	.018			

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3

HEC-RAS Plan: BotOnly_NoSed_Qs River: Alvarado Creek Reach: Lower Reach

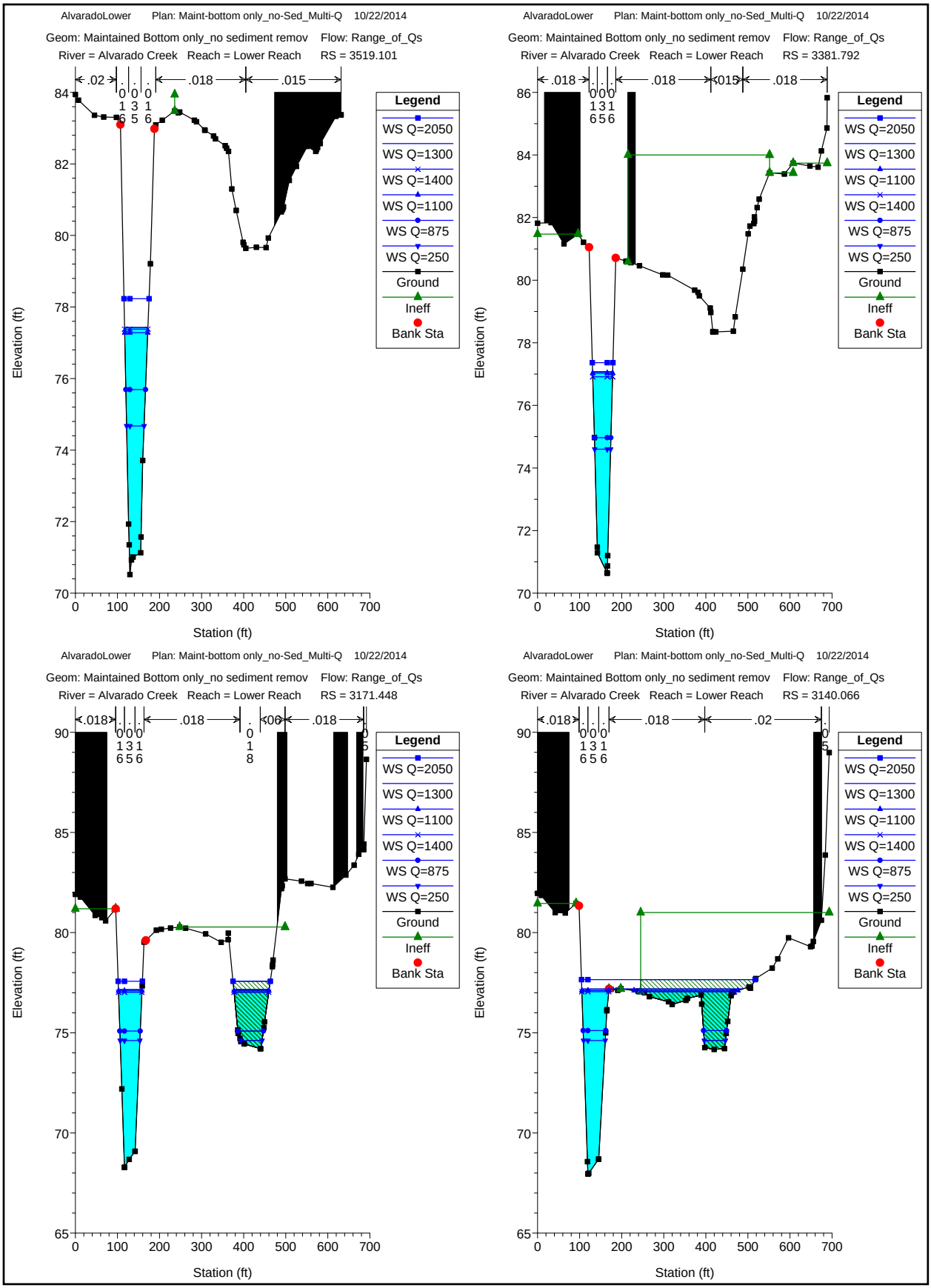
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1300	1300.00	70.52	77.43		77.83	0.001139	5.1	257.06	55.53	0.41
Lower Reach	3519.101	Q=1100	1100.00	70.52	77.28		77.58	0.000900	4.4	248.90	54.78	0.37
Lower Reach	3519.101	Q=250	250.00	70.52	74.68		74.74	0.000409	2.0	123.47	41.54	0.21
Lower Reach	3519.101	Q=1400	1400.00	70.52	77.38		77.85	0.001365	5.5	254.36	55.28	0.45
Lower Reach	3519.101	Q=2050	2050.00	70.52	78.23		78.94	0.001708	6.8	303.34	59.62	0.53
Lower Reach	3519.101	Q=875	875.00	70.52	75.69		76.11	0.001908	5.2	168.23	46.70	0.48
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1300	1300.00	70.64	77.07	75.01	77.63	0.001564	6.0	217.97	47.90	0.49
Lower Reach	3381.792	Q=1100	1100.00	70.64	77.03	74.62	77.43	0.001154	5.1	215.85	47.72	0.42
Lower Reach	3381.792	Q=250	250.00	70.64	74.60	72.41	74.68	0.000460	2.2	111.92	37.87	0.23
Lower Reach	3381.792	Q=1400	1400.00	70.64	76.91	75.19	77.60	0.002027	6.7	210.27	47.24	0.56
Lower Reach	3381.792	Q=2050	2050.00	70.64	77.37	76.25	78.58	0.003211	8.8	232.05	49.08	0.72
Lower Reach	3381.792	Q=875	875.00	70.64	74.97	74.14	75.71	0.003879	6.9	126.01	39.31	0.68
Lower Reach	3171.448	Q=1300	1300.00	68.28	77.16	72.64	77.38	0.000395	3.8	342.70	139.97	0.27
Lower Reach	3171.448	Q=1100	1100.00	68.28	77.09	72.27	77.25	0.000293	3.2	338.89	138.95	0.23
Lower Reach	3171.448	Q=250	250.00	68.28	74.61	70.10	74.63	0.000064	1.2	212.00	97.63	0.10
Lower Reach	3171.448	Q=1400	1400.00	68.28	77.02	72.83	77.29	0.000491	4.2	334.95	137.88	0.30
Lower Reach	3171.448	Q=2050	2050.00	68.28	77.57	73.89	78.06	0.000803	5.6	366.27	146.22	0.39
Lower Reach	3171.448	Q=875	875.00	68.28	75.09	71.79	75.30	0.000571	3.7	234.65	109.27	0.30
Lower Reach	3140.066	Q=1300	1300.00	67.95	77.18	72.18	77.35	0.000284	3.3	393.96	373.72	0.24
Lower Reach	3140.066	Q=1100	1100.00	67.95	77.11	71.81	77.23	0.000211	2.8	386.91	311.35	0.20
Lower Reach	3140.066	Q=250	250.00	67.95	74.61	69.69	74.63	0.000044	1.0	243.42	102.15	0.08
Lower Reach	3140.066	Q=1400	1400.00	67.95	77.05	72.35	77.26	0.000352	3.7	382.80	287.43	0.26
Lower Reach	3140.066	Q=2050	2050.00	67.95	77.65	73.38	78.00	0.000530	4.7	460.58	412.88	0.33
Lower Reach	3140.066	Q=875	875.00	67.95	75.11	71.36	75.27	0.000391	3.2	269.65	108.63	0.26
Lower Reach	3034.592	Q=1300	1300.00	67.91	77.10	72.31	77.32	0.000359	3.7	348.61	236.72	0.26
Lower Reach	3034.592	Q=1100	1100.00	67.91	77.05	71.92	77.21	0.000264	3.2	345.72	230.76	0.22
Lower Reach	3034.592	Q=250	250.00	67.91	74.61	69.70	74.62	0.000052	1.1	222.56	46.13	0.09
Lower Reach	3034.592	Q=1400	1400.00	67.91	76.95	72.49	77.21	0.000449	4.1	340.25	221.33	0.29
Lower Reach	3034.592	Q=2050	2050.00	67.91	77.43	73.58	77.91	0.000766	5.6	366.83	252.08	0.38
Lower Reach	3034.592	Q=875	875.00	67.91	75.02	71.44	75.22	0.000496	3.6	242.02	47.58	0.28
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1300	1300.00	68.72	77.03	74.27	77.18	0.001349	1.4	516.73	255.72	0.11
Lower Reach	2847.761	Q=1100	1100.00	68.72	76.60	73.82	77.02	0.021325	5.2	210.80	249.40	0.42
Lower Reach	2847.761	Q=250	250.00	68.72	74.53	71.06	74.59	0.004344	1.9	130.01	34.93	0.18
Lower Reach	2847.761	Q=1400	1400.00	68.72	76.82	74.49	77.03	0.002317	1.8	463.47	254.04	0.14
Lower Reach	2847.761	Q=2050	2050.00	68.72	77.37	75.68	77.63	0.001921	1.7	602.40	258.48	0.13
Lower Reach	2847.761	Q=875	875.00	68.72	73.26	73.26	74.76	0.157210	9.8	89.04	29.63	1.00
Lower Reach	2677.801	Q=1300	1300.00	67.57	74.34	74.34	76.25	0.106310	11.1	117.20	56.52	1.00
Lower Reach	2677.801	Q=1100	1100.00	67.57	73.85	73.85	75.63	0.108107	10.7	102.84	44.68	1.00
Lower Reach	2677.801	Q=250	250.00	67.57	73.55	70.79	73.66	0.007091	2.7	94.10	37.09	0.25
Lower Reach	2677.801	Q=1400	1400.00	67.57	75.15	75.15	76.08	0.019007	5.1	211.55	141.47	0.43
Lower Reach	2677.801	Q=2050	2050.00	67.57	75.74	75.74	76.87	0.011681	4.3	296.46	148.83	0.35
Lower Reach	2677.801	Q=875	875.00	67.57	73.24	73.24	74.85	0.110979	10.2	85.92	26.55	1.00
Lower Reach	2514.866	Q=1300	1300.00	67.21	73.90	73.01	74.11	0.001405	1.4	425.73	203.99	0.12
Lower Reach	2514.866	Q=1100	1100.00	67.21	73.71	72.76	73.89	0.001428	1.4	386.65	201.39	0.12
Lower Reach	2514.866	Q=250	250.00	67.21	70.93	70.19	71.29	0.043031	4.8	51.98	25.52	0.59
Lower Reach	2514.866	Q=1400	1400.00	67.21	74.00	73.04	74.22	0.001375	1.4	446.27	205.34	0.12
Lower Reach	2514.866	Q=2050	2050.00	67.21	74.62	73.39	74.90	0.001208	1.4	576.55	215.46	0.11
Lower Reach	2514.866	Q=875	875.00	67.21	73.48	72.19	73.62	0.001440	1.3	340.65	198.14	0.12
Lower Reach	2360.635	Q=1300	1300.00	67.07	73.58	72.66	73.90	0.001196	4.9	313.09	169.35	0.45
Lower Reach	2360.635	Q=1100	1100.00	67.07	73.41	72.08	73.69	0.001078	4.5	285.01	167.41	0.42
Lower Reach	2360.635	Q=250	250.00	67.07	70.18	69.23	70.46	0.001923	4.2	58.93	27.15	0.51
Lower Reach	2360.635	Q=1400	1400.00	67.07	73.68	72.78	74.01	0.001213	5.0	330.03	170.50	0.45
Lower Reach	2360.635	Q=2050	2050.00	67.07	74.33	73.48	74.71	0.001160	5.4	443.58	175.32	0.45
Lower Reach	2360.635	Q=875	875.00	67.07	73.22	71.28	73.44	0.000908	4.0	245.18	164.00	0.38
Lower Reach	2340.973	Q=1300	1300.00	67.19	73.77	70.15	73.81	0.000097	1.6	885.62	289.01	0.13
Lower Reach	2340.973	Q=1100	1100.00	67.19	73.58	69.99	73.61	0.000082	1.4	830.91	279.10	0.12
Lower Reach	2340.973	Q=250	250.00	67.19	70.35	68.48	70.37	0.000202	1.2	214.71	132.03	0.16
Lower Reach	2340.973	Q=1400	1400.00	67.19	73.87	70.24	73.92	0.000102	1.7	916.37	291.20	0.14
Lower Reach	2340.973	Q=2050	2050.00	67.19	74.55	70.71	74.61	0.000128	2.1	1116.79	310.44	0.16
Lower Reach	2340.973	Q=875	875.00	67.19	73.35	69.68	73.38	0.000063	1.2	772.12	253.00	0.11
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1300	1300.00	66.92	73.63	71.39	73.79	0.000532	3.6	457.44	264.75	0.30
Lower Reach	2309.739	Q=1100	1100.00	66.92	73.45	71.02	73.59	0.000483	3.4	416.23	247.94	0.29
Lower Reach	2309.739	Q=250	250.00	66.92	70.21	68.79	70.35	0.000866	3.0	84.62	37.23	0.35
Lower Reach	2309.739	Q=1400	1400.00	66.92	73.74	71.57	73.90	0.000525	3.7	501.86	265.94	0.30
Lower Reach	2309.739	Q=2050	2050.00	66.92	74.43	72.56	74.59	0.000468	3.8	688.97	279.11	0.29

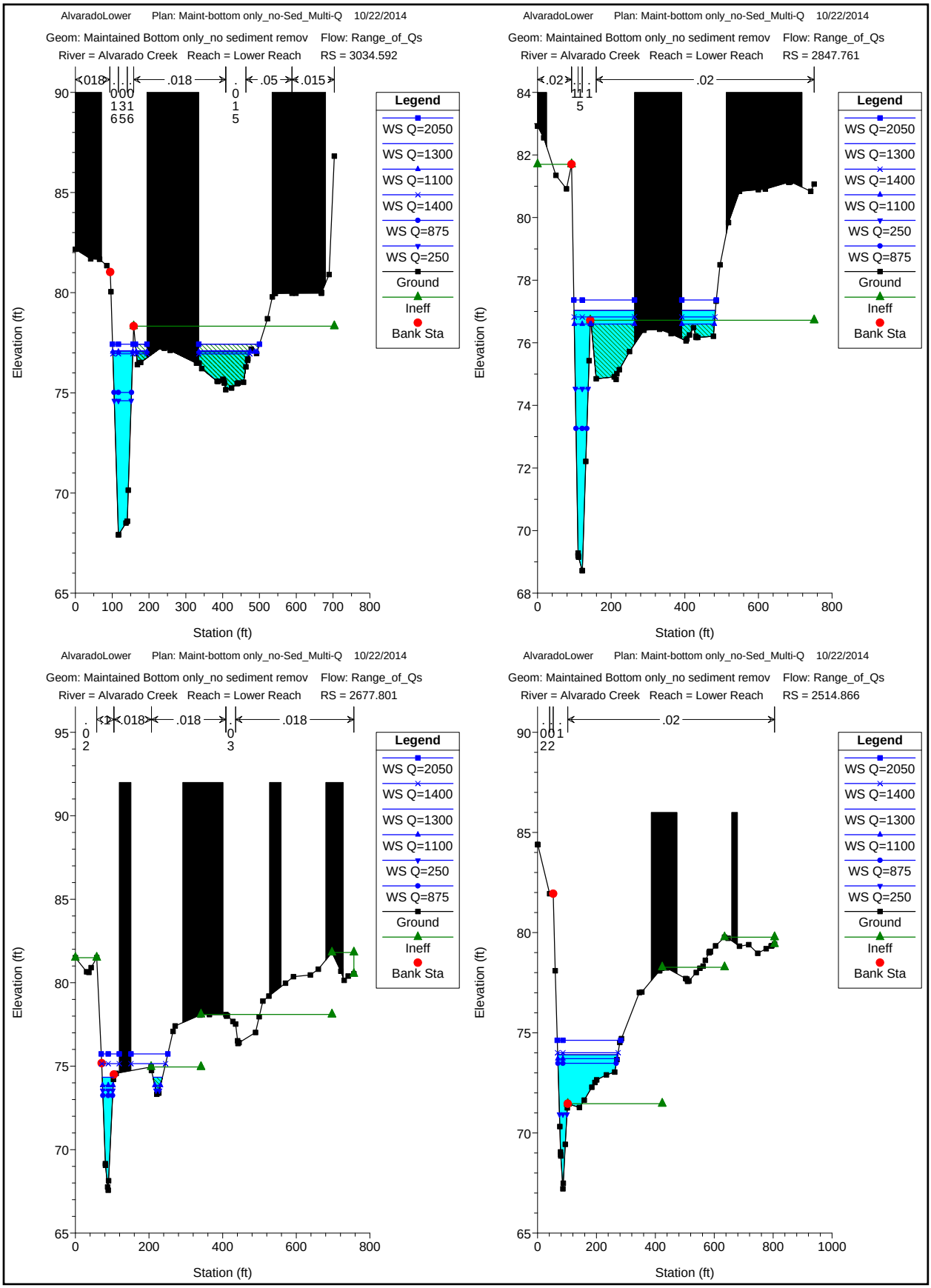
HEC-RAS Plan: BotOnly_NoSed_Qs River: Alvarado Creek Reach: Lower Reach (Continued)

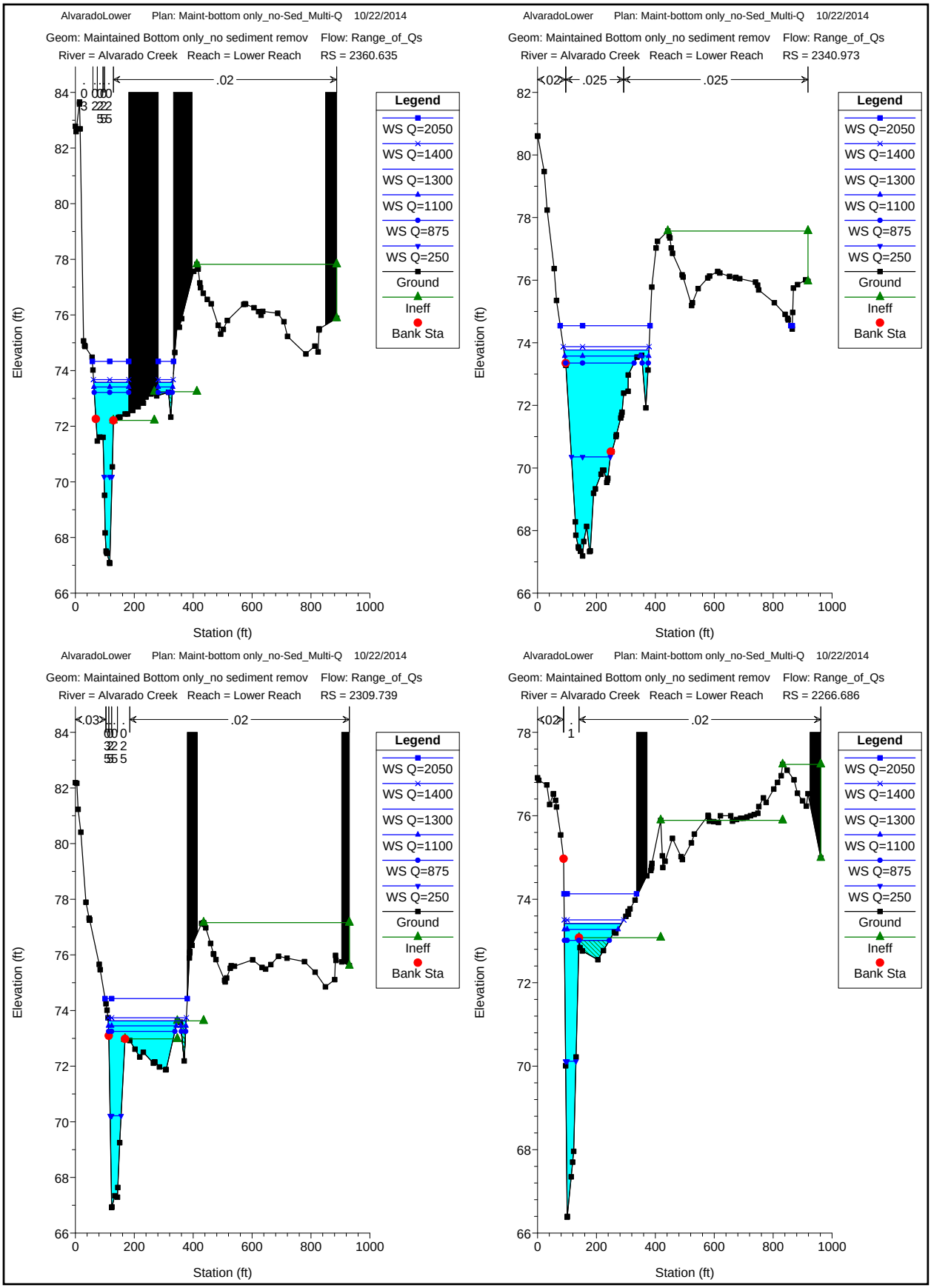
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	2309.739	Q=875	875.00	66.92	73.25	70.57	73.36	0.000407	3.0	369.93	239.87	0.26
Lower Reach	2266.686	Q=1300	1300.00	66.38	73.42	71.31	73.71	0.010266	4.0	306.03	194.48	0.33
Lower Reach	2266.686	Q=1100	1100.00	66.38	73.28	70.92	73.52	0.009806	3.8	280.25	182.78	0.32
Lower Reach	2266.686	Q=250	250.00	66.38	70.12	68.66	70.26	0.013391	3.0	83.84	35.21	0.34
Lower Reach	2266.686	Q=1400	1400.00	66.38	73.51	71.49	73.82	0.009838	3.9	323.96	202.22	0.32
Lower Reach	2266.686	Q=2050	2050.00	66.38	74.13	72.53	74.51	0.005906	3.3	465.73	246.18	0.25
Lower Reach	2266.686	Q=875	875.00	66.38	73.01	70.45	73.29	0.013038	4.2	206.22	151.51	0.37
Lower Reach	2090.444	Q=1300	1300.00	66.18	72.48	70.87	72.78	0.003084	4.4	297.13	142.54	0.41
Lower Reach	2090.444	Q=1100	1100.00	66.18	72.05	70.40	72.39	0.004351	4.8	236.60	139.64	0.48
Lower Reach	2090.444	Q=250	250.00	66.18	68.96	68.09	69.20	0.003315	4.0	62.76	31.31	0.50
Lower Reach	2090.444	Q=1400	1400.00	66.18	72.70	71.08	72.98	0.002609	4.2	328.19	144.00	0.38
Lower Reach	2090.444	Q=2050	2050.00	66.18	73.62	72.27	73.95	0.001790	3.9	464.40	256.49	0.33
Lower Reach	2090.444	Q=875	875.00	66.18	71.38	69.92	71.87	0.005389	5.6	157.17	72.57	0.56
Lower Reach	1904.254	Q=1300	1300.00	65.47	71.04	70.05	71.91	0.006682	7.5	174.15	124.24	0.68
Lower Reach	1904.254	Q=1100	1100.00	65.47	70.43	69.67	71.31	0.007404	7.5	146.43	56.42	0.72
Lower Reach	1904.254	Q=250	250.00	65.47	67.47	67.47	68.12	0.011310	6.5	38.49	28.90	0.99
Lower Reach	1904.254	Q=1400	1400.00	65.47	71.34	70.22	72.20	0.006346	7.4	188.52	151.95	0.66
Lower Reach	1904.254	Q=2050	2050.00	65.47	73.31	71.26	73.60	0.001834	4.9	511.72	861.28	0.37
Lower Reach	1904.254	Q=875	875.00	65.47	69.72	69.20	70.59	0.008336	7.5	116.53	40.28	0.78
Lower Reach	1849.924	Q=1300	1300.00	64.56	70.99	68.46	71.40	0.006917	5.2	251.43	54.70	0.42
Lower Reach	1849.924	Q=1100	1100.00	64.56	70.37	68.10	70.76	0.007426	5.0	219.67	50.04	0.42
Lower Reach	1849.924	Q=250	250.00	64.56	67.23	66.10	67.38	0.007555	3.1	81.32	38.20	0.37
Lower Reach	1849.924	Q=1400	1400.00	64.56	71.29	68.63	71.72	0.006634	5.2	267.66	108.93	0.41
Lower Reach	1849.924	Q=2050	2050.00	64.56	73.16	69.62	73.47	0.003006	4.3	459.18	592.31	0.30
Lower Reach	1849.924	Q=875	875.00	64.56	69.65	67.67	70.00	0.007821	4.7	184.66	47.32	0.42
Lower Reach	1742.873	Q=1300	1300.00	64.03	70.24	67.68	70.66	0.006982	5.2	249.42	51.00	0.42
Lower Reach	1742.873	Q=1100	1100.00	64.03	69.53	67.32	69.94	0.007785	5.1	214.38	48.55	0.43
Lower Reach	1742.873	Q=250	250.00	64.03	66.34	65.31	66.50	0.008818	3.2	77.05	37.44	0.40
Lower Reach	1742.873	Q=1400	1400.00	64.03	70.58	67.84	71.01	0.006618	5.2	267.34	52.20	0.41
Lower Reach	1742.873	Q=2050	2050.00	64.03	72.78	68.84	73.12	0.003802	4.8	443.22	552.35	0.32
Lower Reach	1742.873	Q=875	875.00	64.03	68.72	66.87	69.11	0.008773	5.0	176.31	45.74	0.45
Lower Reach	1705.846	Q=1300	1300.00	63.85	70.14	67.69	70.57	0.001248	5.2	248.35	52.08	0.42
Lower Reach	1705.846	Q=1100	1100.00	63.85	69.41	67.34	69.83	0.001481	5.2	211.35	49.56	0.44
Lower Reach	1705.846	Q=250	250.00	63.85	66.11	65.37	66.32	0.002950	3.7	67.31	37.49	0.49
Lower Reach	1705.846	Q=1400	1400.00	63.85	70.50	67.86	70.92	0.001152	5.2	267.17	53.32	0.41
Lower Reach	1705.846	Q=2050	2050.00	63.85	72.77	68.85	73.06	0.000548	4.5	526.51	574.90	0.31
Lower Reach	1705.846	Q=875	875.00	63.85	68.57	66.91	68.97	0.001839	5.1	170.66	46.55	0.47
Lower Reach	1573.644	Q=1300	1300.00	63.68	69.97	67.34	70.40	0.001301	5.3	247.52	47.86	0.41
Lower Reach	1573.644	Q=1100	1100.00	63.68	69.22	66.99	69.63	0.001519	5.2	212.18	46.10	0.43
Lower Reach	1573.644	Q=250	250.00	63.68	65.49	65.06	65.79	0.005495	4.4	57.00	37.10	0.62
Lower Reach	1573.644	Q=1400	1400.00	63.68	70.33	67.50	70.77	0.001215	5.3	265.09	48.71	0.40
Lower Reach	1573.644	Q=2050	2050.00	63.68	72.64	68.50	72.97	0.000652	4.9	505.41	574.95	0.31
Lower Reach	1573.644	Q=875	875.00	63.68	68.32	66.56	68.73	0.001878	5.1	171.99	44.00	0.45
Lower Reach	1305.41	Q=1300	1300.00	62.42	69.71	66.08	70.08	0.000959	4.9	266.09	41.33	0.34
Lower Reach	1305.41	Q=1100	1100.00	62.42	68.94	65.71	69.28	0.001024	4.7	234.52	40.34	0.34
Lower Reach	1305.41	Q=250	250.00	62.42	64.85	63.68	65.00	0.001685	3.1	80.17	35.08	0.36
Lower Reach	1305.41	Q=1400	1400.00	62.42	70.08	66.26	70.47	0.000930	5.0	281.52	41.80	0.34
Lower Reach	1305.41	Q=2050	2050.00	62.42	72.32	67.32	72.77	0.000806	5.4	381.43	376.87	0.34
Lower Reach	1305.41	Q=875	875.00	62.42	68.01	65.25	68.32	0.001117	4.4	197.65	39.15	0.35
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1300	1300.00	60.67	66.64	64.12	67.01	0.001125	4.9	267.15	58.96	0.40
Lower Reach	1155.558	Q=1100	1100.00	60.67	66.13	63.78	66.47	0.001158	4.6	237.59	56.38	0.40
Lower Reach	1155.558	Q=250	250.00	60.67	62.99	61.85	63.12	0.001521	2.9	85.27	40.74	0.36
Lower Reach	1155.558	Q=1400	1400.00	60.67	66.87	64.28	67.26	0.001120	5.0	280.66	60.11	0.41
Lower Reach	1155.558	Q=2050	2050.00	60.67	67.84	65.24	68.41	0.001310	6.0	340.97	63.88	0.46
Lower Reach	1155.558	Q=875	875.00	60.67	65.47	63.35	65.77	0.001222	4.3	201.61	53.07	0.39
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1300	1300.00	60.08	66.27	64.46	66.83	0.001820	6.0	217.11	52.54	0.52
Lower Reach	1036.821	Q=1100	1100.00	60.08	65.76	64.08	66.27	0.001935	5.8	190.84	49.76	0.52
Lower Reach	1036.821	Q=250	250.00	60.08	62.57	61.87	62.84	0.003790	4.2	59.72	32.49	0.54
Lower Reach	1036.821	Q=1400	1400.00	60.08	66.49	64.64	67.07	0.001795	6.1	228.92	53.75	0.52
Lower Reach	1036.821	Q=2050	2050.00	60.08	67.31	65.66	68.18	0.002205	7.5	274.88	58.20	0.60
Lower Reach	1036.821	Q=875	875.00	60.08	65.09	63.63	65.56	0.002153	5.5	158.90	46.15	0.52
Lower Reach	819.1344	Q=1300	1300.00	58.79	65.89	62.65	66.09	0.005256	3.6	358.57	97.04	0.30
Lower Reach	819.1344	Q=1100	1100.00	58.79	65.34	62.33	65.53	0.005158	3.5	315.56	75.77	0.30
Lower Reach	819.1344	Q=250	250.00	58.79	61.80	60.42	61.90	0.004401	2.5	98.35	47.06	0.31

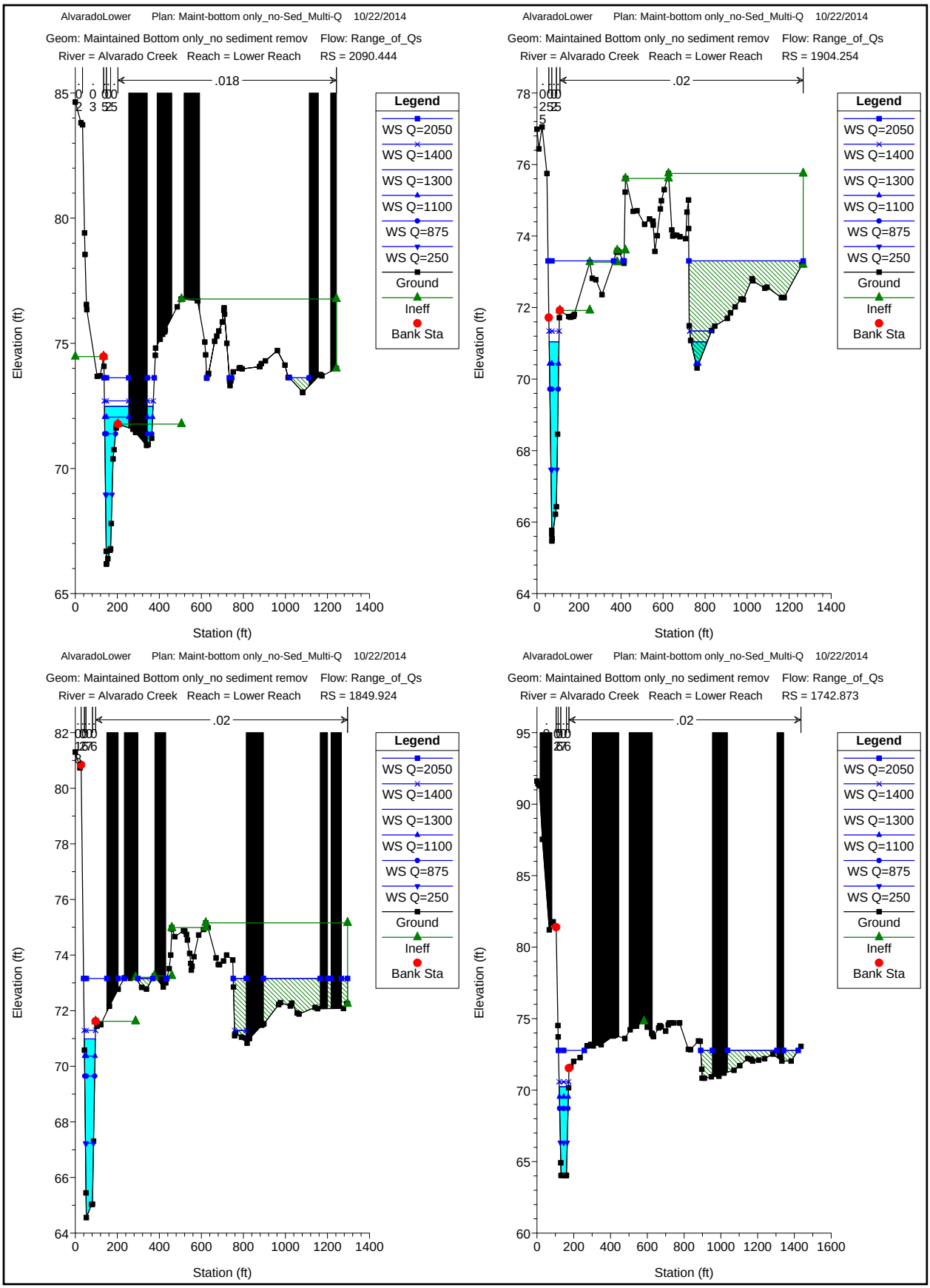
HEC-RAS Plan: BotOnly_NoSed_Qs River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	819.1344	Q=1400	1400.00	58.79	66.12	62.80	66.33	0.005367	3.7	377.50	119.18	0.30
Lower Reach	819.1344	Q=2050	2050.00	58.79	66.86	63.68	67.20	0.007839	4.7	440.59	245.97	0.37
Lower Reach	819.1344	Q=875	875.00	58.79	64.61	61.93	64.78	0.005128	3.3	262.47	69.86	0.30
Lower Reach	415.466	Q=1300	1300.00	57.01	63.91	59.51	63.98	0.005008	2.2	602.55	133.60	0.16
Lower Reach	415.466	Q=1100	1100.00	57.01	63.37	59.30	63.44	0.005009	2.0	539.97	106.36	0.16
Lower Reach	415.466	Q=250	250.00	57.01	59.96	58.08	59.98	0.005006	1.2	205.99	89.34	0.14
Lower Reach	415.466	Q=1400	1400.00	57.01	64.13	59.61	64.20	0.005009	2.2	633.88	168.70	0.16
Lower Reach	415.466	Q=2050	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	Q=875	875.00	57.01	62.64	59.05	62.70	0.005009	1.9	463.85	102.79	0.16


AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS Q=2050
WS Q=1300
WS Q=1400
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.015
.018
Legend
WS Q=2050
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS Q=2050
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=2050
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.018
.05
.015
Legend
WS Q=2050
WS Q=1300
WS Q=1100
WS Q=1400
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=2050
WS Q=1300
WS Q=1400
WS Q=1100
WS Q=250
WS Q=875
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=250
WS Q=875
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

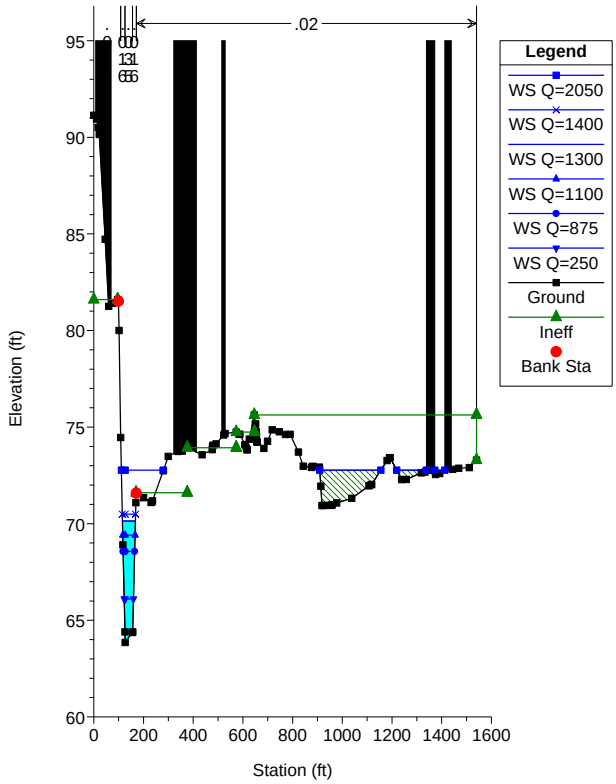

AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs

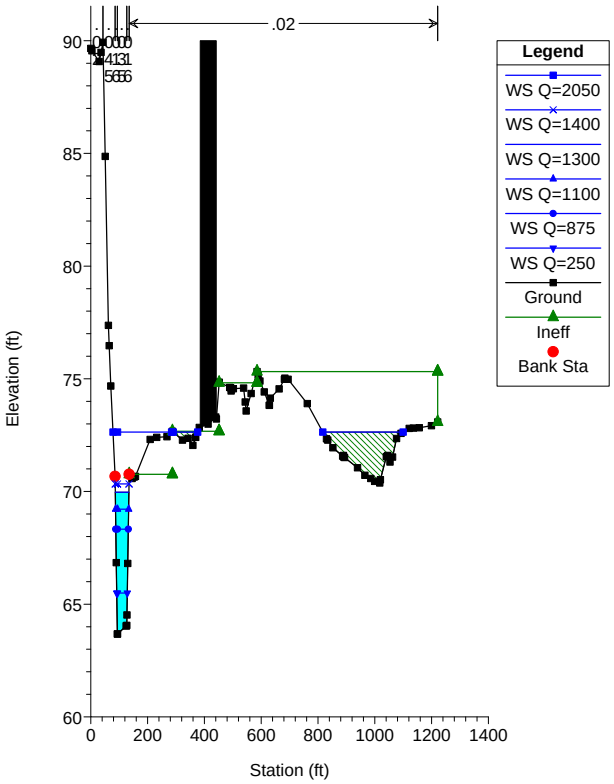
River = Alvarado Creek Reach = Lower Reach RS = 1705.846



AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs

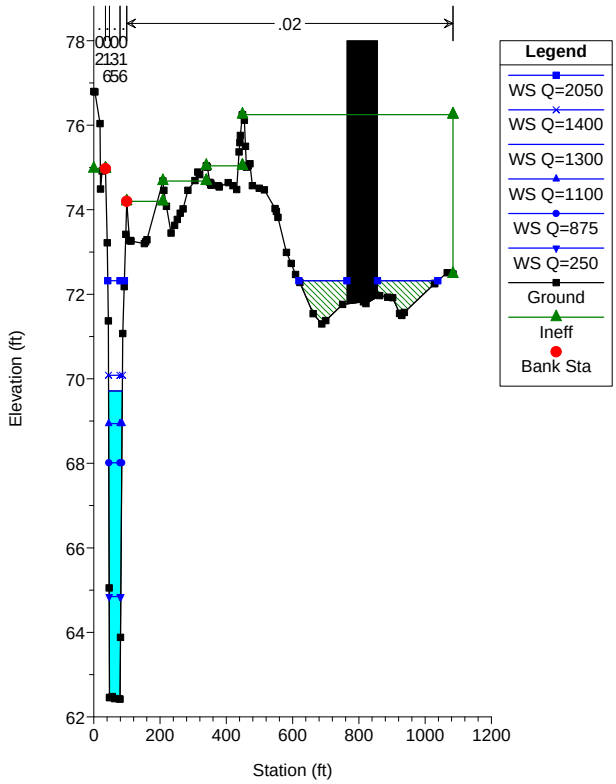
River = Alvarado Creek Reach = Lower Reach RS = 1573.644



AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs

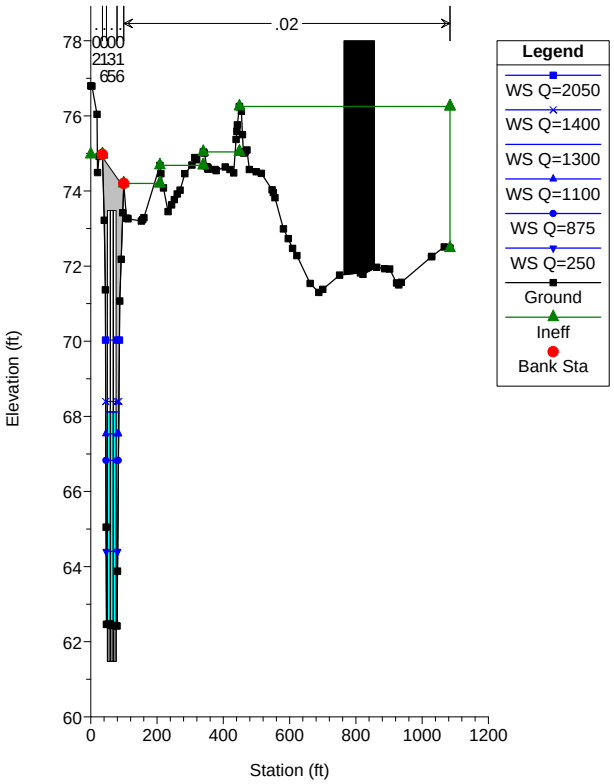
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge

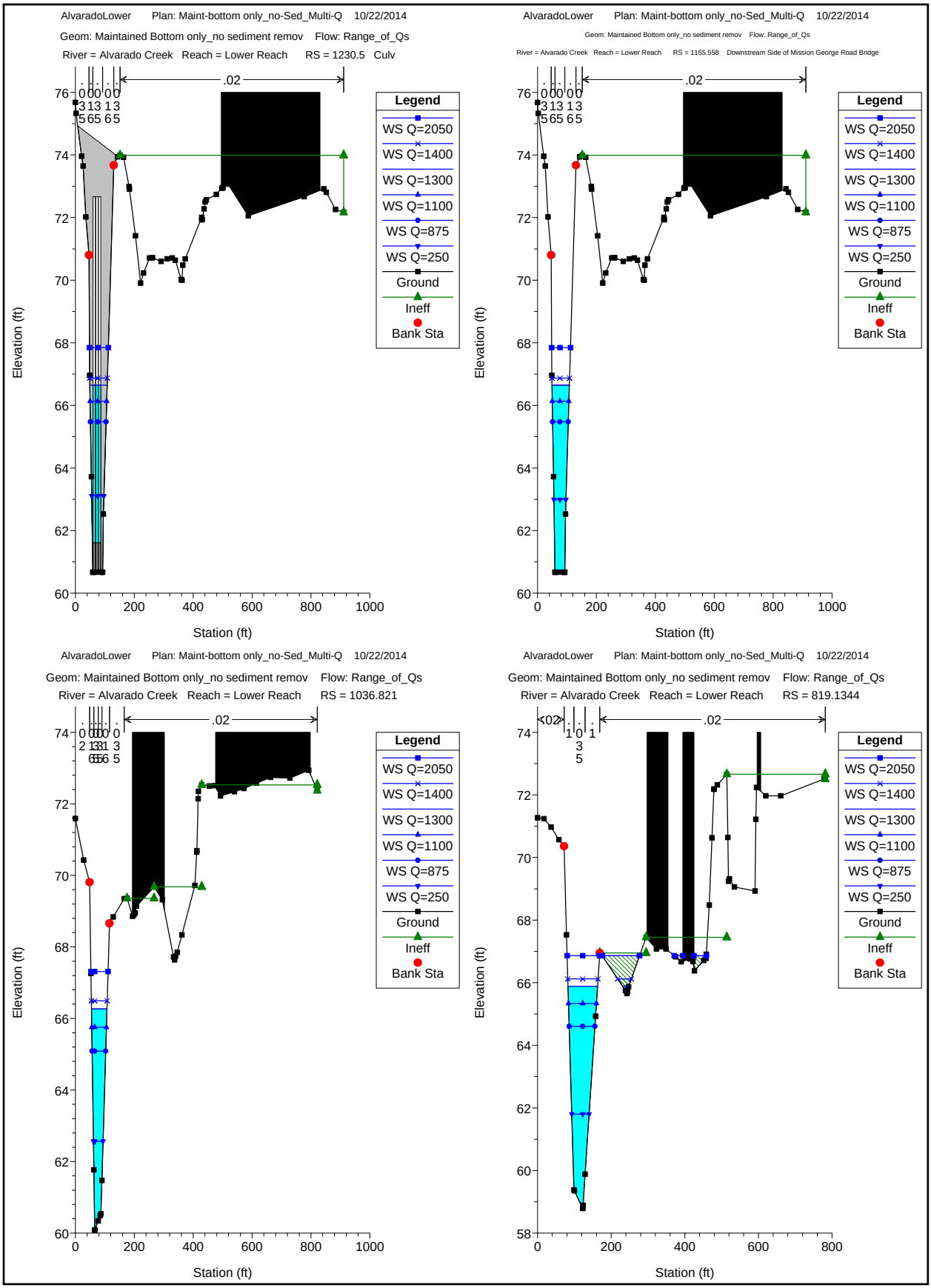


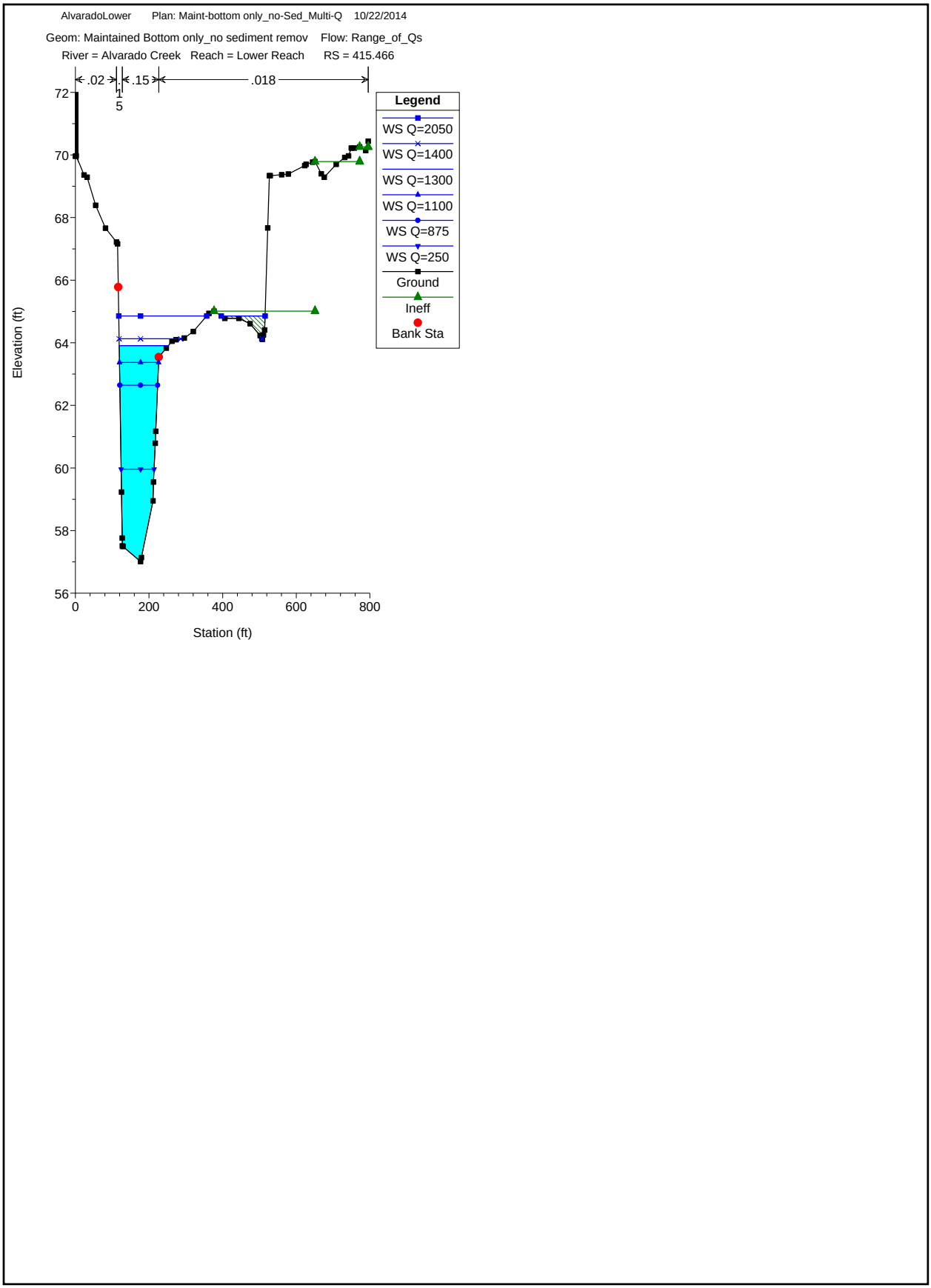
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014

Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs

River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv




AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Maint-bottom only_no-Sed_Multi-Q 10/22/2014
Geom: Maintained Bottom only_no sediment remov Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
Legend
WS Q=2050
WS Q=1400
WS Q=1300
WS Q=1100
WS Q=875
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 12:35:15 PM

Project in English units

*****************************************************************************

PLAN DATA

Plan Title: Maint-bottom only_no-Sed_Multi-Q
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p18

          Geometry Title: Maintained Bottom only_no sediment remov
          Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g10

          Flow Title    : Range_of_Qs
          Flow File     : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Plan Description:
Maintained:vegetation only removal in City of San Diego maintained portions
only (no sediment removed)


Plan Summary Information:
Number of:  Cross Sections =   23    Multiple Openings  =    0
            Culverts       =    1    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    5

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: Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Flow Data (cfs)
*****************************************************************************
*****************************************************************************
***
* River           Reach           RS      *          Q=1700          Q=1300
Q=1100           Q=900           Q=500           Q=340          Q=1250
Q=800 *
* Alvarado Creek  Lower Reach     3519.101*            1700            1300
1100             900             500             340            1250             800
*
*****************************************************************************
*****************************************************************************
***
*****************************************************************************
*****************************************************************************
***
* River           Reach           RS      *           Q=250           Q=600
Q=1850           Q=950           Q=1180          Q=1400          Q=1600
Q=450 *
* Alvarado Creek  Lower Reach     3519.101*             250             600
1850             950             1180            1400            1600             450
*
*****************************************************************************
*****************************************************************************
***

Boundary Conditions
*****************************************************************************
*****************************************************************************
* River           Reach           Profile          *            Upstream
Downstream    *
*****************************************************************************
*****************************************************************************
* Alvarado Creek  Lower Reach     Q=1700           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1300           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1100           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=900            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=500            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=340            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1250           *
Normal S = 0.005 *
```

```
* Alvarado Creek  Lower Reach     Q=800            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=250            *
Normal S = 0.005 *
********************************************************************************
******************

**************************************************************************

GEOMETRY DATA

Geometry Title: Maintained Bottom only_no sediment remov
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g10

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3519.101

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************
       0   83.94    7.23   83.78    45.4   83.36   67.28   83.31   97.34    83.3
  107.14    83.1  126.44   71.93  127.98   71.35   129.5   70.52  133.27   70.93
  137.17   71.01  155.09   71.13  155.92   71.57     160   73.71  178.45   79.21
  188.01   82.98  190.95   83.09  206.58   83.22  236.14   83.48  244.64   83.43
     248   83.45  282.79   83.22  287.79   83.18  307.35   82.95  308.27   82.94
  328.59   82.78  333.03    82.7  355.98   82.51  359.45   82.44  363.96   82.35
   371.9    81.3  382.25    80.7  398.46   79.81  400.43   79.74  405.16   79.64
  430.03   79.67  453.27   79.66  458.52   79.93  489.51   80.66  491.93   80.72
  493.29   80.76  494.77    80.8  508.53   81.54  525.25   81.93  550.96   82.49
  571.25   82.35  573.37    82.4  575.72   82.46  582.06   82.57  619.05   83.33
  631.18   83.37   631.5   83.37

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************************
       0     .02   97.34    .016  126.44    .035  155.92    .016  190.95    .018
  405.16    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        107.14  188.01           137.3  137.31  137.44            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  236.14   631.5               F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
**********************
  473.62   631.5      84

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3506.967

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************
       0   81.44     .54   81.34    5.52   81.13   15.16   81.11   45.52   80.97
   57.61   81.06   60.29   80.98   67.08   80.78   77.87   80.71   87.14   80.65
  103.56   80.83  107.18   80.81  118.93   80.74  131.34   80.66  135.42   80.68
  139.97   80.61  157.29   80.51  165.59   80.46   176.5   80.45  193.52   80.34
  215.72    80.1  223.61   79.99  228.63   79.91  244.19   79.96  252.53   79.88
  260.39    79.8   273.3   79.78  293.11   79.55  302.58   79.56   316.4   79.56
  331.68   79.56   341.8   79.59   343.2   79.34  343.49   79.29  358.82   77.39
  359.99   77.22  360.28   77.21   377.6   76.37  397.84   76.41  407.72   76.44
   410.6   76.34  430.83   77.02  452.14   77.73  453.48   77.73  455.44   77.62
  470.17      78

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3381.792

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************
       0   81.82    32.03   81.84    62.76   81.16    96.23   81.47  109.42   81.21
   122.6   81.05  135.12   74.97  141.89   71.47  142.23   71.29  165.14   70.65
  165.47   70.64  165.73   70.64  166.19   70.87  166.87    71.2  185.99   80.71
  210.05   80.61  221.99   80.56  242.35   80.46  297.45   80.17  309.35   80.16
  373.54   79.68  381.29   79.61   384.5    79.5  410.52   79.11  411.74   78.97
  416.74   78.36  416.89   78.34  423.53   78.35  465.23   78.37  469.91   78.83
  488.01   80.35  500.64   81.48  504.86   81.73  514.07   81.81  515.55   82.02
  515.73   81.88  521.84   82.32  526.82   82.59  551.59   83.43  586.82   83.39
  607.56   83.74  647.33   83.65  666.66   83.61  674.54   84.13  687.77   84.86
  688.54   85.83

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************************
       0    .018   122.6    .016  141.89    .035  166.19    .016  185.99    .018
  411.74    .015  488.01    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         122.6  185.99           209.35  210.34   211.8            .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  607.56  688.54   83.74       F
  551.59  607.56   83.43       F
       0   96.23   81.47       F
     215  551.59      84       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**************************************************
  214.24  232.41      86   16.29  101.01      86
```

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	127.82	68.68
141.72	69.08	141.98	69.08	158.74	77.34	163.16	79.53	164.4	79.54
167.68	79.61	192.51	80.12	204.24	80.17	226.22	80.23	247.8	80.28
262.03	80.22	309.68	79.94	346.41	79.52	363.13	79.65	363.46	79.97
385.92	75.14	386.67	75.01	387	74.97	391.37	74.72	393.12	74.56
401.53	74.44	439.47	74.21	440.47	74.2	448.3	75.25	449.63	75.54
468.16	78.3	468.82	78.4	469.79	78.63	489.77	82.2	491.15	82.34
491.2	82.34	498.23	82.68	537.5	82.57	552.22	82.45	560.01	82.45
612.04	82.26	642.71	82.87	662.61	83.37	673.58	83.91	685.09	84.15
685.14	84.15	685.54	84.42	691.85	88.65				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	116.71	.035	141.72	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.69 167.68 32.79 31.38 28.21 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	95.69	81.19	F
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	121.78	67.99
145.21	68.69	145.46	68.69	161.99	75	164.4	76.1	165.21	76.15
169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2	238.98	77.08
253.88	77	265.89	76.8	311.18	76.55	320.11	76.42	352.63	76.62
356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26	419.63	74.17
444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85	460.97	77
461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24	506.27	77.23
518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74	648.95	79.3
652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87	693.26	88.99

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	119.67	.035	145.46	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.91	117.43	67.92	137.35	68.5
140.94	68.59	140.98	68.59	143.73	70.14	158.51	78.33	168.47	76.41
177.34	76.52	235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12
329.16	76.48	336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57
400.89	75.68	402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16
424.44	75.24	439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53
463.42	76.3	467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97
521.9	78.7	535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97
668.1	79.98	668.55	79.98	669	80.01	689.24	80.91	703.56	86.82

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	93.68	.016	117.02	.035	140.94	.016	158.51	.018
408.4	.015	463.42	.05	588.58	.015				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT

Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.1	110.07	.15	121.5	.1	159.23	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
92.48	143.16	165.5	169.96	176.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.1	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
71.39	104.55	162.85	162.93	162.56	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06

```
  586.66   79.04  604.37   79.34  634.88   79.77  647.22   79.72   685.7   79.32
  717.19    79.4  747.64   78.97  776.38    79.2  793.01   79.33   795.4   79.35
  804.92   79.43

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************
       0     .02    41.1     .02    53.2      .1  102.77     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         53.2  102.77           158.36  154.23  152.81             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  634.88  804.92   79.77       F
  423.21  634.88   78.27       F
  102.77  423.21   71.46       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
  659.03     679      86  386.11   473.7      86

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2360.635

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   82.78    2.38   82.59   14.12   83.65   14.25   83.58   16.28   82.69
   27.93   75.07   31.19    74.9   32.22   74.88   32.55   74.87   56.86   74.48
   59.39   74.02   69.46   72.26   74.34   71.47    82.9   71.61   93.85    71.6
   98.97   69.52  100.84   68.17  104.05   67.51  105.82   67.47  107.64   67.43
  116.02    67.1   116.7   67.07  125.39   70.54  129.21   72.21  146.27   72.31
  147.82   72.32  151.45   72.33  169.17   72.44  177.04   72.44  194.94   72.57
  213.19    72.7  231.11   72.83  239.86   73.05  256.64   73.16  268.08   73.24
  274.44    73.2  275.92   73.09  316.41   73.22  324.05   72.33  337.68   74.65
  345.19   75.59  353.05   75.56  360.81   75.87  401.93   77.57  412.48   77.82
  416.98   77.65  422.38   77.15  424.89   76.98  434.19   76.78  447.79   76.56
  461.33    76.4  484.88   75.63  493.56   75.31   502.3   75.48  515.87    75.8
  571.75   76.38  576.32    76.4  577.86   76.39  606.49   76.26  622.33   76.12
  630.75   75.99  636.37   76.13  687.01   76.06  708.05   75.76  720.51   75.23
  782.65    74.6   813.1   74.88  823.95   74.67   827.4   75.46  827.87    75.5
  887.31   75.88

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0     .03   59.39     .02   74.34    .025   93.85    .025   98.97    .025
  129.21     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         69.46  129.21           19.33   19.66   19.62             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  412.48  887.31   77.82       F
  268.08  412.48   73.24       F
  129.21  268.08   72.21       F
Blocked Obstructions     num=       3
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
  849.37  887.31      84   333.1  396.34      84  181.12  281.23      84

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2340.973

INPUT
Description:
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   80.61     .87    80.6    22.6   79.47    32.6   78.24   56.43   76.37
   64.23   75.35   95.77   73.35    95.9   73.35   95.96   73.33    96.3   73.28
  128.28   68.28  130.03   67.85  138.44   67.48  139.56   67.44  145.84   67.34
  152.75   67.19   156.9   67.65  166.58   68.13  176.76   67.33   179.2   67.35
  190.45   69.19  196.47   69.33   215.6    69.8  220.82   69.93  224.96   69.93
     235   69.54  237.01   69.61  238.67   69.67  249.12   70.52  252.71   70.52
  266.23      71  267.66   71.06  282.66    71.6  284.78   71.69  286.98   71.78
  292.56   72.39  307.25   72.45  308.01   72.97  337.72   73.54   353.4    73.6
  367.91   71.92  375.12   73.13  387.83   75.78  402.57   77.03  407.14   77.24
   442.2   77.57  446.53   77.42  449.33   77.35   454.1   77.03   458.5   76.86
     491   76.17   494.2    76.1  523.16   75.19  526.15   75.28  545.45   75.73
  578.04   76.07  584.36   76.13  611.54   76.28  618.89   76.23  652.11   76.12
  671.87   76.07  673.16   76.09  686.67   76.05  740.04   75.94  747.31   75.84
  750.97   75.69  804.08   75.28  840.64   74.91  848.96   74.78  851.12   74.73
  864.95   74.44  866.51   74.97  868.93   75.75  882.87   75.86  910.13   76.01
  918.13   75.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .02   95.77    .025  292.56    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         95.77  249.12           34.23   31.23   27.43             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   442.2  918.13   77.57       F

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 2332.283

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   72.93    28.6   73.11   32.41   73.05   36.27   73.07   53.73   73.26
   75.72   72.98   83.18   72.87   84.73   72.87  113.73   72.49  120.12    72.4
  121.97    72.3  122.55   72.29  142.45   70.32  150.53   70.37  152.44    70.1
  154.56   70.11  177.32    70.1  177.71    70.1  184.07   70.16  196.07   70.18
  210.92    70.5  211.71   70.49  242.42   70.74  255.17   70.77  296.16   70.87
```

302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08

```
  673.19   75.29  682.75   75.49  699.59   75.85  706.79   76.32  708.21   76.42
   710.5   76.17  721.06      75  733.86   73.51  736.35   73.31  740.23   73.51
  751.82   73.86  779.52      74  784.48   74.03   793.6   73.98  877.01   74.07
  877.93   74.07  884.82   74.19  904.52    74.3  961.49   74.71  997.84   74.13
 1012.87   73.63  1017.1   73.64 1082.33   73.05  1082.5   73.03 1164.82   73.75
 1168.93   73.73 1173.57    73.7 1242.67   73.99

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .02   34.56     .03  134.84     .05   147.9     .02  167.71     .05
  202.76    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        134.84  202.76           183.41  186.19  187.45             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  505.61 1242.67   76.77       F
       0  134.84   74.47       F
  202.76  505.61   71.77       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
  253.88  342.73      85  389.09  459.09      85  517.66  561.05      85
  561.05  591.44      85 1113.13 1156.42      85 1215.17 1242.67      85

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1904.254

INPUT
Description:
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   76.99    8.79   76.44   24.35   77.05   47.31   75.75   56.56   71.72
   70.25   65.77   70.48   65.65   70.85   65.47   72.27   65.53   87.65   66.22
   92.18   66.43   98.17   68.46  106.67   71.72  109.43   71.92  151.01   71.75
  159.27   71.73  168.23   71.75  173.16   71.77  174.73   71.76  177.55   71.81
  251.31   73.27   263.3   72.82  279.78   72.78  309.56   72.36  378.72   73.55
  382.13    73.6  384.52   73.57  390.88   73.55  414.28   73.24  419.89   75.23
   420.9   75.61  422.68   75.61  458.26   74.69  476.08   74.71  512.04   74.33
  535.68   74.48  550.94   74.42     552   74.42  553.17   74.31  560.93   73.57
  571.04   74.01  586.99   74.76  592.36   74.99  605.54    75.3  625.78   75.75
  641.58   74.17  646.46      74  651.36   74.03  665.28   74.02  680.67   73.98
  707.41   73.93  713.85   74.67  720.98   75.01  721.72   74.21  724.33   71.49
  731.33   71.08  761.41   70.31  831.59   71.36  846.38   71.48  905.94    71.7
  921.23   71.85  942.82   72.02  971.41   72.24  981.91   72.22 1023.02   72.81
 1027.24   72.75 1084.74   72.54 1094.89   72.57 1163.16   72.28 1176.32   72.28
  1260.8    73.2 1264.92    73.2 1267.13    73.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0    .025   56.56     .05   70.25     .02   92.18     .05  109.43     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         56.56  109.43           55.48   54.33   52.65             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
  109.43  251.31   71.92       F
  251.31  382.13   73.27       F
  382.13   420.9    73.6       F
   420.9  625.78   75.61       F
  625.78 1267.13   75.75       F

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1849.924

INPUT
Description:
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    81.3   22.19   80.73   27.83   80.84   43.55   70.58    50.9   65.45
   52.16   64.56   77.48   65.04   79.17   65.04   81.83   65.04   86.72   67.31
   96.83   71.62  102.85   71.44  120.83    71.5  121.28    71.5  162.27   72.16
  203.84   72.77  234.07   73.18  262.22   73.16     287    73.2  315.47   72.84
  338.75   72.78   375.8   73.25  418.39   72.85  430.44      73  446.57   73.51
  454.04      74  458.95   74.94  459.21   74.99  459.67   74.98  473.54   74.66
  515.16   74.88  521.36   74.86  529.13   74.74  533.68   74.54  544.33   74.06
   549.3    73.7     552   73.46  555.67    73.6  564.62   73.94  587.23   74.72
  610.02   74.92  621.12   75.16  631.61   74.98  670.03    73.9  680.62   73.66
  686.29   73.65  705.55   73.79  720.09      74  749.26   73.82  752.63   72.85
  758.57    71.1   762.8   71.19  790.92   71.05  809.65   71.02  817.24   70.83
  828.47      71  887.89   71.48  897.69   71.52  967.83   72.22  976.49   72.29
 1023.22   72.17 1030.23   72.27  1055.6   71.92 1065.03   71.88 1141.19   72.12
  1152.9   72.07 1276.23   72.08 1292.03   72.25 1295.72   72.25

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0    .018   27.83     .02   43.55     .06    50.9     .07   81.83     .06
   96.83     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         27.83   96.83           119.68  107.05   93.87             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
   96.83     287   71.62       F
     287   375.8    73.2       F
   375.8  459.12   73.25       F
  459.12  621.12   74.99       F
  621.12 1295.72   75.16       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
  150.01  203.69      82  378.34  430.45      82 1165.47 1200.37      82
  233.42  298.12      82  813.24  895.39      82    1217 1266.52      82

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1742.873

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
```

0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

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

104.06	174.16	35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.33	64.4	126.3	63.85	155.3	64.37
155.61	64.37	156.53	64.4	169.13	71.09	170.1	71.6	171.11	71.58
200.06	71.35	230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74
299.09	73.48	338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57
476.37	73.83	477.83	74	479.36	74.06	491.62	74.13	522.66	74.59
527.93	74.67	573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1
609	74.08	614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38
645.8	75.63	650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51
656.37	74.24	657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86
746.25	74.76	771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98
875.8	72.91	879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94
918.4	70.94	923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98
977.17	71.07	1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03
1180.11	73.27	1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29
1318.12	72.63	1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81
1468.48	72.87	1511.38	72.9	1540.35	73.29				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.33	.035	155.61	.016	171.11	.02

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

99.12	171.11	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	85.63	70.67
89.75	66.84	93.76	63.68	94.09	63.68	124.89	64.04	124.96	64.04
126.79	64.06	127.33	64.52	130.23	66.81	135.25	70.76	145.46	70.58
152.61	70.64	156.91	70.67	208.87	72.31	232.07	72.4	268.04	72.43
287.13	72.67	322.8	72.28	342.36	72.36	359.71	72.05	369.42	72.4
382.2	72.84	413.09	72.99	439.86	73.3	442.26	73.22	451.68	74.82
451.93	74.85	489.05	74.62	492.33	74.6	494.22	74.46	496.02	74.55
502.05	74.56	537.94	74.59	543.47	73.97	547.27	73.57	564.7	74.35
585.61	75.32	589.03	75.19	595.39	74.9	610.65	74.42	628.48	73.82
628.64	73.83	632.03	74.14	662.9	74.55	681.75	74.98	683.52	75.03
694.87	74.98	762.03	73.9	829.96	72.34	834.17	72.28	852.61	71.94
886.74	71.57	889.76	71.6	890.89	71.53	893.47	71.51	939.27	71.05
964.87	70.72	985.97	70.58	999.54	70.45	1017.68	70.38	1019.9	70.52
1040.58	71.55	1043.19	71.55	1044.08	71.56	1045.68	71.6	1053.71	71.31
1062.36	71.53	1076.84	72.35	1092.33	72.58	1121.01	72.8	1135.54	72.81
1156.84	72.83	1199.56	72.92	1221.53	73.08				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	85.63	.016	93.76	.035	126.79	.016
135.25	.02								

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

85.63	135.25	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	47.46	.035	79.09	.016	99.47	.02

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
35.1	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21

Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
35.1	74.97	40.35	73.22	44.03	71.37	46.28	65.05	47.46	62.46
47.61	62.46	55.75	62.48	62.69	62.43	75.77	62.43	79.09	62.42
80.56	63.88	87.2	71.07	91.68	72.18	96.69	73.42	99.47	74.2
107.55	73.27	111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24
160.22	73.29	208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45
243.72	73.63	251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46
305.4	74.69	313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01
350.26	74.65	353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57
378.59	74.54	405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37
440.77	75.59	442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12
457.74	75.5	460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57
499.53	74.51	514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82
581.53	72.99	595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54
687.91	71.3	700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78
862.82	71.97	887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52
929.65	71.5	937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51
1084.18	72.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	35.1	.016	47.46	.035	79.09	.016	99.47	.02

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
35.1	99.47	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02
46.27	70.8	48.44	66.96	54.41	63.72	59.22	60.67	59.37	60.67
68.77	60.67	87.93	60.67	90.19	60.67	92.72	60.67	94.83	62.53

```
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         46.27  130.44           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                21     110     .018     .035      .94                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   46.27    70.8   48.44   66.96   54.41   63.72   59.22   60.67   59.37   60.67
   68.77   60.67   87.93   60.67   90.19   60.67   92.72   60.67   94.83   62.53
  130.44   73.67  143.04   73.94  151.67   73.99  163.31   73.93  182.18   72.99
  183.46   72.91   203.9   71.42   221.2   69.91   231.4   70.23  251.76   70.71
  260.52   70.72  262.13   70.72  290.97    70.6  312.02   70.68  328.69   70.71
  339.11   70.64  359.52   70.02   362.2      70  364.66   70.48  373.11   70.68
  428.82   72.01  429.07   71.93  430.72   71.94  436.95   72.28   440.5    72.5
  444.65   72.57  478.56   72.74  497.03   72.94  499.73   72.96  501.14   72.95
   518.9   73.07  586.99   72.06  777.15   72.67  843.55   72.92  851.87   72.81
  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .035   46.27    .016   59.22    .035   92.72    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         46.27  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width         =      10
Weir Coefficient           =       2
Weir Flow Reference        = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE
```

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	52.88	67.26	62.89	61.77
65.67	60.08	65.95	60.09	77.5	60.34	84.29	60.49	86.4	60.54
89.98	61.47	115.82	68.66	128.53	68.84	165.64	69.35	175.37	69.36
194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14	267.19	69.68
295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74	345.68	67.85
361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69	417.08	72.14
417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51	492.7	72.22
540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74	728.33	72.72
792.36	72.94	821.37	72.37						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.016	62.89	.035	77.5	.035	89.98	.016
115.82	.035	165.64	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
48.23 115.82 217.42 217.69 218.99 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	59.38	100.14	59.35	122.39	58.79	122.92	58.79
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.1	98.97	.035	129.2	.1	168.96	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.14 168.96 431.18 403.67 344.14 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79

```
  667.97    69.4  676.04   69.29  708.55    69.7  731.78   69.92  742.21   69.97
  749.38   70.22  757.73   70.22  772.23   70.26   788.8   70.14  795.52   70.44

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************
       0     .02  111.71     .15  127.59     .15  226.72    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        116.54  226.72           420.92  415.47  422.02             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
       0    7.54      72

********************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek
*************************************************************************************************
****************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
n6    *   n7    *   n8    *   n9    *
*************************************************************************************************
****************************************
*Lower Reach     *    3519.101    *      .02*     .016*     .035*     .016*     .018*
.015*         *         *         *
*Lower Reach     *    3506.967    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    3381.792    *     .018*     .016*     .035*     .016*     .018*
.015*     .018*         *         *
*Lower Reach     *    3171.448    *     .018*     .016*     .035*     .016*     .018*
.018*      .06*     .018*      .05*
*Lower Reach     *    3140.066    *     .018*     .016*     .035*     .016*     .018*
.02*      .05*         *         *
*Lower Reach     *    3034.592    *     .018*     .016*     .035*     .016*     .018*
.015*      .05*     .015*         *
*Lower Reach     *    3029.094    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    2847.761    *      .02*       .1*      .15*       .1*      .02*
*         *        *        *
*Lower Reach     *    2677.801    *      .02*       .1*     .018*     .018*      .03*
.018*         *         *         *
*Lower Reach     *    2514.866    *      .02*      .02*       .1*      .02*         *
*         *         *         *
*Lower Reach     *    2360.635    *      .03*      .02*     .025*     .025*     .025*
.02*         *         *         *
*Lower Reach     *    2340.973    *      .02*     .025*     .025*         *         *
*         *         *         *
*Lower Reach     *    2332.283    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    2309.739    *      .03*     .035*     .025*     .025*     .025*
.02*         *         *         *
*Lower Reach     *    2266.686    *      .02*       .1*      .02*         *         *
*         *         *         *
*Lower Reach     *    2090.444    *      .02*      .03*      .05*      .02*      .05*
.018*         *         *         *
*Lower Reach     *    1904.254    *     .025*      .05*      .02*      .05*      .02*
*         *         *         *
*Lower Reach     *    1849.924    *     .018*      .02*      .06*      .07*      .06*
.02*         *         *         *
*Lower Reach     *    1742.873    *     .018*      .02*      .06*      .07*      .06*
.02*         *         *         *
*Lower Reach     *    1705.846    *      .02*     .016*     .035*     .016*      .02*
*         *         *         *
*Lower Reach     *    1573.644    *      .02*     .045*     .016*     .035*     .016*
.02*         *         *         *
*Lower Reach     *    1305.41     *      .02*     .016*     .035*     .016*      .02*
*         *         *         *
*Lower Reach     *    1230.5      *Culvert  *        *        *        *        *
*         *         *         *
*Lower Reach     *    1155.558    *     .035*     .016*     .035*     .016*     .035*
.02*         *         *         *
*Lower Reach     *    1149.024    *Lat Struct*        *        *        *        *
*         *         *         *
*Lower Reach     *    1121.496    *Lat Struct*        *        *        *        *
*         *         *         *
*Lower Reach     *    1036.821    *      .02*     .016*     .035*     .035*     .016*
.035*       .02*         *         *
*Lower Reach     *    819.1344    *      .02*       .1*     .035*       .1*      .02*
*         *         *         *
*Lower Reach     *    415.466     *      .02*      .15*      .15*     .018*         *
*         *         *         *
*************************************************************************************************
****************************************

********************************************************************************

SUMMARY OF REACH LENGTHS

River: Alvarado Creek
*************************************************************
*     Reach      *   River Sta.   *  Left   * Channel *  Right  *
*************************************************************
*Lower Reach     *    3519.101    *    137.3*   137.31*   137.44*
*Lower Reach     *    3506.967    *Lat Struct*         *         *
*Lower Reach     *    3381.792    *   209.35*   210.34*    211.8*
*Lower Reach     *    3171.448    *    32.79*    31.38*    28.21*
*Lower Reach     *    3140.066    *   101.61*   105.47*   112.32*
*Lower Reach     *    3034.592    *   187.47*   186.83*   186.24*
*Lower Reach     *    3029.094    *Lat Struct*         *         *
*Lower Reach     *    2847.761    *    165.5*   169.96*    176.8*
*Lower Reach     *    2677.801    *   162.85*   162.93*   162.56*
*Lower Reach     *    2514.866    *   158.36*   154.23*   152.81*
*Lower Reach     *    2360.635    *    19.33*    19.66*    19.62*
*Lower Reach     *    2340.973    *    34.23*    31.23*    27.43*
*Lower Reach     *    2332.283    *Lat Struct*         *         *
*Lower Reach     *    2309.739    *    21.27*    43.05*    56.67*
*Lower Reach     *    2266.686    *    166.7*   176.24*   190.03*
*Lower Reach     *    2090.444    *   183.41*   186.19*   187.45*
*Lower Reach     *    1904.254    *    55.48*    54.33*    52.65*
*Lower Reach     *    1849.924    *   119.68*   107.05*    93.87*
*Lower Reach     *    1742.873    *     35.7*    37.03*     38.3*
*Lower Reach     *    1705.846    *   136.62*    132.2*   123.01*
*Lower Reach     *    1573.644    *   286.27*   268.23*   249.58*
*Lower Reach     *    1305.41     *   148.68*   149.85*   158.44*
*Lower Reach     *    1230.5      *Culvert  *         *         *
*Lower Reach     *    1155.558    *   118.42*   118.74*   122.35*
*Lower Reach     *    1149.024    *Lat Struct*         *         *
*Lower Reach     *    1121.496    *Lat Struct*         *         *
```

*Lower Reach	*	1036.821	*	217.42*	217.69*	218.99*
*Lower Reach	*	819.1344	*	431.18*	403.67*	344.14*
*Lower Reach	*	415.466	*	420.92*	415.47*	422.02*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
*Lower Reach	3519.101	.1	.3
*Lower Reach	3506.967	Lat Struct	
*Lower Reach	3381.792	.1	.3
*Lower Reach	3171.448	.1	.3
*Lower Reach	3140.066	.1	.3
*Lower Reach	3034.592	.1	.3
*Lower Reach	3029.094	Lat Struct	
*Lower Reach	2847.761	.1	.3
*Lower Reach	2677.801	.1	.3
*Lower Reach	2514.866	.1	.3
*Lower Reach	2360.635	.1	.3
*Lower Reach	2340.973	.1	.3
*Lower Reach	2332.283	Lat Struct	
*Lower Reach	2309.739	.1	.3
*Lower Reach	2266.686	.1	.3
*Lower Reach	2090.444	.1	.3
*Lower Reach	1904.254	.1	.3
*Lower Reach	1849.924	.1	.3
*Lower Reach	1742.873	.1	.3
*Lower Reach	1705.846	.1	.3
*Lower Reach	1573.644	.1	.3
*Lower Reach	1305.41	.1	.3
*Lower Reach	1230.5	Culvert	
*Lower Reach	1155.558	.1	.3
*Lower Reach	1149.024	Lat Struct	
*Lower Reach	1121.496	Lat Struct	
*Lower Reach	1036.821	.1	.3
*Lower Reach	819.1344	.1	.3
*Lower Reach	415.466	.1	.3

1. Maintained Condition Results (Sediment Removed in City of San Diego Maintained Portions of the Channel Only)
    a. FEMA Flow Rates
    b. Multiple Flow Rates
2. Maintained Condition Results (Sediment Removed Over Entire Channel)
    a. FEMA Flow Rates
    b. Multiple Flow Rates

HEC-RAS Plan: Conc Sed Removal River: Alvarado Creek Reach: Lower Reach

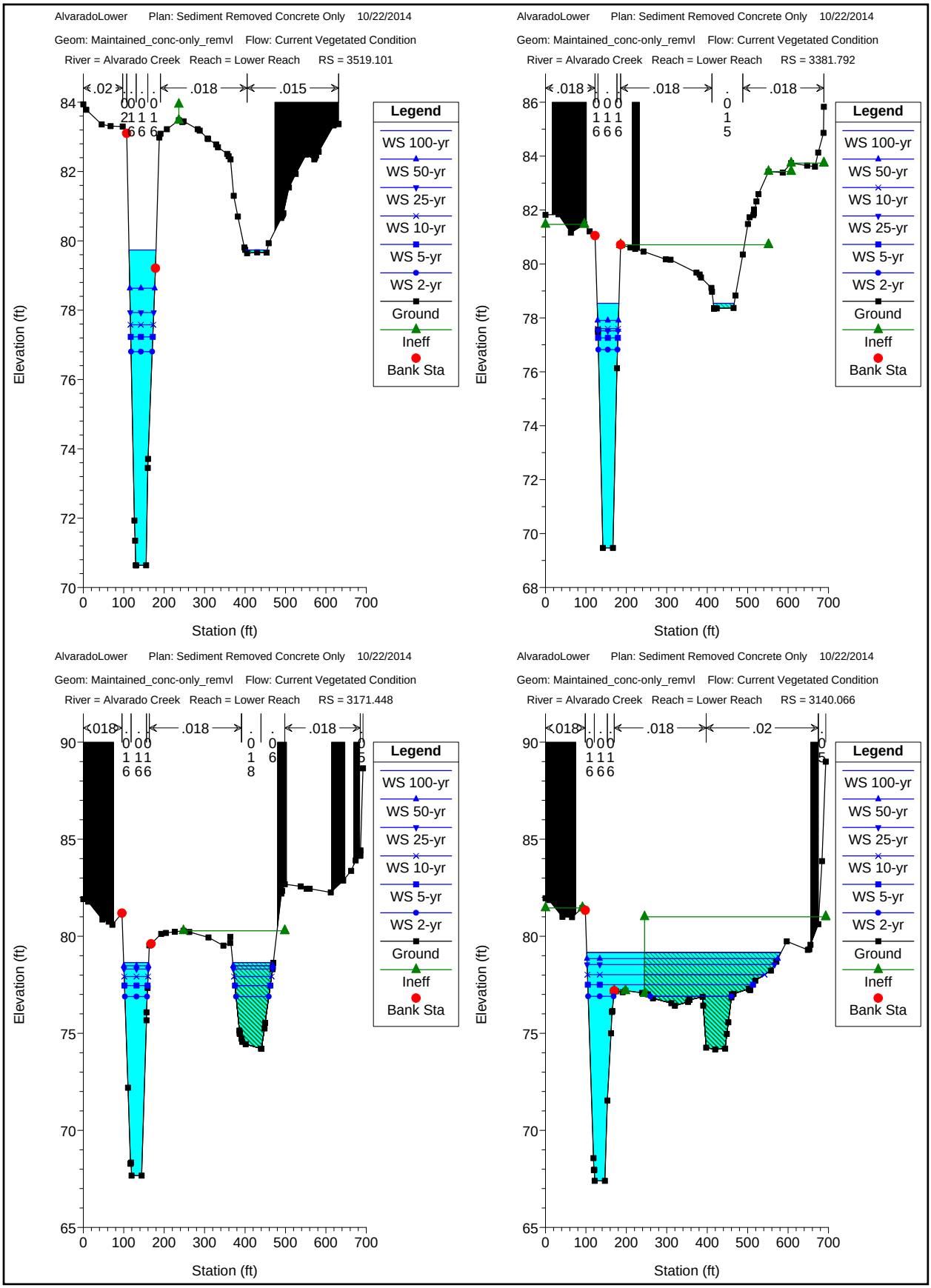
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	100-yr	5100.00	70.64	79.74		82.15	0.001700	12.5	409.26	120.97	0.88
Lower Reach	3519.101	50-yr	4500.00	70.64	78.63	78.63	81.38	0.002292	13.3	338.25	61.66	1.00
Lower Reach	3519.101	25-yr	3800.00	70.64	77.93	77.93	80.49	0.002343	12.8	296.33	58.10	1.00
Lower Reach	3519.101	10-yr	2700.00	70.64	77.58		79.06	0.001433	9.8	276.20	56.31	0.78
Lower Reach	3519.101	5-yr	2050.00	70.64	77.23		78.22	0.001007	8.0	256.86	54.53	0.65
Lower Reach	3519.101	2-yr	1180.00	70.64	76.80		77.20	0.000431	5.0	234.01	52.36	0.42
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	69.47	78.54	78.54	81.81	0.002263	14.5	351.80	105.58	1.00
Lower Reach	3381.792	50-yr	4500.00	69.47	77.91	77.91	81.01	0.002298	14.1	318.40	51.27	1.00
Lower Reach	3381.792	25-yr	3800.00	69.47	77.52	77.11	80.03	0.001943	12.7	298.87	49.78	0.91
Lower Reach	3381.792	10-yr	2700.00	69.47	77.60	75.72	78.83	0.000945	8.9	302.91	50.02	0.64
Lower Reach	3381.792	5-yr	2050.00	69.47	77.26	74.78	78.06	0.000639	7.2	285.90	48.93	0.52
Lower Reach	3381.792	2-yr	1180.00	69.47	76.82	73.26	77.13	0.000261	4.5	264.86	47.39	0.33
Lower Reach	3171.448	100-yr	5100.00	67.67	78.64	76.46	80.42	0.000990	10.7	476.68	161.72	0.68
Lower Reach	3171.448	50-yr	4500.00	67.67	78.48	75.85	79.92	0.000817	9.6	466.63	159.64	0.61
Lower Reach	3171.448	25-yr	3800.00	67.67	78.31	75.10	79.39	0.000619	8.3	456.28	157.28	0.53
Lower Reach	3171.448	10-yr	2700.00	67.67	77.93	73.75	78.53	0.000359	6.2	433.48	151.52	0.40
Lower Reach	3171.448	5-yr	2050.00	67.67	77.46	72.83	77.86	0.000246	5.0	406.47	144.52	0.33
Lower Reach	3171.448	2-yr	1180.00	67.67	76.90	71.36	77.05	0.000102	3.1	374.80	136.03	0.21
Lower Reach	3140.066	100-yr	5100.00	67.40	79.16	76.23	80.17	0.000552	8.4	705.06	480.60	0.52
Lower Reach	3140.066	50-yr	4500.00	67.40	78.85	75.62	79.74	0.000503	7.8	659.71	472.28	0.49
Lower Reach	3140.066	25-yr	3800.00	67.40	78.54	74.88	79.26	0.000420	7.0	616.30	463.66	0.45
Lower Reach	3140.066	10-yr	2700.00	67.40	78.02	73.55	78.47	0.000279	5.5	542.23	438.05	0.36
Lower Reach	3140.066	5-yr	2050.00	67.40	77.50	72.61	77.83	0.000212	4.6	469.34	408.70	0.31
Lower Reach	3140.066	2-yr	1180.00	67.40	76.91	71.11	77.04	0.000092	2.9	403.84	263.95	0.20
Lower Reach	3034.592	100-yr	5100.00	67.41	79.58	76.66	79.93	0.000253	5.7	1255.72	294.57	0.35
Lower Reach	3034.592	50-yr	4500.00	67.41	79.20	76.04	79.53	0.000247	5.5	1144.01	289.31	0.34
Lower Reach	3034.592	25-yr	3800.00	67.41	78.80	75.25	79.10	0.000226	5.2	1031.60	283.92	0.32
Lower Reach	3034.592	10-yr	2700.00	67.41	77.75	73.87	78.42	0.000411	6.6	411.73	260.52	0.43
Lower Reach	3034.592	5-yr	2050.00	67.41	77.36	72.91	77.79	0.000275	5.3	389.77	250.50	0.35
Lower Reach	3034.592	2-yr	1180.00	67.41	76.86	71.34	77.03	0.000111	3.3	362.20	219.24	0.22
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	68.72	79.39	77.68	79.83	0.001230	1.6	1151.03	286.89	0.11
Lower Reach	2847.761	50-yr	4500.00	68.72	79.01	77.45	79.43	0.001330	1.6	1043.35	279.86	0.11
Lower Reach	2847.761	25-yr	3800.00	68.72	78.64	77.17	79.01	0.001352	1.6	939.47	272.92	0.11
Lower Reach	2847.761	10-yr	2700.00	68.72	77.86	76.72	78.17	0.001656	1.7	731.08	263.62	0.12
Lower Reach	2847.761	5-yr	2050.00	68.72	77.37	75.68	77.63	0.001921	1.7	602.40	258.48	0.13
Lower Reach	2847.761	2-yr	1180.00	68.72	76.82	74.01	76.97	0.001660	1.5	462.37	254.01	0.12
Lower Reach	2677.801	100-yr	5100.00	67.57	77.70	77.70	79.31	0.005583	3.8	617.40	262.89	0.25
Lower Reach	2677.801	50-yr	4500.00	67.57	77.61	77.61	78.94	0.004833	3.5	600.12	257.74	0.23
Lower Reach	2677.801	25-yr	3800.00	67.57	76.98	76.98	78.46	0.006099	3.7	491.82	213.12	0.26
Lower Reach	2677.801	10-yr	2700.00	67.57	76.27	76.27	77.53	0.008177	3.9	376.89	155.49	0.29
Lower Reach	2677.801	5-yr	2050.00	67.57	75.74	75.74	76.87	0.011681	4.3	296.46	148.83	0.35
Lower Reach	2677.801	2-yr	1180.00	67.57	74.05	74.05	75.88	0.107686	10.9	108.51	49.44	1.00
Lower Reach	2514.866	100-yr	5100.00	67.21	76.55	74.91	77.05	0.001178	1.6	1045.77	270.45	0.12
Lower Reach	2514.866	50-yr	4500.00	67.21	76.32	74.66	76.76	0.001102	1.6	984.03	263.89	0.11
Lower Reach	2514.866	25-yr	3800.00	67.21	75.93	74.31	76.32	0.001091	1.5	883.53	252.85	0.11
Lower Reach	2514.866	10-yr	2700.00	67.21	75.17	73.77	75.49	0.001145	1.4	697.86	231.08	0.11
Lower Reach	2514.866	5-yr	2050.00	67.21	74.61	73.39	74.89	0.001230	1.4	573.38	215.01	0.11
Lower Reach	2514.866	2-yr	1180.00	67.21	73.79	72.84	73.97	0.001418	1.4	402.52	202.45	0.12
Lower Reach	2360.635	100-yr	5100.00	67.07	76.17	74.99	76.84	0.001320	7.3	809.48	521.87	0.51
Lower Reach	2360.635	50-yr	4500.00	67.07	76.00	74.73	76.57	0.001168	6.7	774.85	427.08	0.48
Lower Reach	2360.635	25-yr	3800.00	67.07	75.64	74.42	76.14	0.001112	6.3	701.17	369.15	0.46
Lower Reach	2360.635	10-yr	2700.00	67.07	74.88	73.89	75.30	0.001124	5.8	545.71	271.15	0.46
Lower Reach	2360.635	5-yr	2050.00	67.07	74.31	73.48	74.69	0.001192	5.5	439.37	175.18	0.46
Lower Reach	2360.635	2-yr	1180.00	67.07	73.48	72.20	73.77	0.001130	4.6	296.23	168.19	0.43
Lower Reach	2340.973	100-yr	5100.00	67.19	76.52	72.36	76.67	0.000220	3.3	1756.64	785.98	0.22
Lower Reach	2340.973	50-yr	4500.00	67.19	76.30	72.10	76.43	0.000193	3.1	1681.84	770.53	0.20
Lower Reach	2340.973	25-yr	3800.00	67.19	75.91	71.75	76.02	0.000174	2.8	1551.06	542.36	0.19
Lower Reach	2340.973	10-yr	2700.00	67.19	75.12	71.13	75.19	0.000147	2.4	1294.14	363.58	0.17
Lower Reach	2340.973	5-yr	2050.00	67.19	74.53	70.71	74.59	0.000130	2.1	1110.97	309.08	0.16
Lower Reach	2340.973	2-yr	1180.00	67.19	73.65	70.05	73.69	0.000088	1.5	852.88	286.68	0.13
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	76.37	74.37	76.65	0.000482	4.7	1264.16	757.59	0.31
Lower Reach	2309.739	50-yr	4500.00	66.92	76.17	74.18	76.41	0.000436	4.4	1201.23	748.28	0.29
Lower Reach	2309.739	25-yr	3800.00	66.92	75.79	73.96	76.00	0.000422	4.2	1084.52	622.49	0.29
Lower Reach	2309.739	10-yr	2700.00	66.92	75.00	73.47	75.18	0.000436	3.9	852.02	316.85	0.29
Lower Reach	2309.739	5-yr	2050.00	66.92	74.40	72.56	74.57	0.000480	3.8	682.77	278.75	0.29

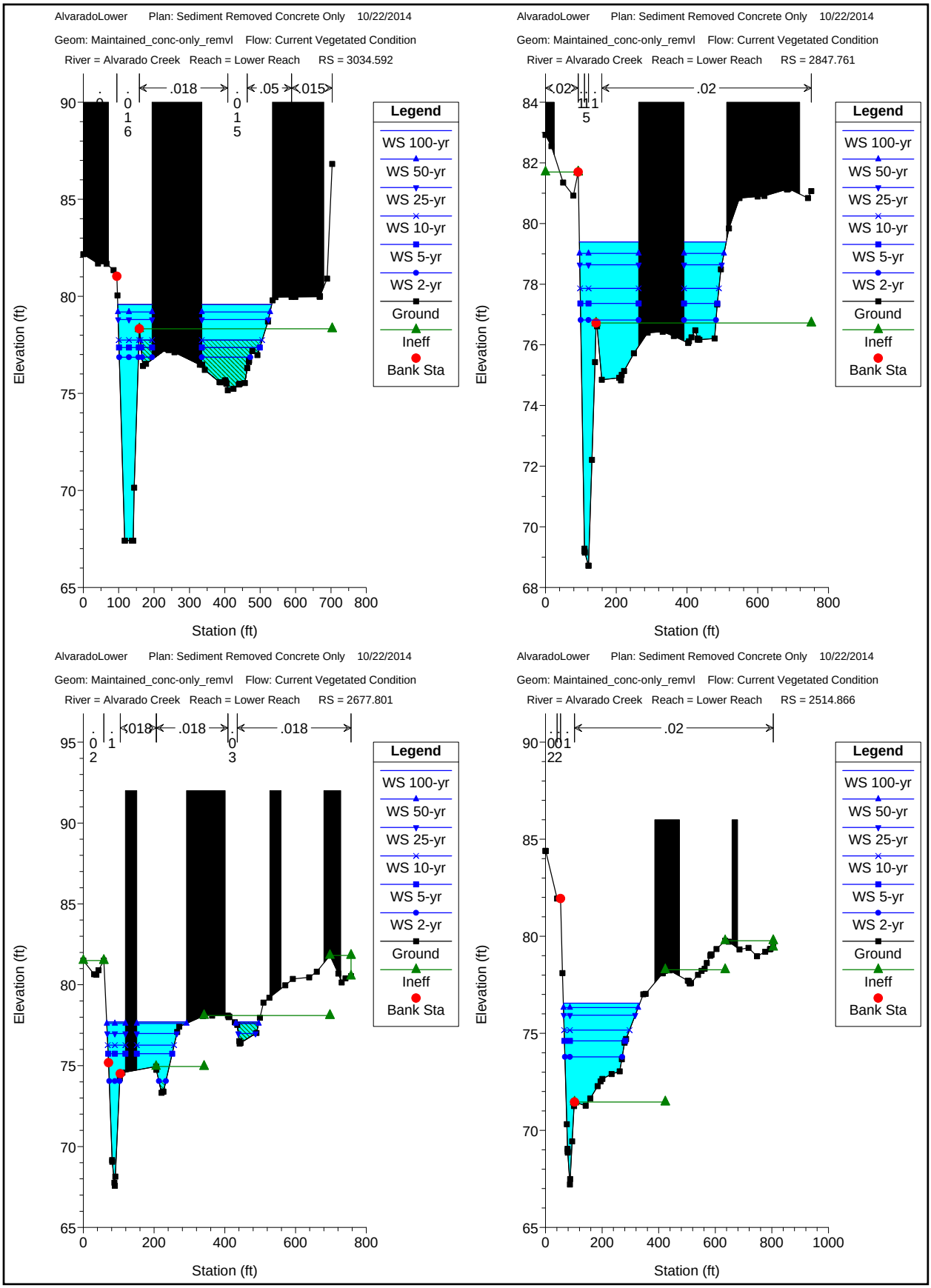
HEC-RAS Plan: Conc Sed Removal River: Alvarado Creek Reach: Lower Reach (Continued)

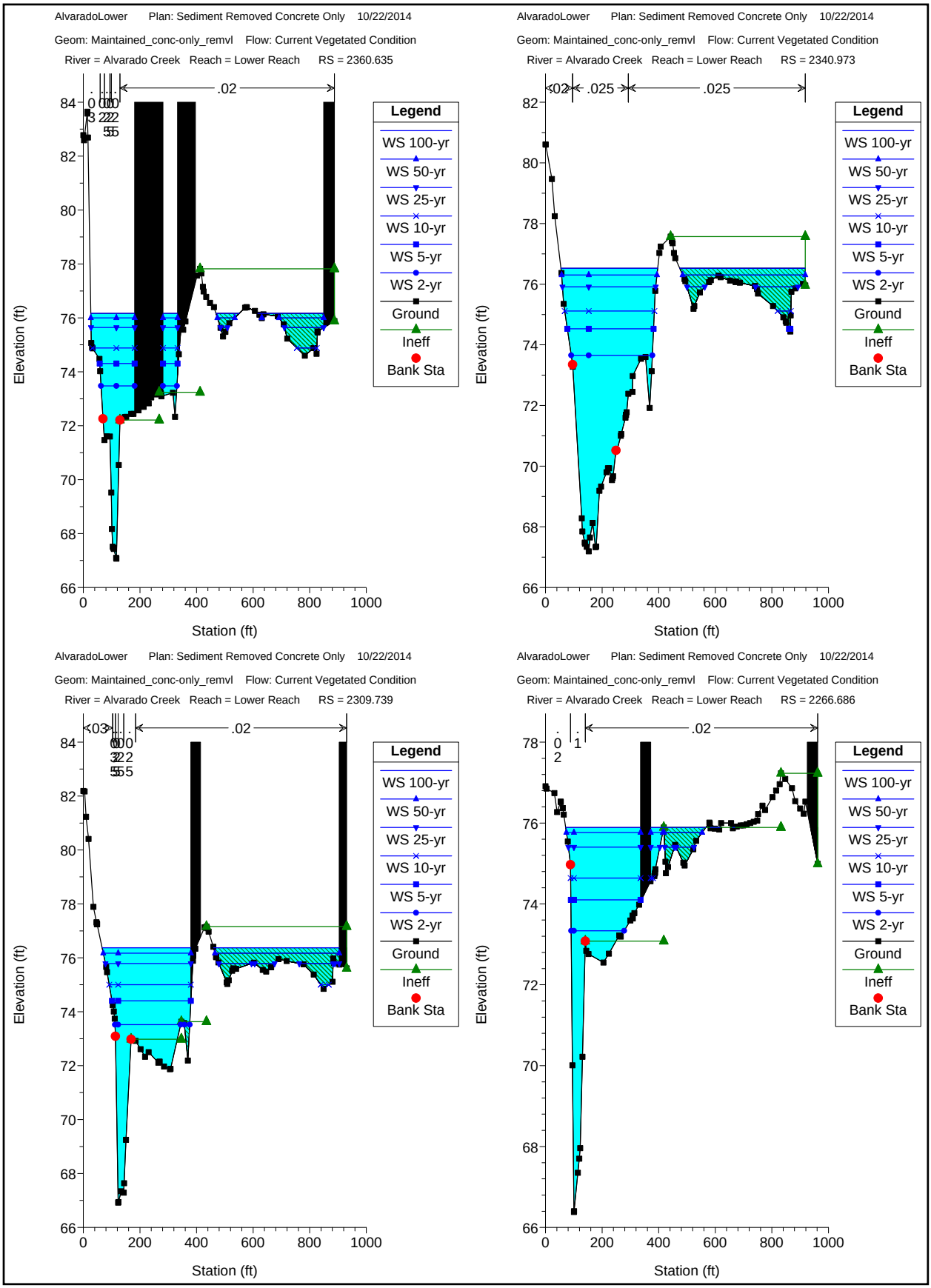
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	2309.739	2-yr	1180.00	66.92	73.52	71.17	73.67	0.000505	3.5	432.70	250.77	0.29
Lower Reach	2266.686	100-yr	5100.00	66.38	75.89	74.89	76.56	0.002559	2.6	943.89	500.50	0.17
Lower Reach	2266.686	50-yr	4500.00	66.38	75.76	74.48	76.33	0.002301	2.4	905.08	439.17	0.16
Lower Reach	2266.686	25-yr	3800.00	66.38	75.40	74.07	75.92	0.002549	2.4	798.51	384.05	0.17
Lower Reach	2266.686	10-yr	2700.00	66.38	74.64	73.58	75.10	0.003938	2.8	591.60	254.34	0.21
Lower Reach	2266.686	5-yr	2050.00	66.38	74.10	72.53	74.49	0.006288	3.4	458.47	246.14	0.26
Lower Reach	2266.686	2-yr	1180.00	66.38	73.33	71.08	73.60	0.010043	3.9	290.50	187.52	0.32
Lower Reach	2090.444	100-yr	5100.00	66.18	75.30	73.80	76.09	0.002395	5.5	794.39	741.84	0.39
Lower Reach	2090.444	50-yr	4500.00	66.18	75.36	73.50	75.96	0.001766	4.7	808.99	748.03	0.34
Lower Reach	2090.444	25-yr	3800.00	66.18	75.04	73.16	75.54	0.001666	4.4	736.43	717.88	0.32
Lower Reach	2090.444	10-yr	2700.00	66.18	74.21	72.62	74.62	0.001734	4.1	553.68	550.43	0.32
Lower Reach	2090.444	5-yr	2050.00	66.18	73.55	72.27	73.88	0.001951	4.1	452.49	243.08	0.34
Lower Reach	2090.444	2-yr	1180.00	66.18	72.21	70.60	72.54	0.003868	4.7	258.86	140.71	0.46
Lower Reach	1904.254	100-yr	5100.00	65.47	75.79	73.90	75.82	0.000077	1.3	3840.23	1220.53	0.08
Lower Reach	1904.254	50-yr	4500.00	65.47	75.48	73.78	75.66	0.000562	3.4	1301.75	1196.90	0.21
Lower Reach	1904.254	25-yr	3800.00	65.47	75.10	73.50	75.27	0.000584	3.3	1161.35	1160.12	0.22
Lower Reach	1904.254	10-yr	2700.00	65.47	74.14	72.80	74.32	0.000943	3.8	806.82	996.53	0.27
Lower Reach	1904.254	5-yr	2050.00	65.47	72.46	71.26	73.27	0.005412	7.5	302.12	516.17	0.61
Lower Reach	1904.254	2-yr	1180.00	65.47	70.31	69.83	71.39	0.009346	8.4	141.16	43.18	0.81
Lower Reach	1849.924	100-yr	5100.00	64.56	75.76	73.57	75.81	0.000146	1.2	2981.58	923.05	0.07
Lower Reach	1849.924	50-yr	4500.00	64.56	75.56	72.73	75.61	0.000139	1.1	2799.21	922.75	0.07
Lower Reach	1849.924	25-yr	3800.00	64.56	75.17	72.44	75.21	0.000154	1.2	2438.83	922.15	0.07
Lower Reach	1849.924	10-yr	2700.00	64.56	73.99	70.48	74.24	0.001960	3.8	672.34	724.50	0.25
Lower Reach	1849.924	5-yr	2050.00	64.56	72.37	69.62	72.86	0.006148	5.7	366.99	484.10	0.41
Lower Reach	1849.924	2-yr	1180.00	64.56	70.22	68.25	70.70	0.009421	5.6	212.46	49.49	0.47
Lower Reach	1742.873	100-yr	5100.00	64.03	75.75	73.41	75.80	0.000119	1.1	3205.37	934.51	0.06
Lower Reach	1742.873	50-yr	4500.00	64.03	75.56	72.94	75.59	0.000113	1.0	3021.01	934.23	0.06
Lower Reach	1742.873	25-yr	3800.00	64.03	75.16	70.98	75.20	0.000124	1.0	2655.16	933.68	0.06
Lower Reach	1742.873	10-yr	2700.00	64.03	73.67	69.71	73.99	0.002928	4.5	597.17	717.53	0.29
Lower Reach	1742.873	5-yr	2050.00	64.03	71.36	68.84	72.04	0.009357	6.6	308.69	138.45	0.49
Lower Reach	1742.873	2-yr	1180.00	64.03	68.29	67.47	69.17	0.022577	7.5	156.90	44.24	0.70
Lower Reach	1705.846	100-yr	5100.00	63.65	75.74	72.69	75.79	0.000050	2.7	3950.91	1269.46	0.16
Lower Reach	1705.846	50-yr	4500.00	63.65	75.19	71.32	75.55	0.000223	5.6	1239.45	1257.15	0.33
Lower Reach	1705.846	25-yr	3800.00	63.65	74.83	70.60	75.16	0.000202	5.2	1087.02	1240.15	0.31
Lower Reach	1705.846	10-yr	2700.00	63.65	73.61	69.34	73.97	0.000221	5.1	695.85	877.40	0.32
Lower Reach	1705.846	5-yr	2050.00	63.65	71.37	68.46	71.97	0.000461	6.2	331.15	229.28	0.45
Lower Reach	1705.846	2-yr	1180.00	63.65	68.31	67.07	69.02	0.000944	6.7	175.07	45.63	0.61
Lower Reach	1573.644	100-yr	5100.00	62.93	75.74	72.03	75.78	0.000066	2.2	3651.38	1098.49	0.12
Lower Reach	1573.644	50-yr	4500.00	62.93	75.40	71.12	75.44	0.000071	2.3	3277.82	1097.48	0.12
Lower Reach	1573.644	25-yr	3800.00	62.93	74.92	69.93	75.09	0.000226	3.9	1344.79	1058.80	0.22
Lower Reach	1573.644	10-yr	2700.00	62.93	73.68	68.63	73.89	0.000297	4.1	895.19	768.61	0.24
Lower Reach	1573.644	5-yr	2050.00	62.93	71.37	67.75	71.85	0.000804	5.6	382.76	231.16	0.38
Lower Reach	1573.644	2-yr	1180.00	62.93	68.31	66.35	68.82	0.001201	5.8	204.74	46.12	0.48
Lower Reach	1305.41	100-yr	5100.00	61.48	74.04	70.30	75.59	0.000867	10.0	510.02	640.96	0.61
Lower Reach	1305.41	50-yr	4500.00	61.48	74.22	69.64	75.30	0.000610	8.4	592.61	673.89	0.51
Lower Reach	1305.41	25-yr	3800.00	61.48	74.08	68.82	74.93	0.000476	7.4	512.71	648.80	0.45
Lower Reach	1305.41	10-yr	2700.00	61.48	73.25	67.39	73.78	0.000301	5.8	464.12	513.53	0.36
Lower Reach	1305.41	5-yr	2050.00	61.48	71.24	66.42	71.73	0.000294	5.6	363.75	43.82	0.34
Lower Reach	1305.41	2-yr	1180.00	61.48	68.25	64.95	68.63	0.000320	4.9	240.07	39.66	0.35
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.67	69.75	68.40	71.57	0.001220	10.8	471.13	72.58	0.75
Lower Reach	1155.558	50-yr	4500.00	60.67	69.13	67.87	70.86	0.001245	10.5	427.09	69.67	0.75
Lower Reach	1155.558	25-yr	3800.00	60.67	68.35	67.23	69.95	0.001284	10.2	373.87	65.98	0.75
Lower Reach	1155.558	10-yr	2700.00	60.67	66.87	66.05	68.31	0.001469	9.6	280.65	60.10	0.78
Lower Reach	1155.558	5-yr	2050.00	60.67	65.97	65.24	67.22	0.001510	9.0	228.42	55.55	0.78
Lower Reach	1155.558	2-yr	1180.00	60.67	64.60	63.92	65.47	0.001452	7.5	157.06	48.65	0.74
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.03	68.34	68.34	71.27	0.002262	13.7	371.35	107.00	1.00
Lower Reach	1036.821	50-yr	4500.00	60.03	67.80	67.80	70.56	0.002297	13.3	337.32	72.52	1.00
Lower Reach	1036.821	25-yr	3800.00	60.03	67.08	67.08	69.66	0.002353	12.9	295.12	57.28	1.00
Lower Reach	1036.821	10-yr	2700.00	60.03	65.85	65.79	68.02	0.002379	11.8	228.55	51.03	0.98
Lower Reach	1036.821	5-yr	2050.00	60.03	65.67	64.89	67.03	0.001536	9.4	219.24	50.09	0.79
Lower Reach	1036.821	2-yr	1180.00	60.03	64.50	63.46	65.30	0.001124	7.2	164.14	44.14	0.66
Lower Reach	819.1344	100-yr	5100.00	58.70	67.31	66.29	68.52	0.004948	9.2	607.67	287.30	0.69
Lower Reach	819.1344	50-yr	4500.00	58.70	67.11	65.83	68.20	0.004587	8.6	565.63	279.75	0.66
Lower Reach	819.1344	25-yr	3800.00	58.70	66.84	65.24	67.93	0.004500	8.4	454.86	242.24	0.65

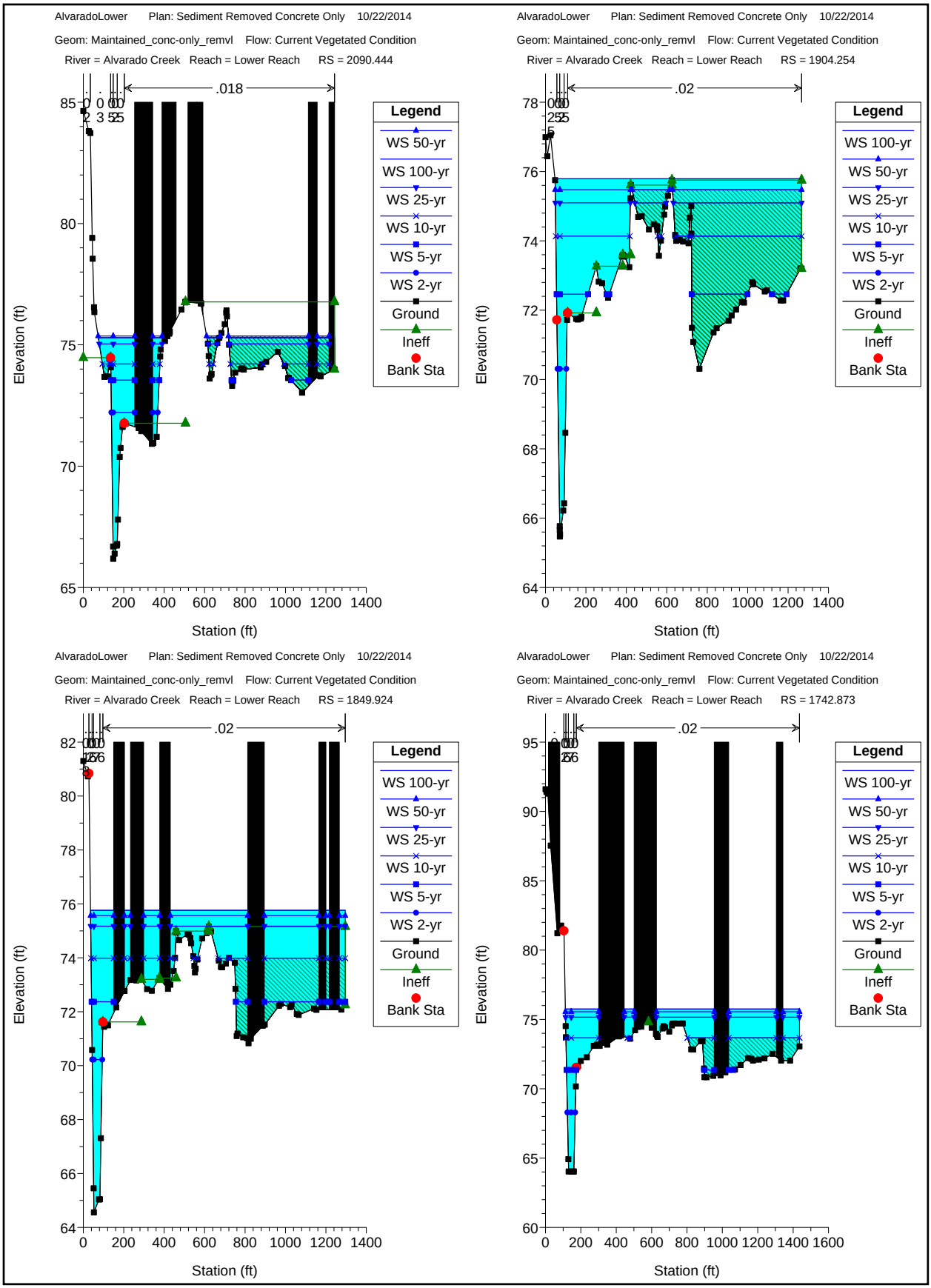
HEC-RAS Plan: Conc Sed Removal River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	819.1344	10-yr	2700.00	58.70	66.31	64.17	66.99	0.003024	6.6	409.34	137.71	0.53
Lower Reach	819.1344	5-yr	2050.00	58.70	65.89	63.42	66.36	0.002215	5.5	374.77	97.91	0.45
Lower Reach	819.1344	2-yr	1180.00	58.70	64.56	62.18	64.85	0.001719	4.3	274.28	70.04	0.38
Lower Reach	415.466	100-yr	5100.00	57.01	65.88	62.35	66.41	0.005005	2.6	1220.96	401.54	0.17
Lower Reach	415.466	50-yr	4500.00	57.01	65.73	61.99	66.16	0.005000	2.6	1158.92	400.93	0.17
Lower Reach	415.466	25-yr	3800.00	57.01	65.53	61.53	65.85	0.005009	2.5	1079.23	400.14	0.17
Lower Reach	415.466	10-yr	2700.00	57.01	65.16	60.74	65.33	0.005005	2.4	932.74	398.69	0.17
Lower Reach	415.466	5-yr	2050.00	57.01	64.86	60.20	64.99	0.005007	2.4	786.69	357.83	0.17
Lower Reach	415.466	2-yr	1180.00	57.01	63.61	59.38	63.68	0.005009	2.1	565.44	112.07	0.16


AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 10-yr
WS 25-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.05
.015
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

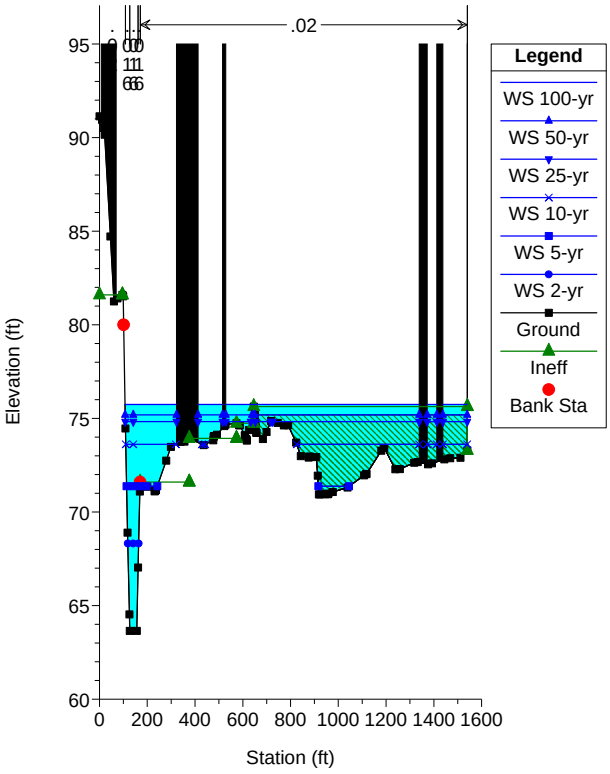

AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 50-yr
WS 100-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

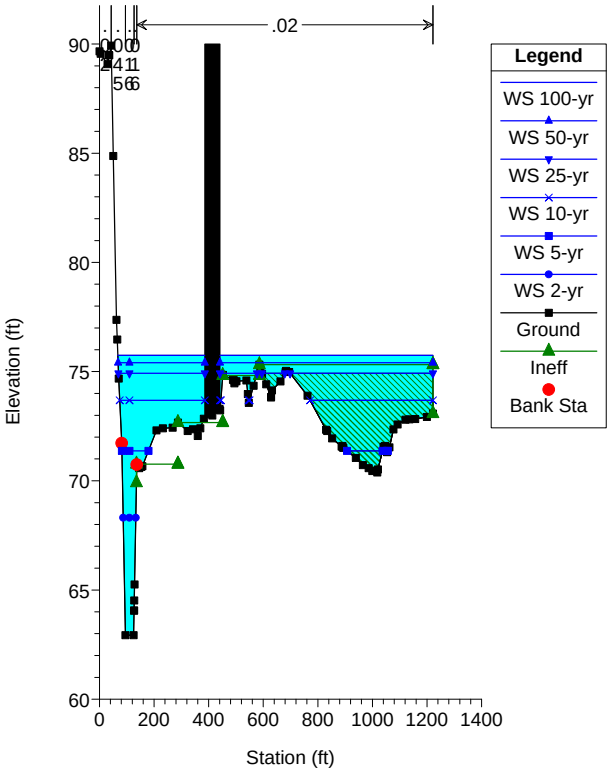
River = Alvarado Creek Reach = Lower Reach RS = 1705.846



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

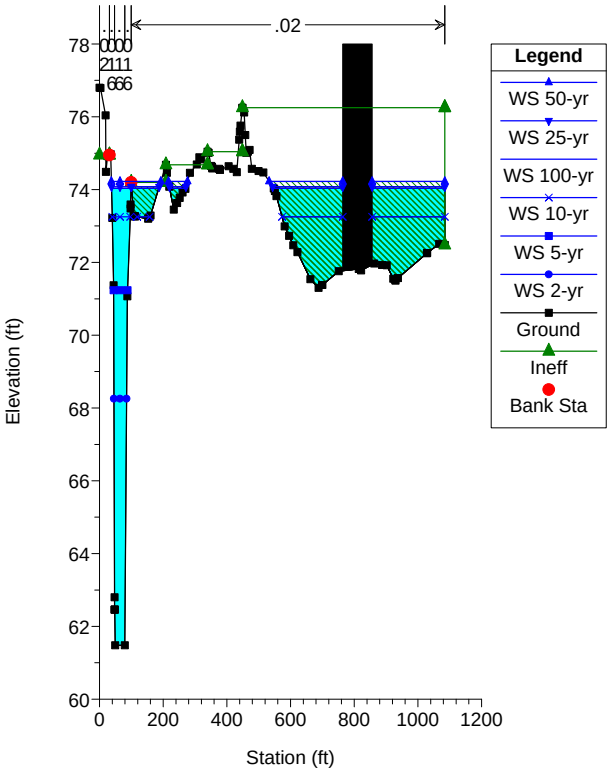
River = Alvarado Creek Reach = Lower Reach RS = 1573.644



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

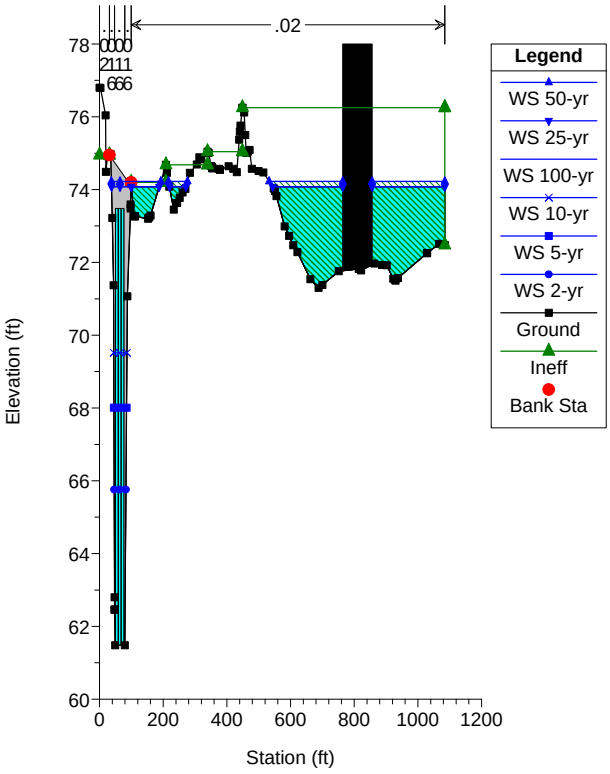
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

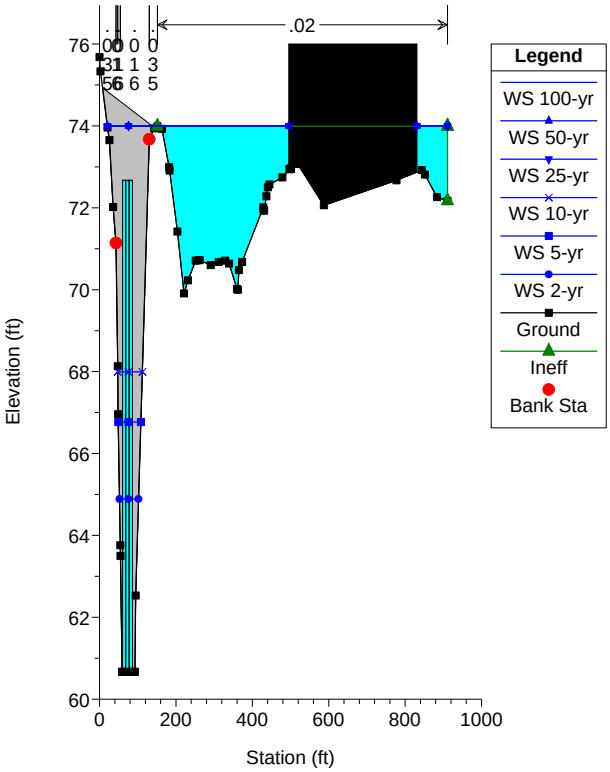
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

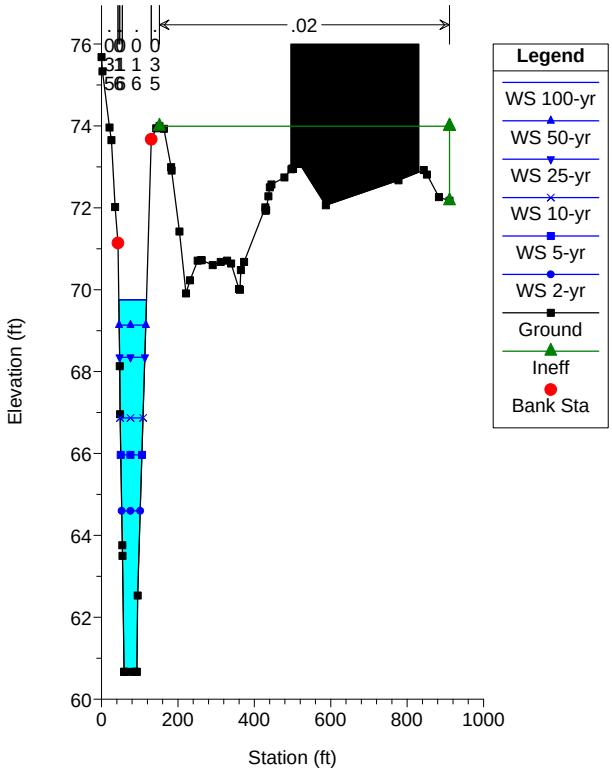
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

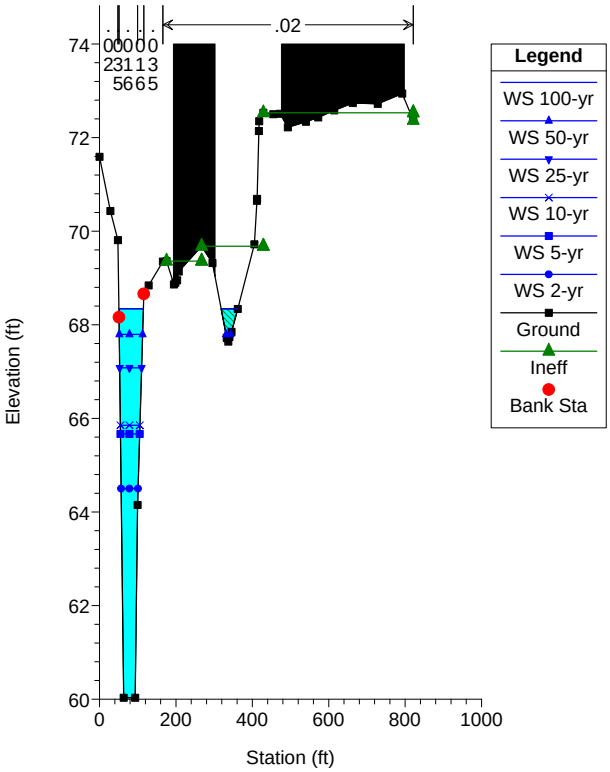
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge



AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

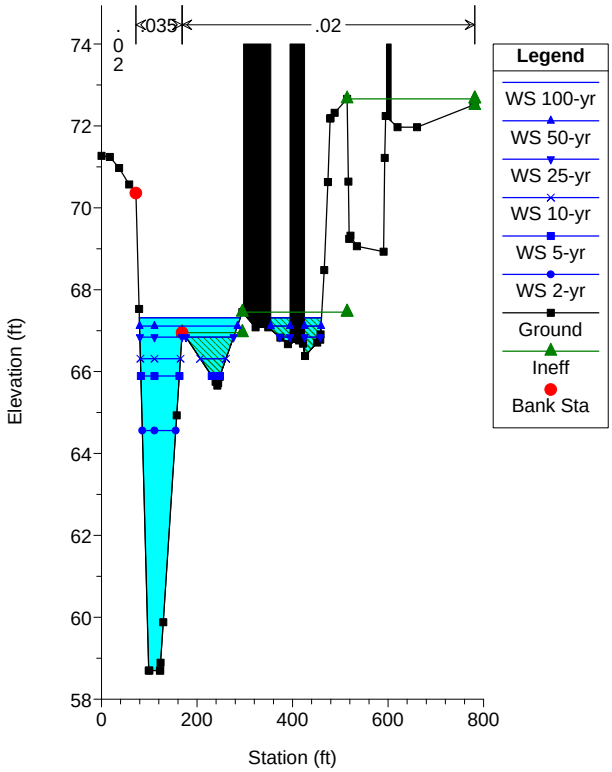
River = Alvarado Creek Reach = Lower Reach RS = 1036.821

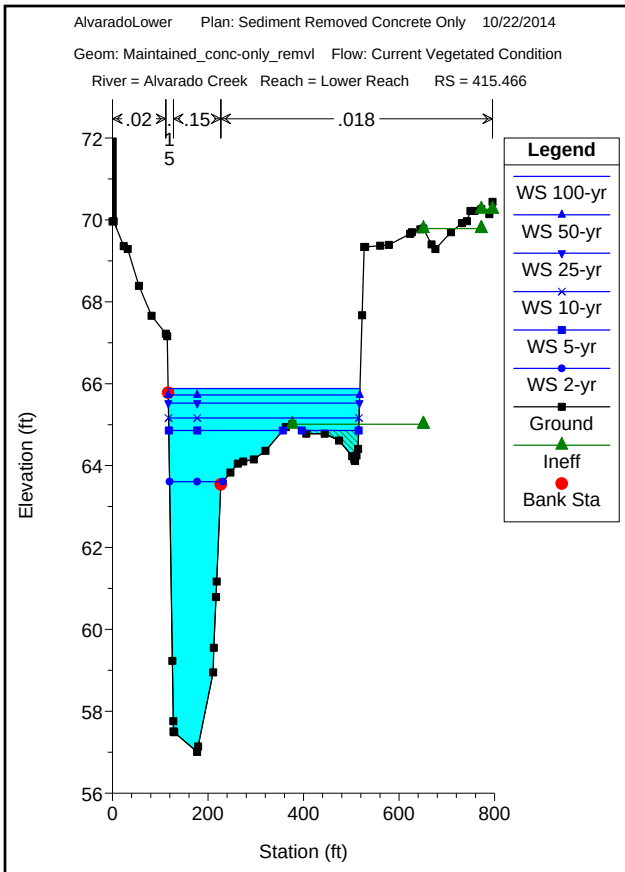


AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014

Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 819.1344




AlvaradoLower Plan: Sediment Removed Concrete Only 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
1
5
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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
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****

PROJECT DATA
Project Title: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 12:59:35 PM

Project in English units

****

PLAN DATA

Plan Title: Sediment Removed Concrete Only
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p03

Geometry Title: Maintained_conc-only_remvl
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g15

Flow Title : Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Plan Description:
Sediment and vegetation removed in the concrete lined channel and the earthen
channel at xs 819.1344, City of San Diego maintained portions only

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Flow Data (cfs)

River	Reach	RS	100-yr	50-yr	25-yr	10-yr	5-yr	2-yr
Alvarado Creek	Lower Reach	3519.101	5100	4500	3800	2700	2050	1180

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	100-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	50-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	25-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	10-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	5-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	2-yr	Normal S = 0.005	

****

GEOMETRY DATA

Geometry Title: Maintained_conc-only_remvl
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g15

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT

Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.64	130.6	70.64
155.29	70.64	159.51	73.45	160	73.71	178.45	79.21	188.01	82.98
190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43	248	83.45
282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94	328.59	82.78
333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35	371.9	81.3
382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64	430.03	79.67
453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72	493.29	80.76
494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49	571.25	82.35
573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33	631.18	83.37
631.5	83.37								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.02	107.14	.016	130.6	.016	159.51	.016
190.95	.018	405.16	.015						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
107.14 178.45 137.3 137.31 137.44 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	129.79	77.56	129.79	77.47	141.79	69.47	166.79	69.47
176.77	76.13	185.99	80.71	210.05	80.61	221.99	80.56	242.35	80.46
297.45	80.17	309.35	80.16	373.54	79.68	381.29	79.61	384.5	79.5
410.52	79.11	411.74	78.97	416.74	78.36	416.89	78.34	423.53	78.35
465.23	78.37	469.91	78.83	488.01	80.35	500.64	81.48	504.86	81.73
514.07	81.81	515.55	82.02	515.73	81.88	521.84	82.32	526.82	82.59
551.59	83.43	586.82	83.39	607.56	83.74	647.33	83.65	666.66	83.61
674.54	84.13	687.77	84.86	688.54	85.83				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	129.79	.016	176.77	.016	185.99	.018
411.74	.015	488.01	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
122.6 185.99 209.35 210.34 211.8 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
185.99	551.59	80.71	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	118.17	68.34
119.18	67.67	144.18	67.67	156.18	75.67	156.18	76.08	158.74	77.34
163.16	79.53	164.4	79.54	167.68	79.61	192.51	80.12	204.24	80.17
226.22	80.23	247.8	80.28	262.03	80.22	309.68	79.94	346.41	79.52
363.13	79.65	363.46	79.97	385.92	75.14	386.67	75.01	387	74.97
391.37	74.72	393.12	74.56	401.53	74.44	439.47	74.21	440.47	74.2
448.3	75.25	449.63	75.54	468.16	78.3	468.82	78.4	469.79	78.63
489.77	82.2	491.15	82.34	491.2	82.34	498.23	82.68	537.5	82.57
552.22	82.45	560.01	82.45	612.04	82.26	642.71	82.87	662.61	83.37
673.58	83.91	685.09	84.15	685.14	84.15	685.54	84.42	691.85	88.65

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	118.17	.016	156.18	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.69 167.68 32.79 31.38 28.21 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	120.86	67.97
121.72	67.4	146.72	67.4	152.94	71.54	161.99	75	164.4	76.1
165.21	76.15	169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2
238.98	77.08	253.88	77	265.89	76.8	311.18	76.55	320.11	76.42
352.63	76.62	356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26
419.63	74.17	444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85
460.97	77	461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24
506.27	77.23	518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74
648.95	79.3	652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87
693.26	88.99								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	120.86	.016	152.94	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.41	117.43	67.41	137.35	67.41
140.94	67.41	143.73	70.14	158.51	78.33	168.47	76.41	177.34	76.52
235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12	329.16	76.48
336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57	400.89	75.68
402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16	424.44	75.24
439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53	463.42	76.3
467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97	521.9	78.7
535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97	668.1	79.98
668.55	79.98	669	80.01	689.24	80.91	703.56	86.82		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	94.76	.016	158.51	.018	408.4	.015	463.42	.05
588.58	.015								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.1	110.07	.15	121.5	.1	159.23	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
92.48 143.16 165.5 169.96 176.8 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.1	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
71.39 104.55 162.85 162.93 162.56 .1 .3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.1	102.77	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.2 102.77 158.36 154.23 152.81 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.46	129.21	19.33	19.66	19.62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:

Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85

561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85	

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
56.56 109.43 55.48 54.33 52.65 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
27.83 96.83 119.68 107.05 93.87 .1 .3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.06 174.16 35.7 37.03 38.3 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.09	64.53	126.41	63.65	156.41	63.65
161.49	67.03	169.13	71.09	170.1	71.6	171.11	71.58	200.06	71.35
230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74	299.09	73.48
338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57	476.37	73.83
477.83	74	479.36	74.06	491.62	74.13	522.66	74.59	527.93	74.67
573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1	609	74.08
614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38	645.8	75.63
650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51	656.37	74.24
657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86	746.25	74.76
771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98	875.8	72.91
879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94	918.4	70.94
923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98	977.17	71.07
1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03	1180.11	73.27
1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29	1318.12	72.63
1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81	1468.48	72.87
1511.38	72.9	1540.35	73.29						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	126.41	.016	161.49	.016	171.11	.02

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

101.43	170.1	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	81.6	71.72
94.78	62.93	124.78	62.93	126.46	64.06	126.79	64.06	127.33	64.52
128.25	65.25	136.49	70.74	145.46	70.58	152.61	70.64	156.91	70.67
208.87	72.31	232.07	72.4	268.04	72.43	287.13	72.67	322.8	72.28
342.36	72.36	359.71	72.05	369.42	72.4	382.2	72.84	413.09	72.99
439.86	73.3	442.26	73.22	451.68	74.82	451.93	74.85	489.05	74.62
492.33	74.6	494.22	74.46	496.02	74.55	502.05	74.56	537.94	74.59
543.47	73.97	547.27	73.57	564.7	74.35	585.61	75.32	589.03	75.19
595.39	74.9	610.65	74.42	628.48	73.82	628.64	73.83	632.03	74.14
662.9	74.55	681.75	74.98	683.52	75.03	694.87	74.98	762.03	73.9
829.96	72.34	834.17	72.28	852.61	71.94	886.74	71.57	889.76	71.6
890.89	71.53	893.47	71.51	939.27	71.05	964.87	70.72	985.97	70.58
999.54	70.45	1017.68	70.38	1019.9	70.52	1040.58	71.55	1043.19	71.55
1044.08	71.56	1045.68	71.6	1053.71	71.31	1062.36	71.53	1076.84	72.35
1092.33	72.58	1121.01	72.8	1135.54	72.81	1156.84	72.83	1199.56	72.92
1221.53	73.08								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	94.78	.016	126.79	.016	136.49	.02

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

81.6	136.49	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54

405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	79.29	.016	99.47	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.29	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	31.29	74.95	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	79.29	.016	99.47	.02

Bank Sta: Left	Right	Coeff Contr.	Expan.
31.29	99.47	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	31.29	74.95	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02
43.26	71.14	47.78	68.13	48.44	66.96	54.33	63.76	54.72	63.5
59.22	60.67	59.37	60.67	68.77	60.67	87.93	60.67	90.19	60.67
92.72	60.67	94.83	62.53	130.44	73.67	143.04	73.94	151.67	73.99
163.31	73.93	182.18	72.99	183.46	72.91	203.9	71.42	221.2	69.91
231.4	70.23	251.76	70.71	260.52	70.72	262.13	70.72	290.97	70.6
312.02	70.68	328.69	70.71	339.11	70.64	359.52	70.02	362.2	70
364.66	70.48	373.11	70.68	428.82	72.01	429.07	71.93	430.72	71.94
436.95	72.28	440.5	72.5	444.65	72.57	478.56	72.74	497.03	72.94
499.73	72.96	501.14	72.95	518.9	73.07	586.99	72.06	777.15	72.67
843.55	72.92	851.87	72.81	883.14	72.26	910.92	72.17		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	43.26	.016	47.78	.016	54.33	.016	130.44	.035
151.67	.02								

Bank Sta: Left	Right	Coeff Contr.	Expan.
43.26	130.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.67	910.92	73.99	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
495.28	830.64	76

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical

```
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins          =    74.1
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                21     110     .018     .018        0                  .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   43.26   71.14   47.78   68.13   48.44   66.96   54.33   63.76   54.72    63.5
   59.22   60.67   59.37   60.67   68.77   60.67   87.93   60.67   90.19   60.67
   92.72   60.67   94.83   62.53  130.44   73.67  143.04   73.94  151.67   73.99
  163.31   73.93  182.18   72.99  183.46   72.91   203.9   71.42   221.2   69.91
   231.4   70.23  251.76   70.71  260.52   70.72  262.13   70.72  290.97    70.6
  312.02   70.68  328.69   70.71  339.11   70.64  359.52   70.02   362.2      70
  364.66   70.48  373.11   70.68  428.82   72.01  429.07   71.93  430.72   71.94
  436.95   72.28   440.5    72.5  444.65   72.57  478.56   72.74  497.03   72.94
  499.73   72.96  501.14   72.95   518.9   73.07  586.99   72.06  777.15   72.67
  843.55   72.92  851.87   72.81  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .035   43.26    .016   47.78    .016   54.33    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          43.26  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev

**********************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width             =      10
Weir Coefficient               =       2
Weir Flow Reference            = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                           = Broad Crested


LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1121.496

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width             =      10
Weir Coefficient               =       2
Weir Flow Reference            = Water Surface
 Weir Embankment Coordinates    num =       43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   73.03   37.12   70.67   51.06   69.64   51.58   69.61    63.9   69.49
   77.77    69.2   78.42   69.18   78.99   69.18  105.92   68.64  109.54   68.56
  109.79   68.56  158.77   67.55  182.38    67.5  182.83    67.5  191.06    67.3
  213.81   67.27  221.88   67.33  272.16   67.24  310.99   67.01  325.37   66.93
   328.4    66.9  329.44    66.9  383.22   66.59  388.38   66.55  388.62   66.55
  440.14   66.56  493.79   66.58  495.22   66.56  498.92   66.51  541.93   65.88
  542.66   65.87  567.25   65.51  588.94   65.18  590.62   65.14  617.49   64.53
  626.74   64.24  627.45   64.29  639.24      64  657.35   63.57  661.52   63.47
  665.23   63.43  667.79   62.32 672.743  60.187

Weir crest shape                           = Broad Crested
```

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	51.25	68.16	63.43	60.03
93.43	60.03	99.62	64.15	115.82	68.66	128.53	68.84	165.64	69.35
175.37	69.36	194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14
267.19	69.68	295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74
345.68	67.85	361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69
417.08	72.14	417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51
492.7	72.22	540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74
728.33	72.72	792.36	72.94	821.37	72.37				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	51.25	.016	99.62	.016	115.82	.035
165.64	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.25	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	58.7	100.14	58.7	122.39	58.7	122.92	58.7
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	168.96	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116.54	226.72	420.92	415.47	422.02	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.02	.016	.016	.016	.018	.015		
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.016	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.016	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.016	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.018	.015	.05	.015			
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.1	.15	.1	.02				
Lower Reach	2677.801	.02	.1	.018	.018	.03	.018			
Lower Reach	2514.866	.02	.02	.1	.02					
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								
Lower Reach	2309.739	.03	.035	.025	.025	.025	.02			
Lower Reach	2266.686	.02	.1	.02						
Lower Reach	2090.444	.02	.03	.05	.02	.05	.018			
Lower Reach	1904.254	.025	.05	.02	.05	.02				
Lower Reach	1849.924	.018	.02	.06	.07	.06	.02			
Lower Reach	1742.873	.018	.02	.06	.07	.06	.02			
Lower Reach	1705.846	.02	.016	.016	.016	.02				
Lower Reach	1573.644	.02	.045	.016	.016	.02				
Lower Reach	1305.41	.02	.016	.016	.016	.02				
Lower Reach	1230.5	Culvert								
Lower Reach	1155.558	.035	.016	.016	.016	.035	.02			
Lower Reach	1149.024	Lat Struct								
Lower Reach	1121.496	Lat Struct								
Lower Reach	1036.821	.02	.035	.016	.016	.035	.02			
Lower Reach	819.1344	.02	.035	.02						
Lower Reach	415.466	.02	.15	.15	.018					

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	

```
*Lower Reach     *    2309.739*       .1*       .3*
*Lower Reach     *    2266.686*       .1*       .3*
*Lower Reach     *    2090.444*       .1*       .3*
*Lower Reach     *    1904.254*       .1*       .3*
*Lower Reach     *    1849.924*       .1*       .3*
*Lower Reach     *    1742.873*       .1*       .3*
*Lower Reach     *    1705.846*       .1*       .3*
*Lower Reach     *    1573.644*       .1*       .3*
*Lower Reach     *    1305.41 *       .1*       .3*
*Lower Reach     *    1230.5  *Culvert  *         *
*Lower Reach     *    1155.558*       .1*       .3*
*Lower Reach     *    1149.024*Lat Struct*         *
*Lower Reach     *    1121.496*Lat Struct*         *
*Lower Reach     *    1036.821*       .1*       .3*
*Lower Reach     *    819.1344*       .1*       .3*
*Lower Reach     *    415.466 *       .1*       .3*
**************************************************
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HEC-RAS Plan: SR_conc_MultiQs River: Alvarado Creek Reach: Lower Reach

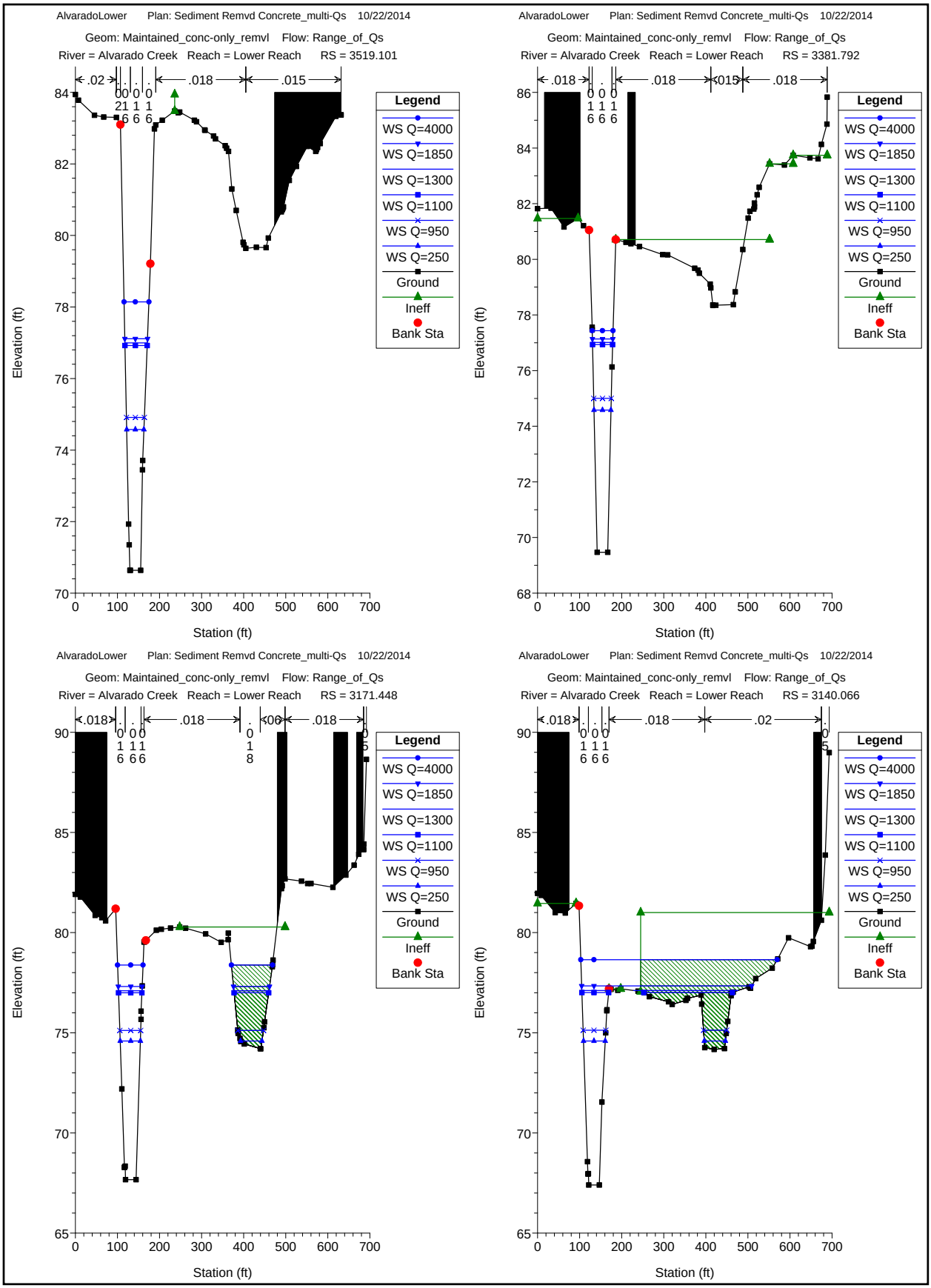
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1300	1300.00	70.64	77.00		77.44	0.000465	5.3	244.22	53.34	0.44
Lower Reach	3519.101	Q=250	250.00	70.64	74.57		74.63	0.000099	1.9	129.86	41.03	0.19
Lower Reach	3519.101	Q=1850	1850.00	70.64	77.11		77.96	0.000879	7.4	250.42	53.93	0.60
Lower Reach	3519.101	Q=950	950.00	70.64	74.91		75.59	0.001067	6.6	144.00	42.74	0.63
Lower Reach	3519.101	Q=1100	1100.00	70.64	76.93		77.25	0.000348	4.6	240.37	52.98	0.38
Lower Reach	3519.101	Q=4000	4000.00	70.64	78.14	78.14	80.75	0.002325	13.0	308.57	59.16	1.00
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1300	1300.00	69.47	77.01	73.49	77.36	0.000289	4.7	274.03	48.07	0.35
Lower Reach	3381.792	Q=250	250.00	69.47	74.58	70.89	74.62	0.000043	1.5	166.95	40.33	0.13
Lower Reach	3381.792	Q=1850	1850.00	69.47	77.14	74.46	77.82	0.000551	6.6	280.12	48.51	0.48
Lower Reach	3381.792	Q=950	950.00	69.47	75.00	72.79	75.41	0.000470	5.2	184.17	41.59	0.43
Lower Reach	3381.792	Q=1100	1100.00	69.47	76.94	73.10	77.19	0.000214	4.1	270.39	47.80	0.30
Lower Reach	3381.792	Q=4000	4000.00	69.47	77.44	77.34	80.30	0.002238	13.6	294.74	49.56	0.98
Lower Reach	3171.448	Q=1300	1300.00	67.67	77.10	71.59	77.27	0.000114	3.4	385.98	139.06	0.23
Lower Reach	3171.448	Q=250	250.00	67.67	74.59	69.07	74.61	0.000013	1.0	256.31	98.57	0.07
Lower Reach	3171.448	Q=1850	1850.00	67.67	77.31	72.53	77.64	0.000212	4.6	397.89	142.25	0.31
Lower Reach	3171.448	Q=950	950.00	67.67	75.12	70.90	75.29	0.000145	3.4	282.00	110.88	0.25
Lower Reach	3171.448	Q=1100	1100.00	67.67	77.00	71.21	77.13	0.000085	2.9	380.48	137.57	0.19
Lower Reach	3171.448	Q=4000	4000.00	67.67	78.38	75.32	79.55	0.000668	8.7	460.57	158.34	0.55
Lower Reach	3140.066	Q=1300	1300.00	67.40	77.11	71.34	77.26	0.000103	3.1	417.28	312.92	0.22
Lower Reach	3140.066	Q=250	250.00	67.40	74.59	68.80	74.60	0.000012	0.9	272.38	101.86	0.07
Lower Reach	3140.066	Q=1850	1850.00	67.40	77.34	72.30	77.62	0.000188	4.3	446.71	404.26	0.29
Lower Reach	3140.066	Q=950	950.00	67.40	75.13	70.64	75.28	0.000129	3.2	300.71	108.86	0.24
Lower Reach	3140.066	Q=1100	1100.00	67.40	77.01	70.95	77.12	0.000077	2.7	410.24	274.53	0.19
Lower Reach	3140.066	Q=4000	4000.00	67.40	78.65	75.09	79.41	0.000440	7.2	631.35	466.88	0.46
Lower Reach	3034.592	Q=1300	1300.00	67.41	77.06	71.58	77.25	0.000125	3.5	372.94	232.09	0.24
Lower Reach	3034.592	Q=250	250.00	67.41	74.59	68.87	74.60	0.000014	1.0	247.71	46.43	0.08
Lower Reach	3034.592	Q=1850	1850.00	67.41	77.23	72.58	77.59	0.000236	4.8	382.36	247.07	0.32
Lower Reach	3034.592	Q=950	950.00	67.41	75.07	70.85	75.26	0.000161	3.5	270.63	48.10	0.26
Lower Reach	3034.592	Q=1100	1100.00	67.41	76.97	71.17	77.11	0.000093	3.0	368.10	222.12	0.20
Lower Reach	3034.592	Q=4000	4000.00	67.41	78.93	75.48	79.24	0.000231	5.3	1068.31	285.69	0.33
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1300	1300.00	68.72	77.03	74.27	77.18	0.001349	1.4	516.73	255.72	0.11
Lower Reach	2847.761	Q=250	250.00	68.72	74.53	71.06	74.59	0.004344	1.9	130.01	34.93	0.18
Lower Reach	2847.761	Q=1850	1850.00	68.72	77.21	75.35	77.46	0.002013	1.7	562.03	257.13	0.13
Lower Reach	2847.761	Q=950	950.00	68.72	73.46	73.46	75.01	0.154443	10.0	94.86	30.44	1.00
Lower Reach	2847.761	Q=1100	1100.00	68.72	76.60	73.82	77.02	0.021325	5.2	210.80	249.40	0.42
Lower Reach	2847.761	Q=4000	4000.00	68.72	78.77	77.25	79.15	0.001324	1.6	974.28	275.27	0.11
Lower Reach	2677.801	Q=1300	1300.00	67.57	74.34	74.34	76.25	0.106310	11.1	117.20	56.52	1.00
Lower Reach	2677.801	Q=250	250.00	67.57	73.55	70.79	73.66	0.007091	2.7	94.10	37.09	0.25
Lower Reach	2677.801	Q=1850	1850.00	67.57	75.55	75.55	76.64	0.013743	4.6	269.08	146.49	0.37
Lower Reach	2677.801	Q=950	950.00	67.57	73.45	73.45	75.13	0.110662	10.4	91.42	34.70	1.00
Lower Reach	2677.801	Q=1100	1100.00	67.57	73.85	73.85	75.63	0.108107	10.7	102.84	44.68	1.00
Lower Reach	2677.801	Q=4000	4000.00	67.57	77.13	77.13	78.61	0.005717	3.6	515.76	219.88	0.25
Lower Reach	2514.866	Q=1300	1300.00	67.21	73.90	73.01	74.11	0.001398	1.4	426.34	204.03	0.12
Lower Reach	2514.866	Q=250	250.00	67.21	70.93	70.19	71.29	0.043031	4.8	51.98	25.52	0.59
Lower Reach	2514.866	Q=1850	1850.00	67.21	74.45	73.25	74.71	0.001226	1.4	539.51	211.36	0.11
Lower Reach	2514.866	Q=950	950.00	67.21	73.55	72.36	73.71	0.001444	1.4	355.89	199.23	0.12
Lower Reach	2514.866	Q=1100	1100.00	67.21	73.71	72.76	73.88	0.001430	1.4	386.45	201.38	0.12
Lower Reach	2514.866	Q=4000	4000.00	67.21	76.05	74.41	76.45	0.001092	1.5	913.66	256.21	0.11
Lower Reach	2360.635	Q=1300	1300.00	67.07	73.58	72.66	73.90	0.001186	4.8	314.11	169.42	0.45
Lower Reach	2360.635	Q=250	250.00	67.07	70.18	69.23	70.46	0.001924	4.2	58.93	27.15	0.51
Lower Reach	2360.635	Q=1850	1850.00	67.07	74.16	73.20	74.51	0.001159	5.3	412.81	174.35	0.45
Lower Reach	2360.635	Q=950	950.00	67.07	73.28	71.84	73.52	0.000961	4.1	264.00	165.95	0.40
Lower Reach	2360.635	Q=1100	1100.00	67.07	73.41	72.08	73.68	0.001081	4.5	284.69	167.39	0.42
Lower Reach	2360.635	Q=4000	4000.00	67.07	75.75	74.50	76.27	0.001123	6.4	724.10	380.06	0.47
Lower Reach	2340.973	Q=1300	1300.00	67.19	73.77	70.15	73.81	0.000096	1.6	886.96	289.11	0.13
Lower Reach	2340.973	Q=250	250.00	67.19	70.35	68.48	70.37	0.000202	1.2	214.68	132.03	0.16
Lower Reach	2340.973	Q=1850	1850.00	67.19	74.36	70.57	74.42	0.000120	2.0	1061.04	301.24	0.15
Lower Reach	2340.973	Q=950	950.00	67.19	73.43	69.79	73.45	0.000069	1.3	791.62	259.19	0.11
Lower Reach	2340.973	Q=1100	1100.00	67.19	73.58	69.99	73.61	0.000082	1.4	830.48	278.66	0.12
Lower Reach	2340.973	Q=4000	4000.00	67.19	76.03	71.87	76.14	0.000179	2.9	1590.83	632.66	0.19
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1300	1300.00	66.92	73.64	71.39	73.79	0.000523	3.6	474.91	265.05	0.30
Lower Reach	2309.739	Q=250	250.00	66.92	70.21	68.79	70.35	0.000866	3.0	84.61	37.23	0.35
Lower Reach	2309.739	Q=1850	1850.00	66.92	74.24	72.28	74.40	0.000475	3.7	637.61	275.60	0.29
Lower Reach	2309.739	Q=950	950.00	66.92	73.32	70.72	73.44	0.000435	3.1	385.45	242.59	0.27
Lower Reach	2309.739	Q=1100	1100.00	66.92	73.45	71.02	73.59	0.000485	3.4	415.80	247.87	0.29

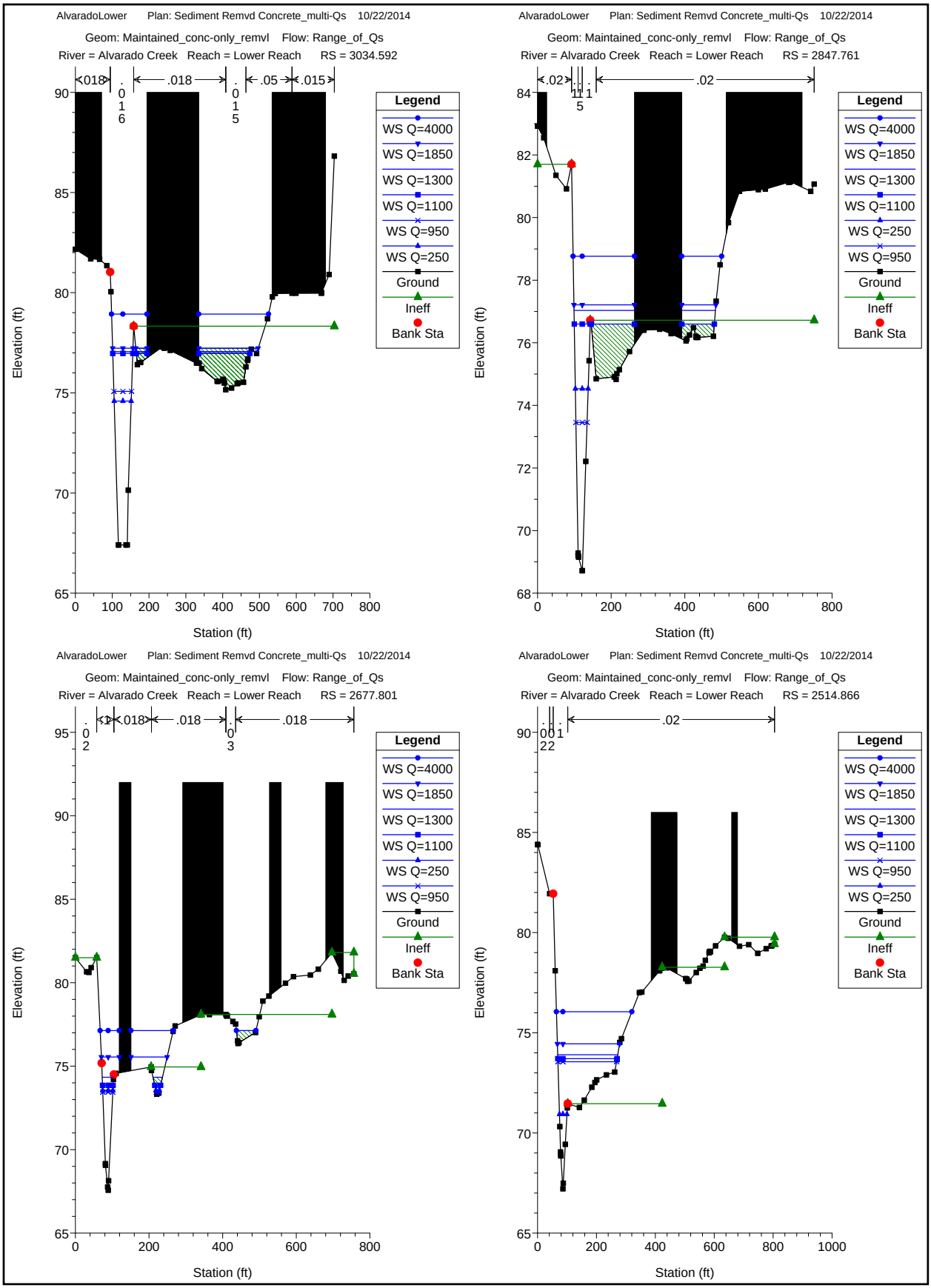
HEC-RAS Plan: SR_conc_MultiQs River: Alvarado Creek Reach: Lower Reach (Continued)

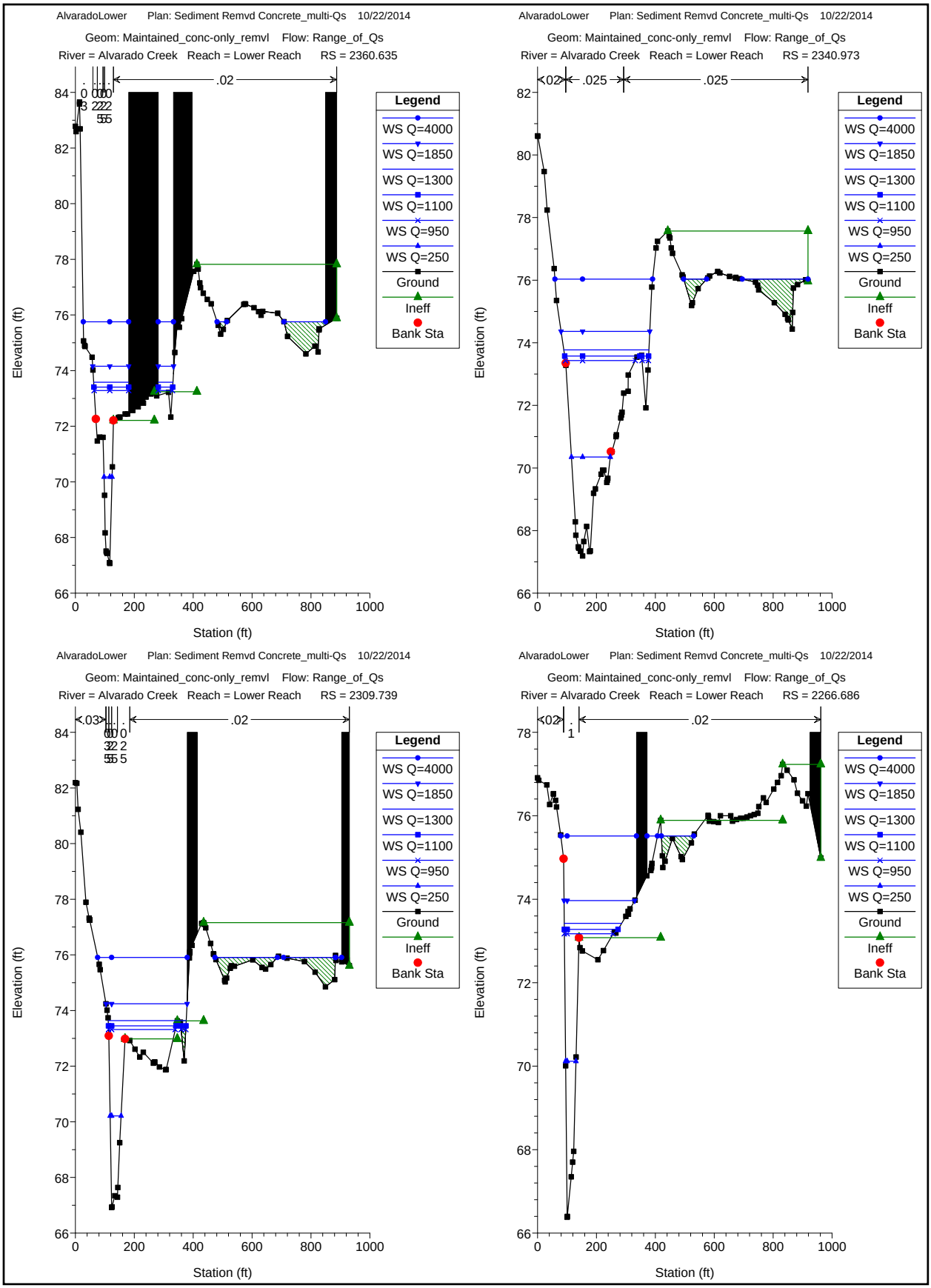
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	2309.739	Q=4000	4000.00	66.92	75.91	74.03	76.12	0.000424	4.3	1120.19	712.52	0.29
Lower Reach	2266.686	Q=1300	1300.00	66.38	73.42	71.31	73.71	0.010091	3.9	307.61	195.18	0.33
Lower Reach	2266.686	Q=250	250.00	66.38	70.12	68.66	70.26	0.013394	3.0	83.83	35.21	0.34
Lower Reach	2266.686	Q=1850	1850.00	66.38	73.97	72.23	74.32	0.006709	3.4	426.03	240.10	0.27
Lower Reach	2266.686	Q=950	950.00	66.38	73.17	70.61	73.38	0.008946	3.6	261.52	165.83	0.30
Lower Reach	2266.686	Q=1100	1100.00	66.38	73.28	70.92	73.52	0.009855	3.8	279.81	182.57	0.32
Lower Reach	2266.686	Q=4000	4000.00	66.38	75.52	74.19	76.05	0.002448	2.4	831.23	401.78	0.17
Lower Reach	2090.444	Q=1300	1300.00	66.18	72.44	70.87	72.75	0.003309	4.5	290.50	142.22	0.43
Lower Reach	2090.444	Q=250	250.00	66.18	68.96	68.09	69.20	0.003306	4.0	62.83	31.32	0.50
Lower Reach	2090.444	Q=1850	1850.00	66.18	73.44	72.16	73.74	0.001780	3.8	437.20	227.47	0.32
Lower Reach	2090.444	Q=950	950.00	66.18	71.64	70.08	72.12	0.005493	5.6	170.49	81.48	0.56
Lower Reach	2090.444	Q=1100	1100.00	66.18	72.06	70.40	72.40	0.004321	4.8	237.18	139.67	0.48
Lower Reach	2090.444	Q=4000	4000.00	66.18	75.15	73.26	75.67	0.001673	4.5	761.13	727.43	0.33
Lower Reach	1904.254	Q=1300	1300.00	65.47	70.58	70.05	71.70	0.009215	8.5	153.29	73.63	0.81
Lower Reach	1904.254	Q=250	250.00	65.47	67.47	67.47	68.12	0.011310	6.5	38.49	28.90	0.99
Lower Reach	1904.254	Q=1850	1850.00	65.47	71.88	70.96	73.03	0.008324	8.6	215.33	316.40	0.75
Lower Reach	1904.254	Q=950	950.00	65.47	69.80	69.36	70.78	0.009140	7.9	119.92	40.69	0.81
Lower Reach	1904.254	Q=1100	1100.00	65.47	70.13	69.67	71.18	0.009366	8.2	133.40	42.29	0.82
Lower Reach	1904.254	Q=4000	4000.00	65.47	75.23	73.56	75.40	0.000568	3.3	1208.57	1172.38	0.21
Lower Reach	1849.924	Q=1300	1300.00	64.56	70.50	68.46	71.01	0.009510	5.7	226.29	50.53	0.48
Lower Reach	1849.924	Q=250	250.00	64.56	67.38	66.10	67.50	0.006154	2.9	86.93	38.74	0.34
Lower Reach	1849.924	Q=1850	1850.00	64.56	71.84	69.33	72.41	0.008012	6.1	309.82	192.45	0.46
Lower Reach	1849.924	Q=950	950.00	64.56	69.72	67.82	70.12	0.008727	5.0	188.13	47.59	0.45
Lower Reach	1849.924	Q=1100	1100.00	64.56	70.04	68.10	70.49	0.009280	5.4	203.57	48.80	0.47
Lower Reach	1849.924	Q=4000	4000.00	64.56	75.30	72.53	75.34	0.000146	1.1	2559.03	922.35	0.07
Lower Reach	1742.873	Q=1300	1300.00	64.03	68.75	67.68	69.58	0.019010	7.3	177.41	45.82	0.66
Lower Reach	1742.873	Q=250	250.00	64.03	65.31	65.31	65.90	0.066818	6.2	40.45	33.87	1.00
Lower Reach	1742.873	Q=1850	1850.00	64.03	70.69	68.56	71.40	0.010876	6.8	272.98	52.57	0.52
Lower Reach	1742.873	Q=950	950.00	64.03	67.34	67.03	68.38	0.035819	8.2	116.53	40.95	0.85
Lower Reach	1742.873	Q=1100	1100.00	64.03	67.98	67.32	68.89	0.025881	7.7	143.03	43.14	0.74
Lower Reach	1742.873	Q=4000	4000.00	64.03	75.30	71.20	75.33	0.000118	1.0	2777.32	933.86	0.06
Lower Reach	1705.846	Q=1300	1300.00	63.65	68.77	67.29	69.45	0.000825	6.6	196.19	47.31	0.57
Lower Reach	1705.846	Q=250	250.00	63.65	64.91	64.91	65.51	0.003632	6.2	40.36	33.91	1.00
Lower Reach	1705.846	Q=1850	1850.00	63.65	70.71	68.17	71.32	0.000523	6.3	294.49	54.05	0.47
Lower Reach	1705.846	Q=950	950.00	63.65	67.38	66.63	68.16	0.001327	7.1	134.19	42.20	0.70
Lower Reach	1705.846	Q=1100	1100.00	63.65	68.00	66.92	68.73	0.001044	6.8	161.07	44.49	0.63
Lower Reach	1705.846	Q=4000	4000.00	63.65	74.96	70.81	75.29	0.000206	5.3	1139.87	1251.52	0.32
Lower Reach	1573.644	Q=1300	1300.00	62.93	68.76	66.56	69.27	0.001127	5.8	225.95	47.48	0.46
Lower Reach	1573.644	Q=250	250.00	62.93	64.20	64.20	64.79	0.004855	6.2	40.45	34.07	1.00
Lower Reach	1573.644	Q=1850	1850.00	62.93	70.69	67.46	71.20	0.000891	5.7	322.88	125.97	0.41
Lower Reach	1573.644	Q=950	950.00	62.93	67.38	65.91	67.90	0.001412	5.8	163.32	43.34	0.53
Lower Reach	1573.644	Q=1100	1100.00	62.93	68.00	66.20	68.51	0.001260	5.8	190.58	45.19	0.50
Lower Reach	1573.644	Q=4000	4000.00	62.93	75.05	70.14	75.21	0.000228	3.9	1402.52	1084.06	0.22
Lower Reach	1305.41	Q=1300	1300.00	61.48	68.70	65.18	69.09	0.000315	5.0	257.77	40.19	0.35
Lower Reach	1305.41	Q=250	250.00	61.48	63.86	62.75	64.02	0.000447	3.2	77.41	34.36	0.38
Lower Reach	1305.41	Q=1850	1850.00	61.48	70.59	66.11	71.06	0.000297	5.5	336.02	42.48	0.34
Lower Reach	1305.41	Q=950	950.00	61.48	67.35	64.49	67.69	0.000331	4.6	204.77	38.57	0.35
Lower Reach	1305.41	Q=1100	1100.00	61.48	67.95	64.79	68.31	0.000323	4.8	228.10	39.29	0.35
Lower Reach	1305.41	Q=4000	4000.00	61.48	74.11	69.05	75.05	0.000522	7.8	514.74	654.66	0.47
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1300	1300.00	60.67	64.88	64.12	65.78	0.001380	7.6	171.08	50.08	0.72
Lower Reach	1155.558	Q=250	250.00	60.67	61.85	61.85	62.42	0.003682	6.0	41.48	36.72	1.00
Lower Reach	1155.558	Q=1850	1850.00	60.67	65.72	64.96	66.87	0.001465	8.6	214.68	54.29	0.76
Lower Reach	1155.558	Q=950	950.00	60.67	63.96	63.50	64.83	0.001735	7.5	127.09	45.44	0.79
Lower Reach	1155.558	Q=1100	1100.00	60.67	64.38	63.78	65.25	0.001537	7.5	146.66	47.56	0.75
Lower Reach	1155.558	Q=4000	4000.00	60.67	68.58	67.41	70.22	0.001270	10.3	389.44	67.08	0.75
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1300	1300.00	60.03	64.77	63.67	65.61	0.001122	7.4	176.26	45.51	0.66
Lower Reach	1036.821	Q=250	250.00	60.03	61.45	61.29	61.92	0.002464	5.5	45.58	34.26	0.84
Lower Reach	1036.821	Q=1850	1850.00	60.03	65.50	64.58	66.70	0.001389	8.8	211.00	49.24	0.75
Lower Reach	1036.821	Q=950	950.00	60.03	63.88	63.02	64.62	0.001199	6.9	137.80	41.56	0.67
Lower Reach	1036.821	Q=1100	1100.00	60.03	64.29	63.30	65.07	0.001141	7.1	155.11	43.08	0.66
Lower Reach	1036.821	Q=4000	4000.00	60.03	67.29	67.29	69.92	0.002341	13.0	307.08	58.34	1.00
Lower Reach	819.1344	Q=1300	1300.00	58.70	64.85	62.38	65.15	0.001710	4.4	295.00	72.34	0.38
Lower Reach	819.1344	Q=250	250.00	58.70	61.17	60.10	61.31	0.002215	3.0	82.29	43.15	0.39
Lower Reach	819.1344	Q=1850	1850.00	58.70	65.68	63.17	66.10	0.002044	5.2	357.97	80.54	0.43

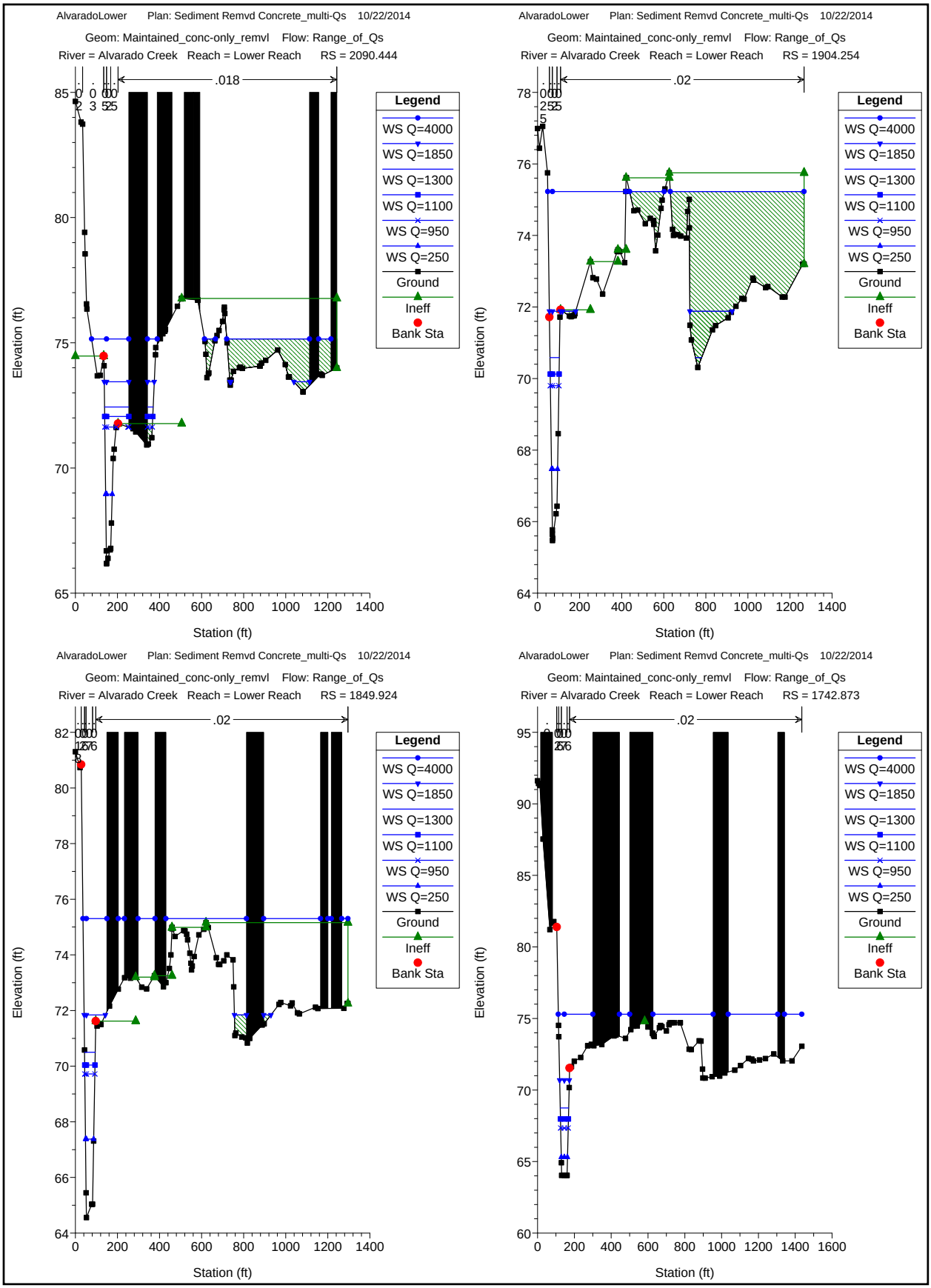
HEC-RAS Plan: SR_conc_MultiQs River: Alvarado Creek Reach: Lower Reach (Continued)

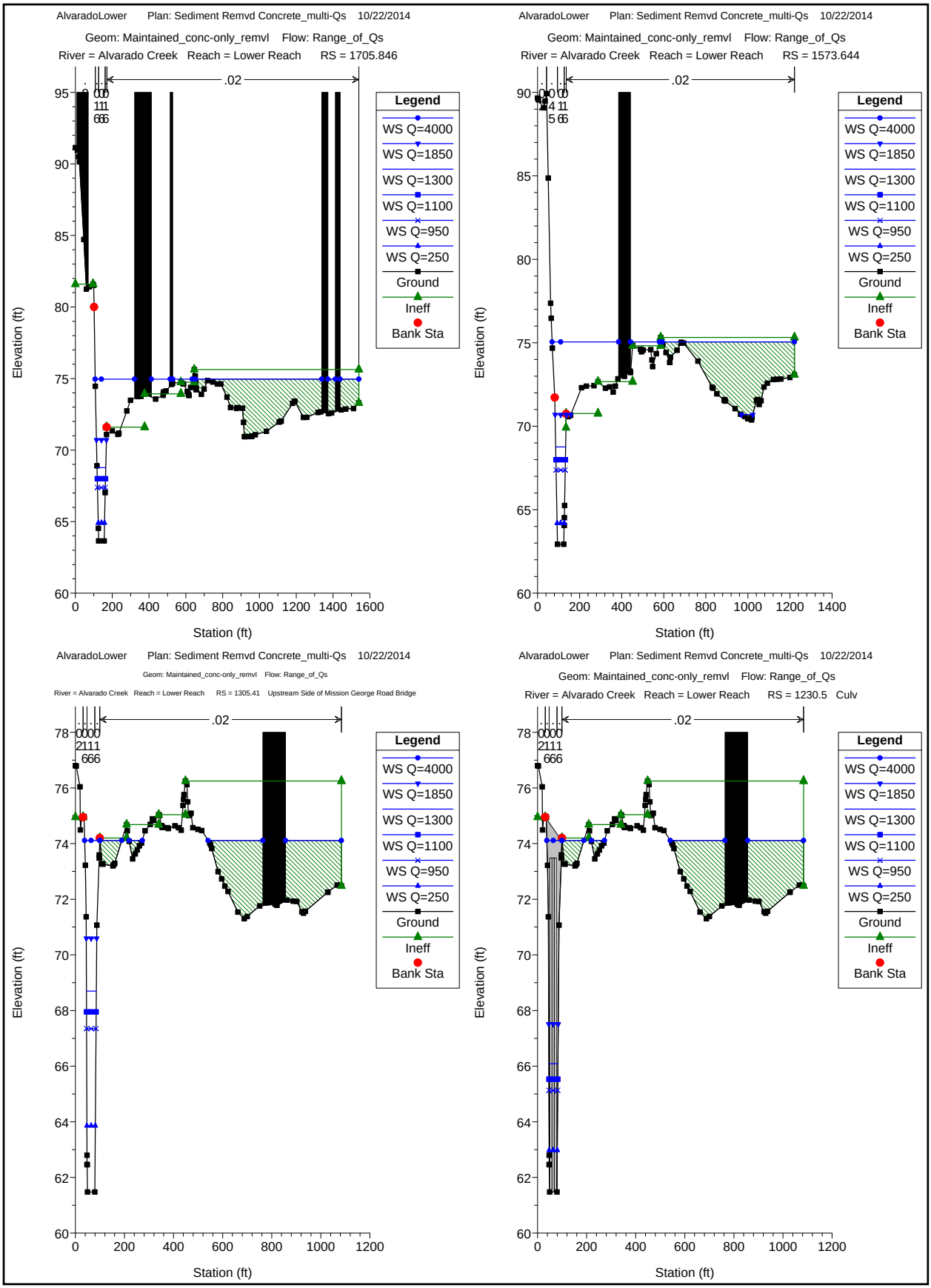
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	819.1344	Q=950	950.00	58.70	63.89	61.79	64.16	0.001819	4.1	229.39	64.76	0.39
Lower Reach	819.1344	Q=1100	1100.00	58.70	64.34	62.05	64.62	0.001749	4.2	258.93	68.28	0.38
Lower Reach	819.1344	Q=4000	4000.00	58.70	66.92	65.41	68.09	0.004784	8.7	461.86	258.29	0.67
Lower Reach	415.466	Q=1300	1300.00	57.01	63.91	59.51	63.98	0.005008	2.2	602.55	133.60	0.16
Lower Reach	415.466	Q=250	250.00	57.01	59.96	58.08	59.98	0.005006	1.2	205.99	89.34	0.14
Lower Reach	415.466	Q=1850	1850.00	57.01	64.68	60.03	64.79	0.005010	2.3	746.28	279.04	0.16
Lower Reach	415.466	Q=950	950.00	57.01	62.89	59.14	62.95	0.005010	1.9	489.81	104.02	0.16
Lower Reach	415.466	Q=1100	1100.00	57.01	63.37	59.30	63.44	0.005009	2.0	539.97	106.36	0.16
Lower Reach	415.466	Q=4000	4000.00	57.01	65.59	61.66	65.94	0.005006	2.5	1102.88	400.37	0.17

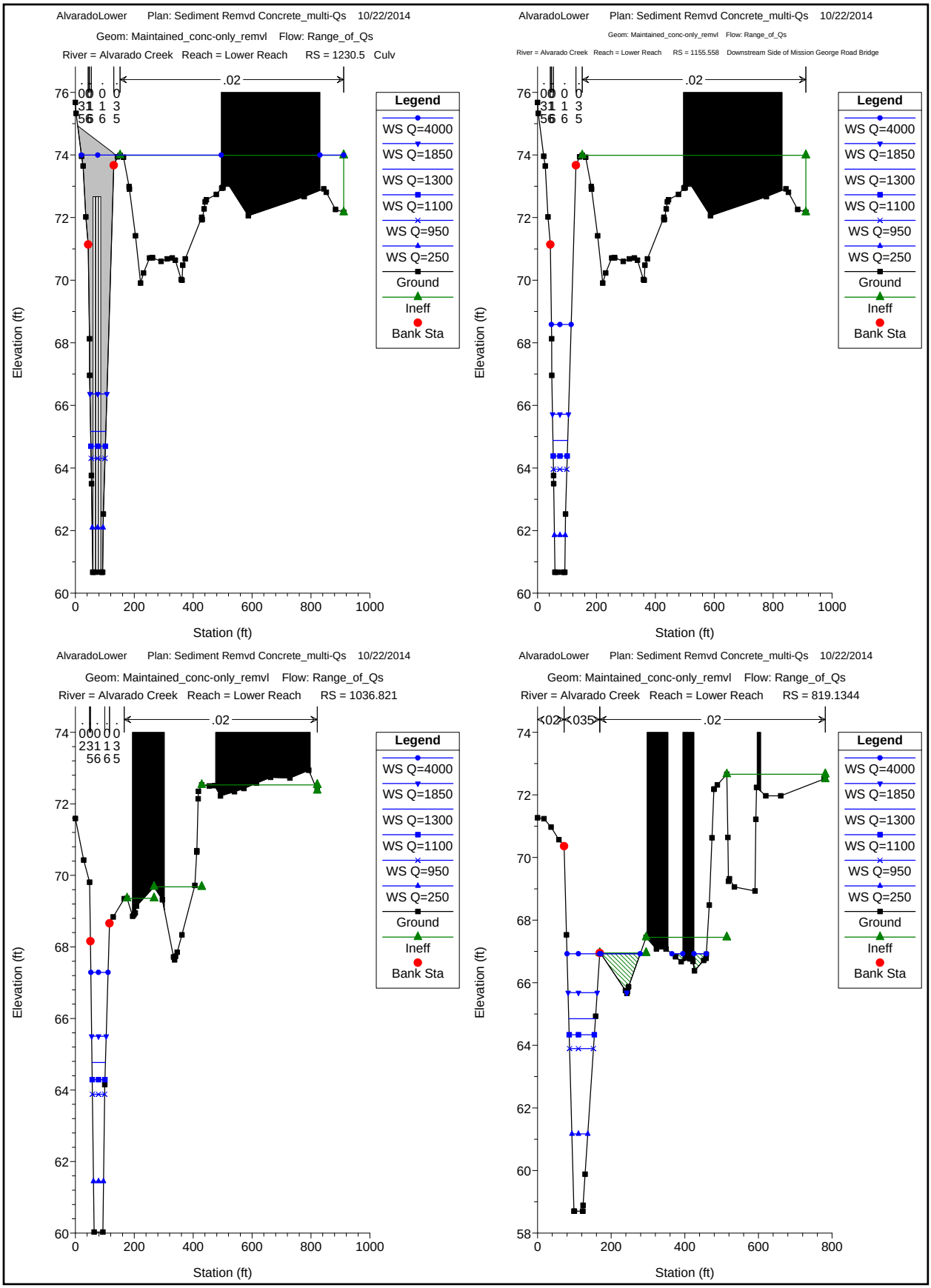

AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.015
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

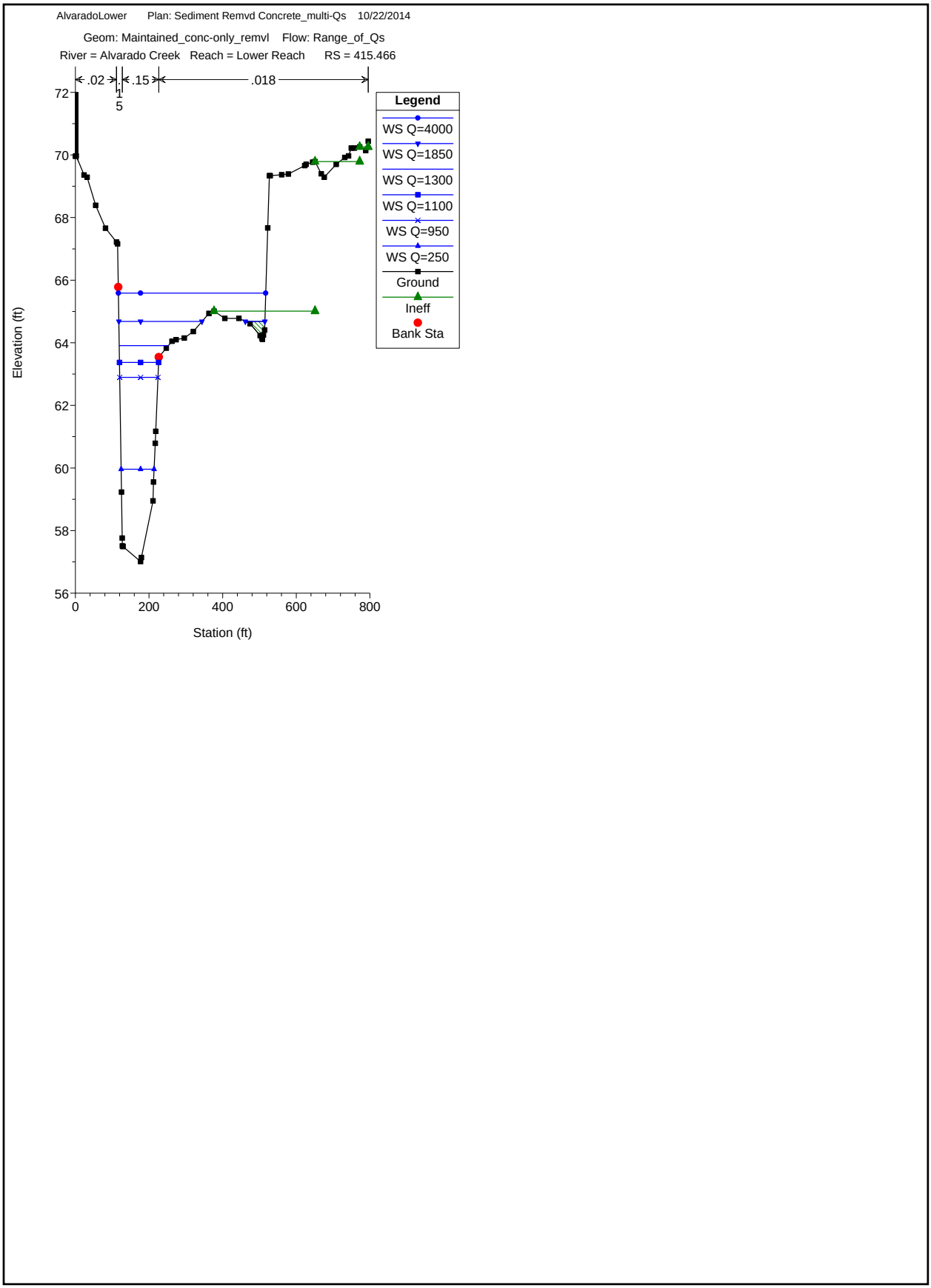

AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.018
.05
.015
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=250
WS Q=950
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=250
WS Q=950
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
.035
.02
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Remvd Concrete_multi-Qs 10/22/2014
Geom: Maintained_conc-only_remvl Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.15
.018
.1
.5
Legend
WS Q=4000
WS Q=1850
WS Q=1300
WS Q=1100
WS Q=950
WS Q=250
Ground
Ineff
Bank Sta
Elevation (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800
Station (ft)

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 1:20:23 PM

Project in English units

*****************************************************************************

PLAN DATA

Plan Title: Sediment Remvd Concrete_multi-Qs
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p14

          Geometry Title: Maintained_conc-only_remvl
          Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g15

          Flow Title    : Range_of_Qs
          Flow File     : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Plan Summary Information:
Number of:  Cross Sections =   23    Multiple Openings  =    0
            Culverts       =    1    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    5

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: Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Flow Data (cfs)
*****************************************************************************
*****************************************************************************
***
* River           Reach           RS      *          Q=1700          Q=1300
Q=1100           Q=900           Q=500           Q=340          Q=1250
Q=800 *
* Alvarado Creek  Lower Reach     3519.101*            1700            1300
1100             900             500             340            1250             800
*
*****************************************************************************
*****************************************************************************
***
*****************************************************************************
*****************************************************************************
***
* River           Reach           RS      *           Q=250           Q=600
Q=1850           Q=950          Q=1180          Q=1400          Q=1600
Q=450 *
* Alvarado Creek  Lower Reach     3519.101*             250             600
1850             950            1180            1400            1600             450
*
*****************************************************************************
*****************************************************************************
***

Boundary Conditions
*****************************************************************************
******************
* River           Reach           Profile          *            Upstream
Downstream    *
*****************************************************************************
******************
* Alvarado Creek  Lower Reach     Q=1700           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1300           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1100           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=900            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=500            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=340            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=1250           *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=800            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=250            *
Normal S = 0.005 *
*****************************************************************************
******************
```

```
*****************************************************************************

GEOMETRY DATA

Geometry Title: Maintained_conc-only_remvl
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g15

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3519.101

INPUT
Description:
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   83.94    7.23   83.78    45.4   83.36   67.28   83.31   97.34    83.3
  107.14    83.1  126.44   71.93  127.98   71.35   129.5   70.64   130.6   70.64
  155.29   70.64  159.51   73.45     160   73.71  178.45   79.21  188.01   82.98
  190.95   83.09  206.58   83.22  236.14   83.48  244.64   83.43     248   83.45
  282.79   83.22  287.79   83.18  307.35   82.95  308.27   82.94  328.59   82.78
  333.03    82.7  355.98   82.51  359.45   82.44  363.96   82.35   371.9    81.3
  382.25    80.7  398.46   79.81  400.43   79.74  405.16   79.64  430.03   79.67
  453.27   79.66  458.52   79.93  489.51   80.66  491.93   80.72  493.29   80.76
  494.77    80.8  508.53   81.54  525.25   81.93  550.96   82.49  571.25   82.35
  573.37    82.4  575.72   82.46  582.06   82.57  619.05   83.33  631.18   83.37
   631.5   83.37

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .02   97.34     .02  107.14    .016   130.6    .016  159.51    .016
  190.95    .018  405.16    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        107.14  178.45           137.3  137.31  137.44            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  236.14   631.5             F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
***********************
  473.62   631.5      84

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3506.967

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   81.44     .54   81.34    5.52   81.13   15.16   81.11   45.52   80.97
   57.61   81.06   60.29   80.98   67.08   80.78   77.87   80.71   87.14   80.65
  103.56   80.83  107.18   80.81  118.93   80.74  131.34   80.66  135.42   80.68
  139.97   80.61  157.29   80.51  165.59   80.46   176.5   80.45  193.52   80.34
  215.72    80.1  223.61   79.99  228.63   79.91  244.19   79.96  252.53   79.88
  260.39    79.8  273.3    79.78  293.11   79.55  302.58   79.56   316.4   79.56
  331.68   79.56  341.8    79.59   343.2   79.34  343.49   79.29  358.82   77.39
  359.99   77.22  360.28   77.21   377.6   76.37  397.84   76.41  407.72   76.44
   410.6   76.34  430.83   77.02  452.14   77.73  453.48   77.73  455.44   77.62
  470.17      78

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3381.792

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   81.82   32.03   81.84   62.76   81.16   96.23   81.47  109.42   81.21
   122.6   81.05  129.79   77.56  129.79   77.47  141.79   69.47  166.79   69.47
  176.77   76.13  185.99   80.71  210.05   80.61  221.99   80.56  242.35   80.46
  297.45   80.17  309.35   80.16  373.54   79.68  381.29   79.61   384.5    79.5
  410.52   79.11  411.74   78.97  416.74   78.36  416.89   78.34  423.53   78.35
  465.23   78.37  469.91   78.83  488.01   80.35  500.64   81.48  504.86   81.73
  514.07   81.81  515.55   82.02  515.73   81.88  521.84   82.32  526.82   82.59
  551.59   83.43  586.82   83.39  607.56   83.74  647.33   83.65  666.66   83.61
  674.54   84.13  687.77   84.86  688.54   85.83

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .018   122.6    .016  129.79    .016  176.77    .016  185.99    .018
  411.74    .015  488.01    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        122.6  185.99           209.35  210.34   211.8             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  607.56  688.54   83.74       F
  551.59  607.56   83.43       F
       0   96.23   81.47       F
  185.99  551.59   80.71       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
************************************************
  214.24  232.41      86   16.29  101.01      86

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3171.448

INPUT
```

Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	118.17	68.34
119.18	67.67	144.18	67.67	156.18	75.67	156.18	76.08	158.74	77.34
163.16	79.53	164.4	79.54	167.68	79.61	192.51	80.12	204.24	80.17
226.22	80.23	247.8	80.28	262.03	80.22	309.68	79.94	346.41	79.52
363.13	79.65	363.46	79.97	385.92	75.14	386.67	75.01	387	74.97
391.37	74.72	393.12	74.56	401.53	74.44	439.47	74.21	440.47	74.2
448.3	75.25	449.63	75.54	468.16	78.3	468.82	78.4	469.79	78.63
489.77	82.2	491.15	82.34	491.2	82.34	498.23	82.68	537.5	82.57
552.22	82.45	560.01	82.45	612.04	82.26	642.71	82.87	662.61	83.37
673.58	83.91	685.09	84.15	685.14	84.15	685.54	84.42	691.85	88.65

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	118.17	.016	156.18	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.69 167.68 32.79 31.38 28.21 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	120.86	67.97
121.72	67.4	146.72	67.4	152.94	71.54	161.99	75	164.4	76.1
165.21	76.15	169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2
238.98	77.08	253.88	77	265.89	76.8	311.18	76.55	320.11	76.42
352.63	76.62	356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26
419.63	74.17	444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85
460.97	77	461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24
506.27	77.23	518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74
648.95	79.3	652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87
693.26	88.99								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	120.86	.016	152.94	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.19	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.41	117.43	67.41	137.35	67.41
140.94	67.41	143.73	70.14	158.51	78.33	168.47	76.41	177.34	76.52
235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12	329.16	76.48
336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57	400.89	75.68
402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16	424.44	75.24
439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53	463.42	76.3
467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97	521.9	78.7
535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97	668.1	79.98
668.55	79.98	669	80.01	689.24	80.91	703.56	86.82		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	94.76	.016	158.51	.018	408.4	.015	463.42	.05
588.58	.015								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	121.5	68.72
121.55	68.72	131.16	72.21	140.04	75.43	143.16	76.72	145.57	76.61
159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01	222.23	75.14
249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29	403.25	76.06
405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21	430.64	76.17
435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49	518.76	79.84
548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13	684.48	81.13
687.11	81.15	742.11	80.84	751.33	81.07				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.1	110.07	.15	121.5	.1	159.23	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
92.48 143.16 165.5 169.96 176.8 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
71.39	75.18	81.5	69.16	81.67	69.06	87.66	67.76	89.09	67.57
90.29	68.14	103.25	74.21	103.93	74.52	104.55	74.5	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.1	104.55	.018	206.53	.018	408.76	.03
435.25	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
71.39 104.55 162.85 162.93 162.56 .1 .3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.49	68.92	78.81	68.85
86.26	67.21	87.29	67.49	94.35	69.43	100.93	71.25	101.72	71.49
102.77	71.46	142.03	71.27	158.47	71.64	184.44	72.28	194.7	72.52
200.88	72.65	233.74	72.9	261.94	73.04	269.59	73.66	279.45	74.52
284.9	74.71	345.6	77.01	353.93	77.03	413.72	78.09	414.74	78.11
421.74	78.22	423.21	78.27	438.25	78.24	502.84	77.71	507.32	77.68
509.47	77.57	514.04	77.58	538.77	78.01	551.49	78.22	562.23	78.33
569.85	78.62	582.46	78.99	583.62	79.04	584.62	79.06	585.59	79.06
586.66	79.04	604.37	79.34	634.88	79.77	647.22	79.72	685.7	79.32
717.19	79.4	747.64	78.97	776.38	79.2	793.01	79.33	795.4	79.35
804.92	79.43								

Manning's n Values num= 4

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

0	.02	41.1	.02	53.2	.1	102.77	.02	

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

53.2	102.77		158.36	154.23	152.81	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

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

69.46	129.21		19.33	19.66	19.62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek

REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

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

95.77	249.12		34.23	31.23	27.43	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27

713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	114.32	67.35	119.16	67.7
122.73	67.96	130.63	70.22	140.68	73.08	144.05	72.84	151.96	72.76
204.76	72.55	223.94	72.77	260.65	73.22	266.07	73.19	299.79	73.59
307.52	73.71	308.78	73.64	314.02	73.77	331.03	73.98	370.85	74.56
384.82	74.69	386.63	74.75	387.16	74.78	388.38	74.86	418.11	75.89
423.92	75.04	425.39	74.76	432.85	74.91	457.95	75.46	487.2	75.02
491.57	74.95	522.3	75.35	532.27	75.56	579.27	76.01	580.21	75.98
583.51	75.87	598.45	75.86	614.06	75.84	620.75	76	655.82	76
662.16	75.87	675.83	75.91	689.65	75.94	698.62	75.94	710.9	75.97
723.26	76	735.67	76.03	748.15	76.06	751.43	76.22	766.94	76.43
776.08	76.32	801.97	76.64	814.86	76.8	827.37	76.96	832.12	77.23
847.31	77.09	870.84	76.86	882.44	76.54	899.87	76.36	912.59	76.23
918.5	76.53	961.83	74.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.1	140.68	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
154.75	66.39	165.88	66.73	167.71	66.79	171.16	67.8	179.85	70.38
184.02	70.75	194.03	71.62	194.27	71.63	202.76	71.77	273.69	71.57
286.93	71.44	339.3	70.92	341.41	70.93	346.27	70.96	363.18	71.21
380.58	74.52	382.15	74.81	403.82	75.16	415.99	75.36	424.89	75.46
426.22	75.5	428.2	75.54	485.28	76.46	504.11	76.75	504.86	76.77
505.61	76.77	581.94	76.71	581.99	76.71	582.19	76.7	616.27	75.05
620.06	74.54	625.23	73.61	632.37	73.76	634.32	73.8	662.88	75.08
673.19	75.29	682.75	75.49	699.59	75.85	706.79	76.32	708.21	76.42
710.5	76.17	721.06	75	733.86	73.51	736.35	73.31	740.23	73.51
751.82	73.86	779.52	74	784.48	74.03	793.6	73.98	877.01	74.07
877.93	74.07	884.82	74.19	904.52	74.3	961.49	74.71	997.84	74.13
1012.87	73.63	1017.1	73.64	1082.33	73.05	1082.5	73.03	1164.82	73.75
1168.93	73.73	1173.57	73.7	1242.67	73.99				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.05	147.9	.02	167.71	.05
202.76	.018								

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

134.84	202.76		183.41	186.19	187.45	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	56.56	71.72
70.25	65.77	70.48	65.65	70.85	65.47	72.27	65.53	87.65	66.22
92.18	66.43	98.17	68.46	106.67	71.72	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	56.56	.05	70.25	.02	92.18	.05	109.43	.02

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

56.56	109.43		55.48	54.33	52.65	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.83	80.84	43.55	70.58	50.9	65.45
52.16	64.56	77.48	65.04	79.17	65.04	81.83	65.04	86.72	67.31
96.83	71.62	102.85	71.44	120.83	71.5	121.28	71.5	162.27	72.16
203.84	72.77	234.07	73.18	262.22	73.16	287	73.2	315.47	72.84
338.75	72.78	375.8	73.25	418.39	72.85	430.44	73	446.57	73.51
454.04	74	458.95	74.94	459.21	74.99	459.67	74.98	473.54	74.66
515.16	74.88	521.36	74.86	529.13	74.74	533.68	74.54	544.33	74.06
549.3	73.7	552	73.46	555.67	73.6	564.62	73.94	587.23	74.72
610.02	74.92	621.12	75.16	631.61	74.98	670.03	73.9	680.62	73.66
686.29	73.65	705.55	73.79	720.09	74	749.26	73.82	752.63	72.85
758.57	71.1	762.8	71.19	790.92	71.05	809.65	71.02	817.24	70.83
828.47	71	887.89	71.48	897.69	71.52	967.83	72.22	976.49	72.29
1023.22	72.17	1030.23	72.27	1055.6	71.92	1065.03	71.88	1141.19	72.12
1152.9	72.07	1276.23	72.08	1292.03	72.25	1295.72	72.25		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.83	.02	43.55	.06	50.9	.07	81.83	.06
96.83	.02								

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

27.83	96.83		119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81

600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
104.06	174.16	35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.09	64.53	126.41	63.65	156.41	63.65
161.49	67.03	169.13	71.09	170.1	71.6	171.11	71.58	200.06	71.35
230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74	299.09	73.48
338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57	476.37	73.83
477.83	74	479.36	74.06	491.62	74.13	522.66	74.59	527.93	74.67
573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1	609	74.08
614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38	645.8	75.63
650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51	656.37	74.24
657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86	746.25	74.76
771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98	875.8	72.91
879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94	918.4	70.94
923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98	977.17	71.07
1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03	1180.11	73.27
1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29	1318.12	72.63
1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81	1468.48	72.87
1511.38	72.9	1540.35	73.29						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	126.41	.016	161.49	.016	171.11	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.43	170.1	136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	81.6	71.72
94.78	62.93	124.78	62.93	126.46	64.06	126.79	64.06	127.33	64.52
128.25	65.25	136.49	70.74	145.46	70.58	152.61	70.64	156.91	70.67
208.87	72.31	232.07	72.4	268.04	72.43	287.13	72.67	322.8	72.28
342.36	72.36	359.71	72.05	369.42	72.4	382.2	72.84	413.09	72.99
439.86	73.3	442.26	73.22	451.68	74.82	451.93	74.85	489.05	74.62
492.33	74.6	494.22	74.46	496.02	74.55	502.05	74.56	537.94	74.59
543.47	73.97	547.27	73.57	564.7	74.35	585.61	75.32	589.03	75.19
595.39	74.9	610.65	74.42	628.48	73.82	628.64	73.83	632.03	74.14
662.9	74.55	681.75	74.98	683.52	75.03	694.87	74.98	762.03	73.9
829.96	72.34	834.17	72.28	852.61	71.94	886.74	71.57	889.76	71.6
890.89	71.53	893.47	71.51	939.27	71.05	964.87	70.72	985.97	70.58
999.54	70.45	1017.68	70.38	1019.9	70.52	1040.58	71.55	1043.19	71.55
1044.08	71.56	1045.68	71.6	1053.71	71.31	1062.36	71.53	1076.84	72.35
1092.33	72.58	1121.01	72.8	1135.54	72.81	1156.84	72.83	1199.56	72.92
1221.53	73.08								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	94.78	.016	126.79	.016	136.49	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
81.6	136.49	286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	79.29	.016	99.47	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
31.29 99.47 148.68 149.85 158.44 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	31.29	74.95	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	79.29	.016	99.47	.02

Bank Sta: Left Right Coeff Contr. Expan.
31.29 99.47 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	31.29	74.95	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02
43.26	71.14	47.78	68.13	48.44	66.96	54.33	63.76	54.72	63.5
59.22	60.67	59.37	60.67	68.77	60.67	87.93	60.67	90.19	60.67
92.72	60.67	94.83	62.53	130.44	73.67	143.04	73.94	151.67	73.99
163.31	73.93	182.18	72.99	183.46	72.91	203.9	71.42	221.2	69.91
231.4	70.23	251.76	70.71	260.52	70.72	262.13	70.72	290.97	70.6
312.02	70.68	328.69	70.71	339.11	70.64	359.52	70.02	362.2	70
364.66	70.48	373.11	70.68	428.82	72.01	429.07	71.93	430.72	71.94
436.95	72.28	440.5	72.5	444.65	72.57	478.56	72.74	497.03	72.94
499.73	72.96	501.14	72.95	518.9	73.07	586.99	72.06	777.15	72.67
843.55	72.92	851.87	72.81	883.14	72.26	910.92	72.17		

Manning's n Values num= 6

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .035   43.26    .016   47.78    .016   54.33    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         43.26  130.44           .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 21     110     .018     .018        0                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   43.26   71.14   47.78   68.13   48.44   66.96   54.33   63.76   54.72    63.5
   59.22   60.67   59.37   60.67   68.77   60.67   87.93   60.67   90.19   60.67
   92.72   60.67   94.83   62.53  130.44   73.67  143.04   73.94  151.67   73.99
  163.31   73.93  182.18   72.99  183.46   72.91   203.9   71.42   221.2   69.91
   231.4   70.23  251.76   70.71  260.52   70.72  262.13   70.72  290.97    70.6
  312.02   70.68  328.69   70.71  339.11   70.64  359.52   70.02   362.2      70
  364.66   70.48  373.11   70.68  428.82   72.01  429.07   71.93  430.72   71.94
  436.95   72.28   440.5    72.5  444.65   72.57  478.56   72.74  497.03   72.94
  499.73   72.96  501.14   72.95   518.9   73.07  586.99   72.06  777.15   72.67
  843.55   72.92  851.87   72.81  883.14   72.26  910.92   72.17

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .035   43.26    .016   47.78    .016   54.33    .016  130.44    .035
  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         43.26  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1121.496

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
```

Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	51.25	68.16	63.43	60.03
93.43	60.03	99.62	64.15	115.82	68.66	128.53	68.84	165.64	69.35
175.37	69.36	194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14
267.19	69.68	295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74
345.68	67.85	361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69
417.08	72.14	417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51
492.7	72.22	540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74
728.33	72.72	792.36	72.94	821.37	72.37				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	51.25	.016	99.62	.016	115.82	.035
165.64	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
51.25 115.82 217.42 217.69 218.99 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	58.7	100.14	58.7	122.39	58.7	122.92	58.7
123.52	58.89	129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94
238.83	65.75	242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45
322.74	67.08	348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76
420.51	66.79	421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78
458.53	66.91	466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19
488.24	72.32	514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32
534.61	69.06	590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97
660.51	71.97	778.79	72.51	781.74	72.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	168.96	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.14 168.96 431.18 403.67 344.14 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.15	127.59	.15	226.72	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
116.54 226.72 420.92 415.47 422.02 .1 .3
Ineffective Flow num= 3

```
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
**********************
       0    7.54      72

********************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek
********************************************************************************
****************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
n6    *   n7    *   n8    *   n9    *
********************************************************************************
****************************************
*Lower Reach     *    3519.101    *      .02*      .02*     .016*     .016*     .016*
.018*     .015*         *         *
*Lower Reach     *    3506.967    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    3381.792    *     .018*     .016*     .016*     .016*     .018*
.015*     .018*         *         *
*Lower Reach     *    3171.448    *     .018*     .016*     .016*     .016*     .018*
.018*      .06*     .018*      .05*
*Lower Reach     *    3140.066    *     .018*     .016*     .016*     .016*     .018*
.02*      .05*          *         *
*Lower Reach     *    3034.592    *     .018*     .016*     .018*     .015*      .05*
.015*         *         *         *
*Lower Reach     *    3029.094    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    2847.761    *      .02*       .1*      .15*       .1*      .02*
*        *        *        *
*Lower Reach     *    2677.801    *      .02*       .1*     .018*     .018*      .03*
.018*         *         *         *
*Lower Reach     *    2514.866    *      .02*      .02*       .1*      .02*         *
*        *        *        *
*Lower Reach     *    2360.635    *      .03*      .02*     .025*     .025*     .025*
.02*         *         *         *
*Lower Reach     *    2340.973    *      .02*     .025*     .025*         *         *
*        *        *        *
*Lower Reach     *    2332.283    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    2309.739    *      .03*     .035*     .025*     .025*     .025*
.02*         *         *         *
*Lower Reach     *    2266.686    *      .02*       .1*      .02*         *         *
*        *        *        *
*Lower Reach     *    2090.444    *      .02*      .03*      .05*      .02*      .05*
.018*         *         *         *
*Lower Reach     *    1904.254    *     .025*      .05*      .02*      .05*      .02*
*        *        *        *
*Lower Reach     *    1849.924    *     .018*      .02*      .06*      .07*      .06*
.02*         *         *         *
*Lower Reach     *    1742.873    *     .018*      .02*      .06*      .07*      .06*
.02*         *         *         *
*Lower Reach     *    1705.846    *      .02*     .016*     .016*     .016*      .02*
*        *        *        *
*Lower Reach     *    1573.644    *      .02*     .045*     .016*     .016*      .02*
*        *        *        *
*Lower Reach     *    1305.41     *      .02*     .016*     .016*     .016*      .02*
*        *        *        *
*Lower Reach     *    1230.5      *Culvert  *        *        *        *        *
*        *        *        *
*Lower Reach     *    1155.558    *     .035*     .016*     .016*     .016*     .035*
.02*         *         *         *
*Lower Reach     *    1149.024    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    1121.496    *Lat Struct*        *        *        *        *
*        *        *        *
*Lower Reach     *    1036.821    *      .02*     .035*     .016*     .016*     .035*
.02*         *         *         *
*Lower Reach     *    819.1344    *      .02*     .035*      .02*         *         *
*        *        *        *
*Lower Reach     *    415.466     *      .02*      .15*      .15*     .018*         *
*        *        *        *
********************************************************************************
****************************************

********************************************************************************

SUMMARY OF REACH LENGTHS

River: Alvarado Creek
************************************************************
*     Reach      *   River Sta.   *  Left   * Channel *  Right  *
************************************************************
*Lower Reach     *    3519.101    *    137.3*   137.31*   137.44*
*Lower Reach     *    3506.967    *Lat Struct*         *         *
*Lower Reach     *    3381.792    *   209.35*   210.34*    211.8*
*Lower Reach     *    3171.448    *    32.79*    31.38*    28.21*
*Lower Reach     *    3140.066    *   101.61*   105.47*   112.32*
*Lower Reach     *    3034.592    *   187.47*   186.83*   186.24*
*Lower Reach     *    3029.094    *Lat Struct*         *         *
*Lower Reach     *    2847.761    *    165.5*   169.96*    176.8*
*Lower Reach     *    2677.801    *   162.85*   162.93*   162.56*
*Lower Reach     *    2514.866    *   158.36*   154.23*   152.81*
*Lower Reach     *    2360.635    *    19.33*    19.66*    19.62*
*Lower Reach     *    2340.973    *    34.23*    31.23*    27.43*
*Lower Reach     *    2332.283    *Lat Struct*         *         *
*Lower Reach     *    2309.739    *    21.27*    43.05*    56.67*
*Lower Reach     *    2266.686    *    166.7*   176.24*   190.03*
*Lower Reach     *    2090.444    *   183.41*   186.19*   187.45*
*Lower Reach     *    1904.254    *    55.48*    54.33*    52.65*
*Lower Reach     *    1849.924    *   119.68*   107.05*    93.87*
*Lower Reach     *    1742.873    *     35.7*    37.03*     38.3*
*Lower Reach     *    1705.846    *   136.62*    132.2*   123.01*
*Lower Reach     *    1573.644    *   286.27*   268.23*   249.58*
*Lower Reach     *    1305.41     *   148.68*   149.85*   158.44*
*Lower Reach     *    1230.5      *Culvert  *         *         *
*Lower Reach     *    1155.558    *   118.42*   118.74*   122.35*
*Lower Reach     *    1149.024    *Lat Struct*         *         *
*Lower Reach     *    1121.496    *Lat Struct*         *         *
*Lower Reach     *    1036.821    *   217.42*   217.69*   218.99*
*Lower Reach     *    819.1344    *   431.18*   403.67*   344.14*
*Lower Reach     *    415.466     *   420.92*   415.47*   422.02*
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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek
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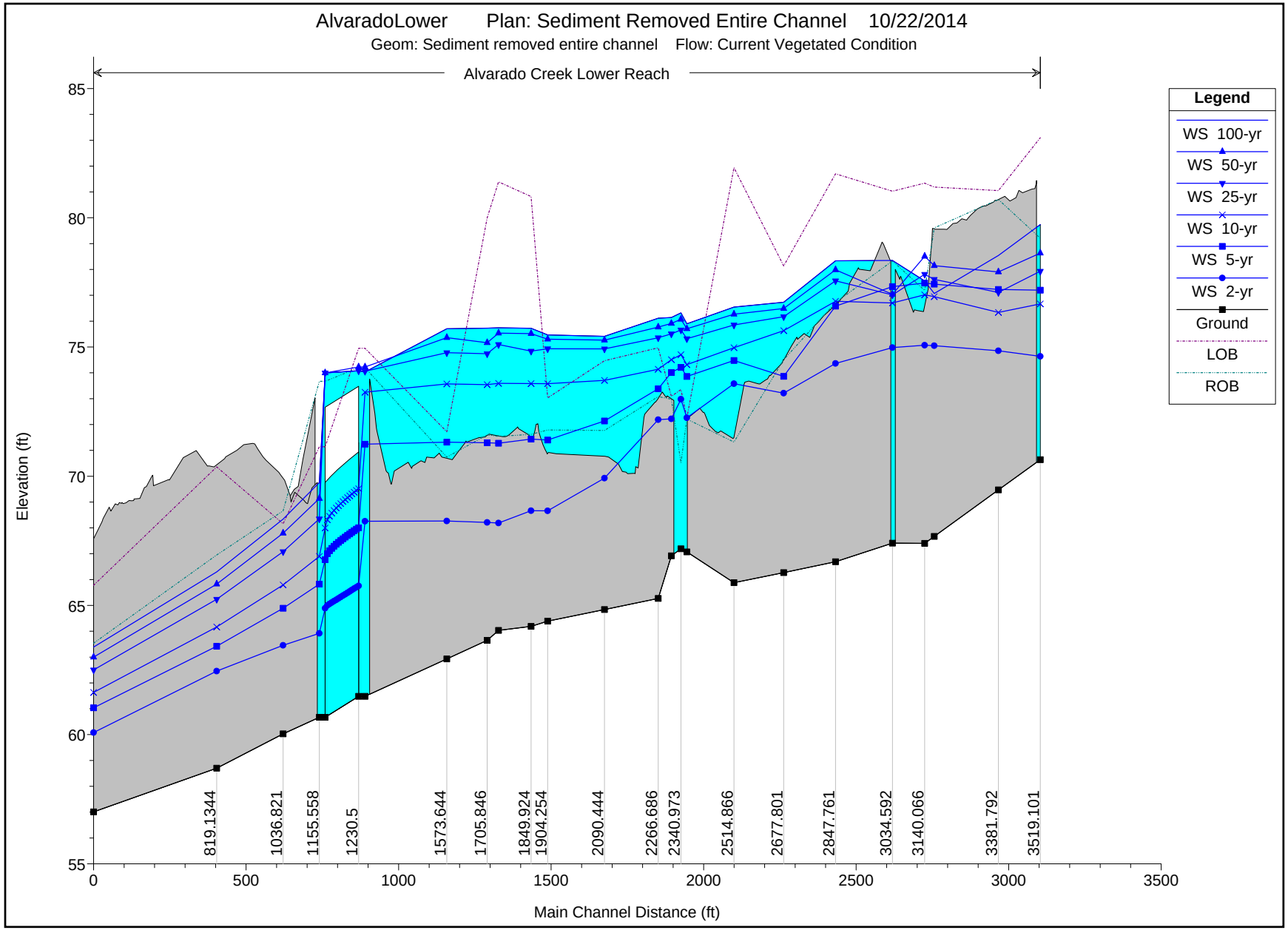
Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3
Lower Reach	2340.973	.1	.3
Lower Reach	2332.283	Lat Struct	
Lower Reach	2309.739	.1	.3
Lower Reach	2266.686	.1	.3
Lower Reach	2090.444	.1	.3
Lower Reach	1904.254	.1	.3
Lower Reach	1849.924	.1	.3
Lower Reach	1742.873	.1	.3
Lower Reach	1705.846	.1	.3
Lower Reach	1573.644	.1	.3
Lower Reach	1305.41	.1	.3
Lower Reach	1230.5	Culvert	
Lower Reach	1155.558	.1	.3
Lower Reach	1149.024	Lat Struct	
Lower Reach	1121.496	Lat Struct	
Lower Reach	1036.821	.1	.3
Lower Reach	819.1344	.1	.3
Lower Reach	415.466	.1	.3


AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
Alvarado Creek Lower Reach
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
85
80
75
70
65
60
55
0
500
1000
1500
2000
2500
3000
3500
819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
2266.686
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101

HEC-RAS Plan: Entire Chan Sedi River: Alvarado Creek Reach: Lower Reach

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)	
Lower Reach	3519.101	100-yr	5100.00	70.64	79.74		82.15	0.001700	12.5	409.26	120.97	0.88
Lower Reach	3519.101	50-yr	4500.00	70.64	78.63	78.63	81.38	0.002292	13.3	338.25	61.66	1.00
Lower Reach	3519.101	25-yr	3800.00	70.64	77.93	77.93	80.49	0.002343	12.8	296.33	58.10	1.00
Lower Reach	3519.101	10-yr	2700.00	70.64	76.67	76.67	78.87	0.002455	11.9	226.86	51.66	1.00
Lower Reach	3519.101	5-yr	2050.00	70.64	77.20		78.20	0.001026	8.0	255.16	54.38	0.65
Lower Reach	3519.101	2-yr	1180.00	70.64	74.64	74.32	75.87	0.002072	8.9	132.59	41.36	0.88
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	100-yr	5100.00	69.47	78.54	78.54	81.81	0.002263	14.5	351.80	105.58	1.00
Lower Reach	3381.792	50-yr	4500.00	69.47	77.91	77.91	81.01	0.002298	14.1	318.40	51.27	1.00
Lower Reach	3381.792	25-yr	3800.00	69.47	77.11	77.11	80.00	0.002350	13.6	278.92	48.42	1.00
Lower Reach	3381.792	10-yr	2700.00	69.47	76.34	75.72	78.26	0.001744	11.1	242.49	45.71	0.85
Lower Reach	3381.792	5-yr	2050.00	69.47	77.23	74.78	78.03	0.000648	7.2	284.47	48.83	0.53
Lower Reach	3381.792	2-yr	1180.00	69.47	74.85	73.26	75.53	0.000800	6.6	177.98	41.14	0.56
Lower Reach	3171.448	100-yr	5100.00	67.67	77.07	76.46	79.80	0.001768	13.3	384.61	138.69	0.89
Lower Reach	3171.448	50-yr	4500.00	67.67	78.15	75.85	79.72	0.000920	10.1	446.52	154.83	0.65
Lower Reach	3171.448	25-yr	3800.00	67.67	77.62	75.10	78.92	0.000797	9.1	415.40	146.86	0.60
Lower Reach	3171.448	10-yr	2700.00	67.67	76.95	73.75	77.74	0.000521	7.1	377.68	136.81	0.48
Lower Reach	3171.448	5-yr	2050.00	67.67	77.43	72.83	77.83	0.000249	5.1	404.95	144.12	0.33
Lower Reach	3171.448	2-yr	1180.00	67.67	75.05	71.36	75.33	0.000232	4.2	278.79	109.82	0.31
Lower Reach	3140.066	100-yr	5100.00	67.40	77.55	76.24	79.53	0.001275	11.3	476.73	410.15	0.76
Lower Reach	3140.066	50-yr	4500.00	67.40	78.51	75.62	79.53	0.000600	8.3	611.30	462.59	0.53
Lower Reach	3140.066	25-yr	3800.00	67.40	77.81	74.87	78.80	0.000617	8.0	513.26	422.36	0.53
Lower Reach	3140.066	10-yr	2700.00	67.40	77.02	73.54	77.69	0.000462	6.6	410.87	277.31	0.46
Lower Reach	3140.066	5-yr	2050.00	67.40	77.47	72.62	77.80	0.000215	4.6	465.53	407.95	0.31
Lower Reach	3140.066	2-yr	1180.00	67.40	75.07	71.11	75.31	0.000205	4.0	297.56	108.09	0.30
Lower Reach	3034.592	100-yr	5100.00	67.41	78.35	76.66	79.06	0.000554	7.8	903.62	275.83	0.50
Lower Reach	3034.592	50-yr	4500.00	67.41	77.04	76.04	79.31	0.001506	12.1	371.93	230.00	0.82
Lower Reach	3034.592	25-yr	3800.00	67.41	77.01	75.25	78.65	0.001085	10.3	370.51	227.08	0.69
Lower Reach	3034.592	10-yr	2700.00	67.41	76.70	73.87	77.61	0.000622	7.6	353.71	211.82	0.52
Lower Reach	3034.592	5-yr	2050.00	67.41	77.33	72.91	77.77	0.000278	5.3	388.25	249.80	0.35
Lower Reach	3034.592	2-yr	1180.00	67.41	74.98	71.34	75.28	0.000260	4.4	266.14	47.78	0.33
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	100-yr	5100.00	66.69	78.33	77.28	78.83	0.001623	5.9	902.36	268.55	0.38
Lower Reach	2847.761	50-yr	4500.00	66.69	77.99	77.10	78.47	0.001750	6.0	809.95	264.94	0.40
Lower Reach	2847.761	25-yr	3800.00	66.69	77.56	76.87	78.03	0.001937	6.1	697.73	260.49	0.41
Lower Reach	2847.761	10-yr	2700.00	66.69	76.77	75.36	77.28	0.002491	6.5	494.79	253.60	0.46
Lower Reach	2847.761	5-yr	2050.00	66.69	76.58	74.18	77.58	0.003938	8.0	255.46	249.12	0.58
Lower Reach	2847.761	2-yr	1180.00	66.69	74.36	72.30	75.12	0.003771	7.0	169.56	34.23	0.55
Lower Reach	2677.801	100-yr	5100.00	66.27	76.73	76.73	78.26	0.005341	10.3	515.64	190.82	0.69
Lower Reach	2677.801	50-yr	4500.00	66.27	76.49	76.49	77.89	0.005230	10.0	476.69	168.74	0.68
Lower Reach	2677.801	25-yr	3800.00	66.27	76.17	76.17	77.44	0.005100	9.7	427.16	155.53	0.67
Lower Reach	2677.801	10-yr	2700.00	66.27	75.63	75.63	76.66	0.004577	8.8	344.59	149.03	0.63
Lower Reach	2677.801	5-yr	2050.00	66.27	73.86	73.86	76.34	0.012468	12.6	162.41	48.75	1.00
Lower Reach	2677.801	2-yr	1180.00	66.27	73.21	71.96	74.29	0.005966	8.3	141.73	30.83	0.68
Lower Reach	2514.866	100-yr	5100.00	65.88	76.54	74.35	76.89	0.000827	4.2	1081.01	270.12	0.28
Lower Reach	2514.866	50-yr	4500.00	65.88	76.27	74.15	76.58	0.000787	4.0	1007.83	262.32	0.27
Lower Reach	2514.866	25-yr	3800.00	65.88	75.85	73.90	76.13	0.000774	3.9	900.94	250.49	0.27
Lower Reach	2514.866	10-yr	2700.00	65.88	74.97	73.48	75.21	0.000835	3.8	692.09	225.59	0.27
Lower Reach	2514.866	5-yr	2050.00	65.88	74.48	73.20	74.67	0.000786	3.6	584.00	211.75	0.26
Lower Reach	2514.866	2-yr	1180.00	65.88	73.58	72.22	73.72	0.000820	3.4	399.65	199.63	0.26
Lower Reach	2360.635	100-yr	5100.00	67.07	75.90	74.99	76.67	0.001625	7.8	753.90	405.93	0.57
Lower Reach	2360.635	50-yr	4500.00	67.07	75.70	74.73	76.38	0.001480	7.3	714.08	375.29	0.54
Lower Reach	2360.635	25-yr	3800.00	67.07	75.32	74.42	75.93	0.001468	7.0	635.46	314.91	0.53
Lower Reach	2360.635	10-yr	2700.00	67.07	74.32	73.89	74.98	0.002048	7.2	440.83	175.23	0.60
Lower Reach	2360.635	5-yr	2050.00	67.07	73.86	73.48	74.45	0.002047	6.7	361.64	172.64	0.59
Lower Reach	2360.635	2-yr	1180.00	67.07	72.26	72.20	73.35	0.006451	8.4	140.84	68.55	0.96
Lower Reach	2340.973	100-yr	5100.00	67.19	76.32	72.35	76.48	0.000247	3.5	1686.49	771.45	0.23
Lower Reach	2340.973	50-yr	4500.00	67.19	76.07	72.10	76.21	0.000222	3.2	1603.93	655.15	0.21
Lower Reach	2340.973	25-yr	3800.00	67.19	75.66	71.75	75.78	0.000203	2.9	1468.42	473.28	0.20
Lower Reach	2340.973	10-yr	2700.00	67.19	74.70	71.14	74.80	0.000198	2.6	1164.47	321.51	0.20
Lower Reach	2340.973	5-yr	2050.00	67.19	74.21	70.71	74.28	0.000166	2.3	1015.88	298.14	0.18
Lower Reach	2340.973	2-yr	1180.00	67.19	72.98	70.05	73.03	0.000159	1.9	674.02	225.66	0.17
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	100-yr	5100.00	66.92	76.14	74.37	76.45	0.000573	5.1	1191.94	746.89	0.34
Lower Reach	2309.739	50-yr	4500.00	66.92	75.91	74.18	76.18	0.000535	4.8	1121.70	715.34	0.32
Lower Reach	2309.739	25-yr	3800.00	66.92	75.51	73.96	75.75	0.000537	4.6	1000.01	417.20	0.32
Lower Reach	2309.739	10-yr	2700.00	66.92	74.51	73.47	74.77	0.000739	4.8	711.87	280.43	0.37
Lower Reach	2309.739	5-yr	2050.00	66.92	74.01	72.56	74.26	0.000781	4.6	574.42	270.76	0.37

HEC-RAS Plan: Entire Chan Sedi River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2309.739	2-yr	1180.00	66.92	72.22	71.17	72.95	0.002712	6.9	172.09	110.63	0.65
Lower Reach	2266.686	100-yr	5100.00	65.27	76.11	74.70	76.41	0.001006	4.9	1186.51	646.81	0.31
Lower Reach	2266.686	50-yr	4500.00	65.27	75.77	74.50	76.14	0.001162	5.1	931.96	440.27	0.33
Lower Reach	2266.686	25-yr	3800.00	65.27	75.36	74.29	75.70	0.001252	5.1	809.98	374.14	0.34
Lower Reach	2266.686	10-yr	2700.00	65.27	74.14	72.83	74.68	0.002651	6.6	493.39	246.20	0.49
Lower Reach	2266.686	5-yr	2050.00	65.27	73.38	71.90	74.14	0.003863	7.3	324.69	191.76	0.58
Lower Reach	2266.686	2-yr	1180.00	65.27	72.19	70.32	72.78	0.003382	6.1	192.01	45.28	0.53
Lower Reach	2090.444	100-yr	5100.00	64.84	75.41	73.63	76.11	0.002043	5.2	840.96	752.84	0.36
Lower Reach	2090.444	50-yr	4500.00	64.84	75.27	73.35	75.85	0.001789	4.8	808.25	738.96	0.34
Lower Reach	2090.444	25-yr	3800.00	64.84	74.93	73.02	75.42	0.001710	4.6	732.67	711.58	0.33
Lower Reach	2090.444	10-yr	2700.00	64.84	73.71	72.49	74.19	0.002567	4.9	497.25	293.25	0.39
Lower Reach	2090.444	5-yr	2050.00	64.84	72.14	72.14	73.05	0.010597	7.9	269.18	140.22	0.74
Lower Reach	2090.444	2-yr	1180.00	64.84	69.93	69.93	71.53	0.016964	10.2	115.95	36.02	1.00
Lower Reach	1904.254	100-yr	5100.00	64.39	75.47	73.96	75.93	0.000289	6.6	1392.35	1195.96	0.38
Lower Reach	1904.254	50-yr	4500.00	64.39	75.30	72.99	75.70	0.000251	6.1	1330.46	1179.56	0.35
Lower Reach	1904.254	25-yr	3800.00	64.39	74.93	71.40	75.29	0.000230	5.6	1193.14	1143.31	0.34
Lower Reach	1904.254	10-yr	2700.00	64.39	73.58	70.10	74.06	0.000318	5.9	693.13	904.84	0.38
Lower Reach	1904.254	5-yr	2050.00	64.39	71.40	69.22	72.21	0.000681	7.2	284.04	161.84	0.54
Lower Reach	1904.254	2-yr	1180.00	64.39	68.66	67.82	69.56	0.001293	7.6	155.49	42.81	0.70
Lower Reach	1849.924	100-yr	5100.00	64.19	75.72	73.01	75.80	0.000079	3.4	2977.19	923.97	0.20
Lower Reach	1849.924	50-yr	4500.00	64.19	75.52	72.45	75.59	0.000073	3.2	2788.02	923.66	0.19
Lower Reach	1849.924	25-yr	3800.00	64.19	74.84	71.19	75.27	0.000267	5.9	915.57	863.85	0.36
Lower Reach	1849.924	10-yr	2700.00	64.19	73.58	69.91	74.04	0.000297	5.7	605.41	622.95	0.37
Lower Reach	1849.924	5-yr	2050.00	64.19	71.44	69.04	72.14	0.000599	6.8	303.56	111.09	0.51
Lower Reach	1849.924	2-yr	1180.00	64.19	68.67	67.62	69.46	0.001113	7.1	165.21	44.62	0.65
Lower Reach	1742.873	100-yr	5100.00	64.03	75.74	73.41	75.78	0.000121	1.1	3193.01	934.49	0.06
Lower Reach	1742.873	50-yr	4500.00	64.03	75.54	72.94	75.57	0.000115	1.0	3001.46	934.20	0.06
Lower Reach	1742.873	25-yr	3800.00	64.03	75.10	70.98	75.13	0.000134	1.1	2590.90	933.58	0.06
Lower Reach	1742.873	10-yr	2700.00	64.03	73.59	69.71	73.93	0.003177	4.7	581.81	697.91	0.30
Lower Reach	1742.873	5-yr	2050.00	64.03	71.27	68.84	71.98	0.009753	6.7	304.29	116.10	0.50
Lower Reach	1742.873	2-yr	1180.00	64.03	68.19	67.47	69.12	0.024672	7.7	152.31	43.88	0.73
Lower Reach	1705.846	100-yr	5100.00	63.65	75.73	72.69	75.78	0.000050	2.7	3933.70	1269.45	0.16
Lower Reach	1705.846	50-yr	4500.00	63.65	75.16	71.32	75.53	0.000227	5.7	1227.43	1256.31	0.33
Lower Reach	1705.846	25-yr	3800.00	63.65	74.74	70.60	75.09	0.000216	5.4	1024.83	1208.19	0.33
Lower Reach	1705.846	10-yr	2700.00	63.65	73.54	69.34	73.90	0.000227	5.1	681.46	850.99	0.33
Lower Reach	1705.846	5-yr	2050.00	63.65	71.29	68.46	71.90	0.000479	6.3	326.65	205.39	0.46
Lower Reach	1705.846	2-yr	1180.00	63.65	68.21	67.07	68.96	0.001021	6.9	170.41	45.25	0.63
Lower Reach	1573.644	100-yr	5100.00	62.93	75.71	71.77	75.77	0.000051	3.1	3609.32	1098.37	0.16
Lower Reach	1573.644	50-yr	4500.00	62.93	75.36	70.85	75.43	0.000054	3.1	3231.46	1097.35	0.17
Lower Reach	1573.644	25-yr	3800.00	62.93	74.78	69.93	75.04	0.000142	4.8	1246.08	1023.91	0.27
Lower Reach	1573.644	10-yr	2700.00	62.93	73.57	68.63	73.86	0.000158	4.7	860.25	759.15	0.28
Lower Reach	1573.644	5-yr	2050.00	62.93	71.32	67.75	71.82	0.000343	5.7	377.46	219.05	0.39
Lower Reach	1573.644	2-yr	1180.00	62.93	68.26	66.35	68.79	0.000595	5.8	202.82	45.99	0.49
Lower Reach	1305.41	100-yr	5100.00	61.48	74.03	70.30	75.59	0.000926	10.0	509.91	640.63	0.61
Lower Reach	1305.41	50-yr	4500.00	61.48	74.23	69.64	75.30	0.000664	8.4	593.10	674.41	0.51
Lower Reach	1305.41	25-yr	3800.00	61.48	74.06	68.82	74.92	0.000512	7.4	511.60	645.58	0.45
Lower Reach	1305.41	10-yr	2700.00	61.48	73.25	67.39	73.78	0.000301	5.8	464.12	513.53	0.36
Lower Reach	1305.41	5-yr	2050.00	61.48	71.24	66.42	71.73	0.000294	5.6	363.75	43.82	0.34
Lower Reach	1305.41	2-yr	1180.00	61.48	68.25	64.95	68.63	0.000320	4.9	240.07	39.66	0.35
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	100-yr	5100.00	60.67	69.75	68.40	71.57	0.001220	10.8	471.13	72.58	0.75
Lower Reach	1155.558	50-yr	4500.00	60.67	69.13	67.87	70.86	0.001245	10.5	427.09	69.67	0.75
Lower Reach	1155.558	25-yr	3800.00	60.67	68.35	67.23	69.95	0.001284	10.2	373.87	65.98	0.75
Lower Reach	1155.558	10-yr	2700.00	60.67	66.90	66.05	68.32	0.001444	9.6	282.35	60.24	0.78
Lower Reach	1155.558	5-yr	2050.00	60.67	65.83	65.24	67.17	0.001666	9.3	220.60	54.84	0.82
Lower Reach	1155.558	2-yr	1180.00	60.67	63.92	63.92	65.30	0.002796	9.4	125.20	45.23	1.00
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	100-yr	5100.00	60.03	68.34	68.34	71.27	0.002262	13.7	371.35	107.00	1.00
Lower Reach	1036.821	50-yr	4500.00	60.03	67.80	67.80	70.56	0.002297	13.3	337.32	72.52	1.00
Lower Reach	1036.821	25-yr	3800.00	60.03	67.08	67.08	69.66	0.002353	12.9	295.12	57.28	1.00
Lower Reach	1036.821	10-yr	2700.00	60.03	65.79	65.79	68.02	0.002467	12.0	225.54	50.73	1.00
Lower Reach	1036.821	5-yr	2050.00	60.03	64.89	64.89	66.86	0.002559	11.3	181.90	46.14	1.00
Lower Reach	1036.821	2-yr	1180.00	60.03	63.46	63.46	64.95	0.002765	9.8	120.41	40.28	1.00
Lower Reach	819.1344	100-yr	5100.00	58.70	66.29	66.29	68.72	0.010905	12.5	407.73	135.89	1.00
Lower Reach	819.1344	50-yr	4500.00	58.70	65.83	65.83	68.13	0.011112	12.2	369.27	91.87	1.00
Lower Reach	819.1344	25-yr	3800.00	58.70	65.24	65.24	67.38	0.011361	11.7	323.49	75.40	1.00

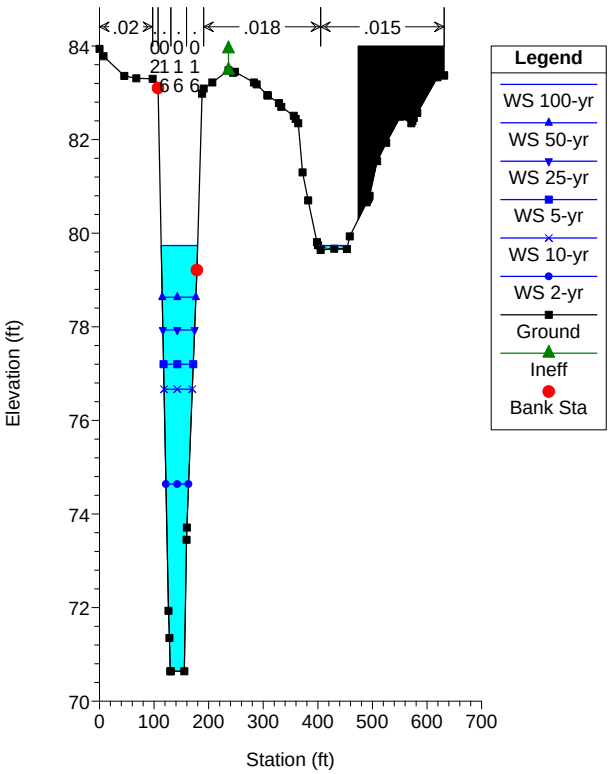
HEC-RAS Plan: Entire Chan Sedi River: Alvarado Creek Reach: Lower Reach (Continued)

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)	
Lower Reach	819.1344	10-yr	2700.00	58.70	64.17	64.17	66.02	0.011949	10.9	247.32	66.92	1.00
Lower Reach	819.1344	5-yr	2050.00	58.70	63.42	63.42	65.06	0.012446	10.3	199.45	60.98	1.00
Lower Reach	819.1344	2-yr	1180.00	58.70	62.46	62.18	63.49	0.010069	8.2	144.55	53.37	0.87
Lower Reach	415.466	100-yr	5100.00	57.01	63.39	62.35	64.77	0.005001	9.4	541.87	106.45	0.74
Lower Reach	415.466	50-yr	4500.00	57.01	63.00	61.99	64.25	0.005001	9.0	500.45	104.52	0.72
Lower Reach	415.466	25-yr	3800.00	57.01	62.51	61.53	63.61	0.005003	8.5	449.62	102.10	0.71
Lower Reach	415.466	10-yr	2700.00	57.01	61.64	60.74	62.50	0.005001	7.4	362.66	97.83	0.68
Lower Reach	415.466	5-yr	2050.00	57.01	61.04	60.20	61.74	0.005001	6.7	305.25	94.89	0.66
Lower Reach	415.466	2-yr	1180.00	57.01	60.08	59.38	60.54	0.005001	5.4	216.57	89.95	0.62

AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

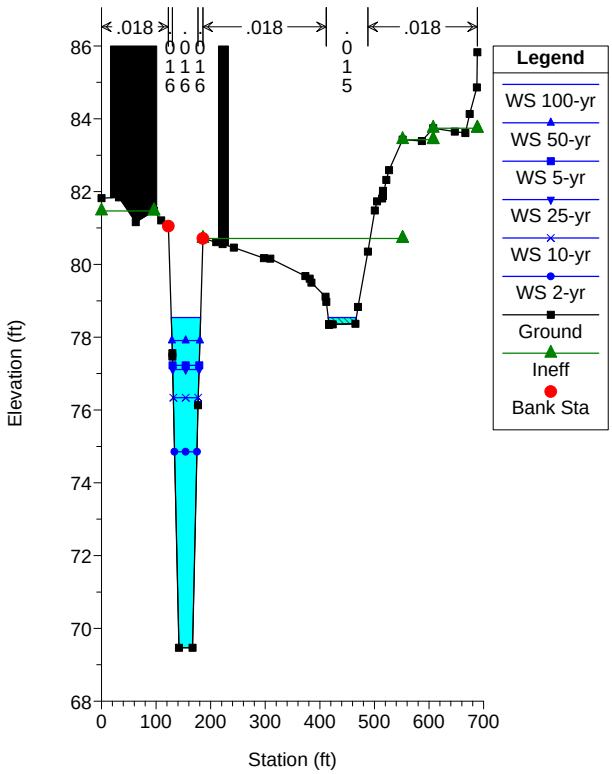
River = Alvarado Creek Reach = Lower Reach RS = 3519.101



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

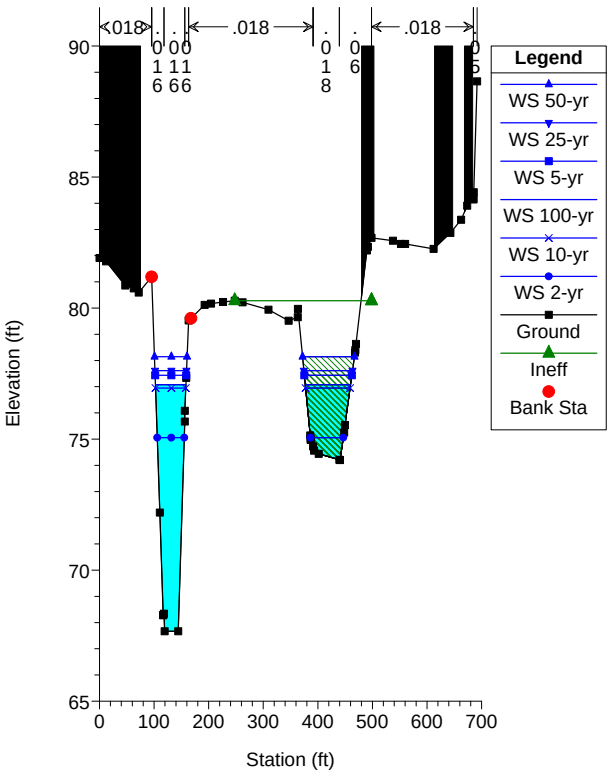
River = Alvarado Creek Reach = Lower Reach RS = 3381.792



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

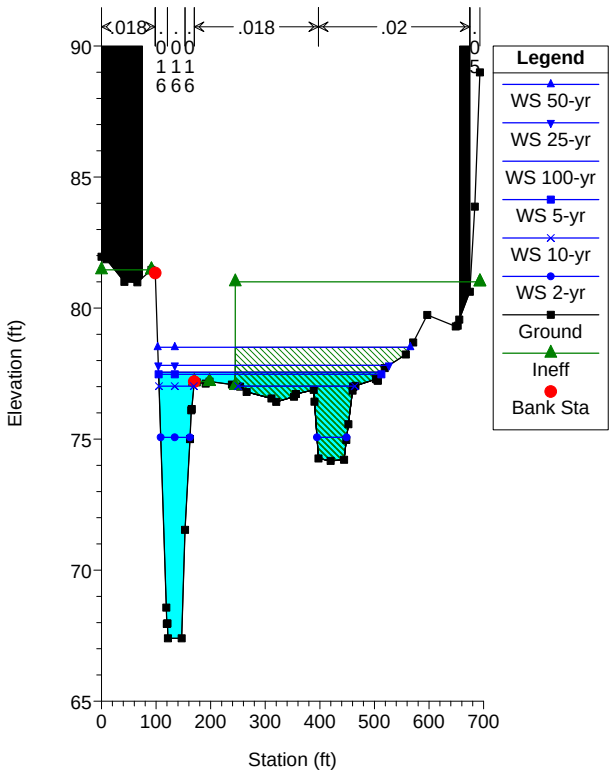
River = Alvarado Creek Reach = Lower Reach RS = 3171.448

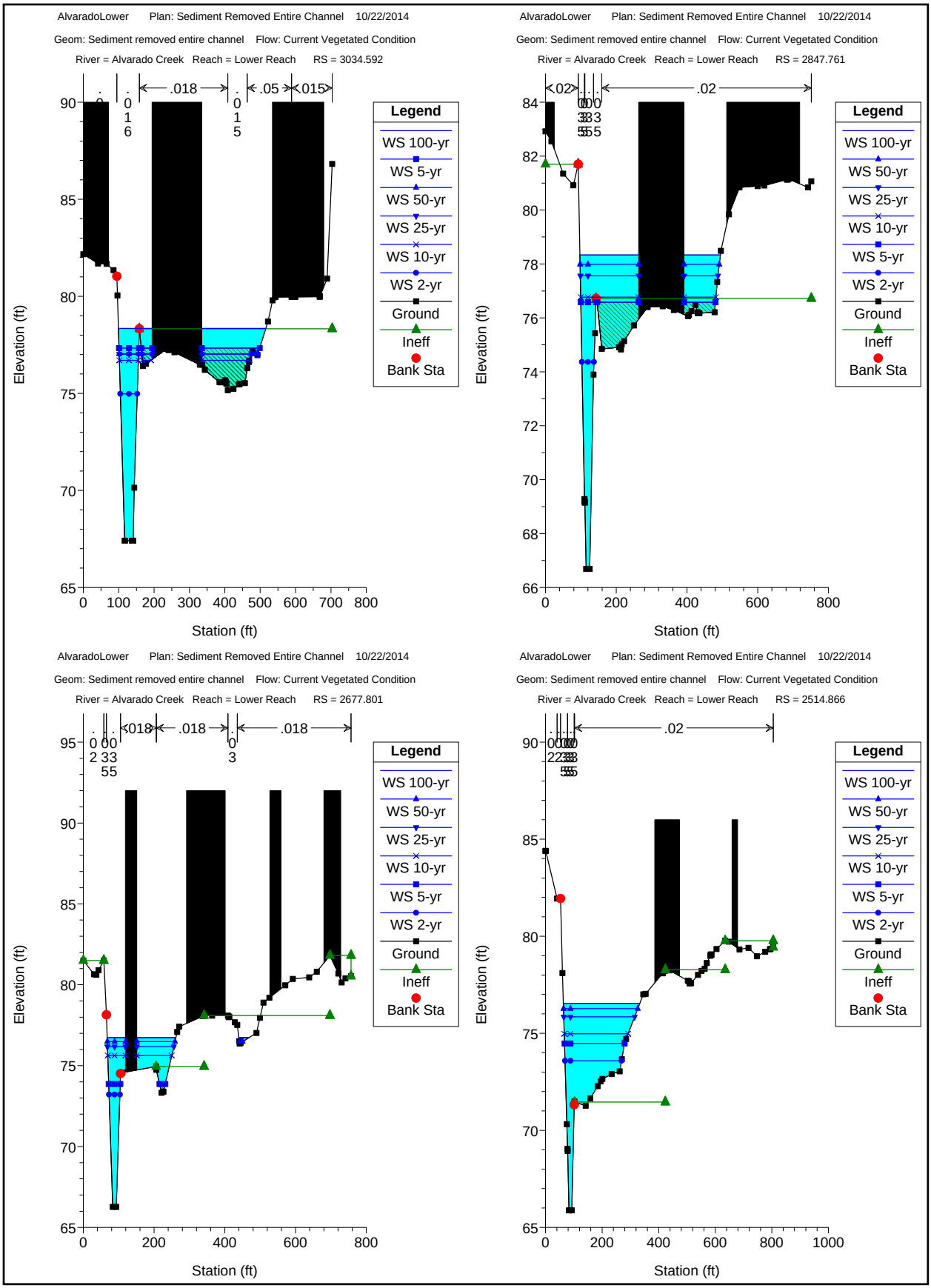


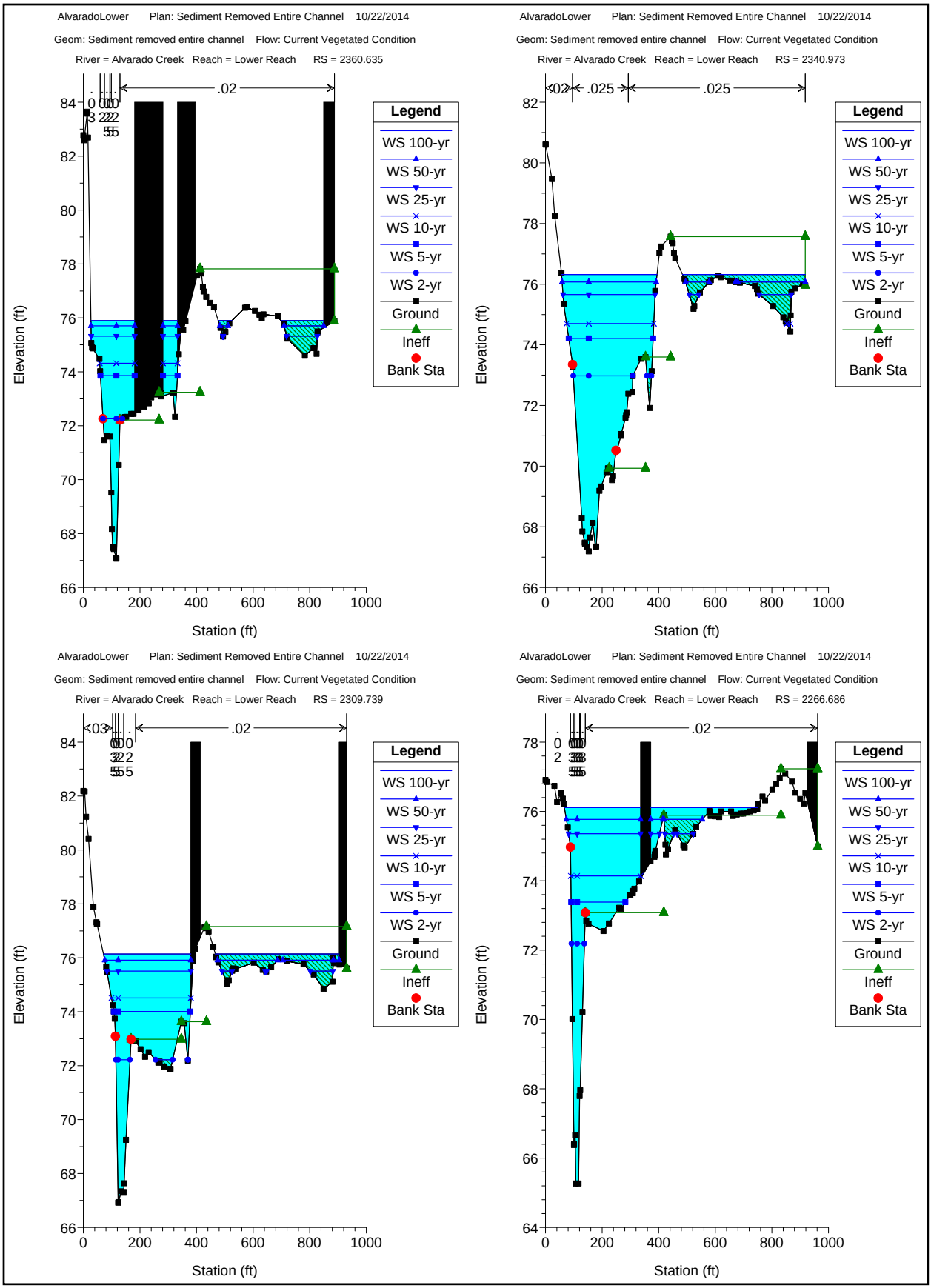
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

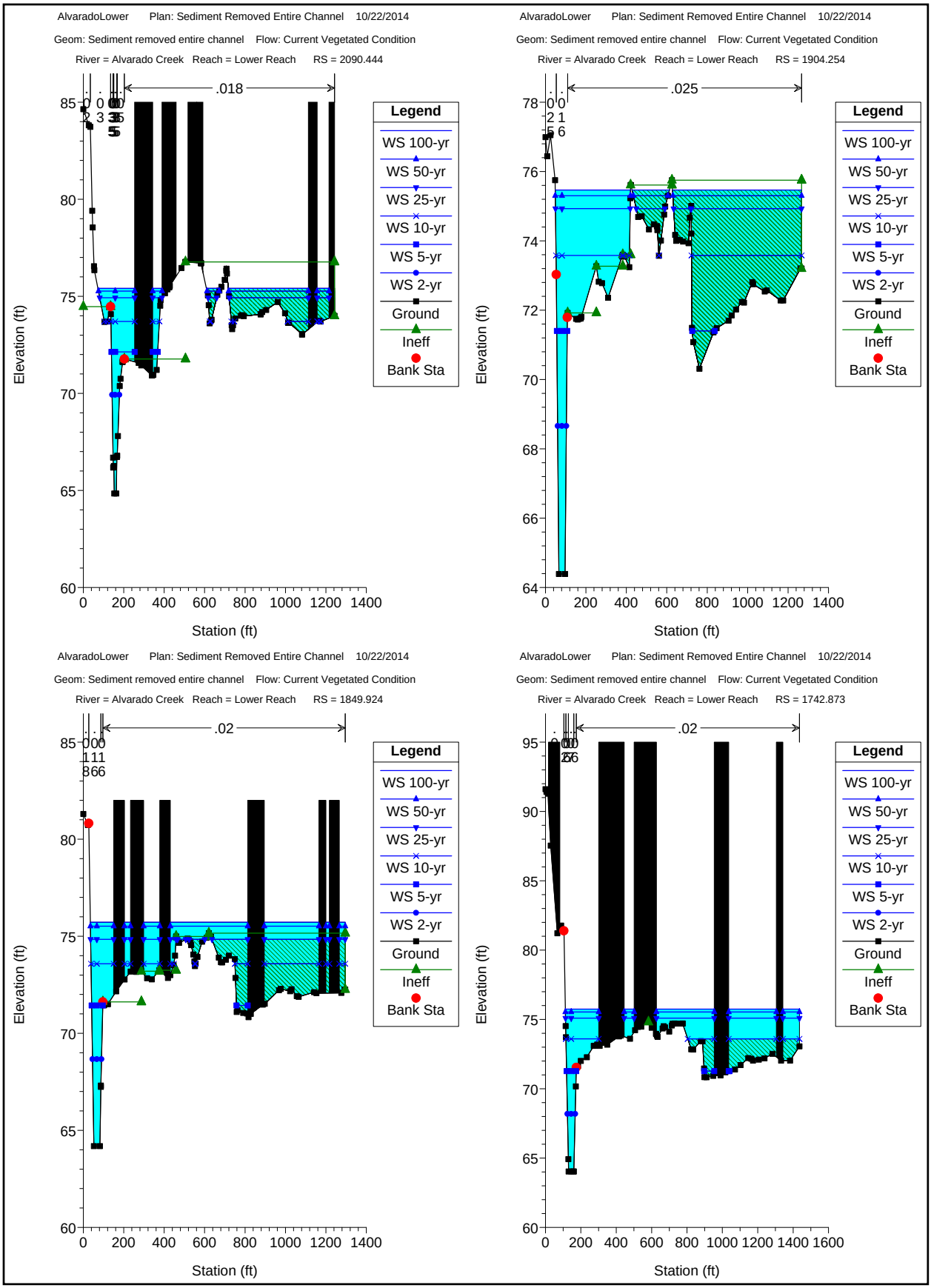
Geom: Sediment removed entire channel Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 3140.066




AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.05
.015
Legend
WS 100-yr
WS 5-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

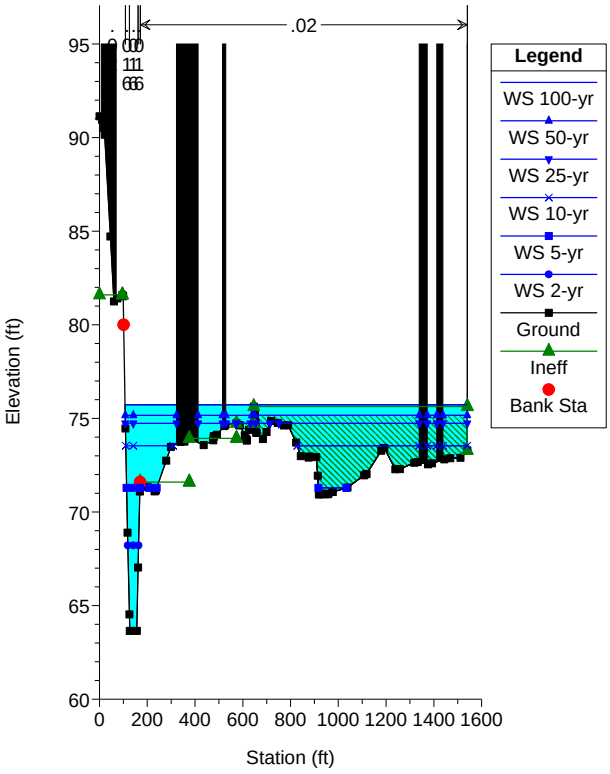

AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 2090.444
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1904.254
.025
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1849.924
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 1742.873
.02
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

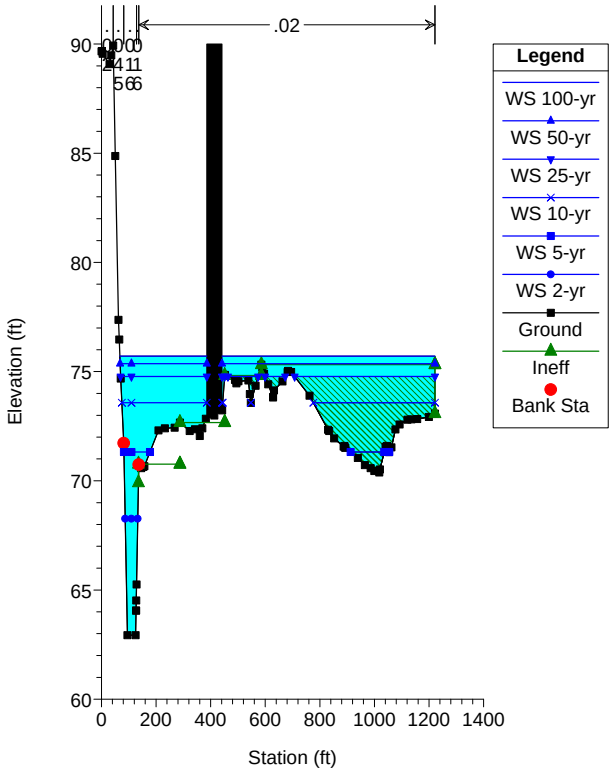
River = Alvarado Creek Reach = Lower Reach RS = 1705.846



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

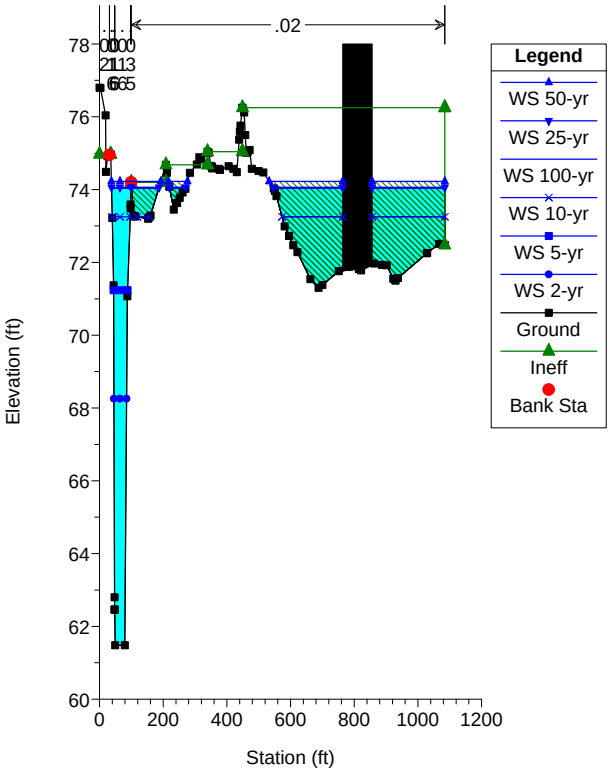
River = Alvarado Creek Reach = Lower Reach RS = 1573.644



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

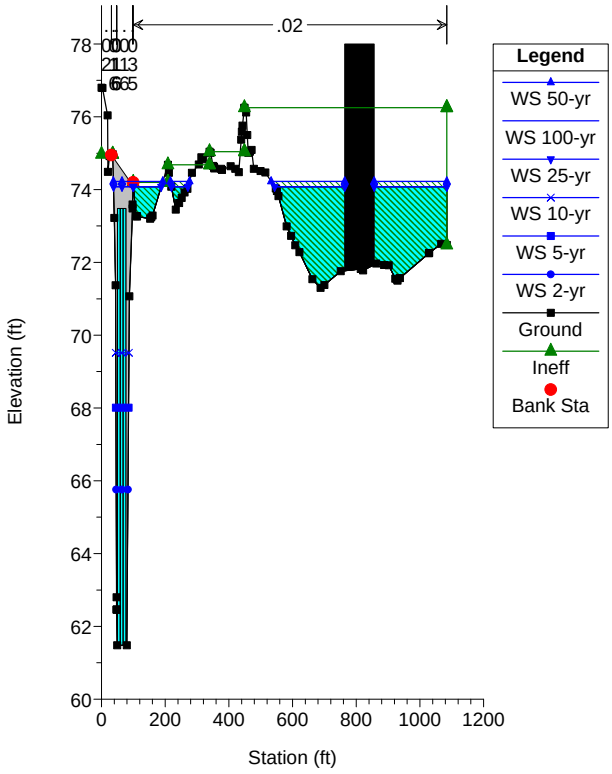
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

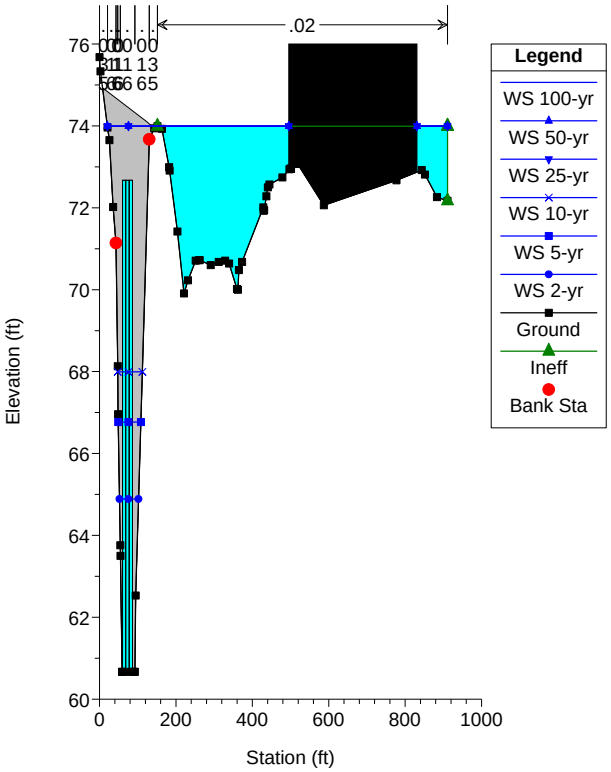
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

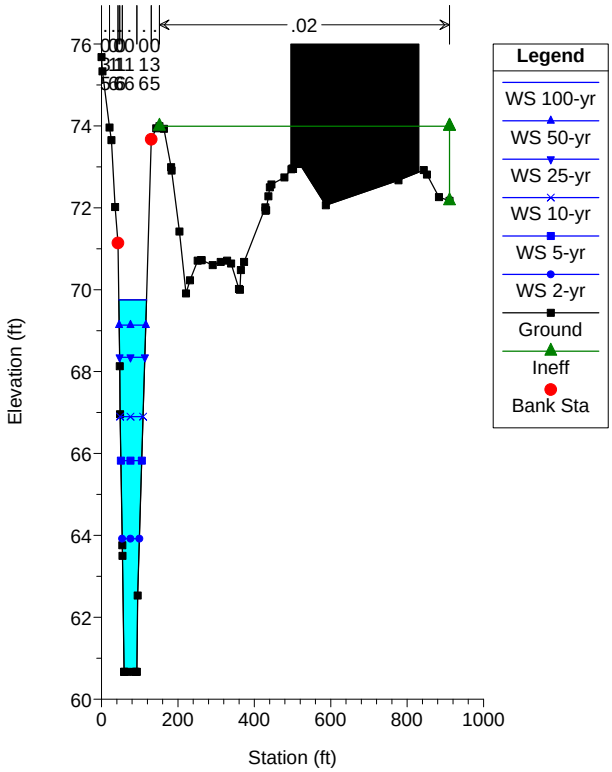
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

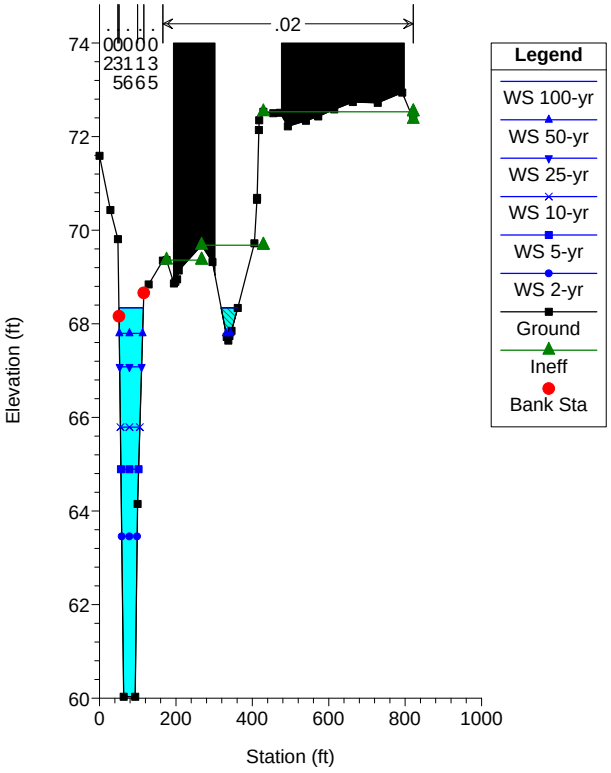
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge



AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

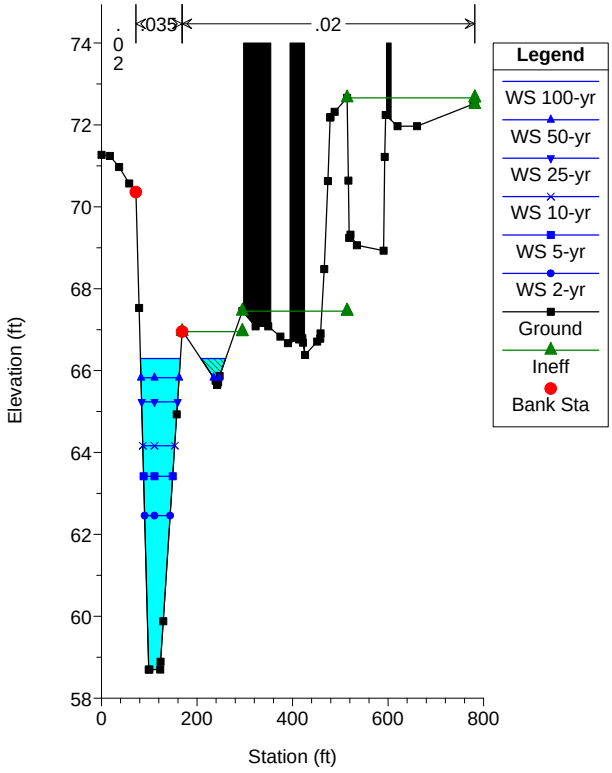
River = Alvarado Creek Reach = Lower Reach RS = 1036.821

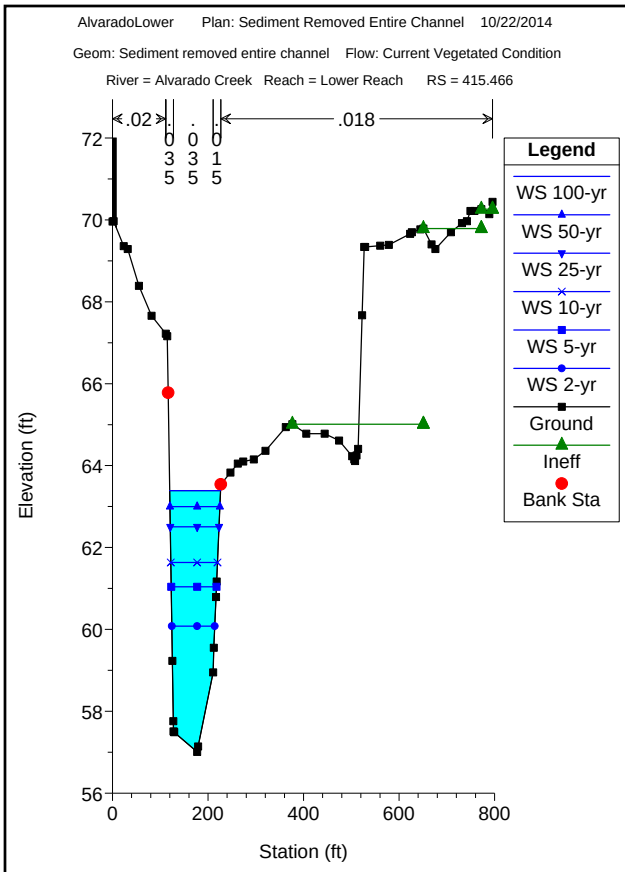


AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014

Geom: Sediment removed entire channel Flow: Current Vegetated Condition

River = Alvarado Creek Reach = Lower Reach RS = 819.1344




AlvaradoLower Plan: Sediment Removed Entire Channel 10/22/2014
Geom: Sediment removed entire channel Flow: Current Vegetated Condition
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.035
.035
.015
.018
Legend
WS 100-yr
WS 50-yr
WS 25-yr
WS 10-yr
WS 5-yr
WS 2-yr
Ground
Ineff
Bank Sta
Elevation (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800
Station (ft)

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 1:27:28 PM

Project in English units

****

PLAN DATA

Plan Title: Sediment Removed Entire Channel
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p09

Geometry Title: Sediment removed entire channel
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g07

Flow Title : Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Plan Description:
Sediment and vegetation removed in the entire channel including portions owned
by others

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Current Vegetated Condition
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f01

Flow Data (cfs)

River	Reach	RS	100-yr	50-yr	25-yr	10-yr	5-yr	2-yr
Alvarado Creek	Lower Reach	3519.101	5100	4500	3800	2700	2050	1180

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Creek	Lower Reach	100-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	50-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	25-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	10-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	5-yr	Normal S = 0.005	
Alvarado Creek	Lower Reach	2-yr	Normal S = 0.005	

****

GEOMETRY DATA

Geometry Title: Sediment removed entire channel
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g07

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3519.101

INPUT

Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	83.94	7.23	83.78	45.4	83.36	67.28	83.31	97.34	83.3
107.14	83.1	126.44	71.93	127.98	71.35	129.5	70.64	130.6	70.64
155.29	70.64	159.51	73.45	160	73.71	178.45	79.21	188.01	82.98
190.95	83.09	206.58	83.22	236.14	83.48	244.64	83.43	248	83.45
282.79	83.22	287.79	83.18	307.35	82.95	308.27	82.94	328.59	82.78
333.03	82.7	355.98	82.51	359.45	82.44	363.96	82.35	371.9	81.3
382.25	80.7	398.46	79.81	400.43	79.74	405.16	79.64	430.03	79.67
453.27	79.66	458.52	79.93	489.51	80.66	491.93	80.72	493.29	80.76
494.77	80.8	508.53	81.54	525.25	81.93	550.96	82.49	571.25	82.35
573.37	82.4	575.72	82.46	582.06	82.57	619.05	83.33	631.18	83.37
631.5	83.37								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	97.34	.02	107.14	.016	130.6	.016	159.51	.016
190.95	.018	405.16	.015						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
107.14 178.45 137.3 137.31 137.44 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
236.14	631.5		F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
473.62	631.5	84

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3506.967

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.44	.54	81.34	5.52	81.13	15.16	81.11	45.52	80.97
57.61	81.06	60.29	80.98	67.08	80.78	77.87	80.71	87.14	80.65
103.56	80.83	107.18	80.81	118.93	80.74	131.34	80.66	135.42	80.68
139.97	80.61	157.29	80.51	165.59	80.46	176.5	80.45	193.52	80.34
215.72	80.1	223.61	79.99	228.63	79.91	244.19	79.96	252.53	79.88
260.39	79.8	273.3	79.78	293.11	79.55	302.58	79.56	316.4	79.56
331.68	79.56	341.8	79.59	343.2	79.34	343.49	79.29	358.82	77.39
359.99	77.22	360.28	77.21	377.6	76.37	397.84	76.41	407.72	76.44
410.6	76.34	430.83	77.02	452.14	77.73	453.48	77.73	455.44	77.62
470.17	78								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3381.792

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.82	32.03	81.84	62.76	81.16	96.23	81.47	109.42	81.21
122.6	81.05	129.79	77.56	129.79	77.47	141.79	69.47	166.79	69.47
176.77	76.13	185.99	80.71	210.05	80.61	221.99	80.56	242.35	80.46
297.45	80.17	309.35	80.16	373.54	79.68	381.29	79.61	384.5	79.5
410.52	79.11	411.74	78.97	416.74	78.36	416.89	78.34	423.53	78.35
465.23	78.37	469.91	78.83	488.01	80.35	500.64	81.48	504.86	81.73
514.07	81.81	515.55	82.02	515.73	81.88	521.84	82.32	526.82	82.59
551.59	83.43	586.82	83.39	607.56	83.74	647.33	83.65	666.66	83.61
674.54	84.13	687.77	84.86	688.54	85.83				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	122.6	.016	129.79	.016	176.77	.016	185.99	.018
411.74	.015	488.01	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
122.6 185.99 209.35 210.34 211.8 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
607.56	688.54	83.74	F
551.59	607.56	83.43	F
0	96.23	81.47	F
185.99	551.59	80.71	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
214.24	232.41	86	16.29	101.01	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	118.17	68.34
119.18	67.67	144.18	67.67	156.18	75.67	156.18	76.08	158.74	77.34
163.16	79.53	164.4	79.54	167.68	79.61	192.51	80.12	204.24	80.17
226.22	80.23	247.8	80.28	262.03	80.22	309.68	79.94	346.41	79.52
363.13	79.65	363.46	79.97	385.92	75.14	386.67	75.01	387	74.97
391.37	74.72	393.12	74.56	401.53	74.44	439.47	74.21	440.47	74.2
448.3	75.25	449.63	75.54	468.16	78.3	468.82	78.4	469.79	78.63
489.77	82.2	491.15	82.34	491.2	82.34	498.23	82.68	537.5	82.57
552.22	82.45	560.01	82.45	612.04	82.26	642.71	82.87	662.61	83.37
673.58	83.91	685.09	84.15	685.14	84.15	685.54	84.42	691.85	88.65

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	118.17	.016	156.18	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

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

95.69	167.68	32.79	31.38	28.21	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	120.86	67.97
121.72	67.4	146.72	67.4	152.94	71.54	161.99	75	164.4	76.1
165.21	76.15	169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2
238.98	77.08	253.88	77	265.89	76.8	311.18	76.55	320.11	76.42
352.63	76.62	356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26
419.63	74.17	444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85
460.97	77	461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24
506.27	77.23	518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74
648.95	79.3	652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87
693.26	88.99								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	120.86	.016	152.94	.016	169.88	.018
397.39	.02	674.71	.05						

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

98.56	169.88	101.61	105.47	112.32	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.2	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.41	117.43	67.41	137.35	67.41
140.94	67.41	143.73	70.14	158.51	78.33	168.47	76.41	177.34	76.52
235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12	329.16	76.48
336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57	400.89	75.68
402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16	424.44	75.24
439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53	463.42	76.3
467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97	521.9	78.7
535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97	668.1	79.98
668.55	79.98	669	80.01	689.24	80.91	703.56	86.82		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	94.76	.016	158.51	.018	408.4	.015	463.42	.05
588.58	.015								

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

94.76	158.51	187.47	186.83	186.24	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	111.31	69.15
115	66.69	125	66.69	135.81	73.9	140.04	75.43	143.16	76.72
145.57	76.61	159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01
222.23	75.14	249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29
403.25	76.06	405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21
430.64	76.17	435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49
518.76	79.84	548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13
684.48	81.13	687.11	81.15	742.11	80.84	751.33	81.07		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.035	110.07	.035	111.31	.035	135.81	.035
159.23	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
92.48 143.16 165.5 169.96 176.8 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
65.16	78.14	82.97	66.27	92.97	66.27	105.33	74.51	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.035	65.16	.035	105.33	.018	206.53	.018
408.76	.03	435.25	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.16 105.33 162.85 162.93 162.56 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.41	68.94	83	65.88
93	65.88	101.16	71.32	101.72	71.49	102.77	71.46	142.03	71.27
158.47	71.64	184.44	72.28	194.7	72.52	200.88	72.65	233.74	72.9
261.94	73.04	269.59	73.66	279.45	74.52	284.9	74.71	345.6	77.01
353.93	77.03	413.72	78.09	414.74	78.11	421.74	78.22	423.21	78.27
438.25	78.24	502.84	77.71	507.32	77.68	509.47	77.57	514.04	77.58
538.77	78.01	551.49	78.22	562.23	78.33	569.85	78.62	582.46	78.99
583.62	79.04	584.62	79.06	585.59	79.06	586.66	79.04	604.37	79.34
634.88	79.77	647.22	79.72	685.7	79.32	717.19	79.4	747.64	78.97
776.38	79.2	793.01	79.33	795.4	79.35	804.92	79.43		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.035	78.01	.035	78.41	.035
101.16	.035	102.77	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.2 101.16 158.36 154.23 152.81 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
69.46 129.21 19.33 19.66 19.62 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.77 249.12 34.23 31.23 27.43 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
224.96	353.4	69.93	F
353.4	442.2	73.6	F
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18
210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	104.59	66.66	106.68	65.27
116.68	65.27	120.46	67.79	122.73	67.96	130.63	70.22	140.68	73.08
144.05	72.84	151.96	72.76	204.76	72.55	223.94	72.77	260.65	73.22
266.07	73.19	299.79	73.59	307.52	73.71	308.78	73.64	314.02	73.77
331.03	73.98	370.85	74.56	384.82	74.69	386.63	74.75	387.16	74.78
388.38	74.86	418.11	75.89	423.92	75.04	425.39	74.76	432.85	74.91
457.95	75.46	487.2	75.02	491.57	74.95	522.3	75.35	532.27	75.56
579.27	76.01	580.21	75.98	583.51	75.87	598.45	75.86	614.06	75.84
620.75	76	655.82	76	662.16	75.87	675.83	75.91	689.65	75.94
698.62	75.94	710.9	75.97	723.26	76	735.67	76.03	748.15	76.06
751.43	76.22	766.94	76.43	776.08	76.32	801.97	76.64	814.86	76.8
827.37	76.96	832.12	77.23	847.31	77.09	870.84	76.86	882.44	76.54
899.87	76.36	912.59	76.23	918.5	76.53	961.83	74.99		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.035	100.62	.035	104.59	.035	120.46	.035
122.73	.035	140.68	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
150.68	66.26	152.81	64.84	162.81	64.84	165.63	66.72	165.88	66.73
167.71	66.79	171.16	67.8	179.85	70.38	184.02	70.75	194.03	71.62
194.27	71.63	202.76	71.77	273.69	71.57	286.93	71.44	339.3	70.92
341.41	70.93	346.27	70.96	363.18	71.21	380.58	74.52	382.15	74.81
403.82	75.16	415.99	75.36	424.89	75.46	426.22	75.5	428.2	75.54
485.28	76.46	504.11	76.75	504.86	76.77	505.61	76.77	581.94	76.71
581.99	76.71	582.19	76.7	616.27	75.05	620.06	74.54	625.23	73.61
632.37	73.76	634.32	73.8	662.88	75.08	673.19	75.29	682.75	75.49
699.59	75.85	706.79	76.32	708.21	76.42	710.5	76.17	721.06	75
733.86	73.51	736.35	73.31	740.23	73.51	751.82	73.86	779.52	74
784.48	74.03	793.6	73.98	877.01	74.07	877.93	74.07	884.82	74.19
904.52	74.3	961.49	74.71	997.84	74.13	1012.87	73.63	1017.1	73.64
1082.33	73.05	1082.5	73.03	1164.82	73.75	1168.93	73.73	1173.57	73.7
1242.67	73.99								

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.035	147.13	.035	147.9	.035
150.68	.035	165.63	.035	167.71	.05	202.76	.018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
134.84 202.76 183.41 186.19 187.45 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	53.56	73.03
66.51	64.39	96.51	64.39	107.61	71.79	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	53.56	.016	109.43	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
53.56	107.61	55.48	54.33	52.65	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.04	80.82	52	64.19	82	64.19
86.57	67.24	86.72	67.31	96.83	71.62	102.85	71.44	120.83	71.5
121.28	71.5	162.27	72.16	203.84	72.77	234.07	73.18	262.22	73.16
287	73.2	315.47	72.84	338.75	72.78	375.8	73.25	418.39	72.85
430.44	73	446.57	73.51	454.04	74	458.95	74.94	459.21	74.99
459.67	74.98	473.54	74.66	515.16	74.88	521.36	74.86	529.13	74.74
533.68	74.54	544.33	74.06	549.3	73.7	552	73.46	555.67	73.6
564.62	73.94	587.23	74.72	610.02	74.92	621.12	75.16	631.61	74.98
670.03	73.9	680.62	73.66	686.29	73.65	705.55	73.79	720.09	74
749.26	73.82	752.63	72.85	758.57	71.1	762.8	71.19	790.92	71.05
809.65	71.02	817.24	70.83	828.47	71	887.89	71.48	897.69	71.52
967.83	72.22	976.49	72.29	1023.22	72.17	1030.23	72.27	1055.6	71.92
1065.03	71.88	1141.19	72.12	1152.9	72.07	1276.23	72.08	1292.03	72.25
1295.72	72.25								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.04	.016	86.57	.016	96.83	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.04	96.83	119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.61	5.15	91.42	13.15	91.28	29.61	87.54	66.99	81.21
80.34	81.66	88.52	81.77	104.06	81.39	104.2	81.39	104.23	81.37
113.87	74.52	115.18	73.72	129.19	64.92	130.67	64.0322	145.1	64.0322
158.33	64.0322	160.03	64.0322	171.6	70.17	174.16	71.54	184.15	71.64
199.83	72.01	234.15	72.27	272.4	73.09	274.67	73.1	292.44	73.19
306.06	73.09	348.94	73.18	415.23	73.78	422.84	73.86	426.23	73.84
477.62	73.61	506.71	74.22	522.52	74.46	541.27	74.48	582.07	74.81
600.01	74.4	624.78	73.97	625.51	73.95	629.98	73.83	633.65	73.74
662.02	74.35	668.04	74.51	675.96	74.43	699.57	74.13	714.2	74.56
718.45	74.69	729.41	74.71	743.77	74.7	775	74.71	775.43	74.7
823.82	72.85	835.11	72.83	878.32	73.44	887.99	73.42	896.21	71.46
898.49	70.84	910.47	70.83	948.26	70.93	989.79	70.97	1017.41	71.19
1071.55	71.39	1103.14	71.71	1146.36	72.21	1163.89	72.16	1173.23	72.03
1205.96	72.1	1238.19	72.2	1282.97	72.52	1332.07	72.03	1382.58	72.03
1435.64	73.06								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	104.06	.02	115.18	.06	129.19	.07	160.03	.06
174.16	.02								

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

104.06	174.16		35.7	37.03	38.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
582.07	1435.64	74.81	F

Blocked Obstructions num= 5

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
17	81	95	301	445	95	501	627	95
954	1036	95	1305	1342	95			

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1705.846

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	91.14	10.89	90.95	17.52	90.51	21.6	90.15	45.69	84.72
60.03	81.25	75.09	81.41	95.63	81.6	99.12	81.52	101.43	80
108.43	74.46	117.22	68.9	125.09	64.53	126.41	63.65	156.41	63.65
161.49	67.03	169.13	71.09	170.1	71.6	171.11	71.58	200.06	71.35
230.61	71.1	233.43	71.12	236.45	71.18	279.17	72.74	299.09	73.48
338.76	73.74	355.98	73.76	375.7	73.93	435.87	73.57	476.37	73.83
477.83	74	479.36	74.06	491.62	74.13	522.66	74.59	527.93	74.67
573.35	74.74	584.49	74.63	587.62	74.63	608.51	74.1	609	74.08
614.43	73.91	616.78	73.83	617.03	73.82	625.88	74.38	645.8	75.63
650.57	75.18	650.85	75.16	653.22	74.76	654.71	74.51	656.37	74.24
657.62	74.22	684.24	73.9	699.43	74.27	718.21	74.86	746.25	74.76
771.58	74.62	790.23	74.63	823.59	73.71	842.73	72.98	875.8	72.91
879.23	72.96	882.45	72.96	908.01	72.93	913.82	71.94	918.4	70.94
923.37	70.94	944.94	70.95	956.3	70.95	959.07	70.98	977.17	71.07
1038.22	71.31	1107.69	71.96	1115.86	72.02	1118.32	72.03	1180.11	73.27
1189.97	73.42	1192.4	73.42	1238.94	72.28	1257.56	72.29	1318.12	72.63
1332.62	72.67	1375.41	72.55	1391.96	72.6	1443.89	72.81	1468.48	72.87
1511.38	72.9	1540.35	73.29						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	108.43	.016	125.09	.016	161.49	.016	171.11	.02

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

101.43	170.1		136.62	132.2	123.01	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
0	95.63	81.6	F
645.8	1540.35	75.63	F
573.35	645.8	74.74	F
375.7	573.35	73.93	F
170.1	375.7	71.6	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
322.16	412.72	95	7.5	69.77	95	514.93	528.44	95
1412.52	1438.18	95	1338.43	1372.34	95	1539.91	1540.35	95

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1573.644

INPUT
Description:
Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	89.66	4.03	89.55	29.17	89.08	36.04	89.48	43.05	89.93
50.48	84.87	61.87	77.37	64.86	76.47	70.17	74.68	81.6	71.72
94.78	62.93	124.78	62.93	126.46	64.06	126.79	64.06	127.33	64.52
128.25	65.25	136.49	70.74	145.46	70.58	152.61	70.64	156.91	70.67
208.87	72.31	232.07	72.4	268.04	72.43	287.13	72.67	322.8	72.28
342.36	72.36	359.71	72.05	369.42	72.4	382.2	72.84	413.09	72.99
439.86	73.3	442.26	73.22	451.68	74.82	451.93	74.85	489.05	74.62
492.33	74.6	494.22	74.46	496.02	74.55	502.05	74.56	537.94	74.59
543.47	73.97	547.27	73.57	564.7	74.35	585.61	75.32	589.03	75.19
595.39	74.9	610.65	74.42	628.48	73.82	628.64	73.83	632.03	74.14
662.9	74.55	681.75	74.98	683.52	75.03	694.87	74.98	762.03	73.9
829.96	72.34	834.17	72.28	852.61	71.94	886.74	71.57	889.76	71.6
890.89	71.53	893.47	71.51	939.27	71.05	964.87	70.72	985.97	70.58
999.54	70.45	1017.68	70.38	1019.9	70.52	1040.58	71.55	1043.19	71.55
1044.08	71.56	1045.68	71.6	1053.71	71.31	1062.36	71.53	1076.84	72.35
1092.33	72.58	1121.01	72.8	1135.54	72.81	1156.84	72.83	1199.56	72.92
1221.53	73.08								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	43.05	.045	81.6	.016	128.25	.016	136.49	.02

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

81.6	136.49		286.27	268.23	249.58	.1	.3

Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
585.61	1221.53	75.32	F
451.68	585.61	74.82	F
287.13	451.68	72.67	F
135.25	287.13	70.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69

313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	47.46	.016	47.82	.016
97.29	.035	99.47	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
31.29	99.47	148.68	149.85	158.44	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	47.46	.016	47.82	.016
97.29	.035	99.47	.02						

Bank Sta: Left	Right	Coeff Contr.	Expan.
31.29	99.47	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02
43.26	71.14	47.78	68.13	48.44	66.96	54.33	63.76	54.72	63.5
59.22	60.67	59.37	60.67	68.77	60.67	87.93	60.67	90.19	60.67
92.72	60.67	94.83	62.53	130.44	73.67	143.04	73.94	151.67	73.99
163.31	73.93	182.18	72.99	183.46	72.91	203.9	71.42	221.2	69.91
231.4	70.23	251.76	70.71	260.52	70.72	262.13	70.72	290.97	70.6
312.02	70.68	328.69	70.71	339.11	70.64	359.52	70.02	362.2	70
364.66	70.48	373.11	70.68	428.82	72.01	429.07	71.93	430.72	71.94
436.95	72.28	440.5	72.5	444.65	72.57	478.56	72.74	497.03	72.94
499.73	72.96	501.14	72.95	518.9	73.07	586.99	72.06	777.15	72.67
843.55	72.92	851.87	72.81	883.14	72.26	910.92	72.17		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	20.96	.016	43.26	.016	47.78	.016	54.33	.016
92.72	.016	130.44	.035	151.67	.02				

Bank Sta: Left	Right	Coeff Contr.	Expan.
43.26	130.44	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.67	910.92	73.99	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev

```
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                21     110     .018     .018        0                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   43.26   71.14   47.78   68.13   48.44   66.96   54.33   63.76   54.72    63.5
   59.22   60.67   59.37   60.67   68.77   60.67   87.93   60.67   90.19   60.67
   92.72   60.67   94.83   62.53  130.44   73.67  143.04   73.94  151.67   73.99
  163.31   73.93  182.18   72.99  183.46   72.91   203.9   71.42   221.2   69.91
   231.4   70.23  251.76   70.71  260.52   70.72  262.13   70.72  290.97    70.6
  312.02   70.68  328.69   70.71  339.11   70.64  359.52   70.02   362.2      70
  364.66   70.48  373.11   70.68  428.82   72.01  429.07   71.93  430.72   71.94
  436.95   72.28   440.5    72.5  444.65   72.57  478.56   72.74  497.03   72.94
  499.73   72.96  501.14   72.95   518.9   73.07  586.99   72.06  777.15   72.67
  843.55   72.92  851.87   72.81  883.14   72.26  910.92   72.17

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .035   20.96    .016   43.26    .016   47.78    .016   54.33    .016
   92.72    .016  130.44    .035  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         43.26  130.44           118.42  118.74  122.35            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                          = Broad Crested


LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1121.496

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0   73.03   37.12   70.67   51.06   69.64   51.58   69.61    63.9   69.49
   77.77    69.2   78.42   69.18   78.99   69.18  105.92   68.64  109.54   68.56
  109.79   68.56  158.77   67.55  182.38    67.5  182.83    67.5  191.06    67.3
  213.81   67.27  221.88   67.33  272.16   67.24  310.99   67.01  325.37   66.93
   328.4    66.9  329.44    66.9  383.22   66.59  388.38   66.55  388.62   66.55
  440.14   66.56  493.79   66.58  495.22   66.56  498.92   66.51  541.93   65.88
  542.66   65.87  567.25   65.51  588.94   65.18  590.62   65.14  617.49   64.53
  626.74   64.24  627.45   64.29  639.24      64  657.35   63.57  661.52   63.47
```

665.23 63.43 667.79 62.32 672.743 60.187

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	51.25	68.16	63.43	60.03
93.43	60.03	99.62	64.15	115.82	68.66	128.53	68.84	165.64	69.35
175.37	69.36	194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14
267.19	69.68	295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74
345.68	67.85	361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69
417.08	72.14	417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51
492.7	72.22	540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74
728.33	72.72	792.36	72.94	821.37	72.37				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	51.25	.016	99.62	.016	115.82	.035
165.64	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.25	115.82	217.42	217.69	218.99	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	58.7	100.14	58.7	122.92	58.7	123.52	58.89
129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94	238.83	65.75
242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45	322.74	67.08
348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76	420.51	66.79
421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78	458.53	66.91
466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19	488.24	72.32
514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32	534.61	69.06
590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97	660.51	71.97
778.79	72.51	781.74	72.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	168.96	.02

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
72.14	168.96	431.18	403.67	344.14	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97
749.38	70.22	757.73	70.22	772.23	70.26	788.8	70.14	795.52	70.44

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	111.71	.035	127.59	.035	210.85	.015	226.72	.018

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116.54	226.72	420.92	415.47	422.02	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
772.23	795.52	70.26	F
650.98	772.23	69.79	F
376.62	650.98	65.01	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
0	7.54	72

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Lower Reach	3519.101	.02	.02	.016	.016	.016	.018	.015		
Lower Reach	3506.967	Lat Struct								
Lower Reach	3381.792	.018	.016	.016	.016	.018	.015	.018		
Lower Reach	3171.448	.018	.016	.016	.016	.018	.018	.06	.018	.05
Lower Reach	3140.066	.018	.016	.016	.016	.018	.02	.05		
Lower Reach	3034.592	.018	.016	.018	.015	.05	.015			
Lower Reach	3029.094	Lat Struct								
Lower Reach	2847.761	.02	.035	.035	.035	.035	.02			
Lower Reach	2677.801	.02	.035	.035	.018	.018	.03	.018		
Lower Reach	2514.866	.02	.02	.035	.035	.035	.035	.02		
Lower Reach	2360.635	.03	.02	.025	.025	.025	.02			
Lower Reach	2340.973	.02	.025	.025						
Lower Reach	2332.283	Lat Struct								
Lower Reach	2309.739	.03	.035	.025	.025	.025	.02			
Lower Reach	2266.686	.02	.035	.035	.035	.035	.035	.02		
Lower Reach	2090.444	.02	.03	.035	.035	.035	.035	.035	.05	.018
Lower Reach	1904.254	.025	.016	.025						
Lower Reach	1849.924	.018	.016	.016	.02					
Lower Reach	1742.873	.018	.02	.06	.07	.06	.02			
Lower Reach	1705.846	.02	.016	.016	.016	.02				
Lower Reach	1573.644	.02	.045	.016	.016	.02				
Lower Reach	1305.41	.02	.016	.016	.016	.016	.035	.02		
Lower Reach	1230.5	Culvert								
Lower Reach	1155.558	.035	.016	.016	.016	.016	.016	.035	.02	
Lower Reach	1149.024	Lat Struct								
Lower Reach	1121.496	Lat Struct								
Lower Reach	1036.821	.02	.035	.016	.016	.035	.02			
Lower Reach	819.1344	.02	.035	.02						
Lower Reach	415.466	.02	.035	.035	.015	.018				

SUMMARY OF REACH LENGTHS

River: Alvarado Creek

Reach	River Sta.	Left	Channel	Right
Lower Reach	3519.101	137.3	137.31	137.44
Lower Reach	3506.967	Lat Struct		
Lower Reach	3381.792	209.35	210.34	211.8
Lower Reach	3171.448	32.79	31.38	28.21
Lower Reach	3140.066	101.61	105.47	112.32
Lower Reach	3034.592	187.47	186.83	186.24
Lower Reach	3029.094	Lat Struct		
Lower Reach	2847.761	165.5	169.96	176.8
Lower Reach	2677.801	162.85	162.93	162.56
Lower Reach	2514.866	158.36	154.23	152.81
Lower Reach	2360.635	19.33	19.66	19.62
Lower Reach	2340.973	34.23	31.23	27.43
Lower Reach	2332.283	Lat Struct		
Lower Reach	2309.739	21.27	43.05	56.67
Lower Reach	2266.686	166.7	176.24	190.03
Lower Reach	2090.444	183.41	186.19	187.45
Lower Reach	1904.254	55.48	54.33	52.65
Lower Reach	1849.924	119.68	107.05	93.87
Lower Reach	1742.873	35.7	37.03	38.3
Lower Reach	1705.846	136.62	132.2	123.01
Lower Reach	1573.644	286.27	268.23	249.58
Lower Reach	1305.41	148.68	149.85	158.44
Lower Reach	1230.5	Culvert		
Lower Reach	1155.558	118.42	118.74	122.35
Lower Reach	1149.024	Lat Struct		
Lower Reach	1121.496	Lat Struct		
Lower Reach	1036.821	217.42	217.69	218.99
Lower Reach	819.1344	431.18	403.67	344.14
Lower Reach	415.466	420.92	415.47	422.02

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
Lower Reach	3519.101	.1	.3
Lower Reach	3506.967	Lat Struct	
Lower Reach	3381.792	.1	.3
Lower Reach	3171.448	.1	.3
Lower Reach	3140.066	.1	.3
Lower Reach	3034.592	.1	.3
Lower Reach	3029.094	Lat Struct	
Lower Reach	2847.761	.1	.3
Lower Reach	2677.801	.1	.3
Lower Reach	2514.866	.1	.3
Lower Reach	2360.635	.1	.3

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*Lower Reach     *    2340.973*       .1*       .3*
*Lower Reach     *    2332.283*Lat Struct*          *
*Lower Reach     *    2309.739*       .1*       .3*
*Lower Reach     *    2266.686*       .1*       .3*
*Lower Reach     *    2090.444*       .1*       .3*
*Lower Reach     *    1904.254*       .1*       .3*
*Lower Reach     *    1849.924*       .1*       .3*
*Lower Reach     *    1742.873*       .1*       .3*
*Lower Reach     *    1705.846*       .1*       .3*
*Lower Reach     *    1573.644*       .1*       .3*
*Lower Reach     *    1305.41 *       .1*       .3*
*Lower Reach     *    1230.5  *Culvert  *         *
*Lower Reach     *    1155.558*       .1*       .3*
*Lower Reach     *    1149.024*Lat Struct*          *
*Lower Reach     *    1121.496*Lat Struct*          *
*Lower Reach     *    1036.821*       .1*       .3*
*Lower Reach     *    819.1344*       .1*       .3*
*Lower Reach     *    415.466 *       .1*       .3*
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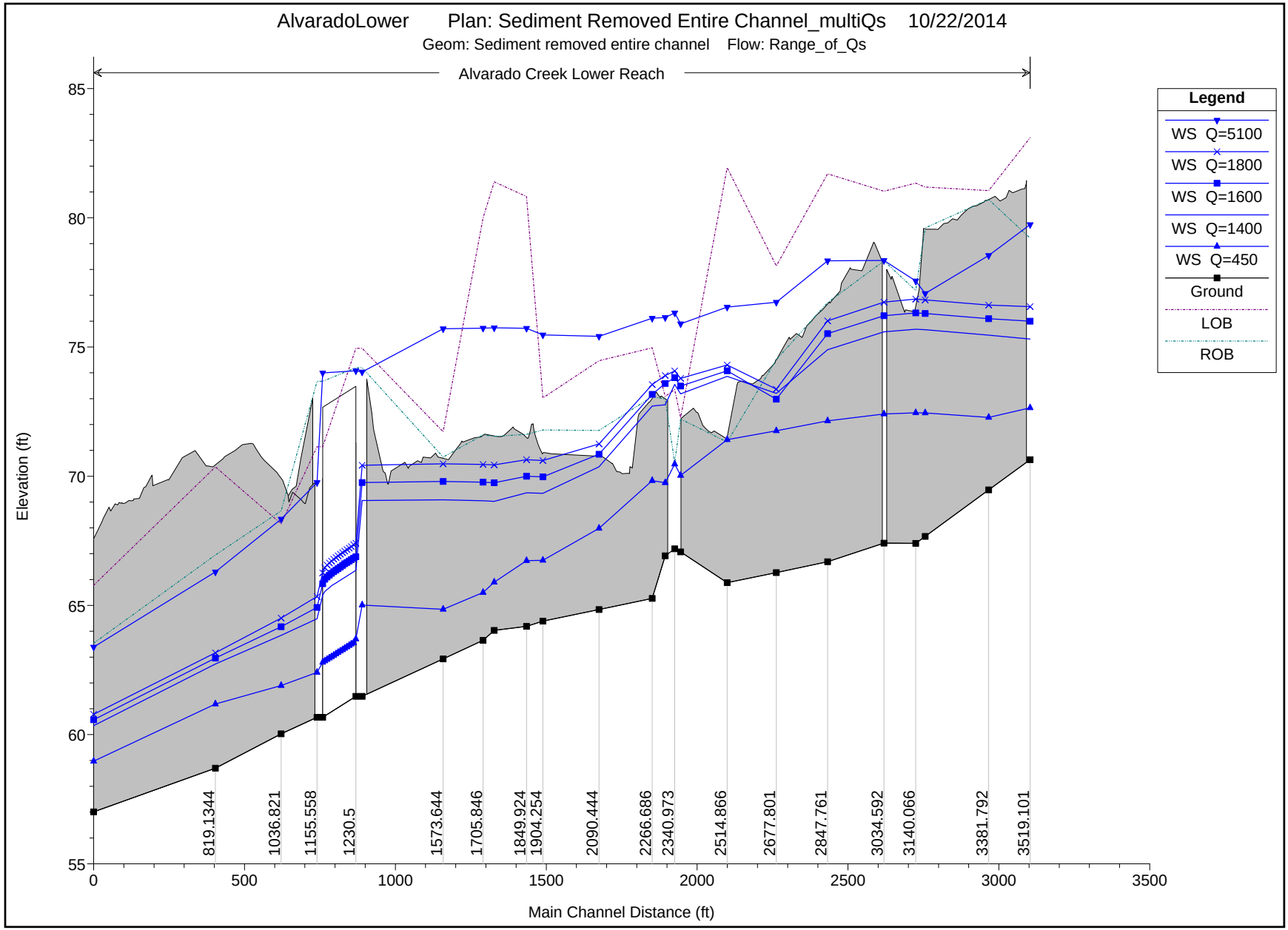
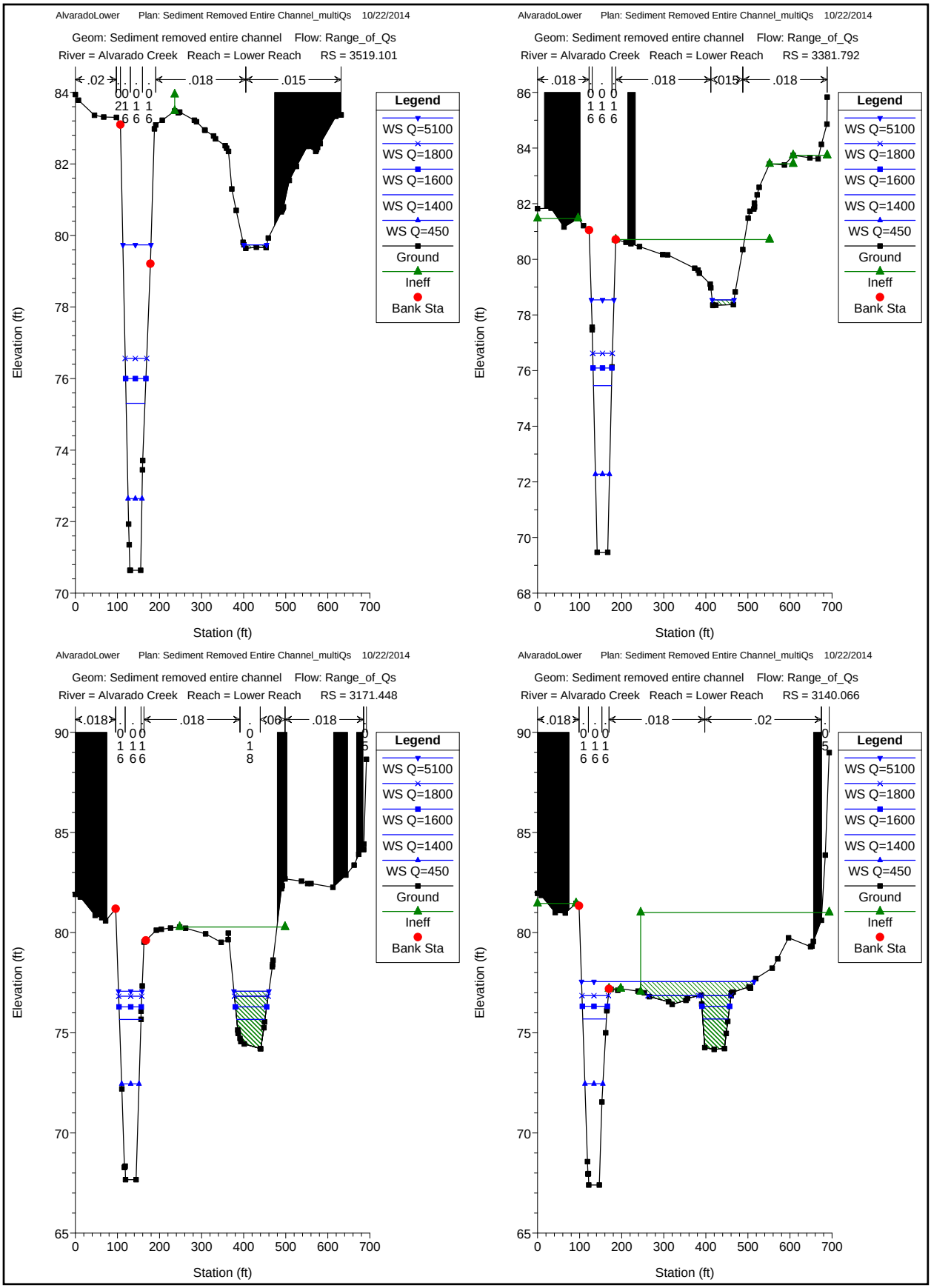

AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
Alvarado Creek Lower Reach
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
LOB
ROB
Elevation (ft)
Main Channel Distance (ft)
85
80
75
70
65
60
55
0
500
1000
1500
2000
2500
3000
3500
819.1344
1036.821
1155.558
1230.5
1573.644
1705.846
1849.924
1904.254
2090.444
2266.686
2340.973
2514.866
2677.801
2847.761
3034.592
3140.066
3381.792
3519.101

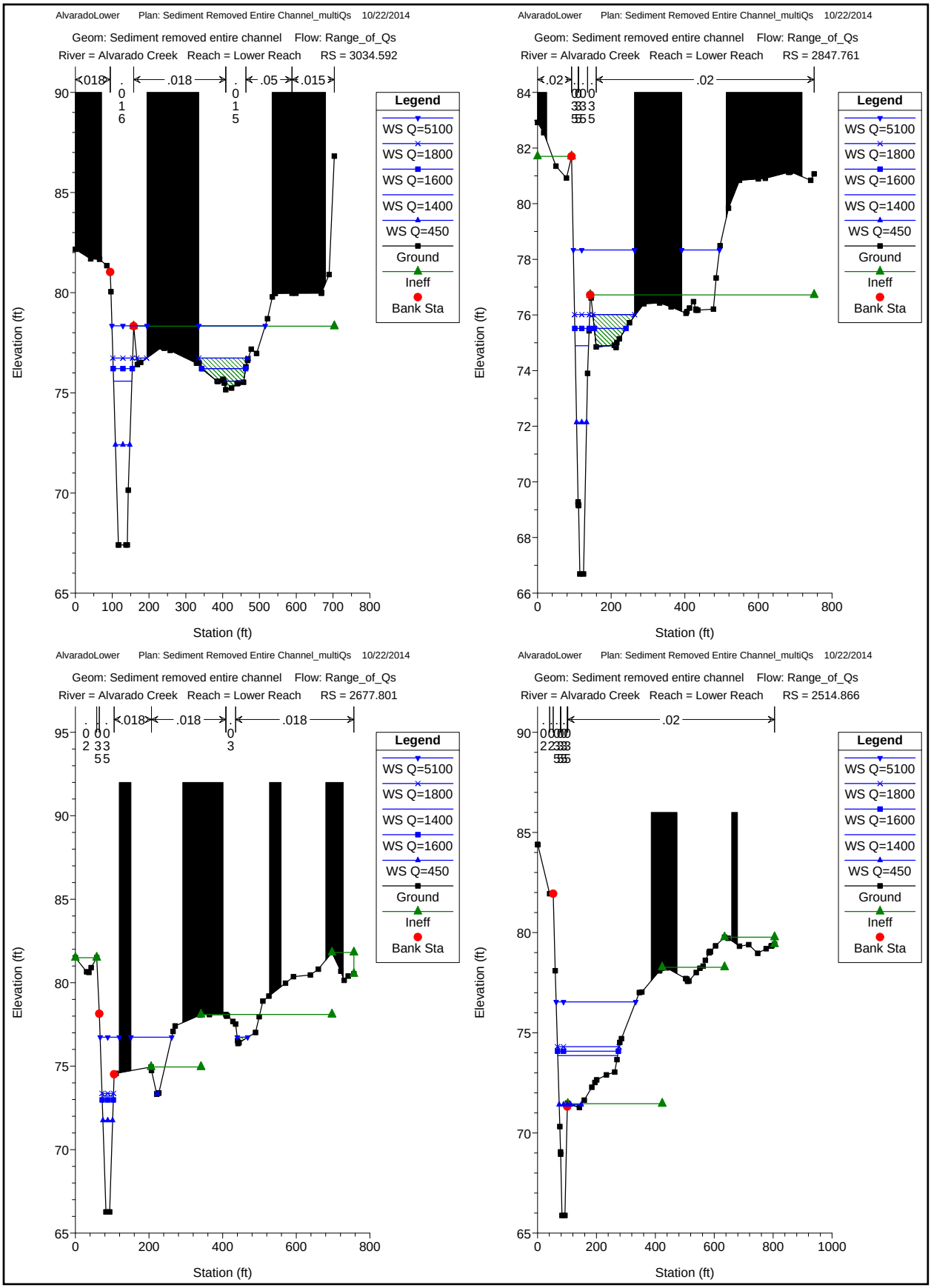
HEC-RAS Plan: Ch_All_multi-Qs River: Alvarado Creek Reach: Lower Reach

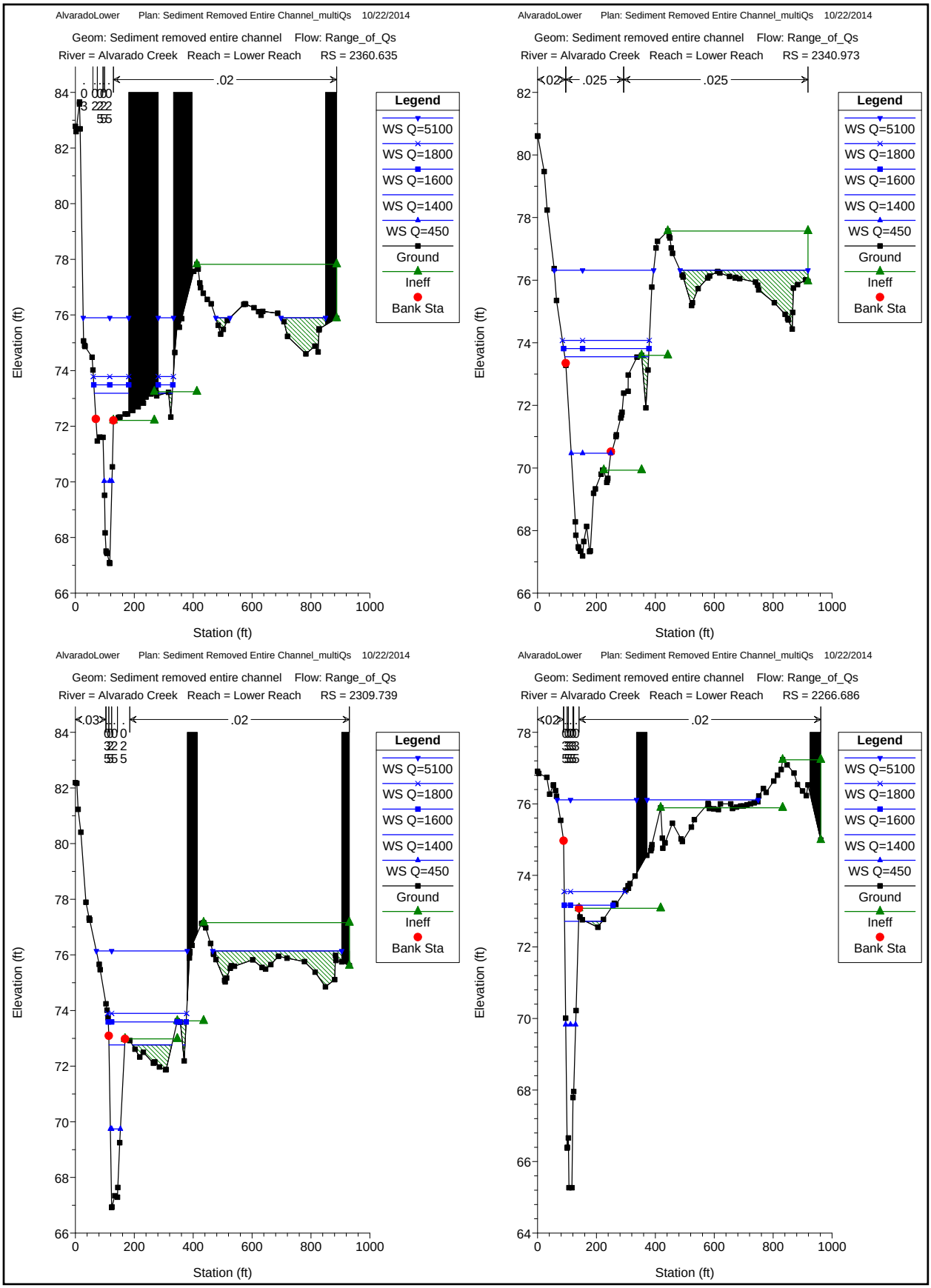
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower Reach	3519.101	Q=1400	1400.00	70.64	75.31		76.48	0.001690	8.7	161.32	44.75	0.81
Lower Reach	3519.101	Q=450	450.00	70.64	72.64	72.64	73.54	0.003223	7.6	59.17	33.09	1.00
Lower Reach	3519.101	Q=5100	5100.00	70.64	79.74		82.15	0.001700	12.5	409.26	120.97	0.88
Lower Reach	3519.101	Q=1800	1800.00	70.64	76.56		77.59	0.001166	8.1	221.43	51.13	0.69
Lower Reach	3519.101	Q=1600	1600.00	70.64	76.00		77.06	0.001336	8.3	193.47	48.27	0.73
Lower Reach	3506.967		Lat Struct									
Lower Reach	3381.792	Q=1400	1400.00	69.47	75.46	73.68	76.19	0.000768	6.9	203.55	42.96	0.56
Lower Reach	3381.792	Q=450	450.00	69.47	72.28	71.53	72.74	0.001130	5.5	81.94	33.41	0.62
Lower Reach	3381.792	Q=5100	5100.00	69.47	78.54	78.54	81.81	0.002263	14.5	351.80	105.58	1.00
Lower Reach	3381.792	Q=1800	1800.00	69.47	76.62	74.38	77.39	0.000671	7.0	255.51	46.70	0.53
Lower Reach	3381.792	Q=1600	1600.00	69.47	76.09	74.04	76.84	0.000698	6.9	231.36	44.86	0.54
Lower Reach	3171.448	Q=1400	1400.00	67.67	75.67	71.77	75.99	0.000242	4.5	309.84	118.39	0.32
Lower Reach	3171.448	Q=450	450.00	67.67	72.45	69.70	72.57	0.000162	2.8	160.70	41.21	0.25
Lower Reach	3171.448	Q=5100	5100.00	67.67	77.07	76.46	79.80	0.001768	13.3	384.61	138.69	0.89
Lower Reach	3171.448	Q=1800	1800.00	67.67	76.82	72.45	77.19	0.000243	4.9	370.91	134.96	0.33
Lower Reach	3171.448	Q=1600	1600.00	67.67	76.30	72.11	76.63	0.000238	4.7	342.45	127.00	0.32
Lower Reach	3140.066	Q=1400	1400.00	67.40	75.69	71.52	75.97	0.000214	4.2	331.59	116.25	0.31
Lower Reach	3140.066	Q=450	450.00	67.40	72.45	69.43	72.56	0.000137	2.6	171.33	42.75	0.23
Lower Reach	3140.066	Q=5100	5100.00	67.40	77.55	76.24	79.53	0.001275	11.3	476.73	410.15	0.76
Lower Reach	3140.066	Q=1800	1800.00	67.40	76.85	72.21	77.17	0.000219	4.5	400.47	254.64	0.31
Lower Reach	3140.066	Q=1600	1600.00	67.40	76.32	71.88	76.61	0.000214	4.3	367.86	125.63	0.31
Lower Reach	3034.592	Q=1400	1400.00	67.41	75.59	71.78	75.93	0.000274	4.7	295.79	108.96	0.34
Lower Reach	3034.592	Q=450	450.00	67.41	72.41	69.54	72.54	0.000173	2.9	154.72	38.95	0.26
Lower Reach	3034.592	Q=5100	5100.00	67.41	78.35	76.66	79.06	0.000554	7.8	903.62	275.83	0.50
Lower Reach	3034.592	Q=1800	1800.00	67.41	76.73	72.49	77.13	0.000273	5.1	355.36	214.94	0.35
Lower Reach	3034.592	Q=1600	1600.00	67.41	76.21	72.15	76.58	0.000270	4.9	327.63	171.36	0.34
Lower Reach	3029.094		Lat Struct									
Lower Reach	2847.761	Q=1400	1400.00	66.69	74.90	72.82	75.75	0.004064	7.4	188.31	78.76	0.58
Lower Reach	2847.761	Q=450	450.00	66.69	72.14	70.02	72.44	0.002169	4.4	101.84	27.16	0.40
Lower Reach	2847.761	Q=5100	5100.00	66.69	78.33	77.28	78.83	0.001623	5.9	902.36	268.55	0.38
Lower Reach	2847.761	Q=1800	1800.00	66.69	76.01	73.68	76.95	0.003927	7.8	231.63	153.95	0.58
Lower Reach	2847.761	Q=1600	1600.00	66.69	75.52	73.26	76.40	0.003927	7.6	211.75	125.10	0.57
Lower Reach	2677.801	Q=1400	1400.00	66.27	73.20	72.50	74.72	0.008445	9.9	141.44	30.80	0.81
Lower Reach	2677.801	Q=450	450.00	66.27	71.75	69.60	72.07	0.002236	4.5	99.97	26.46	0.41
Lower Reach	2677.801	Q=5100	5100.00	66.27	76.73	76.73	78.26	0.005341	10.3	515.64	190.82	0.69
Lower Reach	2677.801	Q=1800	1800.00	66.27	73.37	73.37	75.71	0.012656	12.3	146.66	34.48	1.00
Lower Reach	2677.801	Q=1600	1600.00	66.27	72.98	72.95	75.17	0.012606	11.9	134.62	30.13	0.99
Lower Reach	2514.866	Q=1400	1400.00	65.88	73.86	72.46	74.01	0.000778	3.4	456.45	203.48	0.26
Lower Reach	2514.866	Q=450	450.00	65.88	71.41	69.23	71.71	0.002123	4.4	103.20	64.10	0.40
Lower Reach	2514.866	Q=5100	5100.00	65.88	76.54	74.35	76.89	0.000827	4.2	1081.01	270.12	0.28
Lower Reach	2514.866	Q=1800	1800.00	65.88	74.30	72.72	74.47	0.000741	3.4	547.13	209.39	0.25
Lower Reach	2514.866	Q=1600	1600.00	65.88	74.08	72.64	74.24	0.000768	3.4	500.66	206.39	0.26
Lower Reach	2360.635	Q=1400	1400.00	67.07	73.18	72.78	73.77	0.002427	6.4	241.40	153.29	0.62
Lower Reach	2360.635	Q=450	450.00	67.07	70.03	70.03	71.07	0.007593	8.2	54.90	26.40	1.00
Lower Reach	2360.635	Q=5100	5100.00	67.07	75.90	74.99	76.67	0.001625	7.8	753.90	405.93	0.57
Lower Reach	2360.635	Q=1800	1800.00	67.07	73.79	73.17	74.27	0.001739	6.1	348.61	171.76	0.54
Lower Reach	2360.635	Q=1600	1600.00	67.07	73.49	72.99	74.02	0.002048	6.3	298.01	168.31	0.58
Lower Reach	2340.973	Q=1400	1400.00	67.19	73.55	70.23	73.60	0.000137	1.9	804.97	272.19	0.16
Lower Reach	2340.973	Q=450	450.00	67.19	70.47	68.89	70.53	0.000528	2.0	230.34	134.23	0.26
Lower Reach	2340.973	Q=5100	5100.00	67.19	76.32	72.35	76.48	0.000247	3.5	1686.49	771.45	0.23
Lower Reach	2340.973	Q=1800	1800.00	67.19	74.08	70.54	74.13	0.000143	2.1	975.28	295.33	0.16
Lower Reach	2340.973	Q=1600	1600.00	67.19	73.82	70.39	73.87	0.000141	2.0	899.07	289.97	0.16
Lower Reach	2332.283		Lat Struct									
Lower Reach	2309.739	Q=1400	1400.00	66.92	72.77	71.57	73.52	0.002516	7.0	200.47	195.60	0.64
Lower Reach	2309.739	Q=450	450.00	66.92	69.75	69.48	70.43	0.005213	6.6	67.86	34.21	0.83
Lower Reach	2309.739	Q=5100	5100.00	66.92	76.14	74.37	76.45	0.000573	5.1	1191.94	746.89	0.34
Lower Reach	2309.739	Q=1800	1800.00	66.92	73.90	72.20	74.11	0.000701	4.3	543.24	268.70	0.35
Lower Reach	2309.739	Q=1600	1600.00	66.92	73.59	71.90	73.84	0.000848	4.6	448.27	255.39	0.38
Lower Reach	2266.686	Q=1400	1400.00	65.27	72.72	70.77	73.36	0.003435	6.5	216.54	103.89	0.54
Lower Reach	2266.686	Q=450	450.00	65.27	69.83	68.38	70.15	0.003039	4.6	98.71	33.79	0.47
Lower Reach	2266.686	Q=5100	5100.00	65.27	76.11	74.70	76.41	0.001006	4.9	1186.51	646.81	0.31
Lower Reach	2266.686	Q=1800	1800.00	65.27	73.55	71.49	74.03	0.002457	5.9	357.06	205.71	0.46
Lower Reach	2266.686	Q=1600	1600.00	65.27	73.17	71.14	73.74	0.002994	6.3	285.27	165.30	0.50
Lower Reach	2090.444	Q=1400	1400.00	64.84	70.37	70.37	72.10	0.016918	10.6	132.31	38.17	1.00
Lower Reach	2090.444	Q=450	450.00	64.84	67.98	67.98	69.02	0.017330	8.2	55.18	26.58	1.00
Lower Reach	2090.444	Q=5100	5100.00	64.84	75.41	73.63	76.11	0.002043	5.2	840.96	752.84	0.36

HEC-RAS Plan: Ch_All_multi-Qs River: Alvarado Creek Reach: Lower Reach (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)	
Lower Reach	2090.444	Q=1800	1800.00	64.84	71.25	71.25	72.97	0.018226	10.5	170.77	70.05	1.00
Lower Reach	2090.444	Q=1600	1600.00	64.84	70.85	70.85	72.57	0.017694	10.5	152.24	44.26	1.00
Lower Reach	1904.254	Q=1400	1400.00	64.39	69.34	68.20	70.23	0.001089	7.6	185.23	44.84	0.66
Lower Reach	1904.254	Q=450	450.00	64.39	66.75	66.24	67.25	0.001443	5.7	79.00	37.06	0.69
Lower Reach	1904.254	Q=5100	5100.00	64.39	75.47	73.96	75.93	0.000289	6.6	1392.35	1195.96	0.38
Lower Reach	1904.254	Q=1800	1800.00	64.39	70.61	68.85	71.45	0.000806	7.4	244.55	80.29	0.58
Lower Reach	1904.254	Q=1600	1600.00	64.39	69.98	68.53	70.84	0.000931	7.5	214.35	46.75	0.61
Lower Reach	1849.924	Q=1400	1400.00	64.19	69.36	68.01	70.14	0.000949	7.1	196.83	47.27	0.61
Lower Reach	1849.924	Q=450	450.00	64.19	66.73	66.04	67.16	0.001116	5.2	85.91	37.62	0.61
Lower Reach	1849.924	Q=5100	5100.00	64.19	75.72	73.01	75.80	0.000079	3.4	2977.19	923.97	0.20
Lower Reach	1849.924	Q=1800	1800.00	64.19	70.64	68.66	71.38	0.000708	6.9	260.63	52.20	0.54
Lower Reach	1849.924	Q=1600	1600.00	64.19	70.00	68.34	70.76	0.000816	7.0	228.03	49.74	0.58
Lower Reach	1742.873	Q=1400	1400.00	64.03	69.03	67.84	69.87	0.017918	7.4	190.28	46.79	0.64
Lower Reach	1742.873	Q=450	450.00	64.03	65.90	65.90	66.75	0.059453	7.4	60.90	35.91	1.00
Lower Reach	1742.873	Q=5100	5100.00	64.03	75.74	73.41	75.78	0.000121	1.1	3193.01	934.49	0.06
Lower Reach	1742.873	Q=1800	1800.00	64.03	70.44	68.48	71.18	0.011895	6.9	259.75	51.69	0.54
Lower Reach	1742.873	Q=1600	1600.00	64.03	69.75	68.17	70.53	0.014304	7.1	224.94	49.30	0.59
Lower Reach	1705.846	Q=1400	1400.00	63.65	69.05	67.46	69.74	0.000793	6.7	209.50	48.30	0.57
Lower Reach	1705.846	Q=450	450.00	63.65	65.50	65.50	66.35	0.003266	7.4	60.81	35.85	1.00
Lower Reach	1705.846	Q=5100	5100.00	63.65	75.73	72.69	75.78	0.000050	2.7	3933.70	1269.45	0.16
Lower Reach	1705.846	Q=1800	1800.00	63.65	70.46	68.10	71.09	0.000566	6.4	280.94	53.18	0.49
Lower Reach	1705.846	Q=1600	1600.00	63.65	69.77	67.79	70.43	0.000659	6.5	245.17	50.79	0.52
Lower Reach	1573.644	Q=1400	1400.00	62.93	69.08	66.73	69.61	0.000506	5.8	241.54	48.45	0.46
Lower Reach	1573.644	Q=450	450.00	62.93	64.85	64.78	65.64	0.002872	7.1	63.28	35.85	0.94
Lower Reach	1573.644	Q=5100	5100.00	62.93	75.71	71.77	75.77	0.000051	3.1	3609.32	1098.37	0.16
Lower Reach	1573.644	Q=1800	1800.00	62.93	70.48	67.38	71.00	0.000394	5.8	311.74	75.19	0.41
Lower Reach	1573.644	Q=1600	1600.00	62.93	69.80	67.07	70.31	0.000447	5.8	276.78	50.59	0.44
Lower Reach	1305.41	Q=1400	1400.00	61.48	69.06	65.35	69.47	0.000312	5.1	272.29	40.63	0.35
Lower Reach	1305.41	Q=450	450.00	61.48	65.02	63.34	65.24	0.000392	3.8	117.94	35.75	0.37
Lower Reach	1305.41	Q=5100	5100.00	61.48	74.03	70.30	75.59	0.000926	10.0	509.91	640.63	0.61
Lower Reach	1305.41	Q=1800	1800.00	61.48	70.42	66.04	70.89	0.000299	5.5	328.88	42.27	0.35
Lower Reach	1305.41	Q=1600	1600.00	61.48	69.75	65.70	70.19	0.000305	5.3	300.89	41.47	0.35
Lower Reach	1230.5		Culvert									
Lower Reach	1155.558	Q=1400	1400.00	60.67	64.48	64.28	65.81	0.002272	9.2	151.39	48.06	0.92
Lower Reach	1155.558	Q=450	450.00	60.67	62.41	62.41	63.22	0.003291	7.2	62.25	38.23	1.00
Lower Reach	1155.558	Q=5100	5100.00	60.67	69.75	68.40	71.57	0.001220	10.8	471.13	72.58	0.75
Lower Reach	1155.558	Q=1800	1800.00	60.67	65.34	64.89	66.67	0.001827	9.2	194.80	52.41	0.84
Lower Reach	1155.558	Q=1600	1600.00	60.67	64.92	64.60	66.25	0.002018	9.2	173.19	50.29	0.88
Lower Reach	1149.024		Lat Struct									
Lower Reach	1121.496		Lat Struct									
Lower Reach	1036.821	Q=1400	1400.00	60.03	63.84	63.84	65.48	0.002704	10.3	136.05	41.43	1.00
Lower Reach	1036.821	Q=450	450.00	60.03	61.90	61.88	62.74	0.003148	7.3	61.36	35.61	0.98
Lower Reach	1036.821	Q=5100	5100.00	60.03	68.34	68.34	71.27	0.002262	13.7	371.35	107.00	1.00
Lower Reach	1036.821	Q=1800	1800.00	60.03	64.51	64.51	66.37	0.002597	10.9	164.57	44.19	1.00
Lower Reach	1036.821	Q=1600	1600.00	60.03	64.18	64.18	65.94	0.002638	10.7	150.20	42.50	1.00
Lower Reach	819.1344	Q=1400	1400.00	58.70	62.73	62.53	63.93	0.010761	8.8	159.59	55.56	0.91
Lower Reach	819.1344	Q=450	450.00	58.70	61.18	60.69	61.64	0.007014	5.4	82.95	43.27	0.69
Lower Reach	819.1344	Q=5100	5100.00	58.70	66.29	66.29	68.72	0.010905	12.5	407.73	135.89	1.00
Lower Reach	819.1344	Q=1800	1800.00	58.70	63.17	63.10	64.65	0.011888	9.8	184.57	59.02	0.97
Lower Reach	819.1344	Q=1600	1600.00	58.70	62.96	62.83	64.30	0.011338	9.3	172.43	57.36	0.94
Lower Reach	415.466	Q=1400	1400.00	57.01	60.35	59.61	60.87	0.005000	5.8	240.78	91.34	0.63
Lower Reach	415.466	Q=450	450.00	57.01	58.97	58.46	59.19	0.005007	3.8	119.85	85.27	0.56
Lower Reach	415.466	Q=5100	5100.00	57.01	63.39	62.35	64.77	0.005001	9.4	541.87	106.45	0.74
Lower Reach	415.466	Q=1800	1800.00	57.01	60.79	59.99	61.42	0.005002	6.4	281.47	93.64	0.65
Lower Reach	415.466	Q=1600	1600.00	57.01	60.57	59.80	61.15	0.005004	6.1	261.55	92.52	0.64


AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3519.101
.02
.018
.015
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3381.792
.018
.018
.015
.018
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3171.448
.018
.018
.018
.018
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3140.066
.018
.018
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

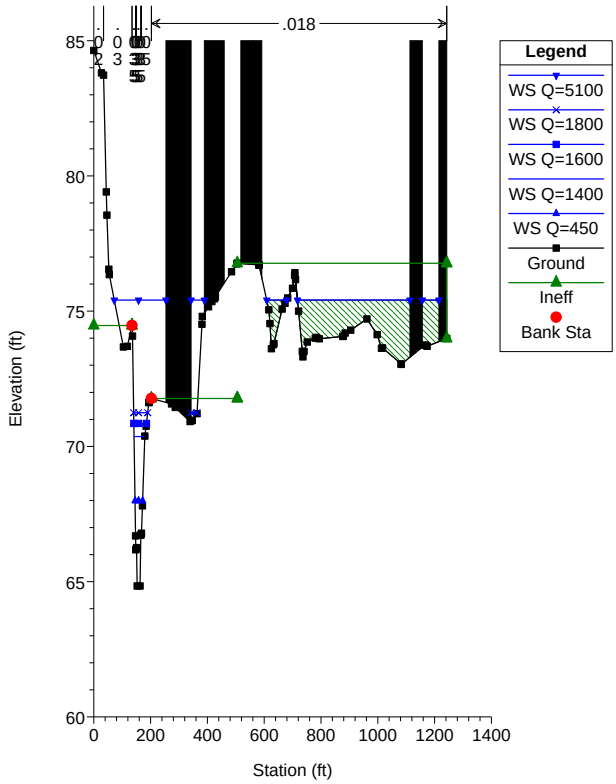

AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 3034.592
.018
.018
.05
.015
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2847.761
.02
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2677.801
.018
.018
.018
Legend
WS Q=5100
WS Q=1800
WS Q=1400
WS Q=1600
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2514.866
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2360.635
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2340.973
.02
.025
.025
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2309.739
.03
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 2266.686
.02
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014

Geom: Sediment removed entire channel Flow: Range_of_Qs

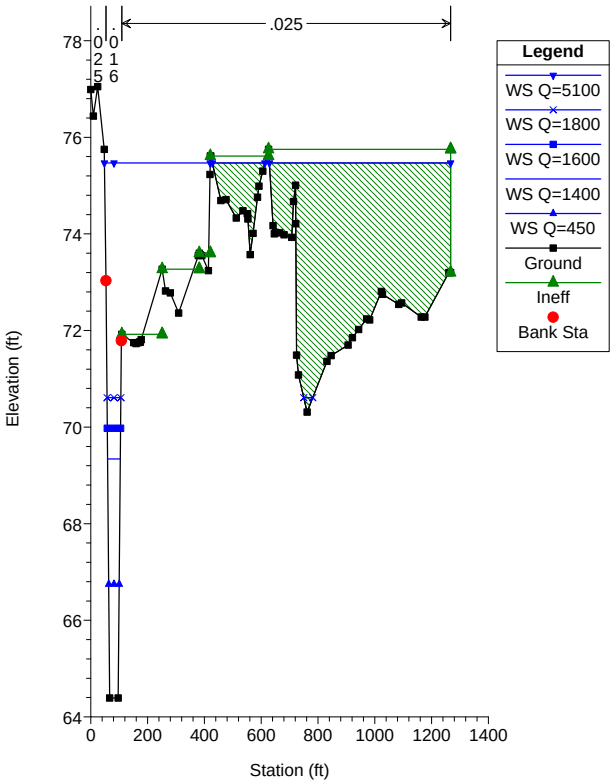
River = Alvarado Creek Reach = Lower Reach RS = 2090.444



AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014

Geom: Sediment removed entire channel Flow: Range_of_Qs

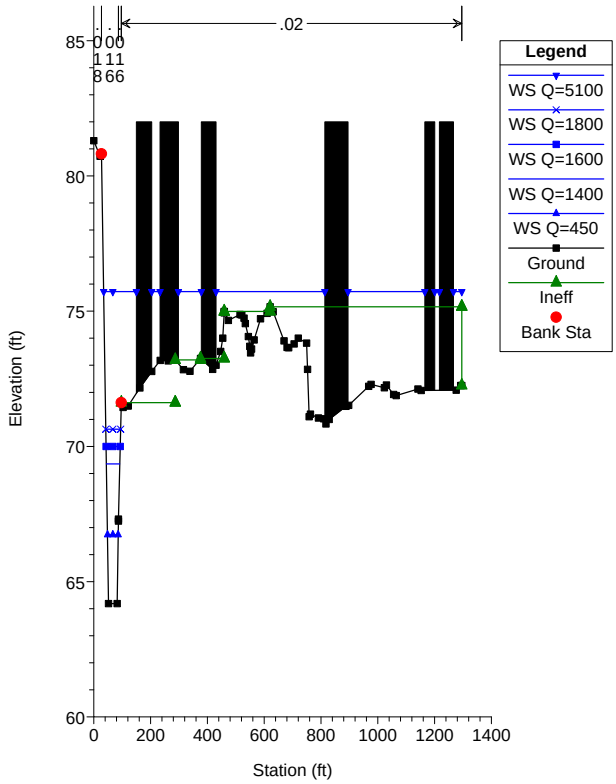
River = Alvarado Creek Reach = Lower Reach RS = 1904.254



AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014

Geom: Sediment removed entire channel Flow: Range_of_Qs

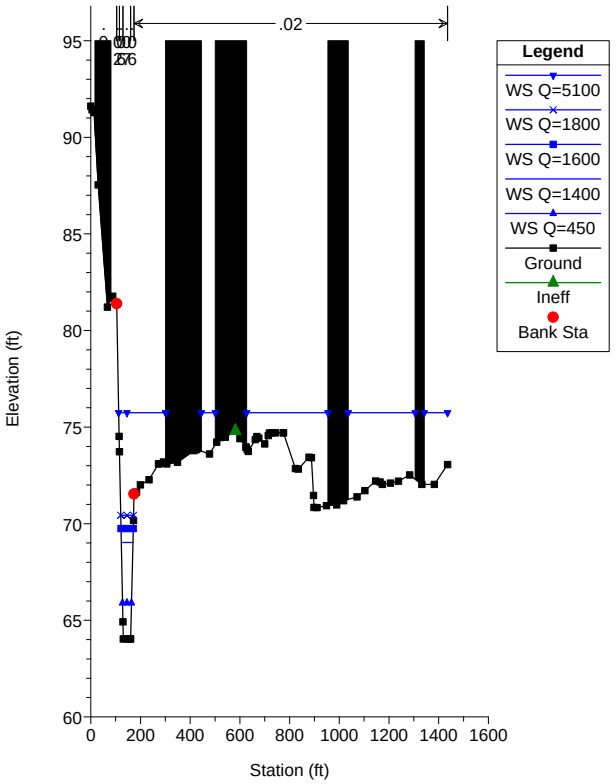
River = Alvarado Creek Reach = Lower Reach RS = 1849.924

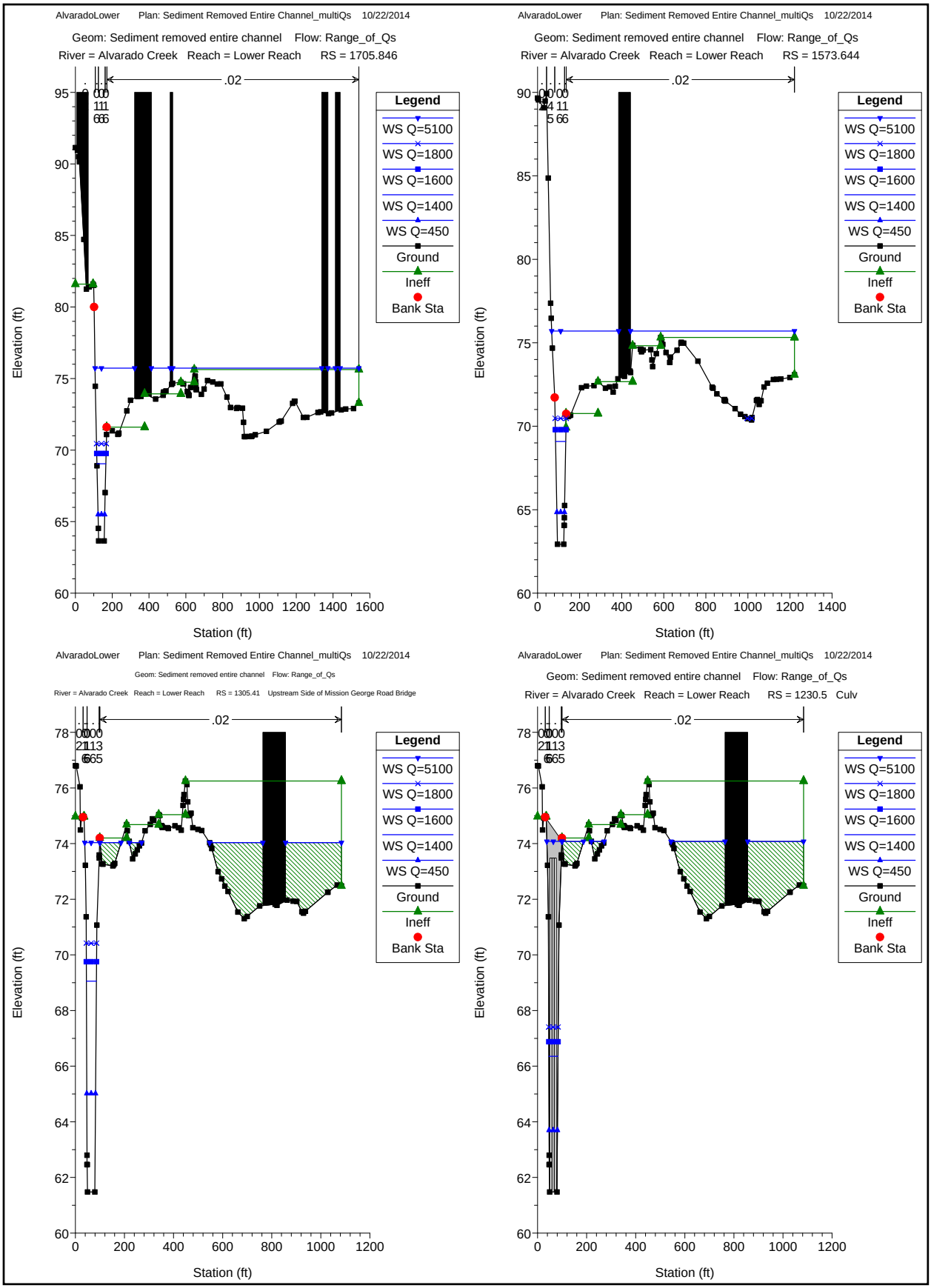


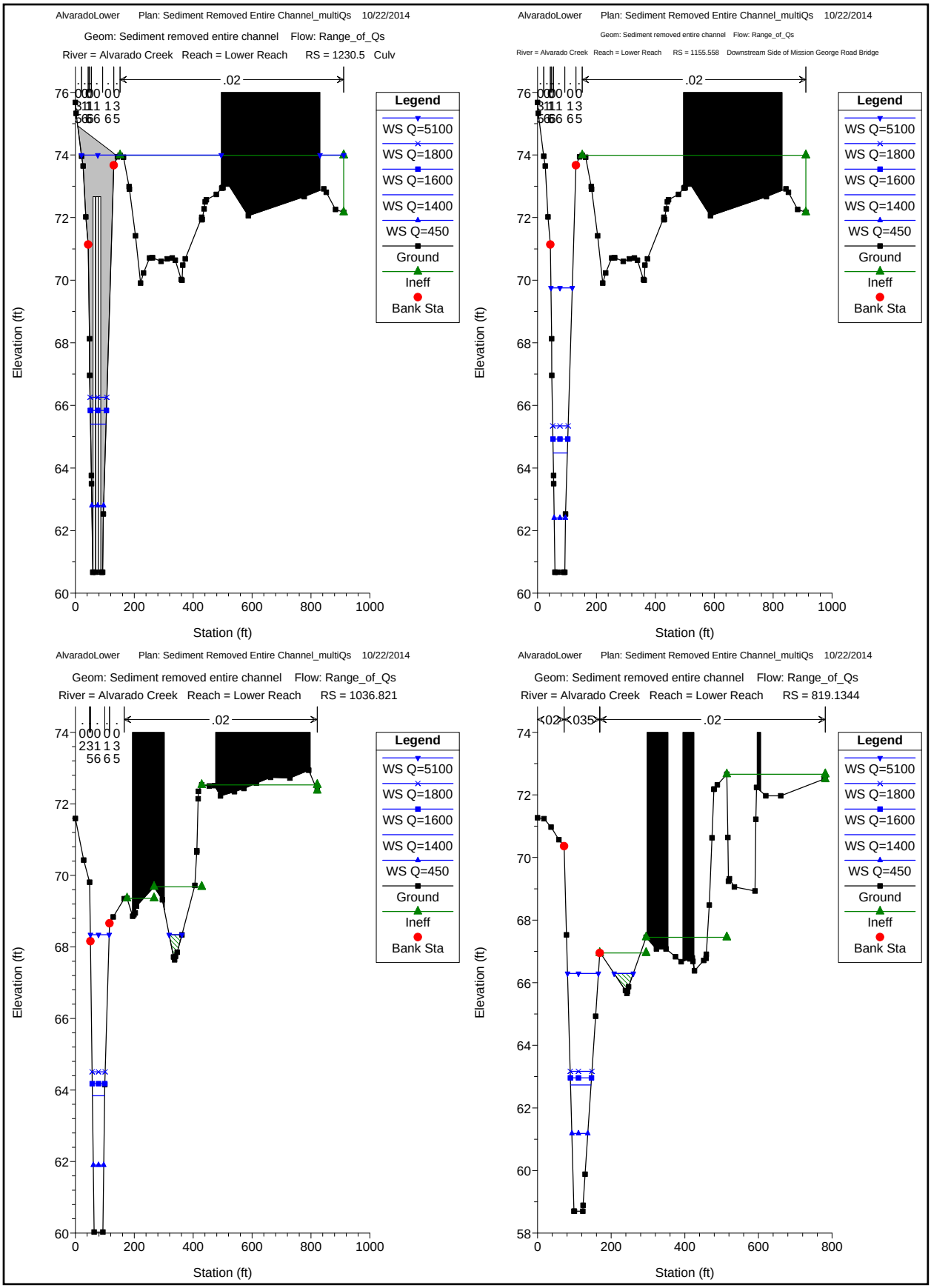
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014

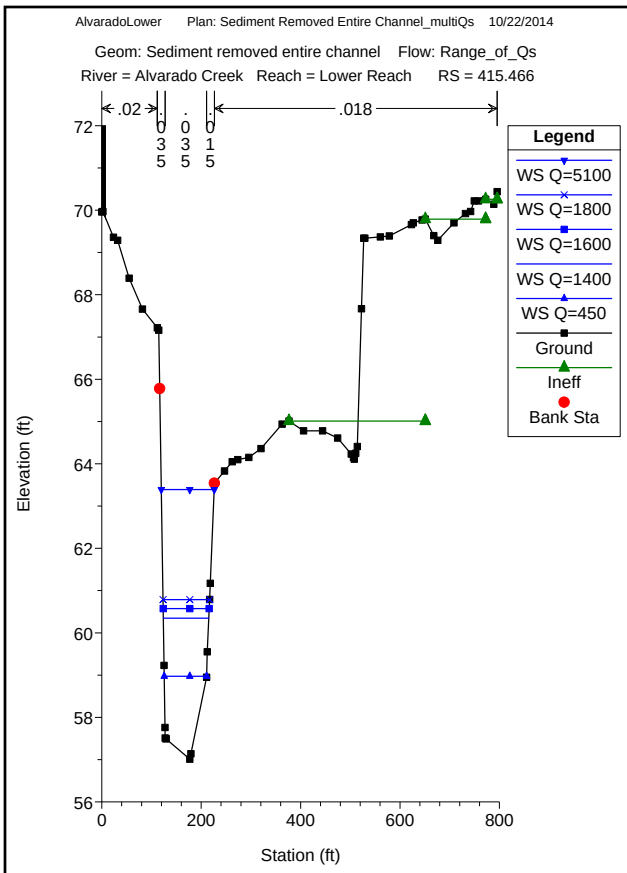
Geom: Sediment removed entire channel Flow: Range_of_Qs

River = Alvarado Creek Reach = Lower Reach RS = 1742.873




AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1705.846
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1573.644
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1305.41 Upstream Side of Mission George Road Bridge
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1230.5 Culv
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1155.558 Downstream Side of Mission George Road Bridge
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 1036.821
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 819.1344
.02
.035
.02
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


AlvaradoLower Plan: Sediment Removed Entire Channel_multiQs 10/22/2014
Geom: Sediment removed entire channel Flow: Range_of_Qs
River = Alvarado Creek Reach = Lower Reach RS = 415.466
.02
.035
.035
.015
.018
Legend
WS Q=5100
WS Q=1800
WS Q=1600
WS Q=1400
WS Q=450
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
72
70
68
66
64
62
60
58
56
0
200
400
600
800

HEC-RAS Version 4.1.0 Jan 2010
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: AlvaradoLower
Project File : AlvaradoLower.prj
Run Date and Time: 10/22/2014 1:48:03 PM

Project in English units

****

PLAN DATA

Plan Title: Sediment Removed Entire Channel_multiQs
Plan File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.p16

Geometry Title: Sediment removed entire channel
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g07

Flow Title : Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Plan Description:
Sediment and vegetation removed in the entire channel including portions owned
by others

Plan Summary Information:
Number of: Cross Sections = 23 Multiple Openings = 0
Culverts = 1 Inline Structures = 0
Bridges = 0 Lateral Structures = 5

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: Range_of_Qs
Flow File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.f02

Flow Data (cfs)

River	Reach	RS	*	Q=1700	Q=1300	Q=1100	Q=900	Q=500	Q=340	Q=1250	Q=800 *
Alvarado Creek	Lower Reach	3519.101*		1700	1300	1100	900	500	340	1250	800 *
River	Reach	RS	*	Q=250	Q=600	Q=1800	Q=950	Q=1180	Q=1400	Q=1600	Q=450 *
Alvarado Creek	Lower Reach	3519.101*		250	600	1850	950	1180	1400	1600	450 *

Boundary Conditions

River	Reach	Profile	*	Upstream	Downstream *
Alvarado Creek	Lower Reach	Q=1700	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=1300	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=1100	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=900	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=500	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=340	*	Normal S = 0.005	*
Alvarado Creek	Lower Reach	Q=1250	*	Normal S = 0.005	*

```
* Alvarado Creek  Lower Reach     Q=800            *
Normal S = 0.005 *
* Alvarado Creek  Lower Reach     Q=250            *
Normal S = 0.005 *
********************************************************************************
******************

**************************************************************************

GEOMETRY DATA

Geometry Title: Sediment removed entire channel
Geometry File : w:\17204-
B_Alvarado_Tripp_BeaverChannels\WaterResources\LowerAlvaradCreekChannel\Hydraulics\He
cRas\AlvaradoLower.g07

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3519.101

INPUT
Description:
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   83.94    7.23   83.78    45.4   83.36   67.28   83.31   97.34    83.3
  107.14    83.1  126.44   71.93  127.98   71.35   129.5   70.64   130.6   70.64
  155.29   70.64  159.51   73.45     160   73.71  178.45   79.21  188.01   82.98
  190.95   83.09  206.58   83.22  236.14   83.48  244.64   83.43     248   83.45
  282.79   83.22  287.79   83.18  307.35   82.95  308.27   82.94  328.59   82.78
  333.03    82.7  355.98   82.51  359.45   82.44  363.96   82.35   371.9    81.3
  382.25    80.7  398.46   79.81  400.43   79.74  405.16   79.64  430.03   79.67
  453.27   79.66  458.52   79.93  489.51   80.66  491.93   80.72  493.29   80.76
  494.77    80.8  508.53   81.54  525.25   81.93  550.96   82.49  571.25   82.35
  573.37    82.4  575.72   82.46  582.06   82.57  619.05   83.33  631.18   83.37
   631.5   83.37

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
       0     .02   97.34     .02  107.14    .016   130.6    .016  159.51    .016
  190.95    .018  405.16    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        107.14  178.45           137.3  137.31  137.44             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  236.14   631.5              F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
**********************
  473.62   631.5      84

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3506.967

INPUT
Description:
Lateral structure position     = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width        =      10
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   81.44     .54   81.34    5.52   81.13   15.16   81.11   45.52   80.97
   57.61   81.06   60.29   80.98   67.08   80.78   77.87   80.71   87.14   80.65
  103.56   80.83  107.18   80.81  118.93   80.74  131.34   80.66  135.42   80.68
  139.97   80.61  157.29   80.51  165.59   80.46   176.5   80.45  193.52   80.34
  215.72    80.1  223.61   79.99  228.63   79.91  244.19   79.96  252.53   79.88
  260.39    79.8   273.3   79.78  293.11   79.55  302.58   79.56   316.4   79.56
  331.68   79.56   341.8   79.59   343.2   79.34  343.49   79.29  358.82   77.39
  359.99   77.22  360.28   77.21   377.6   76.37  397.84   76.41  407.72   76.44
   410.6   76.34  430.83   77.02  452.14   77.73  453.48   77.73  455.44   77.62
  470.17      78

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 3381.792

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
********************************************************************************
       0   81.82    32.03   81.84    62.76   81.16    96.23   81.47  109.42   81.21
   122.6   81.05  129.79   77.56  129.79   77.47  141.79   69.47  166.79   69.47
  176.77   76.13  185.99   80.71  210.05   80.61  221.99   80.56  242.35   80.46
  297.45   80.17  309.35   80.16  373.54   79.68  381.29   79.61   384.5    79.5
  410.52   79.11  411.74   78.97  416.74   78.36  416.89   78.34  423.53   78.35
  465.23   78.37  469.91   78.83  488.01   80.35  500.64   81.48  504.86   81.73
  514.07   81.81  515.55   82.02  515.73   81.88  521.84   82.32  526.82   82.59
  551.59   83.43  586.82   83.39  607.56   83.74  647.33   83.65  666.66   83.61
  674.54   84.13  687.77   84.86  688.54   85.83

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
********************************************************************************
       0    .018   122.6    .016  129.79    .016  176.77    .016  185.99    .018
  411.74    .015  488.01    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        122.6  185.99           209.35  210.34   211.8             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  607.56  688.54   83.74       F
  551.59  607.56   83.43       F
       0   96.23   81.47       F
  185.99  551.59   80.71       F
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
********************************************
  214.24  232.41      86   16.29  101.01      86

CROSS SECTION
```

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3171.448

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.91	11.9	81.78	47.16	80.86	62.8	80.75	71.89	80.59
95.69	81.19	110.54	72.2	116.71	68.28	116.75	68.29	118.17	68.34
119.18	67.67	144.18	67.67	156.18	75.67	156.18	76.08	158.74	77.34
163.16	79.53	164.4	79.54	167.68	79.61	192.51	80.12	204.24	80.17
226.22	80.23	247.8	80.28	262.03	80.22	309.68	79.94	346.41	79.52
363.13	79.65	363.46	79.97	385.92	75.14	386.67	75.01	387	74.97
391.37	74.72	393.12	74.56	401.53	74.44	439.47	74.21	440.47	74.2
448.3	75.25	449.63	75.54	468.16	78.3	468.82	78.4	469.79	78.63
489.77	82.2	491.15	82.34	491.2	82.34	498.23	82.68	537.5	82.57
552.22	82.45	560.01	82.45	612.04	82.26	642.71	82.87	662.61	83.37
673.58	83.91	685.09	84.15	685.14	84.15	685.54	84.42	691.85	88.65

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	95.69	.016	118.17	.016	156.18	.016	163.16	.018
391.37	.018	439.47	.06	498.23	.018	685.09	.05		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
95.69 167.68 32.79 31.38 28.21 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
247.8	498.23	80.28	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
480.04	502.74	90	613.7	647.07	90	668.49	683.59	90
0	75.03	90						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3140.066

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.96	8.74	81.86	42.06	81	65.8	80.98	91.59	81.46
98.56	81.34	118.7	68.57	119.67	67.95	120.26	67.96	120.86	67.97
121.72	67.4	146.72	67.4	152.94	71.54	161.99	75	164.4	76.1
165.21	76.15	169.88	77.19	174.56	77.17	190.83	77.12	197.8	77.2
238.98	77.08	253.88	77	265.89	76.8	311.18	76.55	320.11	76.42
352.63	76.62	356.3	76.72	388.74	76.88	390.22	76.43	397.39	74.26
419.63	74.17	444.35	74.21	448.51	74.97	452.16	75.57	459.93	76.85
460.97	77	461.51	76.99	465.1	77.03	502.63	77.29	505.62	77.24
506.27	77.23	518.73	77.71	557.63	78.23	570.9	78.69	596.76	79.74
648.95	79.3	652.42	79.33	655.52	79.56	674.71	80.62	683.87	83.87
693.26	88.99								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	98.56	.016	120.86	.016	152.94	.016	169.88	.018
397.39	.02	674.71	.05						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
98.56 169.88 101.61 105.47 112.32 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	91.59	81.46	F
245	693.26	81	F
169.88	197.8	77.2	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
656.1	675.15	90	0	74.95	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3034.592

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.17	41.57	81.69	65.68	81.67	85.26	81.35	93.68	81.06
94.76	81.03	96.42	80.05	117.02	67.41	117.43	67.41	137.35	67.41
140.94	67.41	143.73	70.14	158.51	78.33	168.47	76.41	177.34	76.52
235.03	77.29	240.05	77.26	241.67	77.23	257.49	77.12	329.16	76.48
336.01	76.48	343.31	76.21	385.02	75.58	387.61	75.57	400.89	75.68
402.29	75.62	403.95	75.53	404.59	75.49	408.4	75.16	424.44	75.24
439.37	75.46	441.01	75.48	441.88	75.49	456.66	75.53	463.42	76.3
467.85	76.62	468.83	76.69	477.64	77.18	492.12	76.97	521.9	78.7
535.11	79.79	543.17	79.96	588.58	79.97	599.19	79.97	668.1	79.98
668.55	79.98	669	80.01	689.24	80.91	703.56	86.82		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	94.76	.016	158.51	.018	408.4	.015	463.42	.05
588.58	.015								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
94.76 158.51 187.47 186.83 186.24 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
158.51	703.56	78.33	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
194.38	335.17	90	534.53	679.65	90	0	71.12	90

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 3029.094

INPUT
Description:

Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	78.3	8.27	78.53	24.08	78.97	27.46	79.04	29.05	79.06
32.68	78.95	64.72	78.04	68.27	77.95	105.22	78.01	107.55	78.07
109.84	78.02	137.03	77.47	141.61	77.16	163.84	76.88	166.62	76.84
175.9	76.7	177.53	76.74	199.71	76.45	222.84	76.21	239.06	75.98
253.17	75.82	267.4	75.4	268.16	75.39	268.52	75.38	268.91	75.37
287.49	75.52	290.21	75.49	308.94	75.3	311.48	75.38	330.3	75.01
354.72	74.49	356.27	74.51	357.22	74.47	358.77	74.39	398.52	73.89
400.93	73.9	407.71	73.76	411.58	73.74	422.05	73.66	432.57	73.57
432.74	73.57	435.41	73.57	438.91	73.58	469.01	73.68	481.53	73.64
483.87	73.56	485.52	73.5	486.41	73.42	517.76	71.49	517.78	71.49
520.34	71.46	561.12	71.75	566.99	71.7	569.05	71.68	578.17	71.73
589.02	71.85	599.02	71.97	599.46	71.99	613.78	72.42	616.75	72.47
619.29	72.47	619.96	72.48	630.11	72.63	657.92	72.36	659.77	72.35
671.397	72.23								

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2847.761

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.92	16.76	82.55	49.95	81.35	78.58	80.92	92.48	81.7
110.07	69.28	110.17	69.2	110.31	69.19	111.28	69.15	111.31	69.15
115	66.69	125	66.69	135.81	73.9	140.04	75.43	143.16	76.72
145.57	76.61	159.23	74.85	208.25	74.91	213.53	74.83	215.34	75.01
222.23	75.14	249.85	75.72	288.72	76.4	331.44	76.43	362.93	76.29
403.25	76.06	405.6	76.12	412.7	76.25	423.57	76.48	430.12	76.21
430.64	76.17	435.34	76.17	477.89	76.21	485.28	77.33	495.73	78.49
518.76	79.84	548.46	80.84	599.76	80.89	618.77	80.91	682.32	81.13
684.48	81.13	687.11	81.15	742.11	80.84	751.33	81.07		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	92.48	.035	110.07	.035	111.31	.035	135.81	.035
159.23	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
92.48 143.16 165.5 169.96 176.8 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	92.48	81.7	F
143.16	751.33	76.72	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
263.23	391.75	84	512.38	718.6	84	0	24.64	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2677.801

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.5	30.52	80.65	36.77	80.62	42.89	80.9	58.1	81.5
65.16	78.14	82.97	66.27	92.97	66.27	105.33	74.51	110.68	74.57
205.6	74.95	206.53	74.74	221.08	73.32	225.22	73.4	226.53	73.39
265.25	77.08	271.06	77.41	338.32	78.06	339.78	78.1	341.36	78.1
364.19	78.09	408.76	78.09	410.69	78	412.65	78.03	428	77.68
435.25	77.52	440.78	76.52	441.72	76.36	444.58	76.41	489.46	77.02
499.32	77.96	509.15	78.9	525.8	79.2	570.88	79.97	592.3	80.36
638.5	80.46	660.12	80.81	697.06	81.81	720.99	80.69	730.29	80.14
740.99	80.4	756.67	80.53						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	58.1	.035	65.16	.035	105.33	.018	206.53	.018
408.76	.03	435.25	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.16 105.33 162.85 162.93 162.56 .1 .3
Ineffective Flow num= 4

Sta L	Sta R	Elev	Permanent
697.06	756.67	81.81	F
0	58.1	81.5	F
341.36	697.06	78.1	F
205.6	341.36	74.95	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
527.26	558.86	92	680.09	727.68	92	291.63	401.11	92
118.99	151.1	92						

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2514.866

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.4	.06	84.39	.79	84.39	41.1	81.94	53.2	81.94
60.02	78.1	75.48	70.32	78.01	69.05	78.41	68.94	83	65.88
93	65.88	101.16	71.32	101.72	71.49	102.77	71.46	142.03	71.27
158.47	71.64	184.44	72.28	194.7	72.52	200.88	72.65	233.74	72.9
261.94	73.04	269.59	73.66	279.45	74.52	284.9	74.71	345.6	77.01
353.93	77.03	413.72	78.09	414.74	78.11	421.74	78.22	423.21	78.27
438.25	78.24	502.84	77.71	507.32	77.68	509.47	77.57	514.04	77.58
538.77	78.01	551.49	78.22	562.23	78.33	569.85	78.62	582.46	78.99
583.62	79.04	584.62	79.06	585.59	79.06	586.66	79.04	604.37	79.34
634.88	79.77	647.22	79.72	685.7	79.32	717.19	79.4	747.64	78.97

776.38	79.2	793.01	79.33	795.4	79.35	804.92	79.43	

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	41.1	.02	53.2	.035	78.01	.035	78.41	.035
101.16	.035	102.77	.02						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
53.2	101.16	158.36	154.23	152.81	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
634.88	804.92	79.77	F
423.21	634.88	78.27	F
102.77	423.21	71.46	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
659.03	679	86	386.11	473.7	86

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2360.635

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.78	2.38	82.59	14.12	83.65	14.25	83.58	16.28	82.69
27.93	75.07	31.19	74.9	32.22	74.88	32.55	74.87	56.86	74.48
59.39	74.02	69.46	72.26	74.34	71.47	82.9	71.61	93.85	71.6
98.97	69.52	100.84	68.17	104.05	67.51	105.82	67.47	107.64	67.43
116.02	67.1	116.7	67.07	125.39	70.54	129.21	72.21	146.27	72.31
147.82	72.32	151.45	72.33	169.17	72.44	177.04	72.44	194.94	72.57
213.19	72.7	231.11	72.83	239.86	73.05	256.64	73.16	268.08	73.24
274.44	73.2	275.92	73.09	316.41	73.22	324.05	72.33	337.68	74.65
345.19	75.59	353.05	75.56	360.81	75.87	401.93	77.57	412.48	77.82
416.98	77.65	422.38	77.15	424.89	76.98	434.19	76.78	447.79	76.56
461.33	76.4	484.88	75.63	493.56	75.31	502.3	75.48	515.87	75.8
571.75	76.38	576.32	76.4	577.86	76.39	606.49	76.26	622.33	76.12
630.75	75.99	636.37	76.13	687.01	76.06	708.05	75.76	720.51	75.23
782.65	74.6	813.1	74.88	823.95	74.67	827.4	75.46	827.87	75.5
887.31	75.88								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	59.39	.02	74.34	.025	93.85	.025	98.97	.025
129.21	.02								

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.46	129.21	19.33	19.66	19.62	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
412.48	887.31	77.82	F
268.08	412.48	73.24	F
129.21	268.08	72.21	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
849.37	887.31	84	333.1	396.34	84	181.12	281.23	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2340.973

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	80.61	.87	80.6	22.6	79.47	32.6	78.24	56.43	76.37
64.23	75.35	95.77	73.35	95.9	73.35	95.96	73.33	96.3	73.28
128.28	68.28	130.03	67.85	138.44	67.48	139.56	67.44	145.84	67.34
152.75	67.19	156.9	67.65	166.58	68.13	176.76	67.33	179.2	67.35
190.45	69.19	196.47	69.33	215.6	69.8	220.82	69.93	224.96	69.93
235	69.54	237.01	69.61	238.67	69.67	249.12	70.52	252.71	70.52
266.23	71	267.66	71.06	282.66	71.6	284.78	71.69	286.98	71.78
292.56	72.39	307.25	72.45	308.01	72.97	337.72	73.54	353.4	73.6
367.91	71.92	375.12	73.13	387.83	75.78	402.57	77.03	407.14	77.24
442.2	77.57	446.53	77.42	449.33	77.35	454.1	77.03	458.5	76.86
491	76.17	494.2	76.1	523.16	75.19	526.15	75.28	545.45	75.73
578.04	76.07	584.36	76.13	611.54	76.28	618.89	76.23	652.11	76.12
671.87	76.07	673.16	76.09	686.67	76.05	740.04	75.94	747.31	75.84
750.97	75.69	804.08	75.28	840.64	74.91	848.96	74.78	851.12	74.73
864.95	74.44	866.51	74.97	868.93	75.75	882.87	75.86	910.13	76.01
918.13	75.96								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	95.77	.025	292.56	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
95.77	249.12	34.23	31.23	27.43	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
224.96	353.4	69.93	F
353.4	442.2	73.6	F
442.2	918.13	77.57	F

LATERAL STRUCTURE

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2332.283

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.93	28.6	73.11	32.41	73.05	36.27	73.07	53.73	73.26
75.72	72.98	83.18	72.87	84.73	72.87	113.73	72.49	120.12	72.4
121.97	72.3	122.55	72.29	142.45	70.32	150.53	70.37	152.44	70.1
154.56	70.11	177.32	70.1	177.71	70.1	184.07	70.16	196.07	70.18

210.92	70.5	211.71	70.49	242.42	70.74	255.17	70.77	296.16	70.87
302.66	70.92	306.93	70.88	308.68	70.86	319.46	70.94	354.27	71.2
365.87	71.27	368.48	71.33	384.5	71.48	405.18	71.71	418.43	72.03
423.2	72.02	436.95	72.01	451.84	71.75	472.67	71.49	475.49	71.48
483.42	71.46	505.62	71.63	509.77	71.66	530.95	71.84	533.46	71.91
534.85	71.88	555.51	71.62	563.1	71.55	571.2	71.53	595.81	71.58
607.74	71.6	619.45	71.63	627.33	71.58	631.93	71.53	632.76	71.52
651.93	71.49	659.23	71.46	688.57	71.32	691.74	71.36	695.44	71.27
713.37	70.98	733.29	70.64	748.42	70.69	765.65	70.74	766.32	70.74
774.59	70.89	791.29	70.71	815.72	70.74	821.7	70.53	834.47	70.6
863.01	70.38	863.32	70.37	865.06	70.3	876.34	70.54	922.18	70.2
931.41	69.69	933.06	69.7	941.64	70.12	945.04	70.15	945.93	70.16
949.02	70.21	978.66	71.74	980.6	71.87	985.97	72.44	1002.83	73.76

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2309.739

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	82.19	4.81	82.17	9.45	81.23	18.46	80.41	35.62	77.89
46.58	77.32	47.59	77.27	48.02	77.25	48.1	77.26	48.52	77.25
48.62	77.25	80.87	75.66	83.92	75.47	103.83	74.24	107.54	74.01
111.05	73.74	113.57	73.09	123.28	66.92	123.96	66.94	134.03	67.34
142.74	67.29	144.15	67.64	150.64	69.25	168.74	72.98	169.57	72.98
184.83	72.92	202.35	72.61	218.31	72.33	230.64	72.5	264.92	72.11
267.25	72.13	268.49	72.14	269.6	72.15	285.37	71.97	306.16	71.87
308.24	71.88	346.13	73.63	356.56	73.58	369.53	72.19	387.32	75.89
388.18	76.07	388.77	76.12	395.83	76.34	428.45	77.13	435.27	77.16
437.39	77.1	442.56	76.97	459.31	76.41	468.86	76.04	469.55	76.02
477.2	75.83	506.71	75.09	508.64	75.03	513.65	75.17	525.79	75.52
529.14	75.61	539.96	75.59	602.04	75.82	633.94	75.55	646.03	75.49
663.73	75.65	689.85	75.95	718.58	75.88	777.93	75.76	814.27	75.38
848.9	74.85	880.64	75.11	883.25	75.98	885.1	75.8	904.76	75.75
930.56	75.61								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.83	.035	113.57	.025	123.28	.025	142.74	.025
184.83	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
113.57 168.74 21.27 43.05 56.67 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
435.27	930.56	77.16	F
346.13	435.27	73.63	F
168.74	346.13	72.98	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
904.29	930.56	84	379.91	413.97	84

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2266.686

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.91	3.86	76.85	31.22	76.74	40.97	76.27	53.8	76.53
54.07	76.52	61	76.37	64.32	76.21	78.65	75.54	88.53	74.97
95.2	70.01	100.62	66.38	100.93	66.4	104.59	66.66	106.68	65.27
116.68	65.27	120.46	67.79	122.73	67.96	130.63	70.22	140.68	73.08
144.05	72.84	151.96	72.76	204.76	72.55	223.94	72.77	260.65	73.22
266.07	73.19	299.79	73.59	307.52	73.71	308.78	73.64	314.02	73.77
331.03	73.98	370.85	74.56	384.82	74.69	386.63	74.75	387.16	74.78
388.38	74.86	418.11	75.89	423.92	75.04	425.39	74.76	432.85	74.91
457.95	75.46	487.2	75.02	491.57	74.95	522.3	75.35	532.27	75.56
579.27	76.01	580.21	75.98	583.51	75.87	598.45	75.86	614.06	75.84
620.75	76	655.82	76	662.16	75.87	675.83	75.91	689.65	75.94
698.62	75.94	710.9	75.97	723.26	76	735.67	76.03	748.15	76.06
751.43	76.22	766.94	76.43	776.08	76.32	801.97	76.64	814.86	76.8
827.37	76.96	832.12	77.23	847.31	77.09	870.84	76.86	882.44	76.54
899.87	76.36	912.59	76.23	918.5	76.53	961.83	74.99		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	88.53	.035	100.62	.035	104.59	.035	120.46	.035
122.73	.035	140.68	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.53 140.68 166.7 176.24 190.03 .1 .3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
832.12	961.83	77.23	F
418.11	832.12	75.89	F
140.68	418.11	73.08	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
925.08	961.83	78	335.84	371.85	78

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 2090.444

INPUT
Description:
Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	84.64	26.94	83.81	34.56	83.73	43.9	79.41	46.03	78.55
52.86	76.55	54.74	76.35	104.35	73.68	118.15	73.7	134.84	74.47
135.36	74.5	136.09	74.08	147.13	66.69	147.9	66.18	148.39	66.19
150.68	66.26	152.81	64.84	162.81	64.84	165.63	66.72	165.88	66.73
167.71	66.79	171.16	67.8	179.85	70.38	184.02	70.75	194.03	71.62
194.27	71.63	202.76	71.77	273.69	71.57	286.93	71.44	339.3	70.92
341.41	70.93	346.27	70.96	363.18	71.21	380.58	74.52	382.15	74.81
403.82	75.16	415.99	75.36	424.89	75.46	426.22	75.5	428.2	75.54

485.28	76.46	504.11	76.75	504.86	76.77	505.61	76.77	581.94	76.71
581.99	76.71	582.19	76.7	616.27	75.05	620.06	74.54	625.23	73.61
632.37	73.76	634.32	73.8	662.88	75.08	673.19	75.29	682.75	75.49
699.59	75.85	706.79	76.32	708.21	76.42	710.5	76.17	721.06	75
733.86	73.51	736.35	73.31	740.23	73.51	751.82	73.86	779.52	74
784.48	74.03	793.6	73.98	877.01	74.07	877.93	74.07	884.82	74.19
904.52	74.3	961.49	74.71	997.84	74.13	1012.87	73.63	1017.1	73.64
1082.33	73.05	1082.5	73.03	1164.82	73.75	1168.93	73.73	1173.57	73.7
1242.67	73.99								

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	34.56	.03	134.84	.035	147.13	.035	147.9	.035
150.68	.035	165.63	.035	167.71	.05	202.76	.018		

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
134.84	202.76	183.41	186.19	187.45	.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
505.61	1242.67	76.77	F
0	134.84	74.47	F
202.76	505.61	71.77	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
253.88	342.73	85	389.09	459.09	85	517.66	561.05	85
561.05	591.44	85	1113.13	1156.42	85	1215.17	1242.67	85

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1904.254

INPUT
Description:
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.99	8.79	76.44	24.35	77.05	47.31	75.75	53.56	73.03
66.51	64.39	96.51	64.39	107.61	71.79	109.43	71.92	151.01	71.75
159.27	71.73	168.23	71.75	173.16	71.77	174.73	71.76	177.55	71.81
251.31	73.27	263.3	72.82	279.78	72.78	309.56	72.36	378.72	73.55
382.13	73.6	384.52	73.57	390.88	73.55	414.28	73.24	419.89	75.23
420.9	75.61	422.68	75.61	458.26	74.69	476.08	74.71	512.04	74.33
535.68	74.48	550.94	74.42	552	74.42	553.17	74.31	560.93	73.57
571.04	74.01	586.99	74.76	592.36	74.99	605.54	75.3	625.78	75.75
641.58	74.17	646.46	74	651.36	74.03	665.28	74.02	680.67	73.98
707.41	73.93	713.85	74.67	720.98	75.01	721.72	74.21	724.33	71.49
731.33	71.08	761.41	70.31	831.59	71.36	846.38	71.48	905.94	71.7
921.23	71.85	942.82	72.02	971.41	72.24	981.91	72.22	1023.02	72.81
1027.24	72.75	1084.74	72.54	1094.89	72.57	1163.16	72.28	1176.32	72.28
1260.8	73.2	1264.92	73.2	1267.13	73.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.025	53.56	.016	109.43	.025

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
53.56	107.61	55.48	54.33	52.65	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
109.43	251.31	71.92	F
251.31	382.13	73.27	F
382.13	420.9	73.6	F
420.9	625.78	75.61	F
625.78	1267.13	75.75	F

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1849.924

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	81.3	22.19	80.73	27.04	80.82	52	64.19	82	64.19
86.57	67.24	86.72	67.31	96.83	71.62	102.85	71.44	120.83	71.5
121.28	71.5	162.27	72.16	203.84	72.77	234.07	73.18	262.22	73.16
287	73.2	315.47	72.84	338.75	72.78	375.8	73.25	418.39	72.85
430.44	73	446.57	73.51	454.04	74	458.95	74.94	459.21	74.99
459.67	74.98	473.54	74.66	515.16	74.88	521.36	74.86	529.13	74.74
533.68	74.54	544.33	74.06	549.3	73.7	552	73.46	555.67	73.6
564.62	73.94	587.23	74.72	610.02	74.92	621.12	75.16	631.61	74.98
670.03	73.9	680.62	73.66	686.29	73.65	705.55	73.79	720.09	74
749.26	73.82	752.63	72.85	758.57	71.1	762.8	71.19	790.92	71.05
809.65	71.02	817.24	70.83	828.47	71	887.89	71.48	897.69	71.52
967.83	72.22	976.49	72.29	1023.22	72.17	1030.23	72.27	1055.6	71.92
1065.03	71.88	1141.19	72.12	1152.9	72.07	1276.23	72.08	1292.03	72.25
1295.72	72.25								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	27.04	.016	86.57	.016	96.83	.02

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
27.04	96.83	119.68	107.05	93.87	.1	.3

Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
96.83	287	71.62	F
287	375.8	73.2	F
375.8	459.12	73.25	F
459.12	621.12	74.99	F
621.12	1295.72	75.16	F

Blocked Obstructions num= 6

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
150.01	203.69	82	378.34	430.45	82	1165.47	1200.37	82
233.42	298.12	82	813.24	895.39	82	1217	1266.52	82

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1742.873

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
*****************************************************************************
       0   91.61    5.15   91.42   13.15   91.28   29.61   87.54   66.99   81.21
   80.34   81.66   88.52   81.77  104.06   81.39   104.2   81.39  104.23   81.37
  113.87   74.52  115.18   73.72  129.19   64.92  130.67 64.0322   145.1 64.0322
  158.33 64.0322  160.03 64.0322   171.6   70.17  174.16   71.54  184.15   71.64
  199.83   72.01  234.15   72.27   272.4   73.09  274.67    73.1  292.44   73.19
  306.06   73.09  348.94   73.18  415.23   73.78  422.84   73.86  426.23   73.84
  477.62   73.61  506.71   74.22  522.52   74.46  541.27   74.48  582.07   74.81
  600.01    74.4  624.78   73.97  625.51   73.95  629.98   73.83  633.65   73.74
  662.02   74.35  668.04   74.51  675.96   74.43  699.57   74.13   714.2   74.56
  718.45   74.69  729.41   74.71  743.77    74.7     775   74.71  775.43    74.7
  823.82   72.85  835.11   72.83  878.32   73.44  887.99   73.42  896.21   71.46
  898.49   70.84  910.47   70.83  948.26   70.93  989.79   70.97 1017.41   71.19
 1071.55   71.39 1103.14   71.71 1146.36   72.21 1163.89   72.16 1173.23   72.03
 1205.96    72.1 1238.19    72.2 1282.97   72.52 1332.07   72.03 1382.58   72.03
 1435.64   73.06

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0    .018  104.06     .02  115.18     .06  129.19     .07  160.03     .06
  174.16     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        104.06  174.16             35.7   37.03    38.3             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  582.07 1435.64   74.81       F
Blocked Obstructions     num=       5
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
      17      81      95     301     445      95     501     627      95
     954    1036      95    1305    1342      95

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1705.846

INPUT
Description:
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   91.14   10.89   90.95   17.52   90.51    21.6   90.15   45.69   84.72
   60.03   81.25   75.09   81.41   95.63    81.6   99.12   81.52  101.43      80
  108.43   74.46  117.22    68.9  125.09   64.53  126.41   63.65  156.41   63.65
  161.49   67.03  169.13   71.09   170.1    71.6  171.11   71.58  200.06   71.35
  230.61    71.1  233.43   71.12  236.45   71.18  279.17   72.74  299.09   73.48
  338.76   73.74  355.98   73.76   375.7   73.93  435.87   73.57  476.37   73.83
  477.83      74  479.36   74.06  491.62   74.13  522.66   74.59  527.93   74.67
  573.35   74.74  584.49   74.63  587.62   74.63  608.51    74.1     609   74.08
  614.43   73.91  616.78   73.83  617.03   73.82  625.88   74.38   645.8   75.63
  650.57   75.18  650.85   75.16  653.22   74.76  654.71   74.51  656.37   74.24
  657.62   74.22  684.24    73.9  699.43   74.27  718.21   74.86  746.25   74.76
  771.58   74.62  790.23   74.63  823.59   73.71  842.73   72.98   875.8   72.91
  879.23   72.96  882.45   72.96  908.01   72.93  913.82   71.94   918.4   70.94
  923.37   70.94  944.94   70.95   956.3   70.95  959.07   70.98  977.17   71.07
 1038.22   71.31 1107.69   71.96 1115.86   72.02 1118.32   72.03 1180.11   73.27
 1189.97   73.42  1192.4   73.42 1238.94   72.28 1257.56   72.29 1318.12   72.63
 1332.62   72.67 1375.41   72.55 1391.96    72.6 1443.89   72.81 1468.48   72.87
 1511.38    72.9 1540.35   73.29

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .02  108.43    .016  125.09    .016  161.49    .016  171.11     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        101.43   170.1            136.62   132.2  123.01             .1       .3
Ineffective Flow     num=       5
   Sta L   Sta R    Elev  Permanent
       0   95.63    81.6       F
   645.8 1540.35   75.63       F
  573.35   645.8   74.74       F
   375.7  573.35   73.93       F
   170.1   375.7    71.6       F
Blocked Obstructions     num=       6
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************************************************
  322.16  412.72      95     7.5   69.77      95  514.93  528.44      95
 1412.52 1438.18      95 1338.43 1372.34      95 1539.91 1540.35      95

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1573.644

INPUT
Description:
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0   89.66    4.03   89.55   29.17   89.08   36.04   89.48   43.05   89.93
   50.48   84.87   61.87   77.37   64.86   76.47   70.17   74.68    81.6   71.72
   94.78   62.93  124.78   62.93  126.46   64.06  126.79   64.06  127.33   64.52
  128.25   65.25  136.49   70.74  145.46   70.58  152.61   70.64  156.91   70.67
  208.87   72.31  232.07    72.4  268.04   72.43  287.13   72.67   322.8   72.28
  342.36   72.36  359.71   72.05  369.42    72.4   382.2   72.84  413.09   72.99
  439.86    73.3  442.26   73.22  451.68   74.82  451.93   74.85  489.05   74.62
  492.33    74.6  494.22   74.46  496.02   74.55  502.05   74.56  537.94   74.59
  543.47   73.97  547.27   73.57   564.7   74.35  585.61   75.32  589.03   75.19
  595.39    74.9  610.65   74.42  628.48   73.82  628.64   73.83  632.03   74.14
   662.9   74.55  681.75   74.98  683.52   75.03  694.87   74.98  762.03    73.9
  829.96   72.34  834.17   72.28  852.61   71.94  886.74   71.57  889.76    71.6
  890.89   71.53  893.47   71.51  939.27   71.05  964.87   70.72  985.97   70.58
  999.54   70.45 1017.68   70.38  1019.9   70.52 1040.58   71.55 1043.19   71.55
 1044.08   71.56 1045.68    71.6 1053.71   71.31 1062.36   71.53 1076.84   72.35
 1092.33   72.58 1121.01    72.8 1135.54   72.81 1156.84   72.83 1199.56   72.92
 1221.53   73.08

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .02   43.05    .045    81.6    .016  128.25    .016  136.49     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         81.6  136.49            286.27  268.23  249.58             .1       .3
Ineffective Flow     num=       4
   Sta L   Sta R    Elev  Permanent
  585.61 1221.53   75.32       F
  451.68  585.61   74.82       F
  287.13  451.68   72.67       F
  135.25  287.13   70.76       F
```

Blocked Obstructions num= 1

Sta L	Sta R	Elev
385.47	441.5	90

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1305.41

INPUT
Description: Upstream Side of Mission George Road Bridge
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	47.46	.016	47.82	.016
97.29	.035	99.47	.02						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
31.29 99.47 148.68 149.85 158.44 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

CULVERT

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1230.5

INPUT
Description:
Distance from Upstream XS = 21
Deck/Roadway Width = 110
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
31.29	74.95	99	74.1

Upstream Bridge Cross Section Data
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	76.8	3.18	76.79	18.93	76.04	20.08	74.49	25.29	74.92
31.29	74.95	35.1	74.97	40.35	73.22	44.03	71.37	47.3	62.8
47.46	62.46	47.61	62.46	47.82	62.46	49.29	61.48	79.29	61.48
87.2	71.07	97.29	73.48	97.29	73.59	99.47	74.2	107.55	73.27
111.04	73.27	111.8	73.26	152.75	73.2	156.26	73.24	160.22	73.29
208.44	74.68	211.62	74.46	219.34	74.08	233.28	73.45	243.72	73.63
251.87	73.77	260.77	73.92	269.63	74.02	283.97	74.46	305.4	74.69
313.68	74.89	319.79	74.83	339.44	75.04	342.79	75.01	350.26	74.65
353.09	74.63	353.6	74.6	354.11	74.58	375.45	74.57	378.59	74.54
405.71	74.64	420.06	74.57	431.36	74.48	438.63	75.37	440.77	75.59
442.53	75.76	448.54	76.25	448.64	76.24	454.45	76.12	457.74	75.5
460.8	75.01	466.14	75.04	471.51	75.09	478.52	74.57	499.53	74.51
514.59	74.47	547.16	74.03	550.96	73.96	555.9	73.82	581.53	72.99
595.7	72.73	608.77	72.47	621.83	72.28	662.24	71.54	687.91	71.3
700.08	71.38	751.01	71.76	813.92	71.82	821.41	71.78	862.82	71.97
887.32	71.93	901.82	71.92	922.67	71.55	928.78	71.52	929.65	71.5
937.18	71.57	1028.2	72.25	1029	72.26	1066.93	72.51	1084.18	72.48

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	31.29	.016	47.3	.016	47.46	.016	47.82	.016
97.29	.035	99.47	.02						

Bank Sta: Left Right Coeff Contr. Expan.
31.29 99.47 .1 .3
Ineffective Flow num= 5

Sta L	Sta R	Elev	Permanent
448.54	1084.18	76.25	F
339.44	448.54	75.04	F
0	35.1	74.97	F
208.44	339.44	74.68	F
99.47	208.44	74.2	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
763.88	856.31	78

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
2.34	74.97	124.06	74.1	143.04	73.94

Downstream Bridge Cross Section Data
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	75.68	2.52	75.33	20.96	73.96	26.13	73.65	35.57	72.02
43.26	71.14	47.78	68.13	48.44	66.96	54.33	63.76	54.72	63.5
59.22	60.67	59.37	60.67	68.77	60.67	87.93	60.67	90.19	60.67

```
   92.72   60.67   94.83   62.53  130.44   73.67  143.04   73.94  151.67   73.99
  163.31   73.93  182.18   72.99  183.46   72.91   203.9   71.42   221.2   69.91
   231.4   70.23  251.76   70.71  260.52   70.72  262.13   70.72  290.97    70.6
  312.02   70.68  328.69   70.71  339.11   70.64  359.52   70.02   362.2      70
  364.66   70.48  373.11   70.68  428.82   72.01  429.07   71.93  430.72   71.94
  436.95   72.28   440.5    72.5  444.65   72.57  478.56   72.74  497.03   72.94
  499.73   72.96  501.14   72.95   518.9   73.07  586.99   72.06  777.15   72.67
  843.55   72.92  851.87   72.81  883.14   72.26  910.92   72.17

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0    .035   20.96    .016   43.26    .016   47.78    .016   54.33    .016
   92.72    .016  130.44    .035  151.67     .02

Bank Sta: Left   Right    Coeff Contr.   Expan.
         43.26  130.44            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =    74.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box      12       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                21     110     .018     .018        0                   .4
1
Number of Barrels =  3
Upstream   Elevation =  61.48
Centerline Stations
    Sta.    Sta.    Sta.
   54.36   63.36   72.36
Downstream Elevation =  60.67
Centerline Stations
    Sta.    Sta.    Sta.
   64.16   73.16   82.16

CROSS SECTION


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1155.558

INPUT
Description: Downstream Side of Mission George Road Bridge
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   75.68    2.52   75.33   20.96   73.96   26.13   73.65   35.57   72.02
   43.26   71.14   47.78   68.13   48.44   66.96   54.33   63.76   54.72    63.5
   59.22   60.67   59.37   60.67   68.77   60.67   87.93   60.67   90.19   60.67
   92.72   60.67   94.83   62.53  130.44   73.67  143.04   73.94  151.67   73.99
  163.31   73.93  182.18   72.99  183.46   72.91   203.9   71.42   221.2   69.91
   231.4   70.23  251.76   70.71  260.52   70.72  262.13   70.72  290.97    70.6
  312.02   70.68  328.69   70.71  339.11   70.64  359.52   70.02   362.2      70
  364.66   70.48  373.11   70.68  428.82   72.01  429.07   71.93  430.72   71.94
  436.95   72.28   440.5    72.5  444.65   72.57  478.56   72.74  497.03   72.94
  499.73   72.96  501.14   72.95   518.9   73.07  586.99   72.06  777.15   72.67
  843.55   72.92  851.87   72.81  883.14   72.26  910.92   72.17

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0    .035   20.96    .016   43.26    .016   47.78    .016   54.33    .016
   92.72    .016  130.44    .035  151.67     .02

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         43.26  130.44           118.42  118.74  122.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  151.67  910.92   73.99       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
  495.28  830.64      76

LATERAL STRUCTURE


RIVER: Alvarado Creek
REACH: Lower Reach        RS: 1149.024

INPUT
Description:
Lateral structure position     = Next ot left bank station
Distance from Upstream XS =
Deck/Roadway Width         =      10
Weir Coefficient           =       2
Weir Flow Reference        = Water Surface
 Weir Embankment Coordinates    num =       59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0   69.76    16.9   69.55    25.7   69.17   30.58   68.94   31.67   68.94
   36.69   68.98   42.25   69.07   71.47   69.38   83.21      69   85.02   69.17
   85.94   69.26  103.34   69.84  116.65   70.06  121.32   70.15  161.06   70.62
  170.37   70.76  186.05   71.05   195.2   71.25  201.56   71.27  229.21   71.22
  250.77      71  284.88   70.75  288.32   70.68  321.89   70.36  340.36    70.4
  343.09   70.39  344.18   70.39  353.28   70.53  382.88   70.99   426.5   70.72
  426.92   70.72  469.99   69.93  474.53   69.85  477.03   69.87  528.71   69.63
  531.24   70.04  532.97   70.03  552.92    69.6  559.86   69.56  575.37   69.14
  595.47   69.12  595.76   69.09  596.31   69.06  603.26   69.05  611.43   69.06
     612   69.06  622.57   68.97  632.57   68.94  636.24   68.98  638.51   68.95
  645.42   68.98  650.65   68.89  659.59   68.93  661.07    68.9  674.47   68.65
  680.25    68.8     701   68.36  704.61   68.25 733.558   67.58

Weir crest shape                            = Broad Crested


LATERAL STRUCTURE
```

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1121.496

INPUT
Description:
Lateral structure position = Next ot right bank station
Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73.03	37.12	70.67	51.06	69.64	51.58	69.61	63.9	69.49
77.77	69.2	78.42	69.18	78.99	69.18	105.92	68.64	109.54	68.56
109.79	68.56	158.77	67.55	182.38	67.5	182.83	67.5	191.06	67.3
213.81	67.27	221.88	67.33	272.16	67.24	310.99	67.01	325.37	66.93
328.4	66.9	329.44	66.9	383.22	66.59	388.38	66.55	388.62	66.55
440.14	66.56	493.79	66.58	495.22	66.56	498.92	66.51	541.93	65.88
542.66	65.87	567.25	65.51	588.94	65.18	590.62	65.14	617.49	64.53
626.74	64.24	627.45	64.29	639.24	64	657.35	63.57	661.52	63.47
665.23	63.43	667.79	62.32	672.743	60.187				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 1036.821

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.59	28.31	70.43	48.23	69.81	51.25	68.16	63.43	60.03
93.43	60.03	99.62	64.15	115.82	68.66	128.53	68.84	165.64	69.35
175.37	69.36	194.56	68.86	198.66	68.9	203.24	68.95	207.36	69.14
267.19	69.68	295.45	69.32	333.02	67.72	337.01	67.64	339.96	67.74
345.68	67.85	361.62	68.34	405.48	69.72	412.22	70.65	412.49	70.69
417.08	72.14	417.74	72.35	428.97	72.53	454.65	72.5	472.74	72.51
492.7	72.22	540.06	72.34	572.32	72.43	614.53	72.58	662.93	72.74
728.33	72.72	792.36	72.94	821.37	72.37				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	48.23	.035	51.25	.016	99.62	.016	115.82	.035
165.64	.02								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
51.25 115.82 217.42 217.69 218.99 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
428.97	821.37	72.53	F
267.19	428.97	69.68	F
175.37	267.19	69.36	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
193.47	302.14	74	476.06	797.64	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 819.1344

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71.27	17.47	71.24	36.71	70.97	57.95	70.57	72.14	70.36
78.67	67.53	98.97	58.7	100.14	58.7	122.92	58.7	123.52	58.89
129.2	59.88	157.62	64.93	168.96	66.95	171.35	66.94	238.83	65.75
242.61	65.66	244.24	65.72	247.27	65.87	294.8	67.45	322.74	67.08
348.94	67.08	374.67	66.83	390.3	66.67	413.63	66.76	420.51	66.79
421.9	66.68	426.1	66.38	451.45	66.71	457.84	66.78	458.53	66.91
466.39	68.48	473.92	70.63	478.88	72.18	479.52	72.19	488.24	72.32
514.26	72.66	517.04	70.64	518.76	69.24	521.17	69.32	534.61	69.06
590.6	68.93	592.93	71.22	594.97	72.24	619.91	71.97	660.51	71.97
778.79	72.51	781.74	72.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	72.14	.035	168.96	.02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.14 168.96 431.18 403.67 344.14 .1 .3
Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
168.96	294.8	66.95	F
294.8	514.26	67.45	F
514.26	781.74	72.66	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
297.49	354.31	74	394.55	425.01	74	596.65	606.2	74

CROSS SECTION

RIVER: Alvarado Creek
REACH: Lower Reach RS: 415.466

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	69.96	2.41	69.97	23.36	69.36	31.97	69.29	55.2	68.39
81.79	67.66	111.71	67.22	114.72	67.16	116.54	65.78	125.28	59.23
127.25	57.76	127.59	57.51	129.08	57.5	129.13	57.49	177.09	57.01
179.36	57.14	210.85	58.95	212.04	59.55	216.85	60.79	218.23	61.17
226.72	63.54	247	63.83	262.38	64.05	273.7	64.1	295.93	64.15
320.34	64.36	362.69	64.94	376.62	65.01	405.84	64.78	444.15	64.78
474.4	64.61	501.78	64.23	506.26	64.15	507.99	64.11	510.79	64.25
514.09	64.41	522.63	67.67	526.99	69.34	529.14	69.34	560.37	69.37
578.57	69.39	623	69.66	626.91	69.7	644.4	69.77	650.98	69.79
667.97	69.4	676.04	69.29	708.55	69.7	731.78	69.92	742.21	69.97

```
  749.38   70.22  757.73   70.22  772.23   70.26   788.8   70.14  795.52   70.44

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
       0     .02  111.71    .035  127.59    .035  210.85    .015  226.72    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        116.54  226.72           420.92  415.47  422.02             .1       .3
Ineffective Flow     num=       3
   Sta L   Sta R    Elev  Permanent
  772.23  795.52   70.26       F
  650.98  772.23   69.79       F
  376.62  650.98   65.01       F
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
**********************
       0    7.54      72

*****************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Alvarado Creek
*****************************************************************************************
****************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
n6    *   n7    *   n8    *   n9    *
*****************************************************************************************
****************************************
*Lower Reach     *    3519.101    *      .02*      .02*     .016*     .016*     .016*
.018*     .015*          *          *
*Lower Reach     *    3506.967    *Lat Struct*         *         *         *         *
*         *         *         *
*Lower Reach     *    3381.792    *     .018*     .016*     .016*     .016*     .018*
.015*     .018*          *          *
*Lower Reach     *    3171.448    *     .018*     .016*     .016*     .016*     .018*
.018*      .06*     .018*      .05*
*Lower Reach     *    3140.066    *     .018*     .016*     .016*     .016*     .018*
.02*      .05*           *          *
*Lower Reach     *    3034.592    *     .018*     .016*     .018*     .015*      .05*
.015*          *          *          *
*Lower Reach     *    3029.094    *Lat Struct*         *         *         *         *
*         *         *         *
*Lower Reach     *    2847.761    *      .02*     .035*     .035*     .035*     .035*
.02*          *          *          *
*Lower Reach     *    2677.801    *      .02*     .035*     .035*     .018*     .018*
.03*     .018*           *          *
*Lower Reach     *    2514.866    *      .02*      .02*     .035*     .035*     .035*
.035*      .02*           *          *
*Lower Reach     *    2360.635    *      .03*      .02*     .025*     .025*     .025*
.02*          *          *          *
*Lower Reach     *    2340.973    *      .02*     .025*     .025*         *         *
*         *         *         *
*Lower Reach     *    2332.283    *Lat Struct*         *         *         *         *
*         *         *         *
*Lower Reach     *    2309.739    *      .03*     .035*     .025*     .025*     .025*
.02*          *          *          *
*Lower Reach     *    2266.686    *      .02*     .035*     .035*     .035*     .035*
.035*      .02*           *          *
*Lower Reach     *    2090.444    *      .02*      .03*     .035*     .035*     .035*
.035*     .035*      .05*     .018*
*Lower Reach     *    1904.254    *     .025*     .016*     .025*         *         *
*         *         *         *
*Lower Reach     *    1849.924    *     .018*     .016*     .016*      .02*         *
*         *         *         *
*Lower Reach     *    1742.873    *     .018*      .02*      .06*      .07*      .06*
.02*          *          *          *
*Lower Reach     *    1705.846    *      .02*     .016*     .016*     .016*      .02*
*         *         *         *
*Lower Reach     *    1573.644    *      .02*     .045*     .016*     .016*      .02*
*         *         *         *
*Lower Reach     *    1305.41     *      .02*     .016*     .016*     .016*     .016*
.035*      .02*           *          *
*Lower Reach     *    1230.5      *Culvert  *         *         *         *         *
*         *         *         *
*Lower Reach     *    1155.558    *     .035*     .016*     .016*     .016*     .016*
.016*     .035*      .02*           *
*Lower Reach     *    1149.024    *Lat Struct*         *         *         *         *
*         *         *         *
*Lower Reach     *    1121.496    *Lat Struct*         *         *         *         *
*         *         *         *
*Lower Reach     *    1036.821    *      .02*     .035*     .016*     .016*     .035*
.02*          *          *          *
*Lower Reach     *    819.1344    *      .02*     .035*      .02*         *         *
*         *         *         *
*Lower Reach     *    415.466     *      .02*     .035*     .035*     .015*     .018*
*         *         *         *
*****************************************************************************************
****************************************

*****************************************************************************

SUMMARY OF REACH LENGTHS

River: Alvarado Creek
*************************************************************
*     Reach      *   River Sta.   *  Left   * Channel *  Right  *
*************************************************************
*Lower Reach     *    3519.101    *    137.3*   137.31*   137.44*
*Lower Reach     *    3506.967    *Lat Struct*         *         *
*Lower Reach     *    3381.792    *   209.35*   210.34*    211.8*
*Lower Reach     *    3171.448    *    32.79*    31.38*    28.21*
*Lower Reach     *    3140.066    *   101.61*   105.47*   112.32*
*Lower Reach     *    3034.592    *   187.47*   186.83*   186.24*
*Lower Reach     *    3029.094    *Lat Struct*         *         *
*Lower Reach     *    2847.761    *    165.5*   169.96*    176.8*
*Lower Reach     *    2677.801    *   162.85*   162.93*   162.56*
*Lower Reach     *    2514.866    *   158.36*   154.23*   152.81*
*Lower Reach     *    2360.635    *    19.33*    19.66*    19.62*
*Lower Reach     *    2340.973    *    34.23*    31.23*    27.43*
*Lower Reach     *    2332.283    *Lat Struct*         *         *
*Lower Reach     *    2309.739    *    21.27*    43.05*    56.67*
*Lower Reach     *    2266.686    *    166.7*   176.24*   190.03*
*Lower Reach     *    2090.444    *   183.41*   186.19*   187.45*
*Lower Reach     *    1904.254    *    55.48*    54.33*    52.65*
*Lower Reach     *    1849.924    *   119.68*   107.05*    93.87*
*Lower Reach     *    1742.873    *     35.7*    37.03*     38.3*
*Lower Reach     *    1705.846    *   136.62*    132.2*   123.01*
*Lower Reach     *    1573.644    *   286.27*   268.23*   249.58*
*Lower Reach     *    1305.41     *   148.68*   149.85*   158.44*
*Lower Reach     *    1230.5      *Culvert  *         *         *
*Lower Reach     *    1155.558    *   118.42*   118.74*   122.35*
*Lower Reach     *    1149.024    *Lat Struct*         *         *
*Lower Reach     *    1121.496    *Lat Struct*         *         *
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*Lower Reach	*	1036.821	*	217.42*	217.69*	218.99*
*Lower Reach	*	819.1344	*	431.18*	403.67*	344.14*
*Lower Reach	*	415.466	*	420.92*	415.47*	422.02*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alvarado Creek

Reach	River Sta.	Contr.	Expan.
*Lower Reach	3519.101	.1	.3
*Lower Reach	3506.967	Lat Struct	
*Lower Reach	3381.792	.1	.3
*Lower Reach	3171.448	.1	.3
*Lower Reach	3140.066	.1	.3
*Lower Reach	3034.592	.1	.3
*Lower Reach	3029.094	Lat Struct	
*Lower Reach	2847.761	.1	.3
*Lower Reach	2677.801	.1	.3
*Lower Reach	2514.866	.1	.3
*Lower Reach	2360.635	.1	.3
*Lower Reach	2340.973	.1	.3
*Lower Reach	2332.283	Lat Struct	
*Lower Reach	2309.739	.1	.3
*Lower Reach	2266.686	.1	.3
*Lower Reach	2090.444	.1	.3
*Lower Reach	1904.254	.1	.3
*Lower Reach	1849.924	.1	.3
*Lower Reach	1742.873	.1	.3
*Lower Reach	1705.846	.1	.3
*Lower Reach	1573.644	.1	.3
*Lower Reach	1305.41	.1	.3
*Lower Reach	1230.5	Culvert	
*Lower Reach	1155.558	.1	.3
*Lower Reach	1149.024	Lat Struct	
*Lower Reach	1121.496	Lat Struct	
*Lower Reach	1036.821	.1	.3
*Lower Reach	819.1344	.1	.3
*Lower Reach	415.466	.1	.3

COMPACT DISC CD; DIGITAL FILES AND PDF VERSION OF FULL REPORT