

INDIVIDUAL HYDROLOGIC & HYDRAULIC ASSESSMENT (IHHA) REPORT

Site Name/Facility: Alvarado Channel (Upper Portion)

Master Program Map No.: 64

Date: January 23, 2015

Civil Engineer (name, company, phone number):

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Exp. 06/2015

• **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 Upper Alvarado Channel will increase the capacity of the channel from a 5- to 10-year storm to a 10- to 35-year storm. Erosive velocities directly after maintenance will require placement of a check dam near the downstream limit of maintenance that will decrease channel capacity to a 5- to 10-year storm event until vegetation establishes. After adequate vegetation establishes, the check dam can be removed and the Upper Alvarado Channel capacity will increase from a 5- to 10-year storm, to a 10- to 35- year storm.

As stated previously, the channel reach has very little capacity. This channel is subject to frequent flooding and failures. Per the PEIR, maintenance segments anticipated to generate localized velocity increases following maintenance will include placement of temporary check dams to reduce storm water velocities and aid in the re-establishment of vegetation in the channel to reduce the potential for sediment generation within the site. After proposed maintenance, Reach 2 experiences erosive velocities during a bank full storm event (10-year storm) when sediment and vegetation are removed. The installation of a check dam will reduce the maintained channel capacity from a <35-year storm, to a 5- to 10-year storm as it further reduces the capacity prior to the establishment of new vegetation. The Upper Alvarado Channel does not convey the 100-year storm.

The check dam is not required for all storm events but must be installed when forecasts identify a 50% or greater chance of likely precipitation of 1.3 inches or more during the largest 6-hour precipitation event. The check dam is no longer necessary when vegetation height is equivalent to the north bank elevation with 70% coverage. From that point on the vegetation slows the flow and stabilizes the channel bottom such that sediment will not be transported offsite during a large storm.

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 Upper Alvarado Channel between Alvarado Road and College Avenue. The maintenance proposed in the Upper Alvarado Channel is part of a larger maintenance activity which includes maintenance of a downstream portion of Alvarado Creek. The downstream maintenance area is referred to as "Lower 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 Upper Alvarado Channel is subject to sediment deposition and vegetation establishment. Steep slopes in the entirely concrete channel in Reach 3 carry the sediment downstream until the channel slope flattens, causing velocity to decrease and the sediment to deposit in the downstream most 900 feet of Reach 2. The establishment of vegetation in the deposited material continues the reduction in flow velocities, and in turn encourages more sediment to deposit.

Maintenance will not resolve all of the flooding issues within Upper Alvarado Creek, but will significantly assist in reducing the flood event occurrence frequency by increasing the capacity of the channel and restoring the flowlines back to historic elevations. The hydraulic analyses show that the Upper Alvarado Channel will experience flooding issues within Reach 2 regardless of maintenance activities, causing flows within Reach 2 to leave the channel during these large events.

The Current Vegetated results of this IHHA show that the conveyance capacity of the Upper Alvarado Channel is approximately a 5- to 10-year storm event. The Maintained-Sediment removed condition which removes only sediment in the City of San Diego maintained portion of the channel (Reach 2), results in increased capacity from a 5- to 10-year storm to almost a 35-year storm event.

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

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

For purposes of this assessment, the area of study has been divided into three reaches: Reach 1 (HEC-RAS Cross Sections 611.5112 to 2308.404), Reach 2 (HEC-RAS Cross Sections 2335.331 to 3418.613) and Reach 3 (HEC-RAS Cross Sections 3418.613 to 4559.274). The channel geometry is trapezoidal in shape throughout the area of study.

Reach 1 is the most downstream reach and is maintained by the State of California. Reach 1 is an entirely earthen channel that extends from the downstream limits of the area of study and continues upstream for approximately 1,700 feet. Reach 1 consists of dense vegetation and is bounded by Alvarado Road to the north and a parking lot to the south. Downstream of cross section 1873.917 within Reach 1 there is an existing pedestrian bridge. The downstream limits of Reach 2 begin approximately 400 feet upstream of the existing pedestrian bridge where the maintenance boundary goes from the State of California to the City of San Diego, and extends upstream approximately 1,100 feet. Reach 2 is 30% concrete and consists of a concrete lined north side slope with an earthen bottom and earthen south side slope. Reach 2 is a trapezoidal channel with sedimentation and dense vegetation in the lower portion. It is bound by commercial and medical buildings to the north and a vegetated slope to the south. Reach 3 is the most upstream reach and is approximately 1,200 feet in length. Reach 3 is a fully concrete lined channel relatively free of vegetation and is bounded by residential on the east and west, a commercial and a medical building to the north and a vegetated slope on the south. The channel at the upstream portion of Reach 3 is located immediately adjacent to a hospital.

Reach 1 is maintained by the State of California; at this time the City of San Diego does not have legal rights to work on State of California property to perform maintenance in Reach 1. The City of San Diego currently maintains all portions of Reaches 2 and 3.

Table 1: Referenced As-Built Plans

Plan Number	Reach	Description
Flown Topography	Reach 1	Based on the 1999 City of San Diego 2-foot contour topographic information
13526-D	Reach 2	“Drainage Channel-Alvarado Medical Center” –dated January 24, 1969, As-Built Date illegible
59-11vc12	Reach 3	“Plans for Construction on State Highway in San Diego County, in San Diego Between 0.3 Mile Ease of Fairmont Avenue and 0.5 Mile West of Lake Murray Boulevard” - State of California Department of Public Works Division of Highway, approved September 29, 1958

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	1,000	Extrapolated
5-Year	1,700	Extrapolated
10-Year	2,100	2012 San Diego FIS
35-Year	3,000	Interpolated
50-Year	3,400	2012 San Diego FIS
100-Year	3,900	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 mixed flow regime.

The hydraulic modeling prepared for the Current Vegetated Condition, Ultimate Vegetated Condition, Maintained Condition (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 0.1, reflecting moderate to dense vegetation in the earthen or sediment laden portions.

Table 3: Manning's Roughness Coefficients

Reach	Description (Bottom/Right Bank/Left Bank)	Observed Sediment Depth (ft)	Observed Standing Water	N-Value		
				Bottom	Sides	
					Right Bank	Left Bank
Reach 1 (Downstream)	Earthen/Earthen/ Earthen	NA	NA	0.08-0.10	0.04-0.05	0.04-0.05
Reach 2 (Central)	Earthen/Concrete/ Earthen	0.2-1.7	YES	0.05-0.07	0.016	0.03-0.05
Reach 3 (Upper)	Concrete/ Concrete/Concrete	0	YES	0.016	0.016	0.016

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 of the channel in Reach 2. With this model, maintenance was proposed for the bottom and the sides of the channel. The limits of maintenance, for modeling purposes, begin at cross section 2335.331 and extend approximately 1,100 feet upstream of the beginning limits of maintenance.

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 Reach 2. The limits of maintenance, for modeling purposes, begin at cross section 2335.331 and extend approximately 1,100 feet upstream of the beginning limits of maintenance..

Note: Attach Model Output & Workmap

Maintained Condition - Sediment removed (if applicable):

1. Sediment and Vegetation Removed in Reach 2 Only:

In addition to the vegetation-only maintenance (2 models), a Maintained Condition was also prepared that modeled the removal of sediment and vegetation from the bottom of the channel, that has deposited over the years within Reach 2. Sediment removal in Reach 1 was not included in this model as it is maintained by others. The limits of maintenance, for modeling purposes, begin at cross section 2335.331 and extend approximately 1,100 feet upstream of the beginning limits of maintenance.

Sediment and vegetation was removed from the channel within Reach 2 to the historic channel flow lines included in the As-Built plans listed below. Sediment removal ranged from 0.2' at cross section 3018.677, to 1.7' at the downstream end of the concrete channel at cross section 2435.063. No sediment removal was modeled within Reach 1 in the earthen channel currently maintained by the State of California.

In the hydraulic analysis, the channel bottom was adjusted to reflect the historic flow line based on 1999 City of San Diego 2-foot contour topographic information and as-built information.

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

- 59-11vc12 – “Plans for Construction on State Highway in San Diego County, in San Diego Between 0.3 Mile East of Fairmont Avenue and 0.5 Mile West of Lake Murray Boulevard” - State of California Department of Public Works Division of Highway, approved September 29, 1958
- 13526-D – “Drainage Channel-Alvarado Medical Center” –dated January 24, 1969, As-Built Date illegible

2. Sediment and Vegetation Removed in Reaches 1 and 2:

In addition to the first Maintained Condition above, a Maintained Condition was also prepared that modeled the removal of sediment and vegetation from Reach 2, and a portion of Reach 1 (owned by the State of California), that has deposited over the years. The limits of maintenance, for modeling purposes, begins at cross section 1873.917 and extends approximately 1,500 feet upstream of the beginning limits of maintenance. Sediment removal ranged from 0.2' at cross section 3018.677, to 1.7' at cross section 2435.063. Within Reach 1, the bottom width of the sediment removal varies from 20 to 40 feet and was based on the natural width of the current channel configuration and the slope from the daylight of maintenance activities and the historic flow line of the concrete channel upstream. Sediment removal depths in the earthen channel ranged from 0' at the downstream end where sediment removal daylights with the current flow line at cross section 1873.917, to 1.6' at cross section 2287.614. The removal of sediment, to the historic flow line from the bottom of the channel, will increase the capacity of the channel and thus reduce the potential for flooding.

In the hydraulic analysis, sediment was removed from the channel within Reach 2 to the historic channel flow lines based on 1999 City of San Diego 2-foot contour topographic information and as-built information listed below.

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

- 59-11vc12 – “Plans for Construction on State Highway in San Diego County, in San Diego Between 0.3 Mile East of Fairmont Avenue and 0.5 Mile West of Lake Murray Boulevard” - State of California Department of Public Works Division of Highway, approved September 29, 1958
- 13526-D – “Drainage Channel-Alvarado Medical Center” –dated January 24, 1969, As-Built Date illegible

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	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2''-2.3''
2	1,700 to 2,100	5- to 10-year	1.65''-1.8''
3	3,900	100-year	2.6''

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

Note: Reference Detailed Hydraulic Results for Current Vegetated Condition Model

Ultimate Vegetated Condition:

Table 5: Ultimate Vegetated Condition Capacity

Reach	Capacity Flow Rate	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2''-2.3''
2	<1,000	< 2-year	<1.25''
3	1,000 to 1,700	2- to 5-year	1.25''-1.65''

In the Ultimate Vegetated Condition, areas subject to flooding in the Current Vegetated Condition would continue to flood and new flooding would occur in the downstream portion of Reach 3. Flooding would occur more often with smaller storm events and would result in significantly larger flood depths in all storm flood events.

Note: Reference Detailed Hydraulic Results for Ultimate Vegetated Condition Model

Maintained Condition – Vegetation Only (no sediment removed):

1. Maintained Condition (bank to bank):

This Maintained Condition (Bank to Bank) assumes vegetation-only maintenance of the channel. With this model, maintenance was proposed for the earthen bottom and the side of the channel within Reach 2.

Table 6a: Bank to Bank Maintained Condition Capacity-Vegetation Only (no sediment removed)

Reach	Capacity Flow Rate	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2''-2.3''
2	2,100-3,000	10- to 35-year	1.85''-2.2''
3	3,900	100-year	2.6''

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

This Maintained Condition (bottom of the channel only) assumes vegetation-only maintenance of the channel bottom within Reach 2.

Table 6b: Bottom Only Maintained Condition Capacity - Vegetation Only (no sediment removed)

Reach	Capacity Flow Rate	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2"-2.3"
2	2,100-3,000	10- to 35-year	1.85"-2.2"
3	3,900	100-year	2.6"

Based on the Maintained Condition analysis of a bank to bank vegetation removal versus a bottom only vegetation removal, it was determined that removing vegetation on the side slopes, or from bank to bank, of the earthen channel would not result in a significant decrease in flood events compared to removal of vegetation in the channel bottom only. Although capacity of the channel does not change in channel bank to bank versus bottom only vegetation removal conditions, flood elevations decrease by 0.3' in the bank to bank vegetation removal model condition at the upstream end of Reach 2.

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (No Sediment Removed), Bank to Bank and Bottom Only Vegetation Removal

Maintained Condition - Sediment removed (if applicable):

1. Maintained Condition (Sediment and Vegetation Removal for Reach 2):

It was determined removal of sediment and vegetation in Reach 2 would result in improvements to current flooding. A 30' ramp was created at the downstream end of Reach 2 where sediment removal ends at the State of California maintenance boundary. The ramp minimizes possible backwater effects due to an earthen berm created when sediment removal cannot take place within the earthen channel, beyond the limits of the City of San Diego/State of California maintenance boundary. Based on the As-Built plan profiles for the 30% concrete channel in Reach 2, there was evidence of deposition in the lower portion of Reach

This hydraulic analysis modeled the removal of sediment and vegetation for a length of approximately 1,100 feet.

The following are the results for the vegetation and sediment removal analysis of Reach 2, which includes removal of both accumulated sediment and vegetation in the City of San Diego maintained channel only:

Table 7a: Maintained Condition Capacity – Sediment Removed in Reach 2

Reach	Capacity Flow Rate	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2"-2.3"
2	<3,000	< 35-year	<2.2"
3	3,900	100-year	2.6"

2. Maintained Condition (Sediment and Vegetation Removal for Reaches 1 and 2):

In the event maintenance rights are granted to the City of San Diego by the State of California for maintenance within a portion of Reach 1, sediment and vegetation removal for Reach 1 was added to the first 'Maintained Condition Model (Sediment and Vegetation Removal for Reach 2)' to show how downstream sediment removal within the earthen channel may impact current flooding along the channel banks.

Based on the As-Built plan profiles for the concrete channel, there was evidence of deposition in the lower portion of Reach 2. This hydraulic analysis modeled the removal of sediment and vegetation for a length of approximately 1,000 feet in Reach 2, and an additional 400' of the earthen channel in Reach 1. Sediment removal in the earthen channel varies from 20-40' in bottom width depending on the natural width of the current channel configuration. This approach would significantly increase the capacity of the channel and help reduce the backwater effects of the College Avenue RC arch crossing upstream.

Table 7b: Maintained Condition Capacity – Sediment Removed in Reaches 1 and 2

Reach	Capacity Flow Rate	Equivalent Storm Event	6-Hour Precipitation
	(cfs)		
1	3,000 to 3,400	35- to 50-year	2.2”-2.3”
2	<3,400	< 50-year	<2.3”
3	3,900	100-year	2.6”

See Table 7c for a comparison of Existing, Ultimate Vegetated, and Maintained Condition Capacities.

Table 7c: Comparison of Existing, Ultimate Vegetated, and Maintained Condition Capacities

UPPER ALVARADO CHANNEL													Green =City Property
													Pink =Private Property
EXISTING CHANNEL CAPACITY					CHANNEL CAPACITY AFTER CHANNEL MAINTENANCE IN CITY PROPERTY ONLY						CITY + PRIVATE PROPERTY		
Reach	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) Reach 2 only	Storm Event (Year)	Sediment + Vegetation (cfs) Reach 1 & 2 only	Storm Event (Year)	
1 (STATE OF CA)	3000 to 4000	35 to 50	3000 to 3400	35 to 50	3000 to 3400	35 to 50	3000 to 3400	35 to 50	3000 to 3400	35 to 50	3000 to 3400	35 to 50	
2 (MAP 63)	1700 to 2100	5 to 10	<1000	<2	2100 to 3000	10 to 35	2100 to 3000	10 to 35	1700 to 2100 *	5 to 10 *	<3400	<50	
3 (MAP 63)	3900	100	100 to 1700	2 to 5	3900	100	3900	100	3900	100	3900	100	

* The capacity of the channel increases to <35-year storm (<3,000 cfs) after maintenance takes place. Check dams must be installed to prevent erosive velocities before any future storm of 1,300 cfs or associated 6-hour precipitation of 1.3”. Installation of a check dam reduces the capacity of the channel after maintenance from a <35-year storm, to a 5- to 10-year storm.

Note: Reference Detailed Hydraulic Results for Maintained Condition Model (Sediment and Vegetation Removed-Concrete Only and Sediment and Vegetation Removed-All)

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

Vegetation present within the Upper Alvarado Creek Channel (Map #64) is comprised of patches of freshwater marsh dominated by cattails, disturbed southern willow scrub dominated by willow and fan palm, disturbed wetland composed primarily of fan palm, and open water. The upper portion of the channel (1,200 feet) is fully concrete lined. The north side of the lower portion (1,100 feet) is concrete, but the bottom and south bank are earthen. No sensitive plant or animal species were observed or detected, nor is there potential for sensitive

species to occur within or adjacent to the channel. None of the biological resources within this channel warrant avoidance. No modifications to the proposed maintenance or maintenance protocols are recommended for the Upper Alvarado Creek Channel.

Non-native plant material (e.g. palm trees) occurring within the channel maintenance area, but outside the area where vegetation and sediment is to be removed to increase floodwater conveyance, may be removed during maintenance. Removal should be done in accordance with appropriate eradication procedures, and should minimize disturbance that could promote erosion within the 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 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 based on multiple site visits. If future soils analyses yield a different permissible velocity, the following analyses will be updated.

Per the PEIR, maintenance segments anticipated to generate localized velocity increases following maintenance will include placement of temporary check dams to reduce storm water velocities and aid in the re-establishment of vegetation in the channel to reduce the potential for sediment generation within the site. After proposed maintenance, Reach 2 experiences erosive velocities during a bank full storm event (10-year storm) when sediment and vegetation are removed, and the Manning’s N value decreases. See Table 8 for a comparison of bank full velocities in the current vegetated and proposed maintained conditions.

Table 8: Comparison of Bank Full Velocities

	HEC-RAS Cross Section	Current Vegetated Condition 5-Yr Storm (fps)	Maintained (Sediment Removed) Condition 10-Yr Storm (fps)	Change in Velocity for the Bank Full Event (10-Yr Maintained Cond.- 5-Yr Current Vegetated Cond.) (fps)
Reach 3 100% Concrete Lined	4559.274	10.3	11.4	1.1
	4543.777	Lateral Structure		
	4502.213	8.5	9.6	1.1
	4466.915	8.3	9.3	1
	4439.706	12.2	12.8	0.6
	4275.023	16.9	17.5	0.6
	3913.392	18.9	20.3	1.4
	3758.046	17	19.1	2.1
	3600.906	8.1	19.5	11.4
3418.613	7.2	17	9.8	
Reach 2 2/3 Earthen, 1/3 Concrete Lined North Side Slope	3230.305	4.5	7.3	2.8
	3018.677	6.6	9.1	2.5
	2969.225	6.3	10.2	3.9
	2873.24	6.4	9.4	3
	2695.84	6.7	9.1	2.4

	2529.382	8.9	9.9	1
	2435.063	6.7	7.3	0.6
	2335.331	4.5	3.8	-0.7
Reach 1 Earthen (Maintained by the State of CA)	2317.214	Lateral Structure		
	2308.404	5.6	6.3	0.7
	2287.614	5.7	6.1	0.4
	2084.121	4.9	5.3	0.4
	1873.917	7.5	7.8	0.3
	1798.381	11.5	12.1	0.6
	1641.59	5.5	5.6	0.1
	1489.686	8.2	8.6	0.4
	1439.048	9.6	12.7	3.1
	1288.123	9.1	6.1	-3
	1111.63	4.4	2.3	-2.1
	826.8154	4.9	1.3	-3.6
	676.0353	3.2	1.4	-1.8
	611.5112	12.2	4.1	-8.1

After maintenance and before the onset of a predicted 2.5-year storm (1,300 cfs) yielding a 6- hour precipitation of more than 1.31 in, a 1.5' high check dam will be installed at cross section 2529.382. The proposed check dam will slow velocities in the channel decreasing the velocities to at or below the non-erosive velocities associated with Table 1-104.10A: channel unlined channel (See Table 9 and 10 for results).

Table 9: Non-Erosive Velocities and Associated Flow Rate

	HEC-RAS Cross Section	Non-erosive Velocity for associated Q (fps)	Associated Q (cfs)	Associated 6-hour Precipitation (in)
Reach 3 100% Concrete Lined	4559.274	9.2	1300	1.3
	4543.777			
	4502.213	7.4	1300	1.3
	4466.915	7.3	1300	1.3
	4439.706	11.4	1300	1.3
	4275.023	16.2	1300	1.3
	3913.392	18.2	1300	1.3
	3758.046	16.2	1300	1.3
	3600.906	16.8	1300	1.3
	3418.613	14.1	1300	1.3
Reach 2 2/3 Earthen, 1/3 Concrete Lined North Side Slope	3230.305	6.7	1300	1.3
	3018.677	7.7	1300	1.3
	2969.225	9	1300	1.3
	2873.24	8	1300	1.3
	2695.84	7.6	1300	1.3
	2530			

	2529.382	7.7	1300	1.3
	2528			
	2435.063	6	1300	1.3
	2335.331	3.2	1300	1.3
Reach 1 Earthen (Maintained by the State of CA)	2317.214			
	2308.404	5.3	1300	1.3
	2287.614	5.2	1300	1.3
	2084.121	4.5	1300	1.3
	1873.917	7	1300	1.3
	1798.381	10.8	1300	1.3
	1641.59	5.3	1300	1.3
	1489.686	7.4	1300	1.3
	1439.048	8.4	1300	1.3
	1288.123	8.6	1300	1.3
	1111.63	3.5	1300	1.3
	826.8154	7.1	1300	1.3
	676.0353	3.1	1300	1.3
	611.5112	11.3	1300	1.3

Table 10: Non-Erosive Velocities Due to Check Dam

	HEC-RAS Cross Section	Current Vegetated Condition 5 Yr (FPS)	Maintained Condition 5- Year Storm Event (FPS)	1.5' Check Dam (xs 2529.382)
Reach 3 100% Concrete Lined	4559.274	10.3	10.3	10.3
	4543.777	Lateral Structure		
	4502.213	8.5	8.5	8.5
	4466.915	8.3	8.3	8.3
	4439.706	12.2	12.2	12.2
	4275.023	16.9	16.9	16.9
	3913.392	18.9	19.4	19.4
	3758.046	17	17.8	17.8
	3600.906	8.1	18.3	18.3
	3418.613	7.2	15.7	15.7
Reach 2 2/3 Earthen, 1/3 Concrete Lined North Side Slope	3230.305	4.5	7	7
	3018.677	6.6	8.5	8.3
	2969.225	6.3	9.7	8.6
	2873.24	6.4	8.8	8
	2695.84	6.7	8.4	7.2

	2530	Downstream Silt Fence		7
	2529.382	8.9	8.9	10.8 ¹
	2528	Upstream Silt Fence		16.8 ¹
	2435.063	6.7	6.7	6.7
	2335.331	4.5	3.5	3.5
Reach 1 Earthen (Maintained by the State of CA)	2317.214	Lateral Structure		
	2308.404	5.6	5.9	5.9
	2287.614	5.7	5.7	5.7
	2084.121	4.9	4.9	4.9
	1873.917	7.5	7.5	7.5
	1798.381	11.5	11.5	11.5
	1641.59	5.5	5.5	5.5
	1489.686	8.2	8.2	8.2
	1439.048	9.6	9.6	9.6
	1288.123	9.1	9.1	9.1
	1111.63	4.4	4.4	4.4
	826.8154	4.9	4.9	4.9
	676.0353	3.2	3.2	3.2
611.5112	12.2	12.2	12.2	

1) High velocities at the check dam location do not contribute to erosion

The check dam will remain in place until the vegetation growth reaches a Manning's N values of at least 0.08 in the downstream portion of Reach 2, from cross section 2335.331 through 2529.382 (See Table 11). Moderately dense vegetation with a Manning's N value of 0.06 would consist of sluggish reaches with weedy reaches and deep pools. The installation of a check dam will reduce the maintained channel capacity from a <35-year storm, to a 5- to 10-year storm as it further reduces the capacity prior to the establishment of new vegetation.

Table 11: Non-Erosive Velocities and Associated Manning's N-Values

	HEC-RAS Cross Section	Non-erosive Velocities for 5-Yr Storm Event and Required Manning's N-Values (fps)	Manning's N-Values Required to Produce Non-Erosive Velocities (Bottom of the Channel)
Reach 3 100% Concrete Lined	4559.274	10.3	0.016
	4543.777		0.016
	4502.213	8.5	0.016
	4466.915	8.3	0.016
	4439.706	12.2	0.016
	4275.023	16.9	0.016
	3913.392	19.4	0.016
	3758.046	17.8	0.016
	3600.906	18.3	0.016
	3418.613	15.7	0.016
Concrete Lined	3230.305	7	0.035

	3018.677	8.3	0.035
	2969.225	8.8	0.035
	2873.24	8.1	0.035
	2695.84	7.4	0.035
	2530		
	2529.382	8.1	0.06
	2528		
	2435.063	6.5	0.06
	2335.331	3.2	0.06
Reach 1 Earthen (Maintained by the State of CA)	2317.214		
	2308.404	5.9	.035
	2287.614	5.7	0.10
	2084.121	4.9	0.09
	1873.917	7.5	0.07
	1798.381	11.5	0.07
	1641.59	5.5	0.06
	1489.686	8.2	0.10
	1439.048	9.7	0.10
	1288.123	8.9	0.10
	1111.63	4.6	0.10
	826.8154	4	0.10
	676.0353	3	0.10
611.5112	12.2	0.07	

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 Upper 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:

Existing walls placed sporadically along the north side of the Upper Alvarado Channel provide additional capacity in the channel; however the walls do not span the entire length of the channel. Flow spills out of the channel where walls were not continued along the north bank. While construction of a wall along the entire length of channel will slightly increase the capacity along the entire length of channel, the channel would not have 100-year capacity. Increases water surface elevations associated with wall or berm placement could cause negative impacts to upstream properties.

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 Upper Alvarado Channel is bound by commercial and residential properties and a large 2:1 slope; no space is available to construct a storm drain to divert flows.

Widening the channels to accommodate vegetation:

The Upper Alvarado Channel is bound by commercial and residential properties and a large 2:1 slope; no space is available to widen the channel to accommodate vegetation.

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. The bank to bank vegetation only removal condition yields and increase in capacity from a 5- to 10-year storm capacity to a 10- to 35-year storm capacity. In the sediment and vegetation removal condition, the capacity of the channel increased from a 5- to 10-year storm capacity to a less than 35-year storm capacity. Although both maintenance models yield an almost 35-year storm event, the sediment removal condition yields 236.4 cfs less flow leaving the channel in Reach 2 at cross section 2873.24. While currently limited to maintenance within Reaches 2 and 3 only, it is our recommendation that sediment and vegetation removal take place in Reach 2. Lower flood depths and a decrease in the frequency of flows leaving the channel can be achieved by removing sediment along Reach 2. Capacity of the channel in Reach 2 increases from a 5- to 10- year storm event, to a less than 35- year storm event.

As stated previously, the channel reach has very little capacity. This channel is subject to frequent flooding and failures. Per the PEIR, maintenance segments anticipated to generate localized velocity increases following maintenance will include placement of temporary check dams to reduce storm water velocities and aid in the re-establishment of vegetation in the channel to reduce the potential for sediment generation within the site. After proposed maintenance, Reach 2 experiences erosive velocities during a bank full storm event (10-year storm) when sediment and vegetation are removed. The installation of a check dam will reduce the maintained channel capacity from a <35-year storm, to a 5- to 10-year storm as it further reduces the capacity prior to the establishment of new vegetation. The Upper Alvarado Channel does not convey the 100-year storm.

ADDITIONAL COMMENTS OR RECOMMENDATIONS

It is important to note, there are significant benefits to additional sediment and vegetation removal in Reach 1 when combined with the above recommended maintenance approach including vegetation and sediment removal in Reach 2 only. For the largest decrease in current flood levels, it was determined that sediment and vegetation removal should occur in Reaches 1 and 2, along the channel bottom for a distance of approximately 1,400 feet. The length of sediment and vegetation removal includes approximately 1,100 feet of sediment and vegetation removal within the 30% concrete channel in Reach 2 to restore the channel back to the historic flow line; and, removal of sediment and vegetation for approximately 400' within Reach 1, the earthen channel (not maintained by the City of San Diego). Sediment removal in the earthen channel varies from 20-40' in bottom width depending on the natural width of the current channel configuration. This approach would significantly increase the capacity of the channel. The capacity of the channel would increase from a 5 to 10-year storm to just below a 50-year storm if the additional area within Reach 1 of the earthen channel is maintained. Larger storm events are not affected by maintenance activities in the Upper Alvarado channel. It was determined that the Upper Alvarado Channel hydraulics during larger storm events are influenced and controlled by the capacity of the existing RC arch under College Avenue at the downstream end of Reach 1 (State of California maintained). The associated backwater effect from College Avenue will occur during a 50-year storm and larger within Upper Alvarado Reach 2 regardless of maintenance activities.

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)
- ✓ Detailed Hydraulic Analyses for Permissible Velocity Analyses ('Non-Erosive Velocities and Associated Flow Rates Analysis' and 'Check Dam Analysis' and 'Non-Erosive Velocities and Associated Manning's N Values Analysis')
- ✓ 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.



From South side of Reach 1 at the downstream end of the Alvarado Channel, upstream of College Avenue, looking upstream

2.



From North side of Reach 1 at the crossing of Alvarado Road, looking downstream

3.



From Northeast side of Reach 1, upstream of Alvarado Road near pedestrian crossing, looking slightly downstream

4.



From East side of Reach 1, halfway between pedestrian crossing and the State of California maintenance boundary, looking downstream

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

5.



From East side of Reach 2, directly upstream of State of California maintenance boundary, looking downstream

6.



From East side of Reach 2, directly upstream of picture 5, looking upstream

7.



From North side of Reach 2, looking downstream

8.



From North side of Reach 2, Directly upstream of picture 7, looking upstream

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

9.



From North side of channel in Reach 2, looking upstream

10.



From North side of channel in Reach 2, looking upstream

11.



From North side of channel in Reach 2, looking upstream

12.



From North side of channel, at start of Reach 3, where channel becomes 100% concrete, looking downstream

SITE PHOTOS:

Date of Site Visit: August 6, 2014

See Hydraulic Workmap for picture locations and orientation.

13.



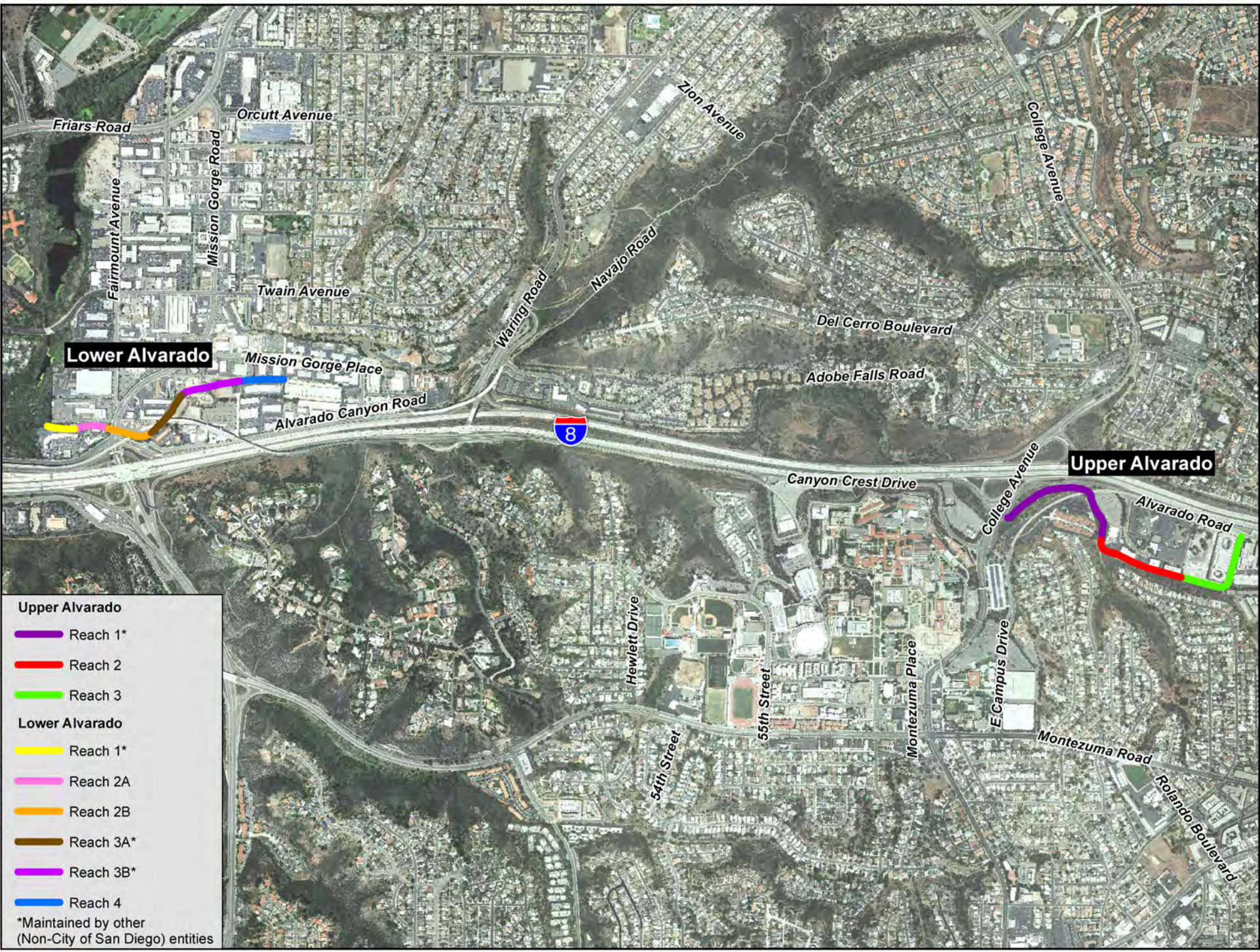
From North side of the channel in Reach 3 within 100% concrete portion of channel at 90 degree bend, looking downstream

14.



From North side of the channel in Reach 3 within 100% concrete portion of channel at 90 degree bend, looking upstream

E:\PROJECTS\SDD\2407 Alvarado - Tripp - Beaver\Map\Misc\UHA - Figure.mxd SDD-24.16 04/6/15 -CL



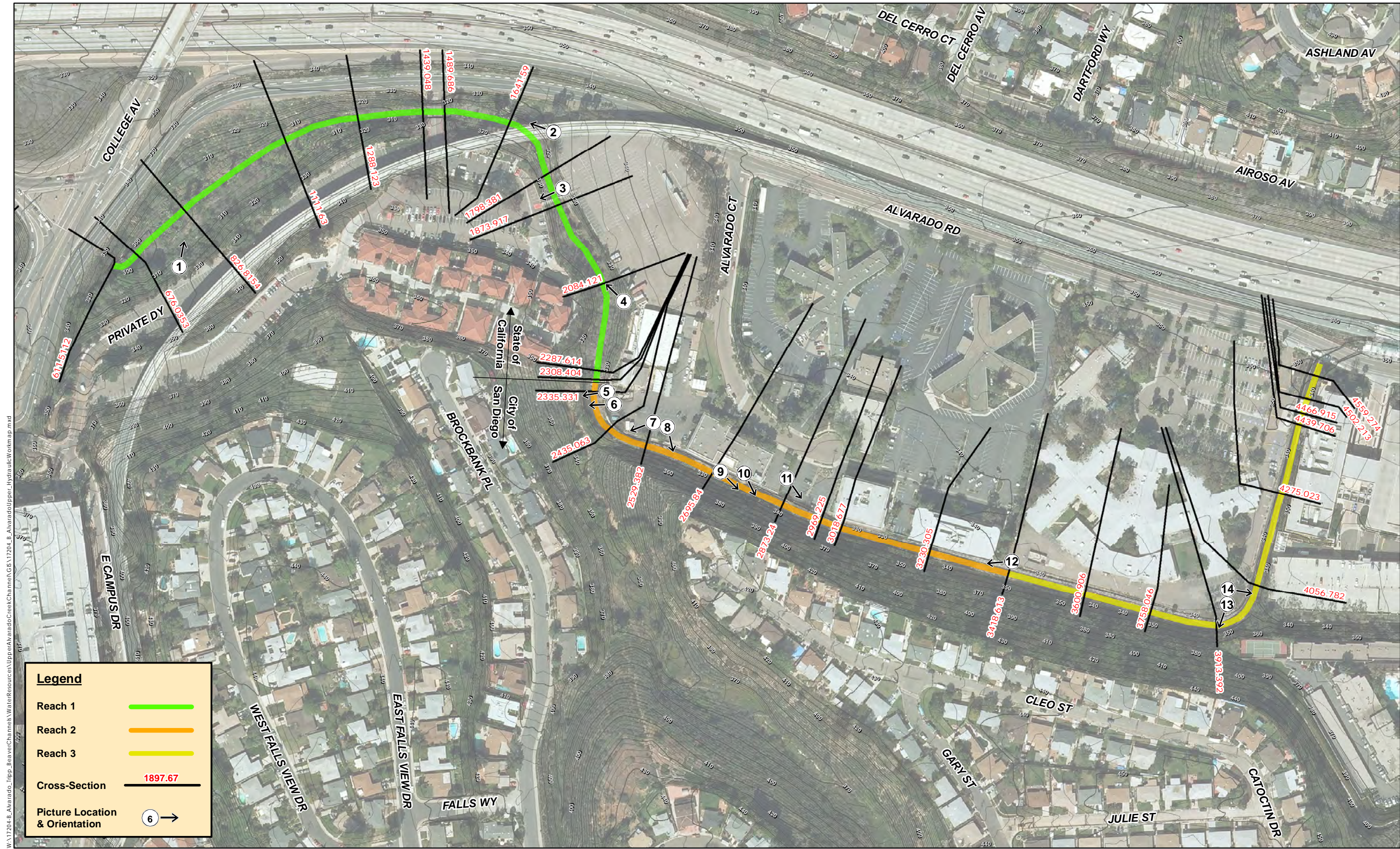
Upper Alvarado

- Reach 1*
- Reach 2
- Reach 3

Lower Alvarado

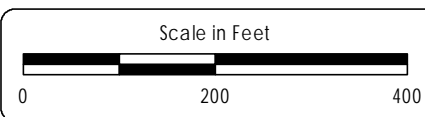
- Reach 1*
- Reach 2A
- Reach 2B
- Reach 3A*
- Reach 3B*
- Reach 4

*Maintained by other (Non-City of San Diego) entities



W:\17204-B Alvarado_Trip_BeaverChannels\WaterResources\UpperAlvaradoCreekChannels\GCS17204_B AlvaradoUpper_HydraulicWorkmap.mxd

Legend	
Reach 1	█
Reach 2	█
Reach 3	█
Cross-Section	1897.67
Picture Location & Orientation	6 →



Date of Exhibit: 09.15.2014
DigitalGlobe Aerial Image: 04.2013

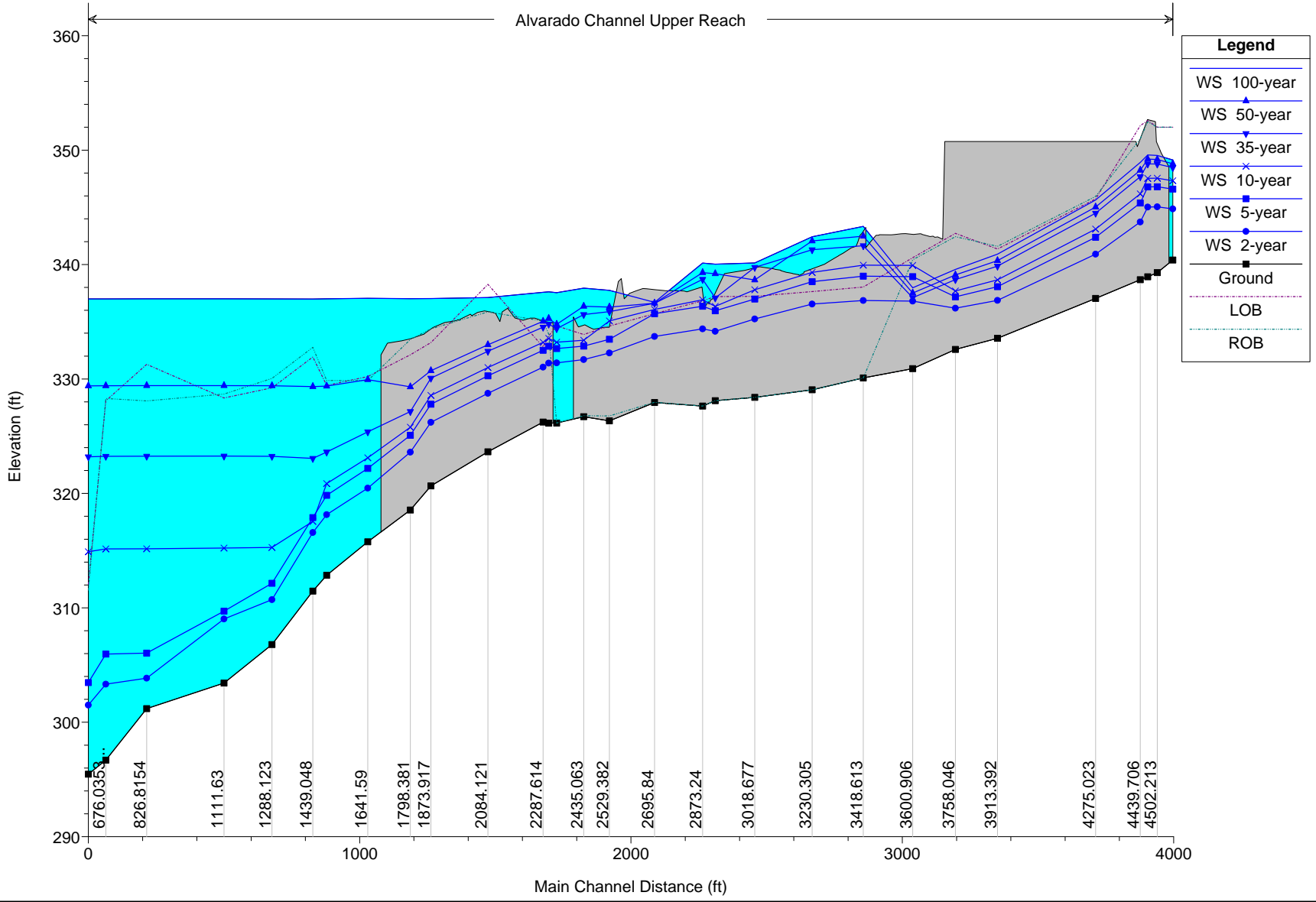
Upper Alvarado Creek Channel

Map Number 64 - Hydraulic Workmap

HYDRAULIC PROFILE FOR CURRENT VEGETATED CONDITION MODEL

Alvarado_Upper Plan: Current Vegetated 1/19/2015
 Geom: Current_Vegetated_Condition Flow: Current_Vegetated

Alvarado Channel Upper Reach

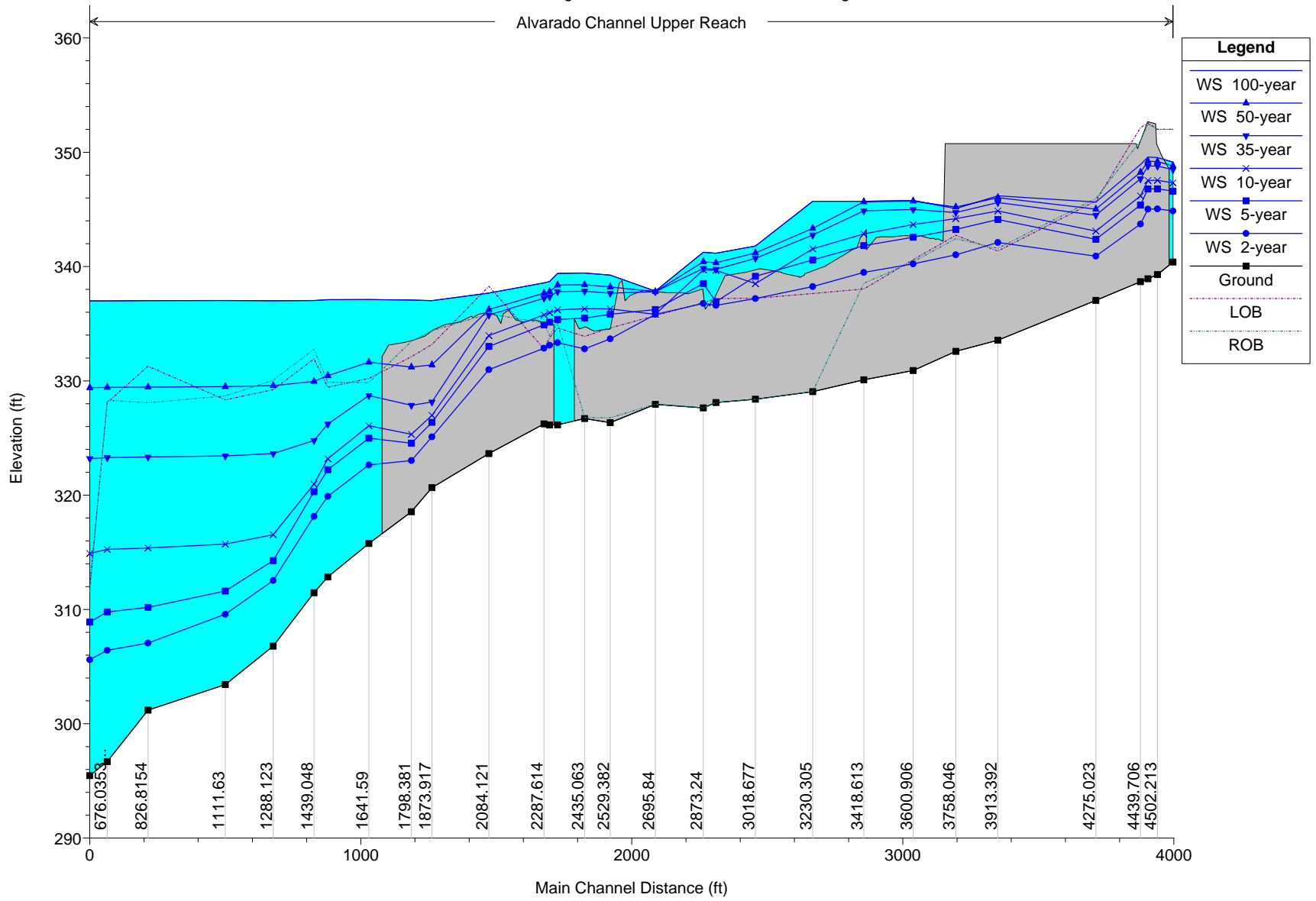


HYDRAULIC PROFILE FOR ULTIMATE VEGETATED CONDITION MODEL

Alvarado_Upper Plan: Ultimate Vegetated 1/19/2015

Geom: Ultimate_Vegetated_Condition Flow: Current_Vegetated

Alvarado Channel Upper Reach



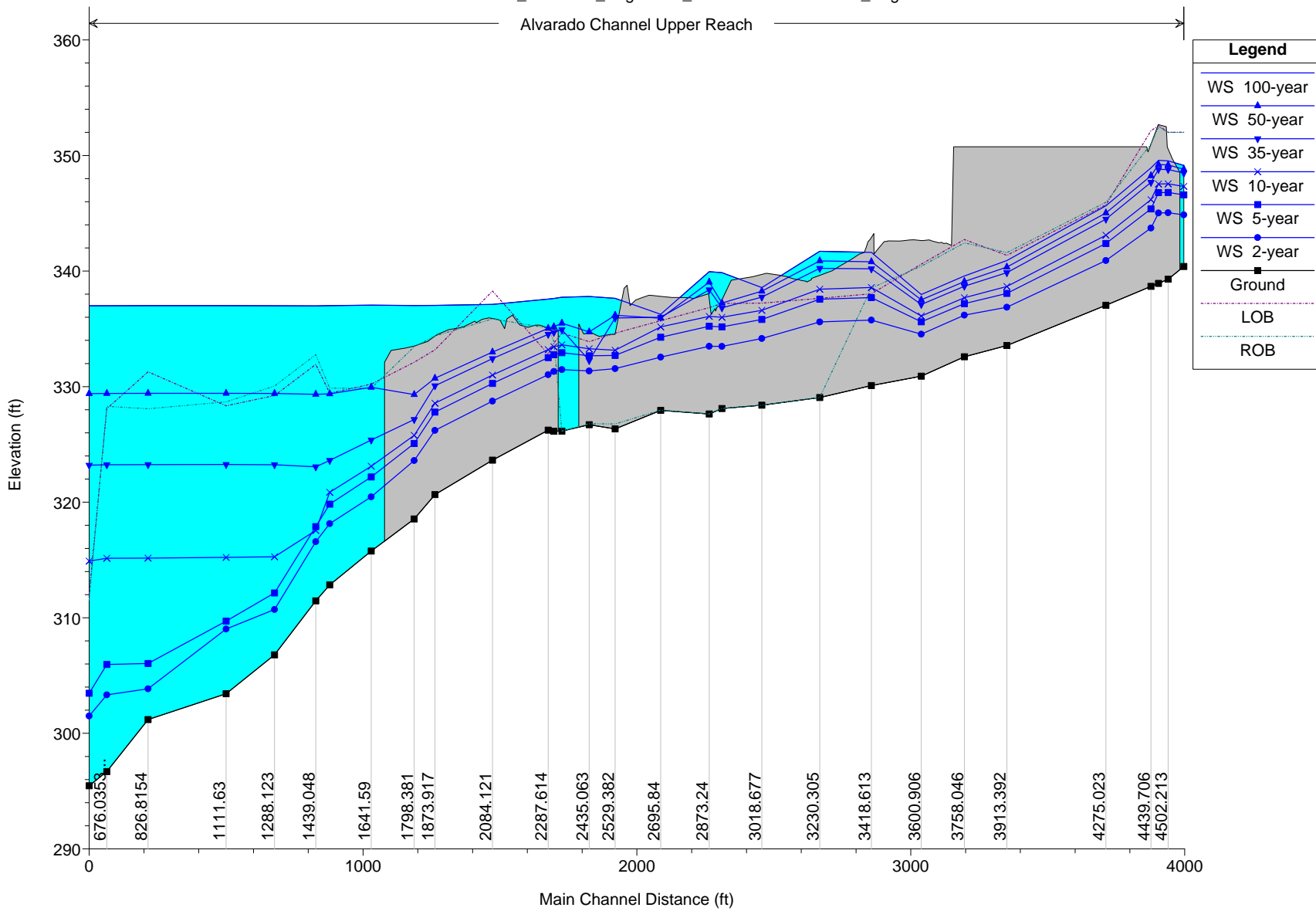
HYDRAULIC PROFILE FOR
MAINTAINED CONDITION MODEL (NO SEDIMENT REMOVED)

1. Maintained Condition (Bank to Bank)
2. Maintained Condition (Bottom Only)

Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bottom-Only 11/13/2014

Geom: Maintained_Condition_Veg-Rmvd_Bottom Flow: Current_Vegetated

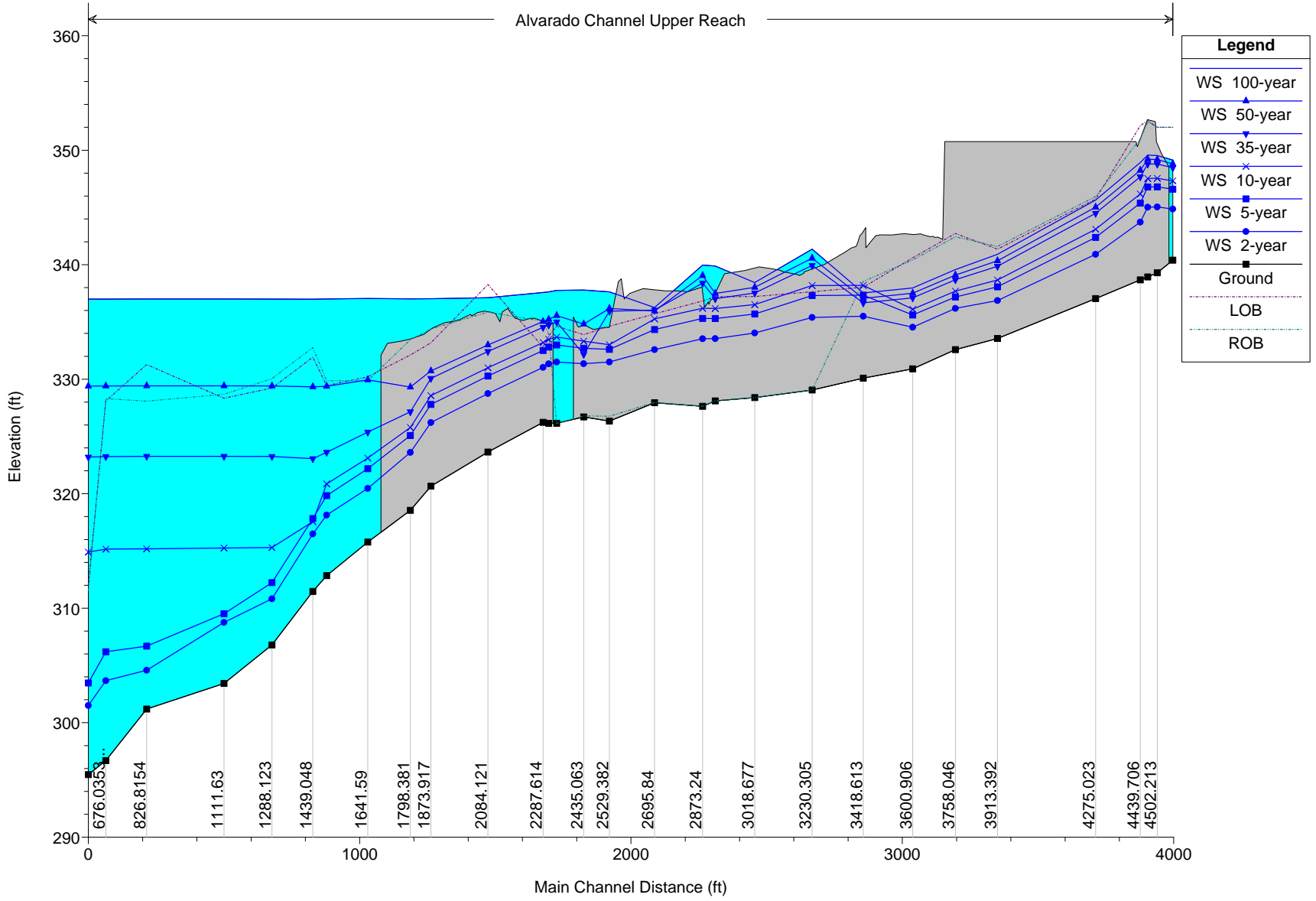
Alvarado Channel Upper Reach



Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bank2Bank 11/13/2014

Geom: Maintained_Condition_Veg-Rmvd-bank2bank Flow: Current_Vegetated

Alvarado Channel Upper Reach



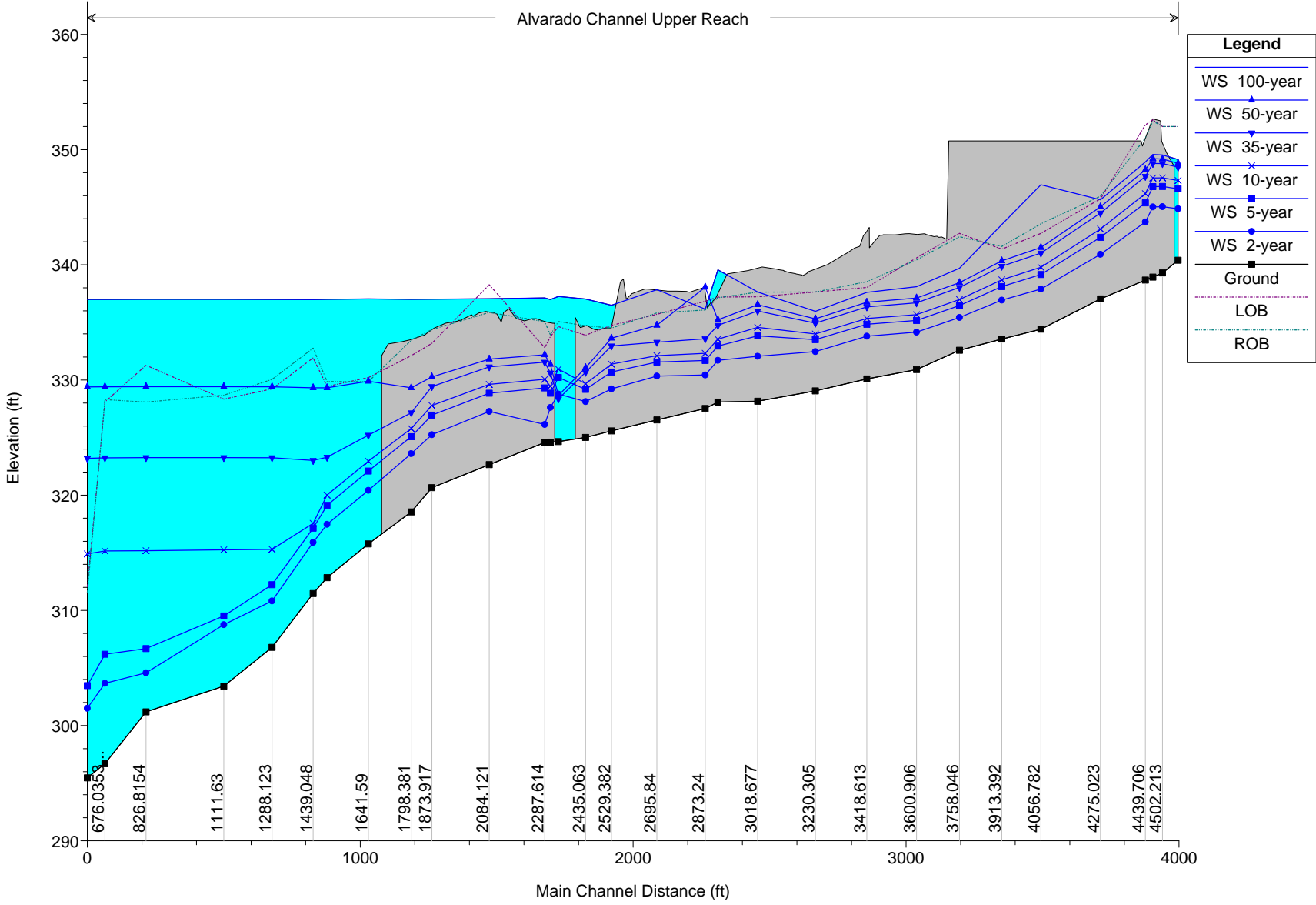
HYDRAULIC PROFILE FOR
MAINTAINED CONDITION MODEL (SEDIMENT REMOVED)

1. Sediment and Vegetation Removed in Reach 2 Only
2. Sediment and Vegetation Removed in Reaches 1 and 2

Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014

Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated

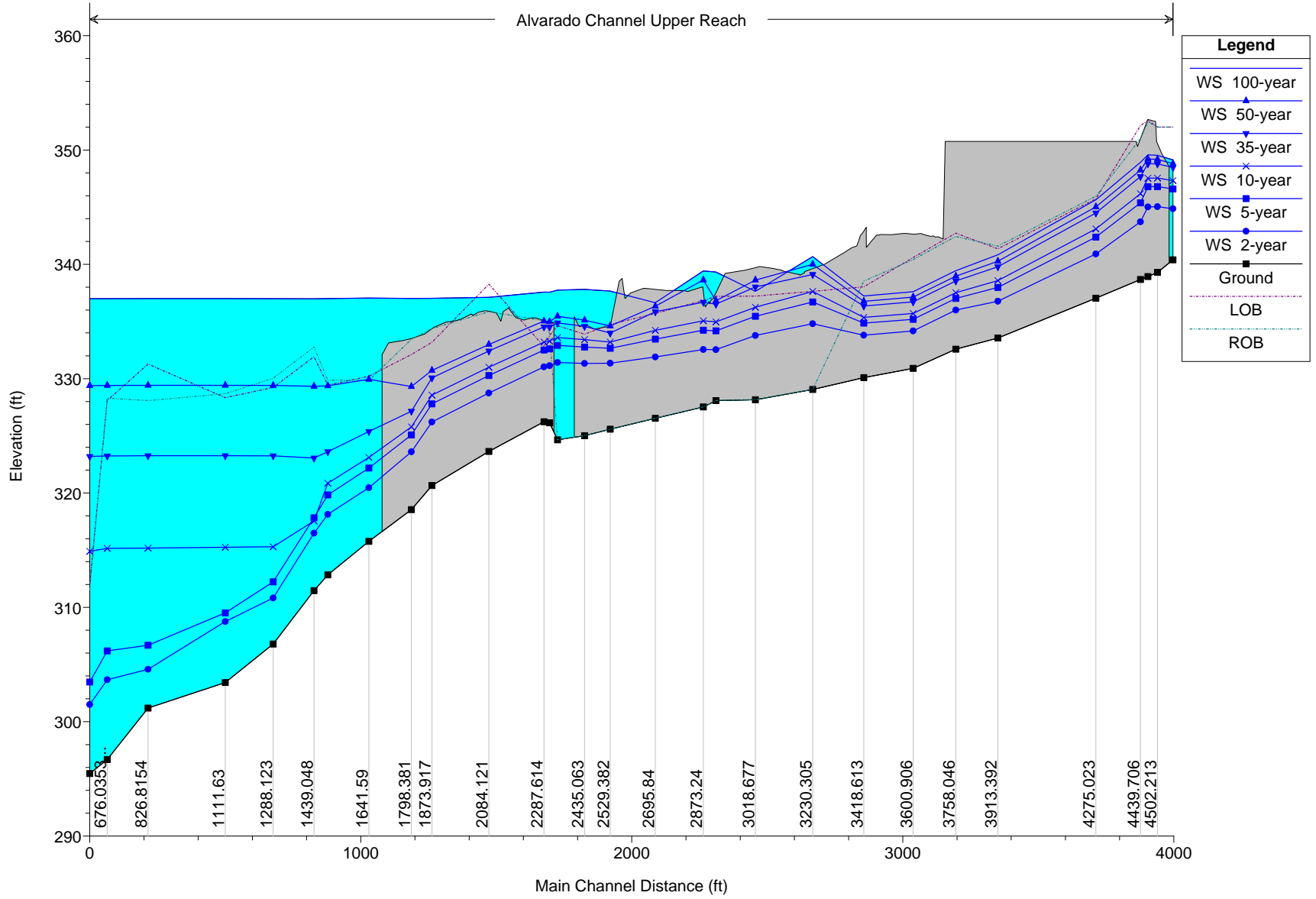
Alvarado Channel Upper Reach



Alvarado_Upper Plan: Maintained_Sed_Removed_Conc-only 12/5/2014

Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Current_Vegetated

Alvarado Channel Upper Reach



DETAILED HYDRAULIC RESULTS FOR
CURRENT VEGETATED CONDITION MODEL

HEC-RAS Plan: Current Vegetate River: Alvarado Channel Reach: Upper Reach

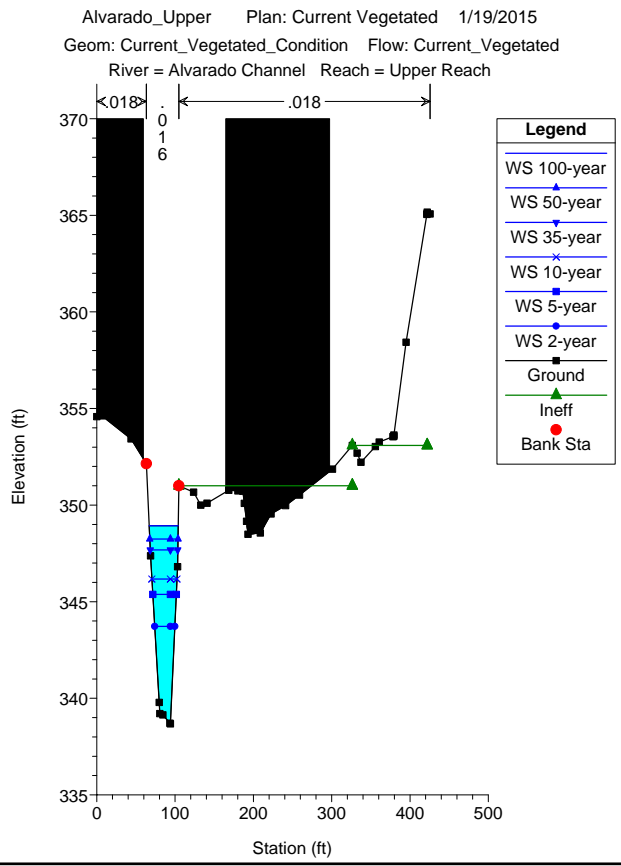
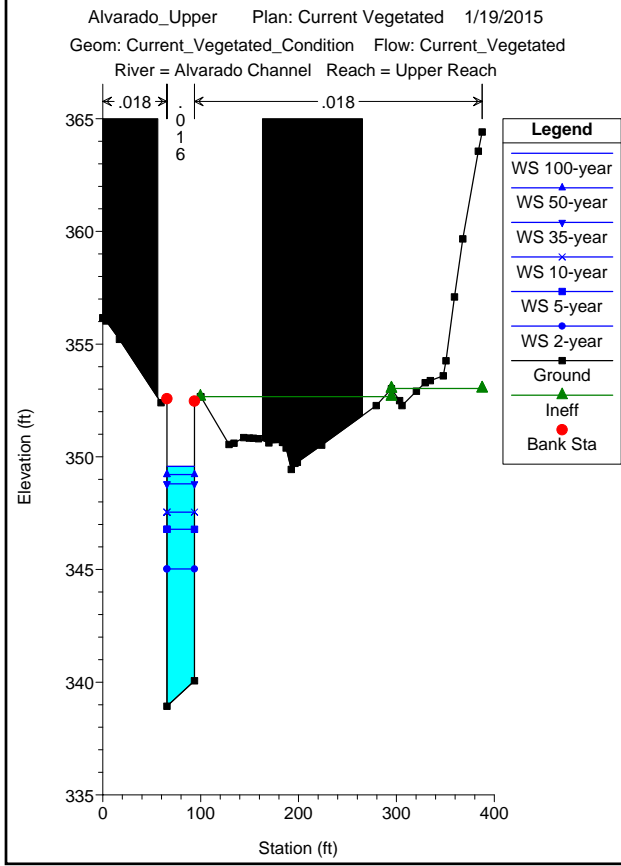
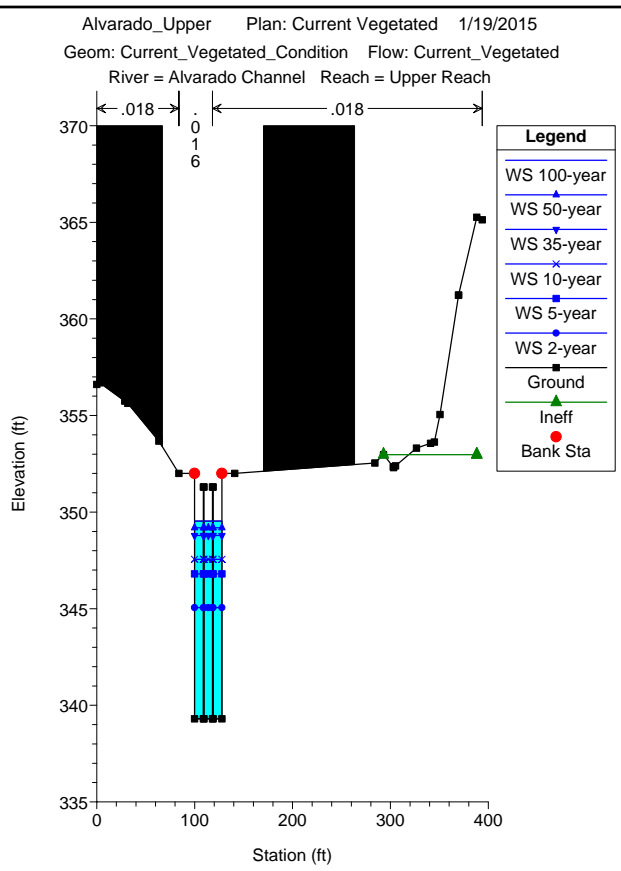
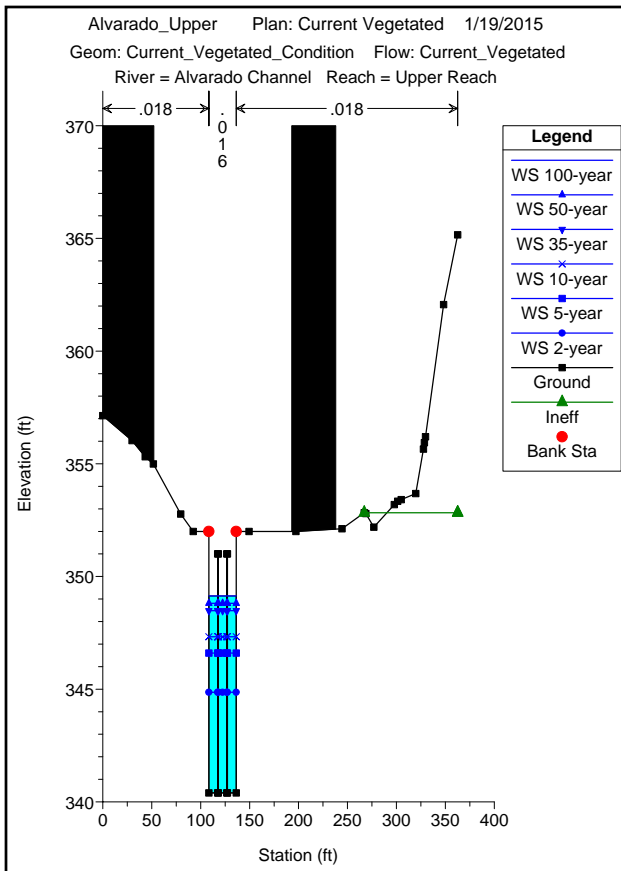
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70
Upper Reach	4543.777		Lat Struct									
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59
Upper Reach	3913.392	100-year	3900.00	333.56	346.19	344.31	347.69	0.008024	6.80	469.75	78.59	0.37
Upper Reach	3913.392	50-year	3400.00	333.56	346.03	342.70	347.19	0.006804	6.20	456.89	78.37	0.34
Upper Reach	3913.392	35-year	3000.00	333.56	345.61	342.28	346.58	0.007108	6.16	424.00	77.81	0.35
Upper Reach	3913.392	10-year	2100.00	333.56	344.86	340.62	345.41	0.006098	5.41	366.49	76.82	0.32
Upper Reach	3913.392	5-year	1700.00	333.56	344.12	339.84	344.59	0.007194	5.55	309.57	75.83	0.34
Upper Reach	3913.392	2-year	1000.00	333.56	342.10	338.18	342.44	0.007429	4.68	214.12	38.70	0.33
Upper Reach	3758.046	100-year	3900.00	332.58	345.07		346.52	0.007008	6.53	497.14	82.24	0.39
Upper Reach	3758.046	50-year	3400.00	332.58	345.20		346.29	0.004884	5.51	508.26	82.43	0.33
Upper Reach	3758.046	35-year	3000.00	332.58	344.72		345.62	0.005218	5.49	468.81	81.74	0.33
Upper Reach	3758.046	10-year	2100.00	332.58	344.19		344.66	0.003744	4.45	425.26	80.98	0.28
Upper Reach	3758.046	5-year	1700.00	332.58	343.26		343.63	0.005080	4.76	350.39	79.65	0.32
Upper Reach	3758.046	2-year	1000.00	332.58	341.03		341.33	0.006731	4.40	227.38	38.00	0.32
Upper Reach	3600.906	100-year	3900.00	330.91	345.79	340.46	345.92	0.000522	2.03	1397.86	421.01	0.10
Upper Reach	3600.906	50-year	3400.00	330.91	345.73	339.80	345.83	0.000423	1.82	1373.52	420.92	0.09
Upper Reach	3600.906	35-year	3000.00	330.91	344.99	339.24	345.12	0.000830	2.45	1064.92	419.78	0.13
Upper Reach	3600.906	10-year	2100.00	330.91	343.67	337.78	344.02	0.003818	4.82	443.65	364.14	0.27
Upper Reach	3600.906	5-year	1700.00	330.91	342.57	337.05	342.90	0.004126	4.62	368.73	52.84	0.28
Upper Reach	3600.906	2-year	1000.00	330.91	340.24	335.49	340.47	0.004343	3.84	260.26	40.96	0.27
Upper Reach	3418.613	100-year	3900.00	330.09	345.71	339.41	345.84	0.000376	1.73	1502.90	409.64	0.08
Upper Reach	3418.613	50-year	3400.00	330.09	345.67	338.72	345.77	0.000298	1.54	1485.28	409.58	0.07
Upper Reach	3418.613	35-year	3000.00	330.09	344.88	338.18	344.99	0.000569	2.04	1161.47	408.51	0.10
Upper Reach	3418.613	10-year	2100.00	330.09	342.85	336.71	343.33	0.003704	4.63	431.63	139.46	0.25
Upper Reach	3418.613	5-year	1700.00	330.09	341.83	335.97	342.17	0.003876	4.42	378.61	73.63	0.25
Upper Reach	3418.613	2-year	1000.00	330.09	339.49	334.42	339.71	0.004018	3.73	269.38	40.58	0.25
Upper Reach	3230.305	100-year	3900.00	329.06	345.71	341.67	345.79	0.000082	0.69	1994.08	284.87	0.03
Upper Reach	3230.305	50-year	3400.00	329.06	343.33	340.91	345.43	0.002517	3.38	559.45	281.03	0.17
Upper Reach	3230.305	35-year	3000.00	329.06	342.76	340.29	344.62	0.002387	3.19	526.41	280.11	0.17
Upper Reach	3230.305	10-year	2100.00	329.06	341.55	338.12	342.76	0.001850	2.61	457.89	232.33	0.14
Upper Reach	3230.305	5-year	1700.00	329.06	340.57	337.64	341.60	0.001838	2.43	404.50	194.96	0.14
Upper Reach	3230.305	2-year	1000.00	329.06	338.25	335.69	339.09	0.002157	2.18	281.59	76.83	0.14
Upper Reach	3018.677	100-year	3900.00	328.39	341.80	341.80	345.38	0.006871	5.16	445.63	183.70	0.27
Upper Reach	3018.677	50-year	3400.00	328.39	341.19	341.19	344.44	0.006858	4.97	411.04	176.99	0.27
Upper Reach	3018.677	35-year	3000.00	328.39	340.71	340.71	343.67	0.006674	4.75	384.60	158.01	0.26
Upper Reach	3018.677	10-year	2100.00	328.39	338.51	338.51	341.75	0.009878	4.91	275.31	119.67	0.31
Upper Reach	3018.677	5-year	1700.00	328.39	339.15	337.82	340.91	0.004582	3.52	303.28	127.40	0.21
Upper Reach	3018.677	2-year	1000.00	328.39	337.20	335.35	338.37	0.004791	3.03	221.71	85.67	0.21
Upper Reach	2969.225	100-year	3900.00	328.10	341.17	339.15	341.36	0.000263	0.93	1325.79	214.81	0.05
Upper Reach	2969.225	50-year	3400.00	328.10	340.33	339.15	340.53	0.000339	1.01	1146.62	213.85	0.05

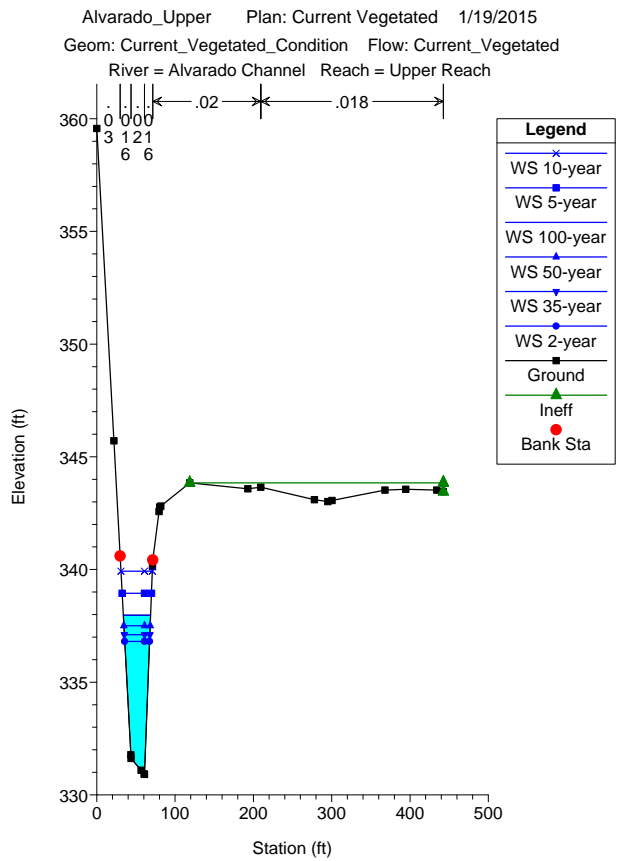
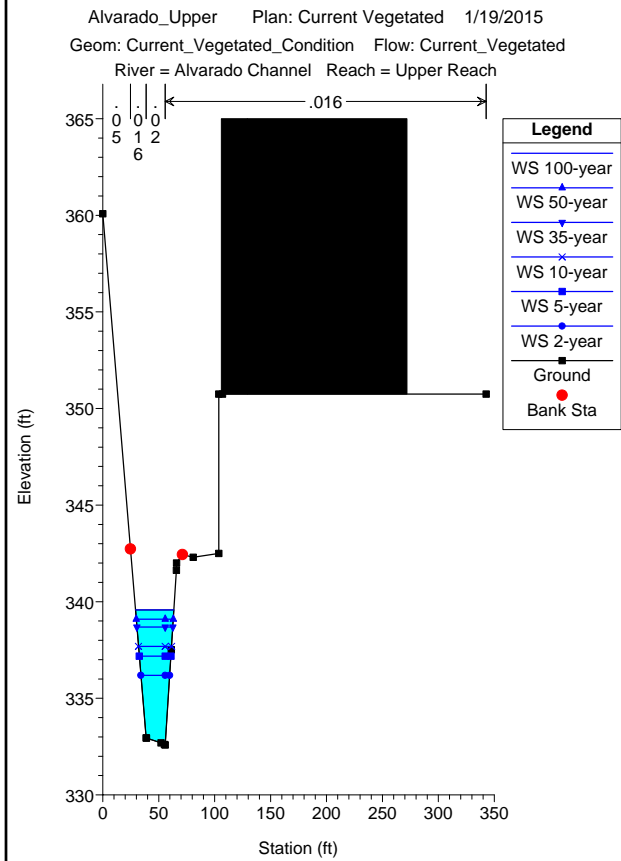
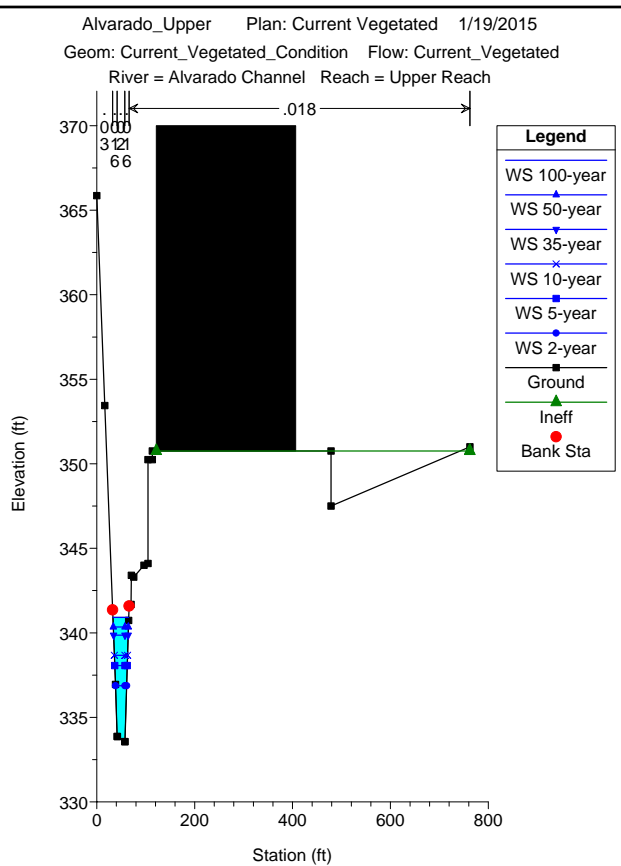
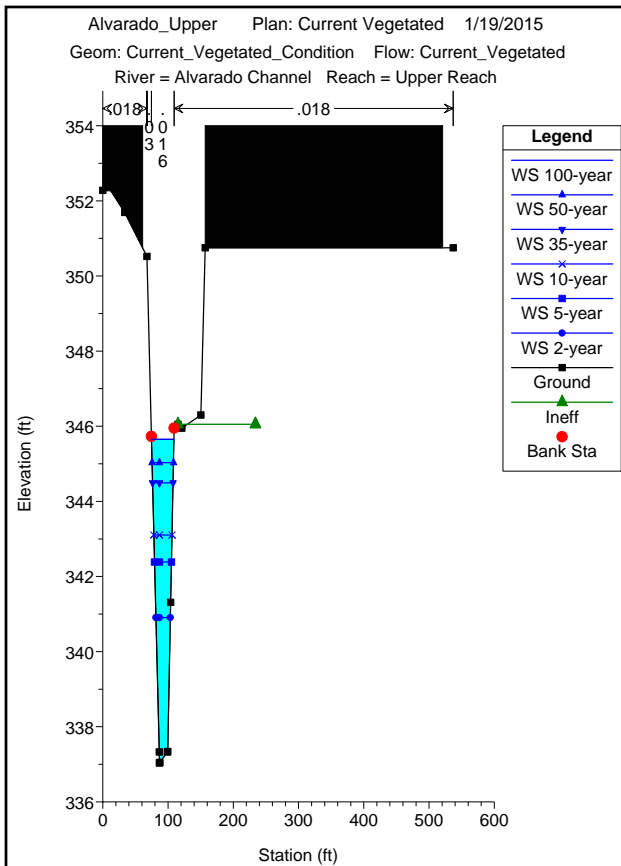
HEC-RAS Plan: Current Vegetate River: Alvarado Channel Reach: Upper Reach (Continued)

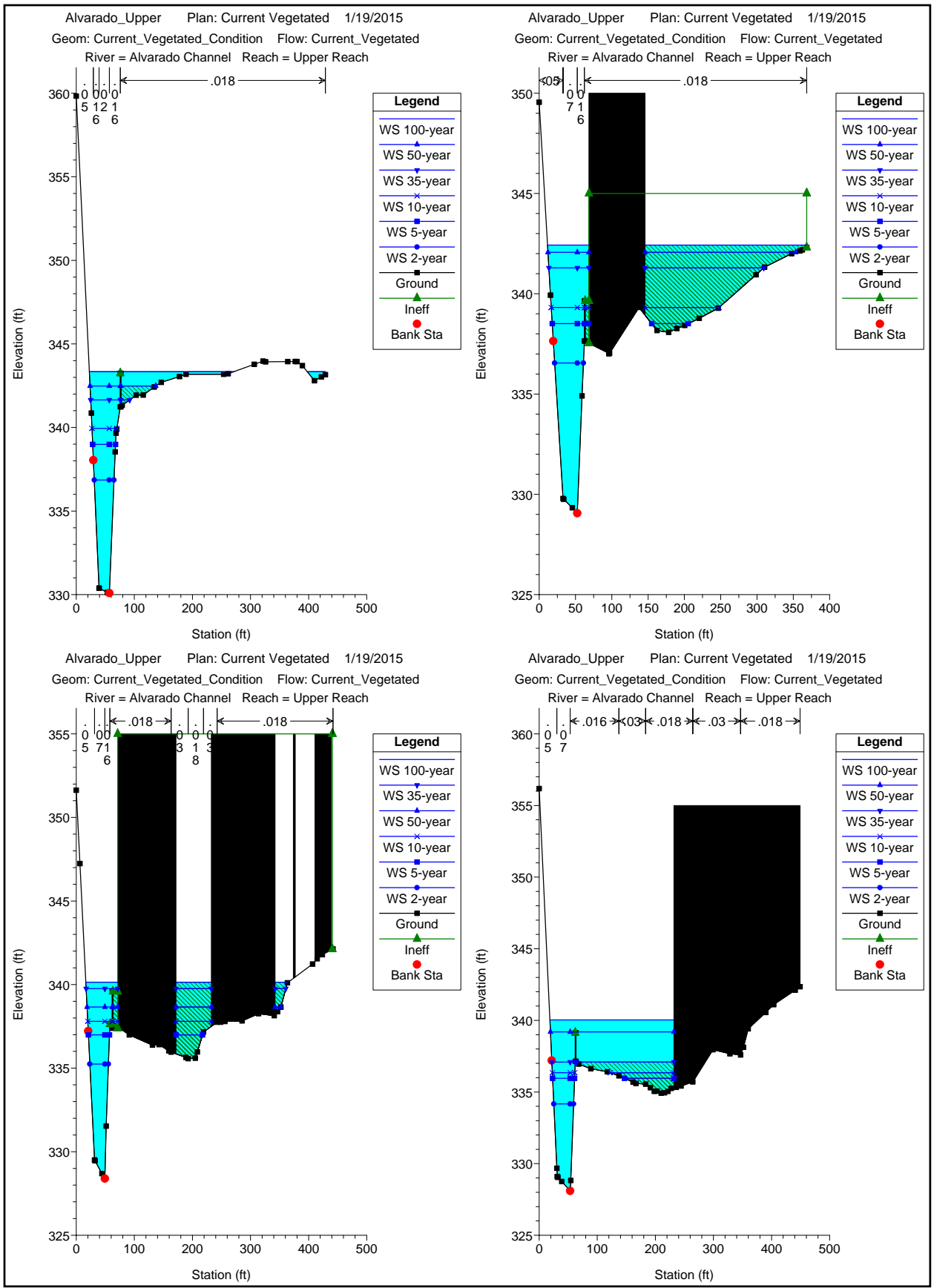
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.10	339.76	339.14	339.96	0.000400	1.05	1024.39	213.19	0.06
Upper Reach	2969.225	10-year	2100.00	328.10	339.67	337.87	339.77	0.000210	0.76	1005.70	213.09	0.04
Upper Reach	2969.225	5-year	1700.00	328.10	336.93	336.93	339.88	0.009921	4.18	259.67	202.41	0.28
Upper Reach	2969.225	2-year	1000.00	328.10	336.60	334.79	337.74	0.004077	2.61	246.71	178.27	0.18
Upper Reach	2873.24	100-year	3900.00	327.64	341.25	338.01	341.32	0.000090	0.59	2127.79	394.09	0.03
Upper Reach	2873.24	50-year	3400.00	327.64	340.42	338.01	340.49	0.000114	0.64	1808.78	368.17	0.03
Upper Reach	2873.24	35-year	3000.00	327.64	339.84	337.37	339.91	0.000132	0.66	1601.79	349.98	0.04
Upper Reach	2873.24	10-year	2100.00	327.64	339.71	336.08	339.75	0.000071	0.48	1557.24	345.79	0.03
Upper Reach	2873.24	5-year	1700.00	327.64	338.52	335.16	338.56	0.000123	0.58	1161.91	321.67	0.03
Upper Reach	2873.24	2-year	1000.00	327.64	337.77	333.13	337.43	0.003962	2.87	272.59	292.87	0.19
Upper Reach	2695.84	100-year	3900.00	327.95	337.85	337.81	340.96	0.016441	6.49	399.94	216.25	0.38
Upper Reach	2695.84	50-year	3400.00	327.95	337.80	337.80	340.19	0.012993	5.75	396.27	215.83	0.34
Upper Reach	2695.84	35-year	3000.00	327.95	337.80	337.80	339.66	0.010116	5.07	396.27	215.83	0.30
Upper Reach	2695.84	10-year	2100.00	327.95	335.82	335.82	339.36	0.024149	6.61	247.96	184.59	0.45
Upper Reach	2695.84	5-year	1700.00	327.95	336.24	335.10	338.30	0.012642	4.98	264.41	200.61	0.33
Upper Reach	2695.84	2-year	1000.00	327.95	335.82	332.96	336.62	0.005497	3.15	247.69	184.24	0.21
Upper Reach	2529.382	100-year	3900.00	326.34	339.25	336.74	339.77	0.000729	1.67	872.04	271.96	0.09
Upper Reach	2529.382	50-year	3400.00	326.34	338.22	336.40	338.82	0.001203	2.02	712.19	236.84	0.11
Upper Reach	2529.382	35-year	3000.00	326.34	337.67	336.15	338.28	0.001531	2.20	627.81	206.36	0.12
Upper Reach	2529.382	10-year	2100.00	326.34	336.30	335.00	336.94	0.003756	3.11	416.89	152.36	0.19
Upper Reach	2529.382	5-year	1700.00	326.34	335.82	335.00	336.42	0.004973	3.45	344.90	151.84	0.21
Upper Reach	2529.382	2-year	1000.00	326.34	333.68	332.74	335.32	0.007664	3.50	193.28	35.08	0.25
Upper Reach	2435.063	100-year	3900.00	326.71	339.43	336.13	339.65	0.000621	1.20	1368.15	348.09	0.06
Upper Reach	2435.063	50-year	3400.00	326.71	338.41	336.00	338.67	0.001019	1.45	1075.82	281.15	0.08
Upper Reach	2435.063	35-year	3000.00	326.71	337.85	335.86	338.11	0.001298	1.57	944.52	232.24	0.09
Upper Reach	2435.063	10-year	2100.00	326.71	336.31	335.59	336.62	0.003655	2.34	591.93	228.24	0.15
Upper Reach	2435.063	5-year	1700.00	326.71	335.49	335.47	335.99	0.007367	3.09	410.58	203.31	0.20
Upper Reach	2435.063	2-year	1000.00	326.71	332.79	331.97	334.52	0.016367	3.55	214.95	46.75	0.29
Upper Reach	2335.331	100-year	3900.00	326.15	339.40	332.44	339.59	0.001353	2.91	1253.75	242.33	0.17
Upper Reach	2335.331	50-year	3400.00	326.15	338.38	331.99	338.56	0.001745	3.07	1067.13	193.92	0.18
Upper Reach	2335.331	35-year	3000.00	326.15	337.81	331.63	337.98	0.001880	3.05	965.11	178.02	0.19
Upper Reach	2335.331	10-year	2100.00	326.15	336.20	330.72	336.35	0.002533	3.05	695.48	152.06	0.21
Upper Reach	2335.331	5-year	1700.00	326.15	335.38	330.16	335.51	0.002925	2.99	575.94	138.41	0.22
Upper Reach	2335.331	2-year	1000.00	326.15	333.35	329.03	333.45	0.003506	2.60	384.93	72.64	0.20
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	338.69	332.86	339.46	0.007769	3.78	962.26	171.42	0.20
Upper Reach	2308.404	50-year	3400.00	326.14	337.81	332.34	338.43	0.009382	3.92	839.07	137.79	0.22
Upper Reach	2308.404	35-year	3000.00	326.14	337.37	331.93	337.85	0.009425	3.81	778.22	136.13	0.22
Upper Reach	2308.404	10-year	2100.00	326.14	335.97	330.87	336.21	0.011309	3.74	592.13	130.94	0.23
Upper Reach	2308.404	5-year	1700.00	326.14	335.14	330.35	335.35	0.012911	3.71	484.56	127.24	0.25
Upper Reach	2308.404	2-year	1000.00	326.14	333.12	329.27	333.27	0.013427	3.12	320.92	60.86	0.24
Upper Reach	2287.614	100-year	3900.00	326.23	338.57	332.75	339.35	0.005710	3.42	1047.07	188.09	0.19
Upper Reach	2287.614	50-year	3400.00	326.23	337.68	332.28	338.27	0.007212	3.62	904.93	156.68	0.21
Upper Reach	2287.614	35-year	3000.00	326.23	337.23	331.88	337.69	0.007387	3.55	837.05	153.27	0.21
Upper Reach	2287.614	10-year	2100.00	326.23	335.78	330.87	335.99	0.009811	3.63	624.64	140.86	0.23
Upper Reach	2287.614	5-year	1700.00	326.23	334.90	330.34	335.09	0.011124	3.56	511.09	110.43	0.25
Upper Reach	2287.614	2-year	1000.00	326.23	332.85	329.27	333.00	0.012585	3.12	320.24	67.00	0.25
Upper Reach	2084.121	100-year	3900.00	323.64	337.68		337.93	0.007193	3.72	1017.00	144.92	0.21
Upper Reach	2084.121	50-year	3400.00	323.64	336.24		336.49	0.009985	4.07	836.66	101.97	0.24
Upper Reach	2084.121	35-year	3000.00	323.64	335.75		335.98	0.009176	3.80	790.12	93.38	0.23
Upper Reach	2084.121	10-year	2100.00	323.64	333.96		334.13	0.008483	3.34	629.45	85.51	0.22
Upper Reach	2084.121	5-year	1700.00	323.64	333.01		333.16	0.008106	3.09	550.49	81.37	0.21
Upper Reach	2084.121	2-year	1000.00	323.64	330.98		331.08	0.007263	2.54	394.00	72.46	0.19
Upper Reach	1873.917	100-year	3900.00	320.65	337.01		337.32	0.001533	1.88	1288.07	268.11	0.10
Upper Reach	1873.917	50-year	3400.00	320.65	331.40		332.31	0.004649	7.65	444.36	69.24	0.53
Upper Reach	1873.917	35-year	3000.00	320.65	328.15	328.15	330.47	0.215317	12.21	245.63	53.23	1.00
Upper Reach	1873.917	10-year	2100.00	320.65	326.98	326.98	328.95	0.226002	11.26	186.54	47.45	1.00
Upper Reach	1873.917	5-year	1700.00	320.65	326.37	326.37	328.15	0.233152	10.72	158.60	44.50	1.00
Upper Reach	1873.917	2-year	1000.00	320.65	325.10	325.10	326.48	0.252834	9.44	105.93	38.33	1.00
Upper Reach	1798.381	100-year	3900.00	318.55	337.08		337.28	0.000062	3.95	1419.97	307.80	0.20
Upper Reach	1798.381	50-year	3400.00	318.55	331.20		332.17	0.000496	7.91	429.97	56.86	0.51
Upper Reach	1798.381	35-year	3000.00	318.55	327.86	327.14	329.94	0.001510	11.56	259.48	45.15	0.85
Upper Reach	1798.381	10-year	2100.00	318.55	325.32	325.78	328.14	0.002990	13.47	155.96	36.48	1.15
Upper Reach	1798.381	5-year	1700.00	318.55	324.55	325.07	327.26	0.003341	13.21	128.72	33.86	1.19
Upper Reach	1798.381	2-year	1000.00	318.55	323.03	323.59	325.39	0.004251	12.33	81.10	28.70	1.29
Upper Reach	1641.59	100-year	3900.00	315.77	337.12		337.24	0.000216	0.88	2505.67	287.12	0.04
Upper Reach	1641.59	50-year	3400.00	315.77	331.63		331.75	0.003829	2.80	1207.39	180.51	0.15
Upper Reach	1641.59	35-year	3000.00	315.77	328.72		328.92	0.007821	3.58	837.62	96.13	0.21
Upper Reach	1641.59	10-year	2100.00	315.77	326.07	320.51	326.26	0.009462	3.49	601.53	83.09	0.23

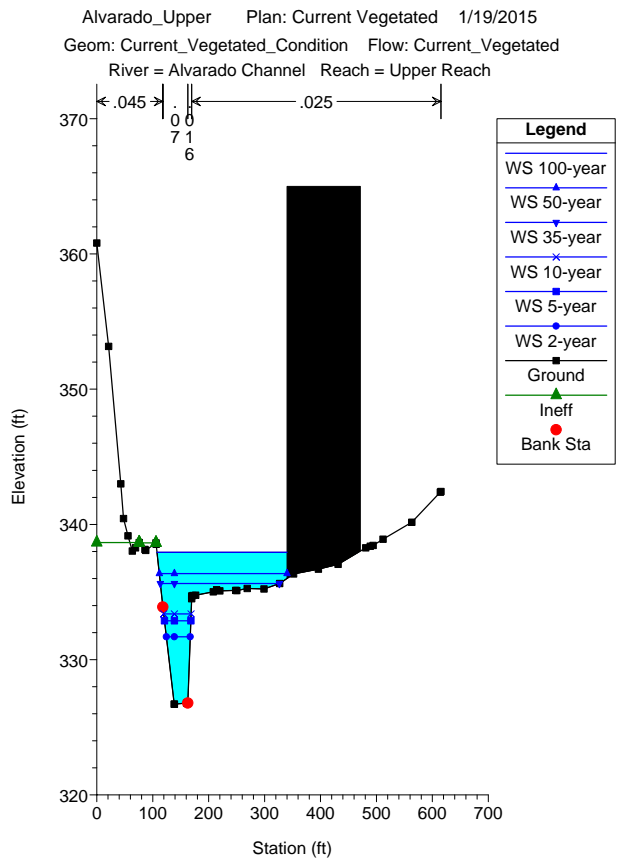
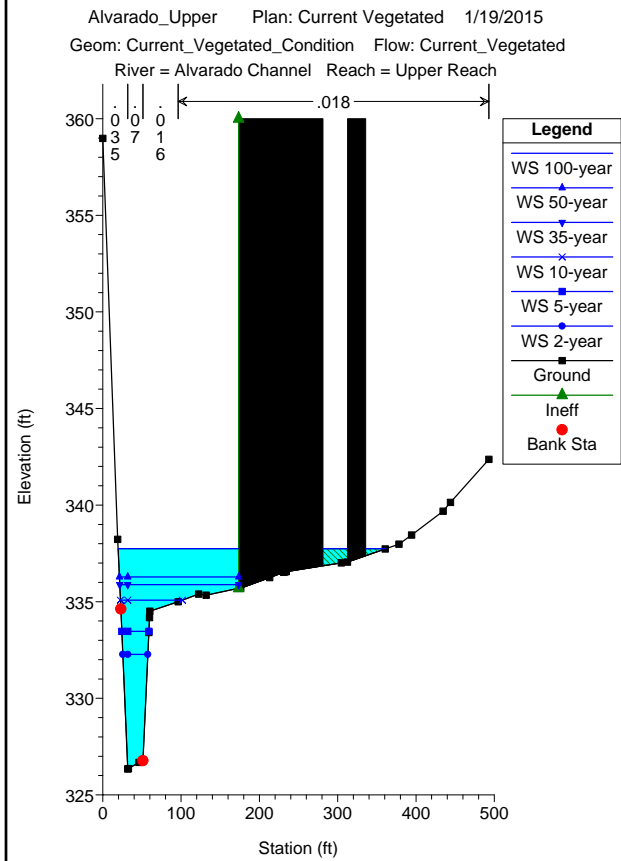
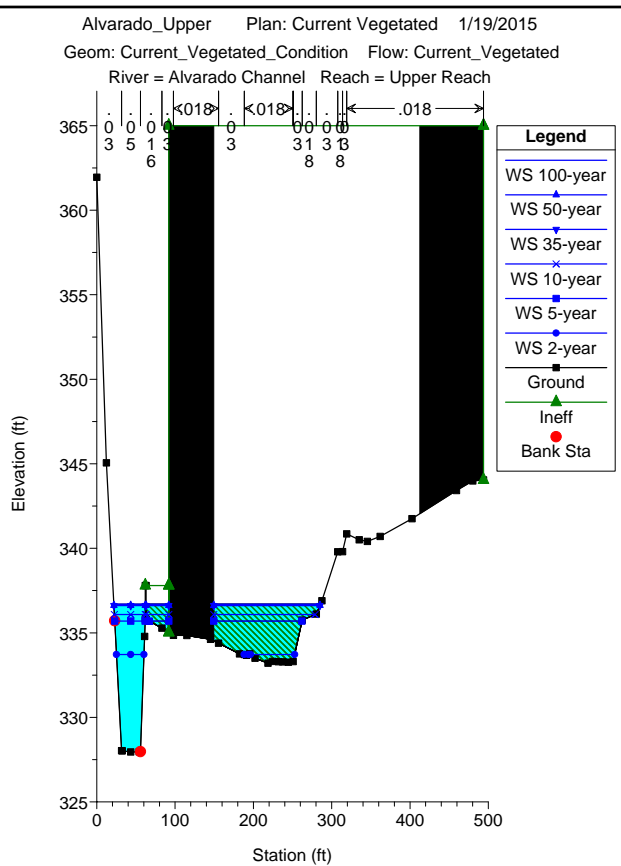
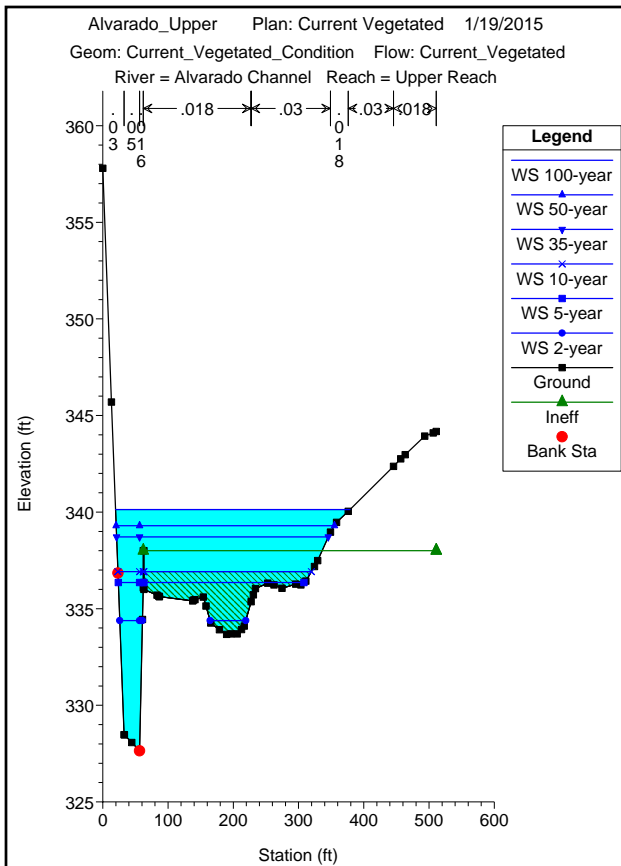
HEC-RAS Plan: Current Vegetate River: Alvarado Channel Reach: Upper Reach (Continued)

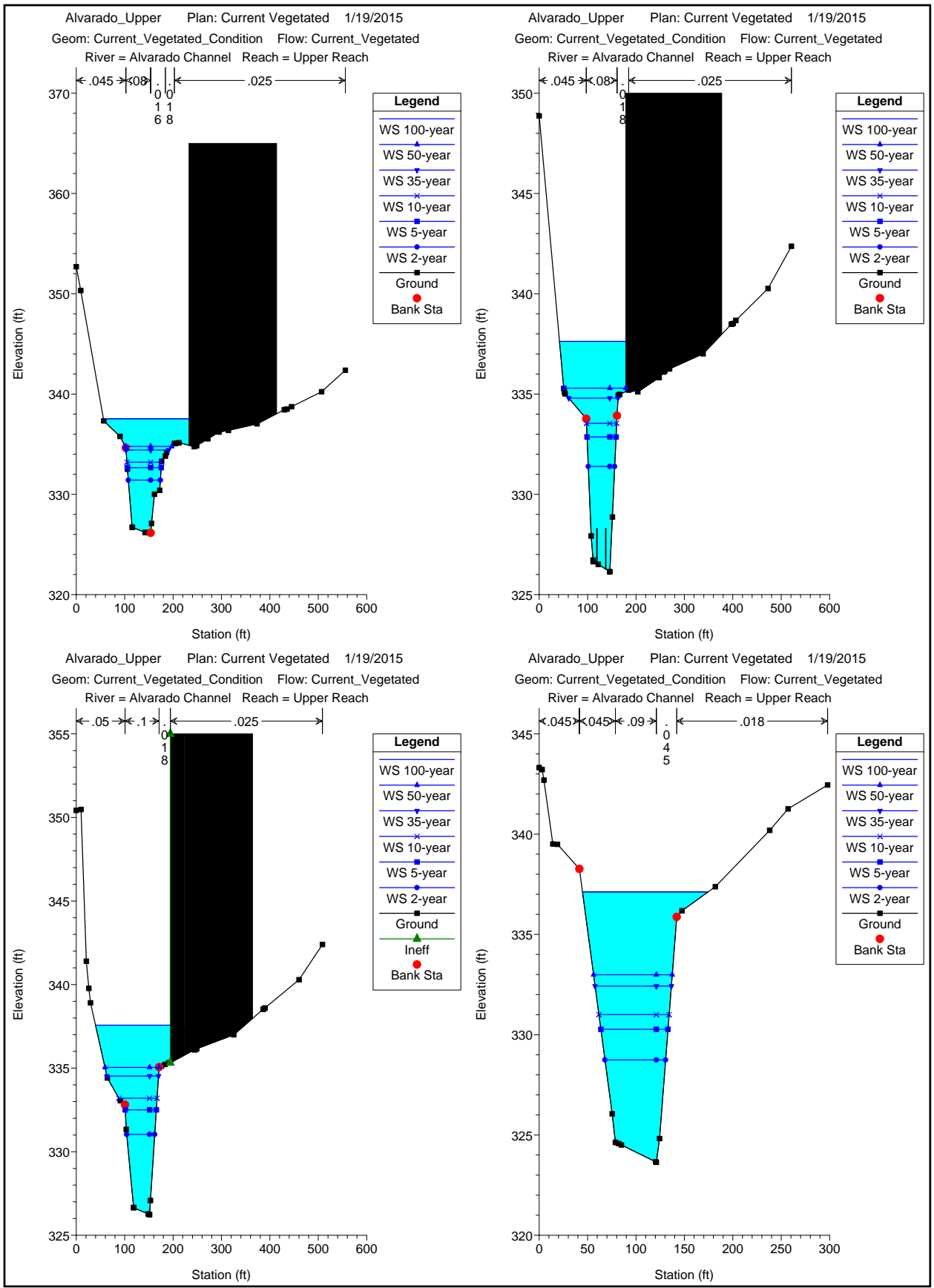
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	324.99	320.03	325.16	0.009709	3.31	513.75	78.68	0.23
Upper Reach	1641.59	2-year	1000.00	315.77	322.64	318.97	322.78	0.011024	2.94	340.43	69.19	0.23
Upper Reach	1489.686	100-year	3900.00	312.84	337.11		337.19	0.000263	0.97	2124.33	265.19	0.04
Upper Reach	1489.686	50-year	3400.00	312.84	330.45		330.80	0.011336	4.81	717.54	126.16	0.24
Upper Reach	1489.686	35-year	3000.00	312.84	326.22		326.87	0.026895	6.45	464.95	45.48	0.36
Upper Reach	1489.686	10-year	2100.00	312.84	323.19		323.80	0.032219	6.26	335.46	40.46	0.38
Upper Reach	1489.686	5-year	1700.00	312.84	322.23		322.74	0.029658	5.72	297.11	39.02	0.37
Upper Reach	1489.686	2-year	1000.00	312.84	319.89		320.25	0.027412	4.76	210.18	35.53	0.34
Upper Reach	1439.048	100-year	3900.00	311.46	337.03		337.17	0.000654	1.49	1897.22	239.95	0.06
Upper Reach	1439.048	50-year	3400.00	311.46	329.96		330.25	0.009896	4.37	778.43	69.32	0.23
Upper Reach	1439.048	35-year	3000.00	311.46	324.78		325.43	0.029886	6.47	464.02	52.07	0.38
Upper Reach	1439.048	10-year	2100.00	311.46	320.96		321.78	0.049668	7.24	290.16	40.13	0.47
Upper Reach	1439.048	5-year	1700.00	311.46	320.30		320.95	0.042084	6.44	264.10	38.64	0.43
Upper Reach	1439.048	2-year	1000.00	311.46	318.15		318.60	0.038876	5.38	185.82	34.31	0.41
Upper Reach	1288.123	100-year	3900.00	306.79	337.01		337.09	0.000277	1.16	2754.14	192.62	0.05
Upper Reach	1288.123	50-year	3400.00	306.79	329.58		329.65	0.001793	2.20	1542.98	117.91	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.64		323.80	0.004834	3.19	941.05	85.54	0.17
Upper Reach	1288.123	10-year	2100.00	306.79	316.54		316.92	0.021525	4.99	421.18	61.20	0.33
Upper Reach	1288.123	5-year	1700.00	306.79	314.28		314.80	0.038963	5.82	292.04	52.94	0.44
Upper Reach	1288.123	2-year	1000.00	306.79	312.54		312.90	0.036290	4.87	205.47	46.60	0.41
Upper Reach	1111.63	100-year	3900.00	303.43	337.03	309.20	337.04	0.000086	0.75	4825.91	292.31	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.50	308.81	329.52	0.000343	1.18	2903.71	215.38	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.44	308.49	323.47	0.000818	1.55	1936.13	142.25	0.07
Upper Reach	1111.63	10-year	2100.00	303.43	315.71	307.72	315.78	0.002722	2.16	973.42	108.56	0.13
Upper Reach	1111.63	5-year	1700.00	303.43	311.61	307.34	311.75	0.009168	3.04	558.49	93.66	0.22
Upper Reach	1111.63	2-year	1000.00	303.43	309.58	306.54	309.69	0.010512	2.66	376.02	86.30	0.22
Upper Reach	826.8154	100-year	3900.00	301.19	337.02		337.03	0.000037	0.53	6683.21	360.91	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.45		329.46	0.000117	0.76	4457.10	259.70	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.33		323.35	0.000253	0.96	3133.16	201.08	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.37		315.40	0.000770	1.26	1665.16	164.98	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	310.18		310.24	0.003369	1.94	877.27	139.41	0.14
Upper Reach	826.8154	2-year	1000.00	301.19	307.05		307.13	0.007748	2.15	465.73	119.42	0.19
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.02	0.000035	0.53	5681.68	307.60	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.43		329.44	0.000159	0.92	3694.43	228.08	0.03
Upper Reach	676.0353	35-year	3000.00	296.69	323.28		323.30	0.000321	1.14	2642.35	151.05	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.25		315.28	0.000718	1.37	1537.96	124.03	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	309.79		309.84	0.002125	1.87	910.39	105.34	0.11
Upper Reach	676.0353	2-year	1000.00	296.69	306.43		306.48	0.002690	1.73	579.07	90.82	0.12
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000138	0.98	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.41	329.42	0.000414	1.45	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.26	0.001398	2.26	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.83	315.15	0.008540	4.09	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	308.90	302.92	309.45	0.030023	5.94	286.18	30.73	0.34
Upper Reach	611.5112	2-year	1000.00	295.46	305.61	300.96	306.03	0.030007	5.20	192.36	26.28	0.34

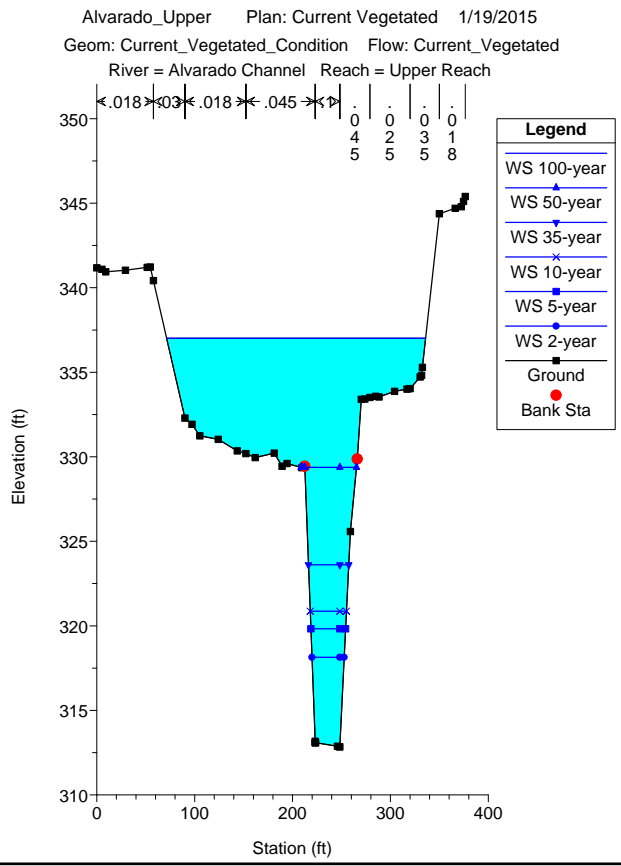
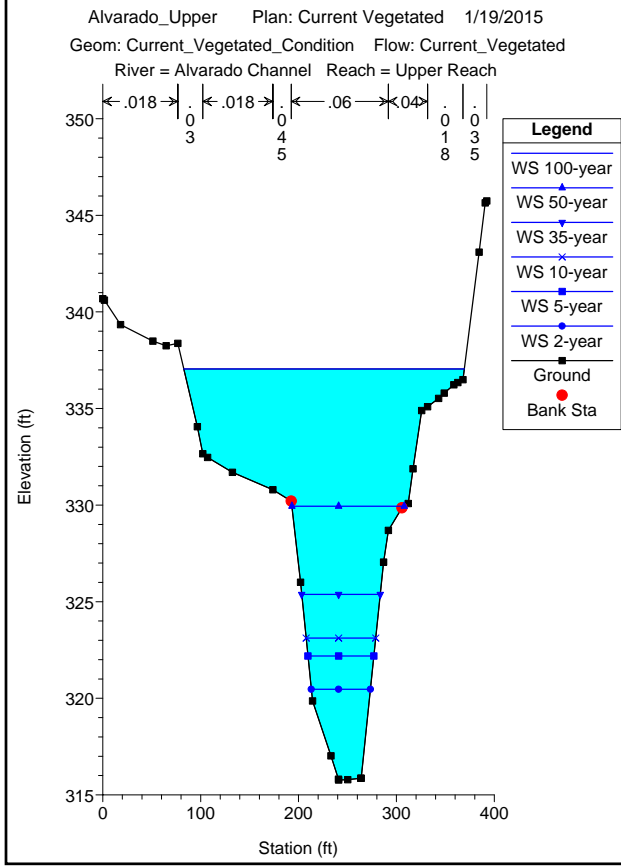
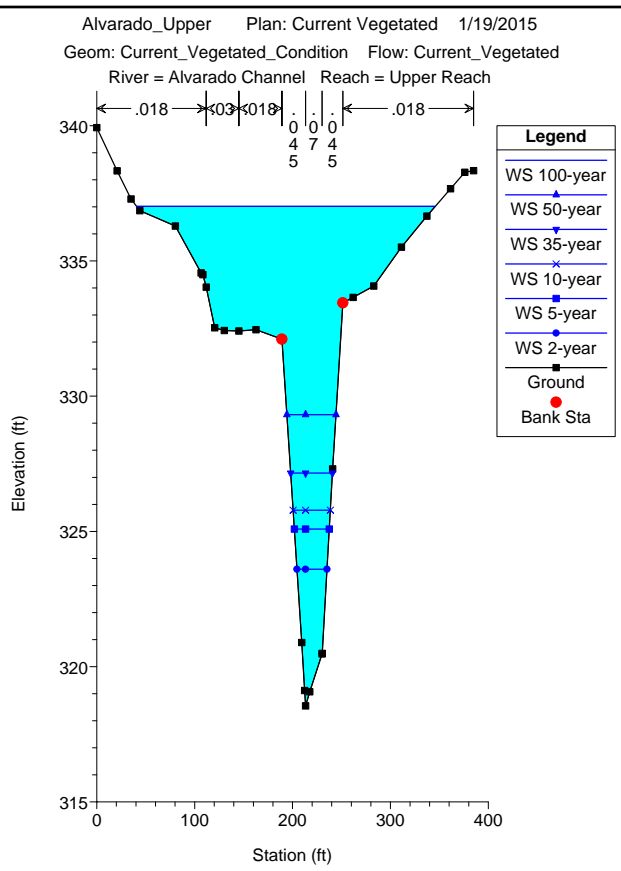
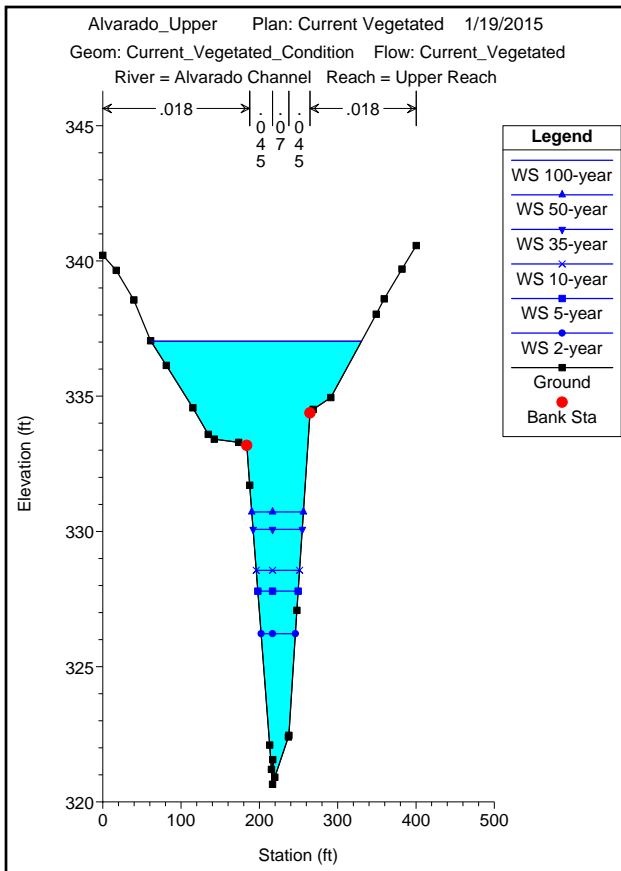


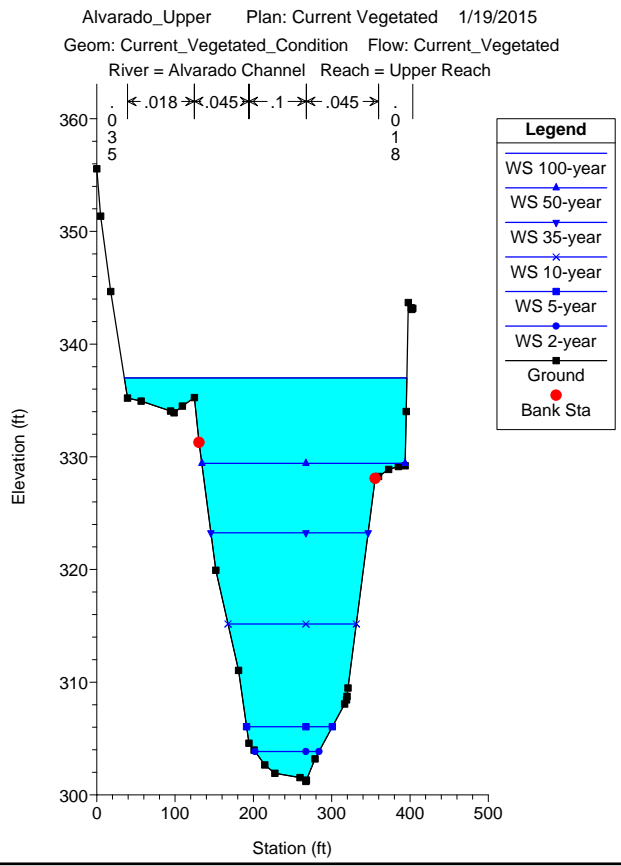
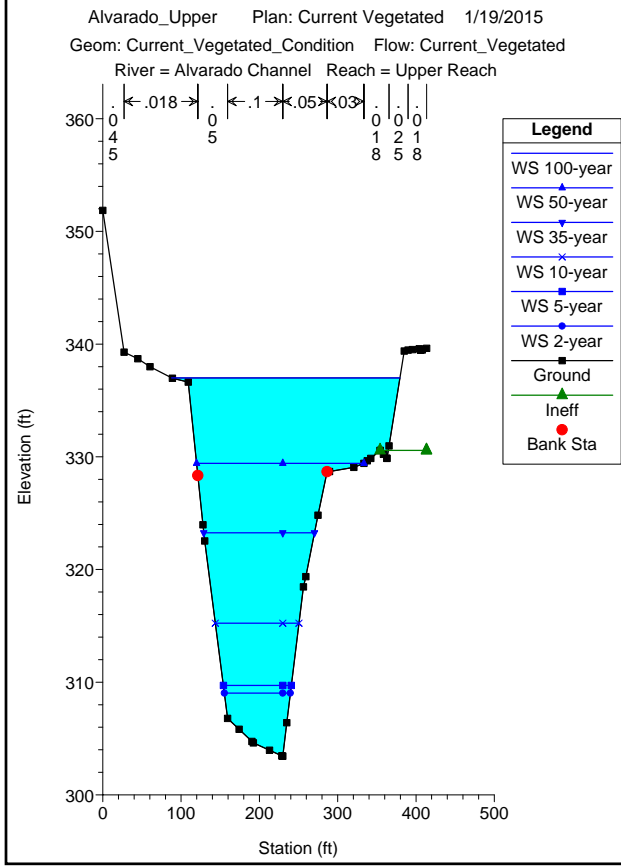
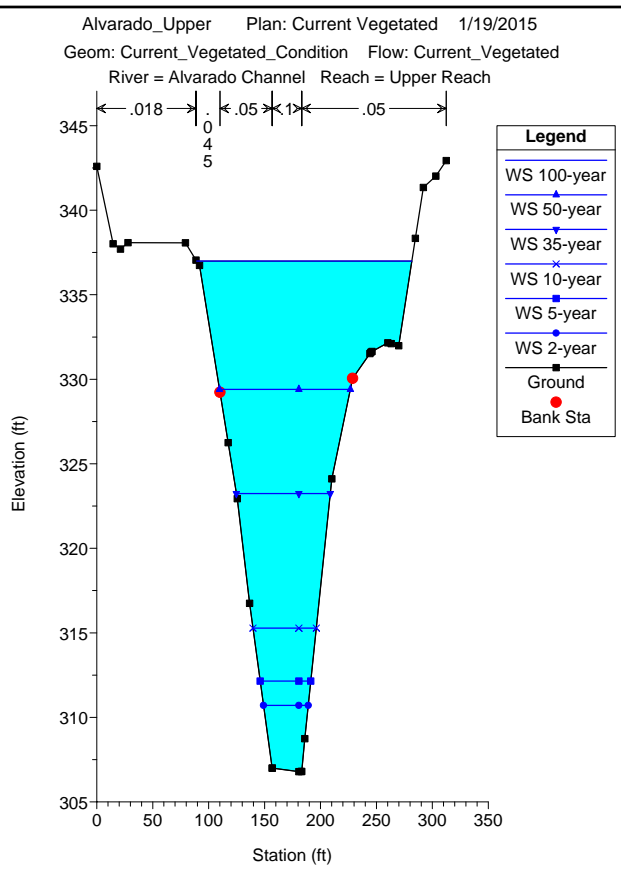
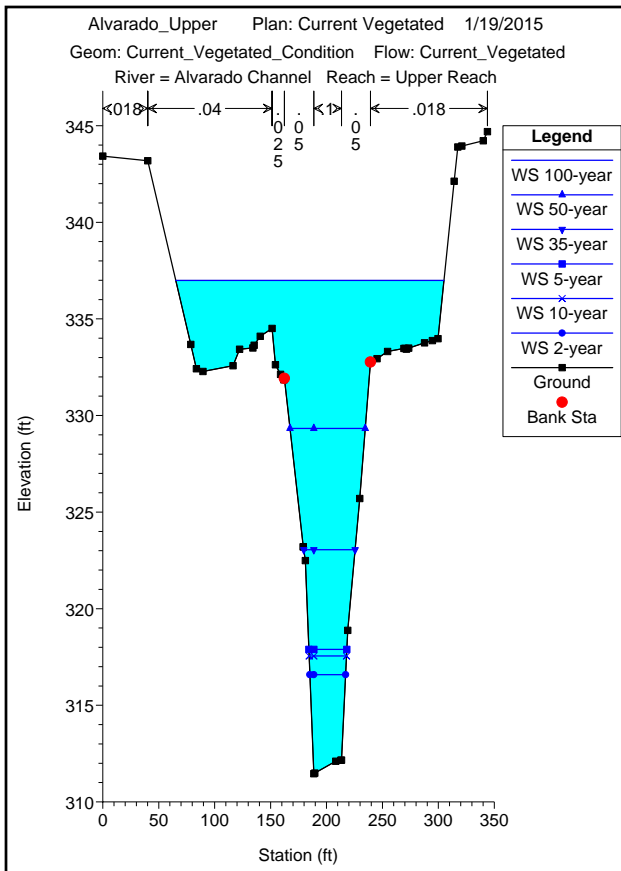


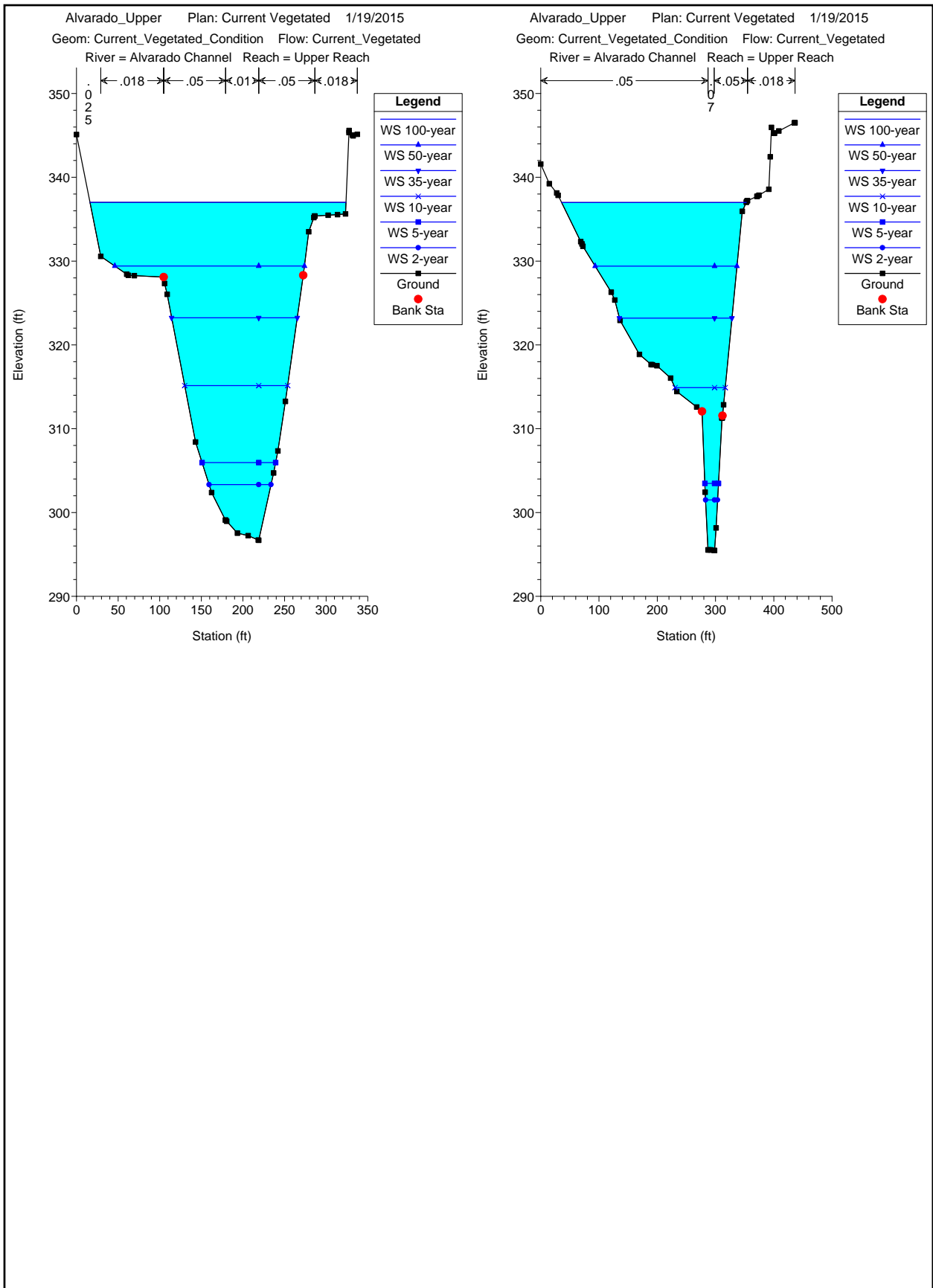












HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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```

PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 1/19/2015 11:22:47 AM

Project in English units

PLAN DATA

Plan Title: Current_Vegetated
 Plan File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p01

Geometry Title: Current_Vegetated_Condition
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g02

Flow Title : Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
Alvarado ChannelUpper	Reach	4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper	Reach	100-year	Critical	Known WS = 337
Alvarado ChannelUpper	Reach	50-year	Critical	Known WS = 329.4
Alvarado ChannelUpper	Reach	35-year	Critical	Known WS = 323.2
Alvarado ChannelUpper	Reach	10-year	Critical	Known WS = 314.9
Alvarado ChannelUpper	Reach	5-year	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Current_Vegetated_Condition
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g02

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99	79.65	352.77
92.38	352.108.38	352	108.38	340.4	117.38	340.4	117.38	340.4	117.38
118.08	351.118.08	340.4	126.68	340.4	126.68	351	127.38	351	127.38
127.38	340.4.136.38	340.4	136.38	352	149.38	352	149.38	352	149.38
244.46	352.12.267.11	352.83	268.8	352.79	276.98	352.19	297.78	353.19	353.19
301.32	353.34.304.91	353.41	319.7	353.68	327.66	355.65	328.6	355.94	355.94
329.79	356.2.348.2	362.06	362.49	365.16					

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.018	108.38	.016	136.38	.018			

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.38 136.38 56.75 57.06 57.78 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75
516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75
						738.21	350.75

745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	336.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1932.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT

Description:

Station Elevation Data	num=	32
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 356.61 3.08 356.69 28.65 355.75 31.72 355.63 63.35 353.68		
83.88 352 99.88 352 99.88 339.3 108.88 339.3 108.88 351.3		
109.58 351.3 109.58 339.3 118.18 339.3 118.18 351.3 118.88 351.3		
118.88 339.3 127.88 339.3 127.88 352 140.88 352 284.1 352.54		
292.86 352.97 302.84 352.34 303.17 352.3 305.15 352.39 326.64 353.31		
340.96 353.56 344.97 353.63 350.68 355.05 369.55 361.22 369.63 361.24		
388.16 365.26 393.87 365.13		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .018 83.88 .016 118.18 .018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.88 127.88 35.29 35.3 35.1 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
292.86 388.16 352.97 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 67.09 370 170.25 263.29 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT

Description:

Station Elevation Data	num=	37
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 356.17 3.48 356.03 16.93 355.21 59.49 352.4 65.6 352.58		
65.6 338.93 93.6 340.06 93.6 352.47 99.74 352.67 100.22 352.66		
128.96 350.55 134.07 350.6 144 350.85 149.79 350.83 153.84 350.82		
159.12 350.8 169.61 350.62 183.5 350.64 185.1 350.64 187.4 350.39		
192.63 349.44 196.36 349.71 198.79 349.76 223.65 350.52 279.35 352.27		
294.86 353.02 303.29 352.49 305.64 352.27 320.46 352.91 329.31 353.29		
334.68 353.38 347.85 353.59 350.6 354.26 359.32 357.09 367.82 359.67		
383.59 363.56 387.54 364.41		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .018 65.6 .016 93.6 .018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.6 93.6 27.81 27.21 26.73 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
99.74 294.86 352.67 F
294.86 387.54 353.03 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 56.31 365 163.1 265.25 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data	num=	40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 354.58 6.49 354.62 43.7 353.43 63.26 352.14 68.58 347.37		
79.62 339.79 80.46 339.21 84.3 339.14 93.29 338.71 93.9 338.68		
103.12 346.81 104.83 351 123.71 350.67 132.91 350 140.83 350.1		
168.65 350.77 180.3 350.74 186.5 350.72 188.43 350.09 191.29 349.16		
193.19 348.49 208.75 348.56 222.54 349.54 241.1 349.97 258.98 350.52		
301.03 351.86 326.23 353.09 332.55 352.69 337.36 352.22 355.74 353.03		
360.73 353.26 378.14 353.54 379.1 353.55 379.16 353.57 379.37 353.63		
395 358.43 421.51 365.05 421.67 365.08 421.9 365.16 425.59 365.07		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .018 63.26 .016 104.83 .018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
63.26 104.83 164.21 164.68 167.58 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
104.83 326.23 351 F
326.23 421.9 353.09 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 59.44 370 164.66 297.32 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data	num=	18
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 352.28 9.37 352.35 33.63 351.69 67.57 350.52 74.43 345.73		
86.46 337.33 86.87 337.04 86.93 337.04 87.27 337.05 98.97 337.33		
99.46 337.34 104.04 341.31 109.33 345.95 115.33 346.05 121.22 345.95		
150.31 346.3 156.99 350.75 536.99 350.75		

Manning's n Values	num=	4
Sta n Val Sta n Val Sta n Val Sta n Val		
0 .018 67.57 .03 74.43 .016 109.33 .018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
74.43 109.33 381.65 361.63 347.98 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
115.33 233.87 346.05 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 61.02 354 156.99 520.69 354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev
0 365.86 16.26 353.45 32.29 341.36 38.14 336.95 41.63 333.87
42.22 333.86 57.31 333.57 57.59 333.56 64.94 340.73 66.19 341.59
69.85 341.68 70.47 343.4 75.47 343.3 96.47 344 104.47 344.1
104.47 350.25 113.47 350.25 113.47 350.76 478.56 350.76 478.56 347.5
762.56 351

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 32.29 .016 41.63 .02 57.31 .016 66.19 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
32.29 66.19 160.29 155.35 151.31 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
121.74 762 350.76 F
Blocked Obstructions num= 1
Sta L Sta R Elev
121.74 406.35 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 360.08 24.76 342.73 38.72 332.95 39.06 332.94 52 332.69
55.04 332.61 55.85 332.58 61.28 337.51 65.85 341.63 66 342
71.24 342.44 80.82 342.3 103.66 342.5 103.66 350.75 107 350.75
342.68 350.75

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 24.76 .016 38.72 .02 55.85 .016

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.76 71.24 156.2 157.14 158.25 .1 .3
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
106 129.29 365 129.29 271.93 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 23
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.57 21.79 345.71 29.74 340.6 43.48 331.78 43.71 331.62
56.66 331.09 60.41 330.93 60.88 330.91 71.14 340.13 71.45 340.42
79.54 342.57 80.33 342.77 81.75 342.81 118.62 343.84 192.97 343.58
209.41 343.65 277.88 343.1 295.07 343.01 300.31 343.06 368.05 343.52
394.52 343.56 434.26 343.52 442.68 343.45

Manning's n Values num= 6
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 29.74 .016 43.71 .02 60.88 .016 71.45 .02
209.41 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.74 71.45 183.48 182.29 181.14 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 34
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.83 25.85 340.86 29.47 338.04 39.31 330.38 39.47 330.38
53.23 330.13 56.6 330.09 56.92 330.09 67.04 338.54 68.39 339.66
69.63 339.89 75.76 341.24 75.77 343.24 76.77 343.24 76.77 341.24
79.11 341.33 103.2 341.93 115.27 341.94 134.16 342.42 146.31 342.7
177.81 343.05 189.09 343.18 253.73 343.18 261.47 343.22 306.56 343.78
321.66 343.97 326.01 343.93 364.07 343.94 376.97 343.95 379.8 343.94
389.33 343.7 410.09 342.8 421.87 343.03 428.88 343.16

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 29.47 .016 39.31 .02 56.92 .016 75.76 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.47 56.92 188.22 188.31 208.19 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
75.77 428.88 343.24 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 29
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 349.55 15.53 339.93 19.43 337.64 32.81 329.79 33.85 329.75
45.6 329.33 51.53 329.09 52.41 329.06 59.04 334.91 62.21 337.64
62.22 339.64 63.22 339.64 63.22 337.64 95.9 337.03 96.15 337.01
96.9 337.04 137.52 339.32 162.33 338.17 178.31 338.08 189.7 338.27
200.4 338.42 220.32 338.78 246.45 339.28 298.6 340.95 310.42 341.33
347.72 342 358.94 342.14 362.36 342.19 368.47 342.31

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 32.81 .07 52.41 .016 62.21 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
19.43 52.41 213.1 211.63 234.86 .1 .3
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
63.22 68.42 339.64 F
68.42 368.47 345 F
Blocked Obstructions num= 1
Sta L Sta R Elev
68.42 145.82 350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 351.63 6.26 347.24 20.56 337.219 31.56 329.51 32.37 329.46
44.1 328.69 48.11 328.45 49.21 328.39 51.59 331.53 57.89 337.63
61.86 337.58 61.86 339.58 62.86 339.58 62.86 337.39 75.24 337.39
91.39 336.99 131.08 336.38 142.66 336.41 159.33 336.04 163.29 335.96
188.72 335.64 192.7 335.57 205 335.6 208.43 335.97 218.96 337.16
242.63 337.75 248.26 337.75 255.89 337.79 285.47 337.83 313.92 338.26
340.9 338.14 346.6 338.38 352.33 338.65 363.42 340.11 406.82 341.23
414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 6.26 .07 20.56 .016 31.56 .018 32.37 .018

0 .05 31.56 .07 49.21 .016 57.89 .018 163.29 .03
 192.7 .018 218.96 .03 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.56 49.21 146.85 145.44 131.99 .1 .3
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 57.89 62.86 337.63 F
 62.86 71.22 339.58 T
 71.22 441 355 F
 Blocked Obstructions num= 4
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
 232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 40
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 356.18 21.74 337.198 30.35 329.68 31.17 329.1 31.35 329.09
 32.26 329.04 38.76 328.75 53.29 328.1 53.58 328.09 54.27 328.83
 62.04 337.14 62.1 339.14 63.1 339.14 63.1 337.14 67.96 336.95
 88.97 336.63 117.23 336.41 137.39 336.13 161.66 335.69 166.55 335.6
 183.27 335.55 191.42 335.3 198.28 335.05 202.99 335.06 210.13 334.92
 215.7 334.95 221.61 335.05 227.44 335.25 235.84 335.33 244.24 335.42
 264.47 335.71 299.23 337.95 328.34 337.67 346.84 337.59 351.58 338.13
 359.81 339.41 390.03 340.55 403.82 341.1 440.67 342.11 449.14 342.35
 Manning's n Values num= 7
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 30.35 .07 53.29 .016 137.39 .03 183.27 .018
 264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.74 53.29 48.12 46.59 34.68 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62.1 449.14 339.14 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 49
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 357.8 13.19 345.7 23.23 336.84 32.69 328.48 33.06 328.47
 44.33 328.07 55.4 327.68 56.49 327.64 60.79 334.44 61.93 336.08
 62 338 63 338 63 336 83 335.7 86.08 335.64
 86.44 335.63 86.75 335.63 137.86 335.4 138.65 335.44 141.22 335.47
 154.05 335.6 158.2 335.14 165.58 334.26 178.77 333.91 189.74 333.67
 196.35 333.7 205.98 333.7 212.66 333.92 216.97 334.1 227.31 335.36
 230.72 335.72 233.9 336.04 252.75 336.32 262.38 336.23 274.67 336.06
 295.69 336.27 303.61 336.23 311.15 336.43 324.47 337.18 329.24 337.49
 348.87 338.96 358.14 339.47 376.13 340.04 445.64 342.37 456.48 342.76
 463.45 342.97 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 32.69 .05 56.49 .016 61.93 .018 227.31 .03
 348.87 .018 376.13 .03 445.64 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 23.23 56.49 179.7 177.4 154.96 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 42
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 361.95 12.31 345.06 22.84 335.71 31.63 328.03 32.59 328.02
 43.26 327.95 54.18 327.96 55.74 327.97 61.02 334.79 61.88 335.82
 62 337.8 63 337.8 63 335.8 83.16 335.28 97.88 334.85
 115.03 334.84 145.23 334.62 155.42 334.39 182.3 333.76 188.41 333.72
 191.22 333.67 195.43 333.76 202.05 333.5 218.7 333.21 224.74 333.31
 232.14 333.29 237.4 333.28 244.5 333.26 250.72 333.3 262.29 335.75
 280.25 336.11 287.55 336.9 307.71 339.79 313.94 339.8 319.15 340.85
 335.15 340.5 345.45 340.41 361.78 340.7 402.63 341.75 459.27 343.42
 480.11 343.99 493.96 344.04

Manning's n Values num= 13
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 31.63 .05 55.74 .016 83.16 .03 97.88 .018
 155.42 .03 188.41 .018 250.72 .03 262.29 .018 280.25 .03
 307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.84 55.74 161.84 166.46 226.33 .1 .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 62 91.85 337.8 F
 91.85 493.96 365 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 28
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 358.98 19.08 338.23 22.99 334.62 31.96 326.34 32.75 326.36
 46.17 326.68 50.81 326.76 51.2 326.77 58.78 333.41 59.67 334.18
 60.05 334.51 96.28 335 122.48 335.39 131.97 335.34 174.16 335.7
 176.05 335.7 213.04 336.25 231.04 336.52 231.23 336.53 234.1 336.55
 304.7 337.01 312.5 337.05 360.6 337.73 378.26 337.98 394.39 338.45
 434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .035 31.96 .07 51.2 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.99 51.2 109.52 94.32 36.08 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 173.53 493.08 360 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT
 Description:
 Station Elevation Data num= 40
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 360.81 21.23 353.16 42.85 343 47.85 340.43 55.92 339.16
 63.64 338.03 69.33 338.27 75.76 338.66 86.2 338.15 87.49 338.08

105.77	338.63	106.06	338.53	118.18	333.89	138.46	326.71	138.83	326.71
160.56	326.79	162.28	326.79	162.8	326.79	169.52	334.5	169.71	334.71
172.01	334.74	176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08
248.23	335.12	250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63
351.83	336.34	396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39
493.94	338.45	511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	118.18	.07	162.8	.016	169.71	.025	

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

118.18	162.8		112	100	22	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
340.09	471.21	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT

Description:

Station	Elevation	Data	num=	32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64
105.72	332.51	115.37	326.72	115.96	326.71	142.3	326.2	150.28	326.16
153.68	326.15	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38
379.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74
506.87	340.23	555.95	342.37						

Manning's n Values num= 5

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	102.47	.08	153.68	.016	184.12	.018	202.82	.025		

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

102.47	153.68		28.83	29	6.18	.1	.3
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Blocked Obstructions num= 1

Sta L	Sta R	Elev
233	414	365

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

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 = 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11		

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT

Description:

Station	Elevation	Data	num=	30					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77
107.31	327.92	111.26	326.72	111.54	326.64	122.23	326.51	145.7	326.14
145.99	326.14	151.2	328.87	160.87	333.92	163.21	334.94	166.35	334.98
184.8	335.2	190.27	335.24	193.34	335.27	203.7	335.11	247.82	335.82
257.56	336.1	259.76	336.16	269.28	336.25	338.64	337.01	397.05	338.48
397.76	338.49	400.6	338.52	406.38	338.67	472.69	340.26	520.97	342.37

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	97.37	.08	160.87	.018	184.8	.025	

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

97.37	160.87		25.93	20.79	5.61	.1	.3
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Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
179	377	350	118.73	119.98	328.3	136.73	137.98	328.3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT

Description:

Station	Elevation	Data	num=	32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6
460.26	340.29	508.6	342.4						

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.05	100.71	.1	171.09	.018	194.36	.025	

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

100.71	171.09		192.47	203.49	166.15	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
224.96	364.18	355	194.19	223.55	355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT

Description:

Station	Elevation	Data	num=	20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87
147.5	336.18	181.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45

Manning's n Values num= 5

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	41.5	.045	78.71	.09	121.04	.045	142.05	.018		

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

41.5	142.05		210.13	210.2	208.24	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1873.917

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7
400.21	340.57								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	187.67	.045	216.73	.07	237.63	.045	264.56	.018

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

183.84	264.56	71.62	75.54	93.1		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1798.381

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66
361.35	337.67	376.05	338.28	385	338.34				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	111.81	.03	145.23	.018	189.06	.045	213.36	.07
230.09	.045	251.36	.018						

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

189.06	251.36	119.25	156.79	237.15		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1641.59

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	76.62	.03	102.18	.018	173.79	.045	192.62	.06
291.75	.04	331.83	.018	367.96	.035				

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

192.62	305.69	133.84	151.9	183		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1489.686

INPUT
Description: U/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21
54.59	341.23	57.81	340.42	90.09	332.29	97.19	331.92	105.34	331.24
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	57.81	.03	90.09	.018	152.39	.045	223.09	.1
248.3	.045	279.01	.025	320.02	.035	349.96	.018		

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

212.54	266.06	50.44	50.64	51.04		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1439.048

INPUT
Description: D/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22
343.78	344.69								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	40.16	.04	151.34	.025	162.38	.05	188.67	.1
213.36	.05	239.35	.018						

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

162.38	239.35	146.36	150.92	160.49		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1288.123

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
0	.018	88.69	.045	110.15	.05	156.79	.1	183.29	.05

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

110.15	228.7	168.1	176.49	194.32		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1111.63

INPUT
 Description:
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.86	27.2	339.28	44.8	338.7	60.26	338	88.84	336.97
109.09	336.63	121.36	328.337	127.82	323.97	130.06	322.53	159.44	306.78
174.11	305.82	190.49	304.74	192.3	304.62	213	303.96	228.71	303.46
229.22	303.44	229.84	303.43	234.91	306.4	256.18	318.46	259.39	319.37
274.82	324.82	286.38	328.68	289.62	328.69	320.59	329.07	333.47	329.42
337.85	329.64	342.23	329.86	354.08	330.57	354.39	330.55	358.31	330.23
362.71	329.87	362.89	329.86	365.46	330.96	384.93	339.39	389.83	339.47
395.28	339.51	404.27	339.58	405.55	339.49	405.96	339.45	408.14	339.49
413.47	339.62								

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	27.2	.018	121.36	.05	159.44	.1	229.84	.05
286.38	.03	333.47	.018	365.46	.025	389.83	.018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 121.36 286.38 256.29 284.82 327.16 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 826.8154

INPUT
 Description:
 Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.56	4.94	351.36	17.74	344.66	39.17	335.21	56.65	334.94
94.27	334.06	98.75	333.91	109.22	334.5	124.61	335.26	130.67	331.28
151.97	319.94	180.98	311.04	194.35	304.59	200.85	303.97	214.63	302.65
227.33	301.92	259.57	301.53	267	301.19	267.72	301.31	278.8	303.19
316.51	308.07	319.03	308.44	319.58	308.75	320.87	309.48	355.52	328.08
359.81	328.25	372.61	328.88	385.26	329.13	393.73	329.21	395.14	334.02
397.85	343.69	401.51	343.22	402.37	343.08	403.61	343.18		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.17	.018	124.61	.045	194.35	.1	267.72	.045
359.81	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 130.67 355.52 157.21 150.78 167.76 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 676.0353

INPUT
 Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	345.1	29.14	330.56	60.41	328.44	62.38	328.3	69.47	328.27
104.89	328.09	105.89	327.33	108.93	326.04	143.06	308.42	162.36	302.38
179	299.1	179.23	299.08	180.51	298.96	193.33	297.54	206.23	297.24
218.47	296.71	218.93	296.69	236.81	304.72	242.08	307.35	250.99	313.25
272.48	328.3	279.05	333.5	285.26	335.19	285.9	335.38	286.53	335.38
302.36	335.48	313.71	335.54	323.25	335.63	327.45	345.35	327.55	345.59
331.52	345.04	332.41	344.95	337.43	345.13				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	29.14	.018	104.89	.05	179.23	.01	218.93	.05
286.53	.018								

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

104.89 272.48 122.82 64.52 43.7 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 611.5112

INPUT
 Description: U/S face of Alvarado Road and College Avenue Crossing
 Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.58	14.76	339.24	27.46	338.13	29.82	337.84	68.72	332.32
70.64	332.05	72.38	331.77	120.87	326.29	127.06	325.35	136.03	322.92
169.31	318.86	189.35	317.66	191.73	317.63	199.52	317.51	223.02	316.04
233.55	314.43	267.61	312.59	276.82	312.06	282.28	302.42	287.17	295.54
287.56	295.54	290.32	295.54	292.26	295.54	297.64	295.47	298.38	295.46
300.9	298.16	311.19	311.26	311.2	311.29	311.21	311.29	311.21	311.3
311.23	311.3	312.01	311.55	313.81	312.86	345.92	335.95	352.92	337.02
353.12	337.05	353.87	337.18	354.92	337.21	370.99	337.72	371.68	337.74
374.54	337.86	391.45	338.57	393.86	342.44	396.02	345.96	400.81	345.28
400.91	345.26	400.98	345.25	408.76	345.53	435.17	346.49	435.96	346.51
436.48	346.51								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	287.17	.07	297.64	.05	354.92	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 276.82 312.01 0 0 .3 .5

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
n9	n10	n11	n12	n13					
Upper Reach	4559.274	.018	.016	.018					
Upper Reach	4543.777	Lat Struct							
Upper Reach	4502.213	.018	.016	.018					
Upper Reach	4466.915	.018	.016	.018					
Upper Reach	4439.706	.018	.016	.018					
Upper Reach	4275.023	.018	.03	.016	.018				
Upper Reach	3913.392	.03	.016	.02	.016	.018			
Upper Reach	3758.046	.05	.016	.02	.016				
Upper Reach	3600.906	.03	.016	.02	.016	.02	.018		
Upper Reach	3418.613	.05	.016	.02	.016	.018			
Upper Reach	3230.305	.05	.07	.016	.018				
Upper Reach	3018.677	.05	.07	.016	.018	.03	.018	.03	
Upper Reach	2969.225	.05	.07	.016	.03	.018	.03	.018	
Upper Reach	2873.24	.03	.05	.016	.018	.03	.018	.03	
Upper Reach	2695.84	.03	.05	.016	.03	.018	.03	.018	
Upper Reach	2529.382	.035	.07	.016	.018				
Upper Reach	2435.063	.045	.07	.016	.025				
Upper Reach	2335.331	.045	.08	.016	.018	.025			
Upper Reach	2317.214	Lat Struct							
Upper Reach	2308.404	.045	.08	.018	.025				
Upper Reach	2287.614	.05	.1	.018	.025				
Upper Reach	2084.121	.045	.045	.09	.045	.018			
Upper Reach	1873.917	.018	.045	.07	.045	.018			
Upper Reach	1798.381	.018	.03	.018	.045	.07	.045	.018	
Upper Reach	1641.59	.018	.03	.018	.045	.06	.04	.018	
Upper Reach	1489.686	.018	.03	.018	.045	.1	.045	.025	
Upper Reach	1439.048	.018	.04	.025	.05	.1	.05	.018	
Upper Reach	1288.123	.018	.045	.05	.1	.05			
Upper Reach	1111.63	.045	.018	.05	.1	.05	.03	.018	
Upper Reach	826.8154	.035	.018	.045	.1	.045	.018		
Upper Reach	676.0353	.025	.018	.05	.01	.05	.018		
Upper Reach	611.5112	.05	.07	.05	.018				

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1286.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1286.123	.1	.3

DETAILED HYDRAULIC RESULTS FOR
ULTIMATE VEGETATED CONDITION MODEL

HEC-RAS Plan: Ult-Veg River: Alvarado Channel Reach: Upper Reach

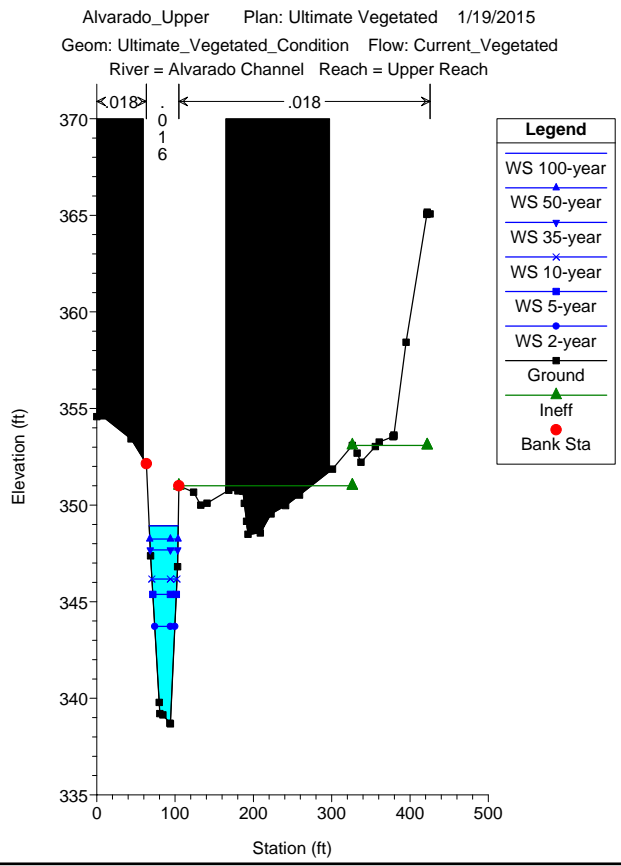
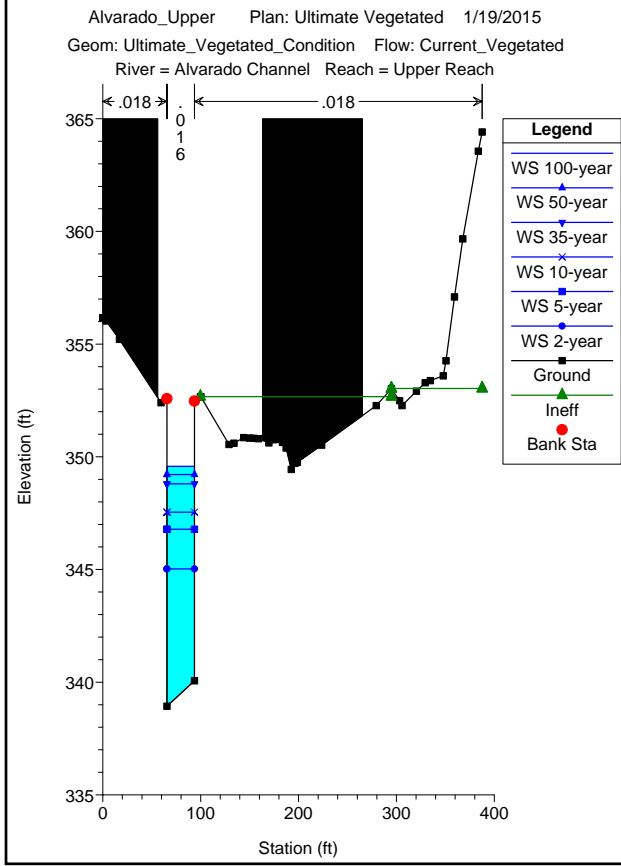
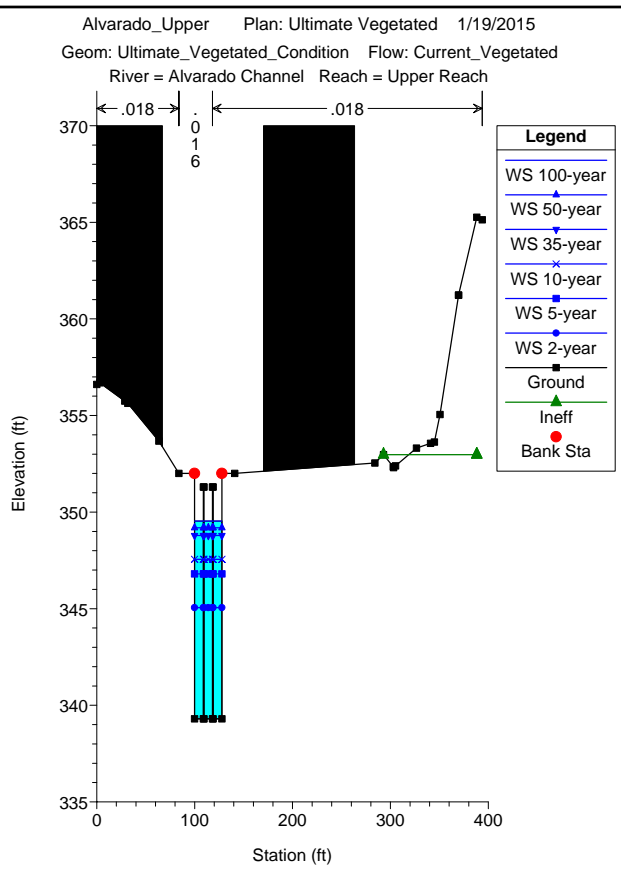
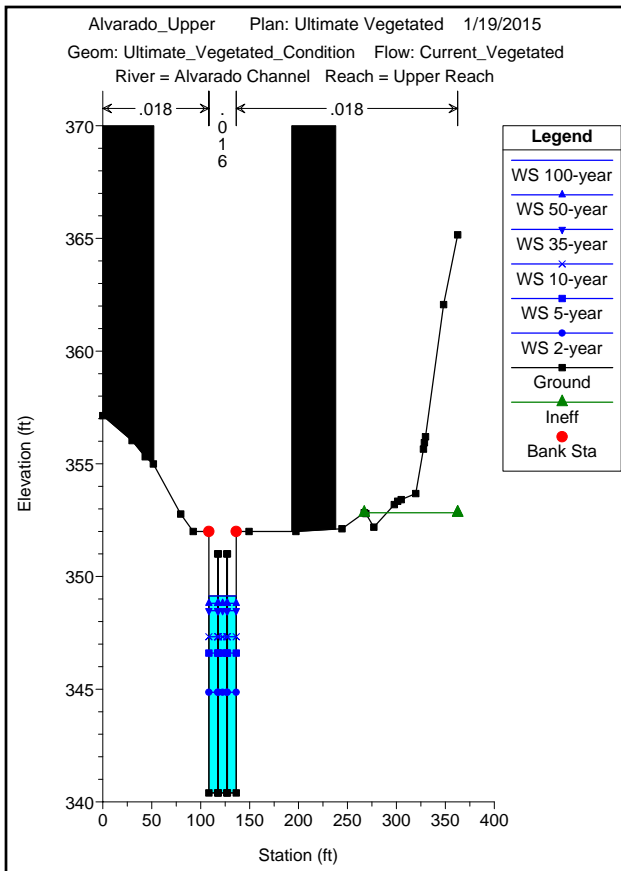
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00	
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92	
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87	
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76	
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73	
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70	
Upper Reach	4543.777		Lat Struct										
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79	
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72	
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68	
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59	
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55	
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48	
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77	
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71	
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67	
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58	
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54	
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48	
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00	
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00	
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00	
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00	
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00	
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00	
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43	
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44	
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45	
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49	
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52	
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59	
Upper Reach	3913.392	100-year	3900.00	333.56	346.19	344.31	347.69	0.008024	6.80	469.75	78.59	0.37	
Upper Reach	3913.392	50-year	3400.00	333.56	346.03	342.70	347.19	0.006804	6.20	456.89	78.37	0.34	
Upper Reach	3913.392	35-year	3000.00	333.56	345.61	342.28	346.58	0.007108	6.16	424.00	77.81	0.35	
Upper Reach	3913.392	10-year	2100.00	333.56	344.86	340.62	345.41	0.006098	5.41	366.49	76.82	0.32	
Upper Reach	3913.392	5-year	1700.00	333.56	344.12	339.84	344.59	0.007194	5.55	309.57	75.83	0.34	
Upper Reach	3913.392	2-year	1000.00	333.56	342.10	338.18	342.44	0.007429	4.68	214.12	38.70	0.33	
Upper Reach	3758.046	100-year	3900.00	332.58	345.07		346.52	0.007008	6.53	497.14	82.24	0.39	
Upper Reach	3758.046	50-year	3400.00	332.58	345.20		346.29	0.004884	5.51	508.26	82.43	0.33	
Upper Reach	3758.046	35-year	3000.00	332.58	344.72		345.62	0.005218	5.49	468.81	81.74	0.33	
Upper Reach	3758.046	10-year	2100.00	332.58	344.19		344.66	0.003744	4.45	425.26	80.98	0.28	
Upper Reach	3758.046	5-year	1700.00	332.58	343.26		343.63	0.005080	4.76	350.39	79.65	0.32	
Upper Reach	3758.046	2-year	1000.00	332.58	341.03		341.33	0.006731	4.40	227.38	38.00	0.32	
Upper Reach	3600.906	100-year	3900.00	330.91	345.79	340.46	345.92	0.000522	2.03	1397.86	421.01	0.10	
Upper Reach	3600.906	50-year	3400.00	330.91	345.73	339.80	345.83	0.000423	1.82	1373.52	420.92	0.09	
Upper Reach	3600.906	35-year	3000.00	330.91	344.99	339.24	345.12	0.000830	2.45	1064.92	419.78	0.13	
Upper Reach	3600.906	10-year	2100.00	330.91	343.67	337.78	344.02	0.003818	4.82	443.65	364.14	0.27	
Upper Reach	3600.906	5-year	1700.00	330.91	342.57	337.05	342.90	0.004126	4.62	368.73	52.84	0.28	
Upper Reach	3600.906	2-year	1000.00	330.91	340.24	335.49	340.47	0.004343	3.84	260.26	40.96	0.27	
Upper Reach	3418.613	100-year	3900.00	330.09	345.71	339.41	345.84	0.000376	1.73	1502.90	409.64	0.08	
Upper Reach	3418.613	50-year	3400.00	330.09	345.67	338.72	345.77	0.000298	1.54	1485.28	409.58	0.07	
Upper Reach	3418.613	35-year	3000.00	330.09	344.88	338.18	344.99	0.000569	2.04	1161.47	408.51	0.10	
Upper Reach	3418.613	10-year	2100.00	330.09	342.85	336.71	343.33	0.003704	4.63	431.63	139.46	0.25	
Upper Reach	3418.613	5-year	1700.00	330.09	341.83	335.97	342.17	0.003876	4.42	378.61	73.63	0.25	
Upper Reach	3418.613	2-year	1000.00	330.09	339.49	334.42	339.71	0.004018	3.73	269.38	40.58	0.25	
Upper Reach	3230.305	100-year	3900.00	329.06	345.71	341.67	345.79	0.000082	0.69	1994.08	284.87	0.03	
Upper Reach	3230.305	50-year	3400.00	329.06	343.33	340.91	345.43	0.002517	3.38	559.45	281.03	0.17	
Upper Reach	3230.305	35-year	3000.00	329.06	342.76	340.29	344.62	0.002387	3.19	526.41	280.11	0.17	
Upper Reach	3230.305	10-year	2100.00	329.06	341.55	338.12	342.76	0.001850	2.61	457.89	232.33	0.14	
Upper Reach	3230.305	5-year	1700.00	329.06	340.57	337.64	341.60	0.001838	2.43	404.50	194.96	0.14	
Upper Reach	3230.305	2-year	1000.00	329.06	338.25	335.69	339.09	0.002157	2.18	281.59	76.83	0.14	
Upper Reach	3018.677	100-year	3900.00	328.39	341.80	341.80	345.38	0.006871	5.16	445.63	183.70	0.27	
Upper Reach	3018.677	50-year	3400.00	328.39	341.19	341.19	344.44	0.006858	4.97	411.04	176.99	0.27	
Upper Reach	3018.677	35-year	3000.00	328.39	340.71	340.71	343.67	0.006674	4.75	384.60	158.01	0.26	
Upper Reach	3018.677	10-year	2100.00	328.39	338.51	338.51	341.75	0.009878	4.91	275.31	119.67	0.31	
Upper Reach	3018.677	5-year	1700.00	328.39	339.15	337.82	340.91	0.004582	3.52	303.28	127.40	0.21	
Upper Reach	3018.677	2-year	1000.00	328.39	337.20	335.35	338.37	0.004791	3.03	221.71	85.67	0.21	
Upper Reach	2969.225	100-year	3900.00	328.10	341.17	339.15	341.36	0.000263	0.93	1325.79	214.81	0.05	
Upper Reach	2969.225	50-year	3400.00	328.10	340.33	339.15	340.53	0.000339	1.01	1146.62	213.85	0.05	

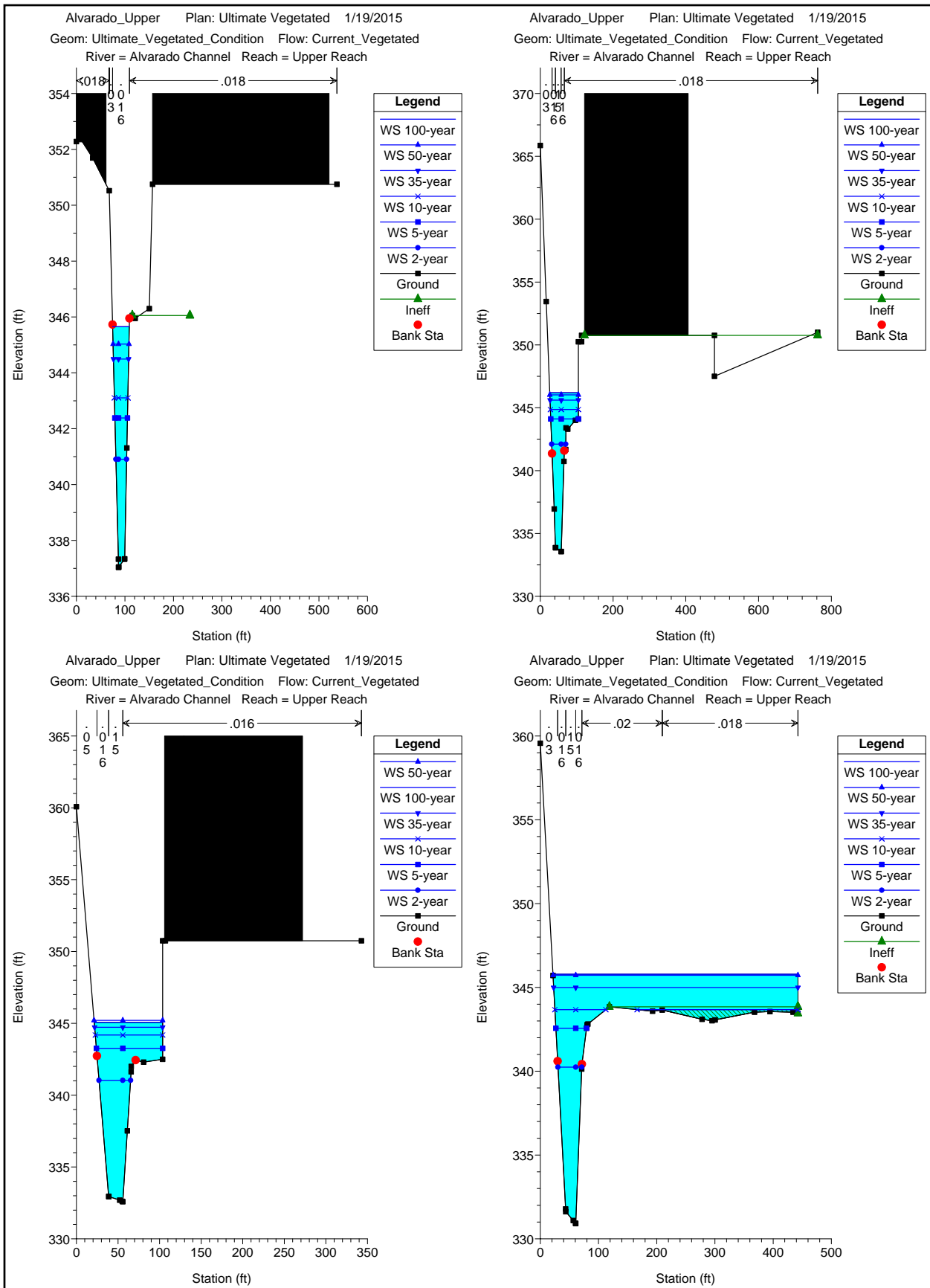
HEC-RAS Plan: Ult-Veg River: Alvarado Channel Reach: Upper Reach (Continued)

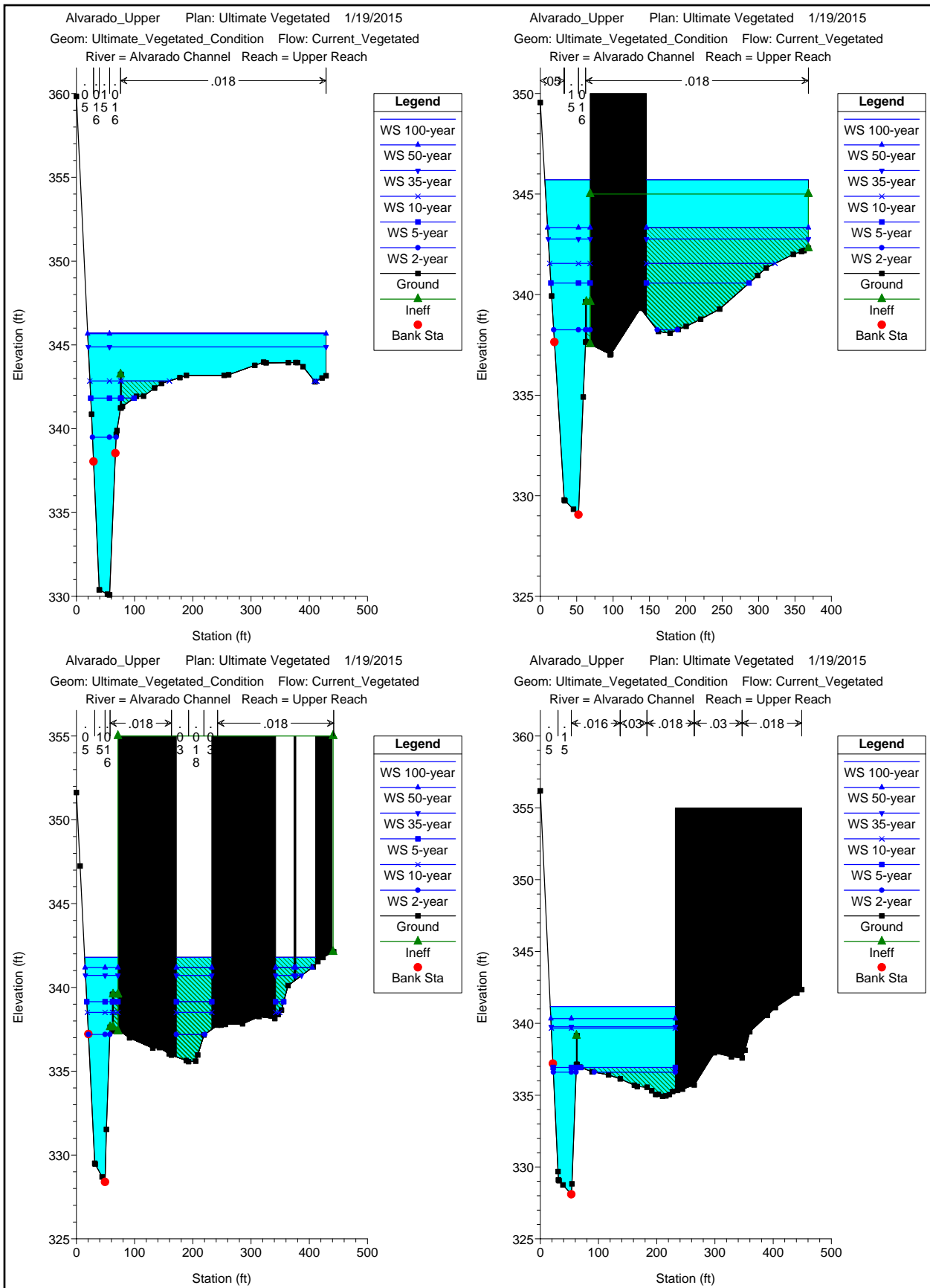
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.10	339.76	339.14	339.96	0.000400	1.05	1024.39	213.19	0.06
Upper Reach	2969.225	10-year	2100.00	328.10	339.67	337.87	339.77	0.000210	0.76	1005.70	213.09	0.04
Upper Reach	2969.225	5-year	1700.00	328.10	336.93	336.93	339.88	0.009921	4.18	259.67	202.41	0.28
Upper Reach	2969.225	2-year	1000.00	328.10	336.60	334.79	337.74	0.004077	2.61	246.71	178.27	0.18
Upper Reach	2873.24	100-year	3900.00	327.64	341.25	338.01	341.32	0.000090	0.59	2127.79	394.09	0.03
Upper Reach	2873.24	50-year	3400.00	327.64	340.42	338.01	340.49	0.000114	0.64	1808.78	368.17	0.03
Upper Reach	2873.24	35-year	3000.00	327.64	339.84	337.37	339.91	0.000132	0.66	1601.79	349.98	0.04
Upper Reach	2873.24	10-year	2100.00	327.64	339.71	336.08	339.75	0.000071	0.48	1557.24	345.79	0.03
Upper Reach	2873.24	5-year	1700.00	327.64	338.52	335.16	338.56	0.000123	0.58	1161.91	321.67	0.03
Upper Reach	2873.24	2-year	1000.00	327.64	336.77	333.13	337.43	0.003962	2.87	272.59	292.87	0.19
Upper Reach	2695.84	100-year	3900.00	327.95	337.85	337.81	340.96	0.016441	6.49	399.94	216.25	0.38
Upper Reach	2695.84	50-year	3400.00	327.95	337.80	337.80	340.19	0.012993	5.75	396.27	215.83	0.34
Upper Reach	2695.84	35-year	3000.00	327.95	337.80	337.80	339.66	0.010116	5.07	396.27	215.83	0.30
Upper Reach	2695.84	10-year	2100.00	327.95	335.82	335.82	339.36	0.024149	6.61	247.96	184.59	0.45
Upper Reach	2695.84	5-year	1700.00	327.95	336.24	335.10	338.30	0.012642	4.98	264.41	200.61	0.33
Upper Reach	2695.84	2-year	1000.00	327.95	335.82	332.96	336.62	0.005497	3.15	247.69	184.24	0.21
Upper Reach	2529.382	100-year	3900.00	326.34	339.25	336.74	339.77	0.000729	1.67	872.04	271.96	0.09
Upper Reach	2529.382	50-year	3400.00	326.34	338.22	336.40	338.82	0.001203	2.02	712.19	236.84	0.11
Upper Reach	2529.382	35-year	3000.00	326.34	337.67	336.15	338.28	0.001531	2.20	627.81	206.36	0.12
Upper Reach	2529.382	10-year	2100.00	326.34	336.30	335.00	336.94	0.003756	3.11	416.89	152.36	0.19
Upper Reach	2529.382	5-year	1700.00	326.34	335.82	335.00	336.42	0.004973	3.45	344.90	151.84	0.21
Upper Reach	2529.382	2-year	1000.00	326.34	333.68	332.74	335.32	0.007664	3.50	193.28	35.08	0.25
Upper Reach	2435.063	100-year	3900.00	326.71	339.43	336.13	339.65	0.000621	1.20	1368.15	348.09	0.06
Upper Reach	2435.063	50-year	3400.00	326.71	338.41	336.00	338.67	0.001019	1.45	1075.82	281.15	0.08
Upper Reach	2435.063	35-year	3000.00	326.71	337.85	335.86	338.11	0.001298	1.57	944.52	232.24	0.09
Upper Reach	2435.063	10-year	2100.00	326.71	336.31	335.59	336.62	0.003655	2.34	591.93	228.24	0.15
Upper Reach	2435.063	5-year	1700.00	326.71	335.49	335.47	335.99	0.007367	3.09	410.58	203.31	0.20
Upper Reach	2435.063	2-year	1000.00	326.71	332.79	331.97	334.52	0.016367	3.55	214.95	46.75	0.29
Upper Reach	2335.331	100-year	3900.00	326.15	339.40	332.44	339.59	0.001353	2.91	1253.75	242.33	0.17
Upper Reach	2335.331	50-year	3400.00	326.15	338.38	331.99	338.56	0.001745	3.07	1067.13	193.92	0.18
Upper Reach	2335.331	35-year	3000.00	326.15	337.81	331.63	337.98	0.001880	3.05	965.11	178.02	0.19
Upper Reach	2335.331	10-year	2100.00	326.15	336.20	330.72	336.35	0.002533	3.05	695.48	152.06	0.21
Upper Reach	2335.331	5-year	1700.00	326.15	335.38	330.16	335.51	0.002925	2.99	575.94	138.41	0.22
Upper Reach	2335.331	2-year	1000.00	326.15	333.35	329.03	333.45	0.003506	2.60	384.93	72.64	0.20
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	338.69	332.86	339.46	0.007769	3.78	962.26	171.42	0.20
Upper Reach	2308.404	50-year	3400.00	326.14	337.81	332.34	338.43	0.009382	3.92	839.07	137.79	0.22
Upper Reach	2308.404	35-year	3000.00	326.14	337.37	331.93	337.85	0.009425	3.81	778.22	136.13	0.22
Upper Reach	2308.404	10-year	2100.00	326.14	335.97	330.87	336.21	0.011309	3.74	592.13	130.94	0.23
Upper Reach	2308.404	5-year	1700.00	326.14	335.14	330.35	335.35	0.012911	3.71	484.56	127.24	0.25
Upper Reach	2308.404	2-year	1000.00	326.14	333.12	329.27	333.27	0.013427	3.12	320.92	60.86	0.24
Upper Reach	2287.614	100-year	3900.00	326.23	338.57	332.75	339.35	0.005710	3.42	1047.07	188.09	0.19
Upper Reach	2287.614	50-year	3400.00	326.23	337.68	332.28	338.27	0.007212	3.62	904.93	156.68	0.21
Upper Reach	2287.614	35-year	3000.00	326.23	337.23	331.88	337.69	0.007387	3.55	837.05	153.27	0.21
Upper Reach	2287.614	10-year	2100.00	326.23	335.78	330.87	335.99	0.009811	3.63	624.64	140.86	0.23
Upper Reach	2287.614	5-year	1700.00	326.23	334.90	330.34	335.09	0.011124	3.56	511.09	110.43	0.25
Upper Reach	2287.614	2-year	1000.00	326.23	332.85	329.27	333.00	0.012585	3.12	320.24	67.00	0.25
Upper Reach	2084.121	100-year	3900.00	323.64	337.68		337.93	0.007193	3.72	1017.00	144.92	0.21
Upper Reach	2084.121	50-year	3400.00	323.64	336.24		336.49	0.009985	4.07	836.66	101.97	0.24
Upper Reach	2084.121	35-year	3000.00	323.64	335.75		335.98	0.009176	3.80	790.12	93.38	0.23
Upper Reach	2084.121	10-year	2100.00	323.64	333.96		334.13	0.008483	3.34	629.45	85.51	0.22
Upper Reach	2084.121	5-year	1700.00	323.64	333.01		333.16	0.008106	3.09	550.49	81.37	0.21
Upper Reach	2084.121	2-year	1000.00	323.64	330.98		331.08	0.007263	2.54	394.00	72.46	0.19
Upper Reach	1873.917	100-year	3900.00	320.65	337.01		337.32	0.001533	1.88	1288.07	268.11	0.10
Upper Reach	1873.917	50-year	3400.00	320.65	331.40		332.31	0.004649	7.65	444.36	69.24	0.53
Upper Reach	1873.917	35-year	3000.00	320.65	328.15	328.15	330.47	0.215317	12.21	245.63	53.23	1.00
Upper Reach	1873.917	10-year	2100.00	320.65	326.98	326.98	328.95	0.226002	11.26	186.54	47.45	1.00
Upper Reach	1873.917	5-year	1700.00	320.65	326.37	326.37	328.15	0.233152	10.72	158.60	44.50	1.00
Upper Reach	1873.917	2-year	1000.00	320.65	325.10	325.10	326.48	0.252834	9.44	105.93	38.33	1.00
Upper Reach	1798.381	100-year	3900.00	318.55	337.08		337.28	0.000062	3.95	1419.97	307.80	0.20
Upper Reach	1798.381	50-year	3400.00	318.55	331.20		332.17	0.000496	7.91	429.97	56.86	0.51
Upper Reach	1798.381	35-year	3000.00	318.55	327.86	327.14	329.94	0.001510	11.56	259.48	45.15	0.85
Upper Reach	1798.381	10-year	2100.00	318.55	325.32	325.78	328.14	0.002990	13.47	155.96	36.48	1.15
Upper Reach	1798.381	5-year	1700.00	318.55	324.55	325.07	327.26	0.003341	13.21	128.72	33.86	1.19
Upper Reach	1798.381	2-year	1000.00	318.55	323.03	323.59	325.39	0.004251	12.33	81.10	28.70	1.29
Upper Reach	1641.59	100-year	3900.00	315.77	337.12		337.24	0.000216	0.88	2505.67	287.12	0.04
Upper Reach	1641.59	50-year	3400.00	315.77	331.63		331.75	0.003829	2.80	1207.39	180.51	0.15
Upper Reach	1641.59	35-year	3000.00	315.77	328.72		328.92	0.007821	3.58	837.62	96.13	0.21
Upper Reach	1641.59	10-year	2100.00	315.77	326.07	320.51	326.26	0.009462	3.49	601.53	83.09	0.23

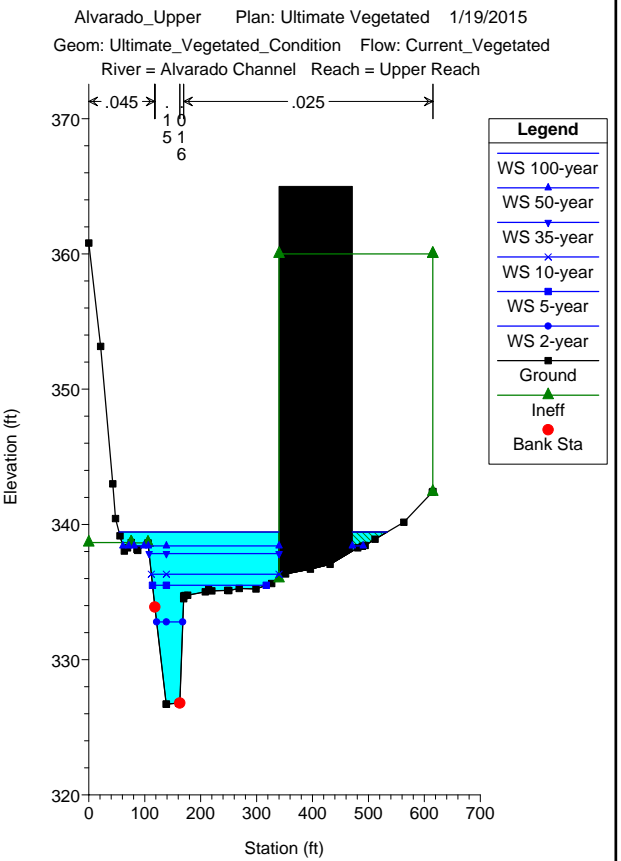
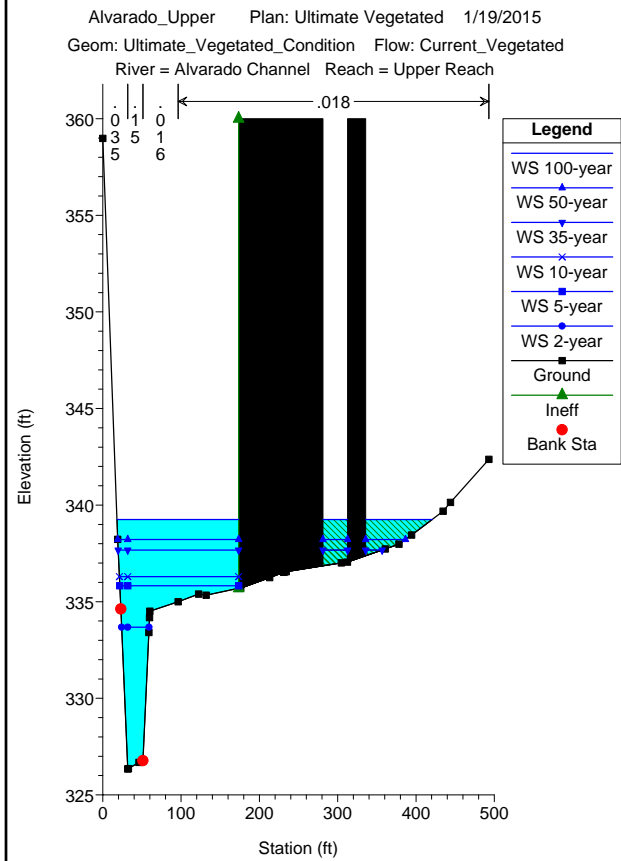
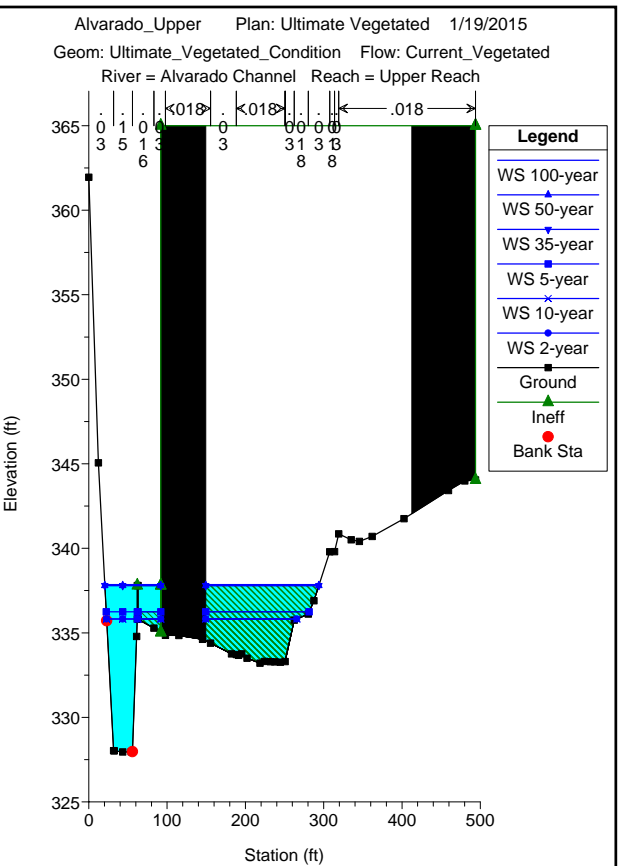
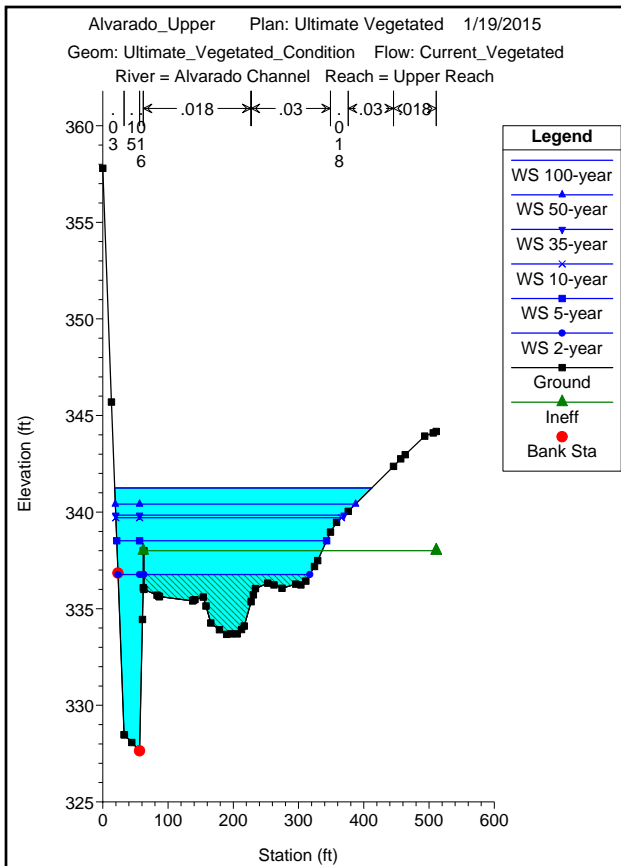
HEC-RAS Plan: Ult-Veg River: Alvarado Channel Reach: Upper Reach (Continued)

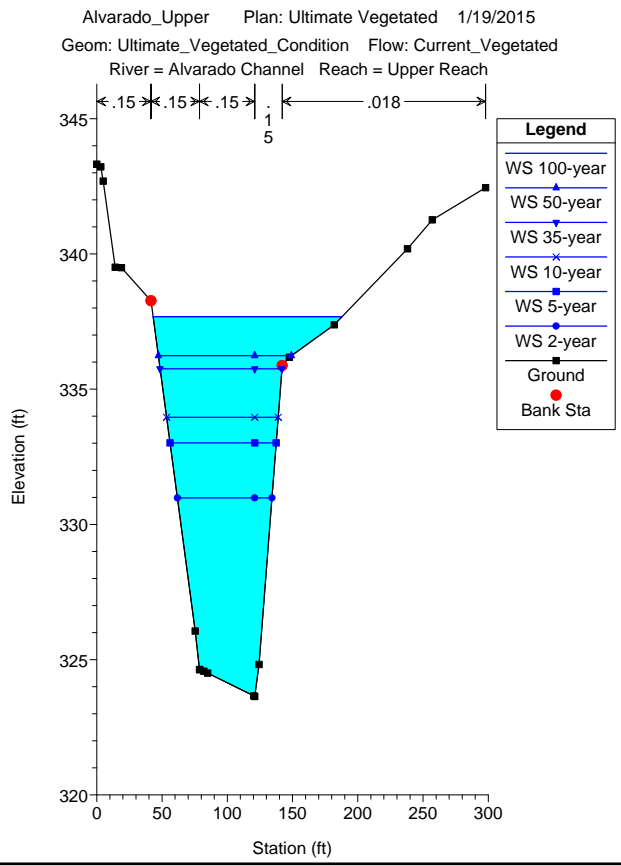
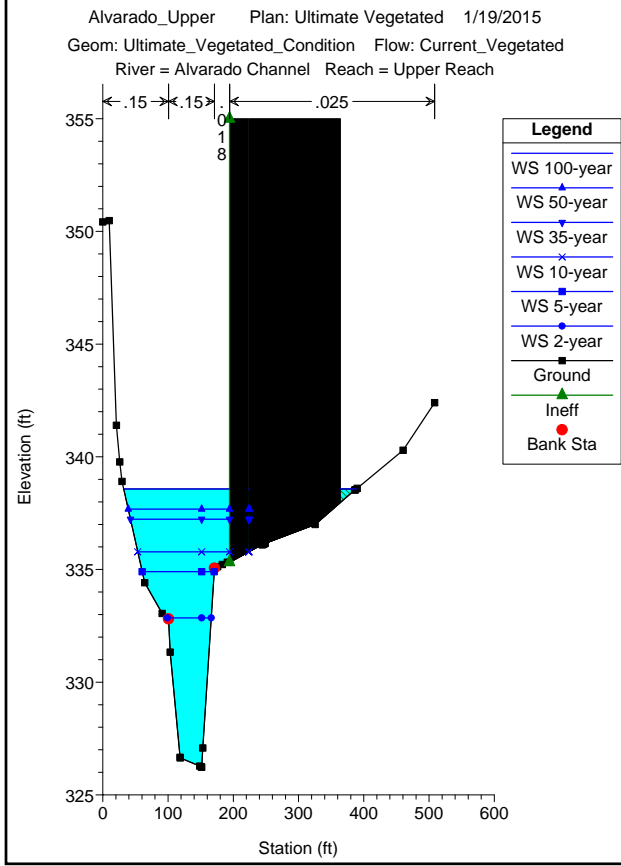
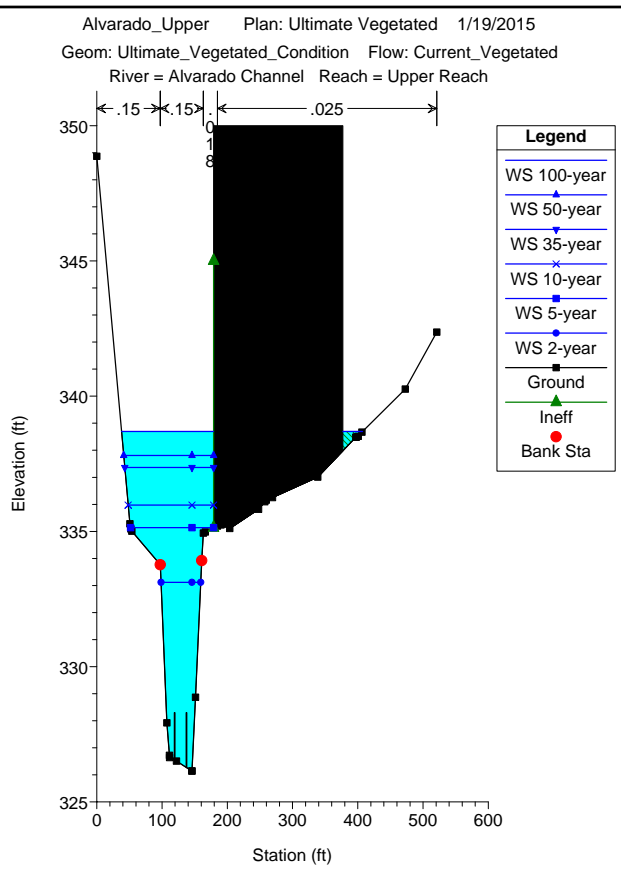
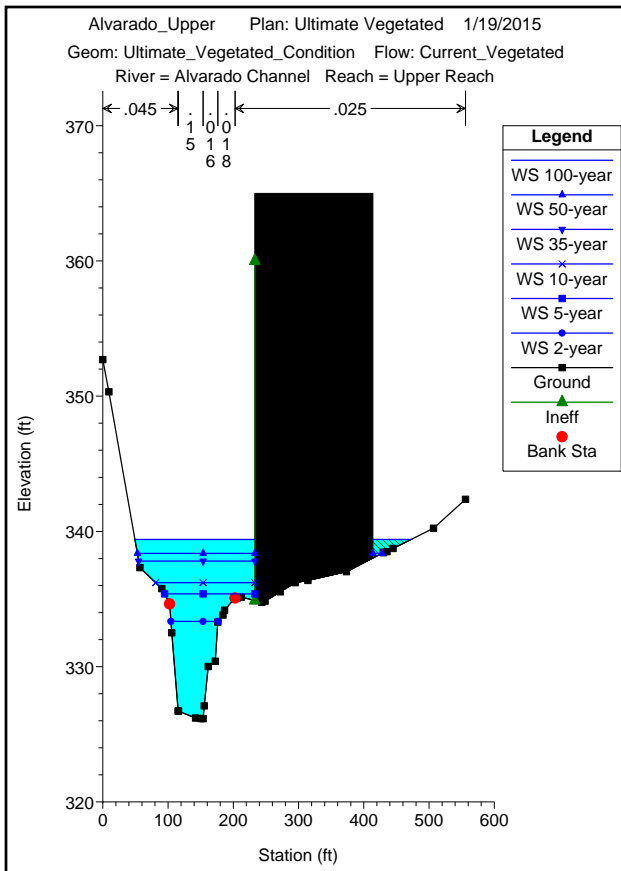
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	324.99	320.03	325.16	0.009709	3.31	513.75	78.68	0.23
Upper Reach	1641.59	2-year	1000.00	315.77	322.64	318.97	322.78	0.011024	2.94	340.43	69.19	0.23
Upper Reach	1489.686	100-year	3900.00	312.84	337.11		337.19	0.000263	0.97	2124.33	265.19	0.04
Upper Reach	1489.686	50-year	3400.00	312.84	330.45		330.80	0.011336	4.81	717.54	126.16	0.24
Upper Reach	1489.686	35-year	3000.00	312.84	326.22		326.87	0.026895	6.45	464.95	45.48	0.36
Upper Reach	1489.686	10-year	2100.00	312.84	323.19		323.80	0.032219	6.26	335.46	40.46	0.38
Upper Reach	1489.686	5-year	1700.00	312.84	322.23		322.74	0.029658	5.72	297.11	39.02	0.37
Upper Reach	1489.686	2-year	1000.00	312.84	319.89		320.25	0.027412	4.76	210.18	35.53	0.34
Upper Reach	1439.048	100-year	3900.00	311.46	337.03		337.17	0.000654	1.49	1897.22	239.95	0.06
Upper Reach	1439.048	50-year	3400.00	311.46	329.96		330.25	0.009896	4.37	778.43	69.32	0.23
Upper Reach	1439.048	35-year	3000.00	311.46	324.78		325.43	0.029886	6.47	464.02	52.07	0.38
Upper Reach	1439.048	10-year	2100.00	311.46	320.96		321.78	0.049668	7.24	290.16	40.13	0.47
Upper Reach	1439.048	5-year	1700.00	311.46	320.30		320.95	0.042084	6.44	264.10	38.64	0.43
Upper Reach	1439.048	2-year	1000.00	311.46	318.15		318.60	0.038876	5.38	185.82	34.31	0.41
Upper Reach	1288.123	100-year	3900.00	306.79	337.01		337.09	0.000277	1.16	2754.14	192.62	0.05
Upper Reach	1288.123	50-year	3400.00	306.79	329.58		329.65	0.001793	2.20	1542.98	117.91	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.64		323.80	0.004834	3.19	941.05	85.54	0.17
Upper Reach	1288.123	10-year	2100.00	306.79	316.54		316.92	0.021525	4.99	421.18	61.20	0.33
Upper Reach	1288.123	5-year	1700.00	306.79	314.28		314.80	0.038963	5.82	292.04	52.94	0.44
Upper Reach	1288.123	2-year	1000.00	306.79	312.54		312.90	0.036290	4.87	205.47	46.60	0.41
Upper Reach	1111.63	100-year	3900.00	303.43	337.03	309.20	337.04	0.000086	0.75	4825.91	292.31	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.50	308.81	329.52	0.000343	1.18	2903.71	215.38	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.44	308.49	323.47	0.000818	1.55	1936.13	142.25	0.07
Upper Reach	1111.63	10-year	2100.00	303.43	315.71	307.72	315.78	0.002722	2.16	973.42	108.56	0.13
Upper Reach	1111.63	5-year	1700.00	303.43	311.61	307.34	311.75	0.009168	3.04	558.49	93.66	0.22
Upper Reach	1111.63	2-year	1000.00	303.43	309.58	306.54	309.69	0.010512	2.66	376.02	86.30	0.22
Upper Reach	826.8154	100-year	3900.00	301.19	337.02		337.03	0.000037	0.53	6683.21	360.91	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.45		329.46	0.000117	0.76	4457.10	259.70	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.33		323.35	0.000253	0.96	3133.16	201.08	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.37		315.40	0.000770	1.26	1665.16	164.98	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	310.18		310.24	0.003369	1.94	877.27	139.41	0.14
Upper Reach	826.8154	2-year	1000.00	301.19	307.05		307.13	0.007748	2.15	465.73	119.42	0.19
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.02	0.000035	0.53	5681.68	307.60	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.43		329.44	0.000159	0.92	3694.43	228.08	0.03
Upper Reach	676.0353	35-year	3000.00	296.69	323.28		323.30	0.000321	1.14	2642.35	151.05	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.25		315.28	0.000718	1.37	1537.96	124.03	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	309.79		309.84	0.002125	1.87	910.39	105.34	0.11
Upper Reach	676.0353	2-year	1000.00	296.69	306.43		306.48	0.002690	1.73	579.07	90.82	0.12
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000138	0.98	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.41	329.42	0.000414	1.45	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.26	0.001398	2.26	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.83	315.15	0.008540	4.09	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	308.90	302.92	309.45	0.030023	5.94	286.18	30.73	0.34
Upper Reach	611.5112	2-year	1000.00	295.46	305.61	300.96	306.03	0.030007	5.20	192.36	26.28	0.34

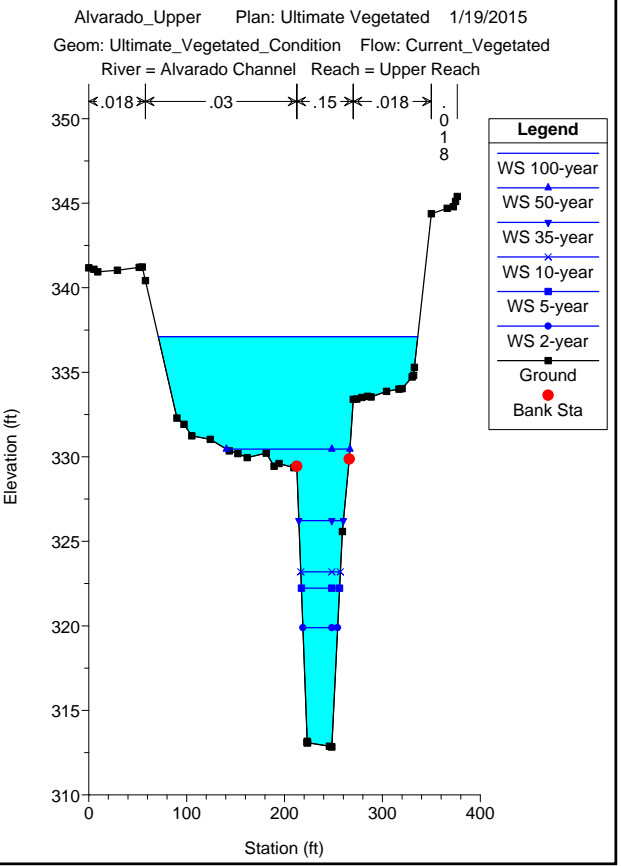
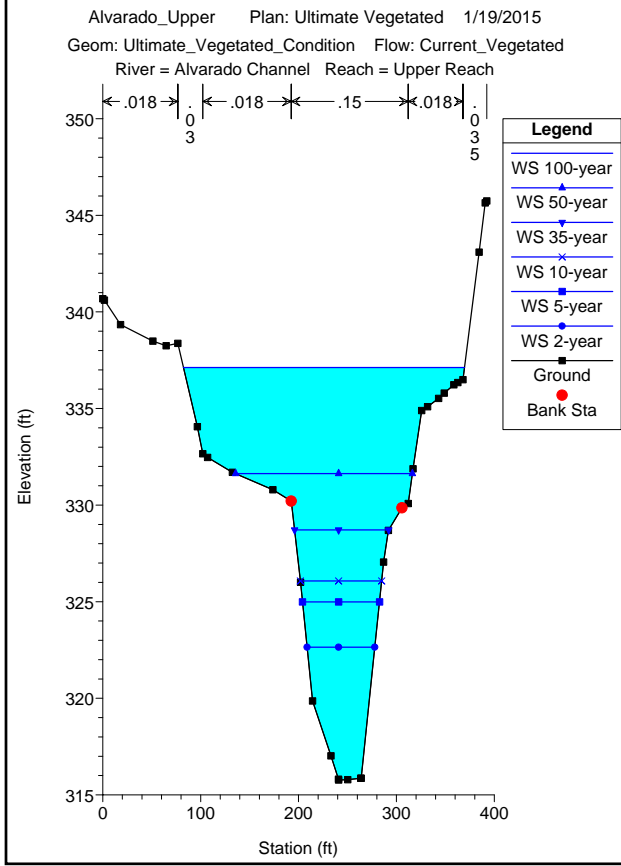
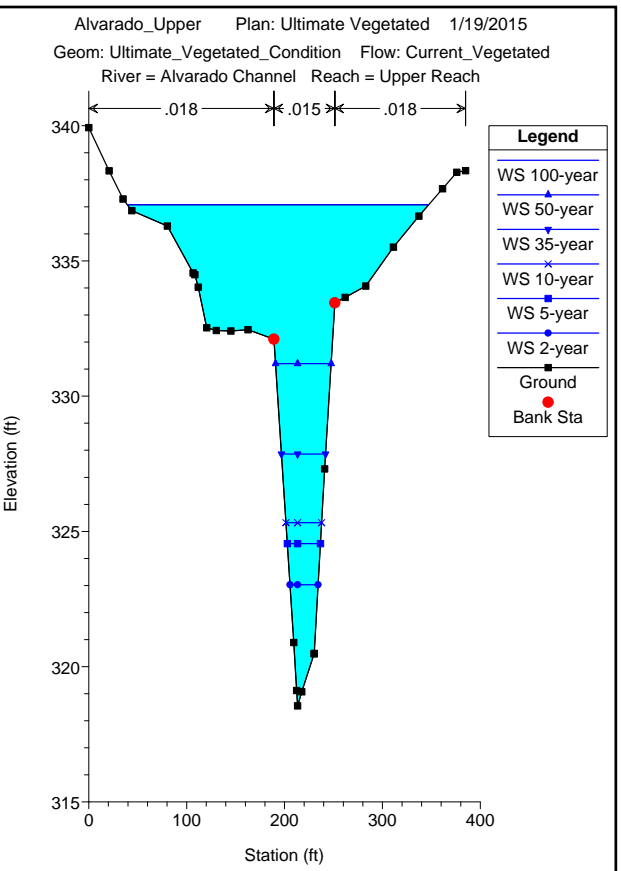
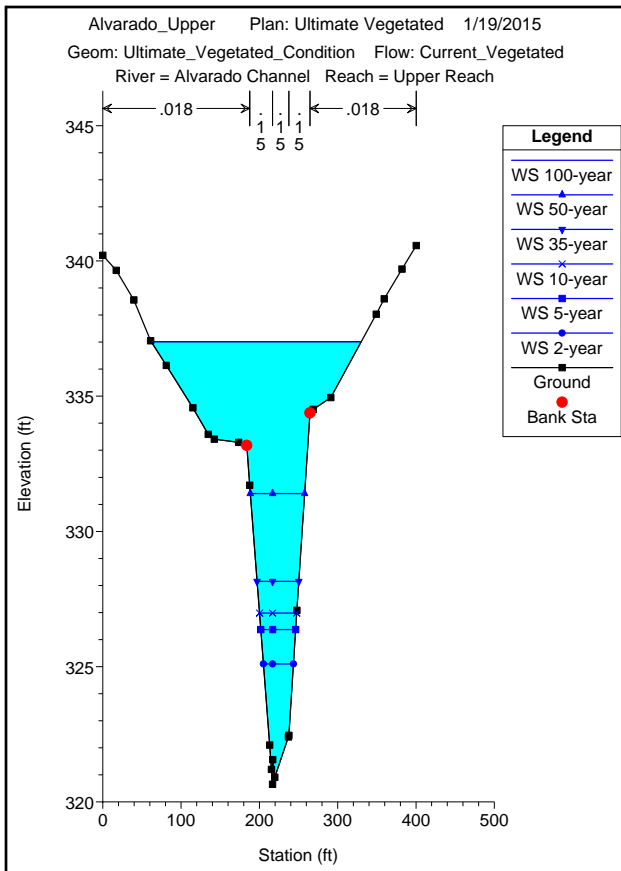


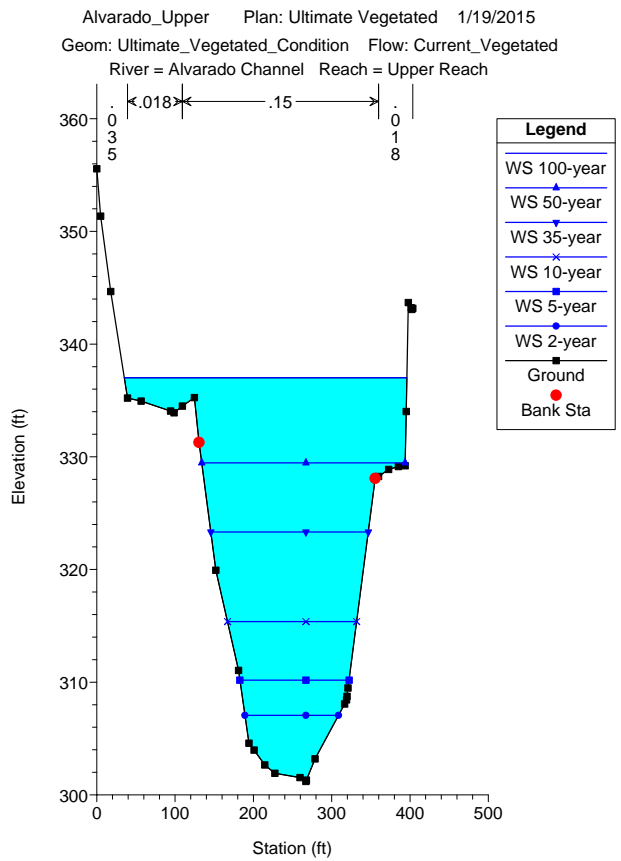
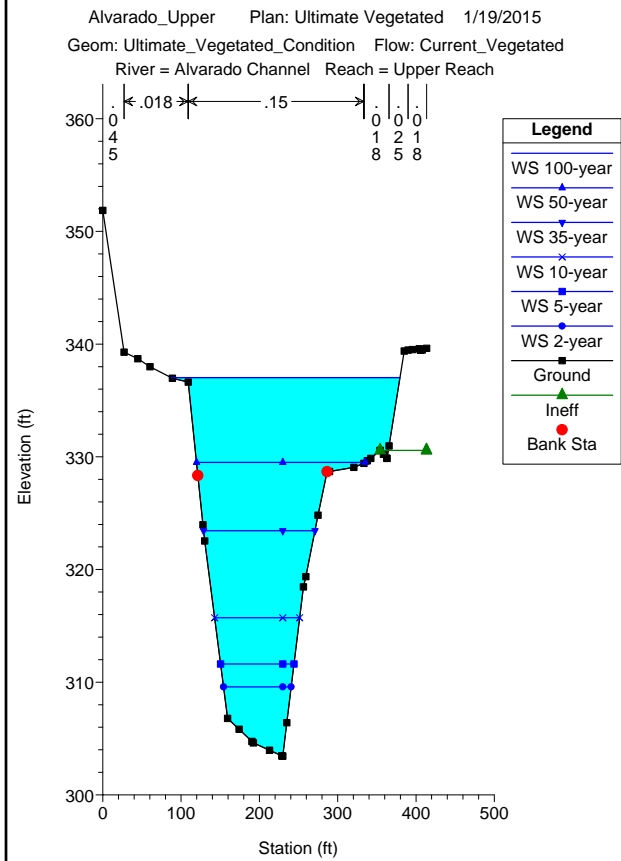
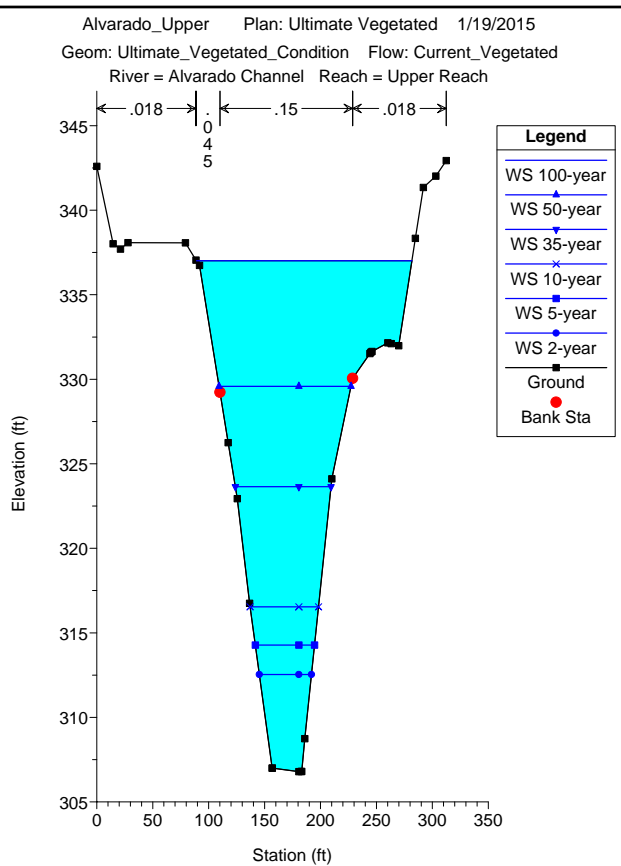
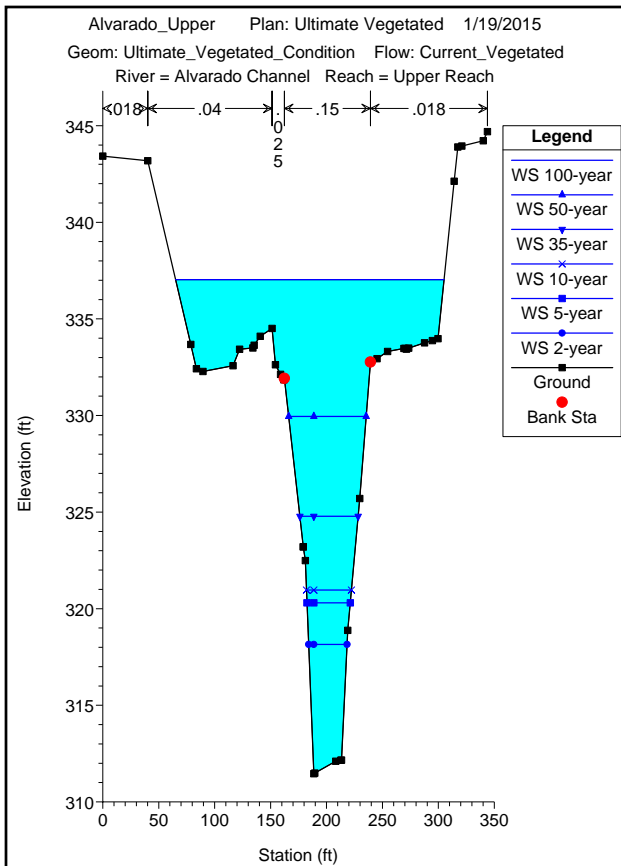


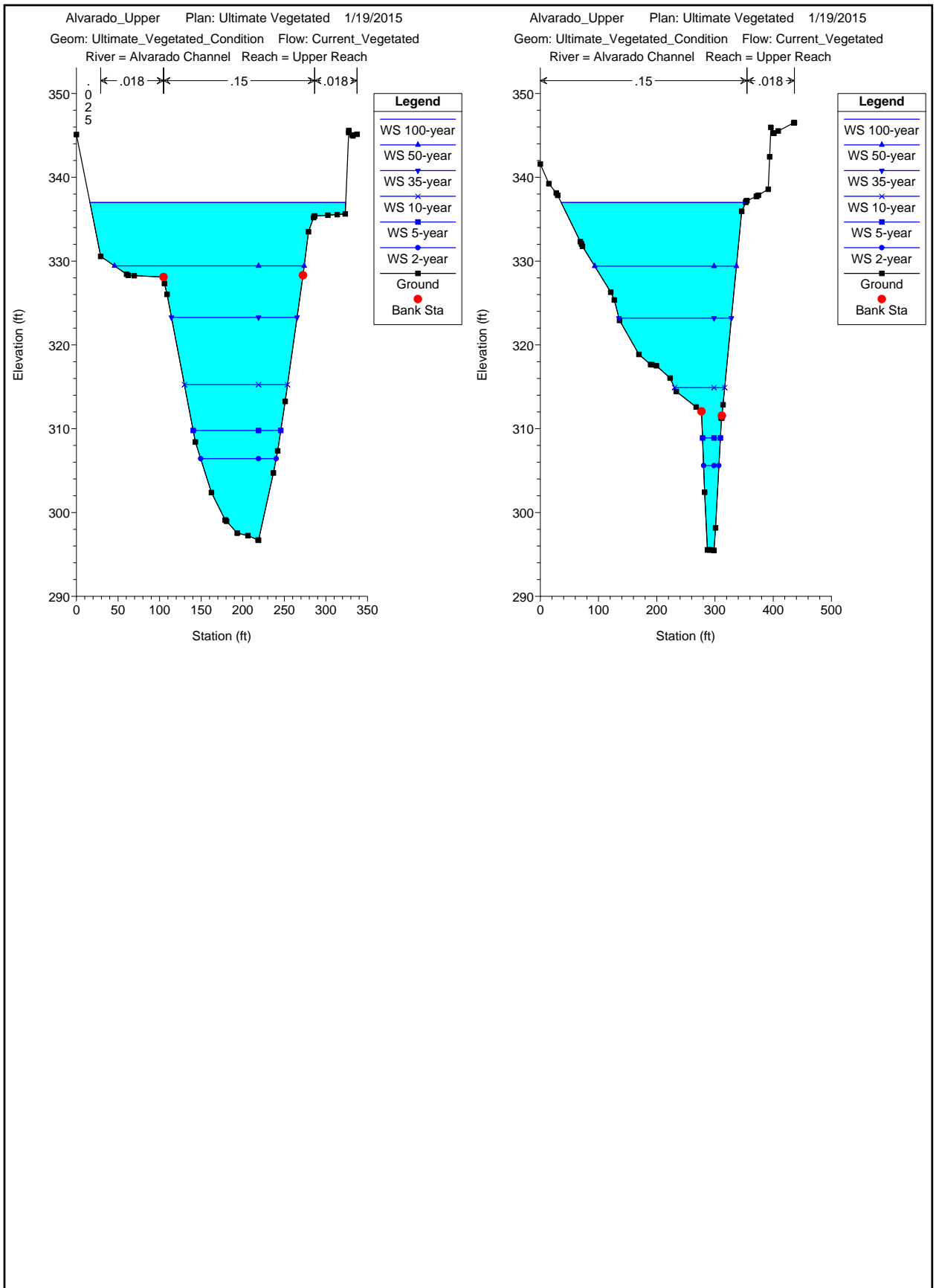












HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 1/19/2015 11:55:12 AM

Project in English units

PLAN DATA

Plan Title: Ultimate Vegetated
 Plan File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p02

Geometry Title: Ultimate_Vegetated_Condition
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g03

Flow Title : Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
Alvarado ChannelUpper	Reach	4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper	Reach	100-year	Critical	Known WS = 337
Alvarado ChannelUpper	Reach	50-year	Critical	Known WS = 329.4
Alvarado ChannelUpper	Reach	35-year	Critical	Known WS = 323.2
Alvarado ChannelUpper	Reach	10-year	Critical	Known WS = 314.9
Alvarado ChannelUpper	Reach	5-year	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Ultimate_Vegetated_Condition
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g03

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99	79.65	352.77
92.38	352.108.38	352	108.38	340.4	117.38	340.4	117.38	340.4	117.38
118.08	351.118.08	340.4	126.68	340.4	126.68	351	127.38	351	127.38
127.38	340.4.136.38	340.4	136.38	352	149.38	352	149.38	352	149.38
244.46	352.12.267.11	352.83	268.8	352.79	276.98	352.19	297.78	353.19	353.19
301.32	353.34.304.91	353.41	319.7	353.68	327.66	355.65	328.6	355.94	355.94
329.79	356.2.348.2	362.06	362.49	365.16					

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.018	108.38	.016	136.38	.018			

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.38 136.38 56.75 57.06 57.78 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75
516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75
						738.21	350.75

745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	336.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1932.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63	63.35	353.68
83.88	352	99.88	352	99.88	339.3	108.88	339.3	108.88	351.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3	118.88	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352	284.1	352.54
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39	326.64	353.31
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22	369.63	361.24
388.16	365.26	393.87	365.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.88 127.88 35.29 35.3 35.1 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
292.86 388.16 352.97 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 67.09 370 170.25 263.29 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66
128.96	350.55	134.07	350.6	144	350.85	149.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39
192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.6 93.6 27.81 27.21 26.73 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
99.74 294.86 352.67 F
294.86 387.54 353.03 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 56.31 365 163.1 265.25 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.36	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
63.26 104.83 164.21 164.68 167.58 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
104.83 326.23 351 F
326.23 421.9 353.09 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 59.44 370 164.66 297.32 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	156.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
74.43 109.33 381.65 361.63 347.98 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
115.33 233.87 346.05 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 61.02 354 156.99 520.69 354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev
0 365.86 16.26 353.45 32.29 341.36 38.14 336.95 41.63 333.87
42.22 333.86 57.31 333.57 57.59 333.56 64.94 340.73 66.19 341.59
69.85 341.68 70.47 343.4 75.47 343.3 96.47 344 104.47 344.1
104.47 350.25 113.47 350.25 113.47 350.76 478.56 350.76 478.56 347.5
762.56 351

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 32.29 .016 41.63 .15 57.31 .016 66.19 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
32.29 66.19 160.29 155.35 151.31 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
121.74 762 350.76 F
Blocked Obstructions num= 1
Sta L Sta R Elev
121.74 406.35 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 360.08 24.76 342.73 38.72 332.95 39.06 332.94 52 332.69
55.04 332.61 55.85 332.58 61.28 337.51 65.85 341.63 66 342
71.24 342.44 80.82 342.3 103.66 342.5 103.66 350.75 107 350.75
342.68 350.75

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 24.76 .016 38.72 .15 55.85 .016

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.76 71.24 156.2 157.14 158.25 .1 .3
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
106 129.29 365 129.29 271.93 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 23
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.57 21.79 345.71 29.74 340.6 43.48 331.78 43.71 331.62
56.66 331.09 60.41 330.93 60.88 330.91 71.14 340.13 71.45 340.42
79.54 342.57 80.33 342.77 81.75 342.81 118.62 343.84 192.97 343.58
209.41 343.65 277.88 343.1 295.07 343.01 300.31 343.06 368.05 343.52
394.52 343.56 434.26 343.52 442.68 343.45

Manning's n Values num= 6
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 29.74 .016 43.71 .15 60.88 .016 71.45 .02
209.41 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.74 71.45 183.48 182.29 181.14 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 34
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.83 25.85 340.86 29.47 338.04 39.31 330.38 39.47 330.38
53.23 330.13 56.6 330.09 56.92 330.09 67.04 338.54 68.39 339.66
69.63 339.89 75.76 341.24 75.77 343.24 76.77 343.24 76.77 341.24
79.11 341.33 103.2 341.93 115.27 341.94 134.16 342.42 146.31 342.7
177.81 343.05 189.09 343.18 253.73 343.18 261.47 343.22 306.56 343.78
321.66 343.97 326.01 343.93 364.07 343.94 376.97 343.95 379.8 343.94
389.33 343.7 410.09 342.8 421.87 343.03 428.88 343.16

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 29.47 .016 39.31 .15 56.92 .016 75.76 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.47 67.04 188.22 188.31 208.19 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
75.77 428.88 343.24 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 29
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 349.55 15.53 339.93 19.43 337.64 32.81 329.79 33.85 329.75
45.6 329.33 51.53 329.09 52.41 329.06 59.04 334.91 62.21 337.64
62.22 339.64 63.22 339.64 63.22 337.64 95.9 337.03 96.15 337.01
96.9 337.04 137.52 339.32 162.33 338.17 178.31 338.08 189.7 338.27
200.4 338.42 220.32 338.78 246.45 339.28 298.6 340.95 310.42 341.33
347.72 342 358.94 342.14 362.36 342.19 368.47 342.31

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 32.81 .15 52.41 .016 62.21 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
19.43 52.41 213.1 211.63 234.86 .1 .3
Ineffective Flow num= 2
Sta L Sta R Elev Permanent
63.22 68.42 339.64 F
68.42 368.47 345 F
Blocked Obstructions num= 1
Sta L Sta R Elev
68.42 145.82 350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 351.63 6.26 347.24 20.56 337.219 31.56 329.51 32.37 329.46
44.1 328.69 48.11 328.45 49.21 328.39 51.59 331.53 57.89 337.63
61.86 337.58 61.86 339.58 62.86 339.58 62.86 337.39 75.24 337.39
91.39 336.99 131.08 336.38 142.66 336.41 159.33 336.04 163.29 335.96
188.72 335.64 192.7 335.57 205 335.6 208.43 335.97 218.96 337.16
242.63 337.75 248.26 337.75 255.89 337.79 285.47 337.83 313.92 338.26
340.9 338.14 346.6 338.38 352.33 338.65 363.42 340.11 406.82 341.23
414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 6.26 .016 20.56 .15 31.56 .016 32.37 .02
57.89 .018

0 .05 31.56 .15 49.21 .016 57.89 .018 163.29 .03
 192.7 .018 218.96 .03 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.56 49.21 146.85 145.44 131.99 .1 .3
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 57.89 62.86 337.63 F
 62.86 71.22 339.58 T
 71.22 441 355 F
 Blocked Obstructions num= 4
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
 232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 40
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 356.18 21.74 337.198 30.35 329.68 31.17 329.1 31.35 329.09
 32.26 329.04 38.76 328.75 53.29 328.1 53.58 328.09 54.27 328.83
 62.04 337.14 62.1 339.14 63.1 339.14 63.1 337.14 67.96 336.95
 88.97 336.63 117.23 336.41 137.39 336.13 161.66 335.69 166.55 335.6
 183.27 335.55 191.42 335.3 198.28 335.05 202.99 335.06 210.13 334.92
 215.7 334.95 221.61 335.05 227.44 335.25 235.84 335.33 244.24 335.42
 264.47 335.71 299.23 337.95 328.34 337.67 346.84 337.59 351.58 338.13
 359.81 339.41 390.03 340.55 403.82 341.1 440.67 342.11 449.14 342.35

Manning's n Values num= 7
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 30.35 .15 53.29 .016 137.39 .03 183.27 .018
 264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.74 53.29 48.12 46.59 34.68 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62.1 449.14 339.14 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 49
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 357.8 13.19 345.7 23.23 336.84 32.69 328.48 33.06 328.47
 44.33 328.07 55.4 327.68 56.49 327.64 60.79 334.44 61.93 336.08
 62 338 63 338 63 336 83 335.7 86.08 335.64
 86.44 335.63 86.75 335.63 137.86 335.4 138.65 335.44 141.22 335.47
 154.05 335.6 158.2 335.14 165.58 334.26 178.77 333.91 189.74 333.67
 196.35 333.7 205.98 333.7 212.66 333.92 216.97 334.1 227.31 335.36
 230.72 335.72 233.9 336.04 252.75 336.32 262.38 336.23 274.67 336.06
 295.69 336.27 303.61 336.23 311.15 336.43 324.47 337.18 329.24 337.49
 348.87 338.96 358.14 339.47 376.13 340.04 445.64 342.37 456.48 342.76
 463.45 342.97 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 32.69 .15 56.49 .016 61.93 .018 227.31 .03
 348.87 .018 376.13 .03 445.64 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 23.23 56.49 179.7 177.4 154.96 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 42
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 361.95 12.31 345.06 22.84 335.71 31.63 328.03 32.59 328.02
 43.26 327.95 54.18 327.96 55.74 327.97 61.02 334.79 61.88 335.82
 62 337.8 63 337.8 63 335.8 83.16 335.28 97.88 334.85
 115.03 334.84 145.23 334.62 155.42 334.39 182.3 333.76 188.41 333.72
 191.22 333.67 195.43 333.76 202.05 333.5 218.7 333.21 224.74 333.31
 232.14 333.29 237.4 333.28 244.5 333.26 250.72 333.3 262.29 335.75
 280.25 336.11 287.55 336.9 307.71 339.79 313.94 339.8 319.15 340.85
 335.15 340.5 345.45 340.41 361.78 340.7 402.63 341.75 459.27 343.42
 480.11 343.99 493.96 344.04

Manning's n Values num= 13
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 31.63 .15 55.74 .016 83.16 .03 97.88 .018
 155.42 .03 188.41 .018 250.72 .03 262.29 .018 280.25 .03
 307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.84 55.74 161.84 166.46 226.33 .1 .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 62 91.85 337.8 F
 91.85 493.96 365 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 28
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 358.98 19.08 338.23 22.99 334.62 31.96 326.34 32.75 326.36
 46.17 326.68 50.81 326.76 51.2 326.77 58.78 333.41 59.67 334.18
 60.05 334.51 96.28 335 122.48 335.39 131.97 335.34 174.16 335.7
 176.05 335.7 213.04 336.25 231.04 336.52 231.23 336.53 234.1 336.55
 304.7 337.01 312.5 337.05 360.6 337.73 378.26 337.98 394.39 338.45
 434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .035 31.96 .15 51.2 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.99 51.2 109.52 94.32 36.08 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 173.53 493.08 360 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT
 Description:
 Station Elevation Data num= 40
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 360.81 21.23 353.16 42.85 343 47.85 340.43 55.92 339.16
 63.64 338.03 69.33 338.27 75.76 338.66 86.2 338.15 87.49 338.08

105.77	338.63	106.06	338.53	118.18	333.89	138.46	326.71	138.83	326.71
160.56	326.79	162.28	326.79	162.8	326.79	169.52	334.5	169.71	334.71
172.01	334.74	176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08
248.23	335.12	250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63
351.83	336.34	396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39
493.94	338.45	511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	118.18	.15	162.8	.016	169.71	.025	

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

118.18	162.8		112	100		.22		.1	.3
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Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F
340.09	615	360	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
340.09	471.21	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT Description:

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64
105.72	332.51	115.37	326.72	115.96	326.71	142.3	326.2	150.28	326.16
153.68	326.15	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74
506.87	340.23	555.95	342.37						

Manning's n Values num= 5

Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.045	115.37	.15	153.68	.016	176.37	.018	202.82	.025		

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

102.47	202.82		28.83	29		6.18		.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
233	555.95	360	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
233	414	365

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

INPUT Description:

Lateral structure position = Next of right bank station

Distance from Upstream XS =

Deck/Roadway Width = 10

Weir Coefficient = 2

Weir Flow Reference = Water Surface

Weir Embankment Coordinates num = 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11		

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT Description:

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77
107.31	327.92	111.26	326.72	111.54	326.64	122.23	326.51	145.7	326.14
145.99	326.14	151.2	328.87	160.87	333.92	163.21	334.94	166.35	334.98
184.8	335.2	190.27	335.24	193.34	335.27	203.7	335.11	247.82	335.82
257.56	336.1	259.76	336.16	269.28	336.25	338.64	337.01	397.05	338.48
397.76	338.49	400.6	338.52	406.38	338.67	472.69	340.26	520.97	342.37

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.15	97.37	.15	163.21	.018	184.8	.025	

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

97.37	160.87		25.93	20.79		5.61		.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
179	520.97	345	F

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev			
179	377	350	118.73	119.98	328.3	136.73	137.98	328.3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT Description:

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6
460.26	340.29	508.6	342.4						

Manning's n Values num= 4

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.15	100.71	.15	171.09	.018	194.36	.025	

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

100.71	171.09		192.47	203.49		166.15		.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
224.96	364.18	355	194.19	223.55	355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT Description:

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87
147.5	336.18	161.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .15 41.5 .15 78.71 .15 121.04 .15 142.05 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1873.917

INPUT
 Description:
 Station Elevation Data num= 26
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 340.21 17.09 339.65 39.55 338.56 61.14 337.05 81.03 336.14
 115.12 334.57 134.63 333.59 142.49 333.41 173.44 333.29 183.84 333.18
 187.67 331.71 213.06 322.1 215.35 321.2 216.73 320.65 216.93 321.56
 219.6 320.91 236.95 322.4 237.63 322.46 247.85 327.08 264.56 334.38
 268.74 334.51 291.21 334.95 349.13 338.03 359.34 338.6 382.09 339.7
 400.21 340.57

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 187.67 .15 216.73 .15 237.63 .15 264.56 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1798.381

INPUT
 Description:
 Station Elevation Data num= 28
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 339.93 20.76 338.33 34.9 337.29 43.91 336.86 80.21 336.29
 106.62 334.56 108.42 334.49 111.81 334.03 120.4 332.53 130.3 332.43
 145.23 332.41 162.57 332.46 189.06 332.11 209.47 320.89 212.4 319.12
 213.36 318.55 217.53 319.07 230.09 320.47 230.3 320.49 241.01 327.31
 251.36 333.45 261.86 333.65 282.99 334.07 311.3 335.51 337.2 336.66
 361.35 337.67 376.05 338.28 385 338.34

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 0 .018 189.06 .015 251.36 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1641.59

INPUT
 Description:
 Station Elevation Data num= 35
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 340.68 1.61 340.61 18.07 339.34 51.19 338.49 64.73 338.25
 76.62 338.37 96.55 334.06 102.18 332.66 107 332.47 132.46 331.7
 173.79 330.79 192.62 330.21 201.99 326.01 214.26 319.86 233.15 317.02
 240.74 315.81 240.97 315.77 250.34 315.79 263.52 315.86 263.99 315.86
 286.95 327.05 291.75 328.69 305.69 329.86 312.05 330.08 316.94 331.88
 325.73 334.89 331.83 335.09 343.08 335.52 348.82 335.8 358.59 336.23
 362.71 336.34 367.96 336.49 384.52 343.09 390.68 345.64 392.33 345.74

Manning's n Values num= 6
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 76.62 .03 102.18 .018 192.62 .15 312.05 .018
 367.96 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1489.686

INPUT
 Description: U/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 44
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 341.18 5.24 341.09 9.17 340.94 29.19 341.04 51.52 341.21
 54.59 341.23 57.81 340.42 90.09 332.29 97.19 331.92 105.34 331.24
 124.03 331.03 143.5 330.35 152.39 330.19 161.87 329.95 181.33 330.22
 189.35 329.44 194.28 329.6 209.49 329.36 212.54 329.44 223.08 313.17
 223.09 313.09 223.19 313.09 223.63 313.09 245.83 312.88 247.67 312.85
 248.3 312.84 259.06 325.58 266.06 329.87 270.18 333.4 273.74 333.42
 279.01 333.51 284.93 333.58 288.34 333.54 304.18 333.87 316.96 334
 320.02 334.03 330.36 334.72 331.8 334.82 332.71 335.29 349.96 344.38
 366.14 344.7 372.42 344.79 374.69 345.11 376.49 345.4

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 57.81 .03 212.54 .15 270.18 .018 349.96 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 212.54 266.06 50.44 50.64 51.04 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1439.048

INPUT
 Description: D/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 41
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 343.43 40.16 343.19 78.69 333.68 83.72 332.42 89.53 332.28
 116.49 332.58 122.27 333.43 134.23 333.5 135.38 333.64 140.72 334.1
 151.34 334.51 154.27 332.63 158.9 332.13 161.85 331.85 162.38 331.92
 179.21 323.2 179.22 323.2 181.06 322.49 188.67 311.46 189.58 311.49
 208.3 312.1 212.7 312.15 213.36 312.16 218.98 318.88 229.67 325.7
 239.35 332.77 245.09 332.94 254.59 333.31 269.24 333.47 270.27 333.47
 271.27 333.45 271.68 333.45 273.42 333.49 287.61 333.76 294.66 333.88
 299.61 333.98 314.16 342.13 317.45 343.9 320.98 343.95 340.1 344.22
 343.78 344.69

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 40.16 .04 151.34 .025 162.38 .15 239.35 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1288.123

INPUT
 Description:
 Station Elevation Data num= 29
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 342.6 14.55 338.01 21.13 337.7 27.84 338.08 79.31 338.07
 88.69 337.05 91.87 336.74 110.15 329.23 117.39 326.25 125.52 322.94
 136.54 316.75 156.79 307 156.94 307 180.63 306.79 182.71 306.8
 183.29 306.8 185.93 308.74 210.07 324.11 228.7 330.05 244.22 331.52
 244.99 331.6 245.97 331.64 260.21 332.16 263.18 332.11 269.92 331.99
 284.82 338.34 291.98 341.35 303.02 342.02 312.33 342.94

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 88.69 .045 110.15 .15 228.7 .018

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

110.15 228.7 168.1 176.49 194.32 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1111.63

INPUT

Description:

Station	Elevation	Data	num=	41					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.86	27.2	339.28	44.8	338.7	60.26	338	88.84	336.97
109.09	336.63	121.36	328.337	127.82	323.97	130.06	322.53	159.44	306.78
174.11	305.82	190.49	304.74	192.3	304.62	213	303.96	228.71	303.46
229.22	303.44	229.84	303.43	234.91	306.4	256.18	318.46	259.39	319.37
274.82	324.82	286.38	328.68	289.62	328.69	320.59	329.07	333.47	329.42
337.85	329.64	342.23	329.86	354.08	330.57	354.39	330.55	358.31	330.23
362.71	329.87	362.89	329.86	365.46	330.96	384.93	339.39	389.83	339.47
395.28	339.51	404.27	339.58	405.55	339.49	405.96	339.45	408.14	339.49
413.47	339.62								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	27.2	.018	109.09	.15	333.47	.018	365.46	.025
389.83	.018								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
121.36 286.38 256.29 284.82 327.16 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 826.8154

INPUT

Description:

Station	Elevation	Data	num=	34					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.56	4.94	351.36	17.74	344.66	39.17	335.21	56.65	334.94
94.27	334.06	98.75	333.91	109.22	334.5	124.61	335.26	130.67	331.28
151.97	319.94	180.98	311.04	194.35	304.59	200.85	303.97	214.63	302.65
227.33	301.92	259.57	301.53	267	301.19	267.72	301.31	278.8	303.19
316.51	308.07	319.03	308.44	319.58	308.75	320.87	309.48	355.52	328.08
359.81	328.25	372.61	328.88	385.26	329.13	393.73	329.21	395.14	334.02
397.85	343.69	401.51	343.22	402.37	343.08	403.61	343.18		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.17	.018	109.22	.15	359.81	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
130.67 355.52 157.21 150.78 167.76 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 676.0353

INPUT

Description:

Station	Elevation	Data	num=	33					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	345.1	29.14	330.56	60.41	328.44	62.38	328.3	69.47	328.27
104.89	328.09	105.89	327.33	108.93	326.04	143.06	308.42	162.36	302.38
179	299.1	179.23	299.08	180.51	298.96	193.33	297.54	206.23	297.24
218.47	296.71	218.93	296.69	236.81	304.72	242.08	307.35	250.99	313.25
272.48	328.3	279.05	333.5	285.26	335.19	285.9	335.38	286.53	335.38
302.36	335.48	313.71	335.54	323.25	335.63	327.45	345.35	327.55	345.59
331.52	345.04	332.41	344.95	337.43	345.13				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	29.14	.018	104.89	.15	286.53	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.89 272.48 122.82 64.52 43.7 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 611.5112

INPUT

Description: U/S face of Alvarado Road and College Avenue Crossing

Station	Elevation	Data	num=	51					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.58	14.76	339.24	27.46	338.13	29.82	337.84	68.72	332.32
70.64	332.05	72.38	331.77	120.87	326.29	127.06	325.35	136.03	322.92
169.31	318.86	189.35	317.66	191.73	317.63	199.52	317.51	223.02	316.04
233.55	314.43	267.61	312.59	276.82	312.06	282.28	302.42	287.17	295.54
287.56	295.54	290.32	295.54	292.26	295.54	297.64	295.47	298.38	295.46
300.9	298.16	311.19	311.26	311.2	311.29	311.21	311.29	311.21	311.3
311.23	311.3	312.01	311.55	313.81	312.86	345.92	335.95	352.92	337.02
353.12	337.05	353.87	337.18	354.92	337.21	370.99	337.72	371.68	337.74
374.54	337.86	391.45	338.57	393.86	342.44	396.02	345.96	400.81	345.28
400.91	345.26	400.98	345.25	408.76	345.53	435.17	346.49	435.96	346.51
436.48	346.51								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
0	.15	354.92	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
276.82 312.01 0 0 0 .3 .5

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

n9	Reach	River Sta. n11	Sta. n12	n1 n13	n2	n3	n4	n5	n6	n7	n8
Upper Reach		4559.274		.018	.016	.018					
Upper Reach		4543.777	Lat Struct								
Upper Reach		4502.213		.018	.016	.018					
Upper Reach		4466.915		.018	.016	.018					
Upper Reach		4439.706		.018	.016	.018					
Upper Reach		4275.023		.018	.03	.016					
Upper Reach		3913.392		.03	.016	.15	.016	.018			
Upper Reach		3758.046		.05	.016	.15	.016				
Upper Reach		3600.906		.03	.016	.15	.016	.02	.018		
Upper Reach		3418.613		.05	.016	.15	.016	.018			
Upper Reach		3230.305		.05	.15	.016	.018				
Upper Reach		3018.677		.05	.15	.016	.018	.03	.018	.03	
.018											
Upper Reach		2969.225		.05	.15	.016	.03	.018	.03	.018	
Upper Reach		2873.24		.03	.15	.016	.018	.03	.018	.03	
.018											
Upper Reach		2695.84		.03	.15	.016	.03	.018	.03	.018	
.03	.018	.03	.018	.03	.018						
Upper Reach		2529.382		.035	.15	.016	.018				
Upper Reach		2435.063		.045	.15	.016	.025				
Upper Reach		2335.331		.045	.15	.016	.018		.025		
Upper Reach		2317.214	Lat Struct								
Upper Reach		2308.404		.15	.15	.018	.025				
Upper Reach		2287.614		.15	.15	.018	.025				
Upper Reach		2084.121		.15	.15	.15	.15	.018			
Upper Reach		1873.917		.018	.15	.15	.15	.018			
Upper Reach		1798.381		.018	.015	.018					
Upper Reach		1641.59		.018	.03	.018	.15	.018	.035		
Upper Reach		1489.686		.018	.03	.15	.018	.018			
Upper Reach		1439.048		.018	.04	.025	.15	.018			
Upper Reach		1288.123		.018	.045	.15	.018				
Upper Reach		1111.63		.045	.018	.15	.018	.025	.018		
Upper Reach		826.8154		.035	.018	.15	.018				
Upper Reach		676.0353		.025	.018	.15	.018				
Upper Reach		611.5112		.15	.018						

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3

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

1. Maintained Condition (Bank to Bank)
2. Maintained Condition (Bottom Only)

HEC-RAS Plan: NoVeg-Bank2Bank River: Alvarado Channel Reach: Upper Reach

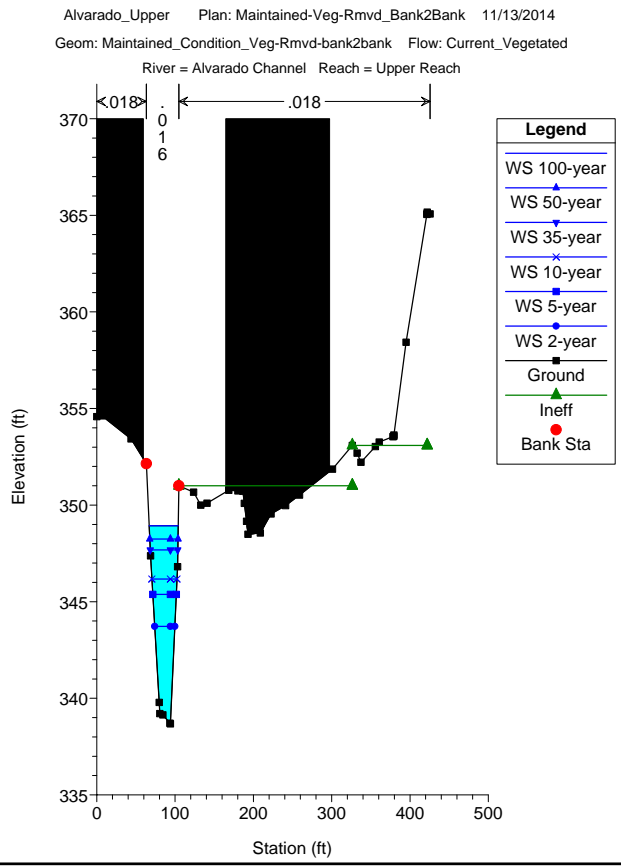
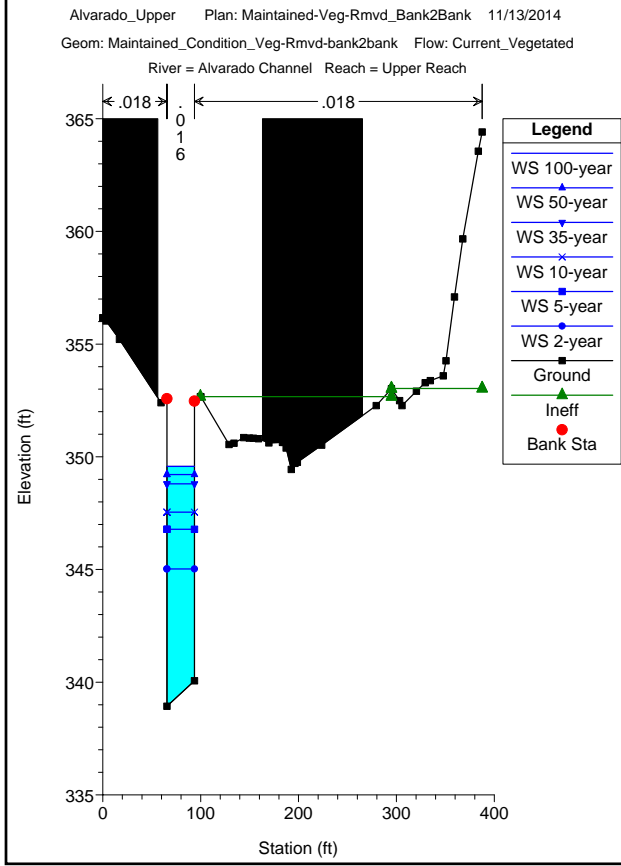
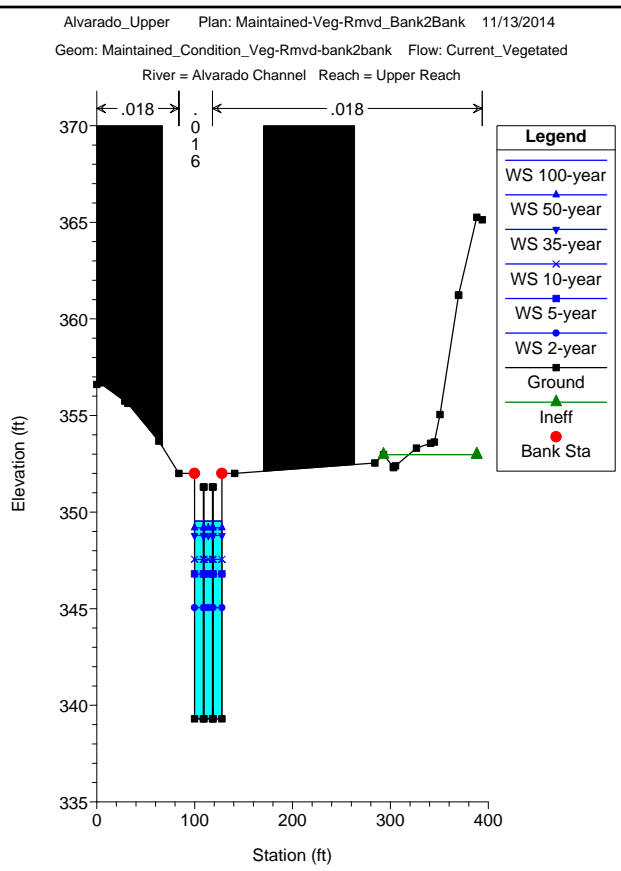
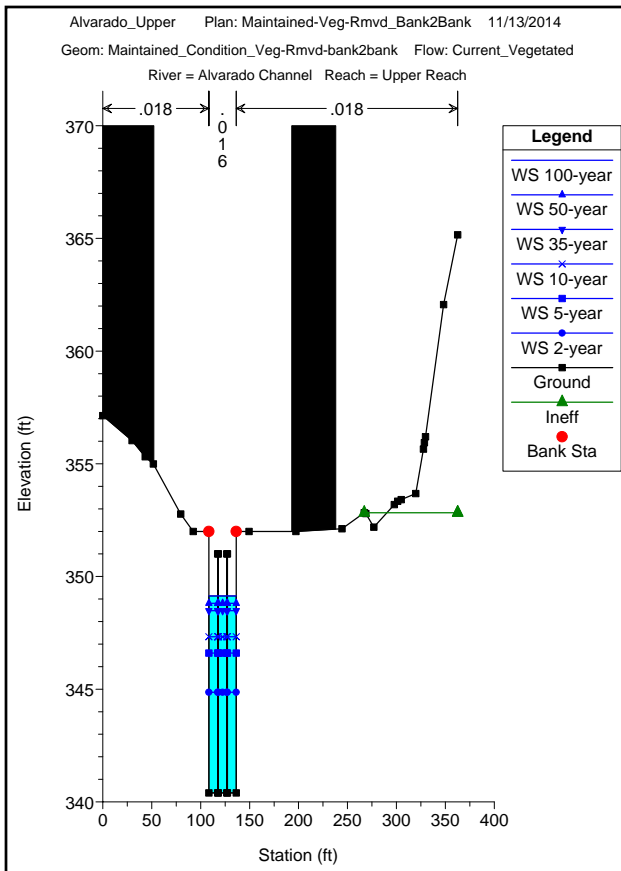
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #	Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00	
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92	
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87	
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76	
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73	
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70	
Upper Reach	4543.777		Lat Struct										
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79	
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72	
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68	
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59	
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55	
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48	
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77	
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71	
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67	
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58	
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54	
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48	
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00	
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00	
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00	
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00	
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00	
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00	
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43	
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44	
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45	
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49	
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52	
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59	
Upper Reach	3913.392	100-year	3900.00	333.56	340.91	343.19	348.88	0.009659	22.65	172.15	32.32	1.73	
Upper Reach	3913.392	50-year	3400.00	333.56	340.35	342.76	347.89	0.009998	22.03	154.31	30.91	1.74	
Upper Reach	3913.392	35-year	3000.00	333.56	339.87	342.19	347.02	0.010329	21.47	139.74	29.79	1.75	
Upper Reach	3913.392	10-year	2100.00	333.56	338.67	340.62	344.79	0.011289	19.86	105.73	26.97	1.77	
Upper Reach	3913.392	5-year	1700.00	333.56	338.07	339.84	343.61	0.011838	18.90	89.95	25.55	1.78	
Upper Reach	3913.392	2-year	1000.00	333.56	336.87	338.18	341.03	0.012823	16.36	61.11	22.76	1.76	
Upper Reach	3758.046	100-year	3900.00	332.58	339.58	342.87	347.31	0.009706	22.31	174.83	34.31	1.74	
Upper Reach	3758.046	50-year	3400.00	332.58	339.10	341.36	346.23	0.009741	21.43	158.63	33.10	1.73	
Upper Reach	3758.046	35-year	3000.00	332.58	338.69	340.79	345.30	0.009743	20.63	145.39	32.06	1.71	
Upper Reach	3758.046	10-year	2100.00	332.58	337.69	339.33	342.91	0.009526	18.34	114.53	29.52	1.64	
Upper Reach	3758.046	5-year	1700.00	332.58	337.18	338.57	341.68	0.009294	17.01	99.95	28.25	1.59	
Upper Reach	3758.046	2-year	1000.00	332.58	336.18	337.00	339.10	0.008153	13.70	72.99	25.72	1.43	
Upper Reach	3600.906	100-year	3900.00	330.91	337.97	340.48	345.76	0.009940	22.39	174.20	34.91	1.77	
Upper Reach	3600.906	50-year	3400.00	330.91	337.51	339.80	344.68	0.009952	21.49	158.19	33.66	1.75	
Upper Reach	3600.906	35-year	3000.00	330.91	337.11	339.24	343.76	0.009956	20.70	144.95	32.59	1.73	
Upper Reach	3600.906	10-year	2100.00	330.91	336.11	337.78	341.39	0.009808	18.44	113.86	29.94	1.67	
Upper Reach	3600.906	5-year	1700.00	330.91	335.61	337.05	340.18	0.009659	17.16	99.04	28.58	1.63	
Upper Reach	3600.906	2-year	1000.00	330.91	334.54	335.49	337.71	0.009329	14.29	69.99	25.73	1.53	
Upper Reach	3418.613	100-year	3900.00	330.09	337.53	339.34	343.77	0.007177	20.04	194.59	35.70	1.51	
Upper Reach	3418.613	50-year	3400.00	330.09	337.06	338.69	342.72	0.007013	19.08	178.19	34.54	1.48	
Upper Reach	3418.613	35-year	3000.00	330.09	336.66	338.18	341.82	0.006850	18.22	164.63	33.56	1.45	
Upper Reach	3418.613	10-year	2100.00	330.09	338.20	336.71	339.62	0.001479	9.59	218.91	37.36	0.70	
Upper Reach	3418.613	5-year	1700.00	330.09	337.34	335.97	338.61	0.001506	9.05	187.95	35.24	0.69	
Upper Reach	3418.613	2-year	1000.00	330.09	335.50	334.42	336.46	0.001606	7.87	127.14	30.66	0.68	
Upper Reach	3230.305	100-year	3900.00	329.06	341.36	338.05	342.67	0.001834	8.19	447.13	221.19	0.45	
Upper Reach	3230.305	50-year	3400.00	329.06	340.57	337.55	341.77	0.001890	7.88	404.17	194.76	0.45	
Upper Reach	3230.305	35-year	3000.00	329.06	339.94	337.00	341.04	0.001916	7.58	370.51	174.06	0.45	
Upper Reach	3230.305	10-year	2100.00	329.06	338.18	335.60	339.14	0.002194	6.99	278.73	71.39	0.46	
Upper Reach	3230.305	5-year	1700.00	329.06	337.30	334.87	338.13	0.002285	6.61	240.98	41.81	0.47	
Upper Reach	3230.305	2-year	1000.00	329.06	335.39	333.38	335.98	0.002311	5.71	166.28	36.34	0.45	
Upper Reach	3018.677	100-year	3900.00	328.39	338.44	338.44	341.76	0.007465	13.66	272.59	118.24	0.86	
Upper Reach	3018.677	50-year	3400.00	328.39	338.02	337.89	340.89	0.007022	12.77	254.52	111.85	0.83	
Upper Reach	3018.677	35-year	3000.00	328.39	337.53	337.10	340.17	0.007079	12.24	234.08	107.07	0.82	
Upper Reach	3018.677	10-year	2100.00	328.39	336.52	335.59	338.33	0.005762	10.22	197.23	76.86	0.73	
Upper Reach	3018.677	5-year	1700.00	328.39	335.69	334.82	337.30	0.005879	9.70	169.08	54.47	0.73	
Upper Reach	3018.677	2-year	1000.00	328.39	334.04	333.22	335.18	0.005822	8.29	117.70	29.09	0.70	
Upper Reach	2969.225	100-year	3900.00	328.10	339.88	337.14	340.10	0.000386	3.63	1050.89	213.34	0.20	
Upper Reach	2969.225	50-year	3400.00	328.10	337.49	336.52	339.85	0.000501	11.40	282.38	209.55	0.73	

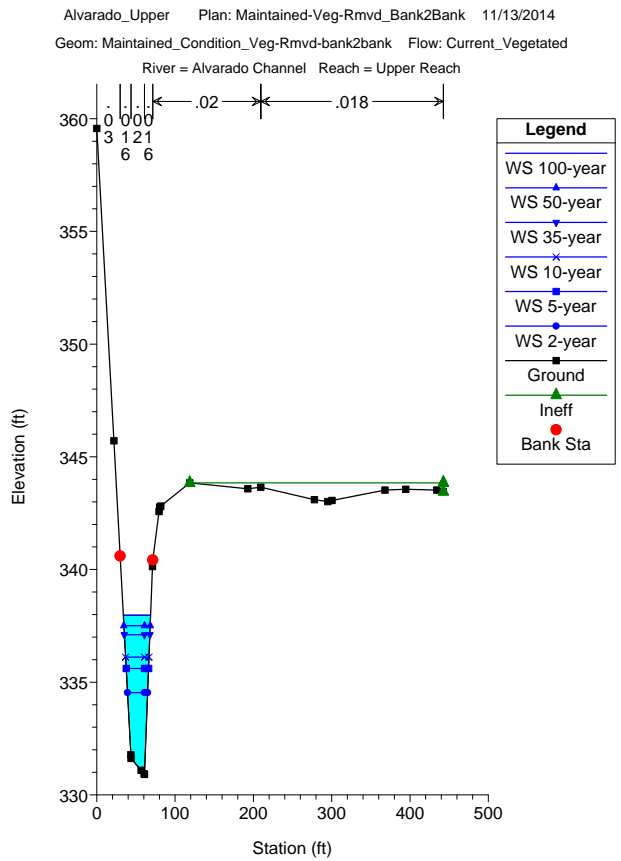
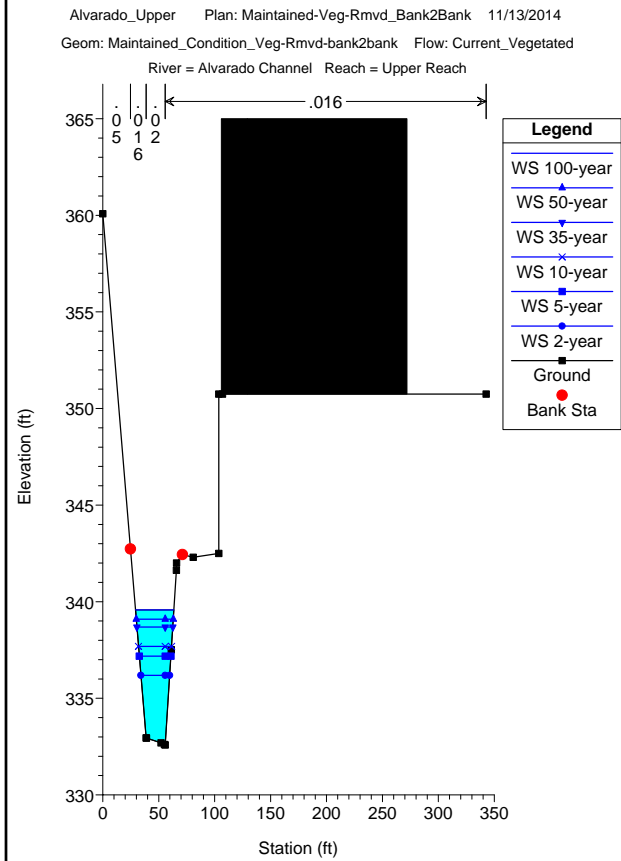
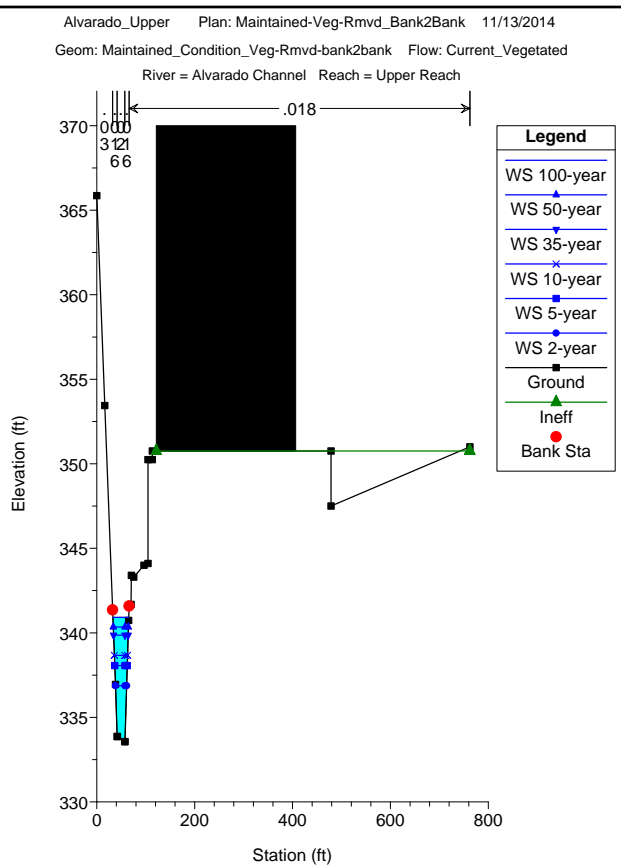
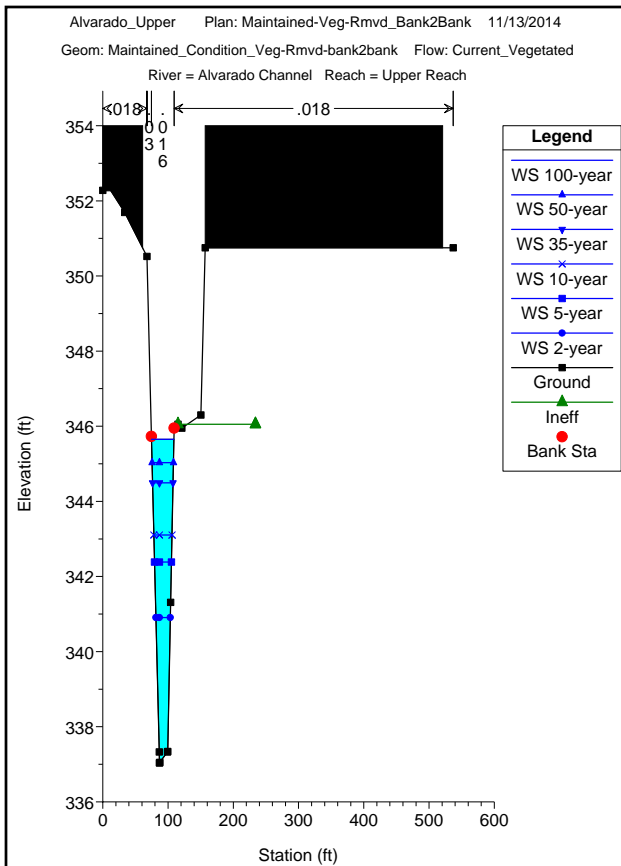
HEC-RAS Plan: NoVeg-Bank2Bank River: Alvarado Channel Reach: Upper Reach (Continued)

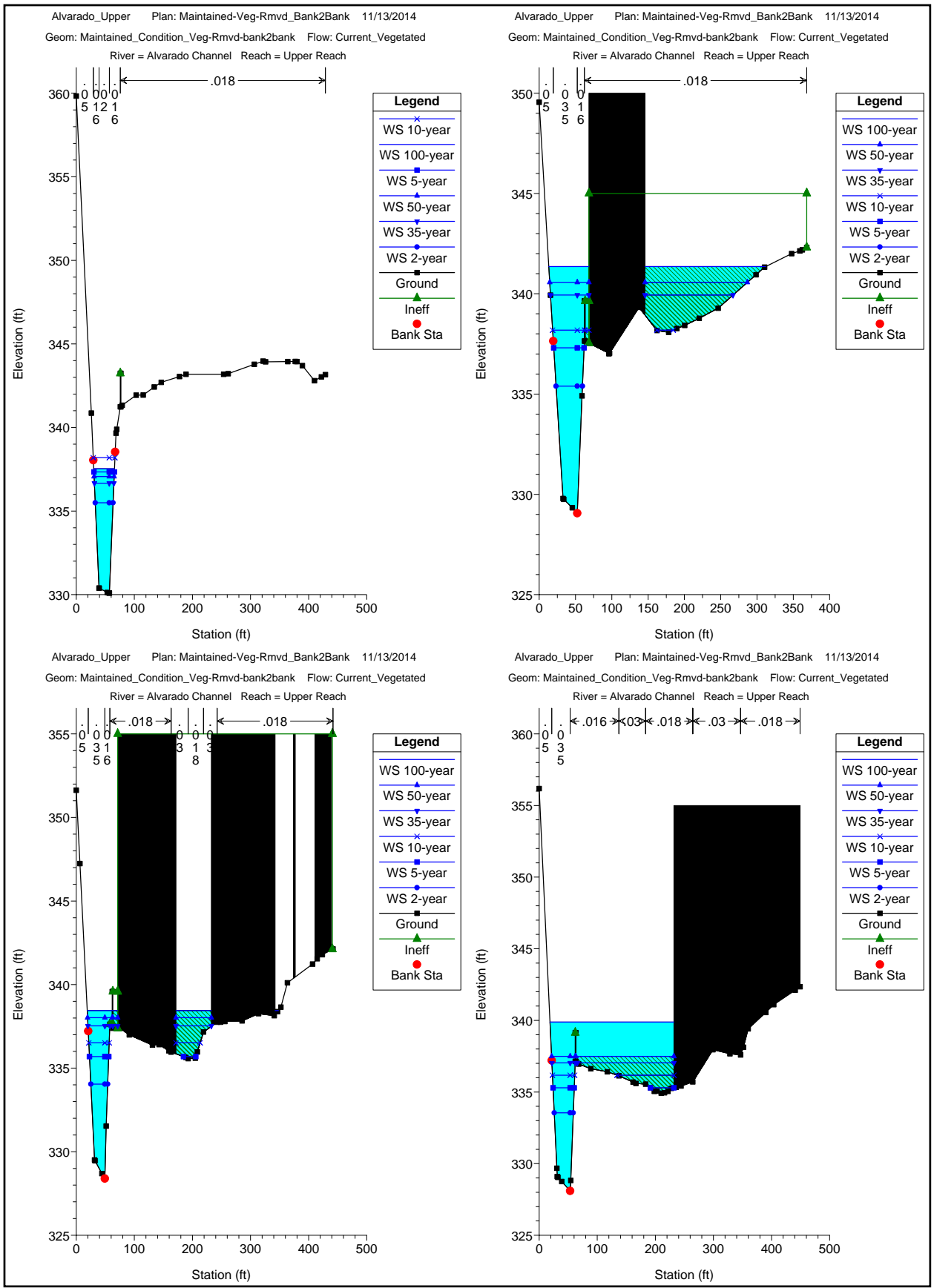
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.10	337.04	335.95	339.14	0.005292	10.78	263.93	206.23	0.71
Upper Reach	2969.225	10-year	2100.00	328.10	336.18	334.52	337.52	0.003857	8.68	230.32	136.15	0.60
Upper Reach	2969.225	5-year	1700.00	328.10	335.30	333.80	336.49	0.003968	8.23	197.49	76.88	0.60
Upper Reach	2969.225	2-year	1000.00	328.10	333.54	332.34	334.40	0.004075	7.04	136.92	32.75	0.59
Upper Reach	2873.24	100-year	3900.00	327.64	339.96	336.47	340.05	0.000148	2.34	1645.57	354.05	0.13
Upper Reach	2873.24	50-year	3400.00	327.64	339.05	335.86	339.15	0.000211	2.64	1334.69	329.80	0.15
Upper Reach	2873.24	35-year	3000.00	327.64	338.39	335.29	338.51	0.000275	2.87	1121.69	319.85	0.17
Upper Reach	2873.24	10-year	2100.00	327.64	336.19	333.86	337.29	0.003213	8.30	250.43	242.21	0.55
Upper Reach	2873.24	5-year	1700.00	327.64	335.31	333.14	336.26	0.003187	7.76	217.42	106.61	0.54
Upper Reach	2873.24	2-year	1000.00	327.64	333.54	331.71	334.18	0.002953	6.39	155.82	33.25	0.51
Upper Reach	2695.84	100-year	3900.00	327.95	336.26	336.26	339.64	0.009288	14.49	265.22	200.82	0.95
Upper Reach	2695.84	50-year	3400.00	327.95	335.96	335.63	338.78	0.008198	13.23	253.23	191.45	0.88
Upper Reach	2695.84	35-year	3000.00	327.95	336.04	335.08	338.18	0.006135	11.53	256.33	195.48	0.77
Upper Reach	2695.84	10-year	2100.00	327.95	335.27	333.68	336.61	0.004388	9.15	226.54	157.04	0.64
Upper Reach	2695.84	5-year	1700.00	327.95	334.33	332.98	335.56	0.004702	8.77	191.80	134.02	0.65
Upper Reach	2695.84	2-year	1000.00	327.95	332.58	331.56	333.48	0.005081	7.58	131.15	32.88	0.65
Upper Reach	2529.382	100-year	3900.00	326.34	337.63	336.39	338.25	0.001261	6.43	621.50	203.41	0.36
Upper Reach	2529.382	50-year	3400.00	326.34	336.17	336.17	337.38	0.003457	9.56	397.82	152.22	0.58
Upper Reach	2529.382	35-year	3000.00	326.34	335.94	335.94	337.08	0.003390	9.29	361.84	151.96	0.57
Upper Reach	2529.382	10-year	2100.00	326.34	333.02	332.90	335.45	0.008880	11.85	170.47	33.60	0.88
Upper Reach	2529.382	5-year	1700.00	326.34	332.61	332.15	334.48	0.007414	10.44	157.05	32.70	0.80
Upper Reach	2529.382	2-year	1000.00	326.34	331.51	330.60	332.57	0.005387	7.95	122.39	30.25	0.67
Upper Reach	2435.063	100-year	3900.00	326.71	337.78	334.34	338.10	0.000767	5.15	930.25	232.08	0.30
Upper Reach	2435.063	50-year	3400.00	326.71	334.82	333.78	336.63	0.005301	10.52	318.03	67.80	0.73
Upper Reach	2435.063	35-year	3000.00	326.71	332.17	333.30	336.22	0.020148	15.86	186.40	44.44	1.34
Upper Reach	2435.063	10-year	2100.00	326.71	333.33	332.07	334.53	0.004742	8.57	240.43	48.72	0.67
Upper Reach	2435.063	5-year	1700.00	326.71	332.71	331.44	333.73	0.004527	7.93	210.92	46.43	0.64
Upper Reach	2435.063	2-year	1000.00	326.71	331.36	330.17	332.04	0.004078	6.52	151.70	41.45	0.59
Upper Reach	2335.331	100-year	3900.00	326.15	337.75		338.06	0.000393	3.88	955.44	177.82	0.21
Upper Reach	2335.331	50-year	3400.00	326.15	335.55		336.09	0.000948	5.13	600.39	140.29	0.32
Upper Reach	2335.331	35-year	3000.00	326.15	335.00	331.53	335.57	0.001007	5.04	527.10	112.29	0.32
Upper Reach	2335.331	10-year	2100.00	326.15	333.68		334.14	0.001032	4.60	410.35	78.18	0.32
Upper Reach	2335.331	5-year	1700.00	326.15	332.99		333.37	0.001030	4.33	359.52	70.96	0.32
Upper Reach	2335.331	2-year	1000.00	326.15	331.50		331.74	0.001040	3.75	256.94	66.49	0.31
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	337.63		338.03	0.003043	4.83	814.12	137.11	0.28
Upper Reach	2308.404	50-year	3400.00	326.14	335.23		336.01	0.010023	7.23	495.41	127.92	0.48
Upper Reach	2308.404	35-year	3000.00	326.14	334.73		335.49	0.010374	7.01	439.71	99.43	0.48
Upper Reach	2308.404	10-year	2100.00	326.14	333.49		334.07	0.010244	6.11	343.49	62.19	0.46
Upper Reach	2308.404	5-year	1700.00	326.14	332.81		333.30	0.009964	5.63	302.02	59.73	0.44
Upper Reach	2308.404	2-year	1000.00	326.14	331.35		331.67	0.009381	4.57	218.63	54.45	0.40
Upper Reach	2287.614	100-year	3900.00	326.23	337.57	332.74	337.95	0.004189	4.11	888.66	155.87	0.24
Upper Reach	2287.614	50-year	3400.00	326.23	335.04	332.28	335.71	0.016908	6.66	526.63	111.82	0.45
Upper Reach	2287.614	35-year	3000.00	326.23	334.52	331.88	335.18	0.018016	6.59	469.90	106.66	0.46
Upper Reach	2287.614	10-year	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	5-year	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	2-year	1000.00	326.23	331.03	329.27	331.39	0.019805	4.81	207.87	57.89	0.45
Upper Reach	2084.121	100-year	3900.00	323.64	337.12		337.39	0.001832	4.19	938.92	129.77	0.24
Upper Reach	2084.121	50-year	3400.00	323.64	332.99		333.59	0.006967	6.20	548.67	81.27	0.42
Upper Reach	2084.121	35-year	3000.00	323.64	332.42		332.97	0.007073	5.96	503.23	78.78	0.42
Upper Reach	2084.121	10-year	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	5-year	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	2-year	1000.00	323.64	328.74		329.01	0.007592	4.11	243.09	62.67	0.37
Upper Reach	1873.917	100-year	3900.00	320.65	337.03		337.18	0.000471	2.99	1293.11	268.87	0.16
Upper Reach	1873.917	50-year	3400.00	320.65	330.72		331.85	0.009292	8.53	398.59	65.90	0.61
Upper Reach	1873.917	35-year	3000.00	320.65	330.08		331.17	0.009904	8.40	357.20	62.72	0.62
Upper Reach	1873.917	10-year	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63
Upper Reach	1873.917	5-year	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	2-year	1000.00	320.65	326.22		326.89	0.013373	6.59	151.75	43.75	0.62
Upper Reach	1798.381	100-year	3900.00	318.55	337.02		337.14	0.000338	2.67	1401.56	305.11	0.13
Upper Reach	1798.381	50-year	3400.00	318.55	329.32		330.98	0.012819	10.34	328.92	50.25	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.028296	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.037463	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.05		337.09	0.000091	1.49	2486.37	286.64	0.07
Upper Reach	1641.59	50-year	3400.00	315.77	329.94		330.13	0.001063	3.52	965.95	114.83	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.38	321.45	325.85	0.004082	5.50	545.27	80.29	0.37
Upper Reach	1641.59	10-year	2100.00	315.77	323.12	320.50	323.61	0.005926	5.62	373.75	71.12	0.43

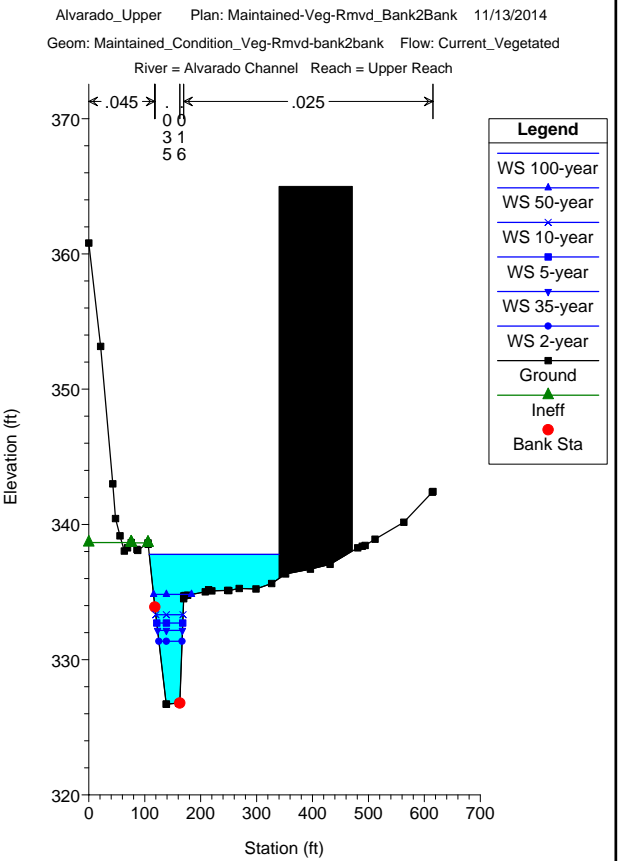
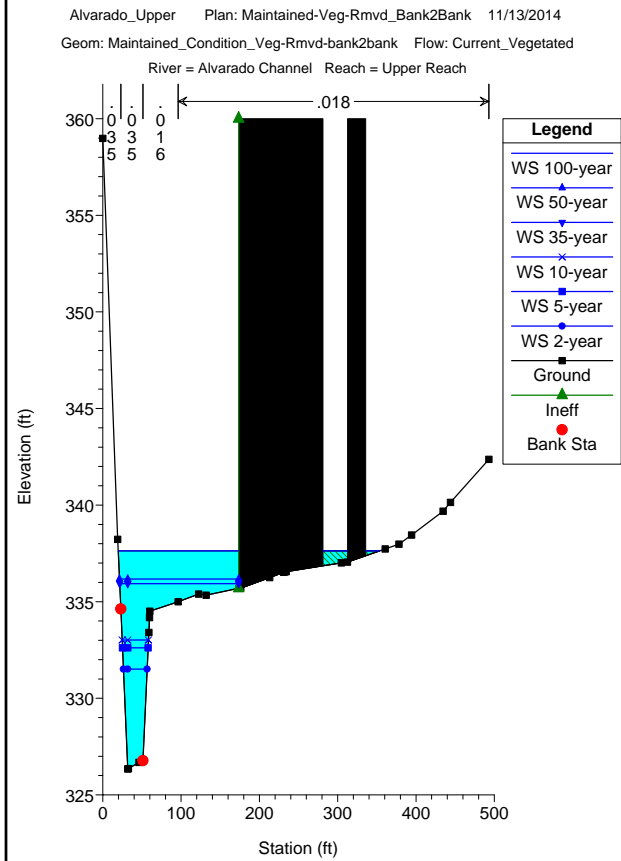
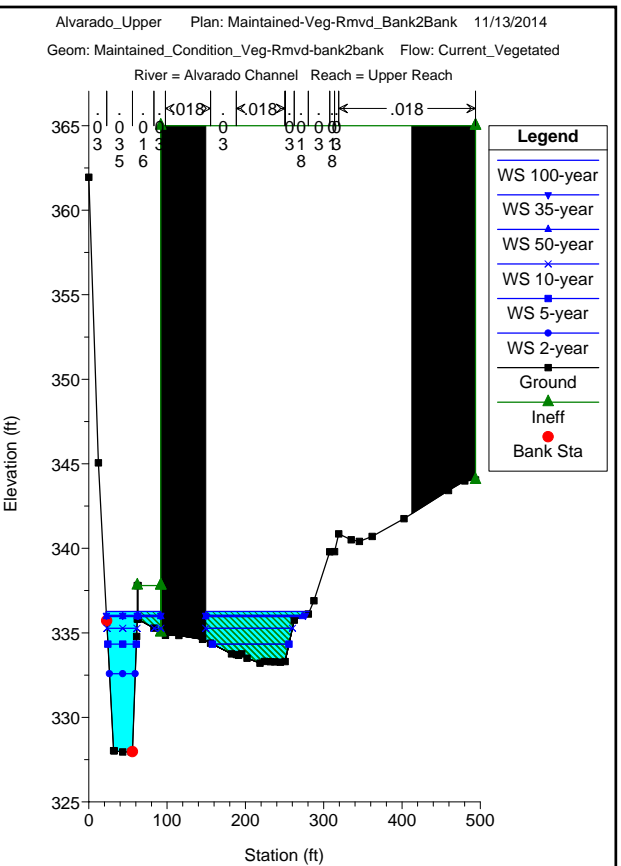
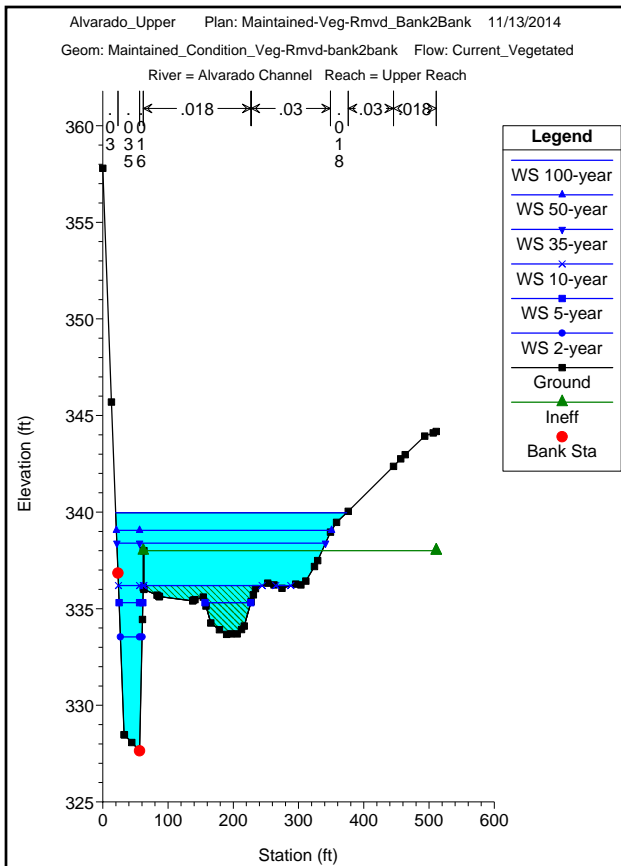
HEC-RAS Plan: NoVeg-Bank2Bank River: Alvarado Channel Reach: Upper Reach (Continued)

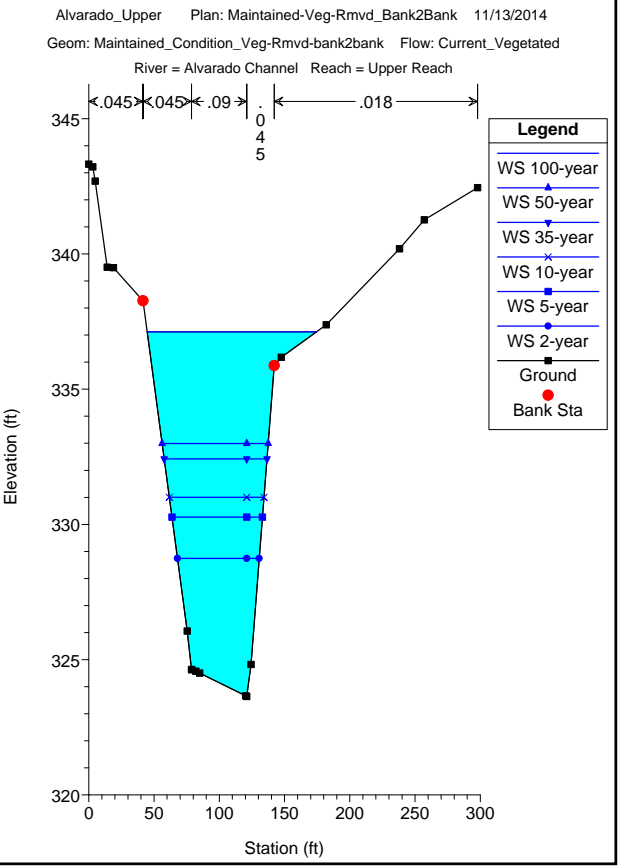
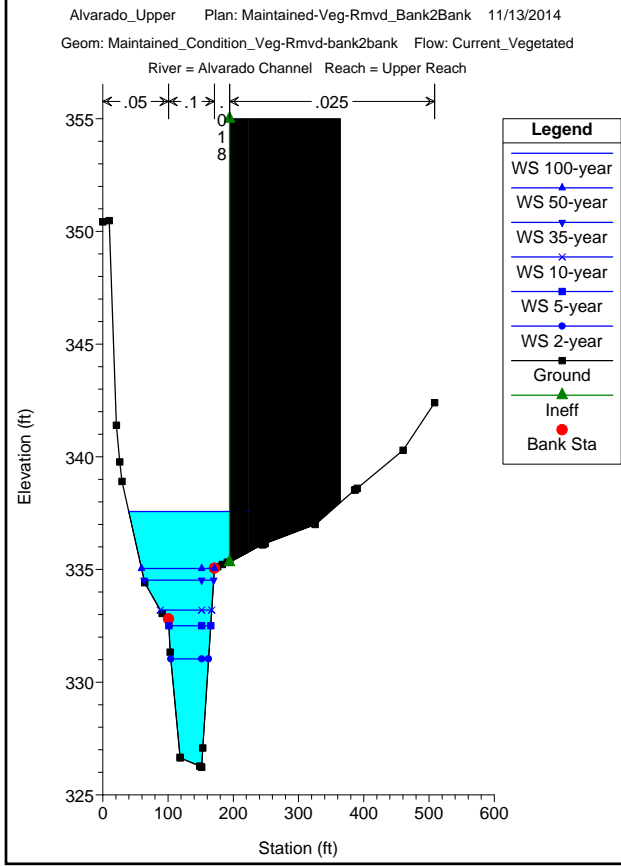
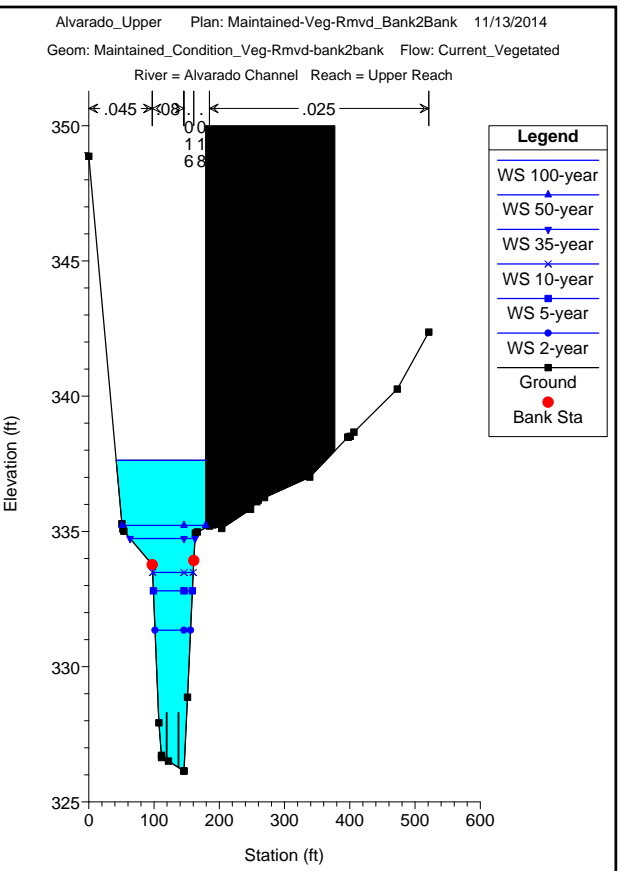
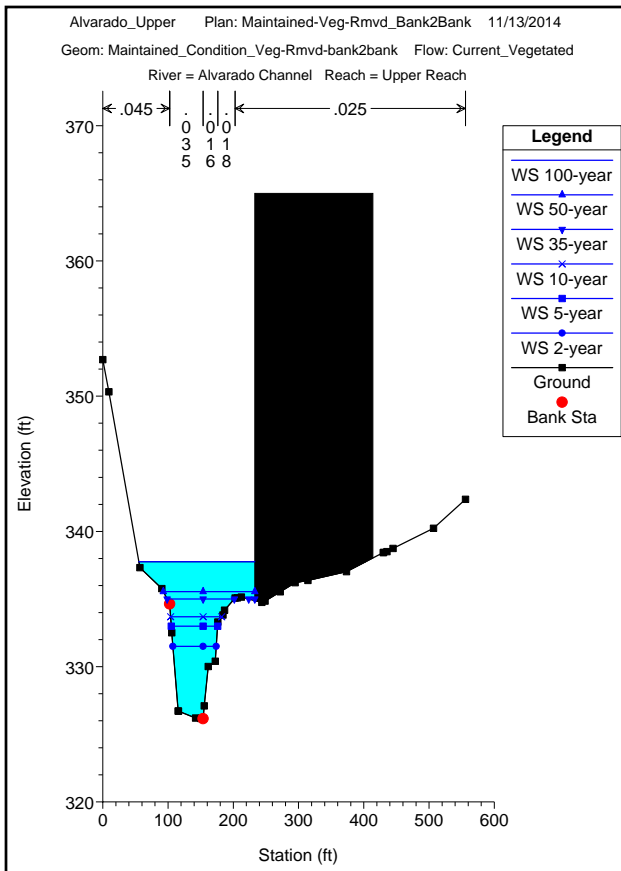
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	322.19	320.02	322.66	0.006737	5.49	309.51	67.36	0.45
Upper Reach	1641.59	2-year	1000.00	315.77	320.47	318.97	320.86	0.008615	5.01	199.44	60.39	0.49
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000150	1.62	2099.81	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.38		329.84	0.003328	5.49	619.83	54.24	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.62		324.74	0.014053	8.50	352.75	41.09	0.51
Upper Reach	1489.686	10-year	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	5-year	1700.00	312.84	319.83		320.87	0.023326	8.18	207.89	35.44	0.59
Upper Reach	1489.686	2-year	1000.00	312.84	318.13		318.82	0.022657	6.67	149.93	32.91	0.55
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000244	2.09	1886.81	239.70	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.33		329.66	0.002303	4.62	735.81	67.27	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.06		324.03	0.012159	7.90	379.66	45.96	0.48
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.83	316.83	319.29	0.040765	9.71	175.04	33.83	0.75
Upper Reach	1439.048	2-year	1000.00	311.46	316.49	315.40	317.39	0.034984	7.63	131.15	31.78	0.66
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.37	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1523.00	116.97	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.25		323.42	0.001035	3.31	907.64	83.95	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.30	312.03	315.87	0.008812	6.03	348.24	56.68	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.24		313.46	0.035850	8.87	191.64	45.51	0.76
Upper Reach	1288.123	2-year	1000.00	306.79	310.83		311.73	0.040430	7.63	131.12	40.36	0.75
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4819.03	291.60	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2887.26	213.74	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.27	308.49	323.31	0.000215	1.57	1912.24	141.51	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.25	307.72	315.33	0.000976	2.27	923.84	106.89	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.52	307.34	309.85	0.011691	4.59	370.66	86.08	0.39
Upper Reach	1111.63	2-year	1000.00	303.43	308.76	306.54	308.93	0.007486	3.26	306.38	83.32	0.30
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.66	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4448.19	259.63	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.26		323.27	0.000051	0.96	3118.06	200.80	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.19		315.21	0.000185	1.28	1634.92	164.04	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.69		306.94	0.008851	4.02	422.61	115.83	0.37
Upper Reach	826.8154	2-year	1000.00	301.19	304.58		304.97	0.033393	5.00	199.98	95.04	0.61
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000009	0.65	5683.23	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000028	0.93	3690.39	227.79	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000059	1.14	2636.23	150.91	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.16		315.19	0.000147	1.38	1526.08	123.71	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	306.19		306.34	0.002081	3.05	557.70	89.59	0.22
Upper Reach	676.0353	2-year	1000.00	296.69	303.67		303.80	0.003061	2.87	348.47	76.25	0.24
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.39	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85

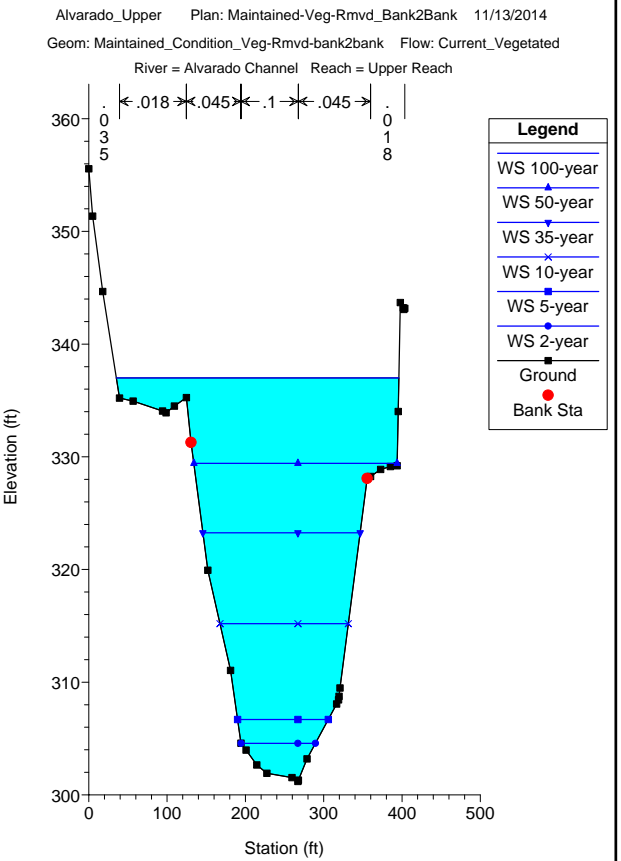
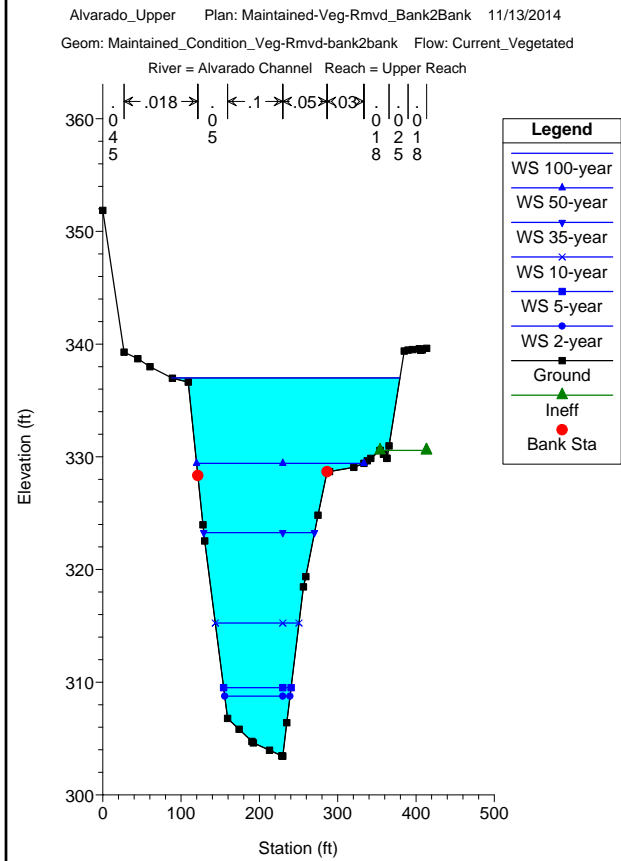
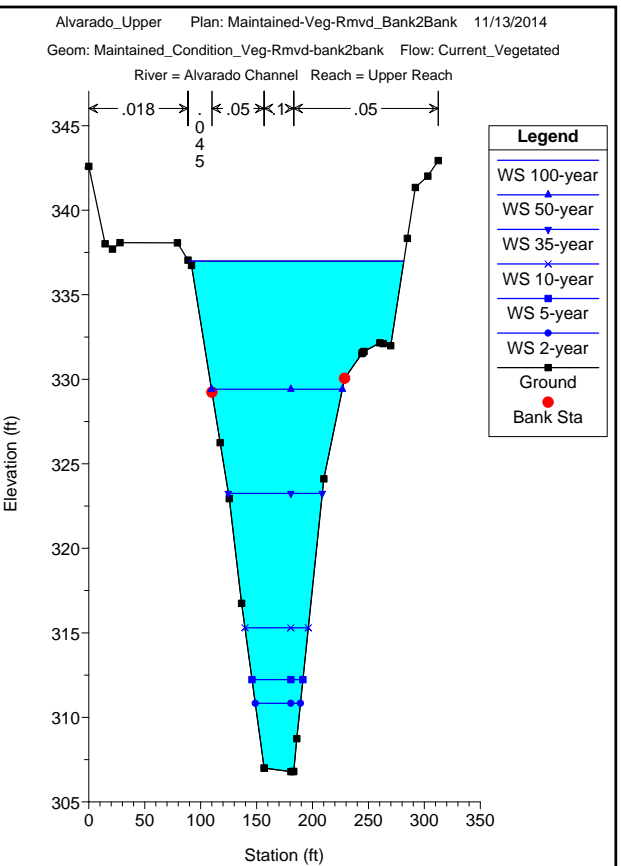
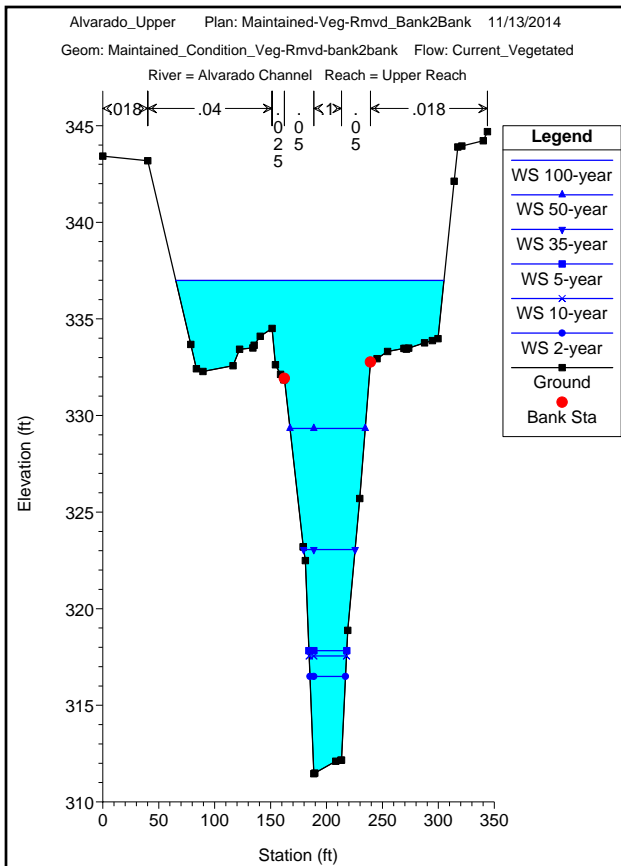




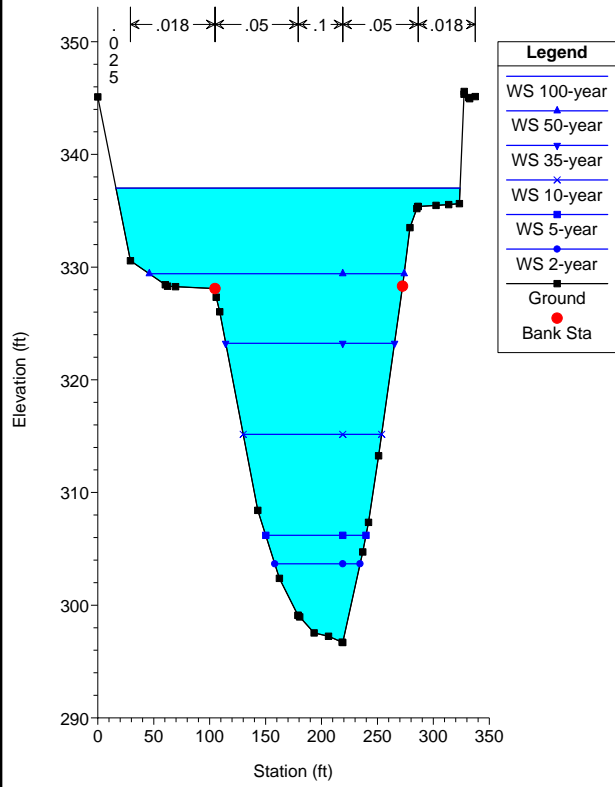




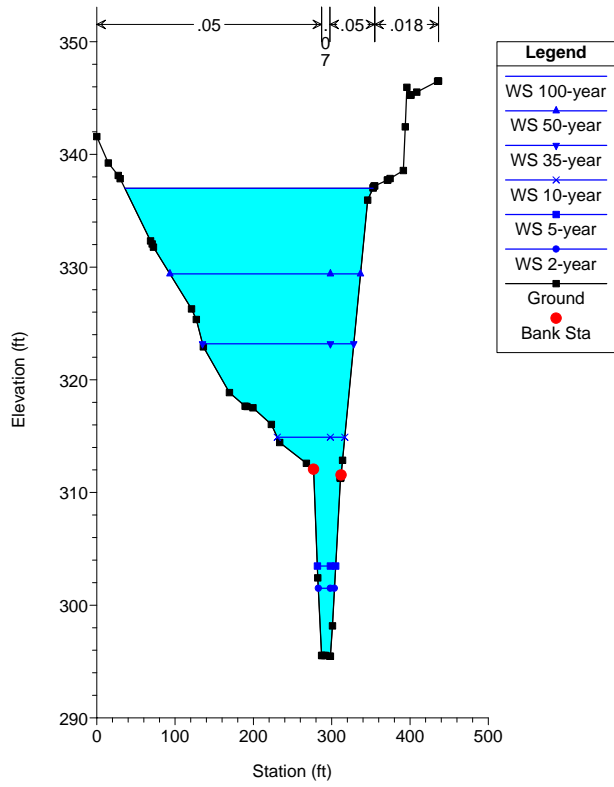




Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bank2Bank 11/13/2014
 Geom: Maintained_Condition_Veg-Rmvd-bank2bank Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bank2Bank 11/13/2014
 Geom: Maintained_Condition_Veg-Rmvd-bank2bank Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
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 Project File : Alvarado_Upper.prj
 Run Date and Time: 11/13/2014 1:49:14 PM

Project in English units

PLAN DATA

Plan Title: Maintained-Veg-Rmvd_Bank2Bank
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 Flow Title : Current_Vegetated
 Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Description:
 Bank to Bank vegetation removed only in the City maintained portion only

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
5-year	2-year					
Alvarado ChannelUpper Reach		4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper Reach	100-year		Critical	Known WS = 337
Alvarado ChannelUpper Reach	50-year		Critical	Known WS = 329.4
Alvarado ChannelUpper Reach	35-year		Critical	Known WS = 323.2
Alvarado ChannelUpper Reach	10-year		Critical	Known WS = 314.9
Alvarado ChannelUpper Reach	5-year		Critical	Normal S = 0.03
Alvarado ChannelUpper Reach	2-year		Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Condition_Veg-Rmvd-bank2bank
 Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g09

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99
92.38	352	108.38	352	108.38	340.4	117.38	340.4
118.08	351	118.08	340.4	126.68	340.4	126.68	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65
329.79	356.2	348.2	362.06	362.49	365.16		

 Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
108.38	136.38	56.75	57.06	57.78	.1	.3	

 Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75

516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	339.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.61
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT

Description:

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63	63.35	353.68
83.88	352	99.88	352	99.88	339.3	108.88	339.3	108.88	351.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3	118.88	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352	284.1	352.54
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39	326.64	353.31
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22	369.63	361.24
388.16	365.26	393.87	365.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

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

99.88	127.88		35.29	35.3	35.1	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
292.86	388.16	352.97	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	67.09	370	170.25	263.29	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT

Description:

Station Elevation Data num= 37									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66
128.96	350.55	134.07	350.6	144	350.85	148.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39

192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

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

65.6	93.6		27.81	27.21	26.73	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
99.74	294.86	352.67	F
294.86	387.54	353.03	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	56.31	365	163.1	265.25	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.36	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

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

63.26	104.83		164.21	164.68	167.58	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
104.83	326.23	351	F
326.23	421.9	353.09	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	59.44	370	164.66	297.32	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	536.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

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

74.43	109.33		381.65	361.63	347.98	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
115.33	233.87	346.05	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	61.02	354	156.99	520.69	354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	365.86	16.26	353.45	32.29	341.36	38.14	336.95	41.63	333.87
42.22	333.86	57.31	333.57	57.59	333.56	64.94	340.73	66.19	341.59
69.85	341.68	70.47	343.4	75.47	343.3	96.47	344	104.47	344.1
104.47	350.25	113.47	350.25	113.47	350.76	478.56	350.76	478.56	347.5
762.56	351								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	32.29	.016	41.63	.02	57.31	.016	66.19	.018

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

32.29	66.19	160.29	155.35	151.31					
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
121.74	762	350.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
121.74	406.35	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.08	24.76	342.73	38.72	332.95	39.06	332.94	52	332.69
55.04	332.61	55.85	332.58	61.28	337.51	65.85	341.63	66	342
71.24	342.44	80.82	342.3	103.66	342.5	103.66	350.75	107	350.75
342.68	350.75								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	24.76	.016	38.72	.02	55.85	.016

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

24.76	71.24	156.2	157.14	158.25					
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Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
106	129.29	365	129.29	271.93	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.57	21.79	345.71	29.74	340.6	43.48	331.78	43.71	331.62
56.66	331.09	60.41	330.93	60.88	330.91	71.14	340.13	71.45	340.42
79.54	342.57	80.33	342.77	81.75	342.81	118.62	343.84	192.97	343.58
209.41	343.65	277.88	343.1	295.07	343.01	300.31	343.06	368.05	343.52
394.52	343.56	434.26	343.52	442.68	343.45				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	29.74	.016	43.71	.02	60.88	.016	71.45	.02
209.41	.018								

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

29.74	71.45	183.48	182.29	181.14					
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Ineffective Flow num= 1

1									
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Sta L	Sta R	Elev	Permanent
118.62	442.68	343.84	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.83	25.85	340.86	29.47	338.04	39.31	330.38	39.47	330.38
53.23	330.13	56.6	330.09	56.92	330.09	67.04	338.54	68.39	339.66
69.63	339.89	75.76	341.24	75.77	343.24	76.77	343.24	76.77	341.24
79.11	341.33	103.2	341.93	115.27	341.94	134.16	342.42	146.31	342.7
177.81	343.05	189.09	343.18	253.73	343.18	261.47	343.22	306.56	343.78
321.66	343.97	326.01	343.93	364.07	343.94	376.97	343.95	379.8	343.94
389.33	343.7	410.09	342.8	421.87	343.03	428.88	343.16		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.47	.016	39.31	.02	56.92	.016	75.76	.018

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

29.47	67.04	188.22	188.31	208.19					
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
75.77	428.88	343.24	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.55	15.53	339.93	19.43	337.64	32.81	329.79	33.85	329.75
45.6	329.33	51.53	329.09	52.41	329.06	59.04	334.91	62.21	337.64
62.22	339.64	63.22	339.64	63.22	337.64	95.9	337.03	96.15	337.01
96.9	337.04	137.52	339.32	162.33	338.17	178.31	338.08	189.7	338.27
200.4	338.42	220.32	338.78	246.45	339.28	298.6	340.95	310.42	341.33
347.72	342	358.94	342.14	362.36	342.19	368.47	342.31		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	19.43	.035	52.41	.016	62.21	.018

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

19.43	52.41	213.1	211.63	234.86					
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
63.22	68.42	339.64	F
68.42	368.47	345	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
68.42	145.82	350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.63	6.26	347.24	20.56	337.219	31.56	329.51	32.37	329.46
44.1	328.69	48.11	328.45	49.21	328.39	51.59	331.53	57.89	337.63
61.86	337.58	61.86	339.58	62.86	339.58	62.86	337.39	75.24	337.39
91.39	336.99	131.08	336.38	142.66	336.41	159.33	336.04	163.29	335.96
188.72	335.64	192.7	335.57	205	335.6	208.43	335.97	218.96	337.16
242.63	337.75	248.26	337.75	255.89	337.79	285.47	337.83	313.92	338.26
340.9	338.14	346.6	338.38	352.33	338.65	363.42	340.11	406.82	341.23

414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 20.56 .035 49.21 .016 57.89 .018 163.29 .03
192.7 .018 218.96 .03 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
20.56 49.21 146.85 145.44 131.99 .1 .3

Ineffective Flow num= 3
Sta L Sta R Elev Permanent
57.89 62.86 337.63 F
62.86 71.22 339.58 T
71.22 441 355 F

Blocked Obstructions num= 4
Sta L Sta R Elev Sta L Sta R Elev
71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2969.225

INPUT
Description:
Station Elevation Data num= 40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 356.18 21.74 337.198 30.35 329.68 31.17 329.1 31.35 329.09
32.26 329.04 38.76 328.75 53.29 328.1 53.58 328.09 54.27 328.83
62.04 337.14 62.1 339.14 63.1 339.14 63.1 337.14 67.96 336.95
88.97 336.63 117.23 336.41 137.39 336.13 161.66 335.69 166.55 335.6
183.27 335.55 191.42 335.3 198.28 335.05 202.99 335.06 210.13 334.92
215.7 334.95 221.61 335.05 227.44 335.25 235.84 335.33 244.24 335.42
264.47 335.71 299.23 337.95 328.34 337.67 346.84 337.59 351.58 338.13
359.81 339.41 390.03 340.55 403.82 341.1 440.67 342.11 449.14 342.35

Manning's n Values num= 7
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 21.74 .035 53.29 .016 137.39 .03 183.27 .018
264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
21.74 53.29 48.12 46.59 34.68 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
62.1 449.14 339.14 F

Blocked Obstructions num= 1
Sta L Sta R Elev
232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2873.24

INPUT
Description:
Station Elevation Data num= 49
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 357.8 13.19 345.7 23.23 336.84 32.69 328.48 33.06 328.47
44.33 328.07 55.4 327.68 56.49 327.64 60.79 334.44 61.93 336.08
62 338 63 338 63 336 83 335.7 86.08 335.64
86.44 335.63 86.75 335.63 137.86 335.4 138.65 335.44 141.22 335.47
154.05 335.6 158.2 335.14 165.58 334.26 178.77 333.91 189.74 333.67
196.35 333.7 205.98 333.7 212.66 333.92 216.87 334.1 227.31 335.36
230.72 335.72 233.9 336.04 252.75 336.32 262.38 336.23 274.67 336.06
295.69 336.27 303.61 336.23 311.15 336.43 324.47 337.18 329.24 337.49
348.87 338.96 358.14 339.47 376.13 340.04 445.64 342.37 456.48 342.76
463.45 342.97 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 23.23 .035 56.49 .016 61.93 .018 227.31 .03
348.87 .018 376.13 .03 445.64 .018

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

23.23 56.49 179.7 177.4 154.96 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2695.84

INPUT
Description:
Station Elevation Data num= 42
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 361.95 12.31 345.06 22.84 335.71 31.63 328.03 32.59 328.02
43.26 327.95 54.18 327.96 55.74 327.97 61.02 334.79 61.88 335.82
62 337.8 63 337.8 63 335.8 83.16 335.28 97.88 334.85
115.03 334.84 145.23 334.62 155.42 334.39 182.3 333.76 188.41 333.72
191.22 333.67 195.43 333.76 202.05 333.5 218.7 333.21 224.74 333.31
232.14 333.29 237.4 333.28 244.5 333.26 250.72 333.3 262.29 335.75
280.25 336.11 287.55 336.9 307.71 339.79 313.94 339.8 319.15 340.85
335.15 340.5 345.45 340.41 361.78 340.7 402.63 341.75 459.27 343.42
480.11 343.99 493.96 344.04

Manning's n Values num= 13
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 22.84 .035 55.74 .016 83.16 .03 97.88 .018
155.42 .03 188.41 .018 250.72 .03 262.29 .018 280.25 .03
307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
22.84 55.74 161.84 166.46 226.33 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
62 91.85 337.8 F
91.85 493.96 365 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2529.382

INPUT
Description:
Station Elevation Data num= 28
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 358.98 19.08 338.23 22.99 334.62 31.96 326.34 32.75 326.36
46.17 326.68 50.81 326.76 51.2 326.77 58.78 333.41 59.67 334.18
60.05 334.51 96.28 335 122.48 335.39 131.97 335.34 174.16 335.7
176.05 335.7 213.04 336.25 231.04 336.52 231.23 336.53 234.1 336.55
304.7 337.01 312.5 337.05 360.6 337.73 378.26 337.98 394.39 338.45
434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .035 22.99 .035 51.2 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
51.2 109.52 94.32 36.08 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
173.53 493.08 360 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2435.063

INPUT
Description:

Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.81	21.23	353.16	42.85	343	47.85	340.43	55.92	339.16		
63.64	338.03	69.33	338.27	75.76	338.66	86.2	338.15	87.49	338.08		
105.77	338.63	106.06	338.53	118.18	333.89	138.46	326.71	138.83	326.71		
160.56	326.79	162.28	326.79	162.8	326.79	169.52	334.5	169.71	334.71		
172.01	334.74	176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08		
248.23	335.12	250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63		
351.83	336.34	356.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39		
493.94	338.45	511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	118.18	.035	162.8	.016	169.71	.025				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.											
118.18	162.8		112	100	22		.1		.3		

Ineffective Flow			
Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions			
Sta L	Sta R	Elev	
340.09	471.21	365	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64		
105.72	332.51	115.37	326.72	115.96	326.71	142.3	326.2	150.28	326.16		
153.68	326.15	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3		
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15		
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38		
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74		
506.87	340.23	555.95	342.37								

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	102.47	.035	153.68	.016	176.37	.018	202.82	.025		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.											
102.47	153.68		28.83	29	6.18		.1		.3		

Blocked Obstructions			
Sta L	Sta R	Elev	
233	414	365	

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

INPUT

Description:
Lateral structure position = Next of right bank station

Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335		
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32		
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33		
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02		
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95		
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66		
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13		
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51		
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51		
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14		
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77		
107.31	327.92	111.26	326.72	111.54	326.64	122.23	326.51	145.7	326.14		
145.99	326.14	151.2	328.87	160.87	333.92	163.21	334.94	166.35	334.98		
184.8	335.2	190.27	335.24	193.34	335.27	203.7	335.11	247.82	335.82		
257.56	336.1	259.76	336.16	269.28	336.25	338.64	337.01	397.05	338.48		
397.76	338.49	400.6	338.52	406.38	338.67	472.69	340.26	520.97	342.37		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	97.37	.08	145.7	.016	160.87	.018	184.8	.025		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.											
97.37	160.87		25.93	20.79	5.61		.1		.3		

Blocked Obstructions			
Sta L	Sta R	Elev	
179	377	350	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91		
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67		
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08		
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32		
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12		
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6		
460.26	340.29	508.6	342.4								

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.											
100.71	171.09		192.47	203.49	166.15		.1		.3		

Ineffective Flow			
Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions			
Sta L	Sta R	Elev	
224.96	364.18	355	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49		
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57		
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87		
147.5	336.18	181.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025				

0 .045 41.5 .045 78.71 .09 121.04 .045 142.05 .018
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1873.917

INPUT
 Description:
 Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14		
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18		
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56		
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38		
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7		
400.21	340.57										

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	187.67	.045	216.73	.07	237.63	.045	264.56	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1798.381

INPUT
 Description:
 Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29		
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43		
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12		
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31		
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66		
361.35	337.67	376.05	338.28	385	338.34						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	111.81	.03	145.23	.018	189.06	.045	213.36	.07
230.09	.045	251.36	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1641.59

INPUT
 Description:
 Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25		
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7		
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02		
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86		
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88		
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23		
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	76.62	.03	102.18	.018	173.79	.045	192.62	.06
291.75	.04	331.83	.018	367.96	.035				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1489.686

INPUT
 Description: U/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21		
54.59	341.23	57.81	340.42	90.09	332.29	97.19	331.92	105.34	331.24		
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22		
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17		
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85		
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42		
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334		
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38		
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045	223.09	.1
248.3	.045	279.01	.025	320.02	.035	349.96	.018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 212.54 266.06 50.44 50.64 51.04 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1439.048

INPUT
 Description: D/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28		
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1		
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92		
179.21	323.2	179.22	323.2	181.06	332.49	188.67	311.46	189.58	311.49		
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7		
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47		
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88		
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22		
343.78	344.69										

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05	188.67	.1
213.36	.05	239.35	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1288.123

INPUT
 Description:
 Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07		
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94		
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8		
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52		
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99		
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	88.69	.045	110.15	.05	156.79	.1	183.29	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

Upper Reach	826.8154	.035	.018	.045	.1	.045	.018
Upper Reach	676.0353	.025	.018	.05	.1	.05	.018
Upper Reach	611.5112	.05	.07	.05	.018		

Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3

HEC-RAS Plan: NoVeg-Bottom River: Alvarado Channel Reach: Upper Reach

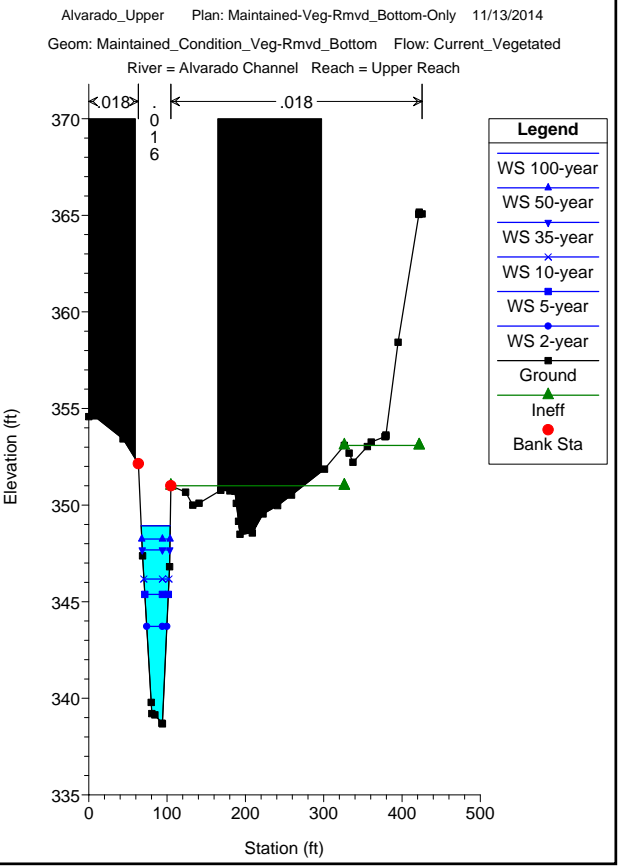
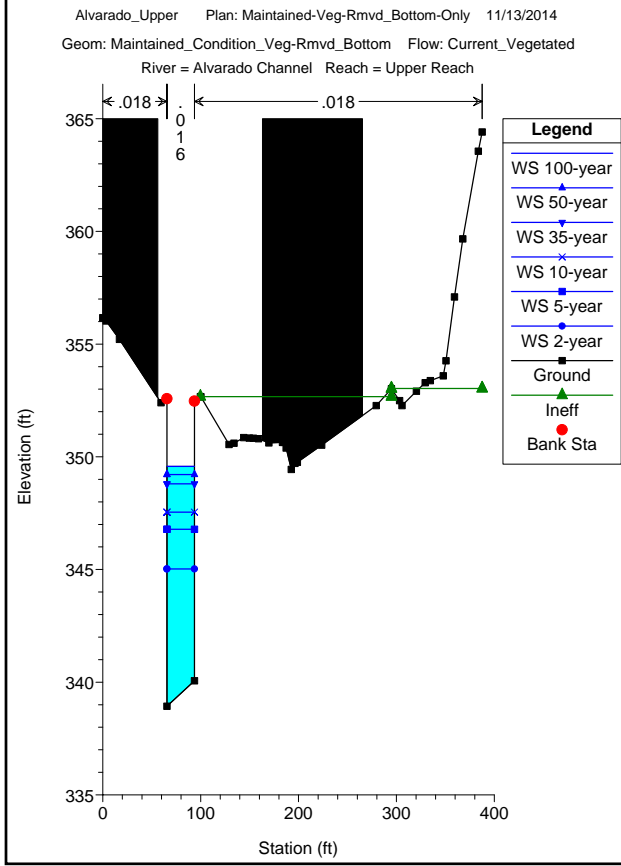
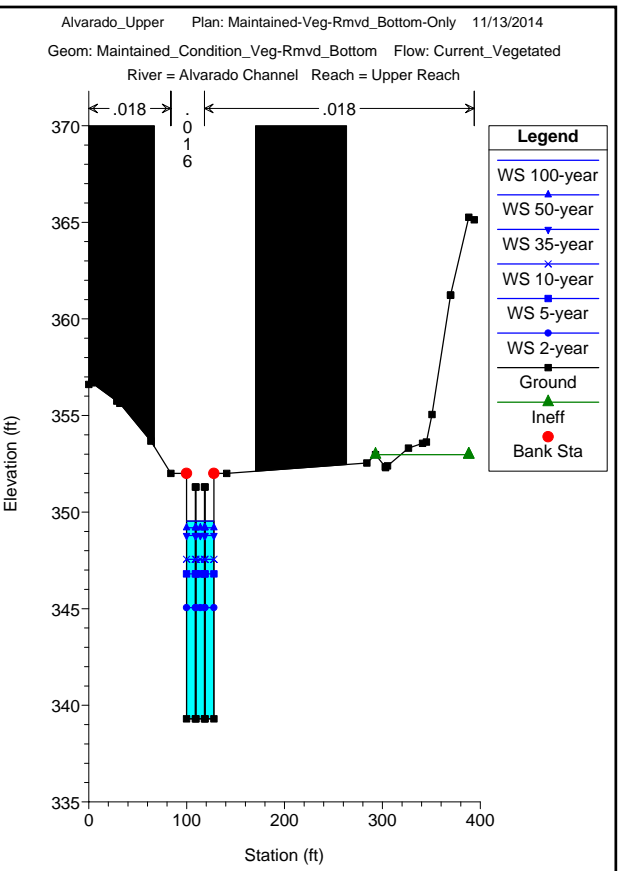
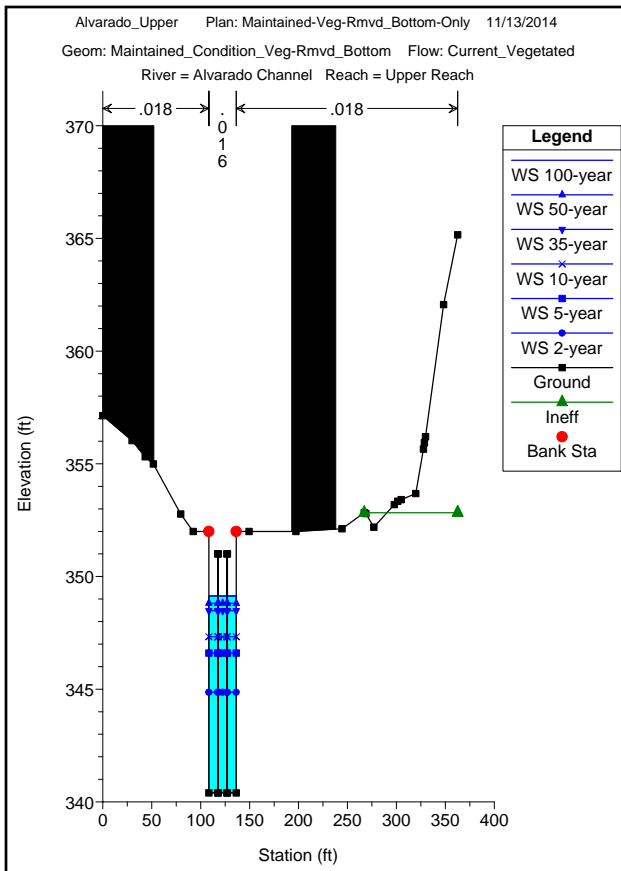
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.38	352.40	0.006463	15.19	223.77	26.60	0.92
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70
Upper Reach	4543.777		Lat Struct									
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59
Upper Reach	3913.392	100-year	3900.00	333.56	340.91	343.19	348.88	0.009659	22.65	172.15	32.32	1.73
Upper Reach	3913.392	50-year	3400.00	333.56	340.35	342.76	347.89	0.009998	22.03	154.31	30.91	1.74
Upper Reach	3913.392	35-year	3000.00	333.56	339.87	342.19	347.02	0.010329	21.47	139.74	29.79	1.75
Upper Reach	3913.392	10-year	2100.00	333.56	338.67	340.62	344.79	0.011289	19.86	105.73	26.97	1.77
Upper Reach	3913.392	5-year	1700.00	333.56	338.07	339.84	343.61	0.011838	18.90	89.95	25.55	1.78
Upper Reach	3913.392	2-year	1000.00	333.56	336.87	338.18	341.03	0.012823	16.36	61.11	22.76	1.76
Upper Reach	3758.046	100-year	3900.00	332.58	339.58	342.87	347.31	0.009706	22.31	174.83	34.31	1.74
Upper Reach	3758.046	50-year	3400.00	332.58	339.10	341.36	346.23	0.009741	21.43	158.63	33.10	1.73
Upper Reach	3758.046	35-year	3000.00	332.58	338.69	340.79	345.30	0.009743	20.63	145.39	32.06	1.71
Upper Reach	3758.046	10-year	2100.00	332.58	337.69	339.33	342.91	0.009526	18.34	114.53	29.52	1.64
Upper Reach	3758.046	5-year	1700.00	332.58	337.18	338.57	341.68	0.009294	17.01	99.95	28.25	1.59
Upper Reach	3758.046	2-year	1000.00	332.58	336.18	337.00	339.10	0.008153	13.70	72.99	25.72	1.43
Upper Reach	3600.906	100-year	3900.00	330.91	337.97	340.48	345.76	0.009940	22.39	174.20	34.91	1.77
Upper Reach	3600.906	50-year	3400.00	330.91	337.51	339.80	344.68	0.009952	21.49	158.19	33.66	1.75
Upper Reach	3600.906	35-year	3000.00	330.91	337.11	339.24	343.76	0.009956	20.70	144.95	32.59	1.73
Upper Reach	3600.906	10-year	2100.00	330.91	336.11	337.78	341.39	0.009808	18.44	113.86	29.94	1.67
Upper Reach	3600.906	5-year	1700.00	330.91	335.61	337.05	340.18	0.009659	17.16	99.04	28.58	1.63
Upper Reach	3600.906	2-year	1000.00	330.91	334.54	335.49	337.71	0.009329	14.29	69.99	25.73	1.53
Upper Reach	3418.613	100-year	3900.00	330.09	341.61	339.34	343.49	0.010822	11.08	367.48	64.59	0.64
Upper Reach	3418.613	50-year	3400.00	330.09	340.80	338.69	342.56	0.011134	10.67	327.18	47.85	0.65
Upper Reach	3418.613	35-year	3000.00	330.09	340.20	338.18	341.80	0.011139	10.18	299.34	44.34	0.64
Upper Reach	3418.613	10-year	2100.00	330.09	338.58	336.71	339.84	0.012123	9.00	233.52	38.31	0.64
Upper Reach	3418.613	5-year	1700.00	330.09	337.71	335.97	338.82	0.012433	8.46	201.02	36.15	0.63
Upper Reach	3418.613	2-year	1000.00	330.09	335.76	334.42	336.61	0.013433	7.40	135.20	31.30	0.63
Upper Reach	3230.305	100-year	3900.00	329.06	341.71	338.19	343.05	0.002065	7.42	466.65	241.35	0.40
Upper Reach	3230.305	50-year	3400.00	329.06	340.87	337.63	342.11	0.002153	7.17	420.78	204.83	0.41
Upper Reach	3230.305	35-year	3000.00	329.06	340.24	337.12	341.37	0.002179	6.89	386.33	183.84	0.40
Upper Reach	3230.305	10-year	2100.00	329.06	338.43	335.65	339.44	0.002530	6.41	289.68	93.80	0.42
Upper Reach	3230.305	5-year	1700.00	329.06	337.56	334.92	338.40	0.002655	6.05	251.82	43.47	0.42
Upper Reach	3230.305	2-year	1000.00	329.06	335.59	333.40	336.18	0.002611	5.30	173.68	36.92	0.41
Upper Reach	3018.677	100-year	3900.00	328.39	338.57	338.57	342.01	0.009198	12.84	278.16	121.16	0.80
Upper Reach	3018.677	50-year	3400.00	328.39	338.26	338.01	341.13	0.008197	11.79	264.53	113.67	0.75
Upper Reach	3018.677	35-year	3000.00	328.39	337.74	337.35	340.38	0.008370	11.37	242.75	111.45	0.75
Upper Reach	3018.677	10-year	2100.00	328.39	336.60	335.62	338.48	0.007261	9.73	200.24	77.82	0.69
Upper Reach	3018.677	5-year	1700.00	328.39	335.81	334.84	337.43	0.007168	9.22	172.92	65.01	0.69
Upper Reach	3018.677	2-year	1000.00	328.39	334.16	333.22	335.27	0.006722	7.89	121.21	29.39	0.66
Upper Reach	2969.225	100-year	3900.00	328.10	339.86	337.16	340.09	0.000422	3.30	1046.97	213.31	0.18
Upper Reach	2969.225	50-year	3400.00	328.10	337.23	336.55	339.95	0.007774	11.51	271.79	209.24	0.75

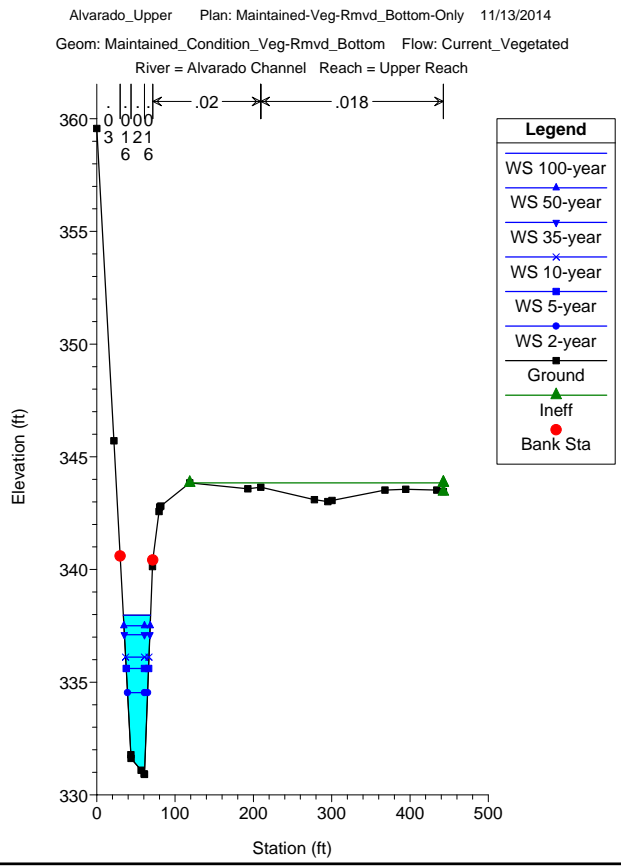
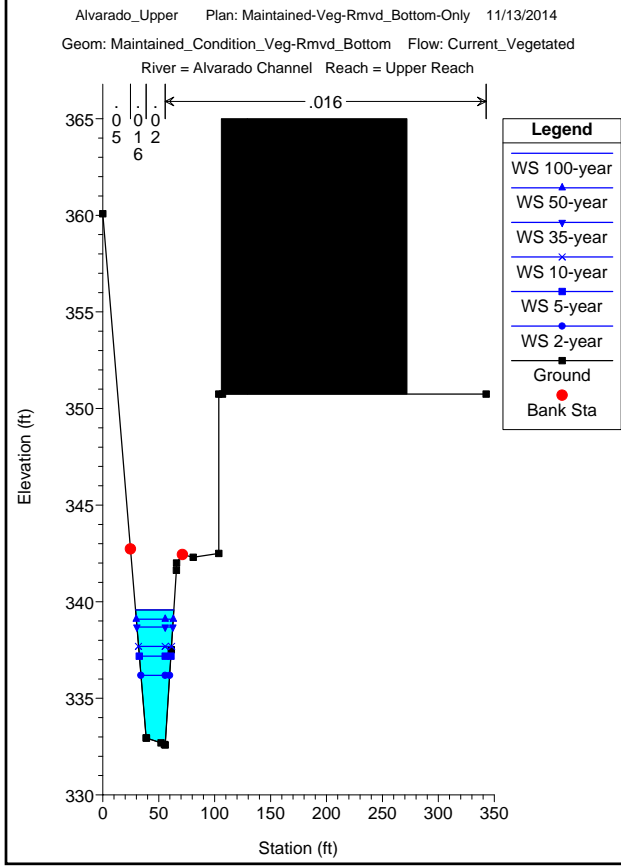
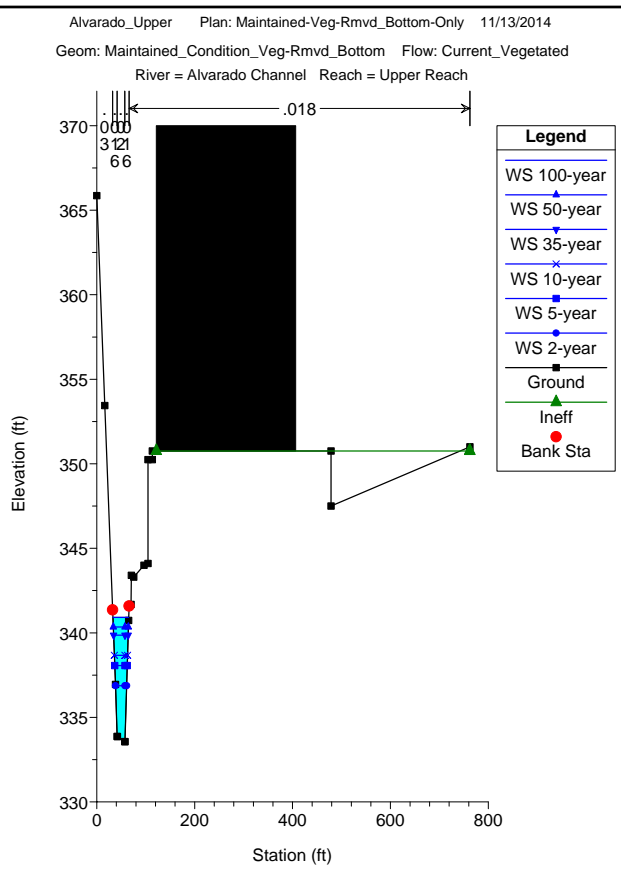
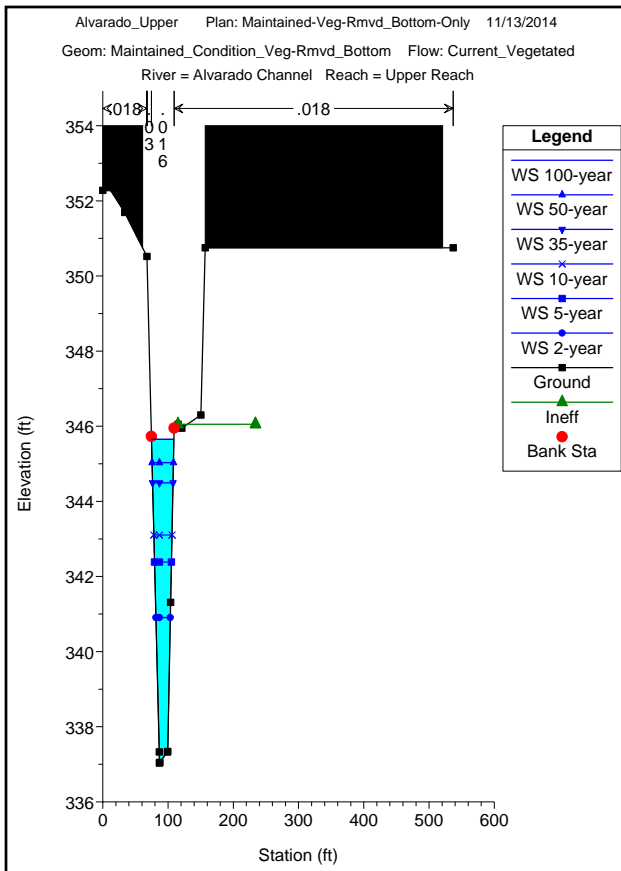
HEC-RAS Plan: NoVeg-Bottom River: Alvarado Channel Reach: Upper Reach (Continued)

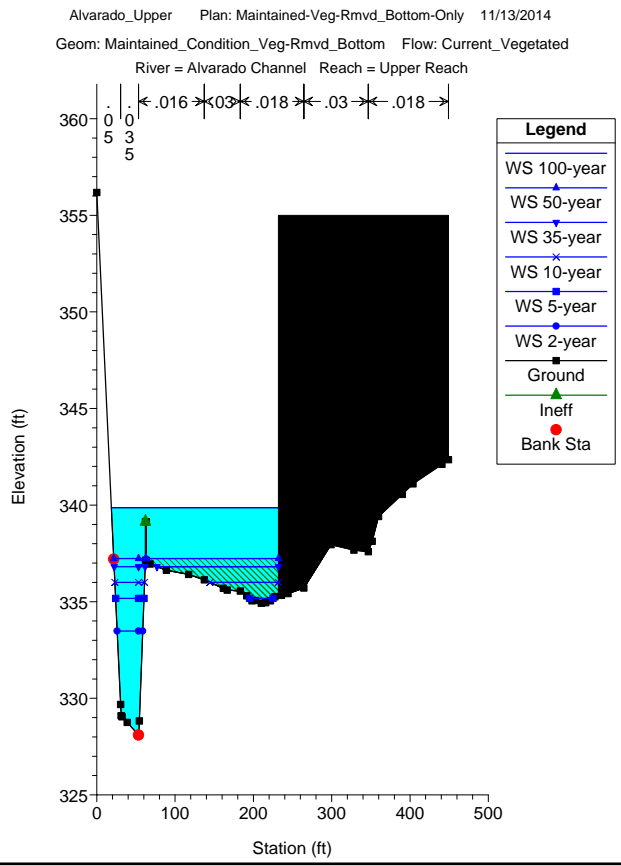
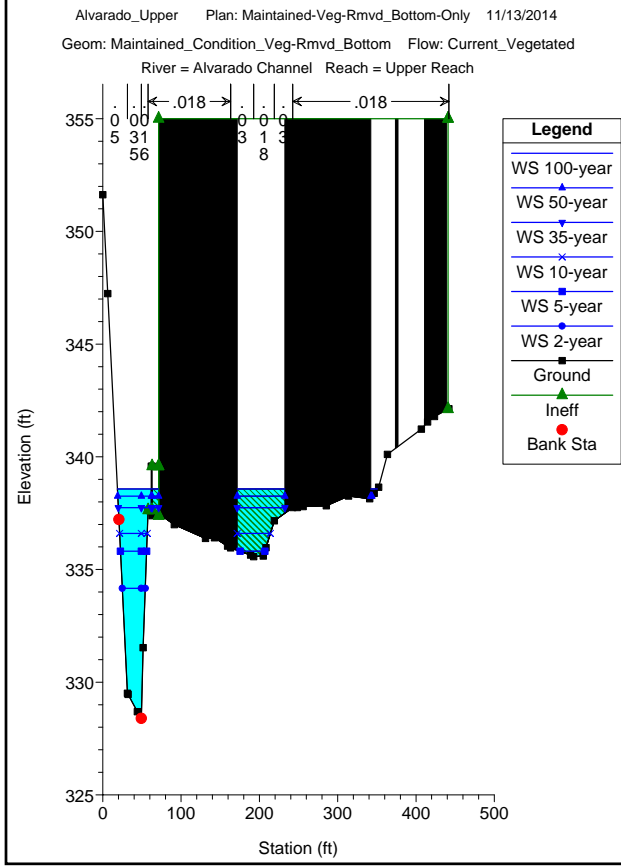
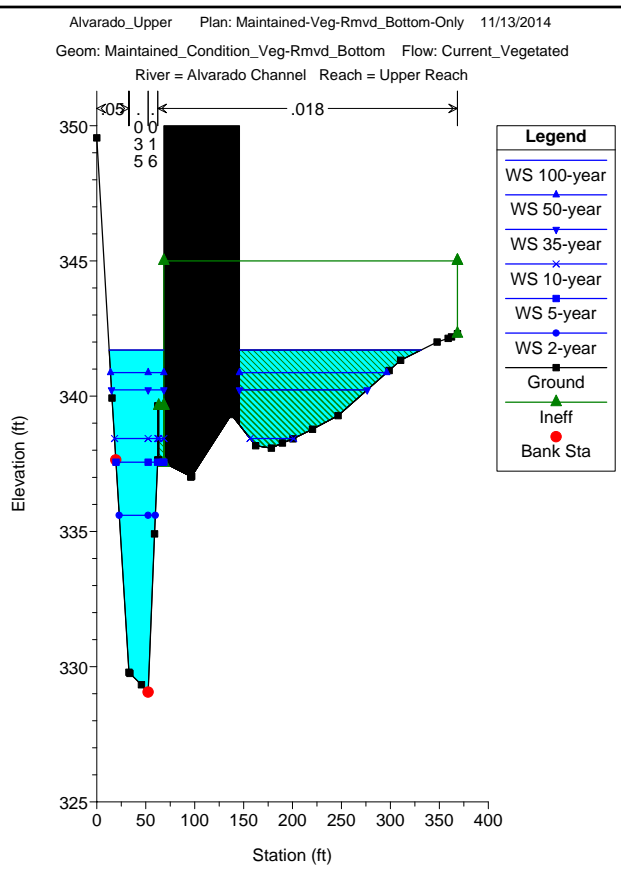
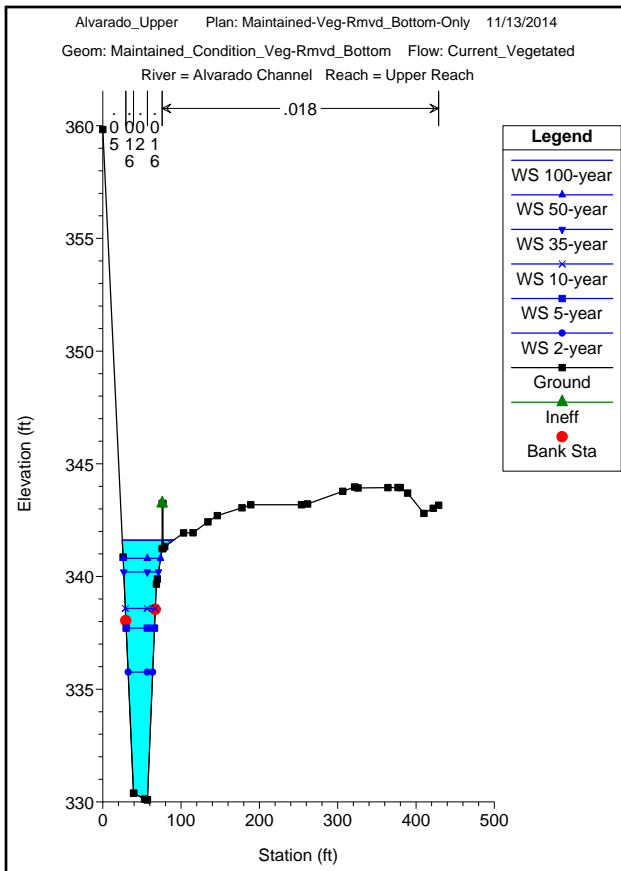
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.10	336.81	335.99	339.20	0.007250	10.86	255.14	194.68	0.72
Upper Reach	2969.225	10-year	2100.00	328.10	336.00	334.55	337.50	0.005151	8.74	223.65	125.35	0.61
Upper Reach	2969.225	5-year	1700.00	328.10	335.17	333.82	336.48	0.005139	8.27	192.83	66.12	0.61
Upper Reach	2969.225	2-year	1000.00	328.10	333.48	332.33	334.39	0.004965	7.06	134.75	32.62	0.59
Upper Reach	2873.24	100-year	3900.00	327.64	339.95	336.50	340.04	0.000146	2.45	1640.13	353.54	0.13
Upper Reach	2873.24	50-year	3400.00	327.64	339.03	335.86	339.14	0.000208	2.75	1329.43	329.49	0.16
Upper Reach	2873.24	35-year	3000.00	327.64	338.37	335.29	338.49	0.000273	3.00	1114.49	319.53	0.18
Upper Reach	2873.24	10-year	2100.00	327.64	336.08	333.87	337.21	0.003110	8.49	246.25	215.65	0.57
Upper Reach	2873.24	5-year	1700.00	327.64	335.22	333.14	336.20	0.003074	7.90	214.37	105.00	0.56
Upper Reach	2873.24	2-year	1000.00	327.64	333.49	331.71	334.14	0.002864	6.47	154.15	33.16	0.52
Upper Reach	2695.84	100-year	3900.00	327.95	336.26	336.26	339.63	0.008566	14.57	265.08	200.79	0.95
Upper Reach	2695.84	50-year	3400.00	327.95	335.92	335.63	338.76	0.007705	13.38	251.60	189.34	0.90
Upper Reach	2695.84	35-year	3000.00	327.95	336.00	335.08	338.16	0.005740	11.65	255.05	193.82	0.78
Upper Reach	2695.84	10-year	2100.00	327.95	335.17	333.68	336.56	0.004248	9.34	222.95	153.16	0.66
Upper Reach	2695.84	5-year	1700.00	327.95	334.28	332.99	335.53	0.004513	8.90	189.73	131.21	0.66
Upper Reach	2695.84	2-year	1000.00	327.95	332.55	331.56	333.47	0.004883	7.64	130.35	32.84	0.66
Upper Reach	2529.382	100-year	3900.00	326.34	337.64	336.39	338.25	0.001257	6.42	622.17	203.72	0.36
Upper Reach	2529.382	50-year	3400.00	326.34	336.17	336.17	337.38	0.003455	9.56	397.93	152.22	0.58
Upper Reach	2529.382	35-year	3000.00	326.34	335.94	335.94	337.08	0.003390	9.29	361.84	151.96	0.57
Upper Reach	2529.382	10-year	2100.00	326.34	333.15	332.90	335.46	0.008204	11.52	175.11	33.91	0.85
Upper Reach	2529.382	5-year	1700.00	326.34	332.70	332.15	334.50	0.007022	10.25	159.96	32.90	0.78
Upper Reach	2529.382	2-year	1000.00	326.34	331.56	330.60	332.59	0.005192	7.85	123.90	30.36	0.66
Upper Reach	2435.063	100-year	3900.00	326.71	337.80	335.71	338.09	0.000873	4.83	933.51	232.12	0.28
Upper Reach	2435.063	50-year	3400.00	326.71	334.73	333.81	336.65	0.007020	10.54	312.43	55.29	0.74
Upper Reach	2435.063	35-year	3000.00	326.71	332.27	333.31	336.20	0.023141	15.33	190.91	44.81	1.28
Upper Reach	2435.063	10-year	2100.00	326.71	333.28	332.08	334.53	0.006091	8.55	238.20	48.56	0.67
Upper Reach	2435.063	5-year	1700.00	326.71	332.67	331.45	333.73	0.005730	7.90	209.39	46.31	0.64
Upper Reach	2435.063	2-year	1000.00	326.71	331.35	330.16	332.04	0.004959	6.48	151.42	41.43	0.59
Upper Reach	2335.331	100-year	3900.00	326.15	337.73		338.05	0.000432	3.74	951.41	177.74	0.21
Upper Reach	2335.331	50-year	3400.00	326.15	335.49		336.07	0.001083	5.03	592.39	139.68	0.31
Upper Reach	2335.331	35-year	3000.00	326.15	334.92	331.50	335.54	0.001170	4.98	518.40	103.62	0.32
Upper Reach	2335.331	10-year	2100.00	326.15	333.62		334.11	0.001187	4.56	405.54	77.16	0.32
Upper Reach	2335.331	5-year	1700.00	326.15	332.94		333.34	0.001176	4.30	355.89	70.81	0.31
Upper Reach	2335.331	2-year	1000.00	326.15	331.47		331.72	0.001166	3.74	255.08	66.40	0.31
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	337.63		338.02	0.002565	4.96	813.80	137.10	0.28
Upper Reach	2308.404	50-year	3400.00	326.14	335.18		335.99	0.008287	7.33	489.58	127.56	0.48
Upper Reach	2308.404	35-year	3000.00	326.14	334.69		335.46	0.008494	7.07	435.60	97.86	0.48
Upper Reach	2308.404	10-year	2100.00	326.14	333.45		334.04	0.008405	6.16	341.14	62.05	0.46
Upper Reach	2308.404	5-year	1700.00	326.14	332.77		333.27	0.008320	5.67	299.73	59.59	0.45
Upper Reach	2308.404	2-year	1000.00	326.14	331.32		331.65	0.008096	4.61	217.10	54.35	0.41
Upper Reach	2287.614	100-year	3900.00	326.23	337.57	332.74	337.95	0.004191	4.11	888.58	155.87	0.24
Upper Reach	2287.614	50-year	3400.00	326.23	335.04	332.28	335.71	0.016908	6.66	526.63	111.82	0.45
Upper Reach	2287.614	35-year	3000.00	326.23	334.52	331.88	335.18	0.018016	6.59	469.90	106.66	0.46
Upper Reach	2287.614	10-year	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	5-year	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	2-year	1000.00	326.23	331.03	329.27	331.39	0.019805	4.81	207.87	57.89	0.45
Upper Reach	2084.121	100-year	3900.00	323.64	337.12		337.39	0.001832	4.19	938.83	129.74	0.24
Upper Reach	2084.121	50-year	3400.00	323.64	332.99		333.59	0.006968	6.20	548.65	81.27	0.42
Upper Reach	2084.121	35-year	3000.00	323.64	332.42		332.97	0.007073	5.96	503.23	78.78	0.42
Upper Reach	2084.121	10-year	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	5-year	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	2-year	1000.00	323.64	328.74		329.01	0.007592	4.11	243.09	62.67	0.37
Upper Reach	1873.917	100-year	3900.00	320.65	337.03		337.18	0.000471	2.99	1292.91	268.84	0.16
Upper Reach	1873.917	50-year	3400.00	320.65	330.72		331.85	0.009296	8.53	398.53	65.89	0.61
Upper Reach	1873.917	35-year	3000.00	320.65	330.08		331.17	0.009904	8.40	357.20	62.72	0.62
Upper Reach	1873.917	10-year	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63
Upper Reach	1873.917	5-year	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	2-year	1000.00	320.65	326.22		326.89	0.013373	6.59	151.75	43.75	0.62
Upper Reach	1798.381	100-year	3900.00	318.55	337.02		337.14	0.000338	2.67	1401.33	305.08	0.13
Upper Reach	1798.381	50-year	3400.00	318.55	329.31		330.97	0.012833	10.34	328.80	50.24	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.028296	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.037463	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.05		337.09	0.000091	1.49	2486.15	286.64	0.07
Upper Reach	1641.59	50-year	3400.00	315.77	329.94		330.13	0.001064	3.52	965.72	114.77	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.38	321.45	325.85	0.004087	5.50	545.07	80.28	0.37
Upper Reach	1641.59	10-year	2100.00	315.77	323.12	320.50	323.61	0.005926	5.62	373.75	71.12	0.43

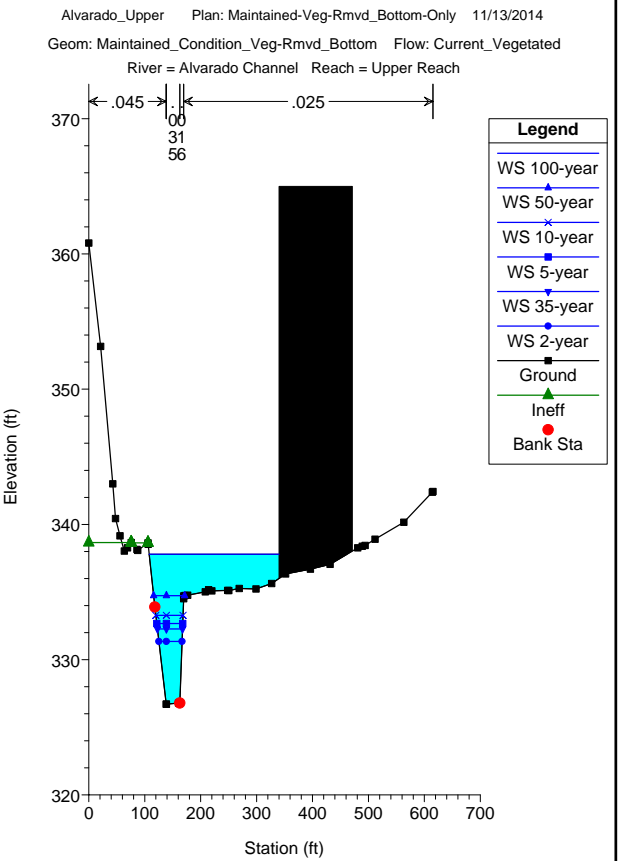
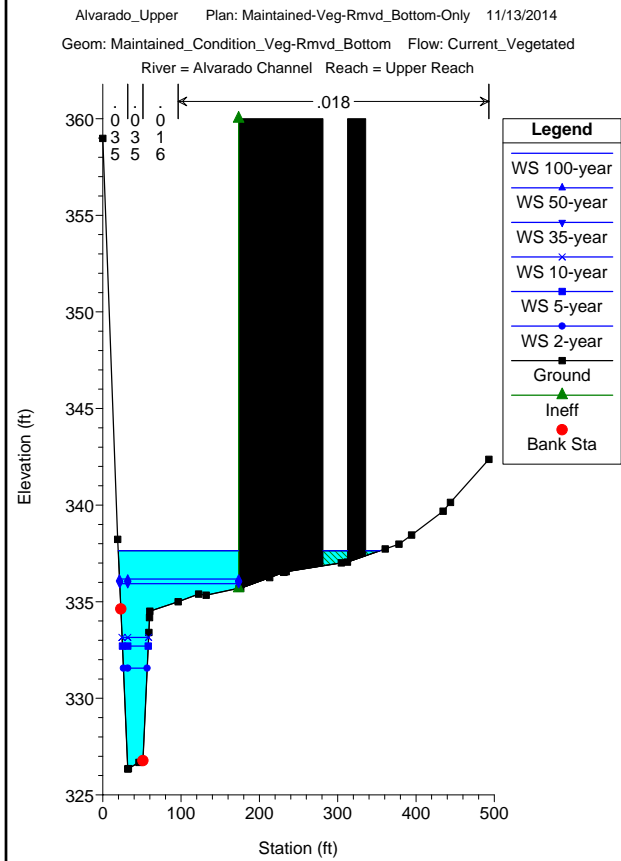
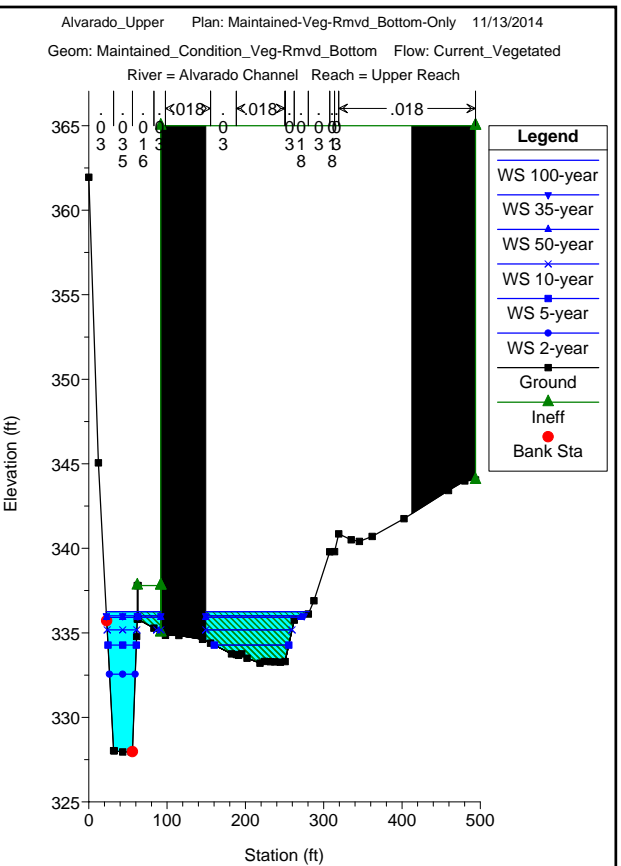
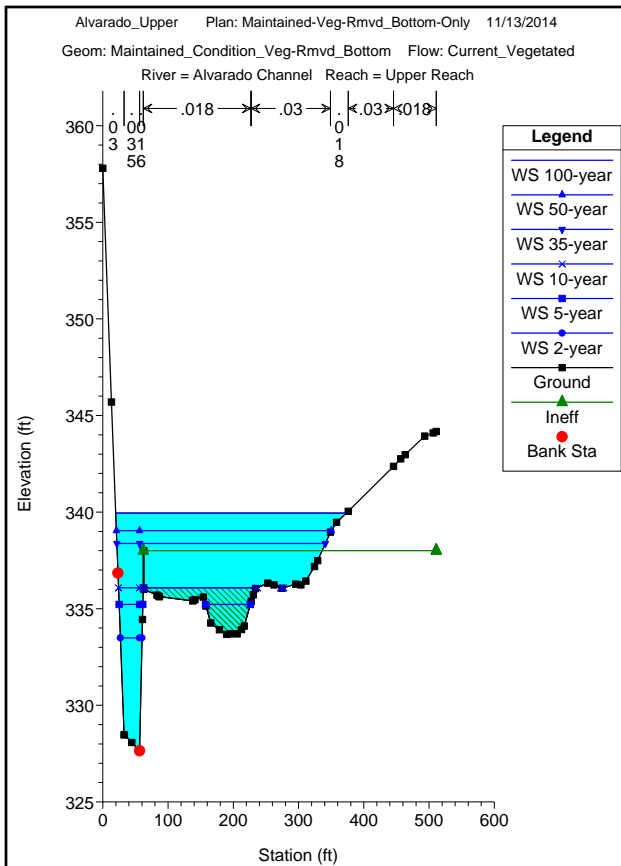
HEC-RAS Plan: NoVeg-Bottom River: Alvarado Channel Reach: Upper Reach (Continued)

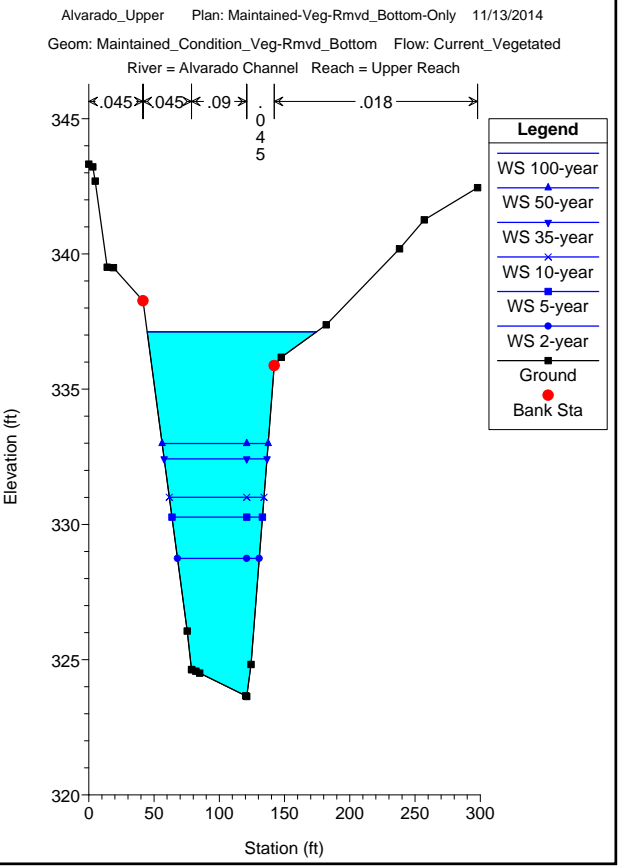
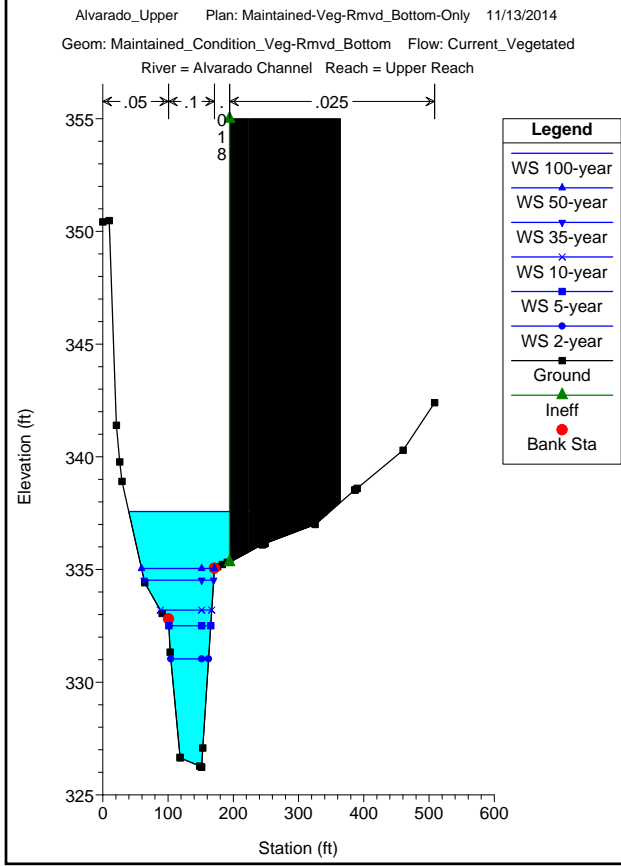
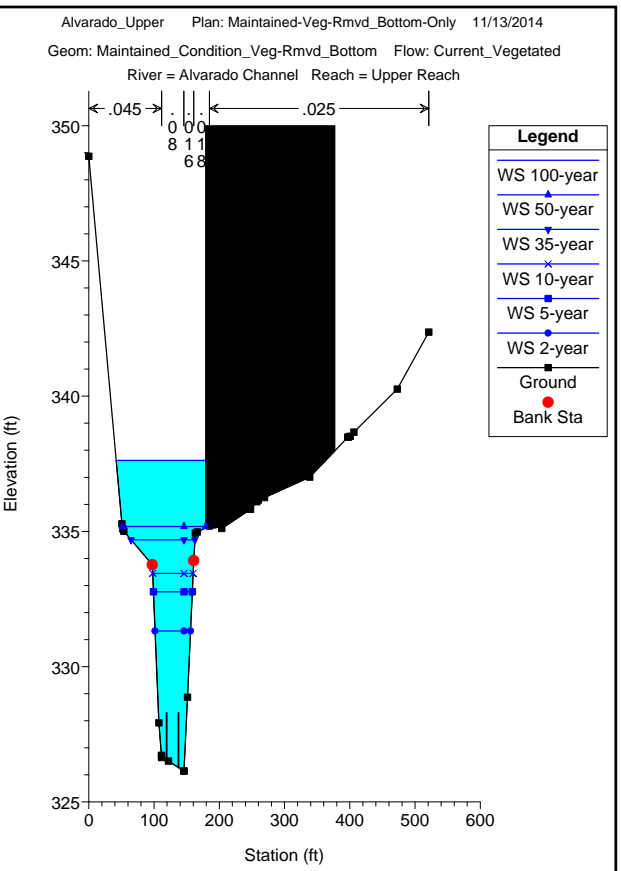
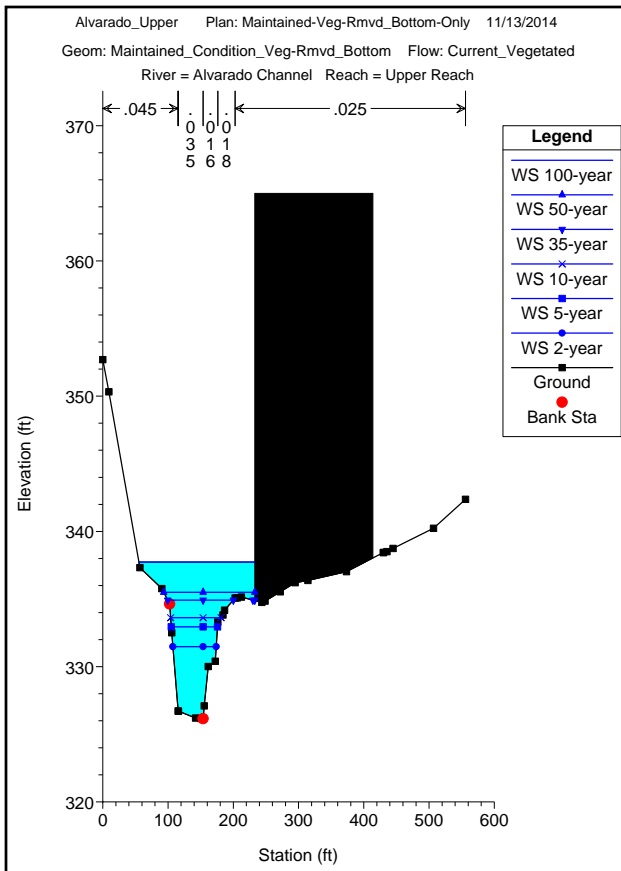
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	322.19	320.02	322.66	0.006738	5.49	309.50	67.36	0.45
Upper Reach	1641.59	2-year	1000.00	315.77	320.47	318.97	320.86	0.008609	5.01	199.48	60.39	0.49
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000150	1.62	2099.60	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.37		329.84	0.003330	5.49	619.71	54.01	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.61		324.74	0.014077	8.51	352.55	41.08	0.51
Upper Reach	1489.686	10-year	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	5-year	1700.00	312.84	319.83		320.87	0.023337	8.18	207.86	35.44	0.60
Upper Reach	1489.686	2-year	1000.00	312.84	318.14		318.83	0.022583	6.66	150.08	32.91	0.55
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000244	2.09	1886.62	239.69	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.33		329.66	0.002304	4.62	735.66	67.26	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.06		324.03	0.012185	7.91	379.37	45.93	0.48
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.89	316.83	319.32	0.039306	9.60	177.09	33.92	0.74
Upper Reach	1439.048	2-year	1000.00	311.46	316.59	315.40	317.45	0.032578	7.46	134.13	31.93	0.64
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.23	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1522.74	116.95	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.24		323.41	0.001036	3.31	907.13	83.93	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.28	312.03	315.85	0.008905	6.05	347.05	56.61	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.15		313.42	0.038229	9.06	187.70	45.19	0.78
Upper Reach	1288.123	2-year	1000.00	306.79	310.71		311.68	0.045245	7.91	126.50	39.94	0.78
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4818.81	291.58	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2886.78	213.68	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.26	308.49	323.30	0.000215	1.57	1911.39	141.49	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.23	307.72	315.31	0.000984	2.28	921.48	106.81	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.71	307.34	310.01	0.010151	4.39	387.27	86.78	0.37
Upper Reach	1111.63	2-year	1000.00	303.43	309.03	306.54	309.17	0.005949	3.04	328.94	84.30	0.27
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.38	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4447.61	259.62	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.25		323.27	0.000051	0.96	3116.86	200.78	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.17		315.19	0.000187	1.29	1631.22	163.93	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.04		306.41	0.016106	4.86	349.91	109.50	0.48
Upper Reach	826.8154	2-year	1000.00	301.19	303.85	303.85	304.69	0.103276	7.37	135.59	81.78	1.01
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000005	0.69	5683.32	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000014	0.93	3690.13	227.78	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000026	1.14	2635.77	150.90	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.15		315.18	0.000053	1.38	1524.66	123.67	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	305.95		306.11	0.000547	3.17	536.36	88.34	0.23
Upper Reach	676.0353	2-year	1000.00	296.69	303.33	300.13	303.48	0.000676	3.10	322.45	74.37	0.26
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.39	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85

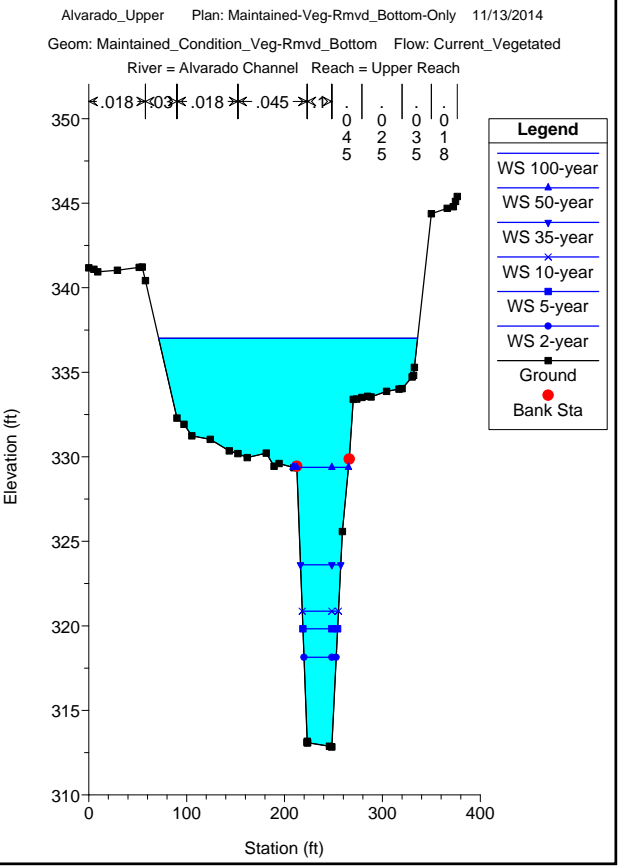
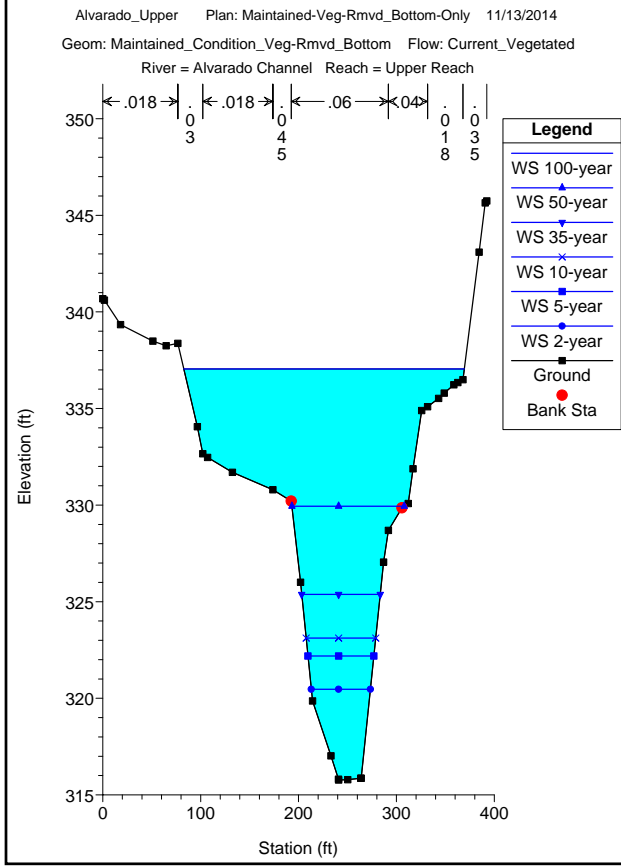
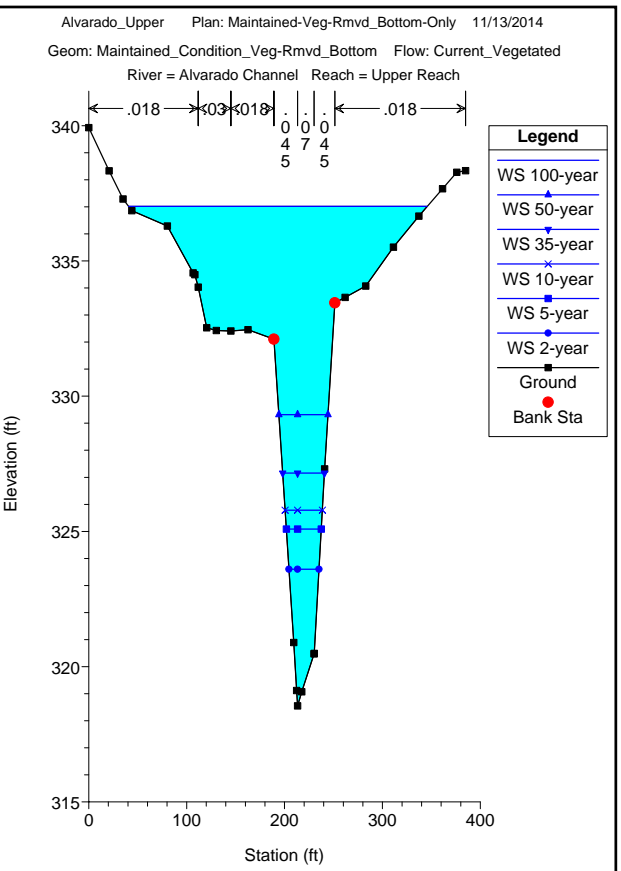
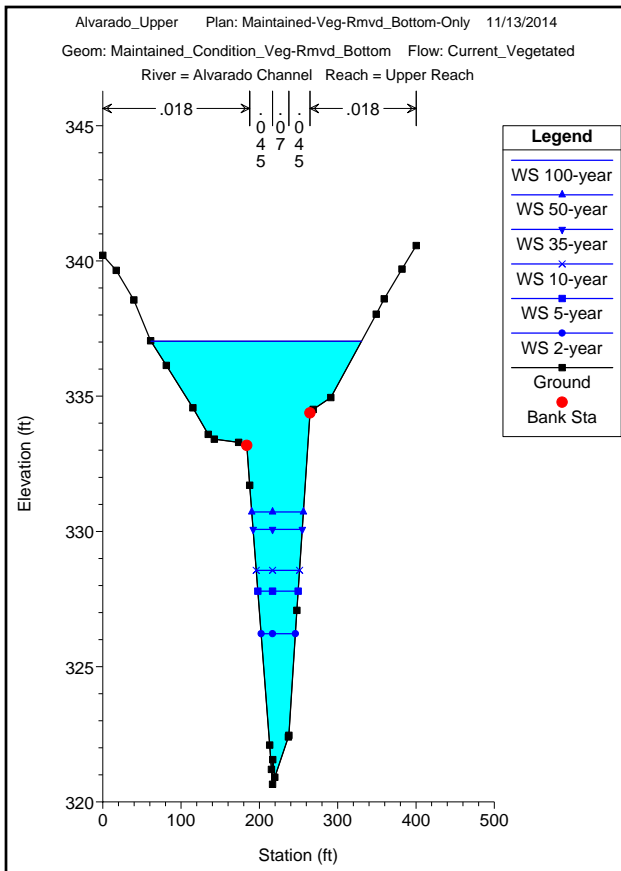


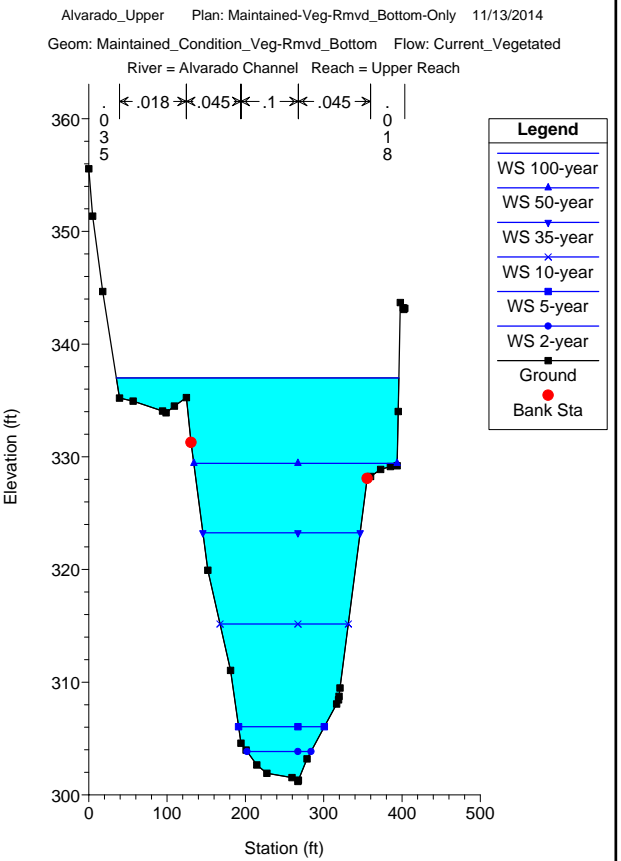
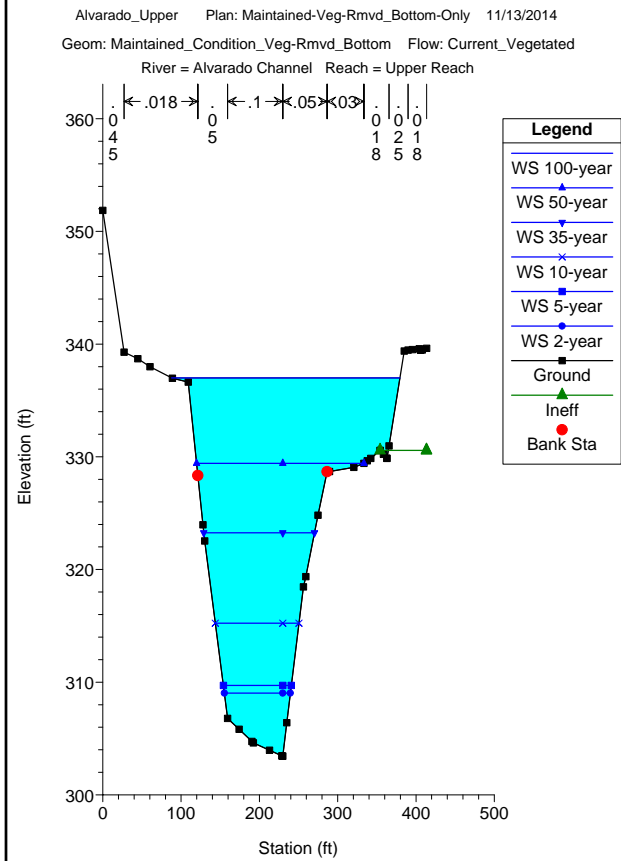
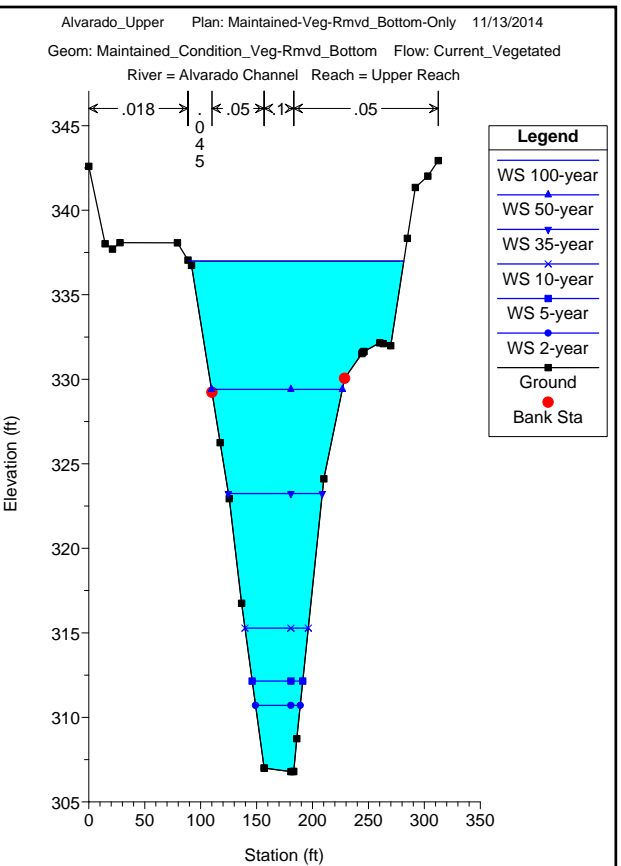
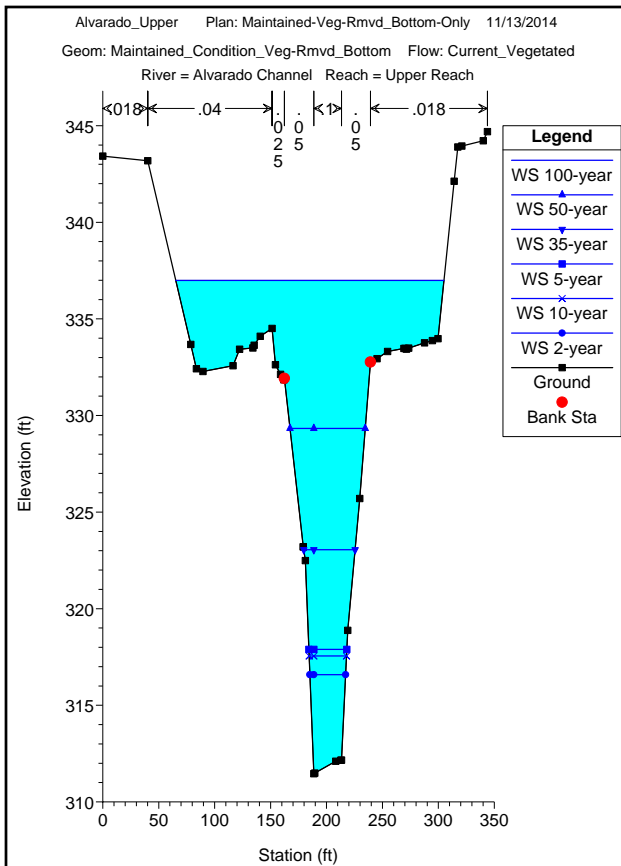




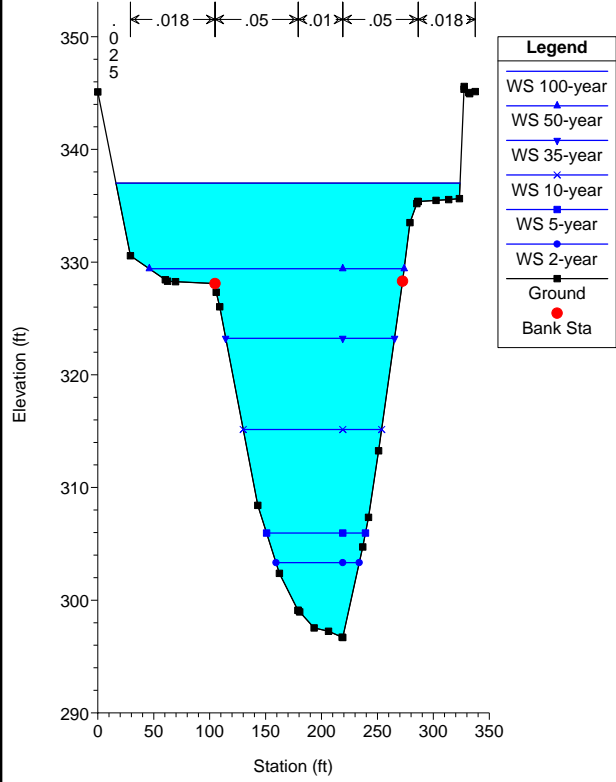




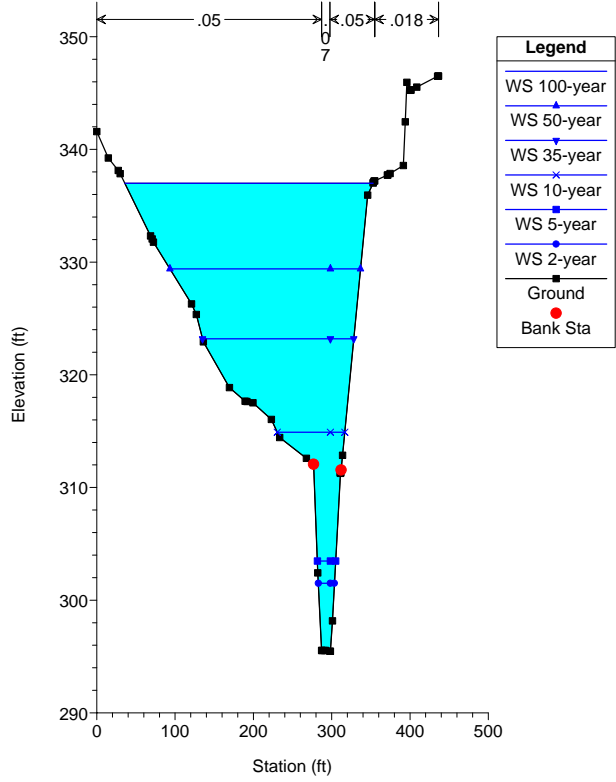




Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bottom-Only 11/13/2014
 Geom: Maintained_Condition_Veg-Rmvd_Bottom Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: Maintained-Veg-Rmvd_Bottom-Only 11/13/2014
 Geom: Maintained_Condition_Veg-Rmvd_Bottom Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File: Alvarado_Upper.prj
 Run Date and Time: 11/13/2014 1:49:34 PM

Project in English units

PLAN DATA

Plan Title: Maintained-Veg-Rmvd_Bottom-Only
 Plan File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p07
 Geometry Title: Maintained_Veg-Rmvd_Bottom
 Geometry File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g08
 Flow Title: Current_Vegetated
 Flow File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Description:
 Bottom Vegetation removed in the City maintained portion only

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

River	Reach	RS	100-year	50-year	35-year	10-year
5-year	2-year					
Alvarado ChannelUpper Reach	1700	4559.274	3900	3400	3000	2100

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper Reach	100-year		Critical	Known WS = 337
Alvarado ChannelUpper Reach	50-year		Critical	Known WS = 329.4
Alvarado ChannelUpper Reach	35-year		Critical	Known WS = 323.2
Alvarado ChannelUpper Reach	10-year		Critical	Known WS = 314.9
Alvarado ChannelUpper Reach	5-year		Critical	Normal S = 0.03
Alvarado ChannelUpper Reach	2-year		Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Condition_Veg-Rmvd_Bottom
 Geometry File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g08

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99
92.38	352	108.38	352	108.38	340.4	117.38	340.4
118.08	351	118.08	340.4	126.68	340.4	126.68	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65
329.79	356.2	348.2	362.06	362.49	365.16		

 Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
108.38	136.38	56.75	57.06	57.78	.1	.3	

 Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

INPUT

Description:
 Lateral structure position = Next of right bank station
 Distance from Upstream XS =
 Deck/Roadway Width = 10
 Weir Coefficient = 2
 Weir Flow Reference = Water Surface
 Weir Embankment Coordinates num = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75

516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	339.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.61
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT

Description:

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63	63.35	353.68
83.88	352	99.88	352	99.88	339.3	108.88	339.3	108.88	351.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3	118.88	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352	284.1	352.54
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39	326.64	353.31
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22	369.63	361.24
388.16	365.26	393.87	365.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

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

99.88	127.88		35.29	35.3	35.1	.1	.3
-------	--------	--	-------	------	------	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
292.86	388.16	352.97	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	67.09	370	170.25	263.29	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT

Description:

Station Elevation Data num= 37									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66
128.96	350.55	134.07	350.6	144	350.85	148.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39

192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

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

65.6	93.6		27.81	27.21	26.73	.1	.3
------	------	--	-------	-------	-------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
99.74	294.86	352.67	F
294.86	387.54	353.03	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	56.31	365	163.1	265.25	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.36	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

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

63.26	104.83		164.21	164.68	167.58	.1	.3
-------	--------	--	--------	--------	--------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
104.83	326.23	351	F
326.23	421.9	353.09	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	59.44	370	164.66	297.32	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	536.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

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

74.43	109.33		381.65	361.63	347.98	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
115.33	233.87	346.05	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	61.02	354	156.99	520.69	354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	365.86	16.26	353.45	32.29	341.36	38.14	336.95	41.63	333.87
42.22	333.86	57.31	333.57	57.59	333.56	64.94	340.73	66.19	341.59
69.85	341.68	70.47	343.4	75.47	343.3	96.47	344	104.47	344.1
104.47	350.25	113.47	350.25	113.47	350.76	478.56	350.76	478.56	347.5
762.56	351								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	32.29	.016	41.63	.02	57.31	.016	66.19	.018

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

	32.29	66.19	160.29	155.35	151.31				
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
121.74	762	350.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
121.74	406.35	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.08	24.76	342.73	38.72	332.95	39.06	332.94	52	332.69
55.04	332.61	55.85	332.58	61.28	337.51	65.85	341.63	66	342
71.24	342.44	80.82	342.3	103.66	342.5	103.66	350.75	107	350.75
342.68	350.75								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	24.76	.016	38.72	.02	55.85	.016

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

	24.76	71.24	156.2	157.14	158.25				
--	-------	-------	-------	--------	--------	--	--	--	--

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
106	129.29	365	129.29	271.93	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.57	21.79	345.71	29.74	340.6	43.48	331.78	43.71	331.62
56.66	331.09	60.41	330.93	60.88	330.91	71.14	340.13	71.45	340.42
79.54	342.57	80.33	342.77	81.75	342.81	118.62	343.84	192.97	343.58
209.41	343.65	277.88	343.1	295.07	343.01	300.31	343.06	368.05	343.52
394.52	343.56	434.26	343.52	442.68	343.45				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	29.74	.016	43.71	.02	60.88	.016	71.45	.02
209.41	.018								

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

	29.74	71.45	183.48	182.29	181.14				
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Ineffective Flow num= 1

			1						
--	--	--	---	--	--	--	--	--	--

Sta L	Sta R	Elev	Permanent
118.62	442.68	343.84	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.83	25.85	340.86	29.47	338.04	39.31	330.38	39.47	330.38
53.23	330.13	56.6	330.09	56.92	330.09	67.04	338.54	68.39	339.66
69.63	339.89	75.76	341.24	75.77	343.24	76.77	343.24	76.77	341.24
79.11	341.33	103.2	341.93	115.27	341.94	134.16	342.42	146.31	342.7
177.81	343.05	189.09	343.18	253.73	343.18	261.47	343.22	306.56	343.78
321.66	343.97	326.01	343.93	364.07	343.94	376.97	343.95	379.8	343.94
389.33	343.7	410.09	342.8	421.87	343.03	428.88	343.16		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.47	.016	39.31	.02	56.92	.016	75.76	.018

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

	29.47	67.04	188.22	188.31	208.19				
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
75.77	428.88	343.24	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.55	15.53	339.93	19.43	337.64	32.81	329.79	33.85	329.75
45.6	329.33	51.53	329.09	52.41	329.06	59.04	334.91	62.21	337.64
62.22	339.64	63.22	339.64	63.22	337.64	95.9	337.03	96.15	337.01
96.9	337.04	137.52	339.32	162.33	338.17	178.31	338.08	189.7	338.27
200.4	338.42	220.32	338.78	246.45	339.28	298.6	340.95	310.42	341.33
347.72	342	358.94	342.14	362.36	342.19	368.47	342.31		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.81	.035	52.41	.016	62.21	.018

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

	19.43	52.41	213.1	211.63	234.86				
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
63.22	68.42	339.64	F
68.42	368.47	345	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
68.42	145.82	350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.63	6.26	347.24	20.56	337.219	31.56	329.51	32.37	329.46
44.1	328.69	48.11	328.45	49.21	328.39	51.59	331.53	57.89	337.63
61.86	337.58	61.86	339.58	62.86	339.58	62.86	337.39	75.24	337.39
91.39	336.99	131.08	336.38	142.66	336.41	159.33	336.04	163.29	335.96
188.72	335.64	192.7	335.57	205	335.6	208.43	335.97	218.96	337.16
242.63	337.75	248.26	337.75	255.89	337.79	285.47	337.83	313.92	338.26
340.9	338.14	346.6	338.38	352.33	338.65	363.42	340.11	406.82	341.23

414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 31.56 .035 49.21 .016 57.89 .018 163.29 .03
192.7 .018 218.96 .03 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
20.56 49.21 146.85 145.44 131.99 .1 .3

Ineffective Flow num= 3
Sta L Sta R Elev Permanent
57.89 62.86 337.63 F
62.86 71.22 339.58 T
71.22 441 355 F

Blocked Obstructions num= 4
Sta L Sta R Elev Sta L Sta R Elev
71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2969.225

INPUT
Description:
Station Elevation Data num= 40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 356.18 21.74 337.198 30.35 329.68 31.17 329.1 31.35 329.09
32.26 329.04 38.76 328.75 53.29 328.1 53.58 328.09 54.27 328.83
62.04 337.14 62.1 339.14 63.1 339.14 63.1 337.14 67.96 336.95
88.97 336.63 117.23 336.41 137.39 336.13 161.66 335.69 166.55 335.6
183.27 335.55 191.42 335.3 198.28 335.05 202.99 335.06 210.13 334.92
215.7 334.95 221.61 335.05 227.44 335.25 235.84 335.33 244.24 335.42
264.47 335.71 299.23 337.95 328.34 337.67 346.84 337.59 351.58 338.13
359.81 339.41 390.03 340.55 403.82 341.1 440.67 342.11 449.14 342.35

Manning's n Values num= 7
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 30.35 .035 53.29 .016 137.39 .03 183.27 .018
264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
21.74 53.29 48.12 46.59 34.68 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
62.1 449.14 339.14 F

Blocked Obstructions num= 1
Sta L Sta R Elev
232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2873.24

INPUT
Description:
Station Elevation Data num= 49
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 357.8 13.19 345.7 23.23 336.84 32.69 328.48 33.06 328.47
44.33 328.07 55.4 327.68 56.49 327.64 60.79 334.44 61.93 336.08
62 338 63 338 63 336 83 335.7 86.08 335.64
86.44 335.63 86.75 335.63 137.86 335.4 138.65 335.44 141.22 335.47
154.05 335.6 158.2 335.14 165.58 334.26 178.77 333.91 189.74 333.67
196.35 333.7 205.98 333.7 212.66 333.92 216.87 334.1 227.31 335.36
230.72 335.72 233.9 336.04 252.75 336.32 262.38 336.23 274.67 336.06
295.69 336.27 303.61 336.23 311.15 336.43 324.47 337.18 329.24 337.49
348.87 338.96 358.14 339.47 376.13 340.04 445.64 342.37 456.48 342.76
463.45 342.97 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 32.69 .035 56.49 .016 61.93 .018 227.31 .03
348.87 .018 376.13 .03 445.64 .018

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

23.23 56.49 179.7 177.4 154.96 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2695.84

INPUT
Description:
Station Elevation Data num= 42
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 361.95 12.31 345.06 22.84 335.71 31.63 328.03 32.59 328.02
43.26 327.95 54.18 327.96 55.74 327.97 61.02 334.79 61.88 335.82
62 337.8 63 337.8 63 335.8 83.16 335.28 97.88 334.85
115.03 334.84 145.23 334.62 155.42 334.39 182.3 333.76 188.41 333.72
191.22 333.67 195.43 333.76 202.05 333.5 218.7 333.21 224.74 333.31
232.14 333.29 237.4 333.28 244.5 333.26 250.72 333.3 262.29 335.75
280.25 336.11 287.55 336.9 307.71 339.79 313.94 339.8 319.15 340.85
335.15 340.5 345.45 340.41 361.78 340.7 402.63 341.75 459.27 343.42
480.11 343.99 493.96 344.04

Manning's n Values num= 13
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 31.63 .035 55.74 .016 83.16 .03 97.88 .018
155.42 .03 188.41 .018 250.72 .03 262.29 .018 280.25 .03
307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
22.84 55.74 161.84 166.46 226.33 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
62 91.85 337.8 F
91.85 493.96 365 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2529.382

INPUT
Description:
Station Elevation Data num= 28
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 358.98 19.08 338.23 22.99 334.62 31.96 326.34 32.75 326.36
46.17 326.68 50.81 326.76 51.2 326.77 58.78 333.41 59.67 334.18
60.05 334.51 96.28 335 122.48 335.39 131.97 335.34 174.16 335.7
176.05 335.7 213.04 336.25 231.04 336.52 231.23 336.53 234.1 336.55
304.7 337.01 312.5 337.05 360.6 337.73 378.26 337.98 394.39 338.45
434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .035 31.96 .035 51.2 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
22.99 51.2 109.52 94.32 36.08 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
173.53 493.08 360 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2435.063

INPUT
Description:

Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.81	21.23	353.16	42.85	343	47.85	340.43	55.92	339.16		
63.64	338.03	69.33	338.27	75.76	338.66	86.2	338.15	87.49	338.08		
105.77	338.63	106.06	338.53	118.18	333.89	138.46	326.71	138.83	326.71		
160.56	326.79	162.28	326.79	162.8	326.79	169.52	334.5	169.71	334.71		
172.01	334.74	176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08		
248.23	335.12	250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63		
351.83	336.34	356.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39		
493.94	338.45	511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	138.46	.035	162.8	.016	169.71	.025				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	118.18	162.8		112	100	22		.1	.3

Ineffective Flow			
Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions			
Sta L	Sta R	Elev	
340.09	471.21	365	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64		
105.72	332.51	115.37	326.72	115.96	326.71	142.3	326.2	150.28	326.16		
153.68	326.15	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3		
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15		
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38		
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74		
506.87	340.23	555.95	342.37								

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	115.37	.035	153.68	.016	176.37	.018	202.82	.025		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	102.47	153.68		28.83	29	6.18		.1	.3

Blocked Obstructions			
Sta L	Sta R	Elev	
233	414	365	

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

INPUT

Description:
Lateral structure position = Next of right bank station

Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335		
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32		
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33		
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02		
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95		
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66		
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13		
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51		
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51		
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14		
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77		
107.31	327.92	111.26	326.72	111.54	326.64	122.23	326.51	145.7	326.14		
145.99	326.14	151.2	328.87	160.87	333.92	163.21	334.94	166.35	334.98		
184.8	335.2	190.27	335.24	193.34	335.27	203.7	335.11	247.82	335.82		
257.56	336.1	259.76	336.16	269.28	336.25	338.64	337.01	397.05	338.48		
397.76	338.49	400.6	338.52	406.38	338.67	472.69	340.26	520.97	342.37		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	111.54	.08	145.7	.016	160.87	.018	184.8	.025		

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	97.37	160.87		25.93	20.79	5.61		.1	.3

Blocked Obstructions			
Sta L	Sta R	Elev	
179	377	350	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91		
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67		
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08		
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32		
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12		
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6		
460.26	340.29	508.6	342.4								

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025				

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	100.71	171.09		192.47	203.49	166.15		.1	.3

Ineffective Flow			
Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions			
Sta L	Sta R	Elev	
224.96	364.18	355	

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT

Description:											
Station Elevation Data											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49		
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57		
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87		
147.5	336.18	181.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45		

Manning's n Values											
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	111.54	.08	145.7	.016	160.87	.018	184.8	.025		

0 .045 41.5 .045 78.71 .09 121.04 .045 142.05 .018
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1873.917

INPUT
 Description:
 Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14		
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18		
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56		
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38		
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7		
400.21	340.57										

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	187.67	.045	216.73	.07	237.63	.045	264.56	.018

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1798.381

INPUT
 Description:
 Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29		
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43		
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12		
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31		
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66		
361.35	337.67	376.05	338.28	385	338.34						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	111.81	.03	145.23	.018	189.06	.045	213.36	.07
230.09	.045	251.36	.018						

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1641.59

INPUT
 Description:
 Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25		
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7		
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02		
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86		
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88		
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23		
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	76.62	.03	102.18	.018	173.79	.045	192.62	.06
291.75	.04	331.83	.018	367.96	.035				

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1489.686

INPUT
 Description: U/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21		
54.59	341.23	57.81	340.42	90.09	332.29	97.19	331.92	105.34	331.24		
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22		
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17		
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85		
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42		
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334		
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38		
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045	223.09	.1
248.3	.045	279.01	.025	320.02	.035	349.96	.018		

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 212.54 266.06 50.44 50.64 51.04 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1439.048

INPUT
 Description: D/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28		
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1		
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92		
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49		
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7		
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47		
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88		
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22		
343.78	344.69										

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05	188.67	.1
213.36	.05	239.35	.018						

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1288.123

INPUT
 Description:
 Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07		
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94		
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8		
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52		
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99		
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	88.69	.045	110.15	.05	156.79	.1	183.29	.05

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

110.15 228.7 168.1 176.49 194.32 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1111.63

INPUT

Description: Station Elevation Data num= 41. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows include values like 0 351.86 27.2 339.28 44.8 338.7 60.26 338 88.84 336.97.

Manning's n Values num= 9. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val. Data rows include values like 0 .045 27.2 .018 121.36 .05 159.44 .1 229.84 .05.

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 121.36 286.38 256.29 284.82 327.16 .1 .3

Ineffective Flow num= 1. Table with columns: Sta L, Sta R, Elev, Permanent. Data row: 354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 826.8154

INPUT

Description: Station Elevation Data num= 34. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows include values like 0 355.56 4.94 351.36 17.74 344.66 39.17 335.21 56.65 334.94.

Manning's n Values num= 6. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val. Data rows include values like 0 .035 39.17 .018 124.61 .045 194.35 .1 267.72 .045.

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 130.67 355.52 157.21 150.78 167.76 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 676.0353

INPUT

Description: Station Elevation Data num= 33. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows include values like 0 345.1 29.14 330.56 60.41 328.44 62.38 328.3 69.47 328.27.

Manning's n Values num= 6. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val. Data rows include values like 0 345.1 29.14 330.56 60.41 328.44 62.38 328.3 69.47 328.27.

0 .025 29.14 .018 104.89 .05 179.23 .01 218.93 .05
286.53 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 104.89 272.48 122.82 64.52 43.7 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 611.5112

INPUT

Description: U/S face of Alvarado Road and College Avenue Crossing Station Elevation Data num= 51. Table with columns: Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev, Sta, Elev. Data rows include values like 0 341.58 14.76 339.24 27.46 338.13 29.82 337.84 68.72 332.32.

Manning's n Values num= 4. Table with columns: Sta, n Val, Sta, n Val, Sta, n Val, Sta, n Val. Data rows include values like 0 .05 287.17 .07 297.64 .05 354.92 .018.

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan. 276.82 312.01 0 0 0 .3 .5

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

Table with columns: n9, Reach, n10, River Sta., n11, n12, n1, n13, n2, n3, n4, n5, n6, n7, n8. Data rows include values like Upper Reach 4559.274 .018 .016 .018.

Upper Reach	826.8154	.035	.018	.045	.1	.045	.018
Upper Reach	676.0353	.025	.018	.05	.01	.05	.018
Upper Reach	611.5112	.05	.07	.05	.018		

Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3

DETAILED HYDRAULIC RESULTS FOR
MAINTAINED CONDITION MODEL (SEDIMENT REMOVED)

1. Sediment and Vegetation Removed in Reach 2 Only
2. Sediment and Vegetation Removed in Reaches 1 and 2

HEC-RAS Plan: Sed-rmvd-con-onl River: Alvarado Channel Reach: Upper Reach

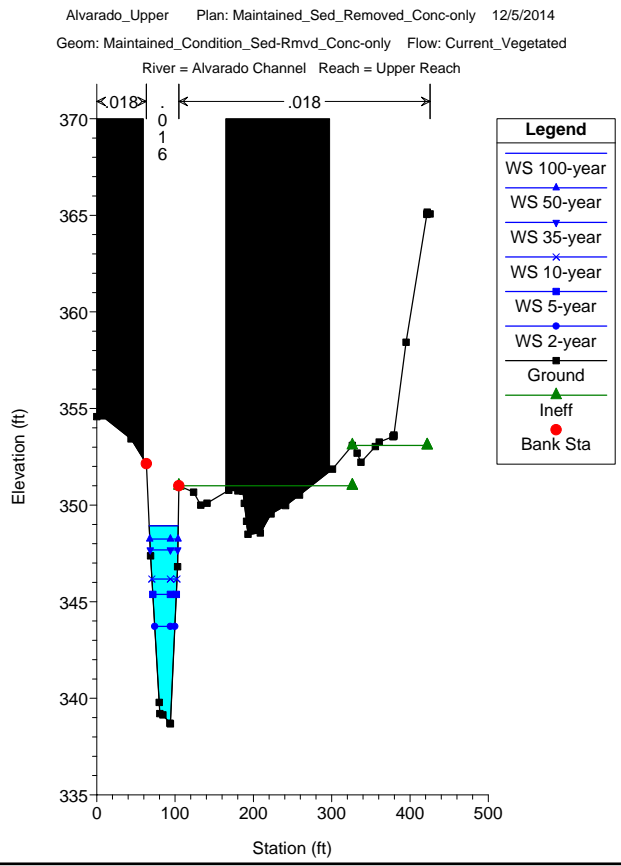
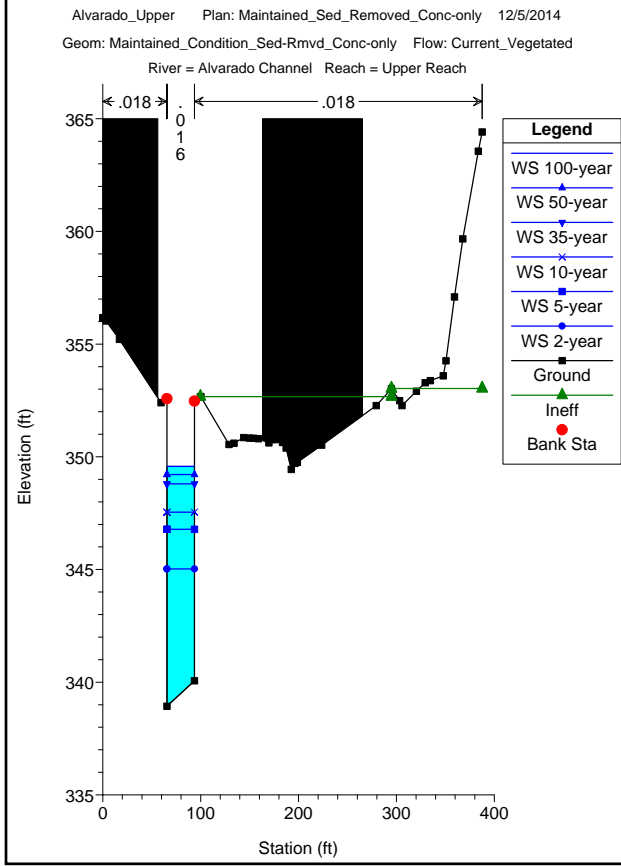
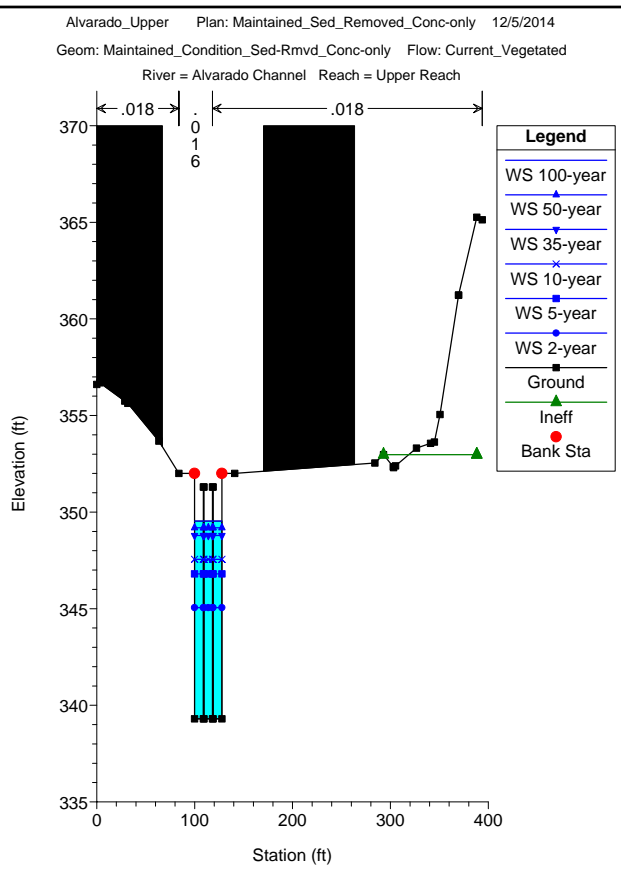
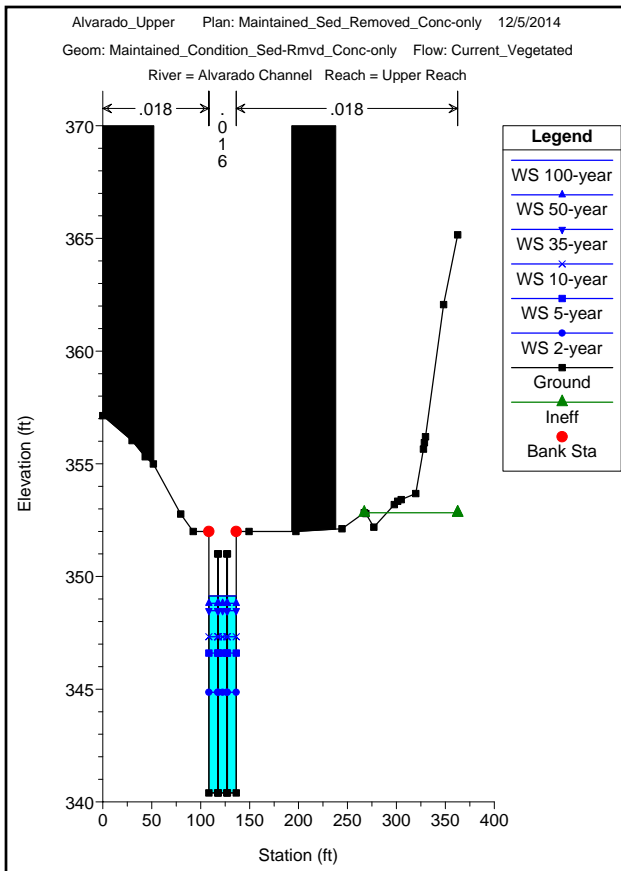
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #	Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00	
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.38	352.40	0.006463	15.19	223.77	26.60	0.92	
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87	
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76	
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73	
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70	
Upper Reach	4543.777		Lat Struct										
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79	
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72	
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68	
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59	
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55	
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48	
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77	
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71	
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67	
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58	
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54	
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48	
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00	
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00	
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00	
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00	
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00	
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00	
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43	
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44	
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45	
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49	
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52	
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59	
Upper Reach	3913.392	100-year	3900.00	333.56	340.84	343.50	349.03	0.008182	22.97	169.76	32.11	1.76	
Upper Reach	3913.392	50-year	3400.00	333.56	340.27	342.74	348.05	0.008431	22.38	151.94	30.73	1.77	
Upper Reach	3913.392	35-year	3000.00	333.56	339.79	342.18	347.19	0.008680	21.84	137.36	29.60	1.79	
Upper Reach	3913.392	10-year	2100.00	333.56	338.58	340.62	344.99	0.009416	20.32	103.34	26.76	1.82	
Upper Reach	3913.392	5-year	1700.00	333.56	337.98	339.84	343.82	0.009822	19.40	87.65	25.34	1.84	
Upper Reach	3913.392	2-year	1000.00	333.56	336.77	338.18	341.27	0.010722	17.02	58.74	22.54	1.86	
Upper Reach	3758.046	100-year	3900.00	332.58	339.44	342.87	347.59	0.010472	22.91	170.24	33.97	1.80	
Upper Reach	3758.046	50-year	3400.00	332.58	338.96	341.36	346.52	0.010586	22.06	154.10	32.75	1.79	
Upper Reach	3758.046	35-year	3000.00	332.58	338.55	340.79	345.59	0.010675	21.30	140.85	31.70	1.78	
Upper Reach	3758.046	10-year	2100.00	332.58	337.53	339.33	343.21	0.010780	19.13	109.77	29.11	1.74	
Upper Reach	3758.046	5-year	1700.00	332.58	337.02	338.57	341.96	0.010687	17.84	95.31	27.83	1.70	
Upper Reach	3758.046	2-year	1000.00	332.58	336.01	337.00	339.32	0.009865	14.60	68.48	25.27	1.56	
Upper Reach	3600.906	100-year	3900.00	330.91	337.61	340.32	346.04	0.008972	23.30	167.37	33.94	1.85	
Upper Reach	3600.906	50-year	3400.00	330.91	337.13	339.63	344.96	0.008998	22.45	151.44	32.66	1.84	
Upper Reach	3600.906	35-year	3000.00	330.91	336.72	339.06	344.03	0.009013	21.69	138.33	31.57	1.83	
Upper Reach	3600.906	10-year	2100.00	330.91	335.70	337.60	341.64	0.009048	19.54	107.45	29.12	1.79	
Upper Reach	3600.906	5-year	1700.00	330.91	335.19	336.85	340.40	0.009064	18.31	92.86	28.04	1.77	
Upper Reach	3600.906	2-year	1000.00	330.91	334.17	335.30	337.82	0.008883	15.32	65.28	25.88	1.70	
Upper Reach	3418.613	100-year	3900.00	330.09	337.24	339.33	344.18	0.006767	21.15	184.36	34.98	1.62	
Upper Reach	3418.613	50-year	3400.00	330.09	336.76	338.70	343.12	0.006650	20.23	168.08	33.80	1.60	
Upper Reach	3418.613	35-year	3000.00	330.09	336.36	338.18	342.20	0.006527	19.39	154.68	32.80	1.57	
Upper Reach	3418.613	10-year	2100.00	330.09	335.36	336.71	339.88	0.006066	17.05	123.18	30.32	1.49	
Upper Reach	3418.613	5-year	1700.00	330.09	334.86	335.97	338.69	0.005746	15.72	108.17	29.07	1.44	
Upper Reach	3418.613	2-year	1000.00	330.09	333.80	334.41	336.30	0.004911	12.67	78.94	26.46	1.29	
Upper Reach	3230.305	100-year	3900.00	329.06	340.67	338.08	342.35	0.002991	8.42	412.62	198.14	0.48	
Upper Reach	3230.305	50-year	3400.00	329.06	340.00	337.58	341.51	0.003004	8.05	376.88	176.22	0.47	
Upper Reach	3230.305	35-year	3000.00	329.06	339.12	337.01	340.80	0.003574	8.18	323.12	142.56	0.51	
Upper Reach	3230.305	10-year	2100.00	329.06	337.63	335.54	338.85	0.003762	7.33	257.71	47.45	0.50	
Upper Reach	3230.305	5-year	1700.00	329.06	336.71	334.79	337.79	0.003851	7.04	219.71	40.13	0.51	
Upper Reach	3230.305	2-year	1000.00	329.06	334.80	333.29	335.58	0.004017	6.30	148.33	34.66	0.52	
Upper Reach	3018.677	100-year	3900.00	328.16	337.64	337.64	341.04	0.011212	13.99	267.45	111.30	0.87	
Upper Reach	3018.677	50-year	3400.00	328.16	336.62	336.81	340.61	0.005295	10.38	309.11	122.24	0.61	
Upper Reach	3018.677	35-year	3000.00	328.16	336.03	336.19	339.84	0.005459	10.07	283.66	111.85	0.61	
Upper Reach	3018.677	10-year	2100.00	328.16	335.25	334.64	337.82	0.005596	9.09	216.77	74.16	0.61	
Upper Reach	3018.677	5-year	1700.00	328.16	334.46	333.86	336.79	0.005334	8.47	189.93	33.22	0.60	
Upper Reach	3018.677	2-year	1000.00	328.16	333.78	332.28	334.64	0.004692	7.04	136.94	29.81	0.56	
Upper Reach	2969.225	100-year	3900.00	328.08	339.33	336.88	339.60	0.006643	3.89	942.99	212.70	0.22	
Upper Reach	2969.225	50-year	3400.00	328.08	336.81	336.19	339.58	0.008822	11.98	265.80	194.68	0.78	

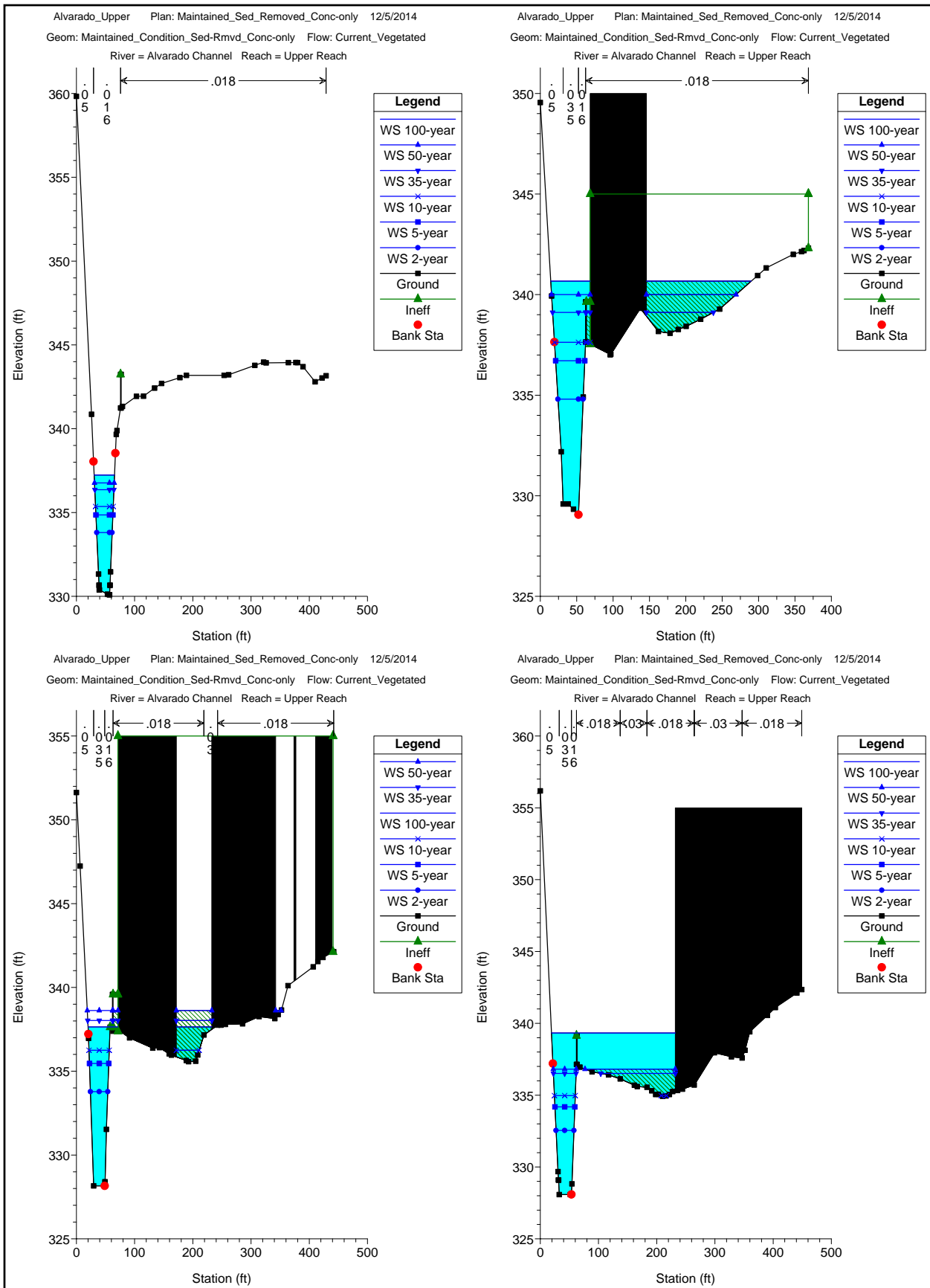
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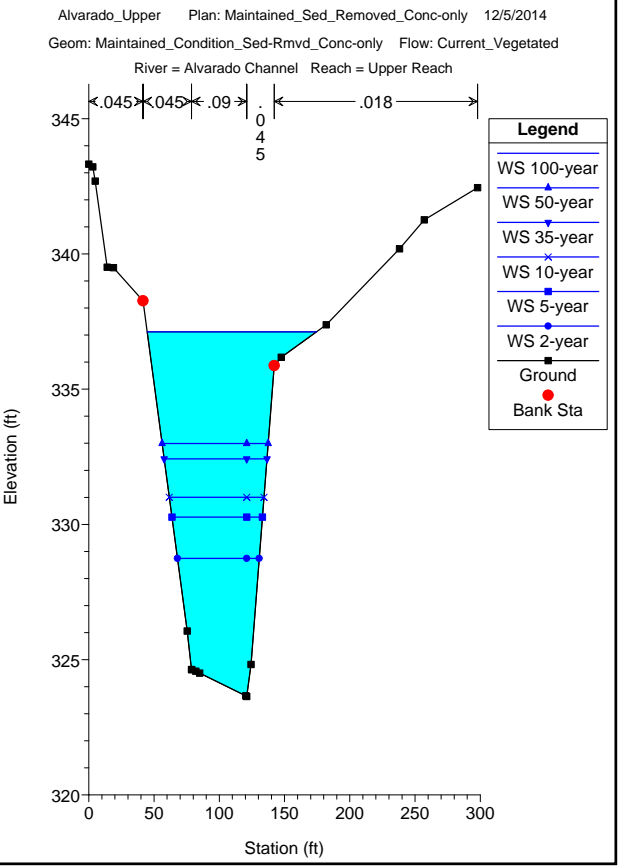
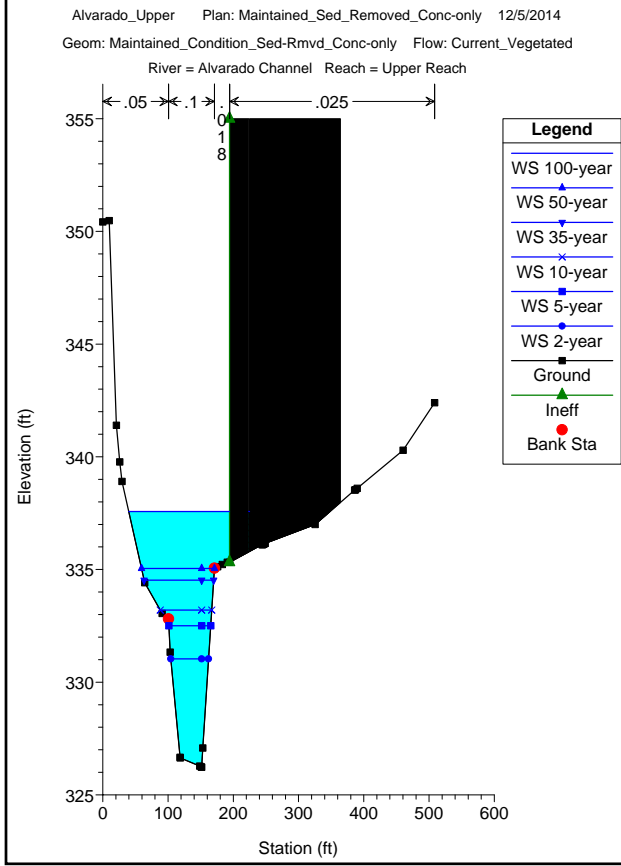
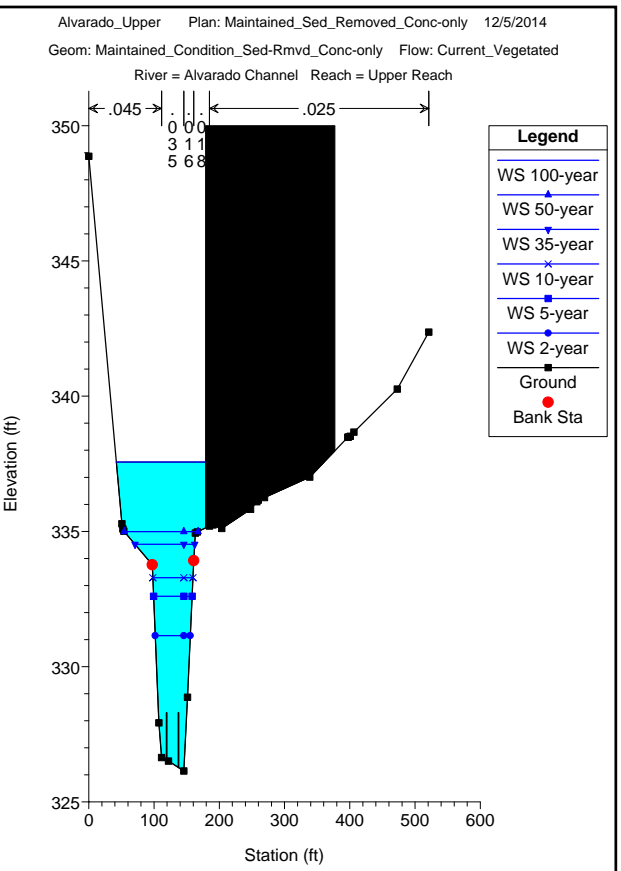
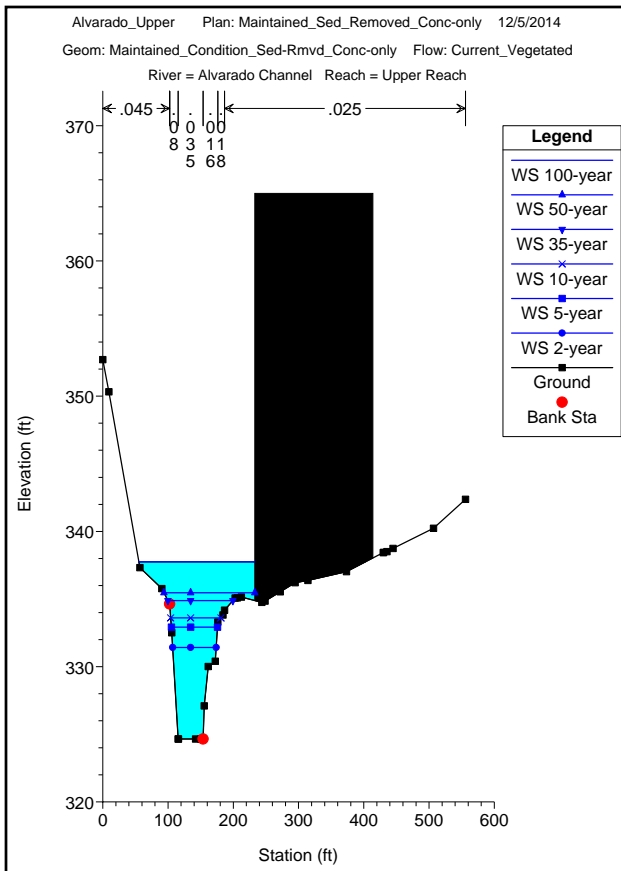
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.08	336.52	335.60	338.86	0.007805	11.09	254.05	167.19	0.73
Upper Reach	2969.225	10-year	2100.00	328.08	334.97	334.14	336.85	0.007959	10.20	196.31	44.78	0.74
Upper Reach	2969.225	5-year	1700.00	328.08	334.18	333.41	335.83	0.008023	9.67	168.88	34.08	0.74
Upper Reach	2969.225	2-year	1000.00	328.08	332.54	331.92	333.73	0.008269	8.41	115.85	30.67	0.74
Upper Reach	2873.24	100-year	3900.00	327.53	339.43	336.11	339.53	0.00201	2.83	1473.61	337.02	0.15
Upper Reach	2873.24	50-year	3400.00	327.53	338.63	335.44	338.75	0.002273	3.13	1210.95	323.24	0.18
Upper Reach	2873.24	35-year	3000.00	327.53	336.69	334.85	338.43	0.004127	10.52	283.52	291.29	0.66
Upper Reach	2873.24	10-year	2100.00	327.53	335.06	333.41	336.44	0.004147	9.42	222.77	102.00	0.65
Upper Reach	2873.24	5-year	1700.00	327.53	334.24	332.67	335.44	0.004104	8.77	193.91	86.41	0.63
Upper Reach	2873.24	2-year	1000.00	327.53	332.55	331.21	333.37	0.003962	7.26	137.94	31.55	0.60
Upper Reach	2695.84	100-year	3900.00	326.53	336.64	335.55	339.20	0.004599	11.89	310.89	204.81	0.72
Upper Reach	2695.84	50-year	3400.00	326.53	336.33	334.86	338.44	0.003977	10.78	298.46	201.57	0.66
Upper Reach	2695.84	35-year	3000.00	326.53	335.85	334.25	337.73	0.003815	10.15	279.60	186.22	0.64
Upper Reach	2695.84	10-year	2100.00	326.53	334.23	332.79	335.73	0.003854	9.11	218.59	129.10	0.63
Upper Reach	2695.84	5-year	1700.00	326.53	333.46	332.04	334.75	0.003738	8.43	191.34	81.86	0.61
Upper Reach	2695.84	2-year	1000.00	326.53	331.89	330.52	332.73	0.003316	6.83	139.48	31.57	0.56
Upper Reach	2529.382	100-year	3900.00	325.58	337.67	334.64	338.23	0.001080	6.19	652.77	205.75	0.33
Upper Reach	2529.382	50-year	3400.00	325.58	334.61	334.61	337.40	0.007939	13.42	253.49	44.40	0.86
Upper Reach	2529.382	35-year	3000.00	325.58	334.00	333.54	336.72	0.007286	12.39	230.74	35.85	0.82
Upper Reach	2529.382	10-year	2100.00	325.58	333.20	332.02	334.92	0.005185	9.91	202.94	34.25	0.68
Upper Reach	2529.382	5-year	1700.00	325.58	332.65	331.25	334.01	0.004491	8.86	184.48	33.15	0.63
Upper Reach	2529.382	2-year	1000.00	325.58	331.36	329.67	332.13	0.003279	6.78	143.16	30.56	0.53
Upper Reach	2435.063	100-year	3900.00	325.02	337.81	333.48	338.08	0.000778	4.67	972.97	232.14	0.26
Upper Reach	2435.063	50-year	3400.00	325.02	335.11	332.87	336.36	0.004273	8.93	380.83	125.03	0.57
Upper Reach	2435.063	35-year	3000.00	325.02	334.57	332.35	335.80	0.004376	8.60	341.26	53.19	0.57
Upper Reach	2435.063	10-year	2100.00	325.02	333.41	331.06	334.29	0.003820	7.31	281.90	49.04	0.52
Upper Reach	2435.063	5-year	1700.00	325.02	332.76	330.38	333.48	0.003453	6.68	250.71	46.64	0.49
Upper Reach	2435.063	2-year	1000.00	325.02	331.33	328.96	331.77	0.002645	5.29	187.81	41.35	0.43
Upper Reach	2335.331	100-year	3900.00	324.65	337.74		338.04	0.000481	3.20	1030.73	177.77	0.16
Upper Reach	2335.331	50-year	3400.00	324.65	335.46		335.98	0.001134	4.26	665.74	139.36	0.24
Upper Reach	2335.331	35-year	3000.00	324.65	334.88		335.42	0.001192	4.18	591.82	99.54	0.25
Upper Reach	2335.331	10-year	2100.00	324.65	333.60		333.98	0.001081	3.78	481.48	76.83	0.24
Upper Reach	2335.331	5-year	1700.00	324.65	332.92		333.20	0.000990	3.52	431.72	70.75	0.23
Upper Reach	2335.331	2-year	1000.00	324.65	331.41		331.56	0.000793	2.92	328.40	66.70	0.21
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	337.57		338.01	0.000989	5.59	805.14	136.88	0.32
Upper Reach	2308.404	50-year	3400.00	326.14	334.99		335.90	0.002841	7.67	466.43	113.33	0.51
Upper Reach	2308.404	35-year	3000.00	326.14	334.52		335.35	0.002838	7.32	419.18	91.50	0.51
Upper Reach	2308.404	10-year	2100.00	326.14	333.29		333.91	0.002737	6.35	330.77	61.47	0.48
Upper Reach	2308.404	5-year	1700.00	326.14	332.60		333.14	0.002660	5.87	289.68	59.00	0.47
Upper Reach	2308.404	2-year	1000.00	326.14	331.15		331.51	0.002513	4.82	207.46	53.73	0.43
Upper Reach	2287.614	100-year	3900.00	326.23	337.57	332.74	337.95	0.004189	4.11	888.66	155.87	0.24
Upper Reach	2287.614	50-year	3400.00	326.23	335.04	332.28	335.71	0.016908	6.66	526.63	111.82	0.45
Upper Reach	2287.614	35-year	3000.00	326.23	334.52	331.88	335.18	0.018016	6.59	469.90	106.66	0.46
Upper Reach	2287.614	10-year	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	5-year	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	2-year	1000.00	326.23	331.03	329.27	331.39	0.019805	4.81	207.87	57.89	0.45
Upper Reach	2084.121	100-year	3900.00	323.64	337.12		337.39	0.001832	4.19	938.92	129.77	0.24
Upper Reach	2084.121	50-year	3400.00	323.64	332.99		333.59	0.006967	6.20	548.67	81.27	0.42
Upper Reach	2084.121	35-year	3000.00	323.64	332.42		332.97	0.007073	5.96	503.23	78.78	0.42
Upper Reach	2084.121	10-year	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	5-year	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	2-year	1000.00	323.64	328.74		329.01	0.007592	4.11	243.09	62.67	0.37
Upper Reach	1873.917	100-year	3900.00	320.65	337.03		337.18	0.000471	2.99	1293.11	268.87	0.16
Upper Reach	1873.917	50-year	3400.00	320.65	330.72		331.85	0.009292	8.53	398.59	65.90	0.61
Upper Reach	1873.917	35-year	3000.00	320.65	330.08		331.17	0.009904	8.40	357.20	62.72	0.62
Upper Reach	1873.917	10-year	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63
Upper Reach	1873.917	5-year	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	2-year	1000.00	320.65	326.22		326.89	0.013373	6.59	151.75	43.75	0.62
Upper Reach	1798.381	100-year	3900.00	318.55	337.02		337.14	0.000338	2.67	1401.56	305.11	0.13
Upper Reach	1798.381	50-year	3400.00	318.55	329.32		330.98	0.012819	10.34	328.92	50.25	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.028296	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.037463	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.05		337.09	0.000091	1.49	2486.37	286.64	0.07
Upper Reach	1641.59	50-year	3400.00	315.77	329.94		330.13	0.001063	3.52	965.95	114.83	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.38	321.45	325.85	0.004082	5.50	545.27	80.29	0.37
Upper Reach	1641.59	10-year	2100.00	315.77	323.12	320.51	323.61	0.005926	5.62	373.75	71.12	0.43

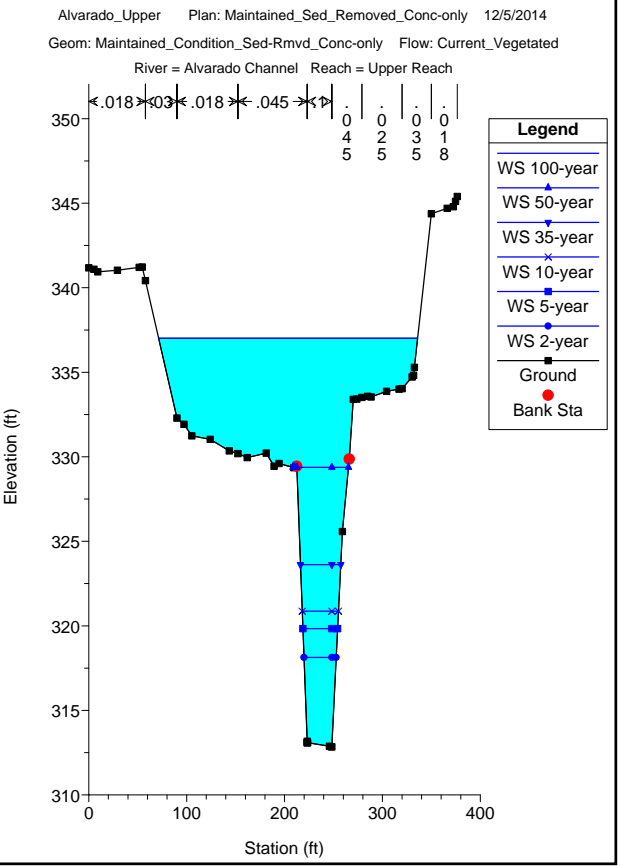
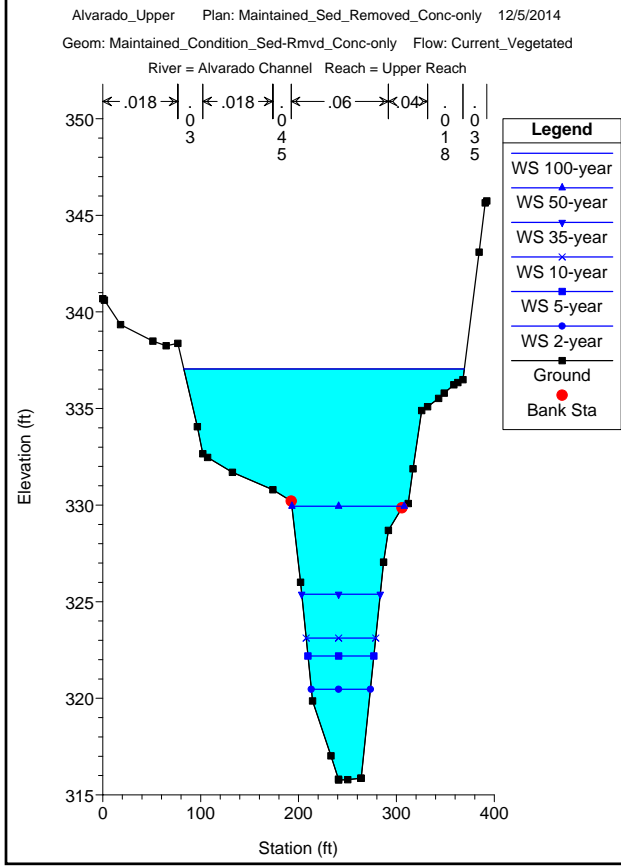
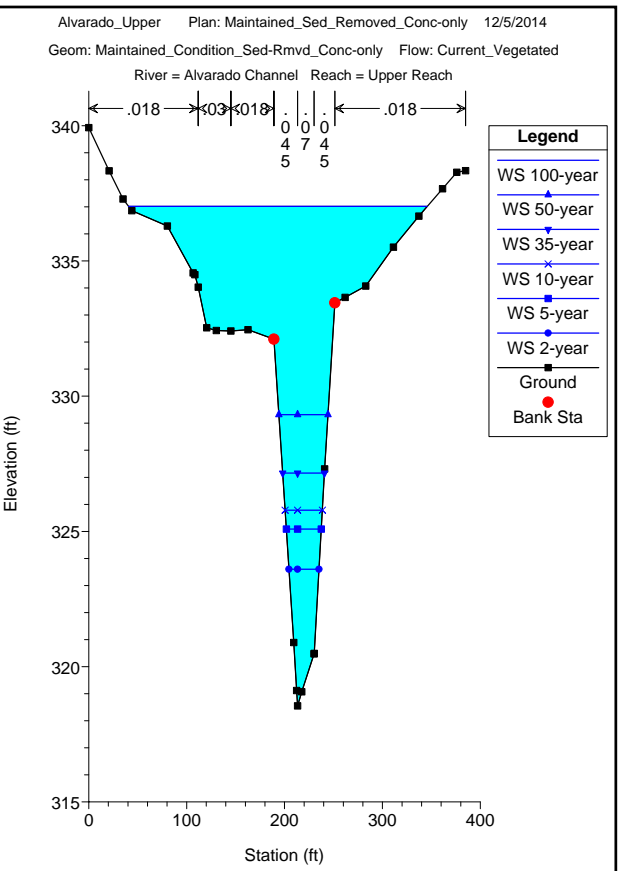
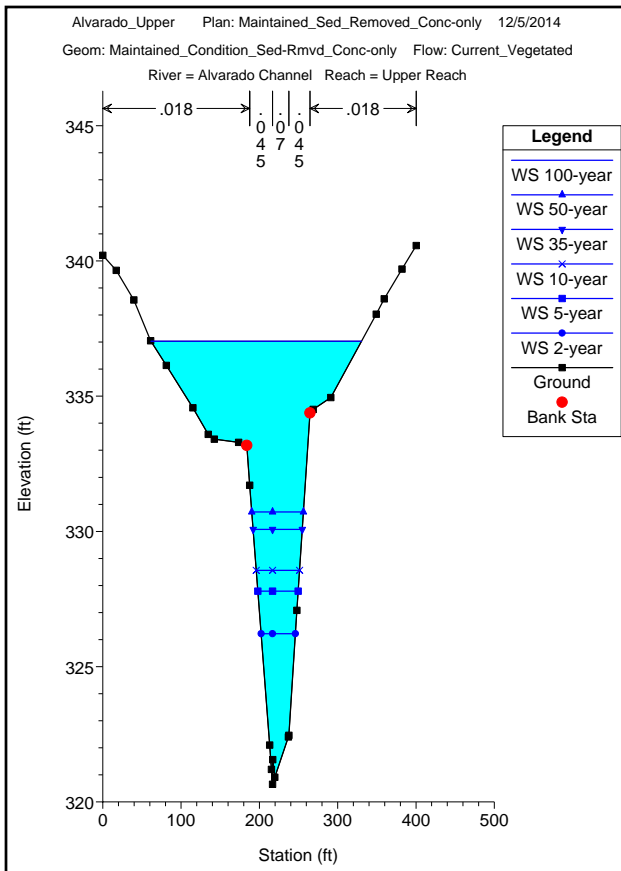
HEC-RAS Plan: Sed-rmvd-con-onl River: Alvarado Channel Reach: Upper Reach (Continued)

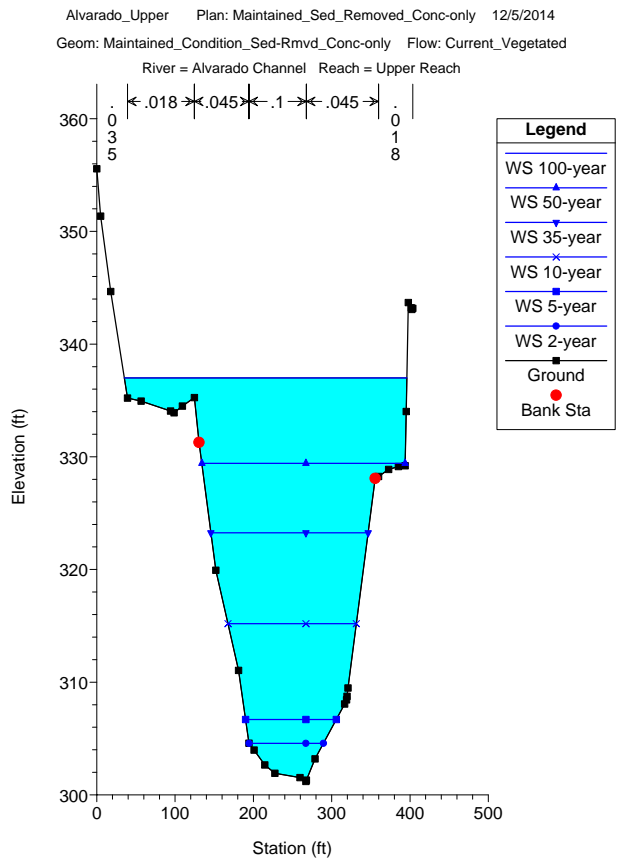
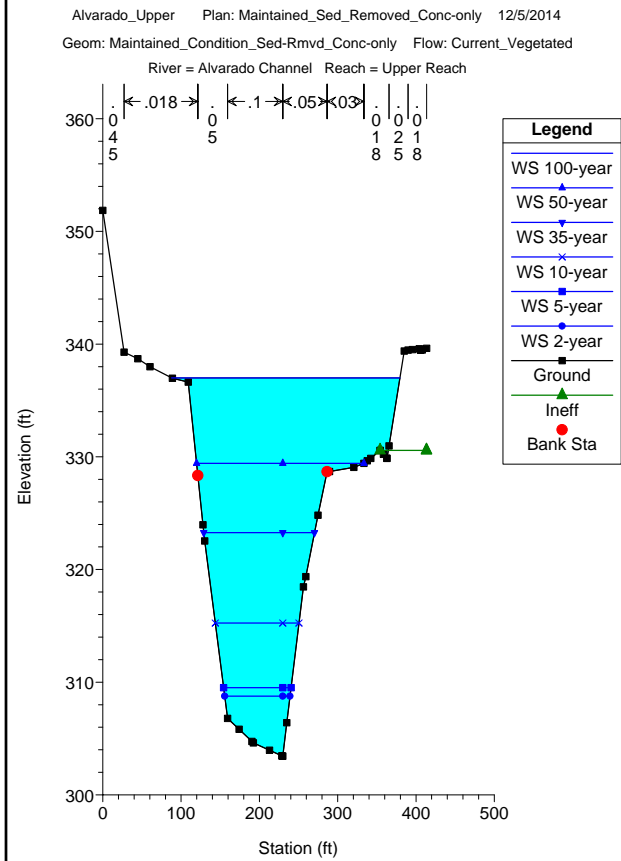
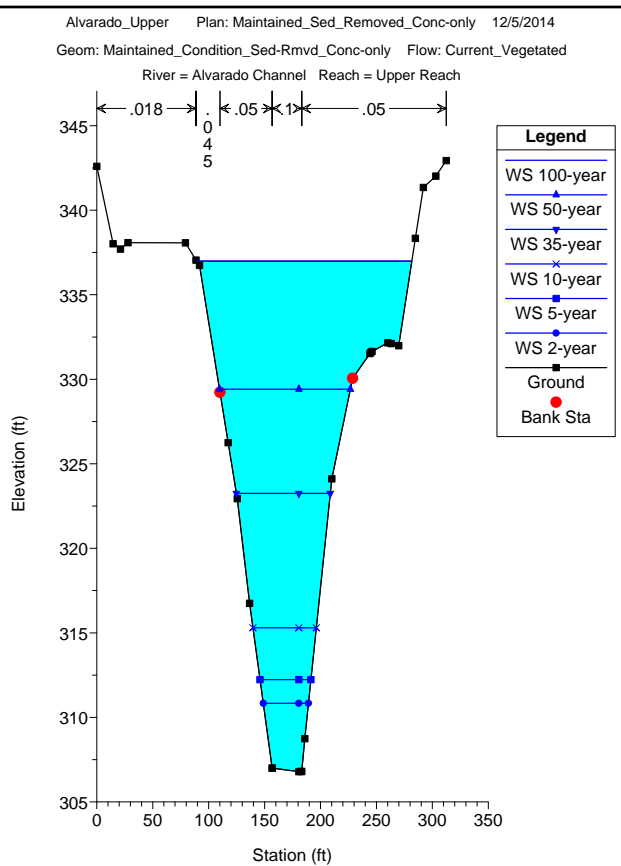
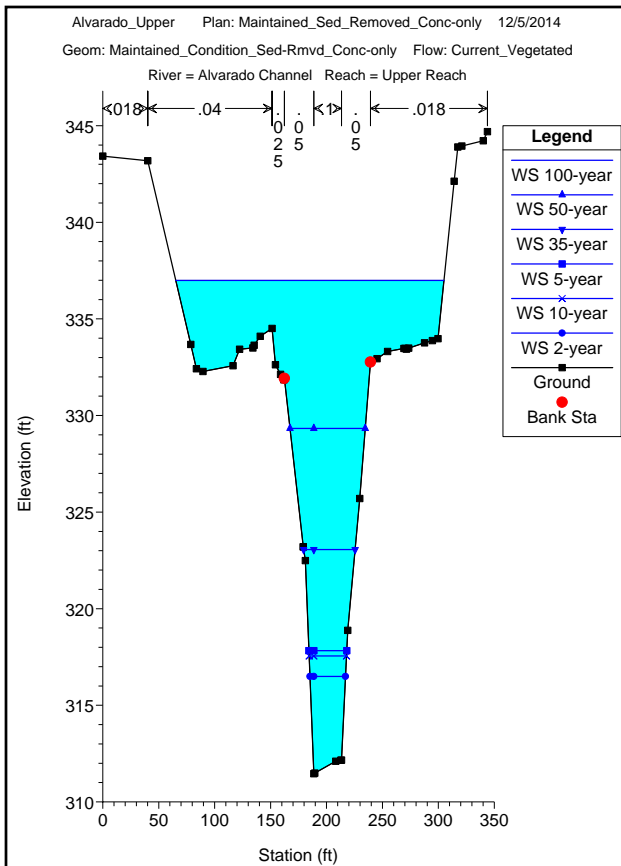
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	322.19	320.02	322.66	0.006737	5.49	309.51	67.36	0.45
Upper Reach	1641.59	2-year	1000.00	315.77	320.47	318.97	320.86	0.008615	5.01	199.44	60.39	0.49
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000150	1.62	2099.81	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.38		329.84	0.003328	5.49	619.83	54.24	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.62		324.74	0.014053	8.50	352.75	41.09	0.51
Upper Reach	1489.686	10-year	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	5-year	1700.00	312.84	319.83		320.87	0.023326	8.18	207.89	35.44	0.59
Upper Reach	1489.686	2-year	1000.00	312.84	318.13		318.82	0.022657	6.67	149.93	32.91	0.55
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000244	2.09	1886.81	239.70	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.33		329.66	0.002303	4.62	735.81	67.27	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.06		324.03	0.012159	7.90	379.66	45.96	0.48
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.83	316.83	319.29	0.040765	9.71	175.04	33.83	0.75
Upper Reach	1439.048	2-year	1000.00	311.46	316.49	315.40	317.39	0.034984	7.63	131.15	31.78	0.66
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.37	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1523.00	116.97	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.25		323.42	0.001035	3.31	907.64	83.95	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.30	312.03	315.87	0.008812	6.03	348.24	56.68	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.24		313.46	0.035850	8.87	191.64	45.51	0.76
Upper Reach	1288.123	2-year	1000.00	306.79	310.83		311.73	0.040430	7.63	131.12	40.36	0.75
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4819.03	291.60	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2887.26	213.74	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.27	308.49	323.31	0.000215	1.57	1912.24	141.51	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.25	307.72	315.33	0.000976	2.27	923.84	106.89	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.52	307.34	309.85	0.011691	4.59	370.66	86.08	0.39
Upper Reach	1111.63	2-year	1000.00	303.43	308.76	306.54	308.93	0.007486	3.26	306.38	83.32	0.30
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.66	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4448.19	259.63	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.26		323.27	0.000051	0.96	3118.06	200.80	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.19		315.21	0.000185	1.28	1634.92	164.04	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.69		306.94	0.008851	4.02	422.61	115.83	0.37
Upper Reach	826.8154	2-year	1000.00	301.19	304.58		304.97	0.033393	5.00	199.98	95.04	0.61
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000009	0.65	5683.23	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000028	0.93	3690.39	227.79	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000059	1.14	2636.23	150.91	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.16		315.19	0.000147	1.38	1526.08	123.71	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	306.19		306.34	0.002081	3.05	557.70	89.59	0.22
Upper Reach	676.0353	2-year	1000.00	296.69	303.67		303.80	0.003061	2.87	348.47	76.25	0.24
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.42	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85



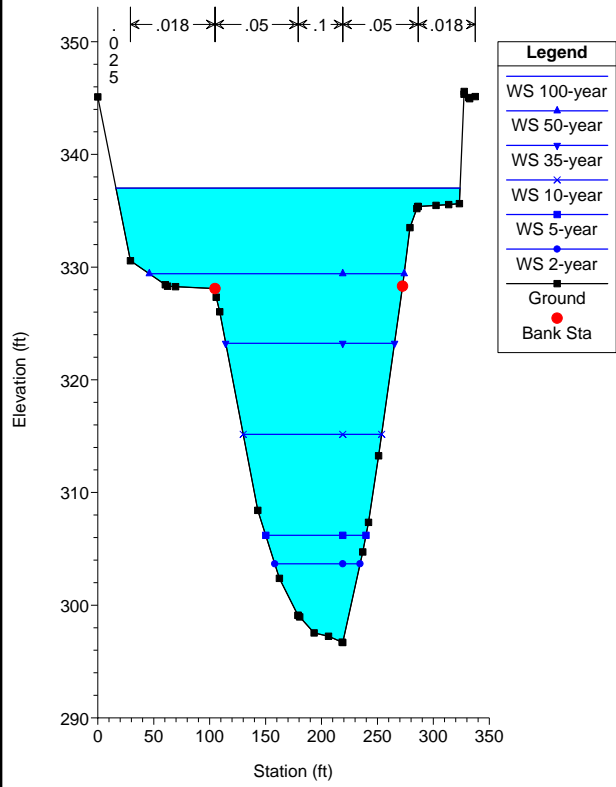




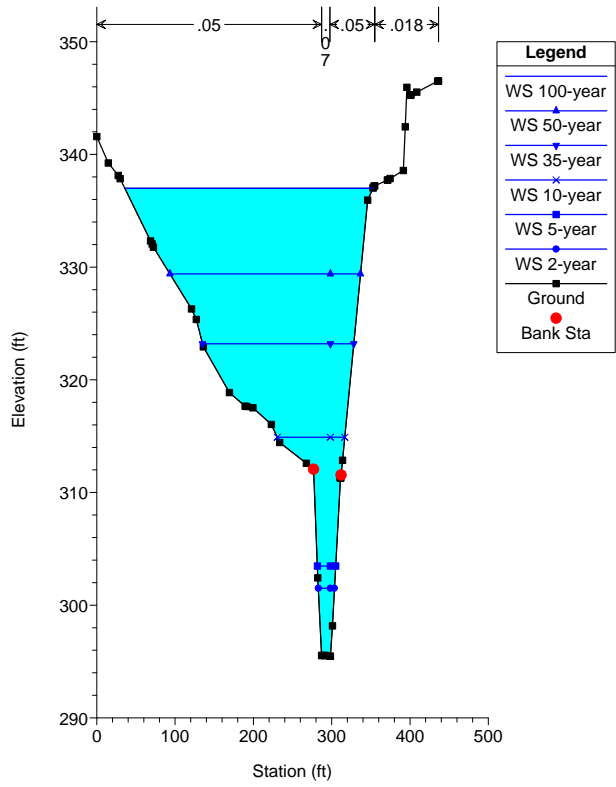




Alvarado_Upper Plan: Maintained_Sed_Removed_Conc-only 12/5/2014
 Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: Maintained_Sed_Removed_Conc-only 12/5/2014
 Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File: Alvarado_Upper.prj
 Run Date and Time: 12/5/2014 7:48:14 AM

Project in English units

PLAN DATA

Plan Title: Maintained_Sed_Removed_Conc-only
 Plan File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p04
 Geometry Title: Maintained_Sed-Rmvd_Conc-only
 Geometry File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g05
 Flow Title: Current_Vegetated
 Flow File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Description:
 Sediment and Vegetation removed in the City maintained portion only

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
5-year	2-year					
Alvarado ChannelUpper Reach		4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper Reach		100-year	Critical	Known WS = 337
Alvarado ChannelUpper Reach		50-year	Critical	Known WS = 329.4
Alvarado ChannelUpper Reach		35-year	Critical	Known WS = 323.2
Alvarado ChannelUpper Reach		10-year	Critical	Known WS = 314.9
Alvarado ChannelUpper Reach		5-year	Critical	Normal S = 0.03
Alvarado ChannelUpper Reach		2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Condition_Sed-Rmvd_Conc-only
 Geometry File: w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g05

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99
79.28	352.108.38	352	108.38	340.4	117.38	340.4	117.38
118.08	351	118.08	340.4	126.68	340.4	126.68	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65
329.79	356.2	348.2	362.06	362.49	365.16		

 Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

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

Left	Right	Left	Right	Coeff	Contr.	Expan.
108.38	136.38	56.75	57.06	57.78	.1	.3

 Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53	27.07	349.73
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72	48.86	352.49
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65	81.56	352.48
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48	115.88	350.31
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75	141.03	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75	186.26	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75	251.79	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75	296.86	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75	368.22	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75	452.46	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75	516.13	350.75

516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	339.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT

Description:

Station Elevation Data	num=	32
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 356.61 3.08 356.69 28.65 355.75 31.72 355.63 63.35 353.68		
83.88 352 99.88 352 99.88 339.3 108.88 339.3 108.88 351.3		
109.58 351.3 109.58 339.3 118.18 339.3 118.18 351.3 118.88 351.3		
118.88 339.3 127.88 339.3 127.88 352 140.88 352 284.1 352.54		
292.86 352.97 302.84 352.34 303.17 352.3 305.15 352.39 326.64 353.31		
340.96 353.56 344.97 353.63 350.68 355.05 369.55 361.22 369.63 361.24		
388.16 365.26 393.87 365.13		

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val		
0 .018 83.88 .016 118.18 .018		

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

99.88 127.88 35.29 35.3 35.1 .1 .3		
------------------------------------	--	--

Ineffective Flow num= 1

Sta L Sta R Elev Permanent		
292.86 388.16 352.97 F		

Blocked Obstructions num= 2

Sta L Sta R Elev Sta L Sta R Elev		
0 67.09 370 170.25 263.29 370		

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT

Description:

Station Elevation Data	num=	37
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 356.17 3.48 356.03 16.93 355.21 59.49 352.4 65.6 352.58		
65.6 338.93 93.6 340.06 93.6 352.47 99.74 352.67 100.22 352.66		
128.96 350.55 134.07 350.6 144 350.85 148.79 350.83 153.84 350.82		
159.12 350.8 169.61 350.62 183.5 350.64 185.1 350.64 187.4 350.39		

192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val		
0 .018 65.6 .016 93.6 .018		

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

65.6 93.6 27.81 27.21 26.73 .1 .3		
-----------------------------------	--	--

Ineffective Flow num= 2

Sta L Sta R Elev Permanent		
99.74 294.86 352.67 F		
294.86 387.54 353.03 F		

Blocked Obstructions num= 2

Sta L Sta R Elev Sta L Sta R Elev		
0 56.31 365 163.1 265.25 365		

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data	num=	40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 354.58 6.49 354.62 43.7 353.43 63.26 352.14 68.58 347.37		
79.62 339.79 80.46 339.21 84.3 339.14 93.29 338.71 93.9 338.68		
103.12 346.81 104.83 351 123.71 350.67 132.91 350 140.83 350.1		
168.65 350.77 180.3 350.74 186.5 350.72 188.43 350.09 191.29 349.16		
193.19 348.49 208.75 348.56 222.54 349.54 241.1 349.97 258.98 350.52		
301.03 351.86 326.23 353.09 332.55 352.69 337.36 352.22 355.74 353.03		
360.73 353.26 378.14 353.54 379.1 353.55 379.16 353.57 379.37 353.63		
395 358.43 421.51 365.05 421.67 365.08 421.9 365.16 425.59 365.07		

Manning's n Values num= 3

Sta n Val Sta n Val Sta n Val		
0 .018 63.26 .016 104.83 .018		

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

63.26 104.83 164.21 164.68 167.58 .1 .3		
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Ineffective Flow num= 2

Sta L Sta R Elev Permanent		
104.83 326.23 351 F		
326.23 421.9 353.09 F		

Blocked Obstructions num= 2

Sta L Sta R Elev Sta L Sta R Elev		
0 59.44 370 164.66 297.32 370		

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data	num=	18
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 352.28 9.37 352.35 33.63 351.69 67.57 350.52 74.43 345.73		
86.46 337.33 86.87 337.04 86.93 337.04 87.27 337.05 98.97 337.33		
99.46 337.34 104.04 341.31 109.33 345.95 115.33 346.05 121.22 345.95		
150.31 346.3 156.99 350.75 536.99 350.75		

Manning's n Values num= 4

Sta n Val Sta n Val Sta n Val Sta n Val		
0 .018 67.57 .03 74.43 .016 109.33 .018		

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

74.43 109.33 381.65 361.63 347.98 .1 .3		
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Ineffective Flow num= 1

Sta L Sta R Elev Permanent		
115.33 233.87 346.05 F		

Blocked Obstructions num= 2

Sta L Sta R Elev Sta L Sta R Elev		
0 61.02 354 156.99 520.69 354		

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	365.86	16.26	353.45	32.29	341.36	38.14	336.95	41.63	333.87
42.22	333.86	57.31	333.57	57.59	333.56	64.94	340.73	66.19	341.59
69.85	341.68	70.47	343.4	75.47	343.3	96.47	344	104.47	344.1
104.47	350.25	113.47	350.25	113.47	350.76	478.56	350.76	478.56	347.5
762.56	351								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	32.29	.016	66.19	.018

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

32.29	66.19	160.29	155.35	151.31	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
121.74	762	350.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
121.74	406.35	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.08	24.76	342.73	38.72	332.95	39.06	332.94	52	332.69
55.04	332.61	55.85	332.58	61.28	337.51	65.85	341.63	66	342
71.24	342.44	80.82	342.3	103.66	342.5	103.66	350.75	107	350.75
342.68	350.75								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	24.76	.016	38.72	.02	55.85	.016

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

24.76	71.24	156.2	157.14	158.25	.1	.3
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Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
106	129.29	365	129.29	271.93	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.57	21.79	345.71	29.74	340.6	36.61	336.19	41.1	331.7
43.59	331.7	43.71	331.62	56.66	331.09	60.41	330.93	60.88	330.91
71.14	340.13	71.45	340.42	79.54	342.57	80.33	342.77	81.75	342.81
118.62	343.84	192.97	343.58	209.41	343.65	277.88	343.1	295.07	343.01
300.31	343.06	368.05	343.52	394.52	343.56	434.26	343.52	442.68	343.45

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	29.74	.016	71.45	.02	209.41	.018

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

29.74	71.45	183.48	182.29	181.14	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
			F

118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.83	25.85	340.86	29.47	338.04	38.09	331.33	38.76	330.66
38.95	330.66	39.31	330.38	39.47	330.38	53.23	330.13	56.6	330.09
56.92	330.09	57.6	330.66	57.76	330.66	58.56	331.46	67.04	338.54
68.39	339.66	69.63	339.89	75.76	341.24	75.77	343.24	76.77	343.24
76.77	341.24	79.11	341.33	103.2	341.93	115.27	341.94	134.16	342.42
146.31	342.7	177.81	343.05	189.09	343.18	253.73	343.18	261.47	343.22
306.56	343.78	321.66	343.97	326.01	343.93	364.07	343.94	376.97	343.95
379.8	343.94	389.33	343.7	410.09	342.8	421.87	343.03	428.88	343.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.47	.016	75.76	.018

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

29.47	67.04	188.22	188.31	208.19	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
75.77	428.88	343.24	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.55	15.53	339.93	19.43	337.64	28.72	332.19	31.32	329.59
38.33	329.59	45.6	329.33	51.53	329.09	52.41	329.06	59.04	334.91
62.21	337.64	62.22	339.64	63.22	339.64	63.22	337.64	95.9	337.03
96.15	337.01	96.9	337.04	137.52	339.32	162.33	338.17	178.31	338.08
189.7	338.27	200.4	338.42	220.32	338.78	246.45	339.28	298.6	340.95
310.42	341.33	347.72	342	358.94	342.14	362.36	342.19	368.47	342.31

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	31.32	.035	52.41	.016	62.21	.018

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

19.43	52.41	213.1	211.63	234.86	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
63.22	68.42	339.64	F
68.42	368.47	345	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
68.42	145.82	350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.63	6.26	347.24	20.56	337.22	20.93	336.96	29.73	328.16
48.73	328.16	48.97	328.4	49.21	328.39	51.59	331.53	57.89	337.63
61.86	337.58	61.86	339.58	62.86	339.58	62.86	337.39	75.24	337.39
91.39	336.99	131.08	336.38	142.66	336.41	159.33	336.04	163.29	335.96
188.72	335.64	192.7	335.57	205	335.6	208.43	335.97	218.96	337.16
242.63	337.75	248.26	337.75	255.89	337.79	285.47	337.83	313.92	338.26
340.9	338.14	346.6	338.38	352.33	338.65	363.42	340.11	406.82	341.23

414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.73	.035	48.73	.016	62.86	.018	218.96	.03
242.63	.018								

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

Sta	Sta	Lengths	Channel	Right	Coeff	Contr.	Expan.
20.56	48.73	146.85	145.44	131.99		.1	.3

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
57.89	62.86	337.63	F
62.86	71.22	339.58	T
71.22	441	355	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
71.22	171.59	355	373.64	376.97	355	410.97	439.07	355
232.63	342.17	355						

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.18	21.74	337.2	30.35	329.68	31.17	329.1	31.35	329.09
31.38	329.09	32.39	328.08	51.39	328.08	53.58	328.09	54.27	328.83
62.04	337.14	62.1	339.14	63.1	339.14	63.1	337.14	67.96	336.95
88.97	336.63	117.23	336.41	137.39	336.13	161.66	335.69	166.55	335.6
183.27	335.55	191.42	335.3	198.28	335.05	202.99	335.06	210.13	334.92
215.7	334.95	221.61	335.05	227.44	335.25	235.84	335.33	244.24	335.42
264.47	335.71	299.23	337.95	328.34	337.67	346.84	337.59	351.58	338.13
359.81	339.41	390.03	340.55	403.82	341.1	440.67	342.11	449.14	342.35

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.39	.035	53.58	.016	62.1	.018	137.39	.03
183.27	.018	264.47	.03	346.84	.018				

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

Sta	Sta	Lengths	Channel	Right	Coeff	Contr.	Expan.
21.74	53.58	48.12	46.59	34.68		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62.1	449.14	339.14	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
232	449.14	355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.8	13.19	345.7	23.23	336.84	27.87	332.74	33.08	327.53
52.08	327.53	56.49	327.53	60.79	334.44	61.93	336.08	62	338
63	338	63	336	83	335.7	86.08	335.64	86.44	335.63
86.75	335.63	137.86	335.4	138.65	335.44	141.22	335.47	154.05	335.6
158.2	335.14	165.58	334.26	178.77	333.91	189.74	333.67	196.35	333.7
205.98	333.7	212.66	333.92	216.87	334.1	227.31	335.36	230.72	335.72
233.9	336.04	252.75	336.32	262.38	336.23	274.67	336.06	295.69	336.27
303.61	336.23	311.15	336.43	324.47	337.18	329.24	337.49	348.87	338.96
358.14	339.47	376.13	340.04	445.64	342.37	456.48	342.76	463.45	342.97
493.24	343.93	506.32	344.1	511.1	344.17				

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	33.08	.035	56.49	.016	61.93	.018	227.31	.03
348.87	.018	376.13	.03	445.64	.018				

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

23.23 56.49 179.7 177.4 154.96 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62	511	338	F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	361.95	12.31	345.06	22.84	335.71	29.49	329.9	34	326.53
53	326.53	55.74	327.97	61.02	334.79	61.88	335.82	62	337.8
63	337.8	63	335.8	83.16	335.28	97.88	334.85	115.03	334.84
145.23	334.62	155.42	334.39	182.3	333.76	188.41	333.72	191.22	333.67
195.43	333.76	202.05	333.5	218.7	333.21	224.74	333.31	232.14	333.29
237.4	333.28	244.5	333.26	250.72	333.3	262.29	335.75	280.25	336.11
287.55	336.9	307.71	339.79	313.94	339.8	319.15	340.85	335.15	340.5
345.45	340.41	361.78	340.7	402.63	341.75	459.27	343.42	480.11	343.99
493.96	344.04								

Manning's n Values num= 14

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	34	.035	53	.016	62	.018	83.16	.03
97.88	.018	155.42	.03	188.41	.018	250.72	.03	262.29	.018
280.25	.013	307.71	.018	313.94	.03	319.15	.018		

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

Sta	Sta	Lengths	Channel	Right	Coeff	Contr.	Expan.
22.84	53	161.84	166.46	226.33		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
62	91.85	337.8	F
91.85	493.96	365	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
91.85	149.36	365	412.55	493.45	365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.98	19.08	338.23	22.86	334.74	32.02	325.58	51.02	325.58
59.3	333.86	59.67	334.18	60.05	334.51	96.28	335	122.48	335.39
131.97	335.34	174.16	335.7	176.05	335.7	213.04	336.25	231.04	336.52
231.23	336.53	234.1	336.55	304.7	337.01	312.5	337.05	360.6	337.73
378.26	337.98	394.39	338.45	434.7	339.68	444.02	340.14	493.08	342.37

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	32.02	.035	51.02	.016	96.28	.018

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

Sta	Sta	Lengths	Channel	Right	Coeff	Contr.	Expan.
22.86	51.02	109.52	94.32	36.08		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
173.53	493.08	360	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
173.53	281.08	360	312.57	335.65	360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT
 Description:
 Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.81	21.23	353.16	42.85	343	47.85	340.43	55.92	339.16		
63.64	338.03	69.33	338.27	75.76	338.66	86.2	338.15	87.49	338.08		
105.77	338.63	106.06	338.53	118.18	333.89	129.64	329.83	143.51	325.02		
162.51	325.02	162.8	326.79	169.52	334.5	169.71	334.71	172.01	334.74		
176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08	248.23	335.12		
250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63	351.83	336.34		
396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39	493.94	338.45		
511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	143.51	.035	162.51	.016	169.71	.025

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
118.18	162.51	112	100	22	.1	.3	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
340.09	471.21	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT

Description: num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64		
105.72	332.51	115.37	324.65	115.96	324.65	142.3	324.65	150.28	324.65		
153.68	324.65	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3		
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15		
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38		
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74		
506.87	340.23	555.95	342.37								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	102.47	.08	115.37	.035	153.68	.016	176.37	.018
186.57	.025								

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
102.47	153.68	28.83	29	6.18	.1	.3	

Blocked Obstructions num= 1

Sta L	Sta R	Elev
233	414	365

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

INPUT

Description: Lateral structure position = Next of right bank station

Distance from Upstream XS =
Deck/Roadway Width = 10
Weir Coefficient = 2
Weir Flow Reference = Water Surface

Weir Embankment Coordinates num = 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11		

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT

Description: num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77		
107.31	327.92	111.54	326.64	122.23	326.51	145.7	326.14	151.2	328.87		
160.87	333.92	163.21	334.94	166.35	334.98	184.8	335.2	190.27	335.24		
193.34	335.27	203.7	335.11	247.82	335.82	257.56	336.1	259.76	336.16		
269.28	336.25	338.64	337.01	397.05	338.48	397.76	338.49	400.6	338.52		
406.38	338.67	472.69	340.26	520.97	342.37						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	111.54	.035	145.7	.016	160.87	.018	184.8	.025

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
97.37	160.87	25.93	20.79	5.61	.1	.3	

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
179	377	350	118.73	119.98	328.3	136.73	137.98	328.3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT

Description: num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91		
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67		
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08		
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32		
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12		
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6		
460.26	340.29	508.6	342.4								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
100.71	171.09	192.47	203.49	166.15	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
224.96	364.18	355	194.19	223.55	355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT

Description: num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49		
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57		
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87		
147.5	336.18	181.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	3.03	.1	14.12	.018	18.89	.025		

0 .045 41.5 .045 78.71 .09 121.04 .045 142.05 .018
 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1873.917

INPUT
 Description:
 Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14		
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18		
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56		
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38		
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7		
400.21	340.57										

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	187.67	.045	216.73	.07	237.63	.045	264.56	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1798.381

INPUT
 Description:
 Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29		
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43		
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12		
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31		
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66		
361.35	337.67	376.05	338.28	385	338.34						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	111.81	.03	145.23	.018	189.06	.045	213.36	.07
230.09	.045	251.36	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1641.59

INPUT
 Description:
 Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25		
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7		
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02		
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86		
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88		
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23		
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74		

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	76.62	.03	102.18	.018	173.79	.045	192.62	.06
291.75	.04	331.83	.018	367.96	.035				

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1489.686

INPUT
 Description: U/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21		
54.59	341.23	57.81	340.42	90.09	332.29	97.19	331.92	105.34	331.24		
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22		
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17		
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85		
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42		
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334		
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38		
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4				

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045	223.09	.1
248.3	.045	279.01	.025	320.02	.035	349.96	.018		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 212.54 266.06 50.44 50.64 51.04 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1439.048

INPUT
 Description: D/S entrance into parking lot from Alvarado Road
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28		
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1		
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92		
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49		
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7		
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47		
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88		
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22		
343.78	344.69										

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05	188.67	.1
213.36	.05	239.35	.018						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1288.123

INPUT
 Description:
 Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07		
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94		
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8		
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52		
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99		
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	88.69	.045	110.15	.05	156.79	.1	183.29	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 162.38 239.35 146.36 150.92 160.49 .1 .3

Upper Reach	826.8154	.035	.018	.045	.1	.045	.018
Upper Reach	676.0353	.025	.018	.05	.1	.05	.018
Upper Reach	611.5112	.05	.07	.05	.018		

Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3

HEC-RAS Plan: Sed-remvd-all River: Alvarado Channel Reach: Upper Reach

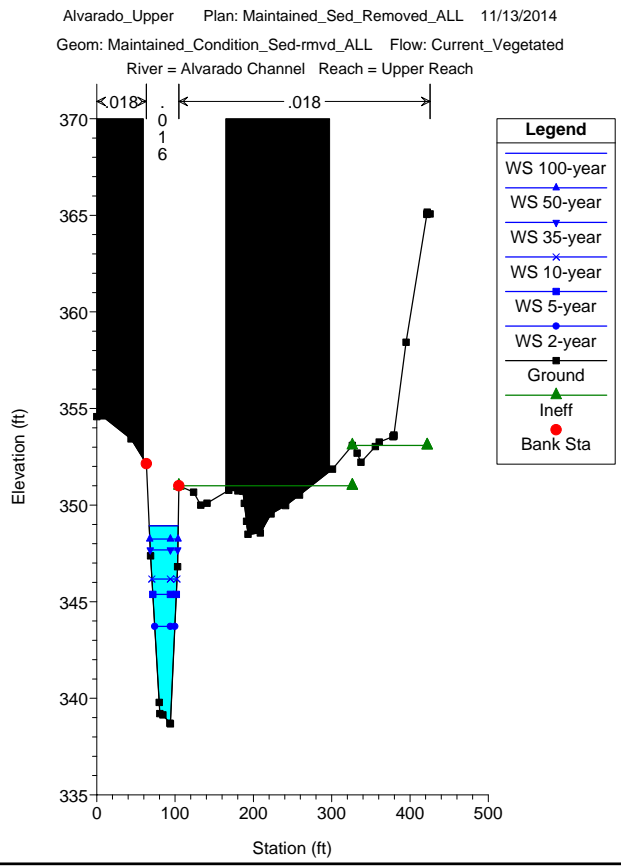
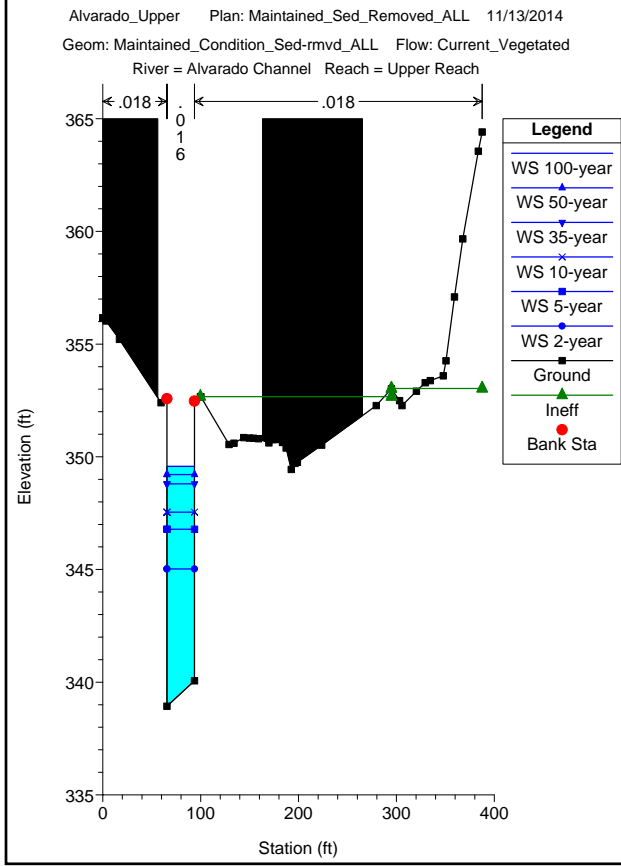
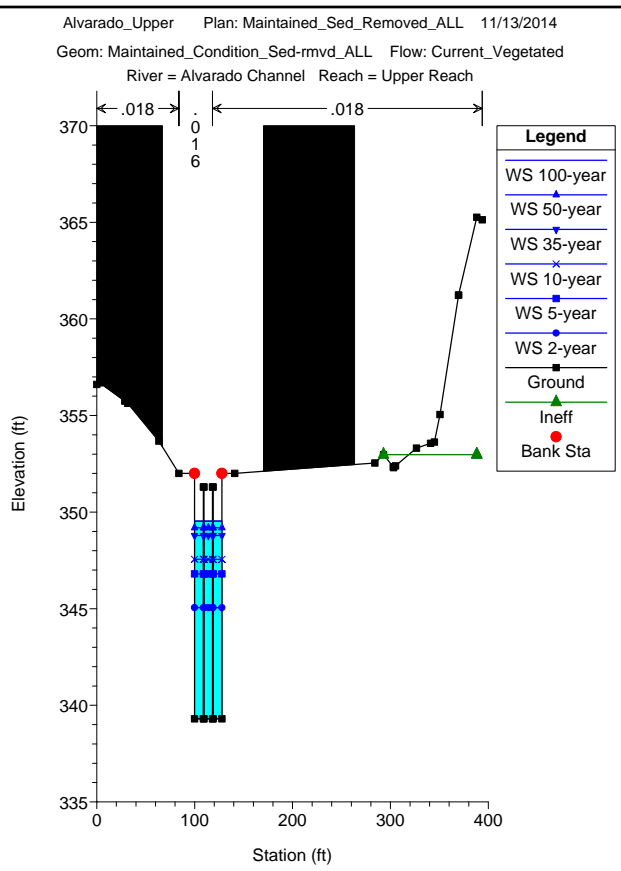
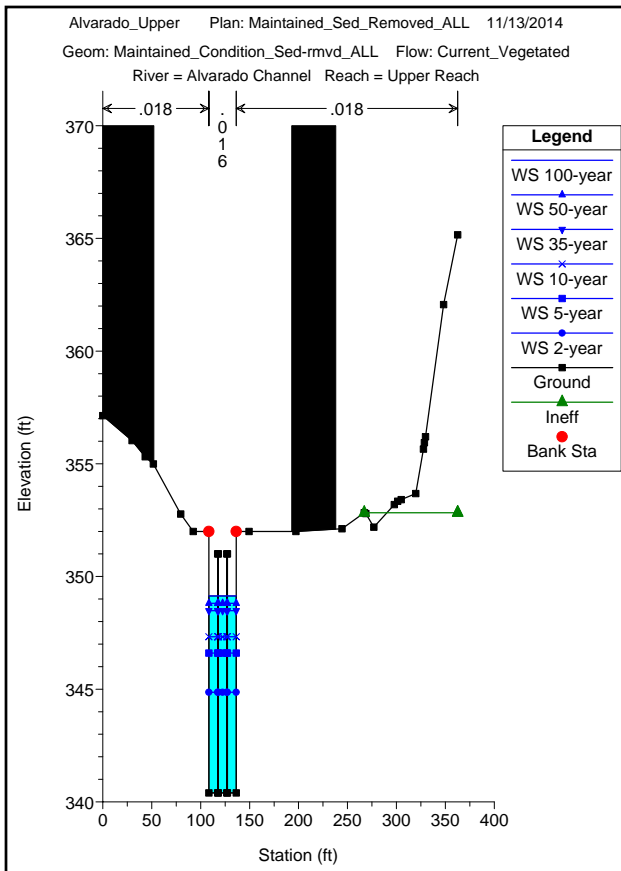
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70
Upper Reach	4543.777		Lat Struct									
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59
Upper Reach	4056.782	100-year	3900.00	334.41	346.95	345.41	347.33	0.000260	6.14	991.69	254.73	0.35
Upper Reach	4056.782	50-year	3400.00	334.41	341.50	345.13	349.05	0.008158	22.06	154.14	31.39	1.75
Upper Reach	4056.782	35-year	3000.00	334.41	341.02	344.88	348.22	0.008392	21.54	139.24	30.13	1.77
Upper Reach	4056.782	10-year	2100.00	334.41	339.79	341.78	346.10	0.009159	20.16	104.18	26.93	1.81
Upper Reach	4056.782	5-year	1700.00	334.41	339.16	341.00	344.98	0.009657	19.36	87.83	25.29	1.83
Upper Reach	4056.782	2-year	1000.00	334.41	337.89	339.34	342.53	0.010873	17.29	57.85	21.99	1.88
Upper Reach	3913.392	100-year	3900.00	333.56	343.50	343.50	346.94	0.002121	14.94	270.97	51.87	0.95
Upper Reach	3913.392	50-year	3400.00	333.56	340.35	342.74	347.89	0.008083	22.04	154.28	30.91	1.74
Upper Reach	3913.392	35-year	3000.00	333.56	339.87	342.18	347.01	0.008242	21.44	139.95	29.80	1.74
Upper Reach	3913.392	10-year	2100.00	333.56	338.70	340.62	344.74	0.008659	19.73	106.46	27.03	1.75
Upper Reach	3913.392	5-year	1700.00	333.56	338.11	339.84	343.54	0.008855	18.70	90.92	25.64	1.75
Upper Reach	3913.392	2-year	1000.00	333.56	336.93	338.18	340.91	0.008970	16.01	62.45	22.89	1.71
Upper Reach	3758.046	100-year	3900.00	332.58	339.70	341.69	346.12	0.006096	20.32	191.89	35.53	1.54
Upper Reach	3758.046	50-year	3400.00	332.58	338.45	340.99	346.49	0.009316	22.75	149.43	32.50	1.87
Upper Reach	3758.046	35-year	3000.00	332.58	338.03	340.42	345.60	0.009474	22.07	135.90	31.47	1.87
Upper Reach	3758.046	10-year	2100.00	332.58	336.98	338.97	343.28	0.009855	20.14	104.29	28.93	1.87
Upper Reach	3758.046	5-year	1700.00	332.58	336.46	338.22	342.06	0.010025	18.99	89.50	27.66	1.86
Upper Reach	3758.046	2-year	1000.00	332.58	335.43	336.67	339.44	0.010018	16.06	62.25	25.15	1.80
Upper Reach	3600.906	100-year	3900.00	330.91	338.10	340.32	345.05	0.006869	21.15	184.38	35.25	1.63
Upper Reach	3600.906	50-year	3400.00	330.91	337.12	339.63	345.00	0.009094	22.54	150.87	32.62	1.85
Upper Reach	3600.906	35-year	3000.00	330.91	336.70	339.06	344.08	0.009133	21.79	137.68	31.52	1.84
Upper Reach	3600.906	10-year	2100.00	330.91	335.68	337.60	341.70	0.009248	19.69	106.65	29.06	1.81
Upper Reach	3600.906	5-year	1700.00	330.91	335.17	336.85	340.46	0.009290	18.46	92.08	27.98	1.79
Upper Reach	3600.906	2-year	1000.00	330.91	334.16	335.30	337.84	0.009011	15.39	64.97	25.85	1.71
Upper Reach	3418.613	100-year	3900.00	330.09	337.61	339.33	343.66	0.005590	19.74	197.53	35.90	1.48
Upper Reach	3418.613	50-year	3400.00	330.09	336.75	338.70	343.14	0.006703	20.29	167.60	33.77	1.60
Upper Reach	3418.613	35-year	3000.00	330.09	336.34	338.18	342.23	0.006591	19.46	154.15	32.76	1.58
Upper Reach	3418.613	10-year	2100.00	330.09	335.34	336.71	339.90	0.006154	17.14	122.55	30.27	1.50
Upper Reach	3418.613	5-year	1700.00	330.09	334.84	335.97	338.71	0.005834	15.80	107.59	29.02	1.45
Upper Reach	3418.613	2-year	1000.00	330.09	333.80	334.41	336.30	0.004943	12.70	78.77	26.44	1.30
Upper Reach	3230.305	100-year	3900.00	329.06	335.96	337.98	342.48	0.006628	20.49	190.38	37.97	1.61
Upper Reach	3230.305	50-year	3400.00	329.06	335.31	337.39	341.81	0.007357	20.45	166.23	36.10	1.68
Upper Reach	3230.305	35-year	3000.00	329.06	334.93	336.83	340.92	0.007245	19.62	152.87	35.03	1.66
Upper Reach	3230.305	10-year	2100.00	329.06	333.99	335.44	338.66	0.006859	17.34	121.13	32.35	1.58
Upper Reach	3230.305	5-year	1700.00	329.06	333.50	334.73	337.52	0.006642	16.09	105.66	30.97	1.53
Upper Reach	3230.305	2-year	1000.00	329.06	332.46	333.26	335.23	0.006214	13.34	74.94	28.01	1.44
Upper Reach	3018.677	100-year	3900.00	328.16	337.64	337.64	340.95	0.002317	14.61	267.21	111.30	0.96
Upper Reach	3018.677	50-year	3400.00	328.16	336.53	336.76	340.03	0.002804	15.00	226.67	77.23	1.04

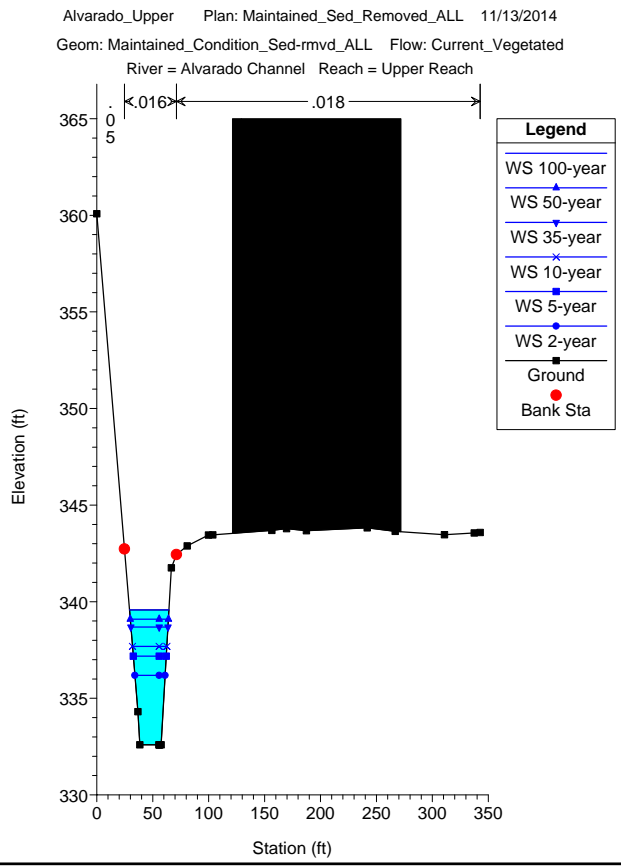
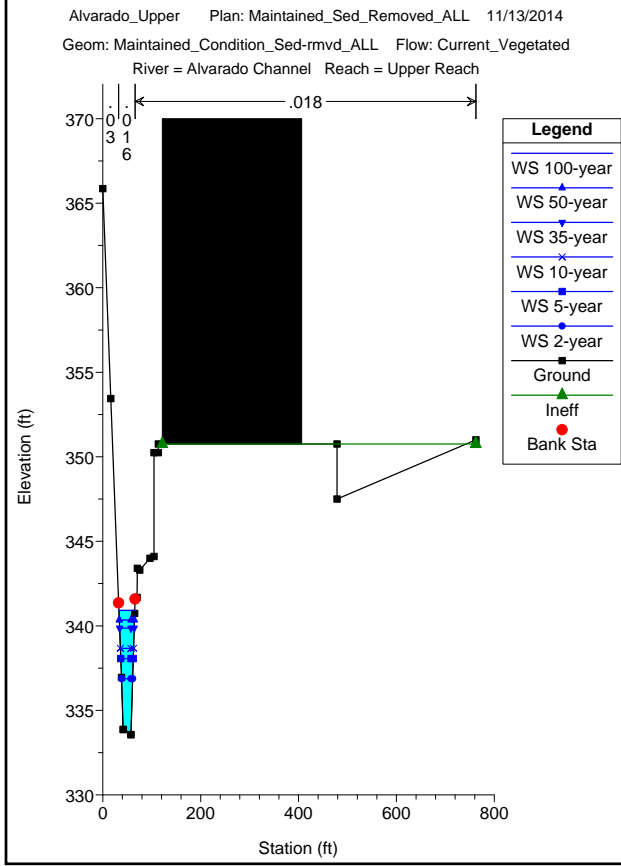
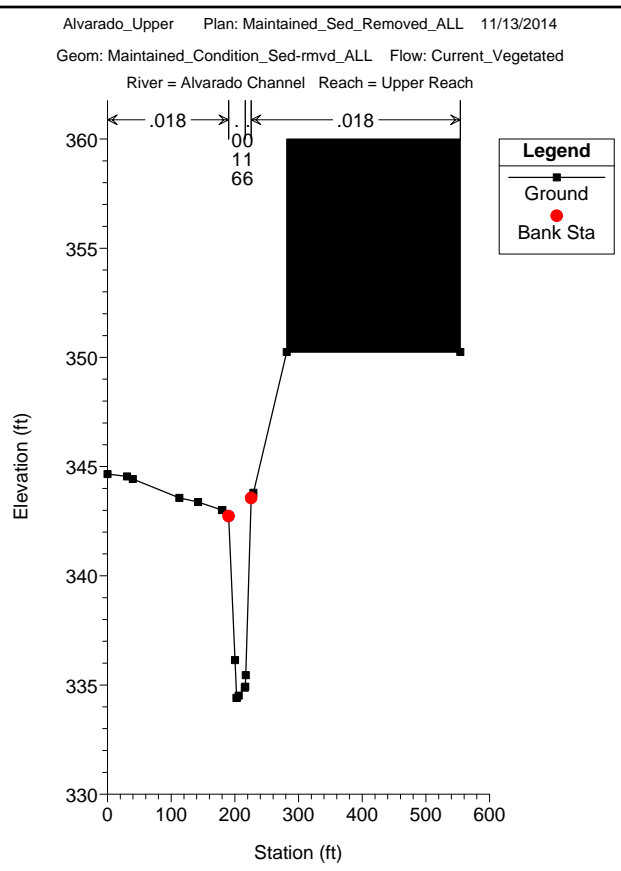
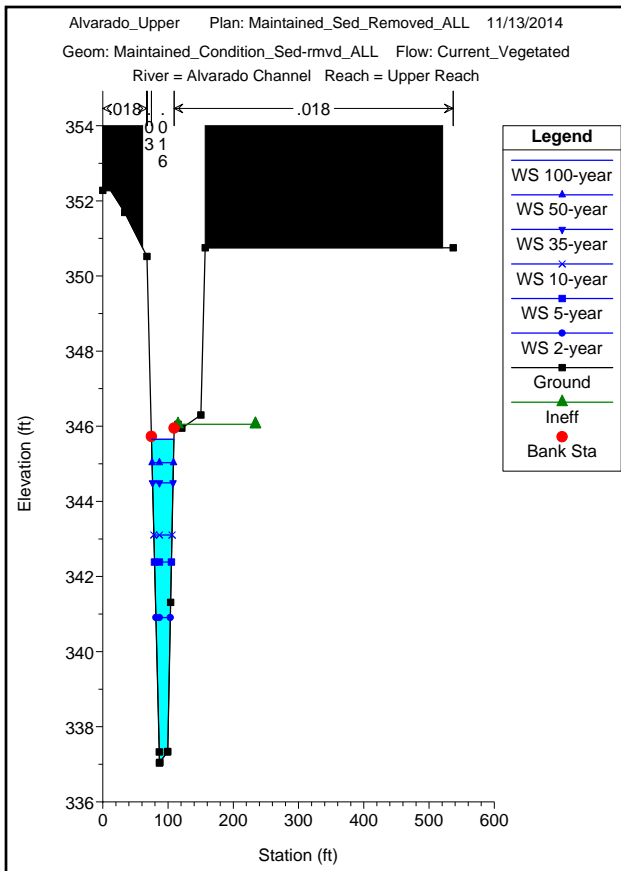
HEC-RAS Plan: Sed-remvd-all River: Alvarado Channel Reach: Upper Reach (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	3018.677	35-year	3000.00	328.16	336.00	336.12	339.23	0.002769	14.42	208.00	71.40	1.03
Upper Reach	3018.677	10-year	2100.00	328.16	334.57	334.63	337.21	0.002769	13.04	161.05	31.41	1.01
Upper Reach	3018.677	5-year	1700.00	328.16	333.83	333.85	336.17	0.002782	12.28	138.39	29.91	1.01
Upper Reach	3018.677	2-year	1000.00	328.16	332.06	332.25	334.04	0.003458	11.29	88.57	26.30	1.08
Upper Reach	2969.225	100-year	3900.00	328.08	339.57	336.81	339.93	0.000258	5.91	994.34	212.97	0.34
Upper Reach	2969.225	50-year	3400.00	328.08	335.22	336.13	339.48	0.003843	16.57	205.25	69.15	1.23
Upper Reach	2969.225	35-year	3000.00	328.08	334.74	335.55	338.69	0.003827	15.95	188.11	35.24	1.22
Upper Reach	2969.225	10-year	2100.00	328.08	333.54	334.13	336.69	0.003751	14.24	147.46	32.75	1.18
Upper Reach	2969.225	5-year	1700.00	328.08	332.94	333.41	335.68	0.003683	13.27	128.14	31.50	1.16
Upper Reach	2969.225	2-year	1000.00	328.08	331.71	331.91	333.59	0.003481	11.01	90.86	28.93	1.09
Upper Reach	2873.24	100-year	3900.00	327.53	336.15	336.15	339.59	0.002533	14.89	261.96	232.14	1.00
Upper Reach	2873.24	50-year	3400.00	327.53	338.06	335.46	338.34	0.000248	5.41	1028.58	315.01	0.32
Upper Reach	2873.24	35-year	3000.00	327.53	333.58	334.88	338.40	0.005079	17.62	170.22	33.32	1.37
Upper Reach	2873.24	10-year	2100.00	327.53	332.31	333.43	336.40	0.005492	16.21	129.51	31.15	1.40
Upper Reach	2873.24	5-year	1700.00	327.53	331.70	332.71	335.36	0.005728	15.37	110.61	30.14	1.41
Upper Reach	2873.24	2-year	1000.00	327.53	330.44	331.24	333.28	0.006636	13.52	73.95	28.09	1.47
Upper Reach	2695.84	100-year	3900.00	326.53	337.84	335.45	338.24	0.000300	6.21	938.61	216.15	0.36
Upper Reach	2695.84	50-year	3400.00	326.53	334.76	334.76	337.95	0.002539	14.34	237.12	145.31	1.00
Upper Reach	2695.84	35-year	3000.00	326.53	333.27	334.17	337.39	0.004021	16.28	184.25	49.45	1.24
Upper Reach	2695.84	10-year	2100.00	326.53	332.11	332.72	335.34	0.003854	14.42	145.65	31.98	1.19
Upper Reach	2695.84	5-year	1700.00	326.53	331.56	331.98	334.28	0.003643	13.25	128.28	30.92	1.15
Upper Reach	2695.84	2-year	1000.00	326.53	330.34	330.49	332.17	0.003323	10.86	92.12	28.59	1.07
Upper Reach	2529.382	100-year	3900.00	325.58	336.48	336.32	338.03	0.000932	10.60	471.14	152.56	0.63
Upper Reach	2529.382	50-year	3400.00	325.58	333.63	334.10	337.42	0.003132	15.62	217.63	35.09	1.11
Upper Reach	2529.382	35-year	3000.00	325.58	332.96	333.51	336.65	0.003319	15.40	194.78	33.77	1.13
Upper Reach	2529.382	10-year	2100.00	325.58	331.38	332.00	334.69	0.003816	14.61	143.79	30.60	1.19
Upper Reach	2529.382	5-year	1700.00	325.58	330.69	331.24	333.64	0.003871	13.79	123.32	29.23	1.18
Upper Reach	2529.382	2-year	1000.00	325.58	329.23	329.66	331.50	0.004268	12.10	82.61	26.30	1.20
Upper Reach	2435.063	100-year	3900.00	325.02	337.03	333.49	337.72	0.000371	7.18	793.31	230.11	0.42
Upper Reach	2435.063	50-year	3400.00	325.02	331.06	332.89	336.80	0.006877	19.23	176.84	40.36	1.62
Upper Reach	2435.063	35-year	3000.00	325.02	330.67	332.38	336.04	0.006913	18.60	161.28	38.91	1.61
Upper Reach	2435.063	10-year	2100.00	325.02	329.67	331.06	334.10	0.006994	16.88	124.40	35.23	1.58
Upper Reach	2435.063	5-year	1700.00	325.02	329.18	330.39	333.07	0.006927	15.83	107.41	33.37	1.55
Upper Reach	2435.063	2-year	1000.00	325.02	328.12	328.97	330.94	0.006841	13.46	74.30	29.41	1.49
Upper Reach	2335.331	100-year	3900.00	324.65	337.25		337.53	0.001758	4.29	944.57	174.81	0.26
Upper Reach	2335.331	50-year	3400.00	324.65	328.66	330.76	334.79	0.210718	19.86	171.16	48.28	1.86
Upper Reach	2335.331	35-year	3000.00	324.65	328.37	330.37	334.02	0.214772	19.09	157.17	47.33	1.85
Upper Reach	2335.331	10-year	2100.00	324.65	330.94	329.03	331.72	0.014624	7.06	297.35	65.48	0.58
Upper Reach	2335.331	5-year	1700.00	324.65	330.22	328.46	330.93	0.016050	6.76	251.33	58.93	0.58
Upper Reach	2335.331	2-year	1000.00	324.65	328.78	327.35	329.28	0.016394	5.65	177.01	48.67	0.52
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	324.61	336.98		337.49	0.000272	5.88	791.23	134.70	0.33
Upper Reach	2308.404	50-year	3400.00	324.61	331.36	331.05	333.58	0.002729	11.96	284.21	54.50	0.92
Upper Reach	2308.404	35-year	3000.00	324.61	330.61	330.59	332.95	0.003319	12.28	244.36	51.79	1.00
Upper Reach	2308.404	10-year	2100.00	324.61	329.45	329.45	331.41	0.003631	11.25	186.68	47.59	1.00
Upper Reach	2308.404	5-year	1700.00	324.61	328.86	328.86	330.63	0.003852	10.68	159.13	45.46	1.01
Upper Reach	2308.404	2-year	1000.00	324.61	327.61	327.61	328.98	0.004063	9.38	106.60	39.37	1.00
Upper Reach	2287.614	100-year	3900.00	324.58	337.12		337.42	0.000536	4.57	984.04	152.41	0.24
Upper Reach	2287.614	50-year	3400.00	324.58	332.19		333.13	0.003067	7.81	435.26	66.11	0.54
Upper Reach	2287.614	35-year	3000.00	324.58	331.55		332.45	0.003205	7.62	393.48	64.29	0.54
Upper Reach	2287.614	10-year	2100.00	324.58	330.07	328.31	330.82	0.003511	6.98	300.93	60.90	0.55
Upper Reach	2287.614	5-year	1700.00	324.58	329.31	327.84	330.00	0.003775	6.65	255.79	59.24	0.56
Upper Reach	2287.614	2-year	1000.00	324.58	326.14	326.88	328.65	0.053547	12.71	78.66	52.24	1.83
Upper Reach	2084.121	100-year	3900.00	322.65	337.05		337.29	0.000598	3.98	990.47	127.53	0.22
Upper Reach	2084.121	50-year	3400.00	322.65	331.81		332.48	0.002549	6.58	516.61	76.11	0.45
Upper Reach	2084.121	35-year	3000.00	322.65	331.14		331.78	0.002603	6.43	466.70	73.18	0.45
Upper Reach	2084.121	10-year	2100.00	322.65	329.62		330.15	0.002554	5.83	360.43	66.51	0.44
Upper Reach	2084.121	5-year	1700.00	322.65	328.85		329.32	0.002509	5.48	310.40	63.13	0.44
Upper Reach	2084.121	2-year	1000.00	322.65	327.27	325.30	327.60	0.002342	4.63	216.12	56.21	0.42
Upper Reach	1873.917	100-year	3900.00	320.65	337.02		337.17	0.000357	3.19	1289.98	268.40	0.17
Upper Reach	1873.917	50-year	3400.00	320.65	330.27		331.58	0.007076	9.21	369.12	63.65	0.67
Upper Reach	1873.917	35-year	3000.00	320.65	329.43		330.81	0.008226	9.45	317.52	59.52	0.72
Upper Reach	1873.917	10-year	2100.00	320.65	327.79		329.12	0.009927	9.27	226.62	51.44	0.78
Upper Reach	1873.917	5-year	1700.00	320.65	326.95		328.26	0.011188	9.18	185.24	47.32	0.82
Upper Reach	1873.917	2-year	1000.00	320.65	325.25	325.10	326.49	0.015406	8.96	111.62	39.05	0.93
Upper Reach	1798.381	100-year	3900.00	318.55	337.01		337.14	0.000274	2.90	1400.61	304.97	0.14
Upper Reach	1798.381	50-year	3400.00	318.55	329.32		330.98	0.008019	10.33	329.26	50.28	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.016387	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.016792	12.12	173.23	38.06	1.00

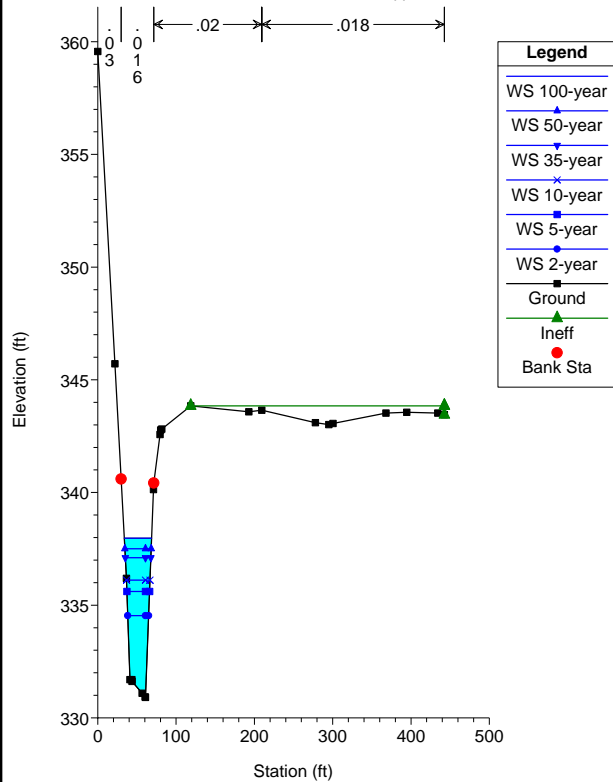
HEC-RAS Plan: Sed-remvd-all River: Alvarado Channel Reach: Upper Reach (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.016981	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.017608	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.04		337.09	0.000111	1.42	2484.48	286.59	0.06
Upper Reach	1641.59	50-year	3400.00	315.77	329.89		330.09	0.001468	3.54	960.60	113.37	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.21	321.45	325.71	0.005972	5.64	531.66	79.60	0.38
Upper Reach	1641.59	10-year	2100.00	315.77	322.96	320.51	323.48	0.008823	5.79	362.40	70.47	0.45
Upper Reach	1641.59	5-year	1700.00	315.77	322.10	320.03	322.58	0.009739	5.61	303.23	66.98	0.46
Upper Reach	1641.59	2-year	1000.00	315.77	320.42	318.97	320.82	0.012241	5.09	196.61	60.20	0.50
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000124	1.82	2099.81	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.32		329.79	0.002206	5.51	616.85	52.54	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.29	323.29	324.50	0.009515	8.84	339.54	40.61	0.54
Upper Reach	1489.686	10-year	2100.00	312.84	320.01	320.01	321.50	0.018524	9.80	214.26	35.71	0.71
Upper Reach	1489.686	5-year	1700.00	312.84	319.11		320.46	0.019663	9.30	182.87	34.37	0.71
Upper Reach	1489.686	2-year	1000.00	312.84	317.47		318.41	0.020303	7.79	128.30	31.91	0.69
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000195	2.18	1886.52	239.69	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.32		329.65	0.001631	4.63	735.13	67.23	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.02		324.00	0.007879	7.95	377.58	45.77	0.49
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.042038	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.14	316.83	319.08	0.035865	11.18	152.05	32.77	0.91
Upper Reach	1439.048	2-year	1000.00	311.46	315.91	315.40	317.13	0.030844	8.85	113.04	30.90	0.82
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.37	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1523.00	116.97	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.25	323.25	323.42	0.001035	3.31	907.64	83.95	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.30	312.03	315.87	0.008812	6.03	348.24	56.68	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.24		313.46	0.035850	8.87	191.64	45.51	0.76
Upper Reach	1288.123	2-year	1000.00	306.79	310.83		311.73	0.040432	7.63	131.12	40.36	0.75
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4819.03	291.60	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2887.26	213.74	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.27	308.49	323.31	0.000215	1.57	1912.24	141.51	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.25	307.72	315.33	0.000976	2.27	923.84	106.89	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.52	307.34	309.85	0.011691	4.59	370.66	86.08	0.39
Upper Reach	1111.63	2-year	1000.00	303.43	308.76	306.54	308.93	0.007485	3.26	306.39	83.32	0.30
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.66	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4448.19	259.63	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.26		323.27	0.000051	0.96	3118.06	200.80	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.19		315.21	0.000185	1.28	1634.92	164.04	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.69		306.94	0.008850	4.02	422.62	115.83	0.37
Upper Reach	826.8154	2-year	1000.00	301.19	304.58		304.97	0.033409	5.00	199.95	95.03	0.61
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000009	0.65	5683.23	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000028	0.93	3690.39	227.79	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000059	1.14	2636.23	150.91	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.16		315.19	0.000147	1.38	1526.08	123.71	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	306.19		306.34	0.002081	3.05	557.71	89.59	0.22
Upper Reach	676.0353	2-year	1000.00	296.69	303.67		303.80	0.003063	2.87	348.40	76.24	0.24
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.42	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.70	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85

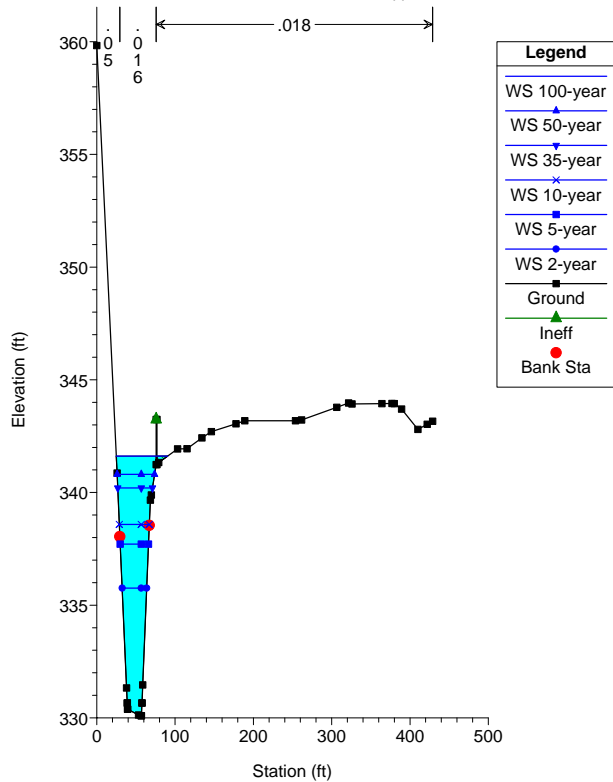




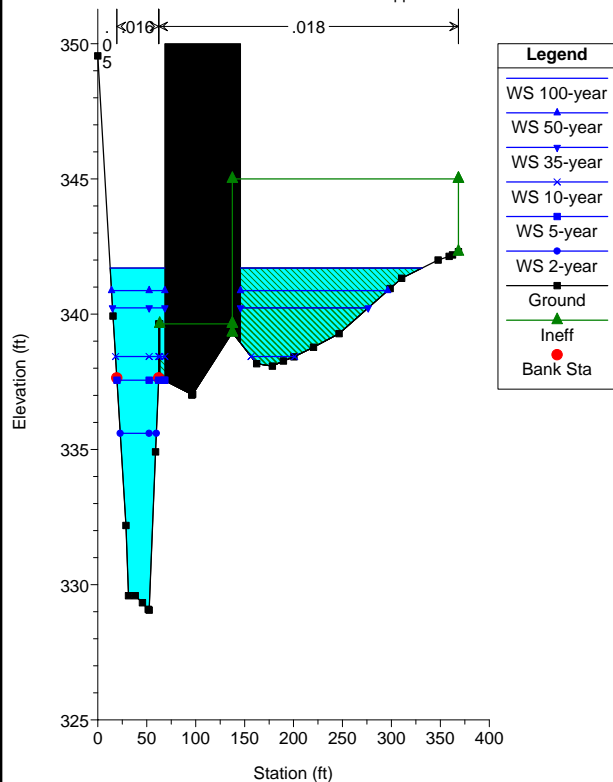
Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



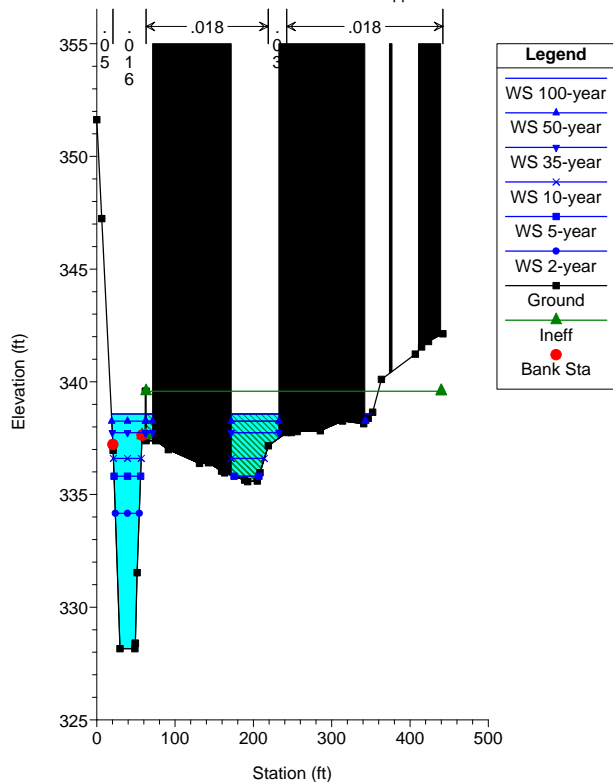
Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach

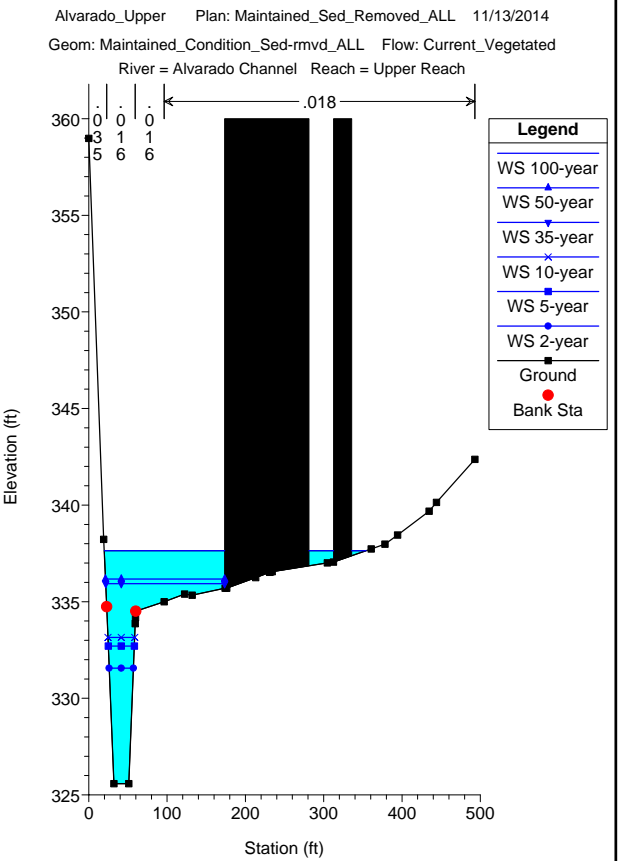
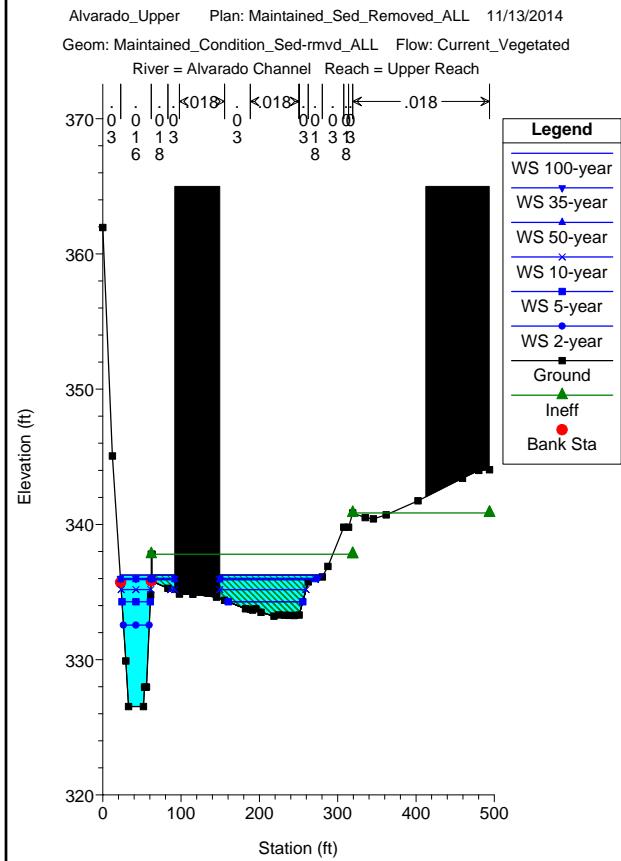
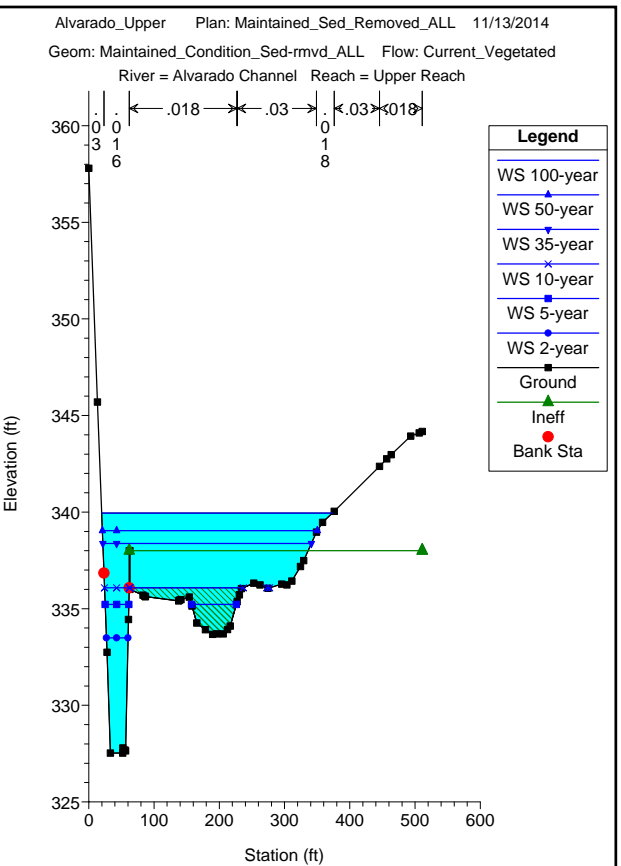
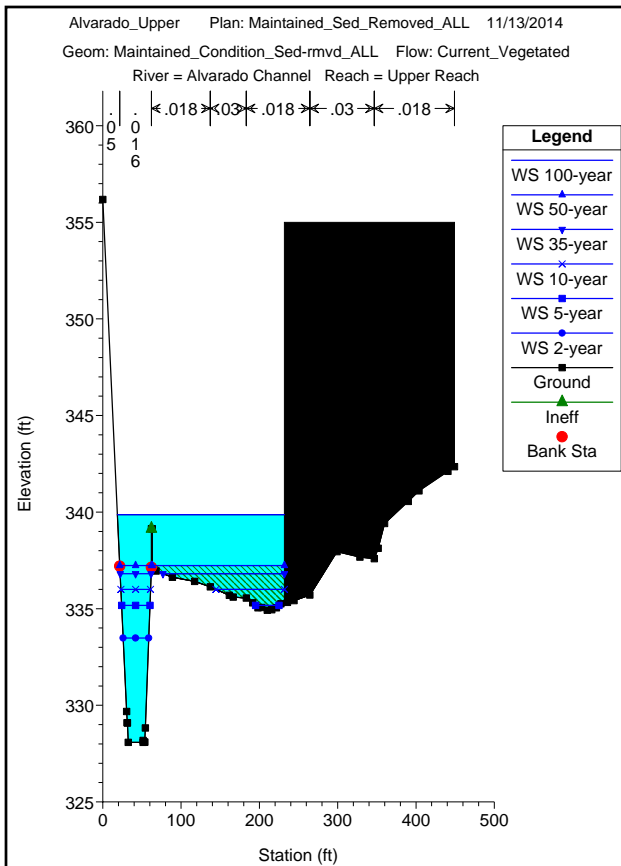


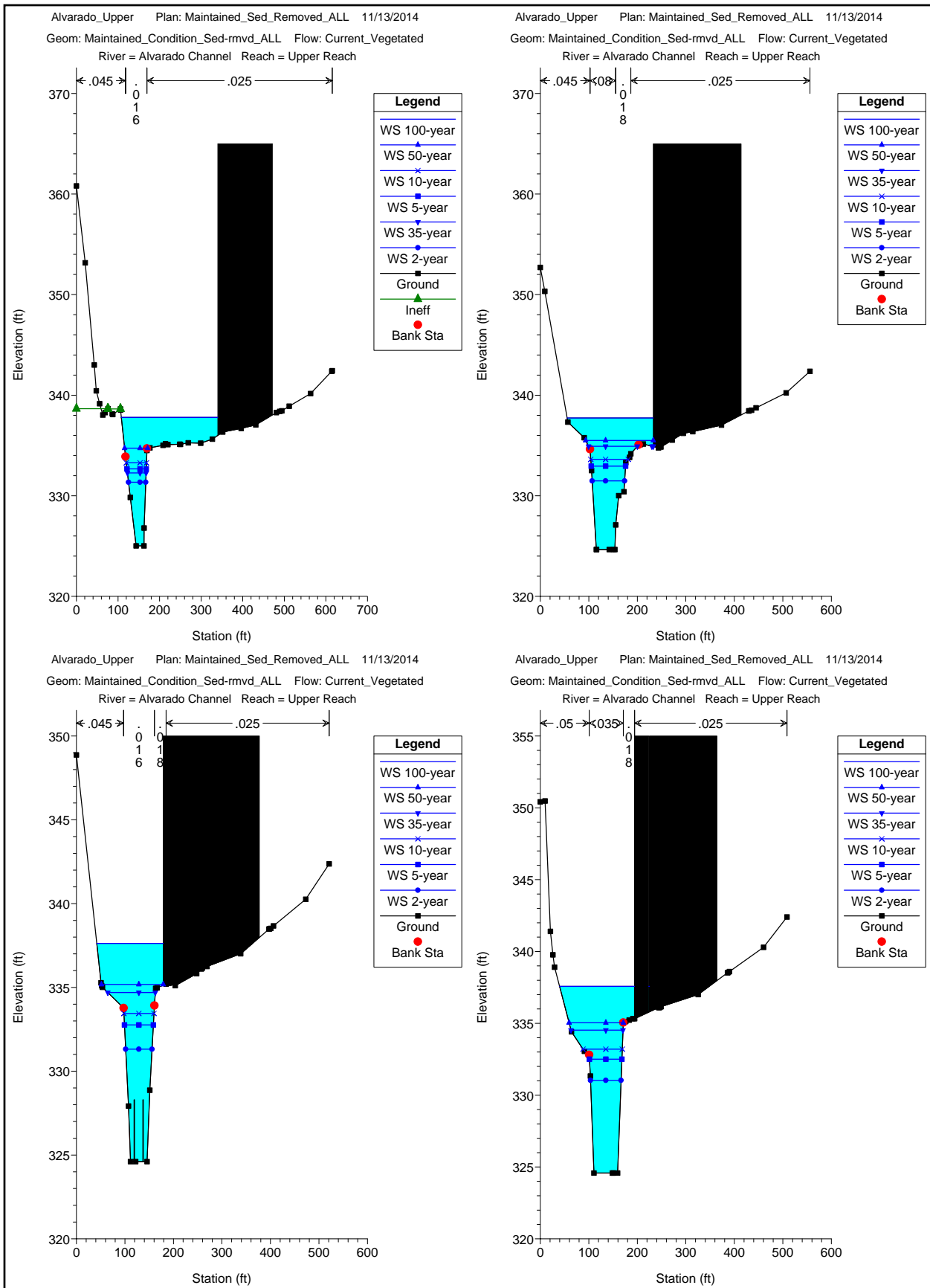
Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach

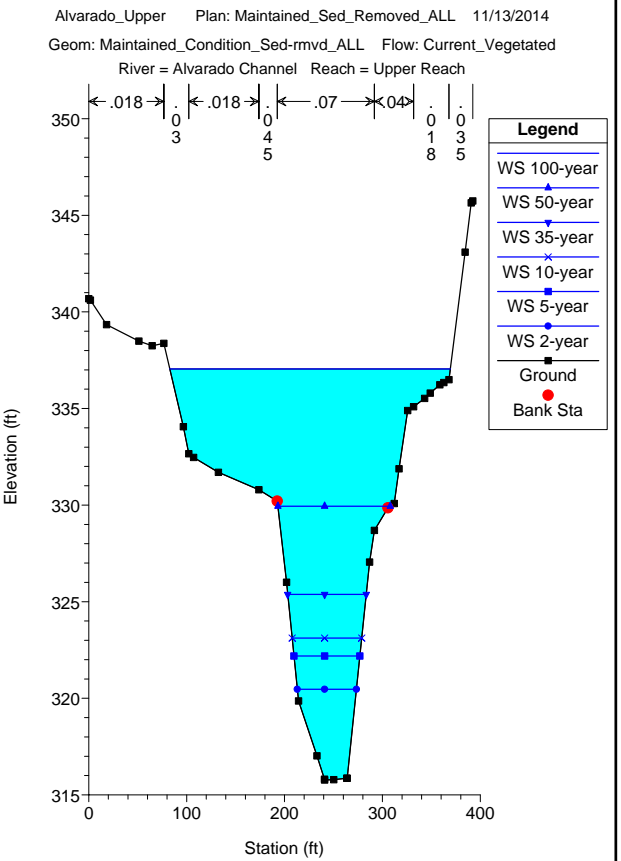
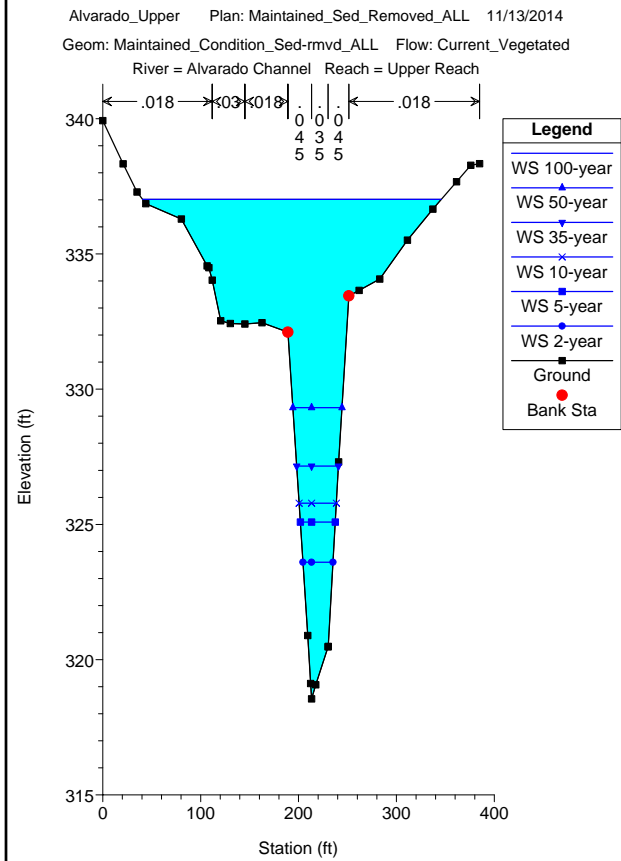
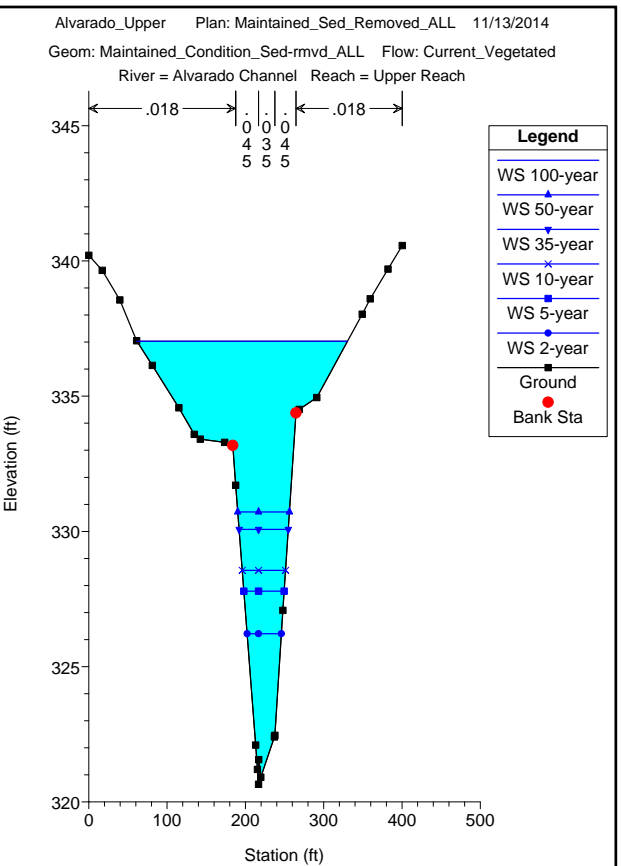
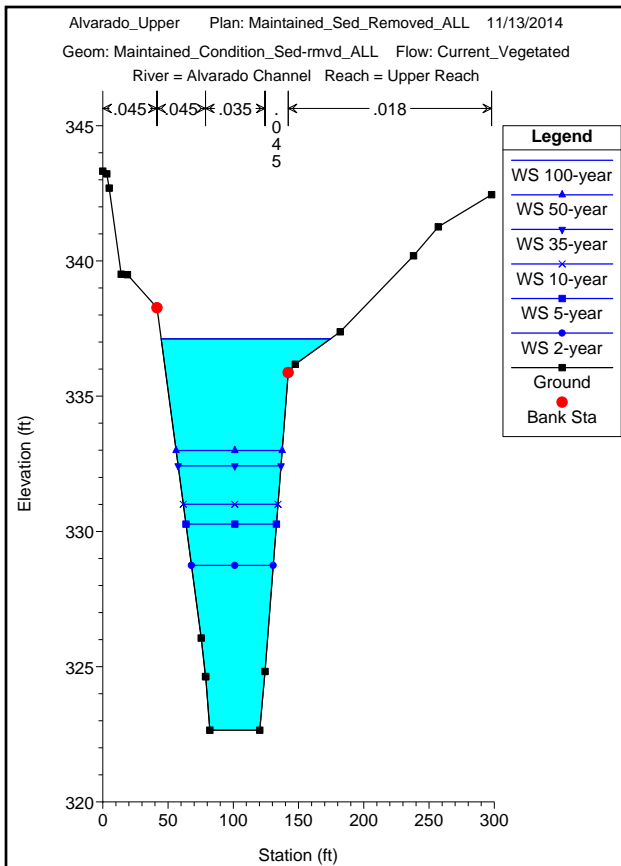


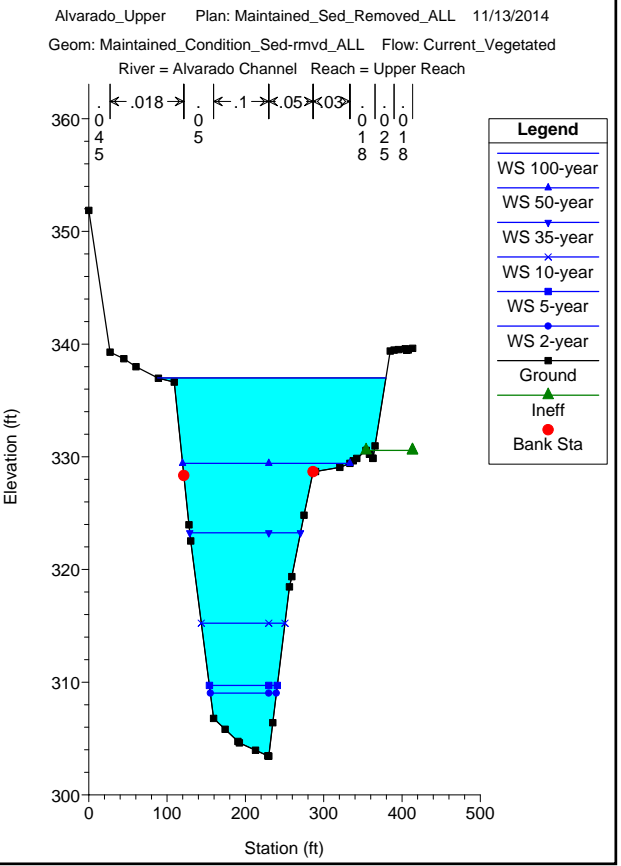
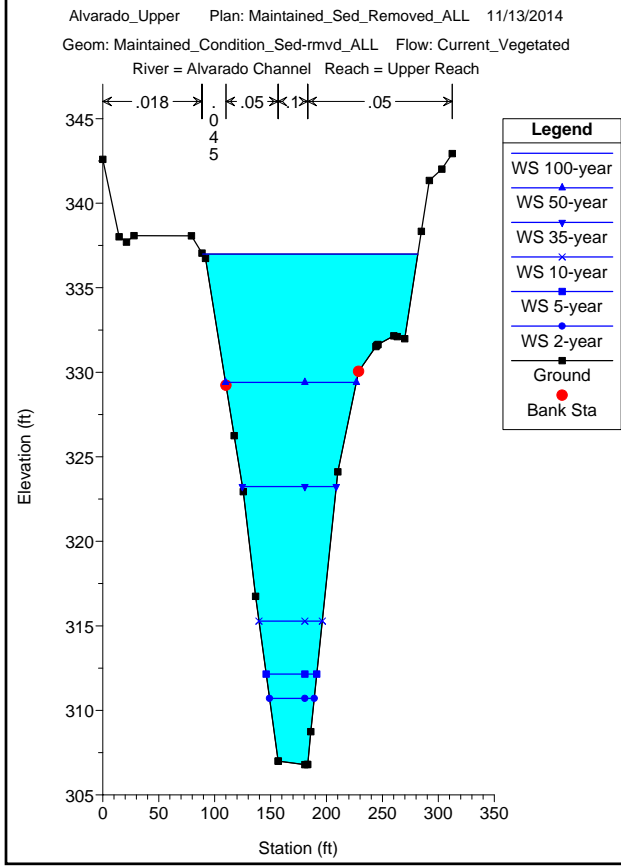
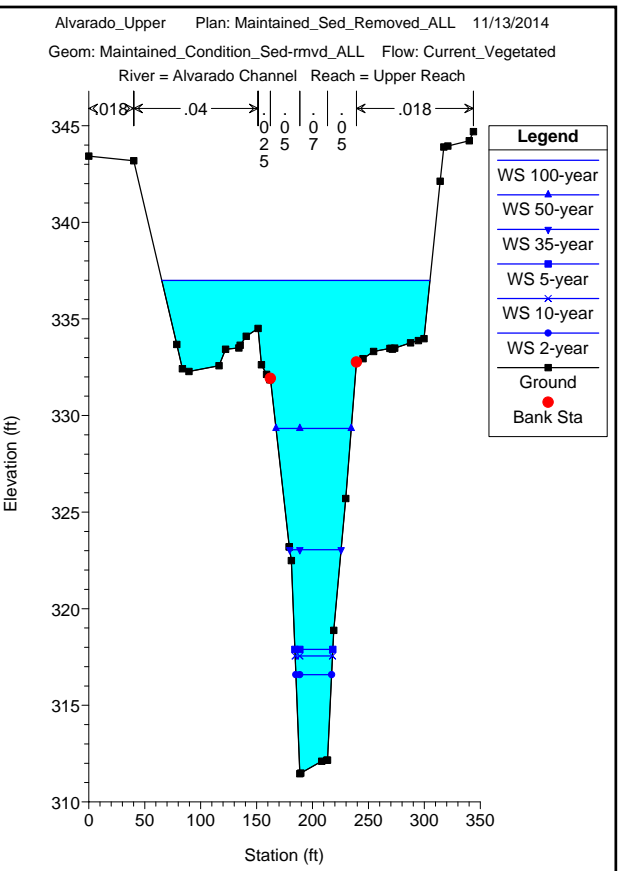
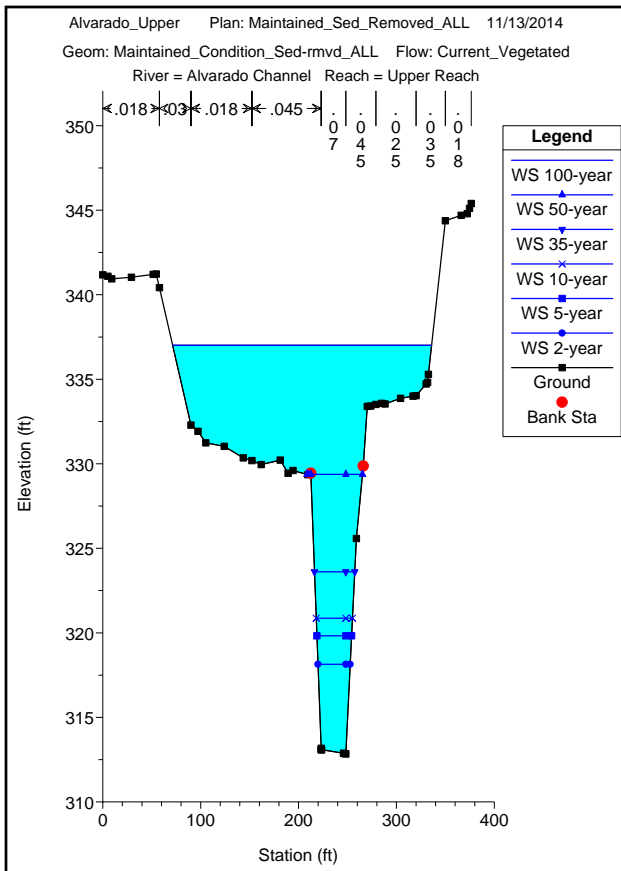
Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



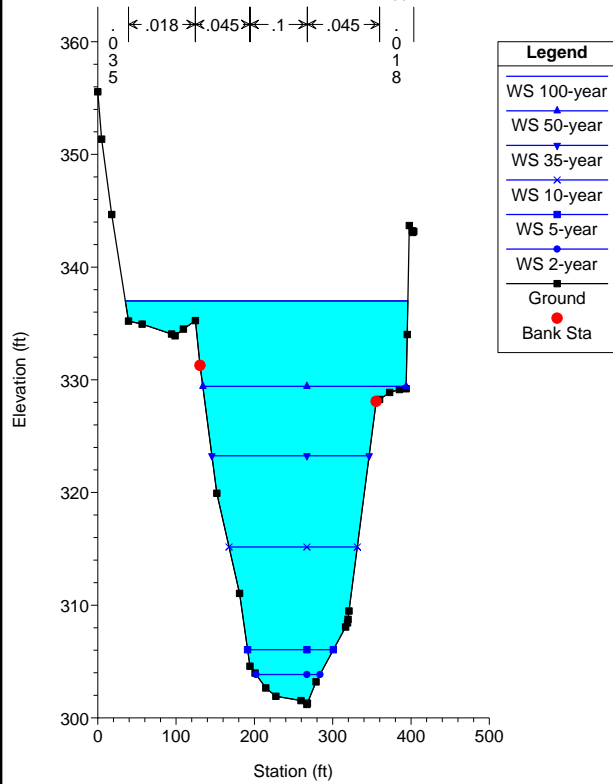




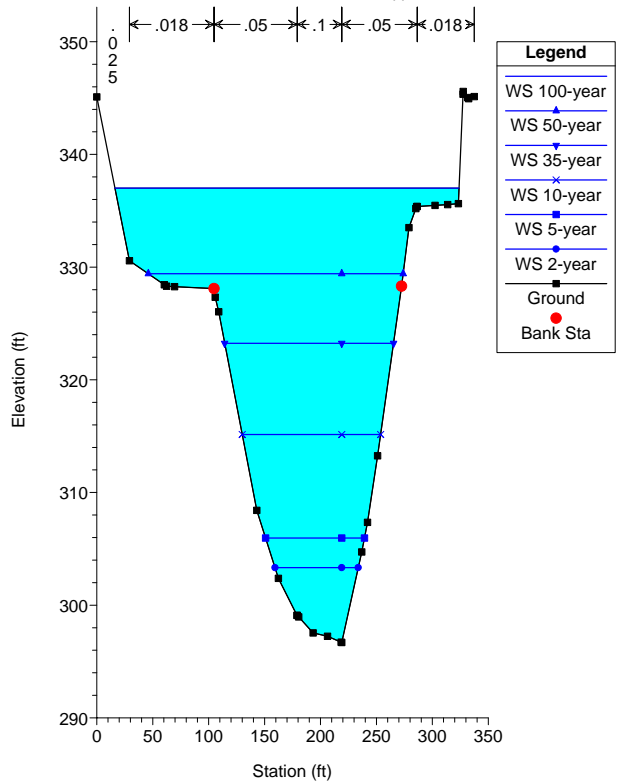




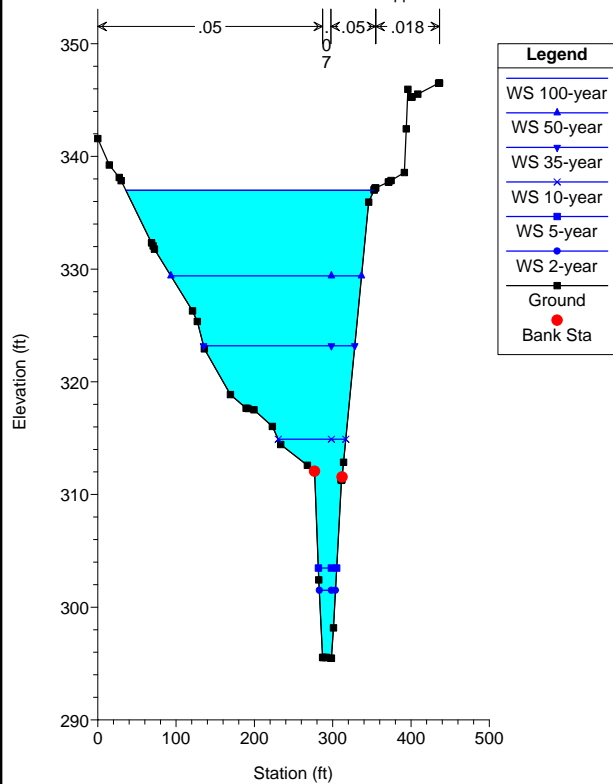
Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: Maintained_Sed_Removed_ALL 11/13/2014
 Geom: Maintained_Condition_Sed-rmvd_ALL Flow: Current_Vegetated
 River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 11/13/2014 1:50:14 PM

Project in English units

PLAN DATA

Plan Title: Maintained_Sed_Removed_ALL
 Plan File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p03

Geometry Title: Maintained_Sed-rmvd_ALL
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g07

Flow Title : Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Description:
 Plan examines removing vegetation and sediment in the City and State maintained portions

Plan Summary Information:
 Number of: Cross Sections = 31 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
5-year	2-year					

Alvarado Channel	Upper Reach	4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado Channel	Upper Reach	100-year	Critical	Known WS = 337
Alvarado Channel	Upper Reach	50-year	Critical	Known WS = 329.4
Alvarado Channel	Upper Reach	35-year	Critical	Known WS = 323.2
Alvarado Channel	Upper Reach	10-year	Critical	Known WS = 314.9
Alvarado Channel	Upper Reach	5-year	Critical	Normal S = 0.03
Alvarado Channel	Upper Reach	2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Condition_Sed-rmvd_ALL
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g07

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99	79.65	352.77
92.38	352.108.38	352	108.38	340.4	117.38	340.4	117.38	351	
118.08	351	118.08	340.4	126.68	340.4	126.68	351	127.38	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352	197.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19	297.78	353.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65	328.6	355.94
329.79	356.2	348.2	362.06	362.49	365.16				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.38 136.38 56.75 57.06 57.78 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 267.11 362.49 352.83 F

Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 0 52.12 370 193.09 238.03 370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

INPUT

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

Weir Embankment Coordinates num = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53	27.07	349.73
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72	48.86	352.49
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65	81.56	352.48
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48	115.88	350.31
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75	141.03	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75	186.26	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75	231.79	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75	296.86	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75	368.22	350.75

404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75	452.46	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75	516.13	350.75
516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	336.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.61
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63
83.88	352	99.88	352	99.88	339.3	108.88	339.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22
388.16	365.26	393.87	365.13				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

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

99.88	127.88	35.29	35.3	35.1	.1	.3
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Ineffective Flow num= 1
Sta L Sta R Elev Permanent

292.86	388.16	352.97	F
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Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev

0	67.09	370	170.25	263.29	370
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66

128.96	350.55	134.07	350.6	144	350.85	149.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39
192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

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

65.6	93.6	27.81	27.21	26.73	.1	.3
------	------	-------	-------	-------	----	----

Ineffective Flow num= 2
Sta L Sta R Elev Permanent

99.74	294.86	352.67	F
294.86	387.54	353.03	F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev

0	56.31	365	163.1	265.25	365
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.96	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

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

63.26	104.83	164.21	164.68	167.58	.1	.3
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Ineffective Flow num= 2
Sta L Sta R Elev Permanent

104.83	326.23	351	F
326.23	421.9	353.09	F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev

0	59.44	370	164.66	297.32	370
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	536.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

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

74.43	109.33	219.68	218.24	219.57	.1	.3
-------	--------	--------	--------	--------	----	----

Ineffective Flow num= 1
Sta L Sta R Elev Permanent

115.33	233.87	346.05	F
--------	--------	--------	---

Blocked Obstructions num= 2

Sta L Sta R Elev Sta L Sta R Elev
0 61.02 354 156.99 520.69 354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4056.782

INPUT
Description:
Station Elevation Data num= 19
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 344.66 30.69 344.55 39.72 344.43 112.81 343.57 142.16 343.38
179.71 343.01 180.29 343.01 190.08 342.73 200.26 336.14 202.69 334.41
202.74 334.41 206.1 334.51 215.47 334.88 216.4 334.92 216.96 335.45
225.55 343.56 229.11 343.8 281.52 350.25 554.12 350.25

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val
0 .018 190.08 .016 216.4 .016 225.55 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
190.08 225.55 161.97 143.39 128.41 .1 .3
Blocked Obstructions num= 1
Sta L Sta R Elev
281.49 554.12 360

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 365.86 16.26 353.45 32.29 341.36 38.14 336.95 41.63 333.87
42.22 333.86 57.31 333.57 57.59 333.56 64.94 340.73 66.19 341.59
69.85 341.68 70.47 343.4 75.47 343.3 96.47 344 104.47 344.1
104.47 350.25 113.47 350.25 113.47 350.76 478.56 350.76 478.56 347.5
762.56 351

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .03 32.29 .016 66.19 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
32.29 66.19 160.29 155.35 151.31 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
121.74 762 350.76 F
Blocked Obstructions num= 1
Sta L Sta R Elev
121.74 406.35 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 360.08 24.76 342.73 36.78 334.31 38.5 332.59 55.58 332.59
55.85 332.58 55.86 332.59 57.5 332.59 66.66 341.75 71.24 342.44
80.82 342.89 99.77 343.45 103.66 343.46 156.54 343.69 169.57 343.78
187.41 343.67 241.76 343.82 266.71 343.64 310.88 343.47 337.44 343.56
342.68 343.58

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .05 24.76 .016 71.24 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.76 71.24 156.2 157.14 158.25 .1 .3

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
121.35 129.29 365 129.29 271.93 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 25
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.57 21.79 345.71 29.74 340.6 36.61 336.19 41.1 331.7
43.59 331.7 43.71 331.62 56.66 331.09 60.41 330.93 60.88 330.91
71.14 340.13 71.45 340.42 79.54 342.57 80.33 342.77 81.75 342.81
118.62 343.84 192.97 343.58 209.41 343.65 277.88 343.1 295.07 343.01
300.31 343.06 368.05 343.52 394.52 343.56 434.26 343.52 442.68 343.45

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 29.74 .016 71.45 .02 209.41 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.74 71.45 183.48 182.29 181.14 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.83 25.85 340.86 29.47 338.04 38.09 331.33 38.76 330.66
38.95 330.66 39.31 330.38 39.47 330.38 53.23 330.13 56.6 330.09
56.92 330.09 57.6 330.66 57.76 330.66 58.56 331.46 67.04 338.54
68.39 339.66 69.63 339.89 75.76 341.24 75.77 343.24 76.77 343.24
76.77 341.24 79.11 341.33 103.2 341.93 115.27 341.94 134.16 342.42
146.31 342.7 177.81 343.05 189.09 343.18 253.73 343.18 261.47 343.22
306.56 343.78 321.66 343.97 326.01 343.93 364.07 343.94 376.97 343.95
379.8 343.94 389.33 343.7 410.09 342.8 421.87 343.03 428.88 343.16

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .05 29.47 .016 75.76 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.47 67.04 188.22 188.31 208.19 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
75.77 428.88 343.24 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 30
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 349.55 15.53 339.93 19.43 337.64 28.72 332.19 31.32 329.59
38.33 329.59 45.6 329.33 51.53 329.09 52.41 329.06 59.04 334.91
62.21 337.64 62.22 339.64 63.22 339.64 63.22 337.64 95.9 337.03
96.15 337.01 96.9 337.04 137.52 339.32 162.33 338.17 178.31 338.08
189.7 338.27 200.4 338.42 220.32 338.78 246.45 339.28 298.6 340.95
310.42 341.33 347.72 342 358.94 342.14 362.36 342.19 368.47 342.31

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .05 19.43 .016 62.21 .018

Bank Sta: Left Right Lengths: Left Channel Right
 19.43 62.21 213.1 211.63 234.86
 Coeff Contr. Expan.
 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 63.22 137.52 339.64 F
 137.52 368.47 345 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 68.42 145.82 350

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 3018.677

INPUT
 Description:
 Station Elevation Data num= 38
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 351.63 6.26 347.24 20.56 337.22 20.93 335.96 29.73 328.16
 48.73 328.16 48.97 328.4 49.21 328.39 51.59 331.53 57.89 337.63
 61.86 337.58 61.86 339.58 62.86 339.58 62.86 337.39 75.24 337.39
 91.39 336.99 131.08 336.38 142.66 336.41 159.33 336.04 163.29 335.96
 188.72 335.64 192.7 335.57 205 335.6 208.43 335.97 218.96 337.16
 242.63 337.75 248.26 337.75 255.89 337.79 285.47 337.83 313.92 338.26
 340.9 338.14 346.6 338.38 352.33 338.65 363.42 340.11 406.82 341.23
 414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 20.56 .016 62.86 .018 218.96 .03 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right
 20.56 57.89 146.85 145.44 131.99
 Coeff Contr. Expan.
 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 57.89 62.86 337.63 F
 62.86 440 339.58 F
 Blocked Obstructions num= 4
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
 232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 42
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 356.18 21.74 337.2 30.35 329.68 31.17 329.1 31.35 329.09
 31.38 329.09 32.39 328.08 51.39 328.08 51.49 328.18 53.29 328.1
 53.58 328.09 54.27 328.83 62.04 337.14 62.1 339.14 63.1 339.14
 63.1 337.14 67.96 336.95 88.97 336.63 117.23 336.41 137.39 336.13
 161.66 335.69 166.55 335.6 183.27 335.55 191.42 335.3 198.28 335.05
 202.99 335.06 210.13 334.92 215.7 334.95 221.61 335.05 227.44 335.25
 235.84 335.33 244.24 335.42 264.47 335.71 299.23 337.95 328.34 337.67
 346.84 337.59 351.58 338.13 359.81 339.41 390.03 340.55 403.82 341.1
 440.67 342.11 449.14 342.35

Manning's n Values num= 7
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 21.74 .016 62.1 .018 137.39 .03 183.27 .018
 264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right
 21.74 62.04 48.12 46.59 34.68
 Coeff Contr. Expan.
 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62.1 449.14 339.14 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 50
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 357.8 13.19 345.7 23.23 336.84 27.87 332.74 33.08 327.53
 52.08 327.53 52.34 327.79 55.4 327.68 56.49 327.64 60.79 334.44
 61.93 336.08 62 338 63 338 63 336 83 335.7
 86.08 335.64 86.44 335.63 86.75 335.63 137.86 335.4 138.65 335.44
 141.22 335.47 154.05 335.6 158.2 335.14 165.58 334.26 178.77 333.91
 189.74 333.67 196.35 333.7 205.98 333.7 212.66 333.92 216.87 334.1
 227.31 335.36 230.72 335.72 233.9 336.04 252.75 336.32 262.38 336.23
 274.67 336.06 295.69 336.27 303.61 336.23 311.15 336.43 324.47 337.18
 329.24 337.49 348.87 338.96 358.14 339.47 376.13 340.04 445.64 342.37
 456.48 342.76 463.45 342.97 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 7
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 23.23 .016 61.93 .018 227.31 .03 348.87 .018
 376.13 .03 445.64 .018

Bank Sta: Left Right Lengths: Left Channel Right
 23.23 61.93 179.7 177.4 154.96
 Coeff Contr. Expan.
 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 43
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 361.95 12.31 345.06 22.84 335.71 29.49 329.9 32.86 326.53
 51.86 326.53 53.29 327.96 54.18 327.96 55.74 327.97 61.02 334.79
 61.88 335.82 62 337.8 63 337.8 63 335.8 83.16 335.28
 97.88 334.85 115.03 334.84 145.23 334.62 155.42 334.39 182.3 333.76
 188.41 333.72 191.22 333.67 195.43 333.76 202.05 333.5 218.7 333.21
 224.74 333.31 232.14 333.29 237.4 333.28 244.5 333.26 250.72 333.3
 262.29 335.75 280.25 336.11 287.55 336.9 307.71 339.79 313.94 339.8
 319.15 340.85 335.15 340.5 345.45 340.41 361.78 340.7 402.63 341.75
 459.27 343.42 480.11 343.99 493.96 344.04

Manning's n Values num= 13
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 22.84 .016 62 .018 83.16 .03 97.88 .018
 155.42 .03 188.41 .018 250.72 .03 262.29 .018 280.25 .03
 307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right
 22.84 61.88 161.84 166.46 226.33
 Coeff Contr. Expan.
 .1 .3

Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 62 319.15 337.8 F
 319.15 493.96 340.85 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 25
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 358.98 19.08 338.23 22.86 334.74 32.02 325.58 51.02 325.58

59.3 333.86 59.67 334.18 60.05 334.51 96.28 335 122.48 335.39
 131.97 335.34 174.16 335.7 176.05 335.7 213.04 336.25 231.04 336.52
 231.23 336.53 234.1 336.55 304.7 337.01 312.5 337.05 360.6 337.73
 378.26 337.98 394.39 338.45 434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 0 .035 22.86 .016 59.3 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.86 60.05 109.52 94.32 36.08 .1 .3
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT
 Description:
 Station Elevation Data num= 39
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 360.81 21.23 353.16 42.85 343 47.85 340.43 55.92 339.16
 63.64 338.03 69.33 338.27 75.76 338.66 86.2 338.15 87.49 338.08
 105.77 338.63 106.06 338.53 118.18 333.89 129.64 329.83 143.51 325.02
 162.51 325.02 162.8 326.79 169.52 334.5 169.71 334.71 172.01 334.74
 176.82 334.77 208.21 335.01 214.18 335.17 220.1 335.08 248.23 335.12
 250.33 335.11 268.76 335.26 298.81 335.23 326.83 335.63 351.83 336.34
 396.17 336.69 431.25 337.05 480.79 338.27 488.97 338.39 493.94 338.45
 511.78 338.91 563.4 340.16 614.31 342.38 615.33 342.43

Manning's n Values num= 3
 Sta n Val Sta n Val
 0 .045 118.18 .016 169.71 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 118.18 169.71 112 100 22 .1 .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 0 75.76 338.66 F
 75.76 105.77 338.63 F

Blocked Obstructions num= 1
 Sta L Sta R Elev
 340.09 471.21 365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2335.331

INPUT
 Description:
 Station Elevation Data num= 32
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 352.7 9.23 350.32 56.77 337.32 90.36 335.77 102.47 334.64
 105.72 332.51 115.37 324.65 115.96 324.65 142.3 324.65 150.28 324.65
 153.68 324.65 155.57 327.1 161.47 330.01 172.37 330.4 176.37 333.3
 184.12 333.82 186.57 334.18 202.82 335.07 206.31 335.09 212.23 335.15
 243.69 334.75 248.57 334.85 271.99 335.54 294.77 336.21 314.25 336.38
 373.55 337.02 429.88 338.43 430.41 338.44 435.56 338.5 444.84 338.74
 506.87 340.23 555.95 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 0 .045 102.47 .08 155.57 .018 186.57 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 102.47 202.82 28.83 29 6.18 .1 .3
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 233 414 365

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2317.214

INPUT
 Description:
 Lateral structure position = Next of right bank station
 Distance from Upstream XS =
 Deck/Roadway Width = 10
 Weir Coefficient = 2
 Weir Flow Reference = Water Surface
 Weir Embankment Coordinates num = 54
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 334.92 6.35 334.92 8.86 334.93 13.49 334.96 22.41 335
 40.08 335.13 67.61 335.32 68.4 335.32 84.51 335.32 84.77 335.32
 85.1 335.32 115.11 335.14 115.84 335.13 116.81 335.14 149.38 335.33
 154.61 335.47 180.16 336.17 190 336.05 202.93 335.86 212.46 335.02
 230.27 335.73 239.09 335.78 240.24 335.81 270.34 335.93 276.22 335.95
 277.23 335.94 300.76 335.82 321.34 335.54 322.18 335.51 327.72 335.66
 340.91 335.51 360.18 335.29 371.42 335.16 374.56 335.19 377.1 335.13
 385.69 335.09 403.81 335.01 423.78 334.94 466.91 334.51 466.99 334.51
 467.67 334.5 497.39 333.98 500.36 333.92 546.13 333.54 548.13 333.51
 548.49 333.51 583.86 333.32 585.48 333.32 631.24 333.14 632.48 333.14
 634.11 333.11 634.57 333.1 647.67 332.53 657.49 332.11

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2308.404

INPUT
 Description:
 Station Elevation Data num= 28
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 348.87 50.64 335.28 52.16 335.09 53.58 335.01 97.37 333.77
 107.31 327.92 111.54 324.61 122.23 324.61 145.7 324.61 151.2 328.87
 160.87 333.92 163.21 334.94 166.35 334.98 184.8 335.2 190.27 335.24
 193.34 335.27 203.7 335.11 247.82 335.82 257.56 336.1 259.76 336.16
 269.28 336.25 338.64 337.01 397.05 338.48 397.76 338.49 400.6 338.52
 406.38 338.67 472.69 340.26 520.97 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 0 .045 97.37 .016 160.87 .018 184.8 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 97.37 160.87 25.93 20.79 5.61 .1 .3
 Blocked Obstructions num= 3
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 179 377 350 118.73 119.98 328.3 136.73 137.98 328.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2287.614

INPUT
 Description:
 Station Elevation Data num= 30
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 350.42 9.72 350.48 20.73 341.4 26.07 339.77 29.4 338.91
 64.12 334.41 91.01 333.05 100.71 332.81 103.26 331.33 110.63 324.58
 148.47 324.58 150.81 324.58 159.433 324.58 171.09 335.06 176.12 335.12
 183.15 335.22 190.68 335.32 194.36 335.32 243.97 336.1 244.76 336.1
 245.06 336.11 246.29 336.12 246.7 336.12 248.99 336.16 325.44 337
 386.01 338.52 387.43 338.54 389.78 338.6 460.26 340.29 508.6 342.4

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val
 0 .05 100.71 .035 171.09 .018 194.36 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 100.71 171.09 192.47 203.49 166.15 .1 .3
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev

224.96 364.18 355 194.19 223.55 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	322.65
120.3	322.65	124.31	324.82	142.05	335.87	147.5	336.18	181.97	337.38
238.05	340.19	257.12	341.26	297.91	342.45				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	41.5	.045	78.71	.035	124.31	.045
142.05		147.5		181.97		238.05	

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

41.5	142.05	210.13	210.2	208.24	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1873.917

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7
400.21	340.57								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	187.67	.045	216.73	.035	237.63	.045
264.56		349.13		359.34		382.09	

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

183.84	264.56	71.62	75.54	93.1	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1798.381

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66
361.35	337.67	376.05	338.28	385	338.34				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	111.81	.03	145.23	.018	189.06	.045
217.53		261.86		282.99		311.3	

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

189.06	251.36	119.25	156.79	237.15	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1641.59

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	76.62	.03	102.18	.018	173.79	.045
233.15		263.99		316.94		331.88	

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

192.62	305.69	133.84	151.9	183	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1489.686

INPUT
Description: U/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21
54.59	341.23	57.81	340.42	90.09	332.29	97.19	331.92	105.34	331.24
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045
247.67		273.74		316.96		333.42	

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

212.54	266.06	50.44	50.64	51.04	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1439.048

INPUT
Description: D/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22
343.78	344.69								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05
162.38		239.35		317.45		343.95	

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

162.38	239.35	146.36	150.92	160.49	.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1288.123

INPUT
Description:
Station Elevation Data num= 29
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 342.6 14.55 338.01 21.13 337.7 27.84 338.08 79.31 338.07
88.69 337.05 91.87 336.74 110.15 329.23 117.39 326.25 125.52 322.94
136.54 316.75 156.79 307 156.94 307 180.63 306.79 182.71 306.8
183.29 306.8 185.93 308.74 210.07 324.11 228.7 330.05 244.22 331.52
244.99 331.6 245.97 331.64 260.21 332.16 263.18 332.11 269.92 331.99
284.82 338.34 291.98 341.35 303.02 342.02 312.33 342.94

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 88.69 .045 110.15 .05 156.79 .1 183.29 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
110.15 228.7 168.1 176.49 194.32 .1 183.29 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1111.63

INPUT
Description:
Station Elevation Data num= 41
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 351.86 27.2 339.28 44.8 338.7 60.26 338 88.84 336.97
109.09 336.63 121.36 328.337 127.82 323.97 130.06 322.53 159.44 306.78
174.11 305.82 190.49 304.74 192.3 304.62 213 303.96 228.71 303.46
229.22 303.44 229.84 303.43 234.91 306.4 256.18 318.46 259.39 319.37
274.82 324.82 286.38 328.68 289.62 328.69 320.59 329.07 333.47 329.42
337.85 329.64 342.23 329.86 354.08 330.57 354.39 330.55 358.31 330.23
362.71 329.87 362.89 329.86 365.46 330.96 384.93 339.39 389.83 339.47
395.28 339.51 404.27 339.58 405.55 339.49 405.96 339.45 408.14 339.49
413.47 339.62

Manning's n Values num= 9
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .045 27.2 .018 121.36 .05 159.44 .1 229.84 .05
286.38 .03 333.47 .018 365.46 .025 389.83 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
121.36 286.38 256.29 284.82 327.16 .1 229.84 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 826.8154

INPUT
Description:
Station Elevation Data num= 34
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 355.56 4.94 351.36 17.74 344.66 39.17 335.21 56.65 334.94
94.27 334.06 98.75 333.91 109.22 334.5 124.61 335.26 130.67 331.28
151.97 319.94 180.98 311.04 194.35 304.59 200.85 303.97 214.63 302.65
227.33 301.92 259.57 301.53 267 301.19 267.72 301.31 278.8 303.19
316.51 308.07 319.03 308.44 319.58 308.75 320.87 309.48 355.52 328.08
359.81 328.25 372.61 328.88 385.26 329.13 393.73 329.21 395.14 334.02
397.85 343.69 401.51 343.22 402.37 343.08 403.61 343.18

Manning's n Values num= 6
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .035 39.17 .018 124.61 .045 194.35 .1 267.72 .045
359.81 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
130.67 355.52 157.21 150.78 167.76 .1 267.72 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 676.0353

INPUT
Description:
Station Elevation Data num= 33
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 345.1 29.14 330.56 60.41 328.44 62.38 328.3 69.47 328.27
104.89 328.09 105.89 327.33 108.93 326.04 143.06 308.42 162.36 302.38
179 299.1 179.23 299.08 180.51 298.96 193.33 297.54 206.23 297.24
218.47 296.71 218.93 296.69 236.81 304.72 242.08 307.35 250.99 313.25
272.48 328.3 279.05 333.5 285.26 335.19 285.9 335.38 286.53 335.38
302.36 335.48 313.71 335.54 323.25 335.63 327.45 345.35 327.55 345.59
331.52 345.04 332.41 344.95 337.43 345.13

Manning's n Values num= 6
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .025 29.14 .018 104.89 .05 179.23 .1 218.93 .05
286.53 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
104.89 272.48 122.82 64.52 43.7 .1 218.93 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 611.5112

INPUT
Description: U/S face of Alvarado Road and College Avenue Crossing
Station Elevation Data num= 51
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 341.58 14.76 339.24 27.46 338.13 29.82 337.94 66.72 332.32
70.64 332.05 72.38 331.77 120.87 326.29 127.06 325.35 136.03 322.92
169.31 318.86 189.35 317.66 191.73 317.63 199.52 317.51 223.02 316.04
233.55 314.43 267.61 312.59 276.82 312.06 282.28 302.42 287.17 295.54
287.56 295.54 290.32 295.54 292.26 295.54 297.64 295.47 298.38 295.46
300.9 298.16 311.19 311.26 311.2 311.29 311.21 311.29 311.21 311.3
311.23 311.3 312.01 311.55 313.81 312.86 345.92 335.95 352.92 337.02
353.12 337.05 353.87 337.18 354.92 337.21 370.99 337.72 371.68 337.74
374.54 337.86 391.45 338.57 393.86 342.44 396.02 345.96 400.81 345.28
400.91 345.26 400.98 345.25 408.76 345.53 435.17 346.49 435.96 346.51
436.48 346.51

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 287.17 .07 297.64 .05 354.92 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
276.82 312.01 0 0 0 .1 354.92 .3

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
n9	n10	n11	n12	n13					
Upper Reach	4559.274	.018	.016	.018					
Upper Reach	4543.777	Lat Struct							
Upper Reach	4502.213	.018	.016	.018					
Upper Reach	4466.915	.018	.016	.018					
Upper Reach	4439.706	.018	.016	.018					
Upper Reach	4275.023	.018	.03	.016	.018				
Upper Reach	4056.782	.018	.016	.016	.018				
Upper Reach	3913.392	.03	.016	.018					
Upper Reach	3758.046	.05	.016	.018					
Upper Reach	3600.906	.03	.016	.02	.018				
Upper Reach	3418.613	.05	.016	.018					
Upper Reach	3230.305	.05	.016	.018					
Upper Reach	3018.677	.05	.016	.018	.03	.018			
Upper Reach	2969.225	.05	.016	.018	.03	.018	.03	.018	
Upper Reach	2873.24	.03	.016	.018	.03	.018	.03	.018	

Upper Reach	2695.84	.03	.016	.018	.03	.018	.03	.018
.03 .018	.03 .018	.03	.018					
Upper Reach	2529.382	.035	.016	.016	.018			
Upper Reach	2435.063	.045	.016	.025				
Upper Reach	2335.331	.045	.08	.018	.025			
Upper Reach	2317.214	Lat Struct						
Upper Reach	2308.404	.045	.016	.018	.025			
Upper Reach	2287.614	.05	.035	.018	.025			
Upper Reach	2084.121	.045	.045	.035	.045	.018		
Upper Reach	1873.917	.018	.045	.035	.045	.018		
Upper Reach	1798.381	.018	.03	.018	.045	.035	.045	.018
Upper Reach	1641.59	.018	.03	.018	.045	.07	.04	.018
.035								
Upper Reach	1489.686	.018	.03	.018	.045	.07	.045	.025
.035 .018								
Upper Reach	1439.048	.018	.04	.025	.05	.07	.05	.018
Upper Reach	1288.123	.018	.045	.05	.1	.05		
Upper Reach	1111.63	.045	.018	.05	.1	.05	.03	.018
.025 .018								
Upper Reach	826.8154	.035	.018	.045	.1	.045	.018	
Upper Reach	676.0353	.025	.018	.05	.1	.05	.018	
Upper Reach	611.5112	.05	.07	.05	.018			

Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	4056.782	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.1	.3

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	219.68	218.24	219.57
Upper Reach	4056.782	161.97	143.39	128.41
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3

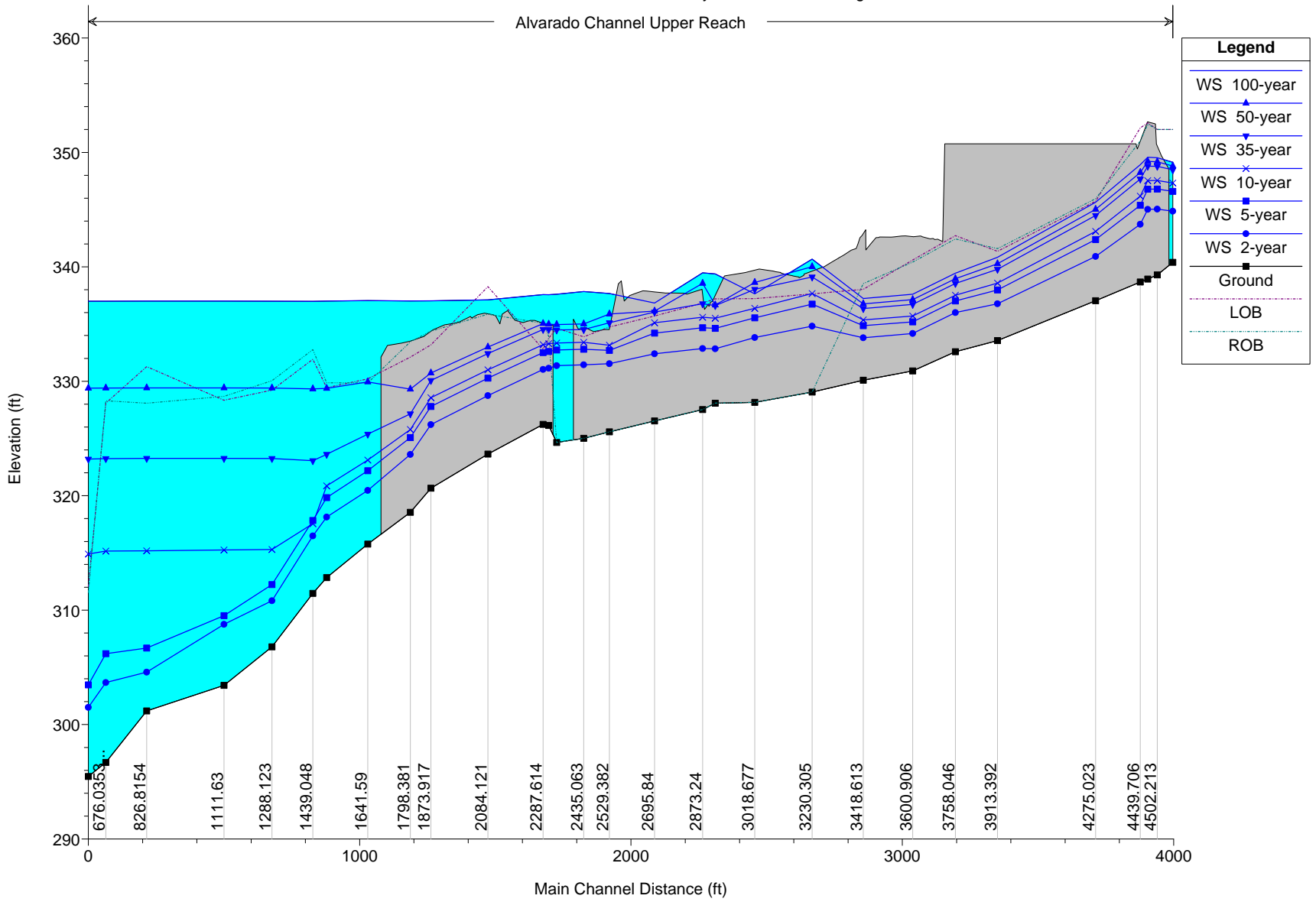
DETAILED HYDRAULIC RESULTS FOR PERMISSIBLE VELOCITY ANALYSES

1. Non-Erosive Velocities and Associated Flow Rate Analysis
2. Check Dam Analysis
3. Non-Erosive Velocities and Associated Manning's N Values Analysis

Alvarado_Upper Plan: N-Value-for-non-erosive_Vel 11/25/2014

Geom: N-Values_for_Non-erosive-velocity Flow: Current_Vegetated

Alvarado Channel Upper Reach



HEC-RAS Plan: N-Val-non-er-vel River: Alvarado Channel Reach: Upper Reach

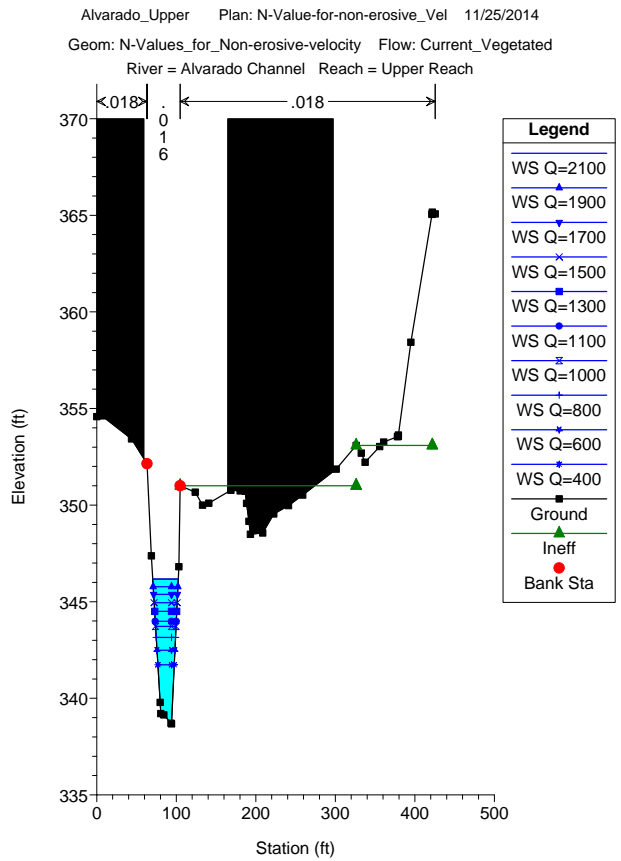
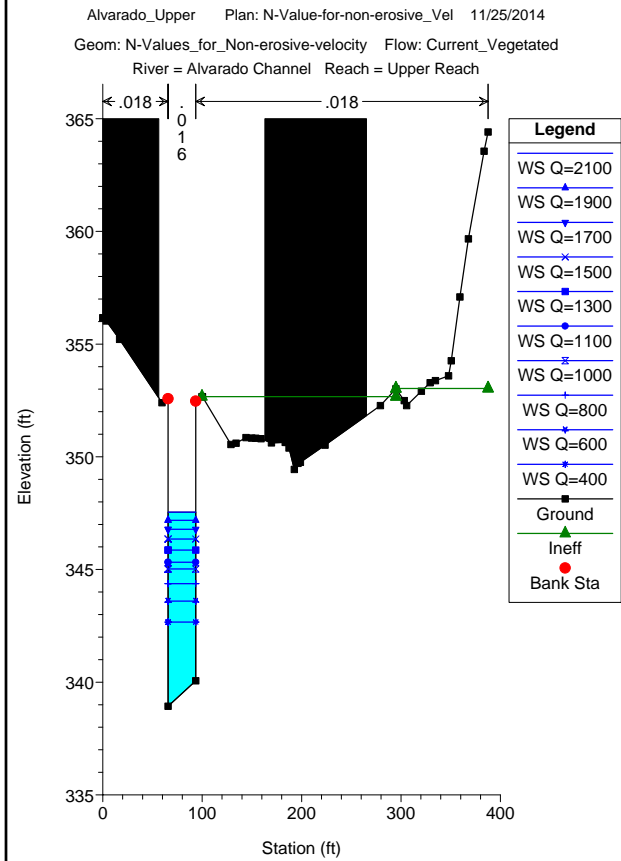
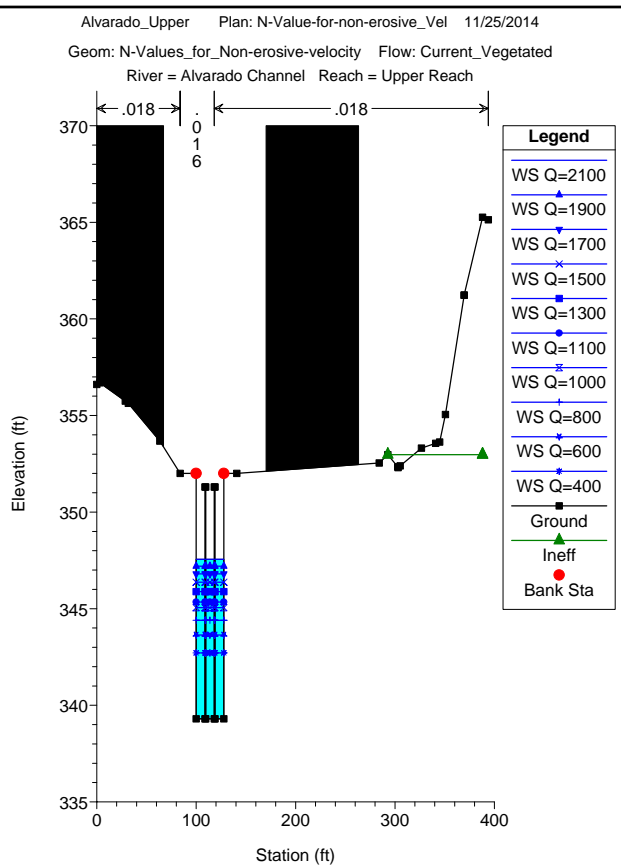
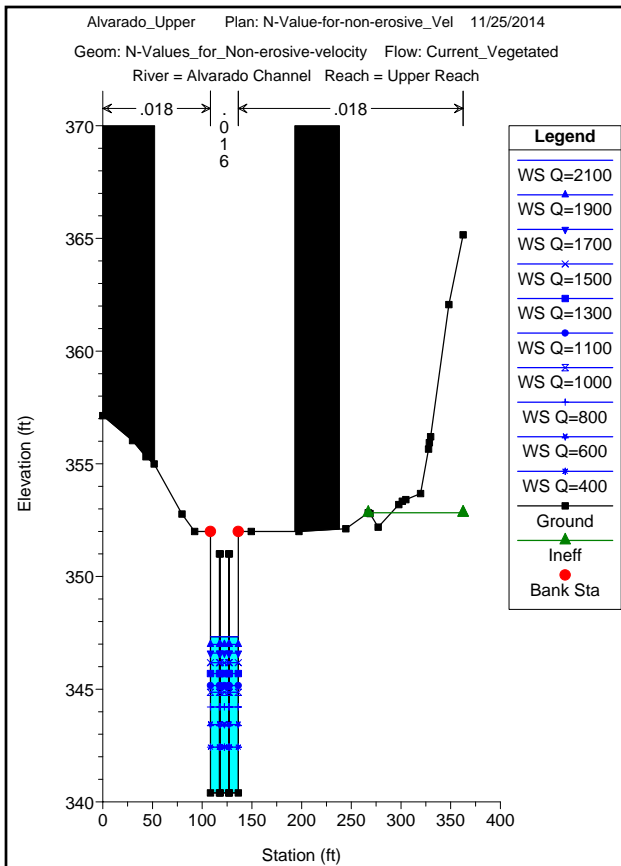
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70
Upper Reach	4543.777		Lat Struct									
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59
Upper Reach	3913.392	100-year	3900.00	333.56	340.84	343.50	349.03	0.008182	22.97	169.76	32.11	1.76
Upper Reach	3913.392	50-year	3400.00	333.56	340.27	342.74	348.05	0.008431	22.38	151.94	30.73	1.77
Upper Reach	3913.392	35-year	3000.00	333.56	339.79	342.18	347.19	0.008680	21.84	137.36	29.60	1.79
Upper Reach	3913.392	10-year	2100.00	333.56	338.58	340.62	344.99	0.009416	20.32	103.34	26.76	1.82
Upper Reach	3913.392	5-year	1700.00	333.56	337.98	339.84	343.82	0.009822	19.40	87.65	25.34	1.84
Upper Reach	3913.392	2-year	1000.00	333.56	336.77	338.18	341.27	0.010722	17.02	58.74	22.54	1.86
Upper Reach	3758.046	100-year	3900.00	332.58	339.44	342.87	347.59	0.010472	22.91	170.24	33.97	1.80
Upper Reach	3758.046	50-year	3400.00	332.58	338.96	341.36	346.52	0.010586	22.06	154.10	32.75	1.79
Upper Reach	3758.046	35-year	3000.00	332.58	338.55	340.79	345.59	0.010675	21.30	140.85	31.70	1.78
Upper Reach	3758.046	10-year	2100.00	332.58	337.53	339.33	343.21	0.010780	19.13	109.77	29.11	1.74
Upper Reach	3758.046	5-year	1700.00	332.58	337.02	338.57	341.96	0.010687	17.84	95.31	27.83	1.70
Upper Reach	3758.046	2-year	1000.00	332.58	336.01	337.00	339.32	0.009865	14.60	68.48	25.27	1.56
Upper Reach	3600.906	100-year	3900.00	330.91	337.61	340.32	346.04	0.008972	23.30	167.37	33.94	1.85
Upper Reach	3600.906	50-year	3400.00	330.91	337.13	339.63	344.96	0.008998	22.45	151.44	32.66	1.84
Upper Reach	3600.906	35-year	3000.00	330.91	336.72	339.06	344.03	0.009013	21.69	138.33	31.57	1.83
Upper Reach	3600.906	10-year	2100.00	330.91	335.70	337.60	341.64	0.009048	19.54	107.45	29.12	1.79
Upper Reach	3600.906	5-year	1700.00	330.91	335.19	336.85	340.40	0.009064	18.31	92.86	28.04	1.77
Upper Reach	3600.906	2-year	1000.00	330.91	334.17	335.30	337.82	0.008883	15.32	65.28	25.88	1.70
Upper Reach	3418.613	100-year	3900.00	330.09	337.24	339.33	344.18	0.006767	21.15	184.36	34.98	1.62
Upper Reach	3418.613	50-year	3400.00	330.09	336.76	338.70	343.12	0.006650	20.23	168.08	33.80	1.60
Upper Reach	3418.613	35-year	3000.00	330.09	336.36	338.18	342.20	0.006527	19.39	154.68	32.80	1.57
Upper Reach	3418.613	10-year	2100.00	330.09	335.36	336.71	339.88	0.006066	17.05	123.18	30.32	1.49
Upper Reach	3418.613	5-year	1700.00	330.09	334.86	335.97	338.69	0.005746	15.72	108.17	29.07	1.44
Upper Reach	3418.613	2-year	1000.00	330.09	333.80	334.41	336.30	0.004911	12.67	78.94	26.46	1.29
Upper Reach	3230.305	100-year	3900.00	329.06	340.67	338.08	342.35	0.002991	8.42	412.62	198.14	0.48
Upper Reach	3230.305	50-year	3400.00	329.06	340.01	337.58	341.52	0.002998	8.04	377.13	176.38	0.47
Upper Reach	3230.305	35-year	3000.00	329.06	339.12	337.01	340.80	0.003569	8.18	323.28	142.75	0.51
Upper Reach	3230.305	10-year	2100.00	329.06	337.67	335.54	338.87	0.003683	7.28	259.37	48.03	0.50
Upper Reach	3230.305	5-year	1700.00	329.06	336.74	334.79	337.80	0.003793	7.00	220.90	40.21	0.51
Upper Reach	3230.305	2-year	1000.00	329.06	334.82	333.29	335.59	0.003981	6.28	148.80	34.70	0.51
Upper Reach	3018.677	100-year	3900.00	328.16	337.64	337.64	341.04	0.011212	13.99	267.45	111.30	0.87
Upper Reach	3018.677	50-year	3400.00	328.16	336.63	336.81	340.62	0.005265	10.36	309.65	122.53	0.61
Upper Reach	3018.677	35-year	3000.00	328.16	336.04	336.19	339.84	0.005430	10.05	284.12	111.87	0.61
Upper Reach	3018.677	10-year	2100.00	328.16	335.37	334.64	337.89	0.005292	8.90	221.07	75.50	0.59
Upper Reach	3018.677	5-year	1700.00	328.16	335.55	333.86	336.83	0.005116	8.34	192.74	33.40	0.58
Upper Reach	3018.677	2-year	1000.00	328.16	333.82	332.28	334.67	0.004581	6.98	138.09	29.89	0.55
Upper Reach	2969.225	100-year	3900.00	328.08	339.39	336.88	339.65	0.000615	3.82	955.70	212.76	0.21
Upper Reach	2969.225	50-year	3400.00	328.08	336.67	336.19	339.55	0.000395	12.27	259.95	184.63	0.80

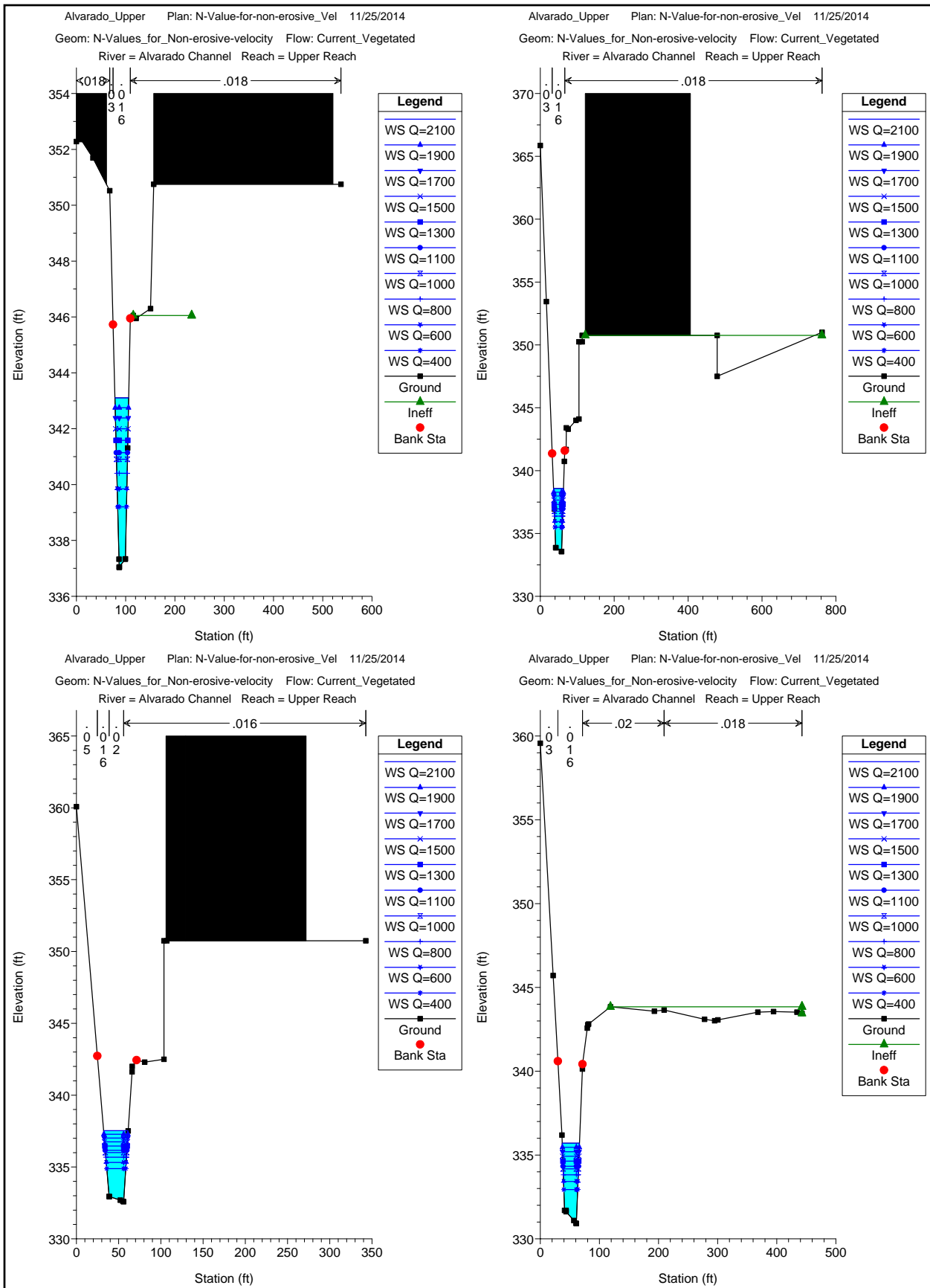
HEC-RAS Plan: N-Val-non-er-vel River: Alvarado Channel Reach: Upper Reach (Continued)

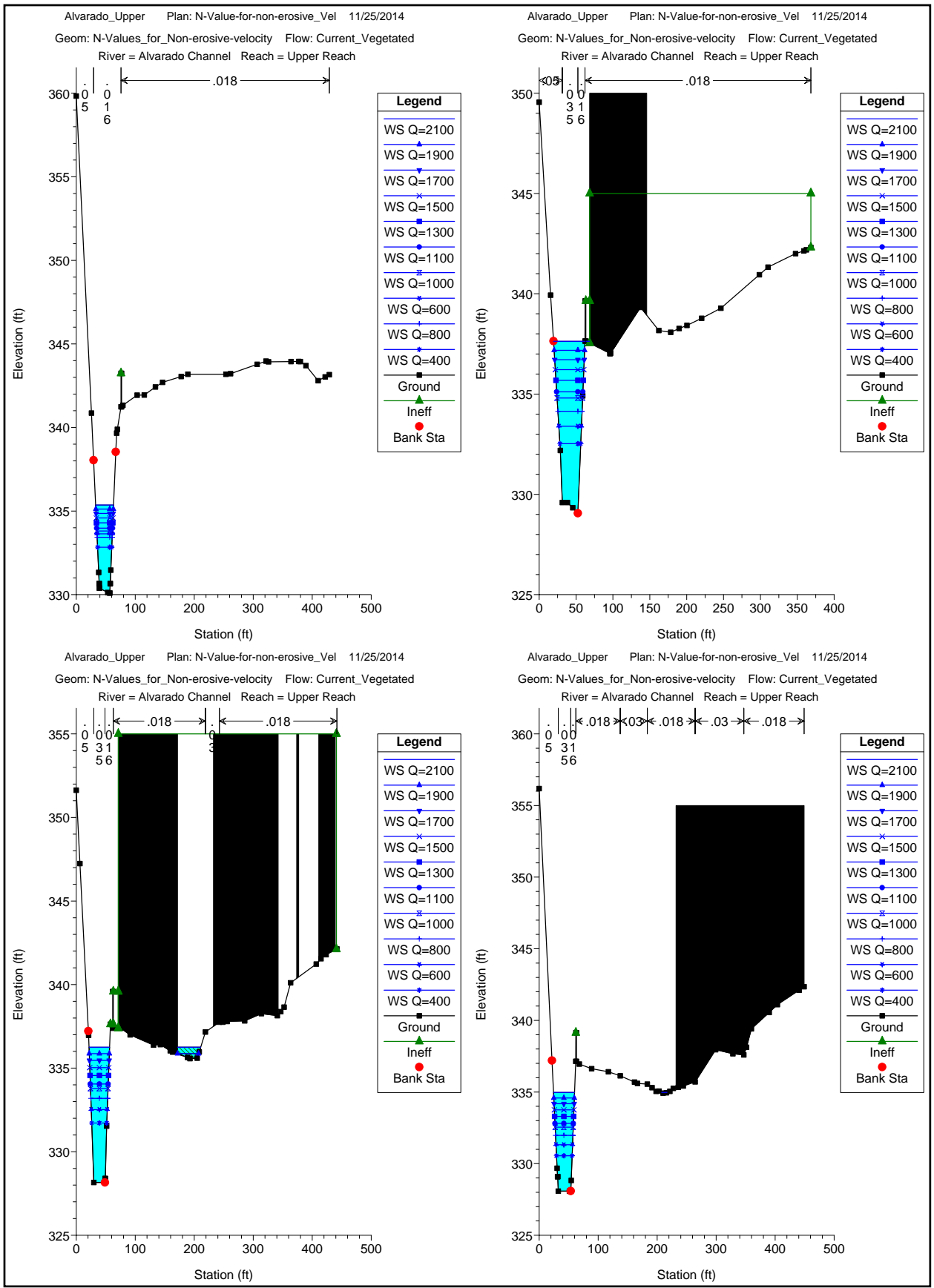
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.08	336.61	335.60	338.89	0.007486	10.92	257.83	179.84	0.72
Upper Reach	2969.225	10-year	2100.00	328.08	335.52	334.14	337.08	0.006042	9.21	216.24	84.52	0.64
Upper Reach	2969.225	5-year	1700.00	328.08	334.63	333.41	336.02	0.006248	8.82	184.28	35.01	0.65
Upper Reach	2969.225	2-year	1000.00	328.08	332.85	331.92	333.86	0.006594	7.76	125.19	31.30	0.66
Upper Reach	2873.24	100-year	3900.00	327.53	339.48	336.11	339.59	0.000193	2.78	1493.01	338.30	0.15
Upper Reach	2873.24	50-year	3400.00	327.53	338.56	335.44	338.69	0.000289	3.20	1188.00	322.21	0.18
Upper Reach	2873.24	35-year	3000.00	327.53	336.78	334.85	338.48	0.003977	10.38	287.01	293.00	0.65
Upper Reach	2873.24	10-year	2100.00	327.53	335.60	333.41	336.77	0.003237	8.66	242.27	172.54	0.58
Upper Reach	2873.24	5-year	1700.00	327.53	334.68	332.67	335.71	0.003273	8.13	209.23	94.97	0.57
Upper Reach	2873.24	2-year	1000.00	327.53	332.86	331.21	333.57	0.003217	6.78	147.71	32.07	0.54
Upper Reach	2695.84	100-year	3900.00	326.53	336.84	335.55	339.27	0.004252	11.61	318.76	206.85	0.69
Upper Reach	2695.84	50-year	3400.00	326.53	336.13	334.86	338.35	0.004343	11.08	290.32	199.43	0.69
Upper Reach	2695.84	35-year	3000.00	326.53	336.05	334.25	337.82	0.003498	9.88	287.26	196.17	0.62
Upper Reach	2695.84	10-year	2100.00	326.53	335.12	332.79	336.26	0.002562	7.90	251.36	151.01	0.52
Upper Reach	2695.84	5-year	1700.00	326.53	334.20	332.04	335.20	0.002563	7.41	217.51	127.63	0.51
Upper Reach	2695.84	2-year	1000.00	326.53	332.41	330.52	333.08	0.002377	6.10	155.88	32.55	0.48
Upper Reach	2529.382	100-year	3900.00	325.58	337.67	336.09	338.27	0.001471	4.99	654.09	206.37	0.27
Upper Reach	2529.382	50-year	3400.00	325.58	336.88	335.88	337.13	0.006054	8.95	379.28	151.90	0.53
Upper Reach	2529.382	35-year	3000.00	325.58	335.12	335.12	336.83	0.009524	10.58	286.07	82.04	0.66
Upper Reach	2529.382	10-year	2100.00	325.58	333.15	332.41	335.34	0.009869	9.22	201.13	34.14	0.64
Upper Reach	2529.382	5-year	1700.00	325.58	332.70	331.57	334.37	0.008256	8.11	186.11	33.25	0.58
Upper Reach	2529.382	2-year	1000.00	325.58	331.54	329.87	332.42	0.005808	6.06	148.69	30.92	0.47
Upper Reach	2435.063	100-year	3900.00	325.02	337.84	333.54	338.09	0.000960	4.14	981.15	232.23	0.23
Upper Reach	2435.063	50-year	3400.00	325.02	336.01	332.91	336.39	0.006731	8.85	370.16	92.53	0.57
Upper Reach	2435.063	35-year	3000.00	325.02	334.52	332.38	335.85	0.006707	8.44	338.57	53.01	0.56
Upper Reach	2435.063	10-year	2100.00	325.02	333.41	331.03	334.34	0.005831	7.14	281.70	49.03	0.51
Upper Reach	2435.063	5-year	1700.00	325.02	332.80	330.37	333.54	0.005285	6.49	252.33	46.76	0.48
Upper Reach	2435.063	2-year	1000.00	325.02	331.44	328.95	331.87	0.004093	5.07	192.23	41.75	0.41
Upper Reach	2335.331	100-year	3900.00	324.65	337.60		338.03	0.000727	2.65	1006.35	177.27	0.14
Upper Reach	2335.331	50-year	3400.00	324.65	334.96		336.00	0.002321	3.99	599.50	107.30	0.23
Upper Reach	2335.331	35-year	3000.00	324.65	334.49		335.46	0.002334	3.87	554.72	89.50	0.23
Upper Reach	2335.331	10-year	2100.00	324.65	333.34		333.98	0.002185	3.47	461.77	72.49	0.22
Upper Reach	2335.331	5-year	1700.00	324.65	332.73		333.20	0.002044	3.22	418.56	70.20	0.21
Upper Reach	2335.331	2-year	1000.00	324.65	331.37		331.58	0.001792	2.68	325.30	66.58	0.19
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	337.57		338.01	0.000989	5.59	805.14	136.88	0.32
Upper Reach	2308.404	50-year	3400.00	326.14	334.99		335.90	0.002841	7.67	466.43	113.33	0.51
Upper Reach	2308.404	35-year	3000.00	326.14	334.52		335.35	0.002838	7.32	419.18	91.50	0.51
Upper Reach	2308.404	10-year	2100.00	326.14	333.29		333.91	0.002737	6.35	330.77	61.47	0.48
Upper Reach	2308.404	5-year	1700.00	326.14	332.60		333.14	0.002660	5.87	289.68	59.00	0.47
Upper Reach	2308.404	2-year	1000.00	326.14	331.15		331.51	0.002513	4.82	207.46	53.73	0.43
Upper Reach	2287.614	100-year	3900.00	326.23	337.57	332.74	337.95	0.004189	4.11	888.66	155.87	0.24
Upper Reach	2287.614	50-year	3400.00	326.23	335.04	332.28	335.71	0.016908	6.66	526.63	111.82	0.45
Upper Reach	2287.614	35-year	3000.00	326.23	334.52	331.88	335.18	0.018016	6.59	469.90	106.66	0.46
Upper Reach	2287.614	10-year	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	5-year	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	2-year	1000.00	326.23	331.03	329.27	331.39	0.019805	4.81	207.87	57.89	0.45
Upper Reach	2084.121	100-year	3900.00	323.64	337.12		337.39	0.001832	4.19	938.92	129.77	0.24
Upper Reach	2084.121	50-year	3400.00	323.64	332.99		333.59	0.006967	6.20	548.67	81.27	0.42
Upper Reach	2084.121	35-year	3000.00	323.64	332.42		332.97	0.007073	5.96	503.23	78.78	0.42
Upper Reach	2084.121	10-year	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	5-year	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	2-year	1000.00	323.64	328.74		329.01	0.007592	4.11	243.09	62.67	0.37
Upper Reach	1873.917	100-year	3900.00	320.65	337.03		337.18	0.000471	2.99	1293.11	268.87	0.16
Upper Reach	1873.917	50-year	3400.00	320.65	330.72		331.85	0.009292	8.53	398.59	65.90	0.61
Upper Reach	1873.917	35-year	3000.00	320.65	330.08		331.17	0.009904	8.40	357.20	62.72	0.62
Upper Reach	1873.917	10-year	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63
Upper Reach	1873.917	5-year	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	2-year	1000.00	320.65	326.22		326.89	0.013373	6.59	151.75	43.75	0.62
Upper Reach	1798.381	100-year	3900.00	318.55	337.02		337.14	0.000338	2.67	1401.56	305.11	0.13
Upper Reach	1798.381	50-year	3400.00	318.55	329.32		330.98	0.012819	10.34	328.92	50.25	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.028296	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.037463	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.05		337.09	0.000091	1.49	2486.37	286.64	0.07
Upper Reach	1641.59	50-year	3400.00	315.77	329.94		330.13	0.001063	3.52	965.95	114.83	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.38	321.45	325.85	0.004082	5.50	545.27	80.29	0.37
Upper Reach	1641.59	10-year	2100.00	315.77	323.12	320.51	323.61	0.005926	5.62	373.75	71.12	0.43

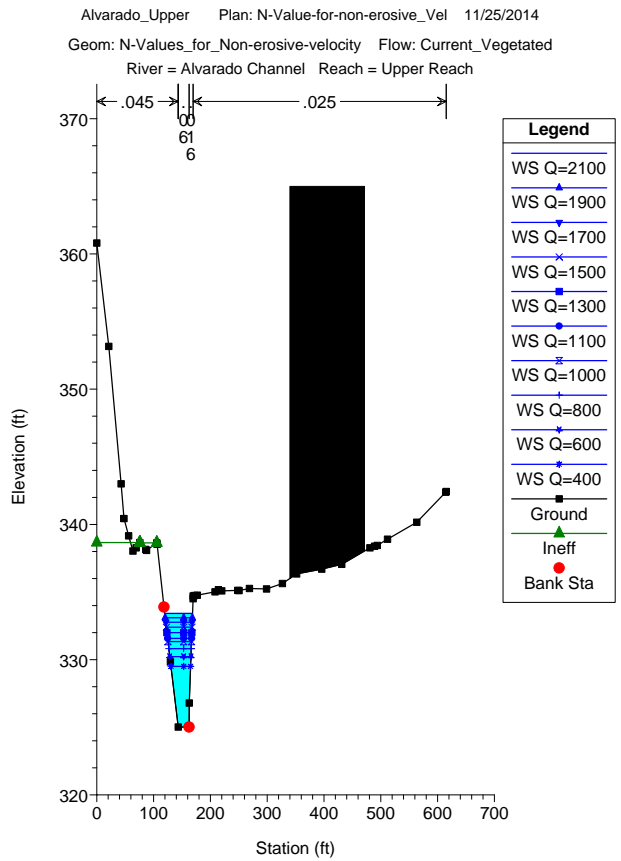
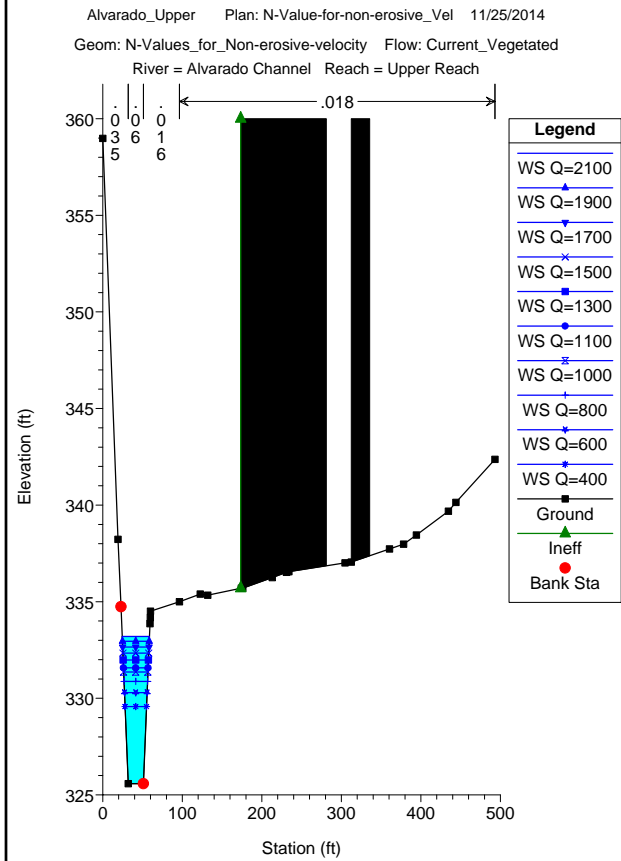
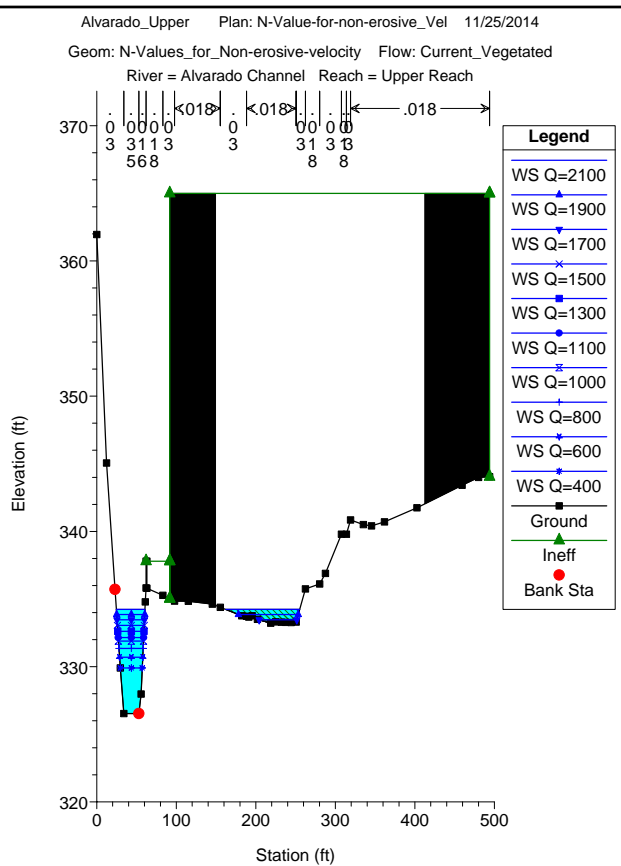
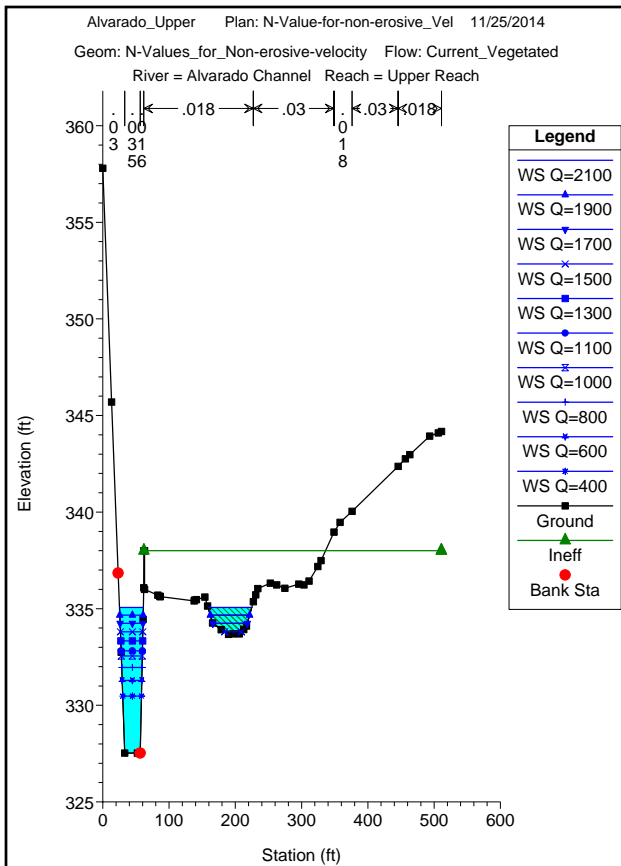
HEC-RAS Plan: N-Val-non-er-vel River: Alvarado Channel Reach: Upper Reach (Continued)

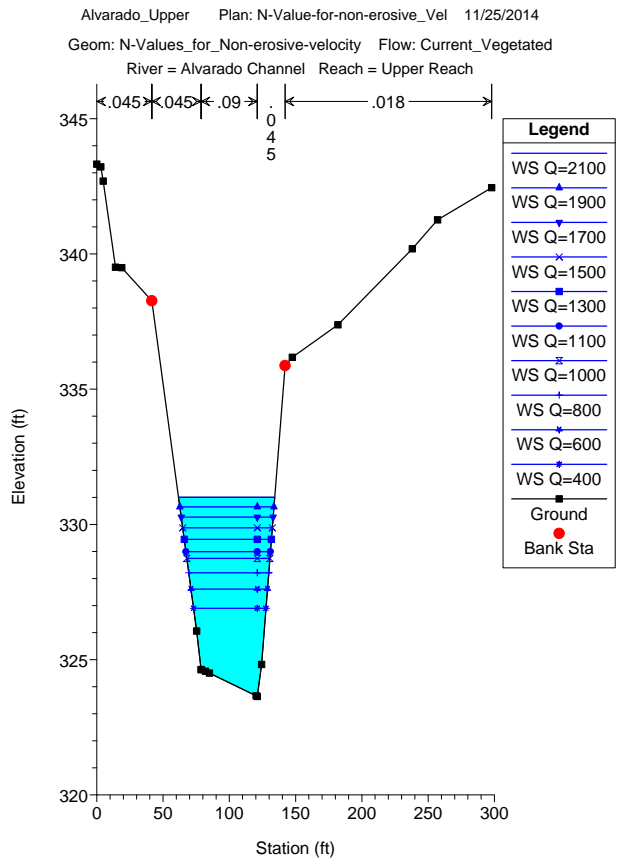
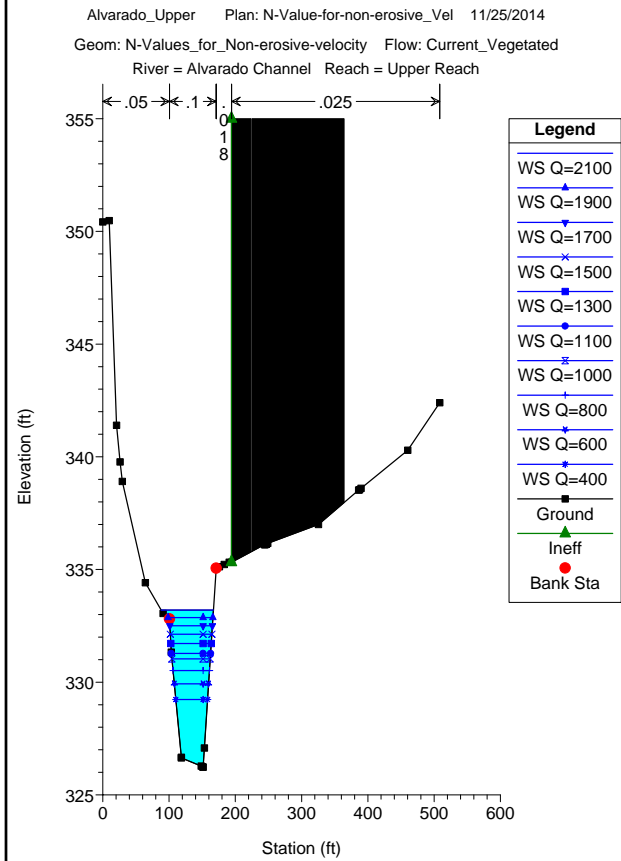
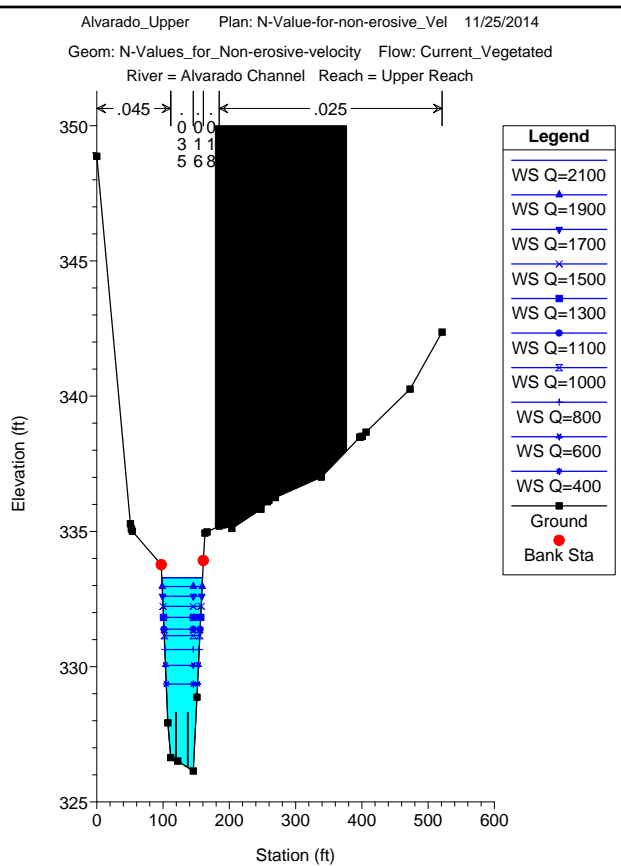
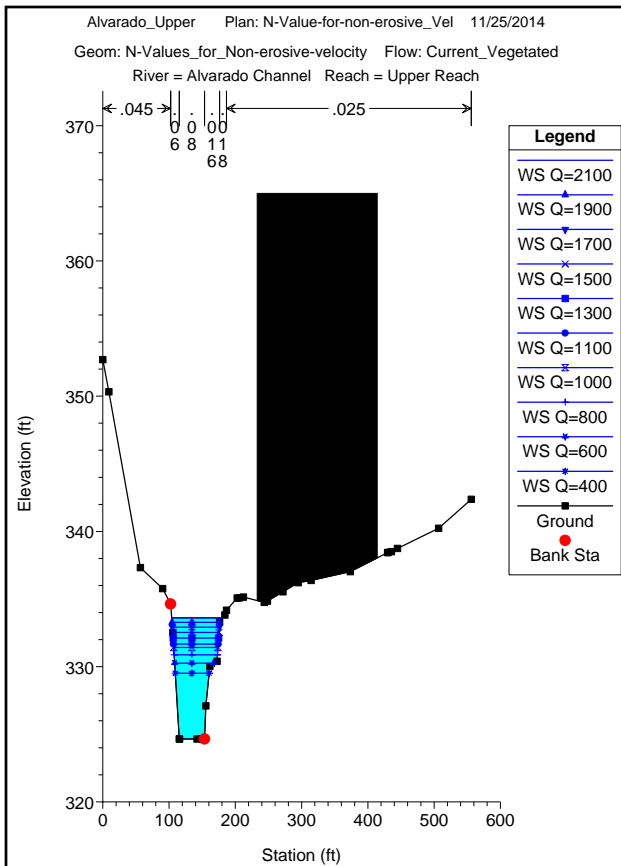
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	5-year	1700.00	315.77	322.19	320.02	322.66	0.006737	5.49	309.51	67.36	0.45
Upper Reach	1641.59	2-year	1000.00	315.77	320.47	318.97	320.86	0.008615	5.01	199.44	60.39	0.49
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000150	1.62	2099.81	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.38		329.84	0.003328	5.49	619.83	54.24	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.62		324.74	0.014053	8.50	352.75	41.09	0.51
Upper Reach	1489.686	10-year	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	5-year	1700.00	312.84	319.83		320.87	0.023326	8.18	207.89	35.44	0.59
Upper Reach	1489.686	2-year	1000.00	312.84	318.13		318.82	0.022657	6.67	149.93	32.91	0.55
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000244	2.09	1886.81	239.70	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.33		329.66	0.002303	4.62	735.81	67.27	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.06		324.03	0.012159	7.90	379.66	45.96	0.48
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.83	316.83	319.29	0.040765	9.71	175.04	33.83	0.75
Upper Reach	1439.048	2-year	1000.00	311.46	316.49	315.40	317.39	0.034984	7.63	131.15	31.78	0.66
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.37	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1523.00	116.97	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.25		323.42	0.001035	3.31	907.64	83.95	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.30	312.03	315.87	0.008812	6.03	348.24	56.68	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.24		313.46	0.035850	8.87	191.64	45.51	0.76
Upper Reach	1288.123	2-year	1000.00	306.79	310.83		311.73	0.040430	7.63	131.12	40.36	0.75
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4819.03	291.60	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2887.26	213.74	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.27	308.49	323.31	0.000215	1.57	1912.24	141.51	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.25	307.72	315.33	0.000976	2.27	923.84	106.89	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.52	307.34	309.85	0.011691	4.59	370.66	86.08	0.39
Upper Reach	1111.63	2-year	1000.00	303.43	308.76	306.54	308.93	0.007486	3.26	306.38	83.32	0.30
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.66	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4448.19	259.63	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.26		323.27	0.000051	0.96	3118.06	200.80	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.19		315.21	0.000185	1.28	1634.92	164.04	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.69		306.94	0.008851	4.02	422.61	115.83	0.37
Upper Reach	826.8154	2-year	1000.00	301.19	304.58		304.97	0.033393	5.00	199.98	95.04	0.61
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000009	0.65	5683.23	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000028	0.93	3690.39	227.79	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000059	1.14	2636.23	150.91	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.16		315.19	0.000147	1.38	1526.08	123.71	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	306.19		306.34	0.002081	3.05	557.70	89.59	0.22
Upper Reach	676.0353	2-year	1000.00	296.69	303.67		303.80	0.003061	2.87	348.47	76.25	0.24
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.42	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.69	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85

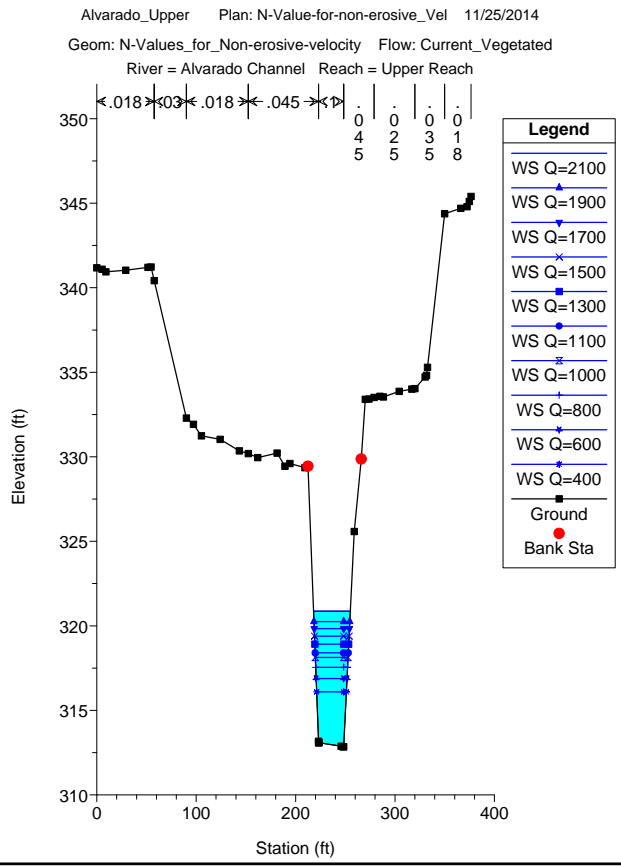
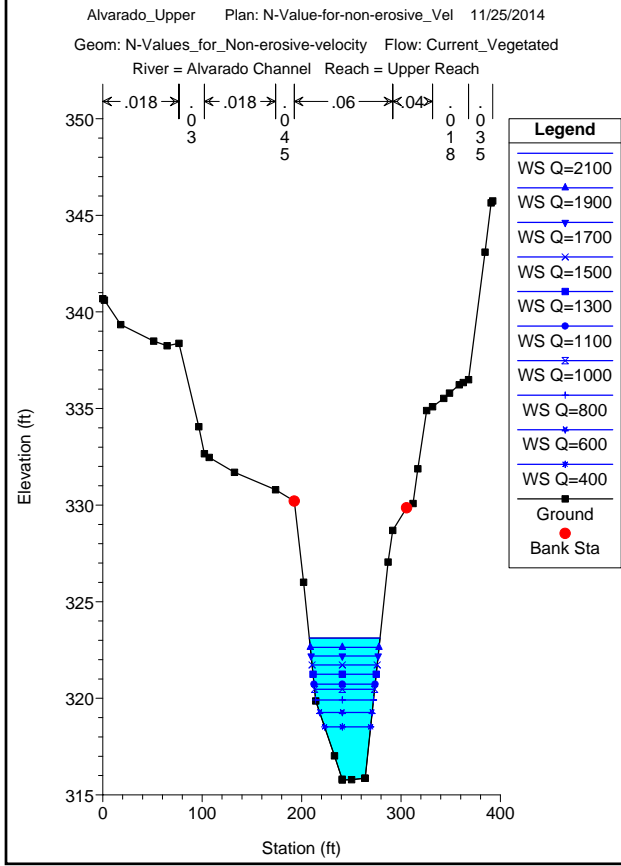
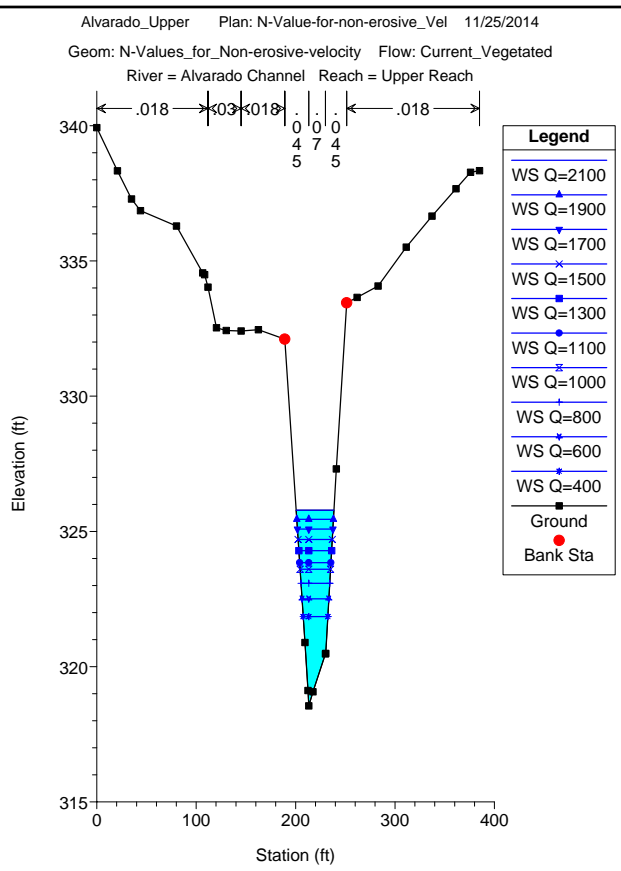
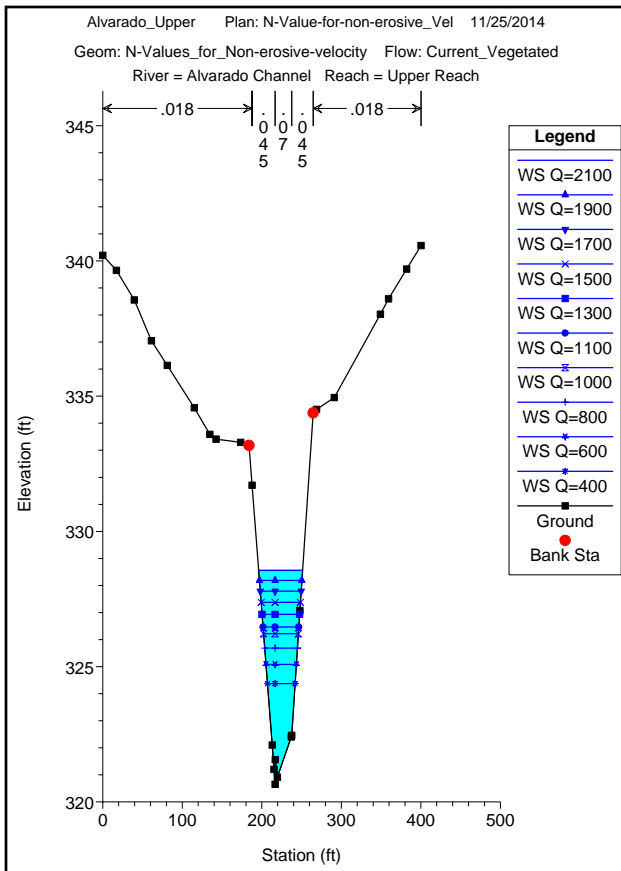


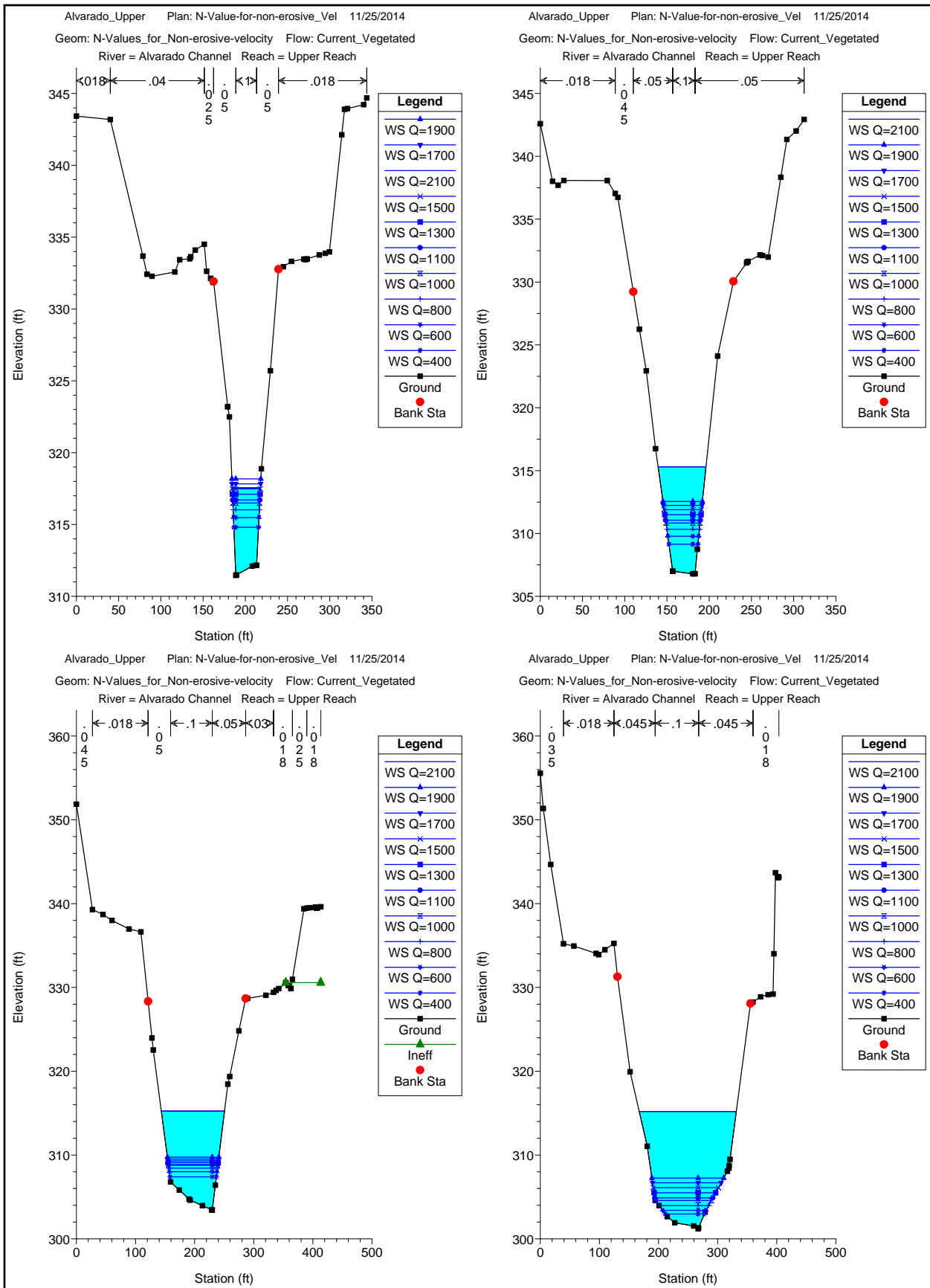






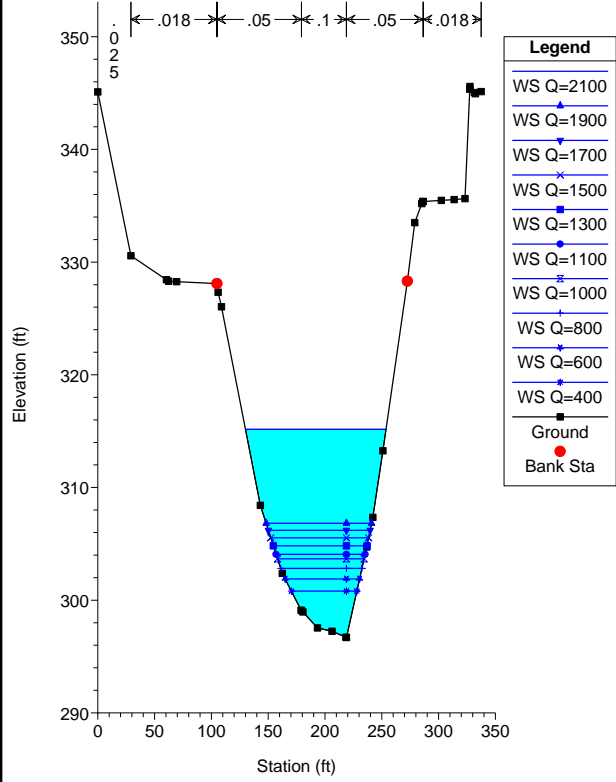






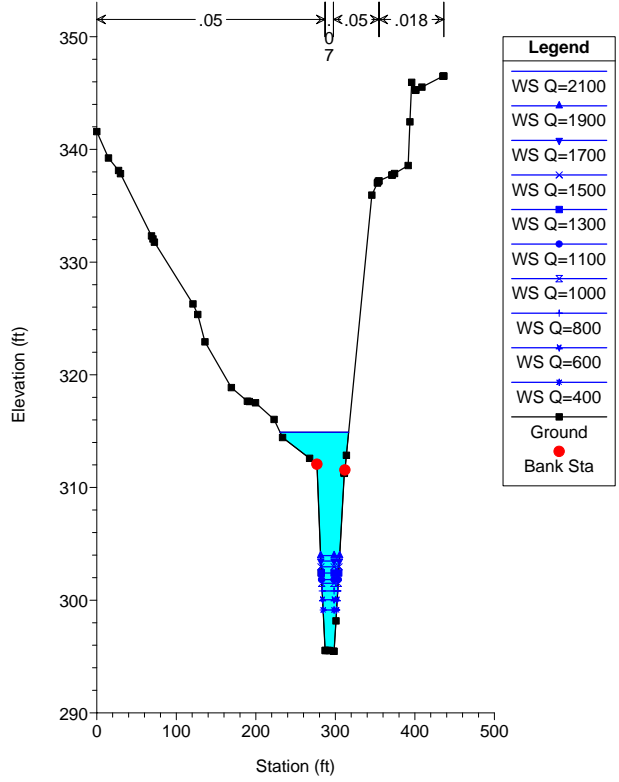
Alvarado_Upper Plan: N-Value-for-non-erosive_Vel 11/25/2014

Geom: N-Values_for_Non-erosive-velocity Flow: Current_Vegetated
River = Alvarado Channel Reach = Upper Reach



Alvarado_Upper Plan: N-Value-for-non-erosive_Vel 11/25/2014

Geom: N-Values_for_Non-erosive-velocity Flow: Current_Vegetated
River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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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
XXXXXX  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  X  XXXXXX  XXXX  X  X  X  X  XXXXX
  
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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 11/25/2014 1:31:02 PM

Project in English units

PLAN DATA

Plan Title: N-Value-for-non-erosive_Vel
 Plan File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p10

Geometry Title: N-Values_for_Non-erosive-velocity
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g10

Flow Title : Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Flow Data (cfs)

River	Reach	RS	100-year	50-year	35-year	10-year
Alvarado ChannelUpper	Reach	4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper	Reach	100-year	Critical	Known WS = 337
Alvarado ChannelUpper	Reach	50-year	Critical	Known WS = 329.4
Alvarado ChannelUpper	Reach	35-year	Critical	Known WS = 323.2
Alvarado ChannelUpper	Reach	10-year	Critical	Known WS = 314.9
Alvarado ChannelUpper	Reach	5-year	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: N-Values_for_Non-erosive-velocity
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g10

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99	79.65	352.77
92.38	352.108.38	352	108.38	340.4	117.38	340.4	117.38	340.4	117.38
118.08	351	118.08	340.4	126.68	340.4	126.68	351	127.38	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352	149.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19	297.78	353.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65	328.6	355.94
329.79	356.2	348.2	362.06	362.49	365.16				

Manning's n Values num= 3

Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.018	108.38	.016	136.38	.018			

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.38 136.38 56.75 57.06 57.78 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75
516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75
						738.21	350.75

745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	336.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1932.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63	63.35	353.68
83.88	352	99.88	352	99.88	339.3	108.88	339.3	108.88	351.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3	118.88	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352	284.1	352.54
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39	326.64	353.31
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22	369.63	361.24
388.16	365.26	393.87	365.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.88 127.88 35.29 35.3 35.1 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
292.86 388.16 352.97 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 67.09 370 170.25 263.29 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66
128.96	350.55	134.07	350.6	144	350.85	149.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39
192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.6 93.6 27.81 27.21 26.73 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
99.74 294.86 352.67 F
294.86 387.54 353.03 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 56.31 365 163.1 265.25 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.36	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
63.26 104.83 164.21 164.68 167.58 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
104.83 326.23 351 F
326.23 421.9 353.09 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 59.44 370 164.66 297.32 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	156.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
74.43 109.33 381.65 361.63 347.98 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
115.33 233.87 346.05 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 61.02 354 156.99 520.69 354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT

Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 365.86 16.26 353.45 32.29 341.36 38.14 336.95 41.63 333.87
42.22 333.86 57.33 333.57 57.59 333.56 64.94 340.73 66.19 341.59
69.85 341.68 70.47 343.4 75.47 343.3 96.47 344 104.47 344.1
104.47 350.25 113.47 350.25 113.47 350.76 478.56 350.76 478.56 347.5
762.56 351

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .03 32.29 .016 66.19 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
32.29 66.19 160.29 155.35 151.31 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
121.74 762 350.76 F

Blocked Obstructions num= 1
Sta L Sta R Elev
121.74 406.35 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT

Description:
Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 360.08 24.76 342.73 38.72 332.95 39.06 332.94 52 332.69
55.04 332.61 55.85 332.58 61.28 337.51 65.85 341.63 66 342
71.24 342.44 80.82 342.3 103.66 342.5 103.66 350.75 107 350.75
342.68 350.75

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 24.76 .016 38.72 .02 55.85 .016

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.76 71.24 156.2 157.14 158.25 .1 .3

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
106 129.29 365 129.29 271.93 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT

Description:
Station Elevation Data num= 25
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.57 21.79 345.71 29.74 340.6 36.61 336.19 41.1 331.7
43.59 331.7 43.71 331.62 56.66 331.09 60.41 330.93 60.88 330.91
71.14 340.13 71.45 340.42 79.54 342.57 80.33 342.77 81.75 342.81
118.62 343.84 192.97 343.58 209.41 343.65 277.88 343.1 295.07 343.01
300.31 343.06 368.05 343.52 394.52 343.56 434.26 343.52 442.68 343.45

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 29.74 .016 71.45 .02 209.41 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.74 71.45 183.48 182.29 181.14 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT

Description:
Station Elevation Data num= 40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.83 25.85 340.86 29.47 338.04 38.09 331.33 38.76 330.66
38.95 330.66 39.31 330.38 39.47 330.38 53.23 330.13 56.6 330.09
56.92 330.09 57.6 330.66 57.76 330.66 58.56 331.46 67.04 338.54
68.39 339.66 69.63 339.89 75.76 341.24 75.77 343.24 76.77 343.24
76.77 341.24 79.11 341.33 103.2 341.93 115.27 341.94 134.16 342.42
146.31 342.7 177.81 343.05 189.09 343.18 253.73 343.18 261.47 343.22
306.56 343.78 321.66 343.97 326.01 343.93 364.07 343.94 376.97 343.95
379.8 343.94 389.33 343.7 410.09 342.8 421.87 343.03 428.88 343.16

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .05 29.47 .016 75.76 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.47 67.04 188.22 188.31 208.19 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
75.77 428.88 343.24 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT

Description:
Station Elevation Data num= 30
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 349.55 15.53 339.93 19.43 337.64 28.72 332.19 31.32 329.59
38.33 329.59 45.6 329.33 51.53 329.09 52.41 329.06 59.04 334.91
62.21 337.64 62.22 339.64 63.22 339.64 63.22 337.64 95.9 337.03
96.15 337.01 96.9 337.04 137.52 339.32 162.33 338.17 178.31 338.08
189.7 338.27 200.4 338.42 220.32 338.78 246.45 339.28 298.6 340.95
310.42 341.33 347.72 342 358.94 342.14 362.36 342.19 368.47 342.31

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 31.32 .035 52.41 .016 62.21 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
19.43 52.41 213.1 211.63 234.86 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
63.22 68.42 339.64 F
68.42 368.47 345 F

Blocked Obstructions num= 1
Sta L Sta R Elev
68.42 145.82 350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT

Description:
Station Elevation Data num= 38
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 351.63 6.26 347.24 20.56 337.22 20.93 336.96 29.73 328.16
48.73 328.16 48.97 328.4 49.21 328.39 51.59 331.53 57.89 337.63
61.86 337.58 61.86 339.58 62.86 339.58 62.86 337.39 75.24 337.39
91.39 336.99 131.08 336.38 142.66 336.41 159.33 336.04 163.29 335.96
188.72 335.64 192.7 335.57 205 335.6 208.43 335.97 218.96 337.16
242.63 337.75 248.26 337.75 255.89 337.79 285.47 337.83 313.92 338.26
340.9 338.14 346.6 338.38 352.33 338.65 363.42 340.11 406.82 341.23
414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 6
Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 6.26 .016 20.56 .016 20.93 .016 29.73 .016 313.92 .016

0 .05 29.73 .035 48.73 .016 62.86 .018 218.96 .03
 242.63 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 20.56 48.73 146.85 145.44 131.99 .1 .3
 Ineffective Flow num= 3
 Sta L Sta R Elev Permanent
 57.89 62.86 337.63 F
 62.86 71.22 339.58 T
 71.22 441 355 F
 Blocked Obstructions num= 4
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 71.22 171.59 355 373.64 376.97 355 410.97 439.07 355
 232.63 342.17 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 40
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 356.18 21.74 337.2 30.35 329.68 31.17 329.1 31.35 329.09
 31.38 329.09 32.39 328.08 51.39 328.08 53.58 328.09 54.27 328.83
 62.04 337.14 62.1 339.14 63.1 339.14 63.1 337.14 67.96 336.95
 88.97 336.63 117.23 336.41 137.39 336.13 161.66 335.69 166.55 335.6
 183.27 335.55 191.42 335.3 198.28 335.05 202.99 335.06 210.13 334.92
 215.7 334.95 221.61 335.05 227.44 335.25 235.84 335.33 244.24 335.42
 264.47 335.71 299.23 337.95 328.34 337.67 346.84 337.59 351.58 338.13
 359.81 339.41 390.03 340.55 403.82 341.1 440.67 342.11 449.14 342.35

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 32.39 .035 53.58 .016 62.1 .018 137.39 .03
 183.27 .018 264.47 .03 346.84 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 21.74 53.58 48.12 46.59 34.68 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62.1 449.14 339.14 F
 Blocked Obstructions num= 1
 Sta L Sta R Elev
 232 449.14 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 48
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 357.8 13.19 345.7 23.23 336.84 27.87 332.74 33.08 327.53
 52.08 327.53 56.49 327.53 60.79 334.44 61.93 336.08 62 338
 63 338 63 336 83 335.7 86.08 335.64 86.44 335.63
 86.75 335.63 137.86 335.4 138.65 335.44 141.22 335.47 154.05 335.6
 158.2 335.14 165.58 334.26 178.77 333.91 189.74 333.67 196.35 333.7
 205.98 333.7 212.66 333.92 216.87 334.1 227.31 335.36 230.72 335.72
 233.9 336.04 252.75 336.32 262.38 336.23 274.67 336.06 295.69 336.27
 303.61 336.23 311.15 336.43 324.47 337.18 329.24 337.49 348.87 338.96
 358.14 339.47 376.13 340.04 445.64 342.37 456.48 342.76 463.45 342.97
 493.24 343.93 506.32 344.1 511.1 344.17

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 33.08 .035 56.49 .016 61.93 .018 227.31 .03
 348.87 .018 376.13 .03 445.64 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 23.23 56.49 179.7 177.4 154.96 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 62 511 338 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 41
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 361.95 12.31 345.06 22.84 335.71 29.49 329.9 34 326.53
 53 326.53 55.74 327.97 61.02 334.79 61.88 335.82 62 337.8
 63 337.8 63 335.8 83.16 335.28 97.88 334.85 115.03 334.84
 145.23 334.62 155.42 334.39 182.3 333.76 188.41 333.72 191.22 333.67
 195.43 333.76 202.05 333.5 218.7 333.21 224.74 333.31 232.14 333.29
 237.4 333.28 244.5 333.26 250.72 333.3 262.29 335.75 280.25 336.11
 287.55 336.9 307.71 339.79 313.94 339.8 319.15 340.85 335.15 340.5
 345.45 340.41 361.78 340.7 402.63 341.75 459.27 343.42 480.11 343.99
 493.96 344.04

Manning's n Values num= 14
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .03 34 .035 53 .016 62 .018 83.16 .03
 97.88 .018 155.42 .03 188.41 .018 250.72 .03 262.29 .018
 280.25 .03 307.71 .018 313.94 .03 319.15 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.84 53 161.84 166.46 226.33 .1 .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 62 91.85 337.8 F
 91.85 493.96 365 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 91.85 149.36 365 412.55 493.45 365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 25
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 358.98 19.08 338.23 22.86 334.74 32.02 325.58 51.02 325.58
 59.3 333.86 59.67 334.18 60.05 334.51 96.28 335 122.48 335.39
 131.97 335.34 174.16 335.7 176.05 335.7 213.04 336.25 231.04 336.52
 231.23 336.53 234.1 336.55 304.7 337.01 312.5 337.05 360.6 337.73
 378.26 337.98 394.39 338.45 434.7 339.68 444.02 340.14 493.08 342.37

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .035 32.02 .06 51.02 .016 96.28 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 22.86 51.02 109.52 94.32 36.08 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 173.53 493.08 360 F
 Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 173.53 281.08 360 312.57 335.65 360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT
 Description:
 Station Elevation Data num= 39
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 360.81 21.23 353.16 42.85 343 47.85 340.43 55.92 339.16
 63.64 338.03 69.33 338.27 75.76 338.66 86.2 338.15 87.49 338.08
 105.77 338.63 106.06 338.53 118.18 333.89 129.64 329.83 143.51 325.02

162.51	325.02	162.8	326.79	169.52	334.5	169.71	334.71	172.01	334.74
176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08	248.23	335.12
250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63	351.83	336.34
396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39	493.94	338.45
511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	143.51	.06	162.51	.016	169.71	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
118.18 162.51 112 100 22 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
0 75.76 338.66 F
75.76 105.77 338.63 F

Blocked Obstructions num= 1
Sta L Sta R Elev
340.09 471.21 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT Description:

Station	Elevation	Data	num=	32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64
105.72	332.51	115.37	324.65	115.96	324.65	142.3	324.65	150.28	324.65
153.68	324.65	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74
506.87	340.23	555.95	342.37						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	102.47	.06	115.37	.08	153.68	.016	176.37	.018
186.57	.025								

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
102.47 153.68 28.83 29 6.18 .1 .3

Blocked Obstructions num= 1
Sta L Sta R Elev
233 414 365

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

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 = 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11		

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT Description:

Station	Elevation	Data	num=	28					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77
107.31	327.92	111.54	326.64	122.23	326.51	145.7	326.14	151.2	328.87
160.87	333.92	163.21	334.94	166.35	334.98	184.8	335.2	190.27	335.24
193.34	335.27	203.7	335.11	247.82	335.82	257.56	336.1	259.76	336.16
269.28	336.25	338.64	337.01	397.05	338.48	397.76	338.49	400.6	338.52
406.38	338.67	472.69	340.26	520.97	342.37				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	111.54	.035	145.7	.016	160.87	.018	184.8	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
97.37 160.87 25.93 20.79 5.61 .1 .3

Blocked Obstructions num= 3
Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
179 377 350 118.73 119.98 328.3 136.73 137.98 328.3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT Description:

Station	Elevation	Data	num=	32					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6
460.26	340.29	508.6	342.4						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
100.71 171.09 192.47 203.49 166.15 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
194.19 508.6 355 F

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
224.96 364.18 355 194.19 223.55 355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT Description:

Station	Elevation	Data	num=	20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57
84.94	324.5	120.3	323.66	121.04	323.64	124.31	324.82	142.05	335.87
147.5	336.18	181.97	337.38	238.05	340.19	257.12	341.26	297.91	342.45

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	41.5	.045	78.71	.09	121.04	.045	142.05	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1873.917

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.21	17.09	339.65	39.55	338.56	61.14	337.05	81.03	336.14
115.12	334.57	134.63	333.59	142.49	333.41	173.44	333.29	183.84	333.18
187.67	331.71	213.06	322.1	215.35	321.2	216.73	320.65	216.93	321.56
219.6	320.91	236.95	322.4	237.63	322.46	247.85	327.08	264.56	334.38
268.74	334.51	291.21	334.95	349.13	338.03	359.34	338.6	382.09	339.7
400.21	340.57								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	187.67	.045	216.73	.07	237.63	.045
264.56	.018						

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

183.84	264.56	71.62	75.54	93.1		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1798.381

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	339.93	20.76	338.33	34.9	337.29	43.91	336.86	80.21	336.29
106.62	334.56	108.42	334.49	111.81	334.03	120.4	332.53	130.3	332.43
145.23	332.41	162.57	332.46	189.06	332.11	209.47	320.89	212.4	319.12
213.36	318.55	217.53	319.07	230.09	320.47	230.3	320.49	241.01	327.31
251.36	333.45	261.86	333.65	282.99	334.07	311.3	335.51	337.2	336.66
361.35	337.67	376.05	338.28	385	338.34				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	111.81	.03	145.23	.018	189.06	.045
213.36	.045	251.36	.018				

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

189.06	251.36	119.25	156.79	237.15		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1641.59

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	340.68	1.61	340.61	18.07	339.34	51.19	338.49	64.73	338.25
76.62	338.37	96.55	334.06	102.18	332.66	107	332.47	132.46	331.7
173.79	330.79	192.62	330.21	201.99	326.01	214.26	319.86	233.15	317.02
240.74	315.81	240.97	315.77	250.34	315.79	263.52	315.86	263.99	315.86
286.95	327.05	291.75	328.69	305.69	329.86	312.05	330.08	316.94	331.88
325.73	334.89	331.83	335.09	343.08	335.52	348.82	335.8	358.59	336.23
362.71	336.34	367.96	336.49	384.52	343.09	390.68	345.64	392.33	345.74

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	76.62	.03	102.18	.018	173.79	.045
192.62	.04	331.83	.018	367.96	.035		

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

192.62	305.69	133.84	151.9	183		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1489.686

INPUT
Description: U/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.18	5.24	341.09	9.17	340.94	29.19	341.04	51.52	341.21
54.59	341.23	57.81	340.42	90.09	332.99	97.19	331.92	105.34	331.24
124.03	331.03	143.5	330.35	152.39	330.19	161.87	329.95	181.33	330.22
189.35	329.44	194.28	329.6	209.49	329.36	212.54	329.44	223.08	313.17
223.09	313.09	223.19	313.09	223.63	313.09	245.83	312.88	247.67	312.85
248.3	312.84	259.06	325.58	266.06	329.87	270.18	333.4	273.74	333.42
279.01	333.51	284.93	333.58	288.34	333.54	304.18	333.87	316.96	334
320.02	334.03	330.36	334.72	331.8	334.82	332.71	335.29	349.96	344.38
366.14	344.7	372.42	344.79	374.69	345.11	376.49	345.4		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045
248.3	.045	279.01	.025	320.02	.035	349.96	.018

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

212.54	266.06	50.44	50.64	51.04		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1439.048

INPUT
Description: D/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22
343.78	344.69								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05
213.36	.05	239.35	.018				

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

162.38	239.35	146.36	150.92	160.49		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1288.123

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	88.69	.045	110.15	.05	156.79	.1
183.29	.045						

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

110.15	228.7	168.1	176.49	194.32		.1	.3
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CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1111.63

INPUT
 Description:
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.86	27.2	339.28	44.8	338.7	60.26	338	88.84	336.97
109.09	336.63	121.36	328.337	127.82	323.97	130.06	322.53	159.44	306.78
174.11	305.82	190.49	304.74	192.3	304.62	213	303.96	228.71	303.46
229.22	303.44	229.84	303.43	234.91	306.4	256.18	318.46	259.39	319.37
274.82	324.82	286.38	328.68	289.62	328.69	320.59	329.07	333.47	329.42
337.85	329.64	342.23	329.86	354.08	330.57	354.39	330.55	358.31	330.23
362.71	329.87	362.89	329.86	365.46	330.96	384.93	339.39	389.83	339.47
395.28	339.51	404.27	339.58	405.55	339.49	405.96	339.45	408.14	339.49
413.47	339.62								

 Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	27.2	.018	121.36	.05	159.44	.1	229.84	.05
286.38	.03	333.47	.018	365.46	.025	389.83	.018		

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 121.36 286.38 256.29 284.82 327.16 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 826.8154

INPUT
 Description:
 Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.56	4.94	351.36	17.74	344.66	39.17	335.21	56.65	334.94
94.27	334.06	98.75	333.91	109.22	334.5	124.61	335.26	130.67	331.28
151.97	319.94	180.98	311.04	194.35	304.59	200.85	303.97	214.63	302.65
227.33	301.92	259.57	301.53	267	301.19	267.72	301.31	278.8	303.19
316.51	308.07	319.03	308.44	319.58	308.75	320.87	309.48	355.52	328.08
359.81	328.25	372.61	328.88	385.26	329.13	393.73	329.21	395.14	334.02
397.85	343.69	401.51	343.22	402.37	343.08	403.61	343.18		

 Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.17	.018	124.61	.045	194.35	.1	267.72	.045
359.81	.018								

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 130.67 355.52 157.21 150.78 167.76 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 676.0353

INPUT
 Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	345.1	29.14	330.56	60.41	328.44	62.38	328.3	69.47	328.27
104.89	328.09	105.89	327.33	108.93	326.04	143.06	308.42	162.36	302.38
179	299.1	179.23	299.08	180.51	298.96	193.33	297.54	206.23	297.24
218.47	296.71	218.93	296.69	236.81	304.72	242.08	307.35	250.99	313.25
272.48	328.3	279.05	333.5	285.26	335.19	285.9	335.38	286.53	335.38
302.36	335.48	313.71	335.54	323.25	335.63	327.45	345.35	327.55	345.59
331.52	345.04	332.41	344.95	337.43	345.13				

 Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	29.14	.018	104.89	.05	179.23	.1	218.93	.05
286.53	.018								

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

104.89 272.48 122.82 64.52 43.7 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 611.5112

INPUT
 Description: U/S face of Alvarado Road and College Avenue Crossing
 Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.58	14.76	339.24	27.46	338.13	29.82	337.84	68.72	332.32
70.64	332.05	72.38	331.77	120.87	326.29	127.06	325.35	136.03	322.92
169.31	318.86	189.35	317.66	191.73	317.63	199.52	317.51	223.02	316.04
233.55	314.43	267.61	312.59	276.82	312.06	282.28	302.42	287.17	295.54
287.56	295.54	290.32	295.54	292.26	295.54	297.64	295.47	298.38	295.46
300.9	298.16	311.19	311.26	311.2	311.29	311.21	311.29	311.21	311.3
311.23	311.3	312.01	311.55	313.81	312.86	345.92	335.95	352.92	337.02
353.12	337.05	353.87	337.18	354.92	337.21	370.99	337.72	371.68	337.74
374.54	337.86	391.45	338.57	393.86	342.44	396.02	345.96	400.81	345.28
400.91	345.26	400.98	345.25	408.76	345.53	435.17	346.49	435.96	346.51
436.48	346.51								

 Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	287.17	.07	297.64	.05	354.92	.018

 Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 276.82 312.01 0 0 .3 .5

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
n9	n10	n11	n12	n13	n14				
Upper Reach	4559.274	.018	.016	.018					
Upper Reach	4543.777	Lat Struct							
Upper Reach	4502.213	.018	.016	.018					
Upper Reach	4466.915	.018	.016	.018					
Upper Reach	4439.706	.018	.016	.018					
Upper Reach	4275.023	.018	.03	.016	.018				
Upper Reach	3913.392	.03	.016	.018					
Upper Reach	3758.046	.05	.016	.02	.016				
Upper Reach	3600.906	.03	.016	.02	.018				
Upper Reach	3418.613	.05	.016	.018					
Upper Reach	3230.305	.05	.035	.016	.018				
Upper Reach	3018.677	.05	.035	.016	.018	.03	.018		
Upper Reach	2969.225	.05	.035	.016	.018	.03	.018	.03	
Upper Reach	2873.24	.03	.035	.016	.018	.03	.018	.03	
Upper Reach	2695.84	.03	.035	.016	.018	.03	.018	.03	
Upper Reach	2529.382	.035	.06	.016	.018	.03	.018	.03	
Upper Reach	2435.063	.045	.06	.016	.025				
Upper Reach	2335.331	.045	.06	.08	.016	.018	.025		
Upper Reach	2317.214	Lat Struct							
Upper Reach	2308.404	.045	.035	.016	.018	.025			
Upper Reach	2287.614	.05	.018	.018	.025				
Upper Reach	2084.121	.045	.045	.09	.045	.018			
Upper Reach	1873.917	.018	.045	.07	.045	.018			
Upper Reach	1798.381	.018	.03	.018	.045	.07	.045	.018	
Upper Reach	1641.59	.018	.03	.018	.045	.06	.04	.018	
Upper Reach	1489.686	.018	.03	.018	.045	.1	.045	.025	
Upper Reach	1439.048	.018	.04	.025	.05	.1	.05	.018	
Upper Reach	1288.123	.018	.045	.05	.1	.05			
Upper Reach	1111.63	.045	.018	.05	.1	.05	.03	.018	
Upper Reach	826.8154	.035	.018	.045	.1	.045	.018		
Upper Reach	676.0353	.025	.018	.05	.1	.05	.018		
Upper Reach	611.5112	.05	.07	.05	.018				

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.224	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1286.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

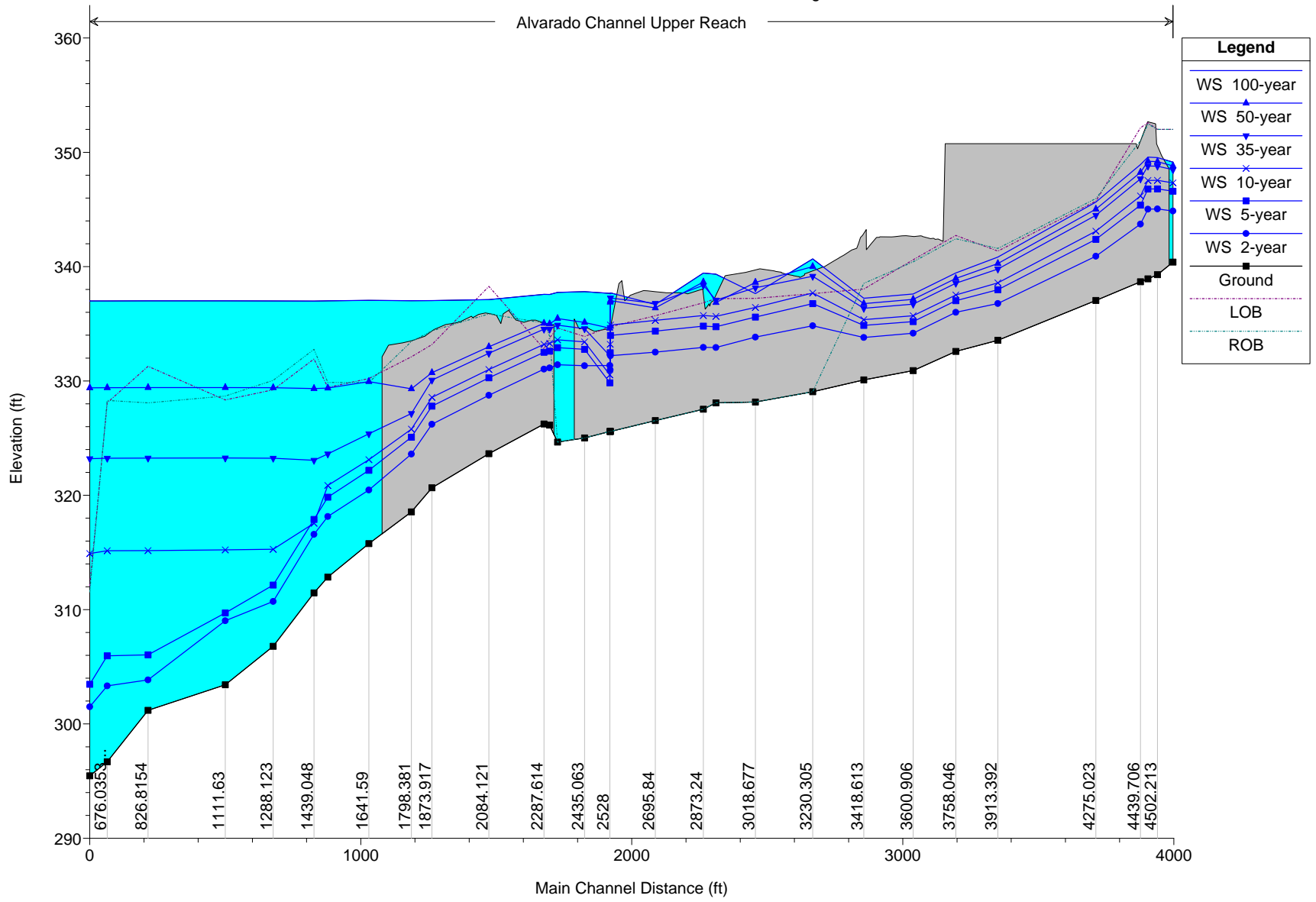
River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.224	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1286.123	.1	.3

Alvarado_Upper Plan: Maintained_Silt-Fence 11/25/2014

Geom: Maintained_Silt-Fence Flow: Current_Vegetated

Alvarado Channel Upper Reach



HEC-RAS Plan: Main_Silt-fence River: Alvarado Channel Reach: Upper Reach

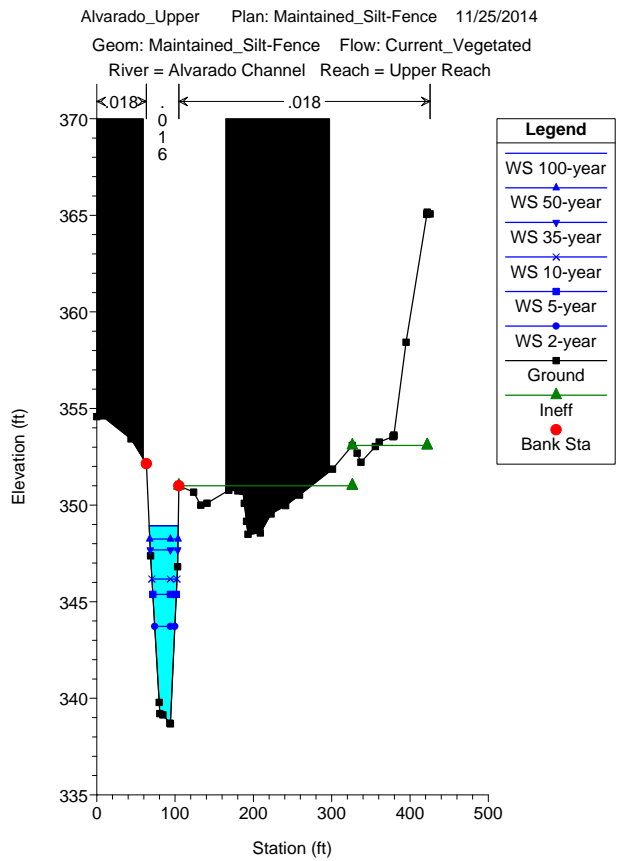
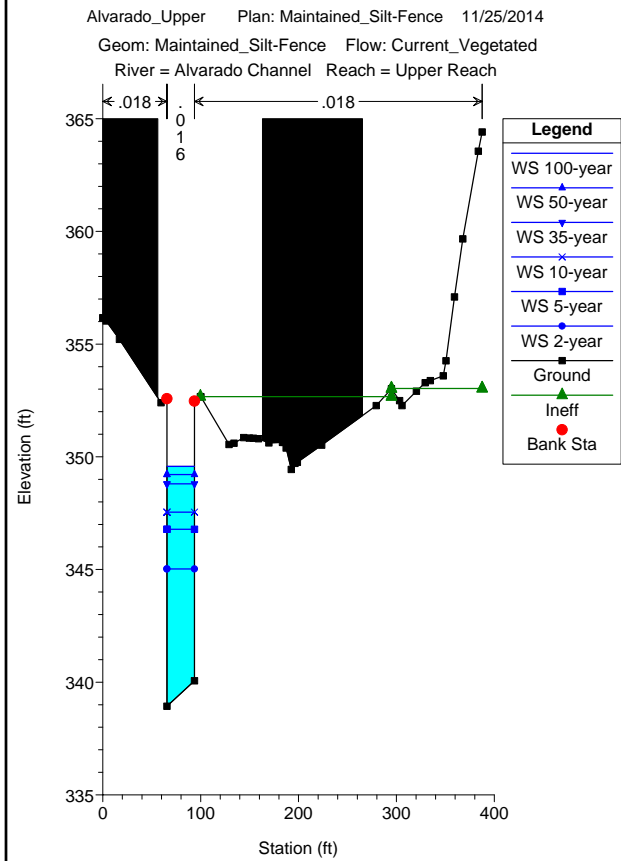
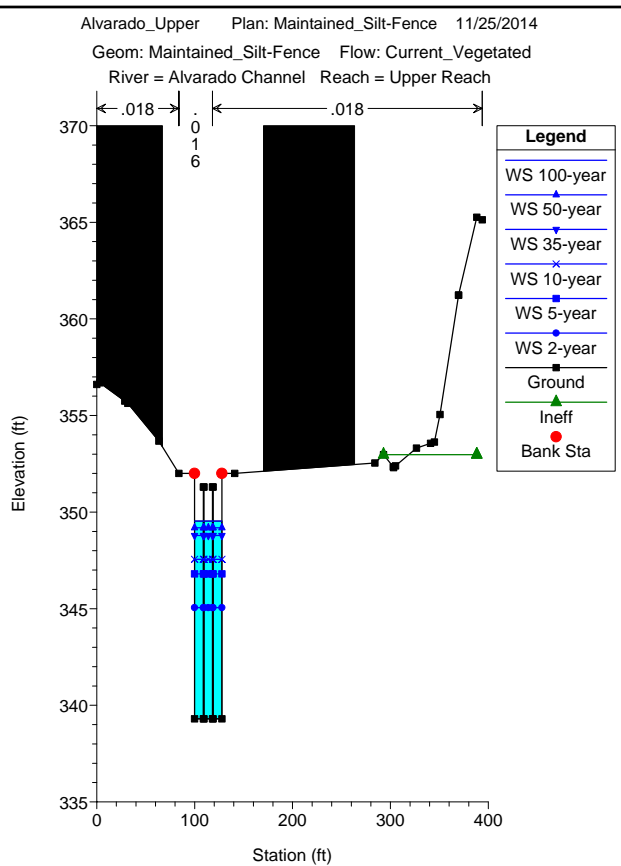
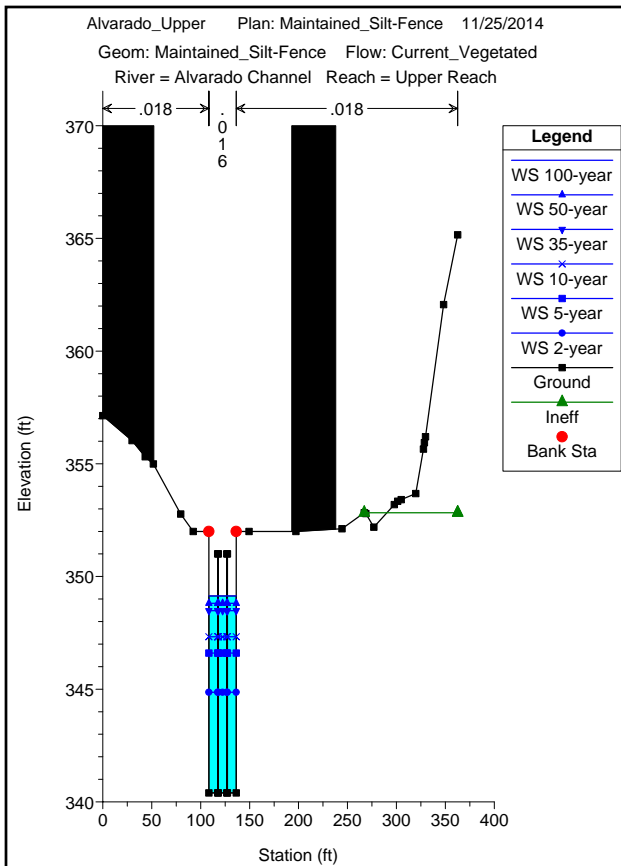
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Upper Reach	4559.274	100-year	3900.00	340.40	349.14	349.14	353.51	0.007750	16.78	232.39	26.60	1.00	
Upper Reach	4559.274	50-year	3400.00	340.40	348.81	348.81	352.40	0.006463	15.19	223.77	26.60	0.92	
Upper Reach	4559.274	35-year	3000.00	340.40	348.48	347.74	351.51	0.005555	13.96	214.97	26.60	0.87	
Upper Reach	4559.274	10-year	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76	
Upper Reach	4559.274	5-year	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73	
Upper Reach	4559.274	2-year	1000.00	340.40	344.86	343.92	345.97	0.002832	8.42	118.75	26.60	0.70	
Upper Reach	4543.777		Lat Struct										
Upper Reach	4502.213	100-year	3900.00	339.30	349.53	348.04	352.72	0.005744	14.33	272.14	26.60	0.79	
Upper Reach	4502.213	50-year	3400.00	339.30	349.18	347.27	351.78	0.004743	12.93	262.94	26.60	0.72	
Upper Reach	4502.213	35-year	3000.00	339.30	348.79	346.64	350.98	0.004075	11.88	252.45	26.60	0.68	
Upper Reach	4502.213	10-year	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59	
Upper Reach	4502.213	5-year	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55	
Upper Reach	4502.213	2-year	1000.00	339.30	345.05	342.83	345.71	0.001585	6.54	152.99	26.60	0.48	
Upper Reach	4466.915	100-year	3900.00	338.93	349.58	347.95	352.54	0.002096	13.82	282.25	28.00	0.77	
Upper Reach	4466.915	50-year	3400.00	338.93	349.21	347.20	351.64	0.001765	12.50	272.07	28.00	0.71	
Upper Reach	4466.915	35-year	3000.00	338.93	348.80	346.57	350.86	0.001550	11.51	260.57	28.00	0.67	
Upper Reach	4466.915	10-year	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58	
Upper Reach	4466.915	5-year	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54	
Upper Reach	4466.915	2-year	1000.00	338.93	345.03	342.90	345.67	0.000771	6.46	154.85	28.00	0.48	
Upper Reach	4439.706	100-year	3900.00	338.68	348.93	348.93	352.43	0.002502	15.00	259.93	37.15	1.00	
Upper Reach	4439.706	50-year	3400.00	338.68	348.24	348.24	351.50	0.002530	14.48	234.79	36.10	1.00	
Upper Reach	4439.706	35-year	3000.00	338.68	347.68	347.68	350.71	0.002540	13.98	214.55	35.23	1.00	
Upper Reach	4439.706	10-year	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00	
Upper Reach	4439.706	5-year	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00	
Upper Reach	4439.706	2-year	1000.00	338.68	343.72	343.72	345.52	0.002855	10.77	92.85	25.72	1.00	
Upper Reach	4275.023	100-year	3900.00	337.04	345.65	347.91	351.60	0.005268	19.57	199.26	34.44	1.43	
Upper Reach	4275.023	50-year	3400.00	337.04	345.03	347.39	350.67	0.005411	19.07	178.31	32.84	1.44	
Upper Reach	4275.023	35-year	3000.00	337.04	344.49	346.85	349.88	0.005546	18.61	161.17	31.47	1.45	
Upper Reach	4275.023	10-year	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49	
Upper Reach	4275.023	5-year	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52	
Upper Reach	4275.023	2-year	1000.00	337.04	340.91	342.06	344.60	0.007668	15.43	64.80	22.24	1.59	
Upper Reach	3913.392	100-year	3900.00	333.56	340.84	343.50	349.03	0.008182	22.97	169.76	32.11	1.76	
Upper Reach	3913.392	50-year	3400.00	333.56	340.27	342.74	348.05	0.008431	22.38	151.94	30.73	1.77	
Upper Reach	3913.392	35-year	3000.00	333.56	339.79	342.18	347.19	0.008680	21.84	137.36	29.60	1.79	
Upper Reach	3913.392	10-year	2100.00	333.56	338.58	340.62	344.99	0.009416	20.32	103.34	26.76	1.82	
Upper Reach	3913.392	5-year	1700.00	333.56	337.98	339.84	343.82	0.009822	19.40	87.65	25.34	1.84	
Upper Reach	3913.392	2-year	1000.00	333.56	336.77	338.18	341.27	0.010722	17.02	58.74	22.54	1.86	
Upper Reach	3758.046	100-year	3900.00	332.58	339.44	342.87	347.59	0.010472	22.91	170.24	33.97	1.80	
Upper Reach	3758.046	50-year	3400.00	332.58	338.96	341.36	346.52	0.010586	22.06	154.10	32.75	1.79	
Upper Reach	3758.046	35-year	3000.00	332.58	338.55	340.79	345.59	0.010675	21.30	140.85	31.70	1.78	
Upper Reach	3758.046	10-year	2100.00	332.58	337.53	339.33	343.21	0.010780	19.13	109.77	29.11	1.74	
Upper Reach	3758.046	5-year	1700.00	332.58	337.02	338.57	341.96	0.010687	17.84	95.31	27.83	1.70	
Upper Reach	3758.046	2-year	1000.00	332.58	336.01	337.00	339.32	0.009865	14.60	68.48	25.27	1.56	
Upper Reach	3600.906	100-year	3900.00	330.91	337.61	340.32	346.04	0.008972	23.30	167.37	33.94	1.85	
Upper Reach	3600.906	50-year	3400.00	330.91	337.13	339.63	344.96	0.008998	22.45	151.44	32.66	1.84	
Upper Reach	3600.906	35-year	3000.00	330.91	336.72	339.06	344.03	0.009013	21.69	138.33	31.57	1.83	
Upper Reach	3600.906	10-year	2100.00	330.91	335.70	337.60	341.64	0.009048	19.54	107.45	29.12	1.79	
Upper Reach	3600.906	5-year	1700.00	330.91	335.19	336.85	340.40	0.009064	18.31	92.86	28.04	1.77	
Upper Reach	3600.906	2-year	1000.00	330.91	334.17	335.30	337.82	0.008883	15.32	65.28	25.88	1.70	
Upper Reach	3418.613	100-year	3900.00	330.09	337.24	339.33	344.18	0.006767	21.15	184.36	34.98	1.62	
Upper Reach	3418.613	50-year	3400.00	330.09	336.76	338.70	343.12	0.006650	20.23	168.08	33.80	1.60	
Upper Reach	3418.613	35-year	3000.00	330.09	336.36	338.18	342.20	0.006527	19.39	154.68	32.80	1.57	
Upper Reach	3418.613	10-year	2100.00	330.09	335.36	336.71	339.88	0.006066	17.05	123.18	30.32	1.49	
Upper Reach	3418.613	5-year	1700.00	330.09	334.86	335.97	338.69	0.005746	15.72	108.17	29.07	1.44	
Upper Reach	3418.613	2-year	1000.00	330.09	333.80	334.41	336.30	0.004911	12.67	78.94	26.46	1.29	
Upper Reach	3230.305	100-year	3900.00	329.06	340.67	338.08	342.35	0.002991	8.42	412.62	198.14	0.48	
Upper Reach	3230.305	50-year	3400.00	329.06	340.00	337.58	341.51	0.003005	8.05	376.85	176.20	0.47	
Upper Reach	3230.305	35-year	3000.00	329.06	339.16	337.01	340.82	0.003506	8.13	325.01	144.82	0.50	
Upper Reach	3230.305	10-year	2100.00	329.06	337.69	335.54	338.88	0.003644	7.25	260.16	48.06	0.50	
Upper Reach	3230.305	5-year	1700.00	329.06	336.76	334.79	337.81	0.003765	6.98	221.49	40.25	0.50	
Upper Reach	3230.305	2-year	1000.00	329.06	334.83	333.29	335.60	0.003963	6.27	149.04	34.72	0.51	
Upper Reach	3018.677	100-year	3900.00	328.16	337.64	337.64	341.04	0.011212	13.99	267.45	111.30	0.87	
Upper Reach	3018.677	50-year	3400.00	328.16	336.62	336.81	340.61	0.005299	10.38	309.04	122.21	0.61	
Upper Reach	3018.677	35-year	3000.00	328.16	336.15	336.19	339.90	0.005144	9.87	288.83	112.03	0.60	
Upper Reach	3018.677	10-year	2100.00	328.16	335.43	334.64	337.92	0.005168	8.82	222.94	76.08	0.59	
Upper Reach	3018.677	5-year	1700.00	328.16	335.59	333.86	336.86	0.005014	8.28	194.12	42.21	0.58	
Upper Reach	3018.677	2-year	1000.00	328.16	333.84	332.28	334.68	0.004527	6.95	138.66	29.92	0.55	
Upper Reach	2969.225	100-year	3900.00	328.08	339.34	336.88	339.61	0.006637	3.87	945.56	212.71	0.22	
Upper Reach	2969.225	50-year	3400.00	328.08	336.86	336.19	339.59	0.008666	11.90	267.48	197.56	0.77	

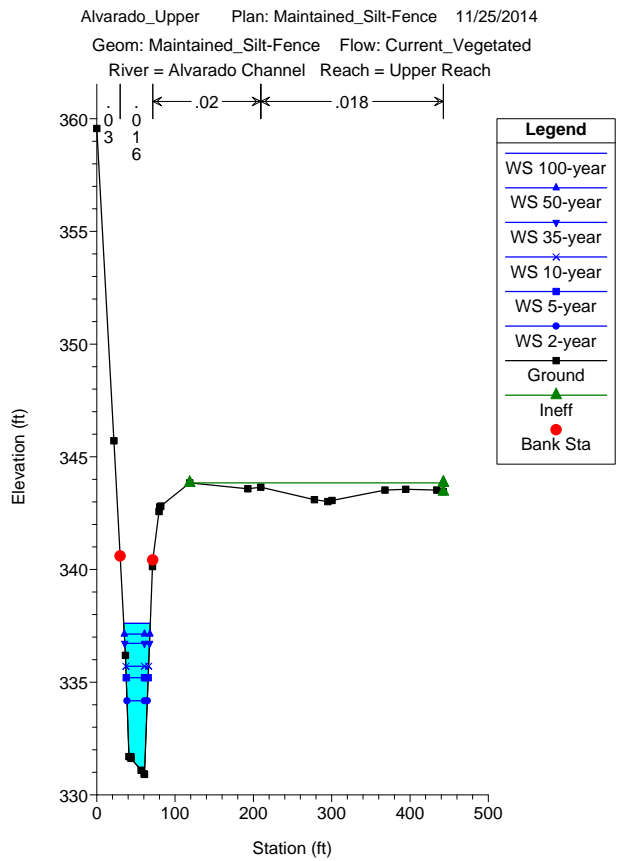
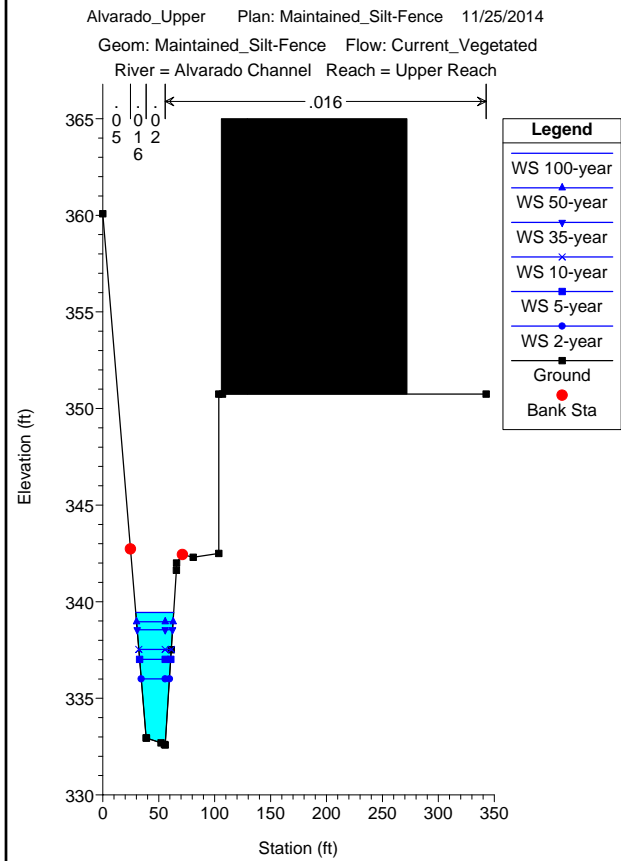
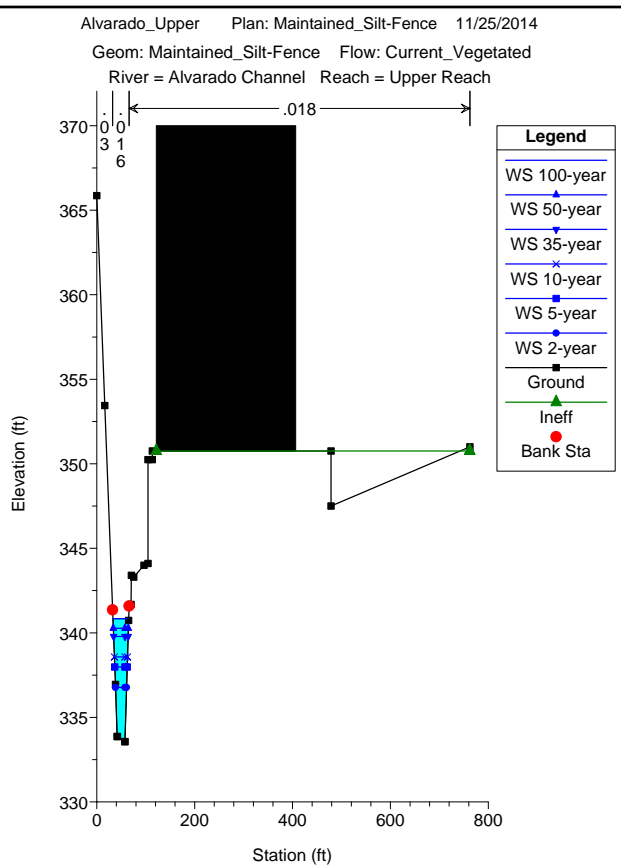
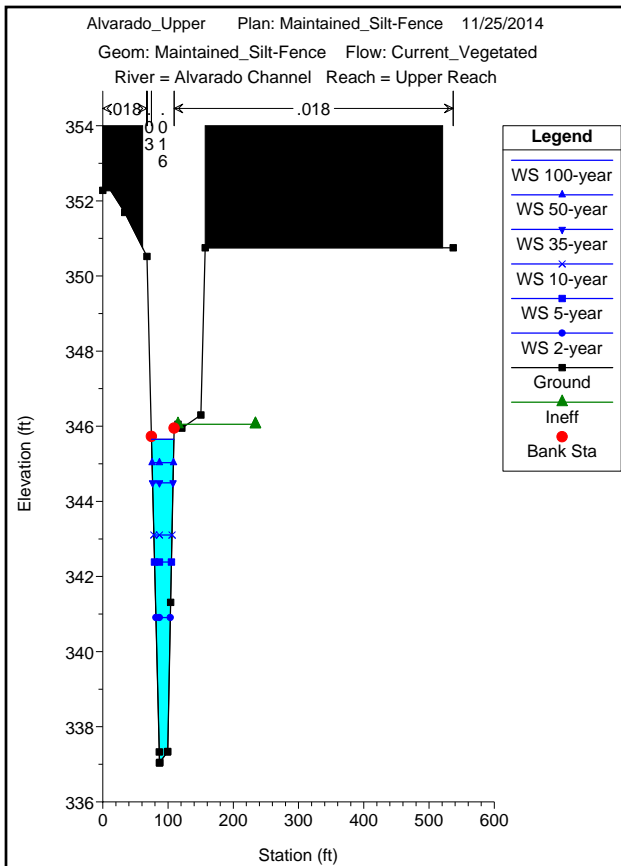
HEC-RAS Plan: Main_Silt-fence River: Alvarado Channel Reach: Upper Reach (Continued)

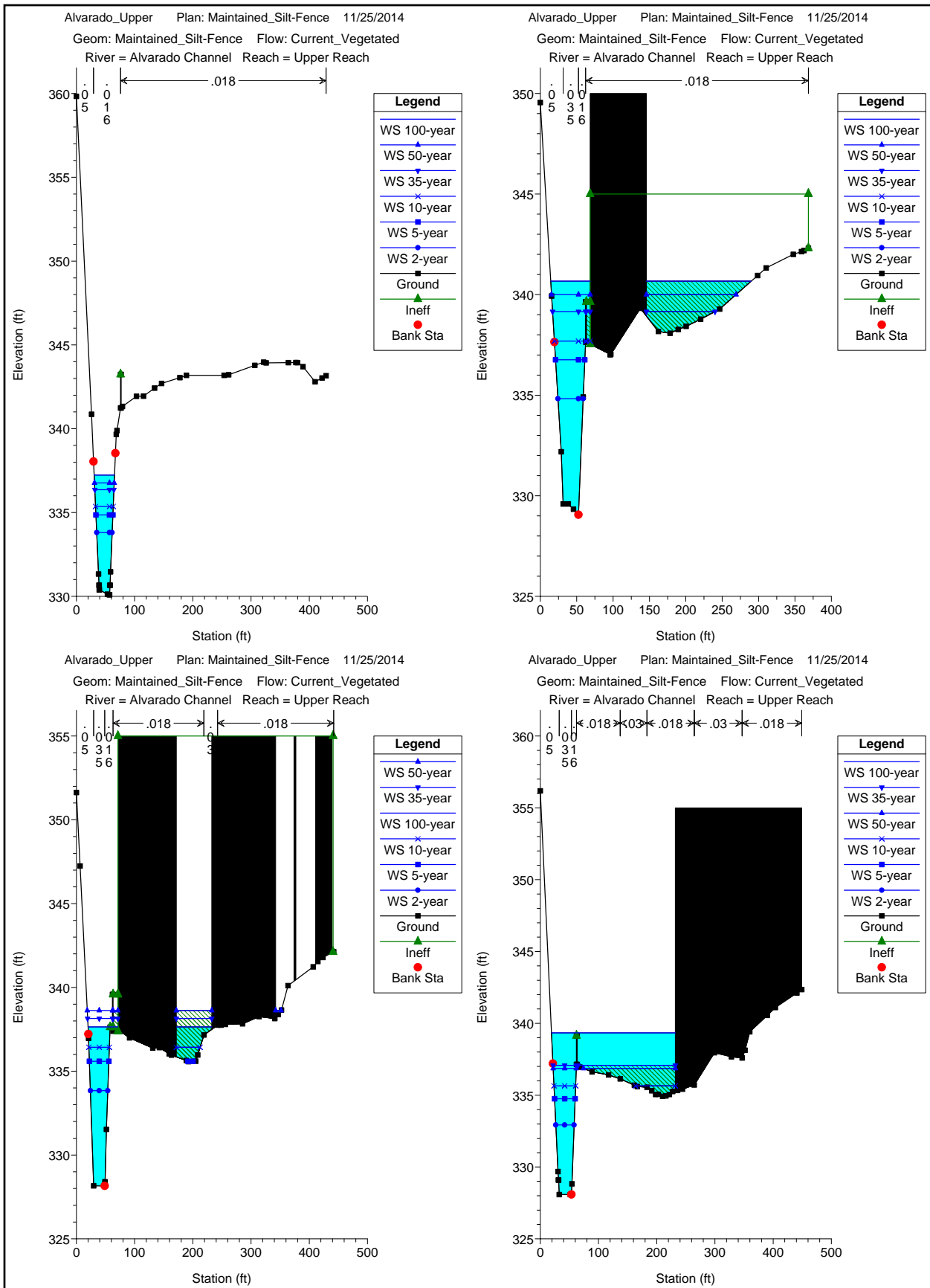
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	35-year	3000.00	328.08	337.07	335.60	339.07	0.006173	10.15	276.03	207.23	0.65
Upper Reach	2969.225	10-year	2100.00	328.08	335.65	334.14	337.15	0.005662	8.99	221.23	105.42	0.62
Upper Reach	2969.225	5-year	1700.00	328.08	334.74	333.41	336.08	0.005869	8.62	188.36	35.25	0.63
Upper Reach	2969.225	2-year	1000.00	328.08	332.92	331.92	333.90	0.006229	7.61	127.67	31.46	0.64
Upper Reach	2873.24	100-year	3900.00	327.53	339.44	336.11	339.55	0.000199	2.82	1477.51	337.25	0.15
Upper Reach	2873.24	50-year	3400.00	327.53	338.65	335.44	338.77	0.000269	3.11	1217.80	323.54	0.18
Upper Reach	2873.24	35-year	3000.00	327.53	338.36	334.85	338.48	0.000263	3.02	1125.71	319.39	0.17
Upper Reach	2873.24	10-year	2100.00	327.53	335.73	333.41	336.85	0.003051	8.49	247.17	187.05	0.56
Upper Reach	2873.24	5-year	1700.00	327.53	334.80	332.67	335.78	0.003091	7.97	213.29	97.09	0.56
Upper Reach	2873.24	2-year	1000.00	327.53	332.94	331.21	333.62	0.003054	6.66	150.27	32.21	0.53
Upper Reach	2695.84	100-year	3900.00	326.53	336.69	335.55	339.21	0.004521	11.83	312.59	205.25	0.71
Upper Reach	2695.84	50-year	3400.00	326.53	336.39	334.86	338.46	0.003884	10.70	300.69	202.15	0.66
Upper Reach	2695.84	35-year	3000.00	326.53	336.78	334.25	338.24	0.002576	8.99	316.39	206.24	0.54
Upper Reach	2695.84	10-year	2100.00	326.53	335.29	332.79	336.37	0.002377	7.70	257.94	158.17	0.50
Upper Reach	2695.84	5-year	1700.00	326.53	334.36	332.04	335.30	0.002379	7.22	223.10	135.26	0.50
Upper Reach	2695.84	2-year	1000.00	326.53	332.52	330.52	333.16	0.002217	5.96	159.58	32.77	0.46
Upper Reach	2530	100-year	3900.00	325.58	337.71	334.64	338.26	0.001047	6.11	659.24	208.77	0.33
Upper Reach	2530	50-year	3400.00	325.58	337.03	334.61	337.63	0.001339	6.61	554.86	180.31	0.37
Upper Reach	2530	35-year	3000.00	325.58	337.26	333.54	337.66	0.000870	5.41	589.79	184.89	0.30
Upper Reach	2530	10-year	2100.00	325.58	334.90	332.02	335.89	0.002901	8.29	269.29	65.89	0.52
Upper Reach	2530	5-year	1700.00	325.58	333.98	331.25	334.86	0.002351	7.03	230.33	35.83	0.46
Upper Reach	2530	2-year	1000.00	325.58	332.21	329.67	332.77	0.001974	5.67	170.04	32.27	0.42
Upper Reach	2529.382	100-year	3900.00	327.10	337.62	336.41	338.25	0.001305	6.40	613.76	202.10	0.37
Upper Reach	2529.382	50-year	3400.00	327.10	336.89	336.16	337.61	0.001831	7.19	501.95	157.62	0.43
Upper Reach	2529.382	35-year	3000.00	327.10	334.68	334.68	337.43	0.009387	13.42	225.45	49.44	0.92
Upper Reach	2529.382	10-year	2100.00	327.10	333.21	333.21	335.73	0.008476	11.33	171.87	34.25	0.86
Upper Reach	2529.382	5-year	1700.00	327.10	332.47	332.47	334.72	0.008819	10.76	147.12	32.78	0.86
Upper Reach	2529.382	2-year	1000.00	327.10	330.96	330.96	332.65	0.009732	9.36	100.11	29.77	0.87
Upper Reach	2528	100-year	3900.00	325.58	337.66	334.64	338.23	0.001081	6.19	652.52	205.63	0.34
Upper Reach	2528	50-year	3400.00	325.58	334.61	334.61	337.40	0.007939	13.42	253.49	44.40	0.86
Upper Reach	2528	35-year	3000.00	325.58	332.19	333.54	337.19	0.017950	17.08	169.43	32.23	1.25
Upper Reach	2528	10-year	2100.00	325.58	330.53	332.02	335.48	0.025262	17.26	118.68	28.91	1.44
Upper Reach	2528	5-year	1700.00	325.58	329.84	331.25	334.47	0.028462	16.81	99.07	27.52	1.51
Upper Reach	2528	2-year	1000.00	325.58	331.35	329.67	332.13	0.003286	6.78	143.06	30.55	0.53
Upper Reach	2435.063	100-year	3900.00	325.02	337.81	333.48	338.08	0.000778	4.67	972.86	232.14	0.26
Upper Reach	2435.063	50-year	3400.00	325.02	335.11	332.87	336.36	0.004273	8.93	380.83	125.03	0.57
Upper Reach	2435.063	35-year	3000.00	325.02	334.57	332.35	335.80	0.004376	8.60	341.26	53.19	0.57
Upper Reach	2435.063	10-year	2100.00	325.02	333.41	331.06	334.29	0.003820	7.31	281.90	49.04	0.52
Upper Reach	2435.063	5-year	1700.00	325.02	332.76	330.38	333.48	0.003453	6.68	250.71	46.64	0.49
Upper Reach	2435.063	2-year	1000.00	325.02	331.33	328.96	331.77	0.002645	5.29	187.81	41.35	0.43
Upper Reach	2335.331	100-year	3900.00	324.65	337.74		338.04	0.000481	3.20	1030.64	177.77	0.16
Upper Reach	2335.331	50-year	3400.00	324.65	336.46		335.98	0.001134	4.26	665.74	139.36	0.24
Upper Reach	2335.331	35-year	3000.00	324.65	334.88		335.42	0.001192	4.18	591.82	99.54	0.25
Upper Reach	2335.331	10-year	2100.00	324.65	333.60		333.98	0.001081	3.78	481.48	76.83	0.24
Upper Reach	2335.331	5-year	1700.00	324.65	332.92		333.20	0.000990	3.52	431.72	70.75	0.23
Upper Reach	2335.331	2-year	1000.00	324.65	331.41		331.56	0.000793	2.92	328.40	66.70	0.21
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	100-year	3900.00	326.14	337.57		338.01	0.000990	5.59	805.06	136.87	0.32
Upper Reach	2308.404	50-year	3400.00	326.14	334.99		335.90	0.002840	7.67	466.44	113.33	0.51
Upper Reach	2308.404	35-year	3000.00	326.14	334.52		335.35	0.002838	7.32	419.18	91.50	0.51
Upper Reach	2308.404	10-year	2100.00	326.14	333.29		333.91	0.002737	6.35	330.77	61.47	0.48
Upper Reach	2308.404	5-year	1700.00	326.14	332.60		333.14	0.002660	5.87	289.68	59.00	0.47
Upper Reach	2308.404	2-year	1000.00	326.14	331.15		331.51	0.002513	4.82	207.46	53.73	0.43
Upper Reach	2287.614	100-year	3900.00	326.23	337.57	332.74	337.95	0.004191	4.11	888.58	155.87	0.24
Upper Reach	2287.614	50-year	3400.00	326.23	335.04	332.28	335.71	0.016908	6.66	526.63	111.82	0.45
Upper Reach	2287.614	35-year	3000.00	326.23	334.52	331.88	335.18	0.018016	6.59	469.90	106.66	0.46
Upper Reach	2287.614	10-year	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	5-year	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	2-year	1000.00	326.23	331.03	329.27	331.39	0.019805	4.81	207.87	57.89	0.45
Upper Reach	2084.121	100-year	3900.00	323.64	337.12		337.39	0.001832	4.19	938.83	129.74	0.24
Upper Reach	2084.121	50-year	3400.00	323.64	332.99		333.59	0.006968	6.20	548.65	81.27	0.42
Upper Reach	2084.121	35-year	3000.00	323.64	332.42		332.97	0.007073	5.96	503.23	78.78	0.42
Upper Reach	2084.121	10-year	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	5-year	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	2-year	1000.00	323.64	328.74		329.01	0.007592	4.11	243.09	62.67	0.37
Upper Reach	1873.917	100-year	3900.00	320.65	337.03		337.18	0.000471	2.99	1292.91	268.84	0.16
Upper Reach	1873.917	50-year	3400.00	320.65	330.72		331.85	0.009296	8.53	398.53	65.89	0.61
Upper Reach	1873.917	35-year	3000.00	320.65	330.08		331.17	0.009904	8.40	357.20	62.72	0.62
Upper Reach	1873.917	10-year	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63

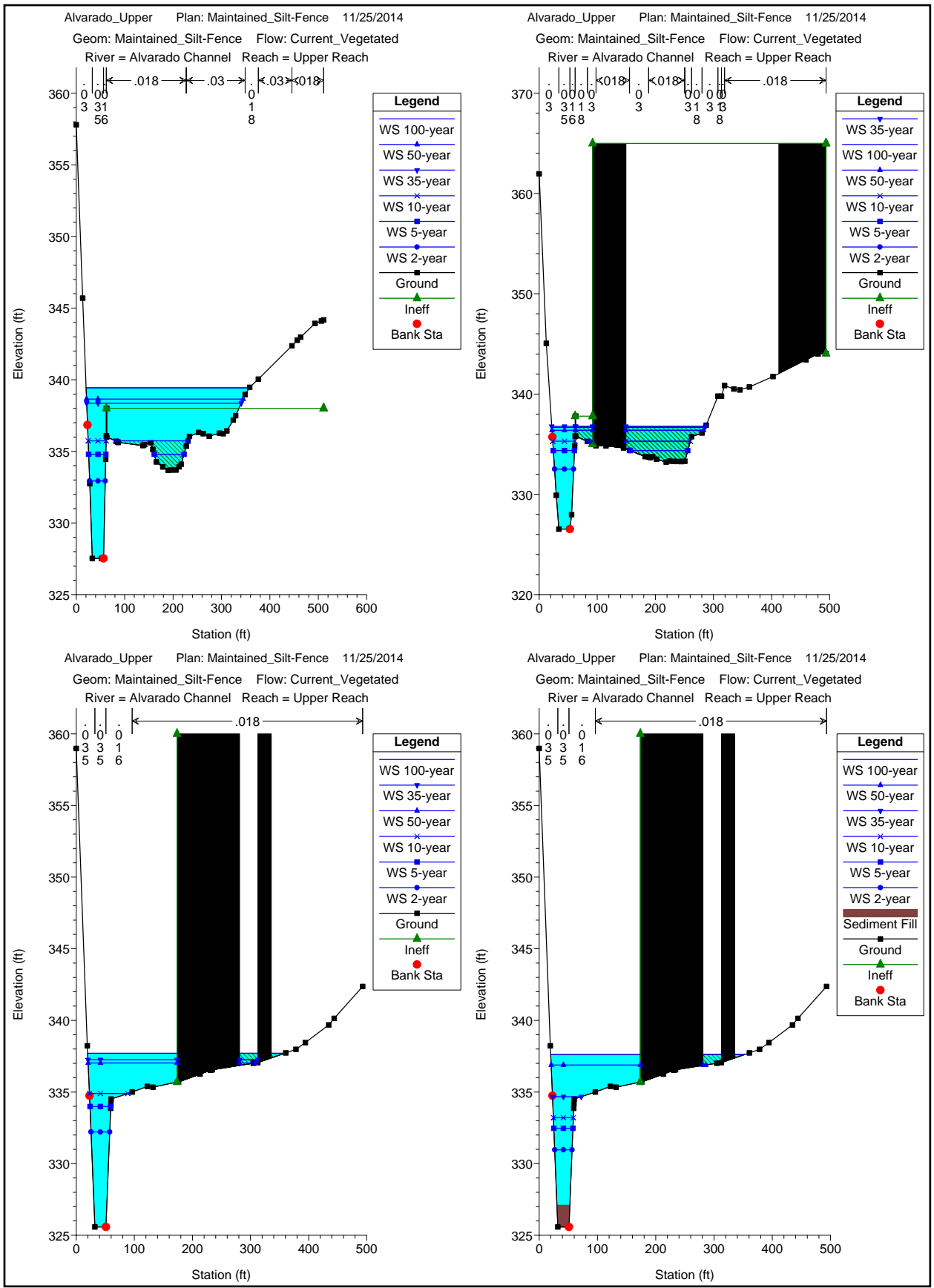
HEC-RAS Plan: Main_Silt-fence River: Alvarado Channel Reach: Upper Reach (Continued)

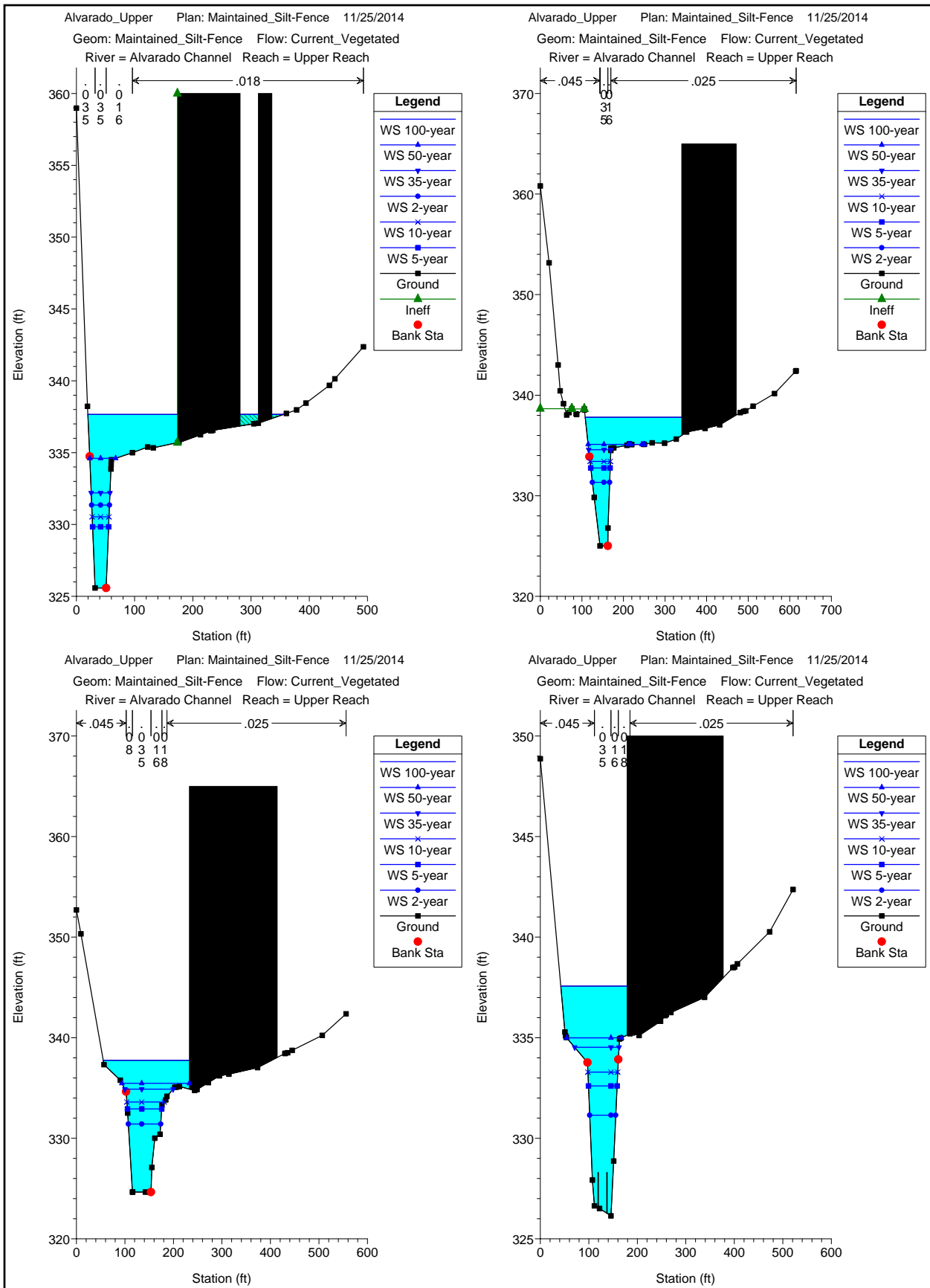
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1873.917	5-year	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	2-year	1000.00	320.65	326.22		326.89	0.013373	6.59	151.75	43.75	0.62
Upper Reach	1798.381	100-year	3900.00	318.55	337.02		337.14	0.000338	2.67	1401.33	305.08	0.13
Upper Reach	1798.381	50-year	3400.00	318.55	329.31		330.97	0.012833	10.34	328.80	50.24	0.71
Upper Reach	1798.381	35-year	3000.00	318.55	327.15	327.15	329.83	0.028296	13.13	228.43	42.69	1.00
Upper Reach	1798.381	10-year	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	5-year	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	2-year	1000.00	318.55	323.60	323.60	325.21	0.037463	10.18	98.22	30.66	1.00
Upper Reach	1641.59	100-year	3900.00	315.77	337.05		337.09	0.000091	1.49	2486.15	286.64	0.07
Upper Reach	1641.59	50-year	3400.00	315.77	329.94		330.13	0.001064	3.52	965.72	114.77	0.21
Upper Reach	1641.59	35-year	3000.00	315.77	325.38	321.45	325.85	0.004087	5.50	545.07	80.28	0.37
Upper Reach	1641.59	10-year	2100.00	315.77	323.12	320.51	323.61	0.005926	5.62	373.75	71.12	0.43
Upper Reach	1641.59	5-year	1700.00	315.77	322.19	320.03	322.66	0.006738	5.49	309.50	67.36	0.45
Upper Reach	1641.59	2-year	1000.00	315.77	320.47	318.97	320.86	0.008609	5.01	199.48	60.39	0.49
Upper Reach	1489.686	100-year	3900.00	312.84	337.01		337.07	0.000150	1.62	2099.60	264.64	0.07
Upper Reach	1489.686	50-year	3400.00	312.84	329.37		329.84	0.003330	5.49	619.71	54.01	0.28
Upper Reach	1489.686	35-year	3000.00	312.84	323.61		324.74	0.014077	8.51	352.55	41.08	0.51
Upper Reach	1489.686	10-year	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	5-year	1700.00	312.84	319.83		320.87	0.023337	8.18	207.86	35.44	0.60
Upper Reach	1489.686	2-year	1000.00	312.84	318.14		318.83	0.022583	6.66	150.08	32.91	0.55
Upper Reach	1439.048	100-year	3900.00	311.46	336.99		337.06	0.000244	2.09	1886.62	239.69	0.09
Upper Reach	1439.048	50-year	3400.00	311.46	329.33		329.66	0.002304	4.62	735.66	67.26	0.25
Upper Reach	1439.048	35-year	3000.00	311.46	323.06		324.03	0.012185	7.91	379.37	45.93	0.48
Upper Reach	1439.048	10-year	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	5-year	1700.00	311.46	317.89	316.83	319.32	0.039306	9.60	177.09	33.92	0.74
Upper Reach	1439.048	2-year	1000.00	311.46	316.59	315.40	317.45	0.032578	7.46	134.13	31.93	0.64
Upper Reach	1288.123	100-year	3900.00	306.79	337.00		337.03	0.000080	1.51	2751.23	192.43	0.06
Upper Reach	1288.123	50-year	3400.00	306.79	329.41		329.48	0.000318	2.23	1522.74	116.95	0.11
Upper Reach	1288.123	35-year	3000.00	306.79	323.24		323.41	0.001036	3.31	907.13	83.93	0.18
Upper Reach	1288.123	10-year	2100.00	306.79	315.28	312.03	315.85	0.008905	6.05	347.05	56.61	0.43
Upper Reach	1288.123	5-year	1700.00	306.79	312.15		313.42	0.038229	9.06	187.70	45.19	0.78
Upper Reach	1288.123	2-year	1000.00	306.79	310.71		311.68	0.045245	7.91	126.50	39.94	0.78
Upper Reach	1111.63	100-year	3900.00	303.43	337.01	309.20	337.02	0.000021	0.78	4818.81	291.58	0.03
Upper Reach	1111.63	50-year	3400.00	303.43	329.42	308.81	329.44	0.000080	1.18	2886.78	213.68	0.05
Upper Reach	1111.63	35-year	3000.00	303.43	323.26	308.49	323.30	0.000215	1.57	1911.39	141.49	0.08
Upper Reach	1111.63	10-year	2100.00	303.43	315.23	307.72	315.31	0.000984	2.28	921.48	106.81	0.14
Upper Reach	1111.63	5-year	1700.00	303.43	309.71	307.34	310.01	0.010151	4.39	387.27	86.78	0.37
Upper Reach	1111.63	2-year	1000.00	303.43	309.03	306.54	309.17	0.005948	3.04	328.94	84.30	0.27
Upper Reach	826.8154	100-year	3900.00	301.19	337.01		337.01	0.000008	0.58	6679.38	360.88	0.02
Upper Reach	826.8154	50-year	3400.00	301.19	329.42		329.43	0.000022	0.77	4447.61	259.62	0.03
Upper Reach	826.8154	35-year	3000.00	301.19	323.25		323.27	0.000051	0.96	3116.86	200.78	0.04
Upper Reach	826.8154	10-year	2100.00	301.19	315.17		315.19	0.000187	1.29	1631.22	163.93	0.07
Upper Reach	826.8154	5-year	1700.00	301.19	306.04		306.41	0.016106	4.86	349.91	109.50	0.48
Upper Reach	826.8154	2-year	1000.00	301.19	303.85	303.85	304.69	0.103281	7.38	135.59	81.78	1.01
Upper Reach	676.0353	100-year	3900.00	296.69	337.00		337.01	0.000005	0.69	5683.32	307.61	0.02
Upper Reach	676.0353	50-year	3400.00	296.69	329.41		329.42	0.000014	0.93	3690.13	227.78	0.04
Upper Reach	676.0353	35-year	3000.00	296.69	323.24		323.26	0.000026	1.14	2635.77	150.90	0.05
Upper Reach	676.0353	10-year	2100.00	296.69	315.15		315.18	0.000053	1.38	1524.66	123.67	0.07
Upper Reach	676.0353	5-year	1700.00	296.69	305.95		306.11	0.000547	3.17	536.36	88.34	0.23
Upper Reach	676.0353	2-year	1000.00	296.69	303.33	300.13	303.48	0.000676	3.10	322.45	74.37	0.26
Upper Reach	611.5112	100-year	3900.00	295.46	337.00	307.26	337.01	0.000016	0.93	5227.86	317.05	0.03
Upper Reach	611.5112	50-year	3400.00	295.46	329.40	306.42	329.42	0.000049	1.38	3104.75	243.46	0.05
Upper Reach	611.5112	35-year	3000.00	295.46	323.20	305.68	323.25	0.000171	2.18	1774.61	193.19	0.08
Upper Reach	611.5112	10-year	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	5-year	1700.00	295.46	303.47	302.90	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	2-year	1000.00	295.46	301.50	300.96	303.19	0.030043	10.42	95.96	20.60	0.85

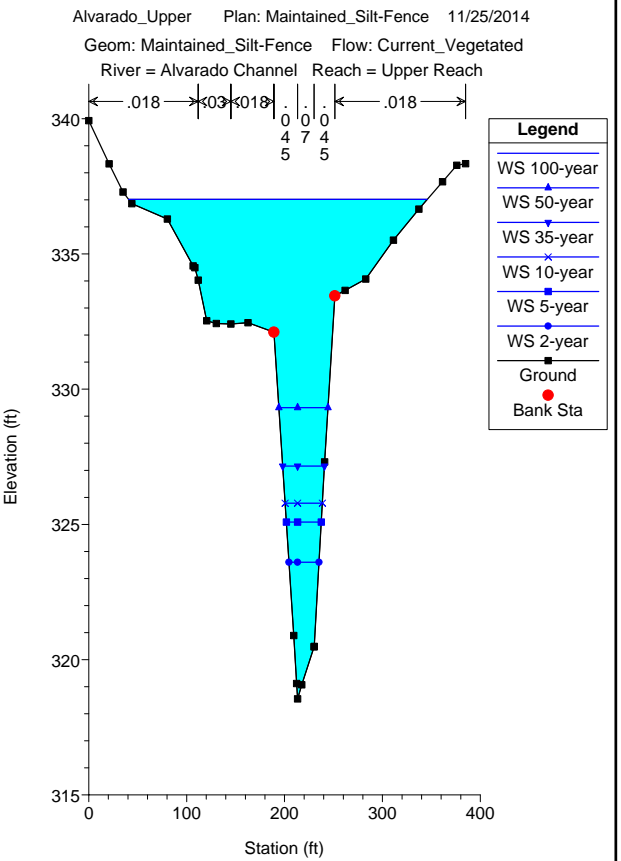
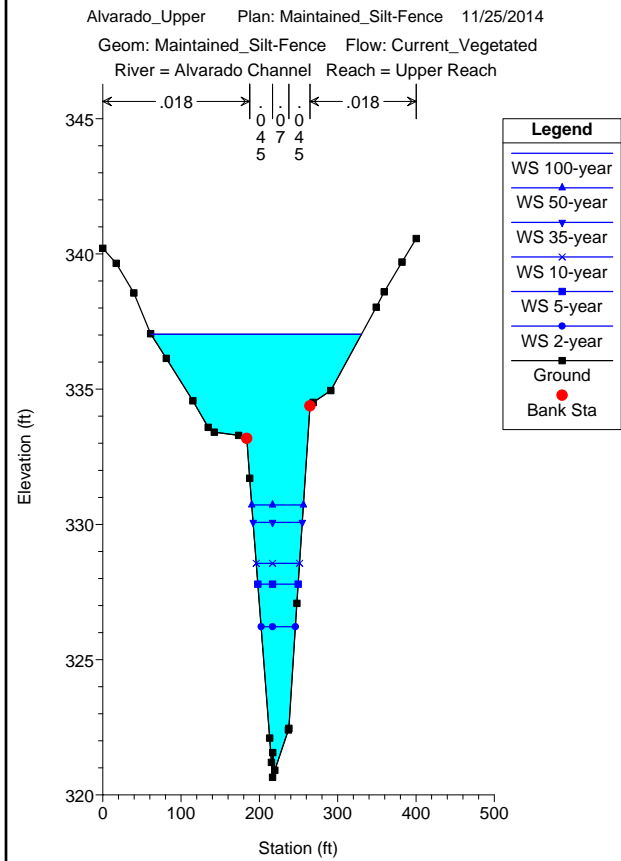
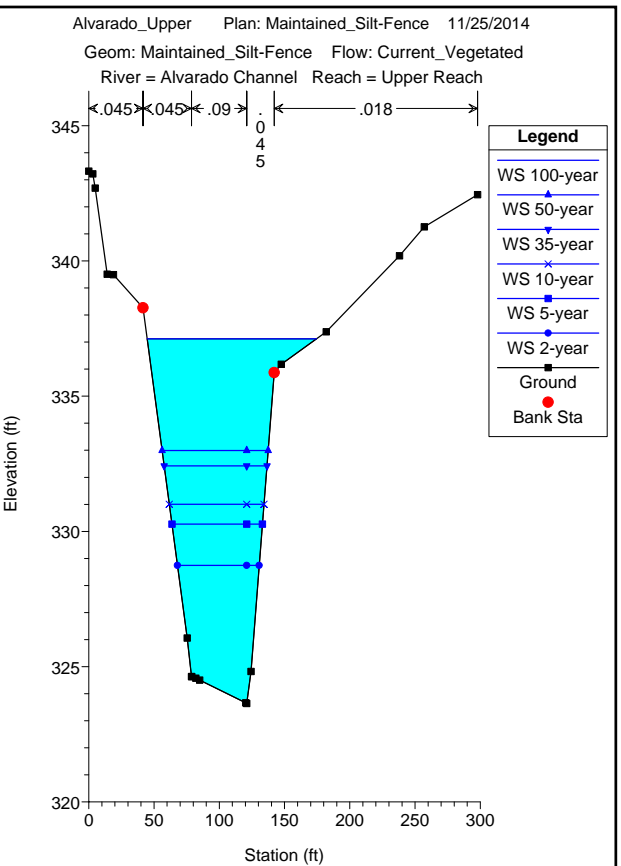
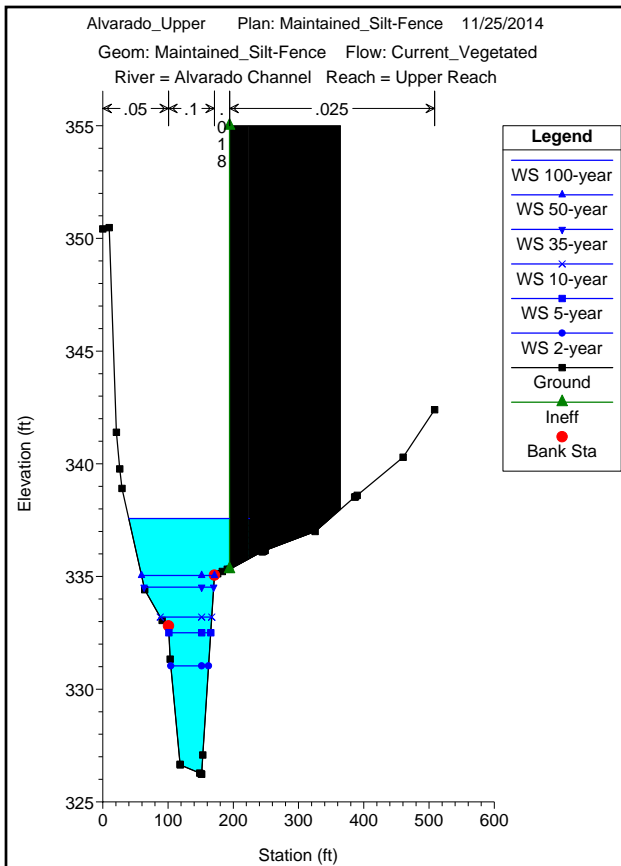


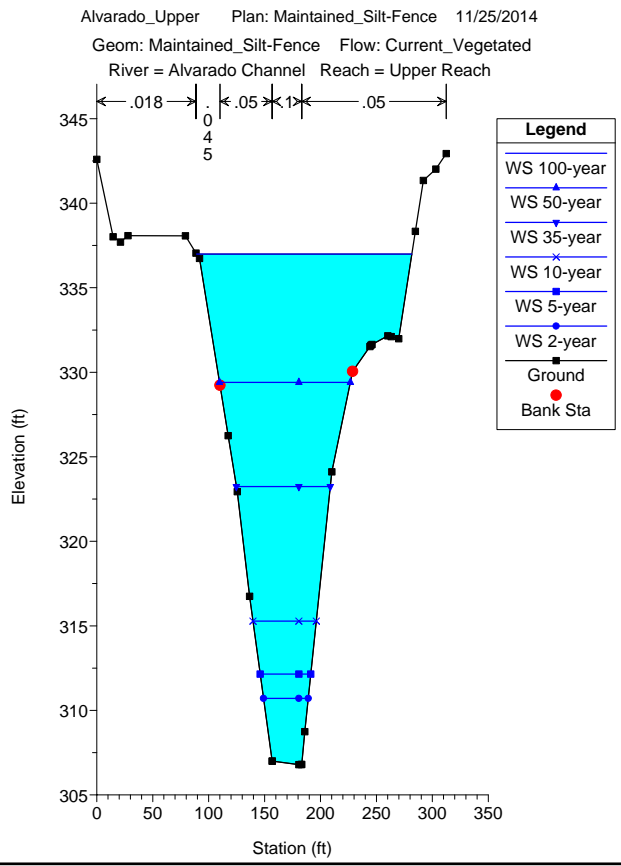
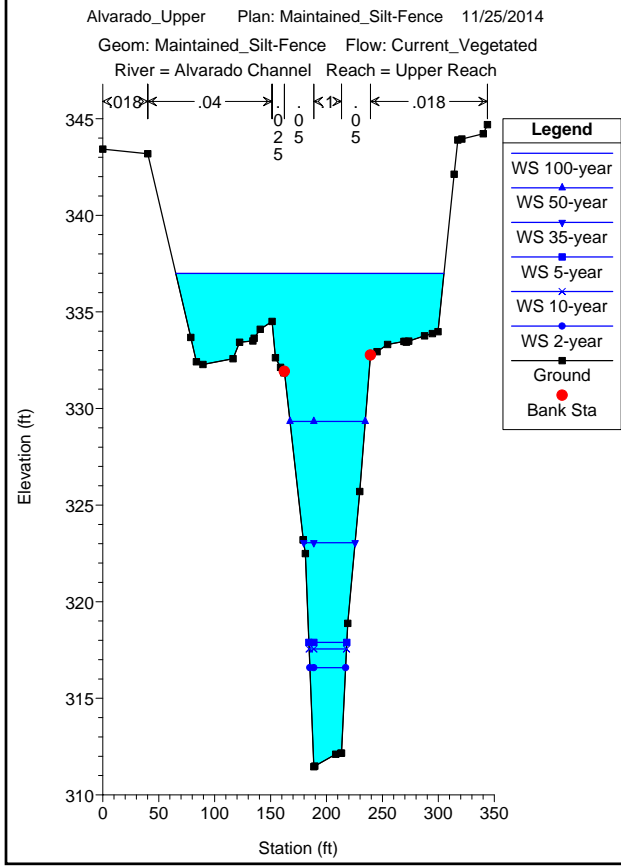
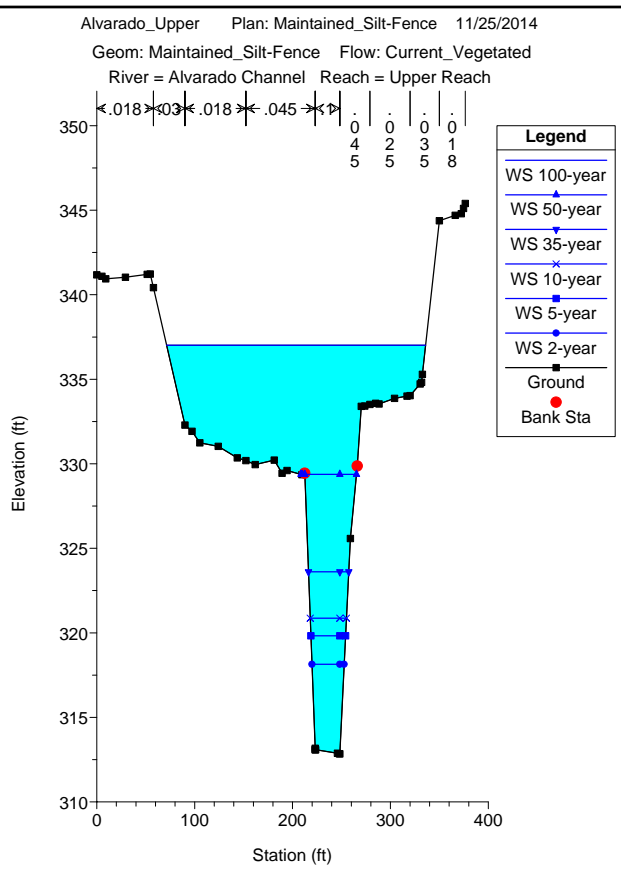
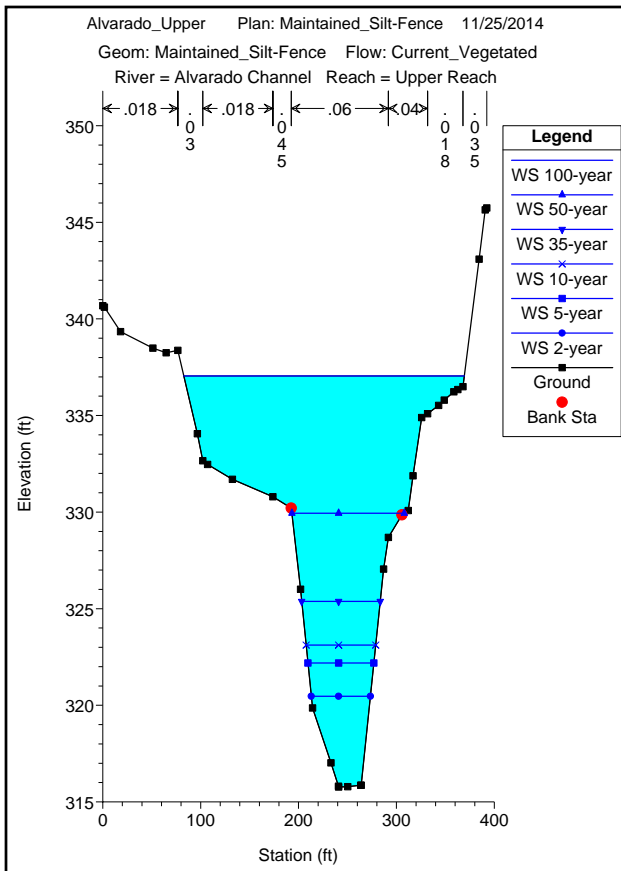


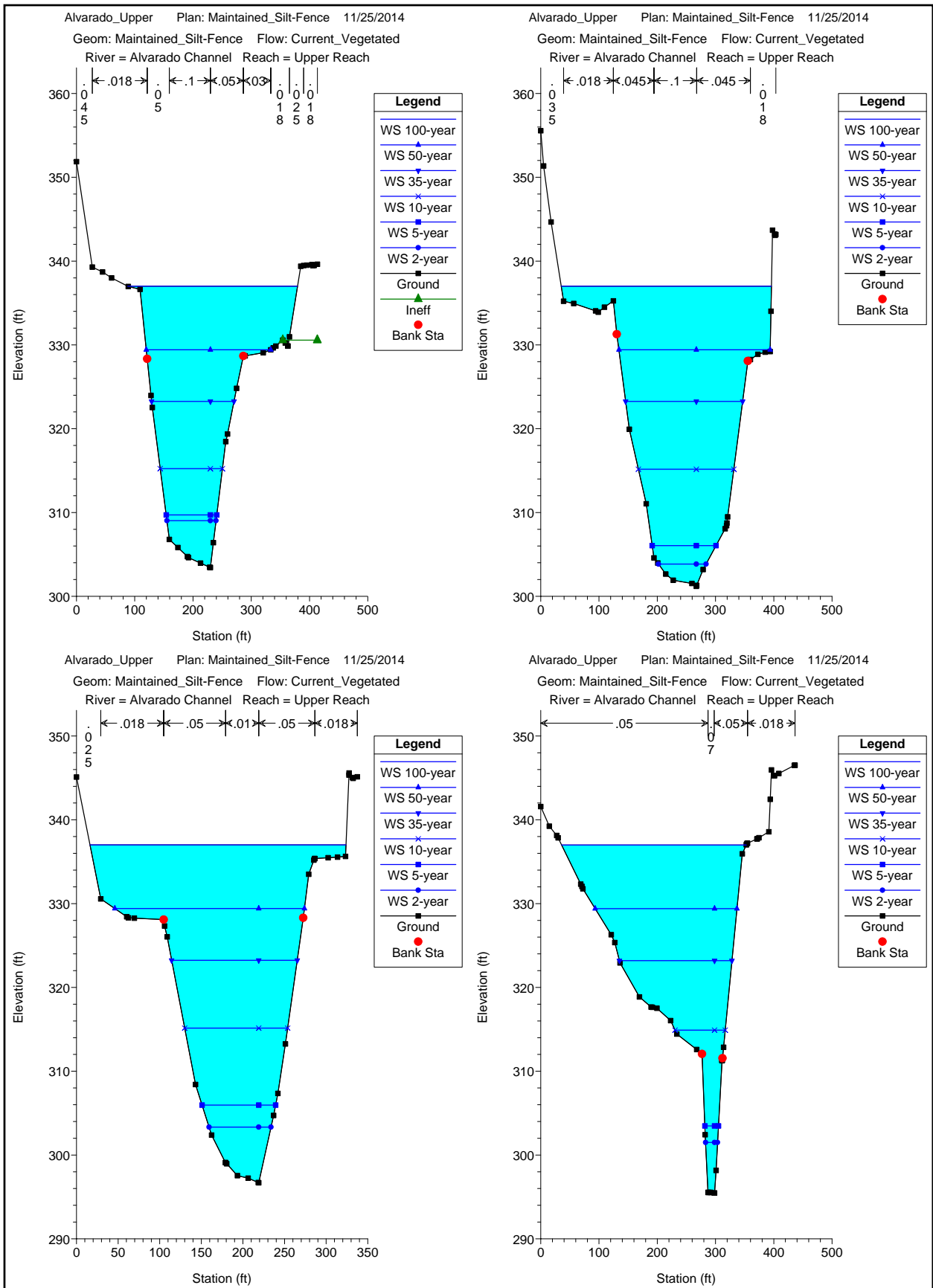












HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 11/25/2014 1:41:32 PM

Project in English units

PLAN DATA

Plan Title: Maintained_Silt-Fence
 Plan File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p06
 Geometry Title: Maintained_Silt-Fence
 Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g04
 Flow Title : Current_Vegetated
 Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

Plan Description:
 Sediment and Vegetation removed in the City maintained portion only

Plan Summary Information:
 Number of: Cross Sections = 32 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Current_Vegetated
 Flow File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f01

River	Reach	RS	100-year	50-year	35-year	10-year
Alvarado ChannelUpper	Reach	4559.274	3900	3400	3000	2100
1700	1000					

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper	Reach	100-year	Critical	Known WS = 337
Alvarado ChannelUpper	Reach	50-year	Critical	Known WS = 329.4
Alvarado ChannelUpper	Reach	35-year	Critical	Known WS = 323.2
Alvarado ChannelUpper	Reach	10-year	Critical	Known WS = 314.9
Alvarado ChannelUpper	Reach	5-year	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	2-year	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Silt-Fence
 Geometry File : w:\17204-B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g04

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99
92.38	352	108.38	352	108.38	340.4	117.38	340.4
118.08	351	118.08	340.4	126.68	340.4	126.68	351
127.38	340.4	136.38	340.4	136.38	352	149.38	352
244.46	352.12	267.11	352.83	268.8	352.79	276.98	352.19
301.32	353.34	304.91	353.41	319.7	353.68	327.66	355.65
329.79	356.2	348.2	362.06	362.49	365.16		

 Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
108.38	136.38	56.75	57.06	57.78	.1	.3	

 Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
267.11	362.49	352.83	F

 Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	52.12	370	193.09	238.03	370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

INPUT

Description:
 Lateral structure position = Next of right bank station
 Distance from Upstream XS =
 Deck/Roadway Width = 10
 Weir Coefficient = 2
 Weir Flow Reference = Water Surface
 Weir Embankment Coordinates num = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53	27.07	349.73
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72	48.86	352.49
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65	81.56	352.48
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48	115.88	350.31
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75	141.03	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75	186.26	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75	251.79	350.75
254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75	296.86	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75	368.22	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75	452.46	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75	516.13	350.75

516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	339.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4502.213

INPUT

Description:

Station Elevation Data num= 32									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.61	3.08	356.69	28.65	355.75	31.72	355.63	63.35	353.68
83.88	352	99.88	352	99.88	339.3	108.88	339.3	108.88	351.3
109.58	351.3	109.58	339.3	118.18	339.3	118.18	351.3	118.88	351.3
118.88	339.3	127.88	339.3	127.88	352	140.88	352	284.1	352.54
292.86	352.97	302.84	352.34	303.17	352.3	305.15	352.39	326.64	353.31
340.96	353.56	344.97	353.63	350.68	355.05	369.55	361.22	369.63	361.24
388.16	365.26	393.87	365.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	83.88	.016	118.18	.018

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

99.88	127.88		35.29	35.3	35.1	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
292.86	388.16	352.97	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	67.09	370	170.25	263.29	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4466.915

INPUT

Description:

Station Elevation Data num= 37									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.17	3.48	356.03	16.93	355.21	59.49	352.4	65.6	352.58
65.6	338.93	93.6	340.06	93.6	352.47	99.74	352.67	100.22	352.66
128.96	350.55	134.07	350.6	144	350.85	148.79	350.83	153.84	350.82
159.12	350.8	169.61	350.62	183.5	350.64	185.1	350.64	187.4	350.39

192.63	349.44	196.36	349.71	198.79	349.76	223.65	350.52	279.35	352.27
294.86	353.02	303.29	352.49	305.64	352.27	320.46	352.91	329.31	353.29
334.68	353.38	347.85	353.59	350.6	354.26	359.32	357.09	367.82	359.67
383.59	363.56	387.54	364.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	65.6	.016	93.6	.018

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

65.6	93.6		27.81	27.21	26.73	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
99.74	294.86	352.67	F
294.86	387.54	353.03	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	56.31	365	163.1	265.25	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data num= 40									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	354.58	6.49	354.62	43.7	353.43	63.26	352.14	68.58	347.37
79.62	339.79	80.46	339.21	84.3	339.14	93.29	338.71	93.9	338.68
103.12	346.81	104.83	351	123.71	350.67	132.91	350	140.83	350.1
168.65	350.77	180.3	350.74	186.5	350.72	188.43	350.09	191.29	349.16
193.19	348.49	208.75	348.56	222.54	349.54	241.1	349.97	258.98	350.52
301.03	351.86	326.23	353.09	332.55	352.69	337.36	352.22	355.74	353.03
360.73	353.26	378.14	353.54	379.1	353.55	379.16	353.57	379.37	353.63
395	358.43	421.51	365.05	421.67	365.08	421.9	365.16	425.59	365.07

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	63.26	.016	104.83	.018

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

63.26	104.83		164.21	164.68	167.58	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
104.83	326.23	351	F
326.23	421.9	353.09	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	59.44	370	164.66	297.32	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data num= 18									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.28	9.37	352.35	33.63	351.69	67.57	350.52	74.43	345.73
86.46	337.33	86.87	337.04	86.93	337.04	87.27	337.05	98.97	337.33
99.46	337.34	104.04	341.31	109.33	345.95	115.33	346.05	121.22	345.95
150.31	346.3	156.99	350.75	536.99	350.75				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	67.57	.03	74.43	.016	109.33	.018

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

74.43	109.33		381.65	361.63	347.98	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
115.33	233.87	346.05	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
0	61.02	354	156.99	520.69	354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	365.86	16.26	353.45	32.29	341.36	38.14	336.95	41.63	333.87
42.22	333.86	57.31	333.57	57.59	333.56	64.94	340.73	66.19	341.59
69.85	341.68	70.47	343.4	75.47	343.3	96.47	344	104.47	344.1
104.47	350.25	113.47	350.25	113.47	350.76	478.56	350.76	478.56	347.5
762.56	351								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	32.29	.016	66.19	.018

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

32.29	66.19	160.29	155.35	151.31	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
121.74	762	350.76	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
121.74	406.35	370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.08	24.76	342.73	38.72	332.95	39.06	332.94	52	332.69
55.04	332.61	55.85	332.58	61.28	337.51	65.85	341.63	66	342
71.24	342.44	80.82	342.3	103.66	342.5	103.66	350.75	107	350.75
342.68	350.75								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	24.76	.016	38.72	.02	55.85	.016

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

24.76	71.24	156.2	157.14	158.25	.1	.3
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Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
106	129.29	365	129.29	271.93	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.57	21.79	345.71	29.74	340.6	36.61	336.19	41.1	331.7
43.59	331.7	43.71	331.62	56.66	331.09	60.41	330.93	60.88	330.91
71.14	340.13	71.45	340.42	79.54	342.57	80.33	342.77	81.75	342.81
118.62	343.84	192.97	343.58	209.41	343.65	277.88	343.1	295.07	343.01
300.31	343.06	368.05	343.52	394.52	343.56	434.26	343.52	442.68	343.45

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	29.74	.016	71.45	.02	209.41	.018

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

29.74	71.45	183.48	182.29	181.14	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent

118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	359.83	25.85	340.86	29.47	338.04	38.09	331.33	38.76	330.66
38.95	330.66	39.31	330.38	39.47	330.38	53.23	330.13	56.6	330.09
56.92	330.09	57.6	330.66	57.76	330.66	58.56	331.46	67.04	338.54
68.39	339.66	69.63	339.89	75.76	341.24	75.77	343.24	76.77	343.24
76.77	341.24	79.11	341.33	103.2	341.93	115.27	341.94	134.16	342.42
146.31	342.7	177.81	343.05	189.09	343.18	253.73	343.18	261.47	343.22
306.56	343.78	321.66	343.97	326.01	343.93	364.07	343.94	376.97	343.95
379.8	343.94	389.33	343.7	410.09	342.8	421.87	343.03	428.88	343.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.47	.016	75.76	.018

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

29.47	67.04	188.22	188.31	208.19	.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
75.77	428.88	343.24	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	349.55	15.53	339.93	19.43	337.64	28.72	332.19	31.32	329.59
38.33	329.59	45.6	329.33	51.53	329.09	52.41	329.06	59.04	334.91
62.21	337.64	62.22	339.64	63.22	339.64	63.22	337.64	95.9	337.03
96.15	337.01	96.9	337.04	137.52	339.32	162.33	338.17	178.31	338.08
189.7	338.27	200.4	338.42	220.32	338.78	246.45	339.28	298.6	340.95
310.42	341.33	347.72	342	358.94	342.14	362.36	342.19	368.47	342.31

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	31.32	.035	52.41	.016	62.21	.018

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

19.43	52.41	213.1	211.63	234.86	.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
63.22	68.42	339.64	F
68.42	368.47	345	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
68.42	145.82	350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.63	6.26	347.24	20.56	337.22	20.93	336.96	29.73	328.16
48.73	328.16	48.97	328.4	49.21	328.39	51.59	331.53	57.89	337.63
61.86	337.58	61.86	339.58	62.86	339.58	62.86	337.39	75.24	337.39
91.39	336.99	131.08	336.38	142.66	336.41	159.33	336.04	163.29	335.96
188.72	335.64	192.7	335.57	205	335.6	208.43	335.97	218.96	337.16
242.63	337.75	248.26	337.75	255.89	337.79	285.47	337.83	313.92	338.26
340.9	338.14	346.6	338.38	352.33	338.65	363.42	340.11	406.82	341.23

414.83 341.55 423.62 341.79 441.87 342.13

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.73	.035	48.73	.016	62.86	.018	218.96	.03
242.63	.018								

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
20.56	48.73	146.85	145.44	131.99	.1	.3	

Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
57.89	62.86	337.63	F
62.86	71.22	339.58	T
71.22	441	355	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
71.22	171.59	355	373.64	376.97	355	410.97	439.07	355
232.63	342.17	355						

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2969.225

INPUT
 Description:
 Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.18	21.74	337.2	30.35	329.68	31.17	329.1	31.35	329.09
31.38	329.09	32.39	328.08	51.39	328.08	53.58	328.09	54.27	328.83
62.04	337.14	62.1	339.14	63.1	339.14	63.1	337.14	67.96	336.95
88.97	336.63	117.23	336.41	137.39	336.13	161.66	335.69	166.55	335.6
183.27	335.55	191.42	335.3	198.28	335.05	202.99	335.06	210.13	334.92
215.7	334.95	221.61	335.05	227.44	335.25	235.84	335.33	244.24	335.42
264.47	335.71	299.23	337.95	328.34	337.67	346.84	337.59	351.58	338.13
359.81	339.41	390.03	340.55	403.82	341.1	440.67	342.11	449.14	342.35

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.39	.035	53.58	.016	62.1	.018	137.39	.03
183.27	.018	264.47	.03	346.84	.018				

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
21.74	53.58	48.12	46.59	34.68	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62.1	449.14	339.14	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
232	449.14	355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2873.24

INPUT
 Description:
 Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.8	13.19	345.7	23.23	336.84	27.87	332.74	33.08	327.53
52.08	327.53	56.49	327.53	60.79	334.44	61.93	336.08	62	338
63	338	63	336	83	335.7	86.08	335.64	86.44	335.63
86.75	335.63	137.86	335.4	138.65	335.44	141.22	335.47	154.05	335.6
158.2	335.14	165.58	334.26	178.77	333.91	189.74	333.67	196.35	333.7
205.98	333.7	212.66	333.92	216.87	334.1	227.31	335.36	230.72	335.72
233.9	336.04	252.75	336.32	262.38	336.23	274.67	336.06	295.69	336.27
303.61	336.23	311.15	336.43	324.47	337.18	329.24	337.49	348.87	338.96
358.14	339.47	376.13	340.04	445.64	342.37	456.48	342.76	463.45	342.97
493.24	343.93	506.32	344.1	511.1	344.17				

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	33.08	.035	56.49	.016	61.93	.018	227.31	.03
348.87	.018	376.13	.03	445.64	.018				

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

23.23 56.49 179.7 177.4 154.96 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62	511	338	F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2695.84

INPUT
 Description:
 Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	361.95	12.31	345.06	22.84	335.71	29.49	329.9	34	326.53
53	326.53	55.74	327.97	61.02	334.79	61.88	335.82	62	337.8
63	337.8	63	335.8	83.16	335.28	97.88	334.85	115.03	334.84
145.23	334.62	155.42	334.39	182.3	333.76	188.41	333.72	191.22	333.67
195.43	333.76	202.05	333.5	218.7	333.21	224.74	333.31	232.14	333.29
237.4	333.28	244.5	333.26	250.72	333.3	262.29	335.75	280.25	336.11
287.55	336.9	307.71	339.79	313.94	339.8	319.15	340.85	335.15	340.5
345.45	340.41	361.78	340.7	402.63	341.75	459.27	343.42	480.11	343.99
493.96	344.04								

Manning's n Values num= 14

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	34	.035	53	.016	62	.018	83.16	.03
97.88	.018	155.42	.03	188.41	.018	250.72	.03	262.29	.018
280.25	.03	307.71	.018	313.94	.03	319.15	.018		

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
22.84	53	160.84	165.46	225.33	.1	.3	

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
62	91.85	337.8	F
91.85	493.96	365	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
91.85	149.36	365	412.55	493.45	365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2530

INPUT
 Description:
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.98	19.08	338.23	22.86	334.74	32.02	325.58	51.02	325.58
59.3	333.86	59.67	334.18	60.05	334.51	96.28	335	122.48	335.39
131.97	335.34	174.16	335.7	176.05	335.7	213.04	336.25	231.04	336.52
231.23	336.53	234.1	336.55	304.7	337.01	312.5	337.05	360.6	337.73
378.26	337.98	394.39	338.45	434.7	339.68	444.02	340.14	493.08	342.37

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	32.02	.035	51.02	.016	96.28	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
22.86	51.02	1	1	1	.1	.3	

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
173.53	493.08	360	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
173.53	281.08	360	312.57	335.65	360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2529.382

INPUT
 Description:
 Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.98	19.08	338.23	22.86	334.74	32.02	325.58	51.02	325.58		
59.3	333.86	59.67	334.18	60.05	334.51	96.28	335	122.48	335.39		
131.97	335.34	174.16	335.7	176.05	335.7	213.04	336.25	231.04	336.52		
231.23	336.53	234.1	336.55	304.7	337.01	312.5	337.05	360.6	337.73		
378.26	337.98	394.39	338.45	434.7	339.68	444.02	340.14	493.08	342.37		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	32.02	.035	51.02	.016	96.28	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
22.86	51.02	1	1	1		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
173.53	493.08	360	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
173.53	281.08	360	312.57	335.65	360

Sediment Elevation = 327.1

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2528

INPUT Description:

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.98	19.08	338.23	22.86	334.74	32.02	325.58	51.02	325.58		
59.3	333.86	59.67	334.18	60.05	334.51	96.28	335	122.48	335.39		
131.97	335.34	174.16	335.7	176.05	335.7	213.04	336.25	231.04	336.52		
231.23	336.53	234.1	336.55	304.7	337.01	312.5	337.05	360.6	337.73		
378.26	337.98	394.39	338.45	434.7	339.68	444.02	340.14	493.08	342.37		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	32.02	.035	51.02	.016	96.28	.018

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
22.86	51.02	108.52	93.32	35.08		.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
173.53	493.08	360	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
173.53	281.08	360	312.57	335.65	360

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2435.063

INPUT Description:

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.81	21.23	353.16	42.85	343	47.85	340.43	55.92	339.16		
63.64	338.03	69.33	338.27	75.76	338.66	86.2	338.15	87.49	338.08		
105.77	338.63	106.06	338.53	118.18	333.89	129.64	329.83	143.51	325.02		
162.51	325.02	162.8	326.79	169.52	334.5	169.71	334.71	172.01	334.74		
176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08	248.23	335.12		
250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63	351.83	336.34		
396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39	493.94	338.45		
511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	143.51	.035	162.51	.016	169.71	.025

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
118.18	162.51	112	100	22		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
340.09	471.21	365

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2335.331

INPUT Description:

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64		
105.72	332.51	115.37	324.65	115.96	324.65	142.3	324.65	150.28	324.65		
153.68	324.65	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3		
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15		
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38		
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74		
506.87	340.23	555.95	342.37								

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	.045	102.47	.08	115.37	.035	153.68	.016	176.37	.018		
186.57	.025										

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
102.47	153.68	28.83	29	6.18		.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
233	414	365

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2317.214

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 = 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335		
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32		
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33		
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02		
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95		
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66		
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13		
385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51		
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51		
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14		
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2308.404

INPUT Description:

Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77		
107.31	327.92	111.54	326.64	122.23	326.51	145.7	326.14	151.2	328.87		
160.87	333.92	163.21	334.94	166.35	334.98	184.8	335.2	190.27	335.24		
193.34	335.27	203.7	335.11	247.82	335.82	257.56	336.1	259.76	336.16		
269.28	336.25	338.64	337.01	397.05	338.48	397.76	338.49	400.6	338.52		
406.38	338.67	472.69	340.26	520.97	342.37						

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .045 111.54 .035 145.7 .016 160.87 .018 184.8 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 97.37 160.87 25.93 20.79 5.61 .1 .3

Blocked Obstructions num= 3
 Sta L Sta R Elev Sta L Sta R Elev Sta L Sta R Elev
 179 377 350 118.73 119.98 328.3 136.73 137.98 328.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2287.614

INPUT Description: Station Elevation Data num= 32
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 350.42 9.72 350.48 20.73 341.4 26.07 339.77 29.4 338.91
 64.12 334.41 91.01 333.05 100.71 332.81 103.26 331.33 118.55 326.67
 118.63 326.64 148.47 326.28 150.81 326.24 151.43 326.23 153.32 327.08
 171.09 335.06 176.12 335.12 183.15 335.22 190.68 335.32 194.36 335.32
 243.97 336.1 244.76 336.1 245.06 336.11 246.29 336.12 246.7 336.12
 248.99 336.16 325.44 337 386.01 338.52 387.43 338.54 389.78 338.6
 460.26 340.29 508.6 342.4

Manning's n Values num= 4
 Sta n Val Sta n Val Sta n Val Sta n Val
 0 .05 100.71 .1 171.09 .018 194.36 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 100.71 171.09 192.47 203.49 166.15 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 194.19 508.6 355 F

Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 224.96 364.18 355 194.19 223.55 355

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 2084.121

INPUT Description: Station Elevation Data num= 20
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 343.32 3.03 343.22 4.86 342.69 14.12 339.51 18.89 339.49
 41.5 338.27 75.39 326.06 78.71 324.63 78.88 324.63 81.99 324.57
 84.94 324.5 120.3 323.66 121.04 323.64 124.31 324.82 142.05 335.87
 147.5 336.18 181.97 337.38 238.05 340.19 257.12 341.26 297.91 342.45

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .045 41.5 .045 78.71 .09 121.04 .045 142.05 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1873.917

INPUT Description: Station Elevation Data num= 26
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 340.21 17.09 339.65 39.55 338.56 61.14 337.05 81.03 336.14
 115.12 334.57 134.63 333.59 142.49 333.41 173.44 333.29 183.84 331.18
 187.67 331.71 213.06 322.1 215.35 321.2 216.73 320.65 216.93 321.56
 219.6 320.91 236.95 322.4 237.63 322.46 247.85 327.08 264.56 334.38
 268.74 334.51 291.21 334.95 349.13 338.03 359.34 338.6 382.09 339.7

400.21 340.57

Manning's n Values num= 5
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 187.67 .045 216.73 .07 237.63 .045 264.56 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1798.381

INPUT Description: Station Elevation Data num= 28
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 339.93 20.76 338.33 34.9 337.29 43.91 336.86 80.21 336.29
 106.62 334.56 108.42 334.49 111.81 334.03 120.4 332.53 130.3 332.43
 145.23 332.41 162.57 332.46 189.06 332.11 209.47 320.89 212.4 319.12
 213.36 318.55 217.53 319.07 230.09 320.47 230.3 320.49 241.01 327.31
 251.36 333.45 261.86 333.65 282.99 334.07 311.3 335.51 337.2 336.66
 361.35 337.67 376.05 338.28 385 338.34

Manning's n Values num= 7
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 111.81 .03 145.23 .018 189.06 .045 213.36 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1641.59

INPUT Description: Station Elevation Data num= 35
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 340.68 1.61 340.61 18.07 339.34 51.19 338.49 64.73 338.25
 76.62 338.37 96.55 334.06 102.18 332.66 107 332.47 132.46 331.7
 173.79 330.79 192.62 330.21 201.99 326.01 214.26 319.86 233.15 317.02
 240.74 315.81 240.97 315.77 250.34 315.79 263.52 315.86 263.99 315.86
 286.95 327.05 291.75 328.69 305.69 329.86 312.05 330.08 316.94 331.88
 325.73 334.89 331.83 335.09 343.08 335.52 348.82 335.8 358.59 336.23
 362.71 336.34 367.96 336.49 384.52 343.09 390.68 345.64 392.33 345.74

Manning's n Values num= 8
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val
 0 .018 76.62 .03 102.18 .018 173.79 .045 192.62 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1489.686

INPUT Description: U/S entrance into parking lot from Alvarado Road Station Elevation Data num= 44
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 0 341.18 5.24 341.09 9.17 340.94 29.19 341.04 51.52 341.21
 54.59 341.23 57.81 340.42 90.09 332.29 97.19 331.92 105.34 331.24
 124.03 331.03 143.5 330.35 152.39 330.19 161.87 329.95 181.33 330.22
 189.35 329.44 194.28 329.6 209.49 329.36 212.54 329.44 223.08 313.17
 223.09 313.09 223.19 313.09 223.63 313.09 245.83 312.88 247.67 312.85
 248.3 312.84 259.06 325.58 266.06 329.87 270.18 333.4 273.74 333.42
 279.01 333.51 284.93 333.58 288.34 333.54 304.18 333.87 316.96 334
 320.02 334.03 330.36 334.72 331.8 334.82 332.71 335.29 349.96 344.38
 366.14 344.7 372.42 344.79 374.69 345.11 376.49 345.4

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	57.81	.03	90.09	.018	152.39	.045	223.09	.1
248.3	.045	279.01	.025	320.02	.035	349.96	.018		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	212.54	266.06		50.44	50.64		51.04	.1	.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1439.048

INPUT
 Description: D/S entrance into parking lot from Alvarado Road

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.43	40.16	343.19	78.69	333.68	83.72	332.42	89.53	332.28
116.49	332.58	122.27	333.43	134.23	333.5	135.38	333.64	140.72	334.1
151.34	334.51	154.27	332.63	158.9	332.13	161.85	331.85	162.38	331.92
179.21	323.2	179.22	323.2	181.06	322.49	188.67	311.46	189.58	311.49
208.3	312.1	212.7	312.15	213.36	312.16	218.98	318.88	229.67	325.7
239.35	332.77	245.09	332.94	254.59	333.31	269.24	333.47	270.27	333.47
271.27	333.45	271.68	333.45	273.42	333.49	287.61	333.76	294.66	333.88
299.61	333.98	314.16	342.13	317.45	343.9	320.98	343.95	340.1	344.22
343.78	344.69								

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	40.16	.04	151.34	.025	162.38	.05	188.67	.1
213.36	.05	239.35	.018						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	162.38	239.35		146.36	150.92		160.49	.1	.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1288.123

INPUT
 Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.6	14.55	338.01	21.13	337.7	27.84	338.08	79.31	338.07
88.69	337.05	91.87	336.74	110.15	329.23	117.39	326.25	125.52	322.94
136.54	316.75	156.79	307	156.94	307	180.63	306.79	182.71	306.8
183.29	306.8	185.93	308.74	210.07	324.11	228.7	330.05	244.22	331.52
244.99	331.6	245.97	331.64	260.21	332.16	263.18	332.11	269.92	331.99
284.82	338.34	291.98	341.35	303.02	342.02	312.33	342.94		

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.018	88.69	.045	110.15	.05	156.79	.1	183.29	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	110.15	228.7		168.1	176.49		194.32	.1	.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 1111.63

INPUT
 Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	351.86	27.2	339.28	44.8	338.7	60.26	338	88.84	336.97
109.09	336.63	121.36	328.337	127.82	323.97	130.06	322.53	159.44	306.78
174.11	305.82	190.49	304.74	192.3	304.62	213	303.96	228.71	303.46
229.22	303.44	229.84	303.43	234.91	306.4	256.18	318.46	259.39	319.37
274.82	324.82	286.38	328.68	289.62	328.69	320.59	329.07	333.47	329.42
337.85	329.64	342.23	329.86	354.08	330.57	354.39	330.55	358.31	330.23
362.71	329.87	362.89	329.86	365.46	330.96	384.93	339.39	389.83	339.47
395.28	339.51	404.27	339.58	405.55	339.49	405.96	339.45	408.14	339.49

413.47 339.62

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	27.2	.018	121.36	.05	159.44	.1	229.84	.05
286.38	.03	333.47	.018	365.46	.025	389.83	.018		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	121.36	286.38		256.29	284.82		327.16	.1	.3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 354.08 413.37 330.57 F

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 826.8154

INPUT
 Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	355.56	4.94	351.36	17.74	344.66	39.17	335.21	56.65	334.94
94.27	334.06	98.75	333.91	109.22	334.5	124.61	335.26	130.67	331.28
151.97	319.94	180.98	311.04	194.35	304.59	200.85	303.97	214.63	302.65
227.33	301.92	259.57	301.53	267	301.19	267.72	301.31	278.8	303.19
316.51	308.07	319.03	308.44	319.58	308.75	320.87	309.48	355.52	328.08
359.81	328.25	372.61	328.88	385.26	329.13	393.73	329.21	395.14	334.02
397.85	343.69	401.51	343.22	402.37	343.08	403.61	343.18		

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.17	.018	124.61	.045	194.35	.1	267.72	.045
359.81	.018								

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	130.67	355.52		157.21	150.78		167.76	.1	.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 676.0353

INPUT
 Description:

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	345.1	29.14	330.56	60.41	328.44	62.38	328.3	69.47	328.27
104.89	328.09	105.89	327.33	108.93	326.04	143.06	308.42	162.36	302.38
179	299.1	179.23	299.08	180.51	298.96	193.33	297.54	206.23	297.24
218.47	296.71	218.93	296.69	236.81	304.72	242.08	307.35	250.99	313.25
272.48	328.3	279.05	333.5	285.26	335.19	285.9	335.38	286.53	335.38
302.36	335.48	313.71	335.54	323.25	335.63	327.45	345.35	327.55	345.59
331.52	345.04	332.41	344.95	337.43	345.13				

Manning's n Values									
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.025	29.14	.018	104.89	.05	179.23	.01	218.93	.05
286.53	.018								

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	104.89	272.48		122.82	64.52		43.7	.1	.3

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 611.5112

INPUT
 Description: U/S face of Alvarado Road and College Avenue Crossing

Station Elevation Data									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	341.58	14.76	339.24	27.46	338.13	29.82	337.84	68.72	332.32
70.64	332.05	72.38	331.77	120.87	326.29	127.06	325.35	136.03	322.92
169.31	318.86	189.35	317.66	191.73	317.63	199.52	317.51	223.02	316.04
233.55	314.43	267.61	312.59	276.82	312.06	282.28	302.42	287.17	295.54

287.56	295.54	290.32	295.54	292.26	295.54	297.64	295.47	298.38	295.46
300.9	298.16	311.19	311.26	311.2	311.29	311.21	311.29	311.21	311.3
311.23	311.3	312.01	311.55	313.81	312.86	345.92	335.95	352.92	337.02
353.12	337.05	353.87	337.18	354.92	337.21	370.99	337.72	371.68	337.74
374.54	337.86	391.45	338.57	393.86	342.44	396.02	345.96	400.81	345.28
400.91	345.26	400.98	345.25	408.76	345.53	435.17	346.49	435.96	346.51
436.48	346.51								

Manning's n	Val	Sta	num=	4
0	.05	287.17	.07	297.64
			.05	354.92
				.018

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	276.82	312.01		0	0	0		.3	.5

SUMMARY OF MANNING'S N VALUES

River: Alvarado Channel

n9	Reach	n10	River Sta.	n11	n12	n1	n13	n2	n14	n3	n4	n5	n6	n7	n8
Upper Reach	4559.274					.018		.016	.018						
Upper Reach	4543.777				Lat Struct										
Upper Reach	4502.213					.018		.016	.018						
Upper Reach	4466.915					.018		.016	.018						
Upper Reach	4439.706					.018		.016	.018						
Upper Reach	4275.023					.018		.03	.016	.018					
Upper Reach	3913.392					.03		.016	.018						
Upper Reach	3758.046					.05		.016	.02	.016					
Upper Reach	3600.906					.03		.016	.02	.018					
Upper Reach	3418.613					.05		.016	.018						
Upper Reach	3230.305					.05		.035	.016	.018					
Upper Reach	3018.677					.05		.035	.016	.018		.03	.018		
Upper Reach	2969.225					.05		.035	.016	.018		.03	.018	.03	
Upper Reach	2873.24					.03		.035	.016	.018		.03	.018	.03	
Upper Reach	2695.84					.03		.035	.016	.018		.03	.018	.03	
Upper Reach	2530				.03	.018		.03	.018						
Upper Reach	2529.382				.03	.018		.03	.018						
Upper Reach	2528				.03	.018		.03	.018						
Upper Reach	2435.063				.03	.018		.03	.018						
Upper Reach	2335.331				.03	.018		.03	.018						
Upper Reach	2317.214				Lat Struct										
Upper Reach	2308.404					.045		.035	.016	.018	.025				
Upper Reach	2287.614					.05		.1	.018	.025					
Upper Reach	2084.121					.045		.045	.09	.045	.018				
Upper Reach	1873.917					.018		.045	.07	.045	.018				
Upper Reach	1798.381					.018		.03	.018	.045	.07	.045	.018		
Upper Reach	1641.59					.018		.03	.018	.045	.06	.04	.018		
Upper Reach	1489.686					.018		.03	.018	.045	.1	.045	.025		
Upper Reach	1439.048					.018		.04	.025	.05	.1	.05	.018		
Upper Reach	1288.123					.018		.045	.05	.1	.05				
Upper Reach	1111.63					.045		.018	.05	.1	.05	.03	.018		
Upper Reach	826.8154					.035		.018	.045	.1	.045	.018			
Upper Reach	676.0353					.025		.018	.05	.01	.05	.018			
Upper Reach	611.5112					.05		.07	.05	.018					

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58

Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	160.84	165.46	225.33
Upper Reach	2530	1	1	1
Upper Reach	2529.382	1	1	1
Upper Reach	2528	108.52	93.32	35.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

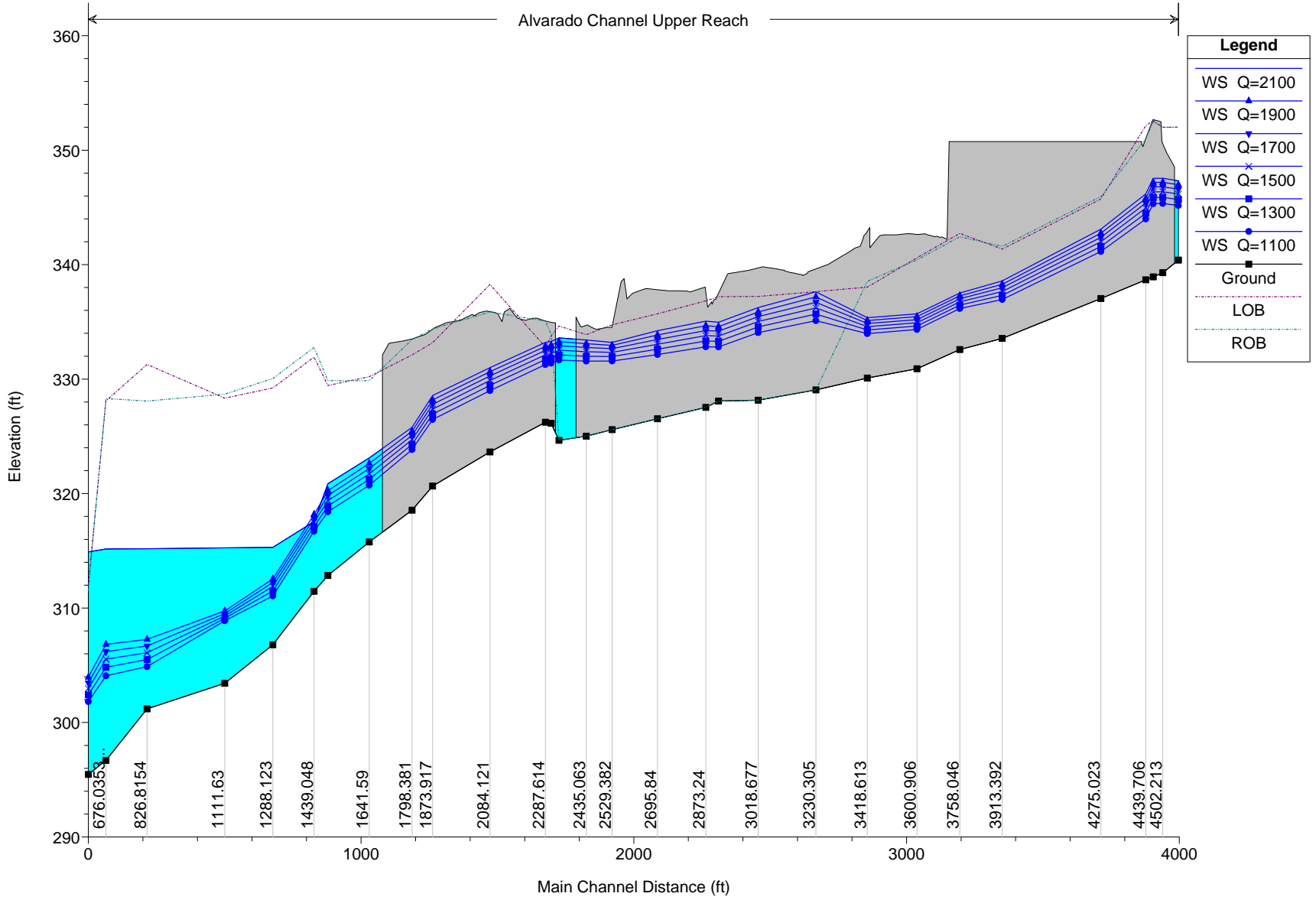
River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2530	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2528	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3
Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

Alvarado_Upper Plan: Multi-Q_for-non-erosive-vel 11/13/2014

Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Multi Q

Alvarado Channel Upper Reach



HEC-RAS Plan: multiQ-non-erosi River: Alvarado Channel Reach: Upper Reach

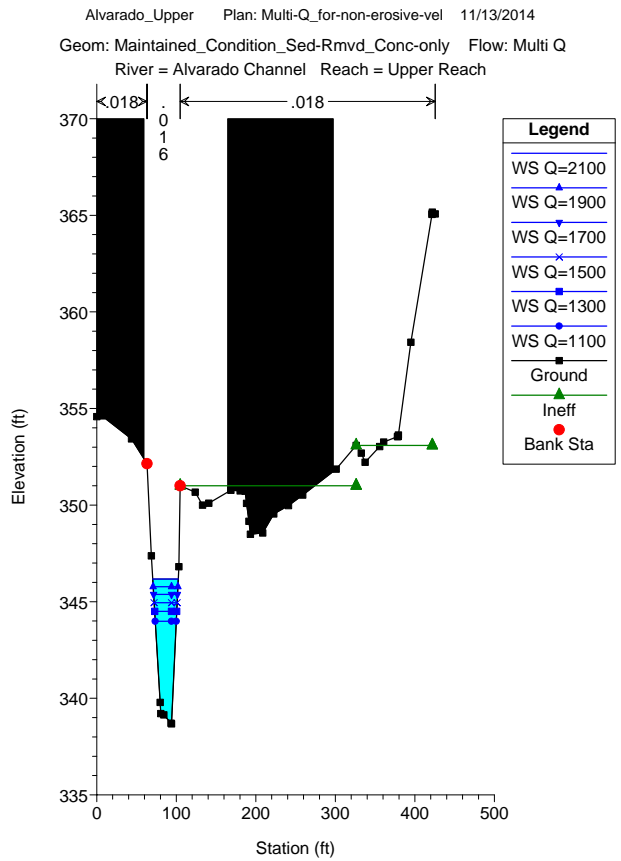
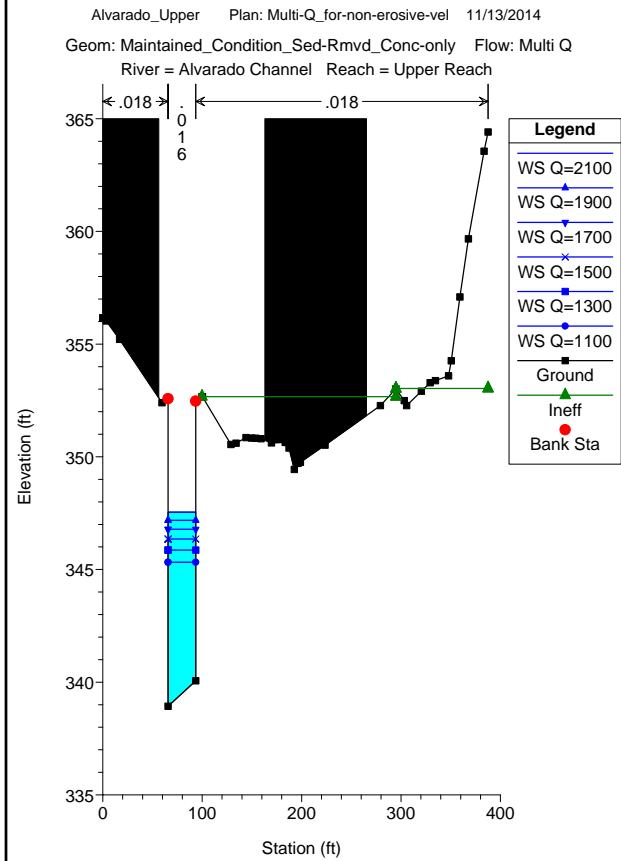
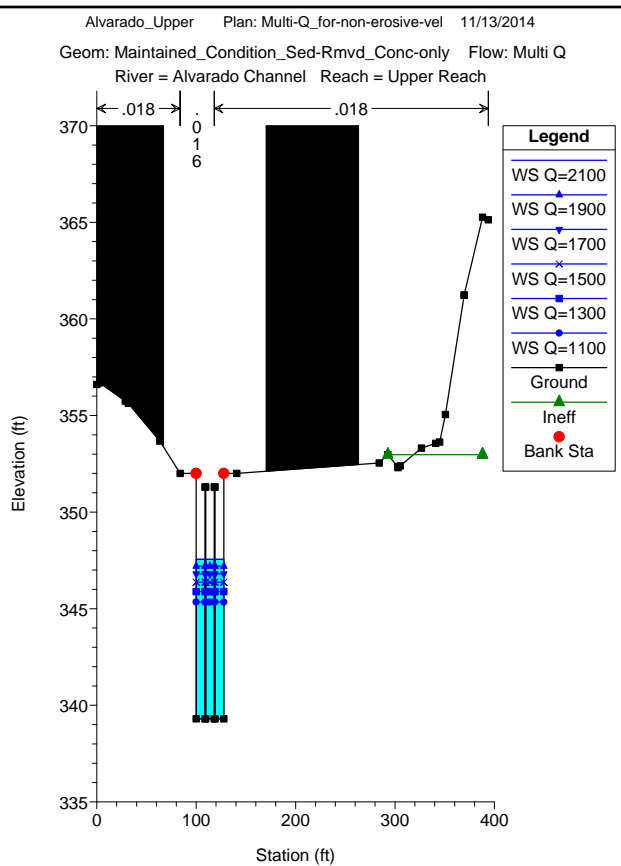
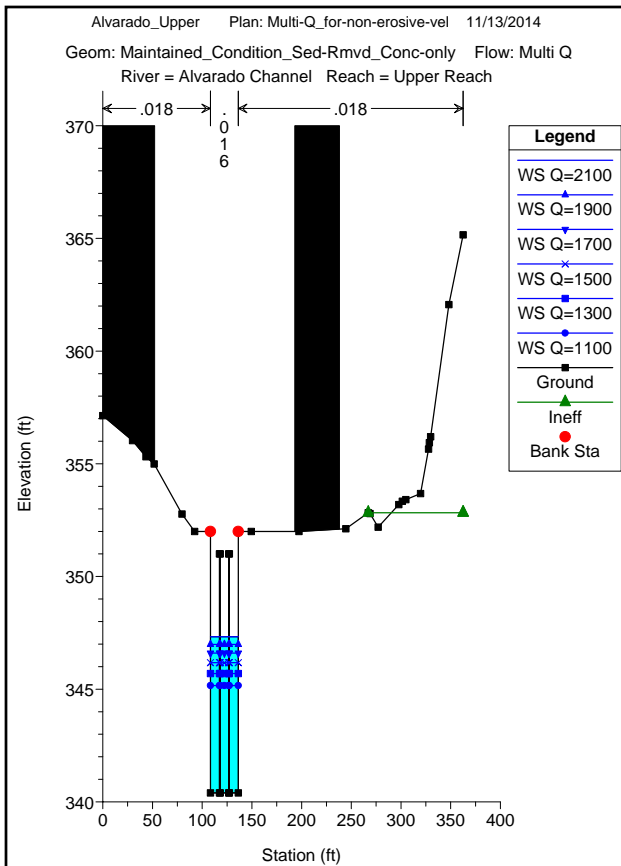
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Upper Reach	4559.274	Q=2100	2100.00	340.40	347.32	346.19	349.34	0.004002	11.40	184.20	26.60	0.76	
Upper Reach	4559.274	Q=1900	1900.00	340.40	346.98	345.81	348.81	0.003724	10.85	175.10	26.60	0.75	
Upper Reach	4559.274	Q=1700	1700.00	340.40	346.60	345.43	348.25	0.003475	10.31	164.88	26.60	0.73	
Upper Reach	4559.274	Q=1500	1500.00	340.40	346.17	345.03	347.65	0.003247	9.77	153.56	26.60	0.72	
Upper Reach	4559.274	Q=1300	1300.00	340.40	345.69	344.60	347.02	0.003056	9.23	140.78	26.60	0.71	
Upper Reach	4559.274	Q=1100	1100.00	340.40	345.16	344.16	346.33	0.002891	8.69	126.60	26.60	0.70	
Upper Reach	4543.777		Lat Struct										
Upper Reach	4502.213	Q=2100	2100.00	339.30	347.55	345.07	348.97	0.002811	9.57	219.49	26.60	0.59	
Upper Reach	4502.213	Q=1900	1900.00	339.30	347.20	344.71	348.47	0.002565	9.04	210.07	26.60	0.57	
Upper Reach	4502.213	Q=1700	1700.00	339.30	346.80	344.32	347.93	0.002332	8.52	199.60	26.60	0.55	
Upper Reach	4502.213	Q=1500	1500.00	339.30	346.37	343.92	347.36	0.002107	7.98	188.07	26.60	0.53	
Upper Reach	4502.213	Q=1300	1300.00	339.30	345.88	343.51	346.74	0.001895	7.42	175.14	26.60	0.51	
Upper Reach	4502.213	Q=1100	1100.00	339.30	345.35	343.06	346.07	0.001685	6.84	160.85	26.60	0.49	
Upper Reach	4466.915	Q=2100	2100.00	338.93	347.54	345.09	348.89	0.001145	9.32	225.32	28.00	0.58	
Upper Reach	4466.915	Q=1900	1900.00	338.93	347.18	344.72	348.39	0.001067	8.82	215.31	28.00	0.56	
Upper Reach	4466.915	Q=1700	1700.00	338.93	346.79	344.34	347.86	0.000995	8.33	204.19	28.00	0.54	
Upper Reach	4466.915	Q=1500	1500.00	338.93	346.35	343.95	347.30	0.000926	7.81	191.96	28.00	0.53	
Upper Reach	4466.915	Q=1300	1300.00	338.93	345.86	343.55	346.69	0.000861	7.29	178.32	28.00	0.51	
Upper Reach	4466.915	Q=1100	1100.00	338.93	345.32	343.13	346.03	0.000800	6.74	163.18	28.00	0.49	
Upper Reach	4439.706	Q=2100	2100.00	338.68	346.18	346.18	348.73	0.002631	12.82	163.79	32.08	1.00	
Upper Reach	4439.706	Q=1900	1900.00	338.68	345.78	345.78	348.23	0.002677	12.56	151.25	31.05	1.00	
Upper Reach	4439.706	Q=1700	1700.00	338.68	345.38	345.38	347.70	0.002699	12.23	139.05	30.02	1.00	
Upper Reach	4439.706	Q=1500	1500.00	338.68	344.95	344.95	347.14	0.002739	11.88	126.29	28.89	1.00	
Upper Reach	4439.706	Q=1300	1300.00	338.68	344.50	344.50	346.53	0.002758	11.45	113.56	27.73	1.00	
Upper Reach	4439.706	Q=1100	1100.00	338.68	343.98	343.98	345.87	0.002833	11.03	99.71	26.40	1.00	
Upper Reach	4275.023	Q=2100	2100.00	337.04	343.10	344.56	347.87	0.006103	17.52	119.90	27.90	1.49	
Upper Reach	4275.023	Q=1900	1900.00	337.04	342.75	344.17	347.37	0.006297	17.24	110.22	26.99	1.50	
Upper Reach	4275.023	Q=1700	1700.00	337.04	342.39	343.75	346.83	0.006507	16.92	100.50	26.05	1.52	
Upper Reach	4275.023	Q=1500	1500.00	337.04	342.00	343.31	346.25	0.006748	16.55	90.62	25.05	1.53	
Upper Reach	4275.023	Q=1300	1300.00	337.04	341.58	342.84	345.64	0.007062	16.16	80.45	23.98	1.55	
Upper Reach	4275.023	Q=1100	1100.00	337.04	341.14	342.34	344.96	0.007434	15.69	70.11	22.85	1.58	
Upper Reach	3913.392	Q=2100	2100.00	333.56	338.58	340.62	344.99	0.009416	20.32	103.34	26.76	1.82	
Upper Reach	3913.392	Q=1900	1900.00	333.56	338.28	340.24	344.43	0.009611	19.89	95.55	26.06	1.83	
Upper Reach	3913.392	Q=1700	1700.00	333.56	337.98	339.84	343.82	0.009822	19.40	87.65	25.34	1.84	
Upper Reach	3913.392	Q=1500	1500.00	333.56	337.65	339.40	343.17	0.010071	18.85	79.56	24.58	1.85	
Upper Reach	3913.392	Q=1300	1300.00	333.56	337.31	338.94	342.47	0.010326	18.22	71.35	23.78	1.85	
Upper Reach	3913.392	Q=1100	1100.00	333.56	336.96	338.44	341.69	0.010583	17.46	62.99	22.94	1.86	
Upper Reach	3758.046	Q=2100	2100.00	332.58	337.53	339.33	343.21	0.010780	19.13	109.77	29.11	1.74	
Upper Reach	3758.046	Q=1900	1900.00	332.58	337.28	338.96	342.60	0.010760	18.52	102.58	28.48	1.72	
Upper Reach	3758.046	Q=1700	1700.00	332.58	337.02	338.57	341.96	0.010687	17.84	95.31	27.83	1.70	
Upper Reach	3758.046	Q=1500	1500.00	332.58	336.75	338.16	341.27	0.010575	17.07	87.87	27.14	1.67	
Upper Reach	3758.046	Q=1300	1300.00	332.58	336.46	337.71	340.54	0.010410	16.21	80.20	26.42	1.64	
Upper Reach	3758.046	Q=1100	1100.00	332.58	336.17	337.25	339.74	0.010071	15.18	72.48	25.67	1.59	
Upper Reach	3600.906	Q=2100	2100.00	330.91	335.70	337.60	341.64	0.009048	19.54	107.45	29.12	1.79	
Upper Reach	3600.906	Q=1900	1900.00	330.91	335.46	337.22	341.03	0.009053	18.95	100.27	28.59	1.78	
Upper Reach	3600.906	Q=1700	1700.00	330.91	335.19	336.85	340.40	0.009064	18.31	92.86	28.04	1.77	
Upper Reach	3600.906	Q=1500	1500.00	330.91	334.92	336.43	339.72	0.009035	17.57	85.35	27.47	1.76	
Upper Reach	3600.906	Q=1300	1300.00	330.91	334.64	336.01	339.00	0.009002	16.77	77.54	26.86	1.74	
Upper Reach	3600.906	Q=1100	1100.00	330.91	334.33	335.53	338.22	0.008914	15.83	69.51	26.22	1.71	
Upper Reach	3418.613	Q=2100	2100.00	330.09	335.36	336.71	339.88	0.006066	17.05	123.18	30.32	1.49	
Upper Reach	3418.613	Q=1900	1900.00	330.09	335.12	336.35	339.30	0.005913	16.41	115.80	29.71	1.46	
Upper Reach	3418.613	Q=1700	1700.00	330.09	334.86	335.97	338.69	0.005746	15.72	108.17	29.07	1.44	
Upper Reach	3418.613	Q=1500	1500.00	330.09	334.58	335.57	338.05	0.005543	14.95	100.34	28.39	1.40	
Upper Reach	3418.613	Q=1300	1300.00	330.09	334.29	335.13	337.38	0.005317	14.11	92.12	27.67	1.36	
Upper Reach	3418.613	Q=1100	1100.00	330.09	333.98	334.65	336.67	0.005049	13.17	83.51	26.88	1.32	
Upper Reach	3230.305	Q=2100	2100.00	329.06	337.63	335.54	338.85	0.003762	7.33	257.71	47.45	0.50	
Upper Reach	3230.305	Q=1900	1900.00	329.06	337.18	335.19	338.33	0.003807	7.20	238.87	41.47	0.51	
Upper Reach	3230.305	Q=1700	1700.00	329.06	336.71	334.79	337.79	0.003851	7.04	219.71	40.13	0.51	
Upper Reach	3230.305	Q=1500	1500.00	329.06	336.22	334.40	337.21	0.003893	6.87	200.14	38.70	0.51	
Upper Reach	3230.305	Q=1300	1300.00	329.06	335.69	333.97	336.60	0.003940	6.67	179.96	37.18	0.51	
Upper Reach	3230.305	Q=1100	1100.00	329.06	335.11	333.52	335.94	0.003990	6.43	159.09	35.53	0.52	
Upper Reach	3018.677	Q=2100	2100.00	328.16	336.25	334.64	337.82	0.005596	9.09	216.77	74.16	0.61	
Upper Reach	3018.677	Q=1900	1900.00	328.16	335.87	334.26	337.32	0.005471	8.79	203.59	69.96	0.60	
Upper Reach	3018.677	Q=1700	1700.00	328.16	335.46	333.86	336.79	0.005334	8.47	189.93	33.22	0.60	
Upper Reach	3018.677	Q=1500	1500.00	328.16	335.03	333.44	336.23	0.005176	8.12	175.77	32.35	0.59	
Upper Reach	3018.677	Q=1300	1300.00	328.16	334.56	332.99	335.63	0.005005	7.73	160.86	31.40	0.58	
Upper Reach	3018.677	Q=1100	1100.00	328.16	334.05	332.53	334.98	0.004806	7.28	145.15	30.36	0.56	
Upper Reach	2969.225	Q=2100	2100.00	328.08	334.97	334.14	336.85	0.007959	10.20	196.31	44.78	0.74	
Upper Reach	2969.225	Q=1900	1900.00	328.08	334.59	333.79	336.35	0.007986	9.94	182.81	34.92	0.74	

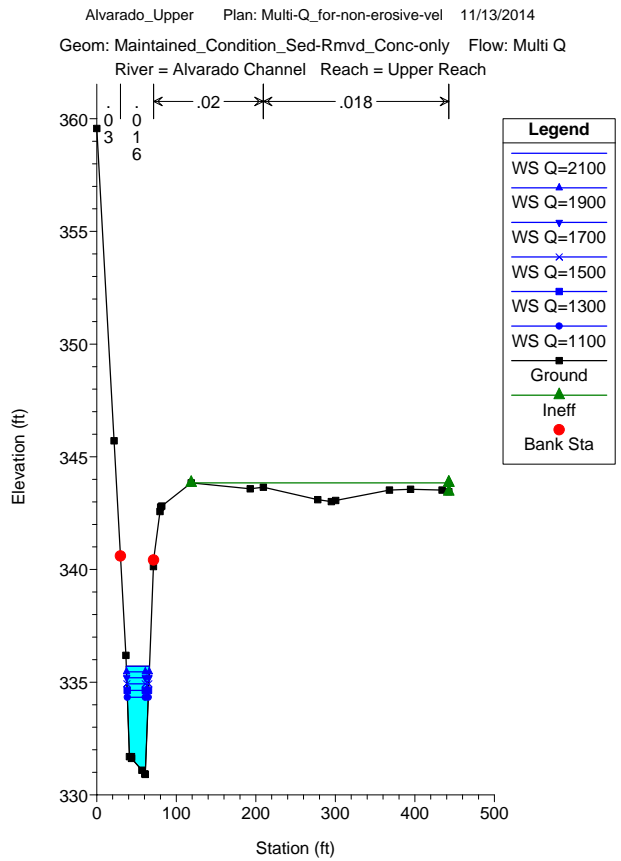
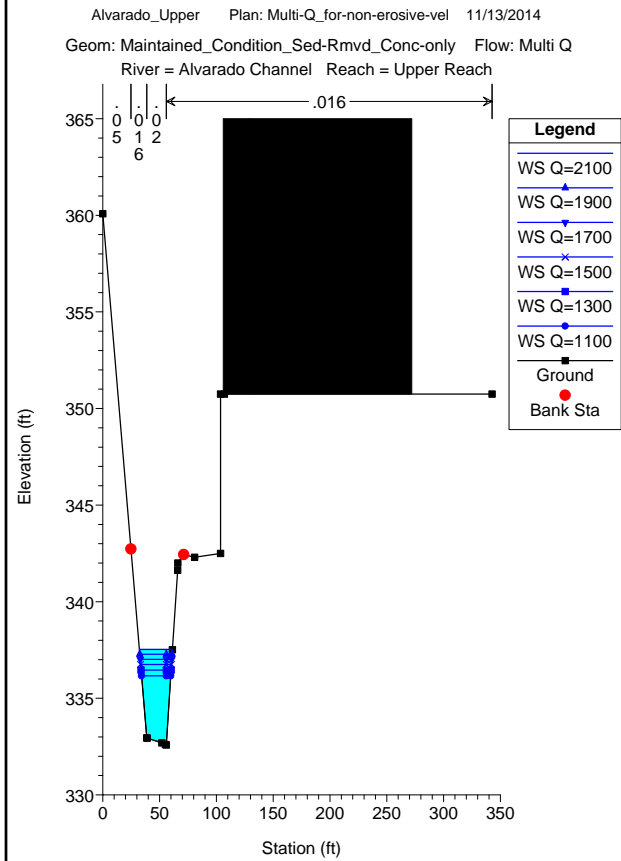
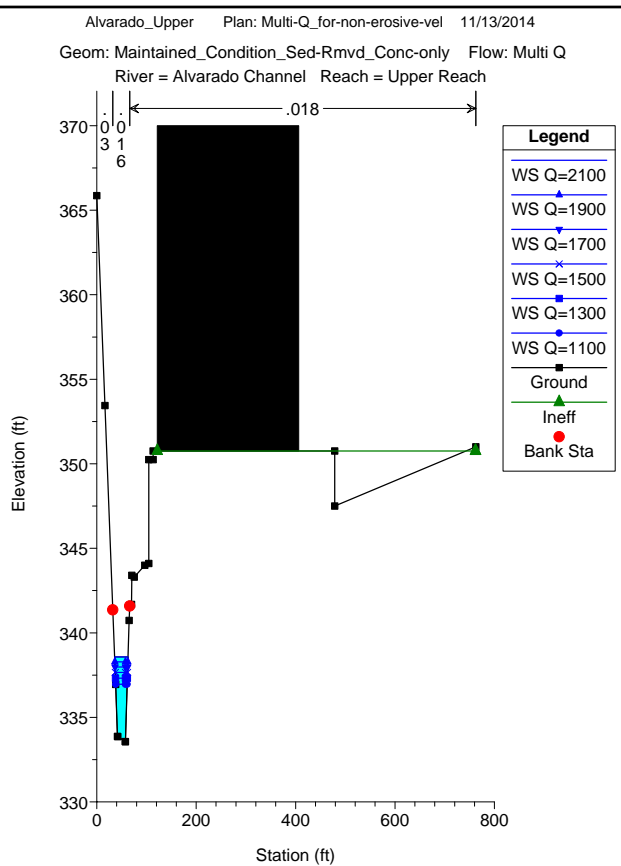
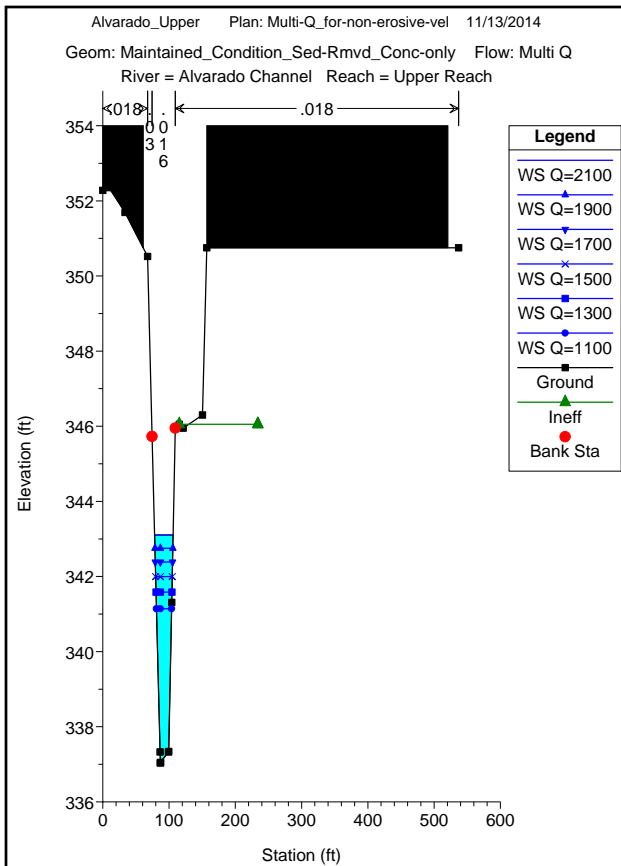
HEC-RAS Plan: multiQ-non-erosi River: Alvarado Channel Reach: Upper Reach (Continued)

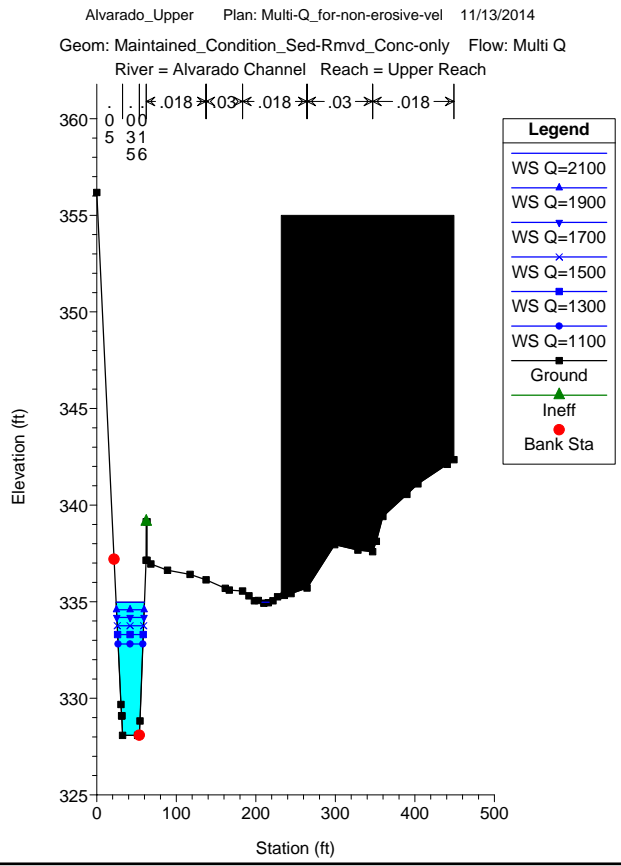
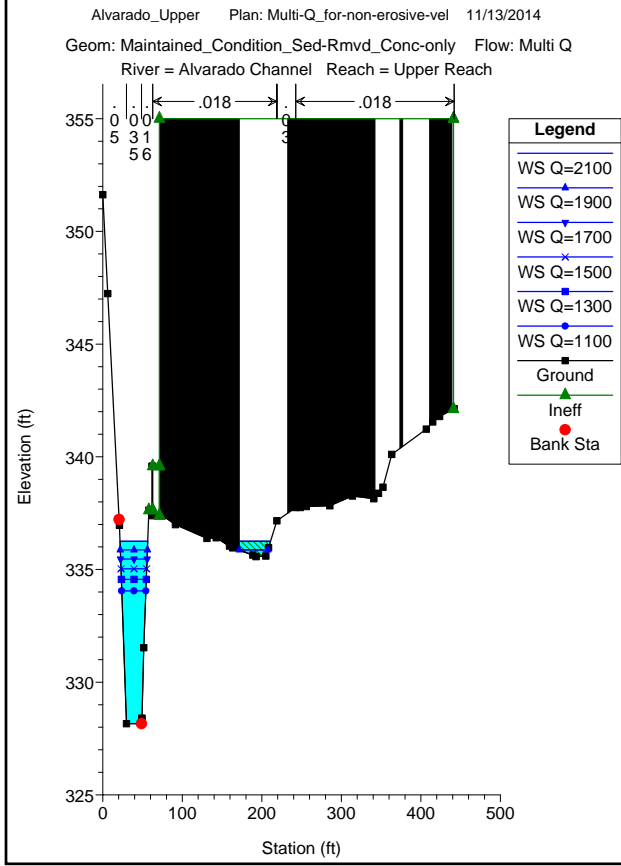
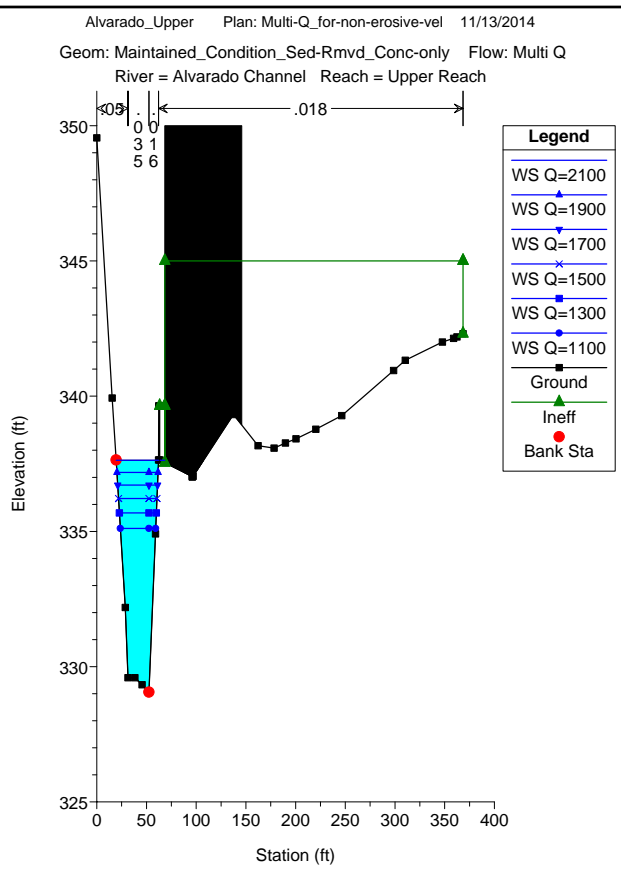
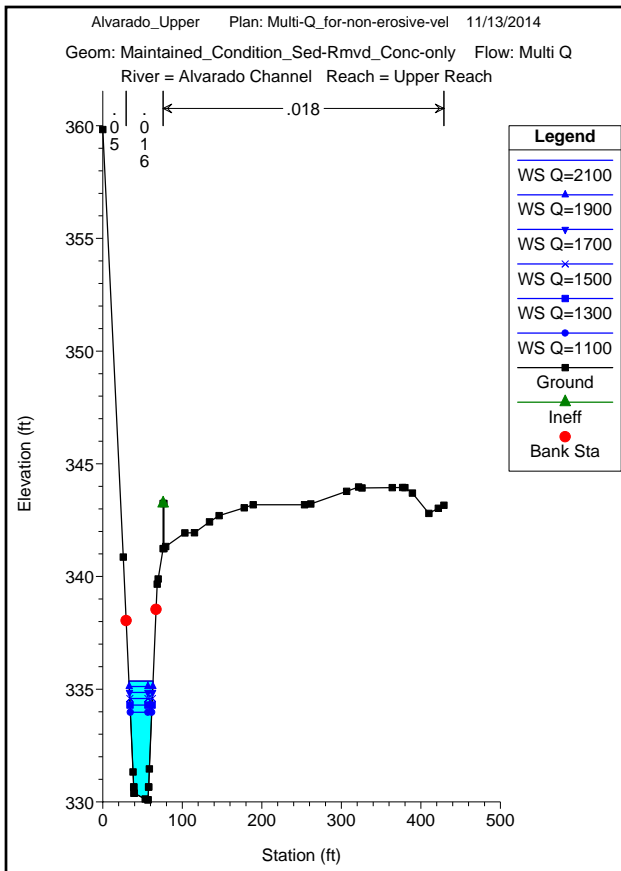
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	2969.225	Q=1700	1700.00	328.08	334.18	333.41	335.83	0.008023	9.67	168.88	34.08	0.74
Upper Reach	2969.225	Q=1500	1500.00	328.08	333.75	333.02	335.28	0.008070	9.36	154.50	33.19	0.74
Upper Reach	2969.225	Q=1300	1300.00	328.08	333.30	332.59	334.69	0.008124	9.02	139.60	32.24	0.74
Upper Reach	2969.225	Q=1100	1100.00	328.08	332.81	332.14	334.06	0.008199	8.62	124.03	31.22	0.74
Upper Reach	2873.24	Q=2100	2100.00	327.53	335.06	333.41	336.44	0.004147	9.42	222.77	102.00	0.65
Upper Reach	2873.24	Q=1900	1900.00	327.53	334.66	333.05	335.95	0.004127	9.11	208.55	94.61	0.64
Upper Reach	2873.24	Q=1700	1700.00	327.53	334.24	332.67	335.44	0.004104	8.77	193.91	86.41	0.63
Upper Reach	2873.24	Q=1500	1500.00	327.53	333.80	332.29	334.89	0.004075	8.40	178.76	58.99	0.63
Upper Reach	2873.24	Q=1300	1300.00	327.53	333.33	331.87	334.32	0.004034	7.98	163.06	32.90	0.62
Upper Reach	2873.24	Q=1100	1100.00	327.53	332.82	331.44	333.70	0.003982	7.51	146.61	32.01	0.60
Upper Reach	2695.84	Q=2100	2100.00	326.53	334.23	332.79	335.73	0.003854	9.11	218.59	129.10	0.63
Upper Reach	2695.84	Q=1900	1900.00	326.53	333.86	332.43	335.25	0.003802	8.79	205.15	110.54	0.62
Upper Reach	2695.84	Q=1700	1700.00	326.53	333.46	332.04	334.75	0.003738	8.43	191.34	81.86	0.61
Upper Reach	2695.84	Q=1500	1500.00	326.53	333.05	331.64	334.21	0.003655	8.05	177.16	33.78	0.60
Upper Reach	2695.84	Q=1300	1300.00	326.53	332.61	331.22	333.65	0.003540	7.60	162.63	32.95	0.58
Upper Reach	2695.84	Q=1100	1100.00	326.53	332.15	330.77	333.05	0.003391	7.10	147.54	32.06	0.57
Upper Reach	2529.382	Q=2100	2100.00	325.58	333.20	332.02	334.92	0.005185	9.91	202.94	34.25	0.68
Upper Reach	2529.382	Q=1900	1900.00	325.58	332.95	331.65	334.48	0.004824	9.39	194.24	33.73	0.66
Upper Reach	2529.382	Q=1700	1700.00	325.58	332.65	331.25	334.01	0.004491	8.86	184.48	33.15	0.63
Upper Reach	2529.382	Q=1500	1500.00	325.58	332.34	330.84	333.52	0.004151	8.31	173.99	32.51	0.60
Upper Reach	2529.382	Q=1300	1300.00	325.58	331.98	330.40	333.00	0.003812	7.73	162.49	31.80	0.58
Upper Reach	2529.382	Q=1100	1100.00	325.58	331.58	329.93	332.43	0.003458	7.11	149.97	31.00	0.55
Upper Reach	2435.063	Q=2100	2100.00	325.02	333.41	331.06	334.29	0.003820	7.31	281.90	49.04	0.52
Upper Reach	2435.063	Q=1900	1900.00	325.02	333.10	330.73	333.90	0.003635	7.00	266.85	47.90	0.51
Upper Reach	2435.063	Q=1700	1700.00	325.02	332.76	330.38	333.48	0.003453	6.68	250.71	46.64	0.49
Upper Reach	2435.063	Q=1500	1500.00	325.02	332.39	330.02	333.04	0.003254	6.34	233.88	45.28	0.48
Upper Reach	2435.063	Q=1300	1300.00	325.02	332.00	329.63	332.56	0.003032	5.95	216.24	43.82	0.46
Upper Reach	2435.063	Q=1100	1100.00	325.02	331.57	329.20	332.05	0.002780	5.53	197.66	42.22	0.44
Upper Reach	2335.331	Q=2100	2100.00	324.65	333.60		333.98	0.001081	3.78	481.48	76.83	0.24
Upper Reach	2335.331	Q=1900	1900.00	324.65	333.28		333.61	0.001039	3.66	457.25	71.79	0.23
Upper Reach	2335.331	Q=1700	1700.00	324.65	332.92		333.20	0.000990	3.52	431.72	70.75	0.23
Upper Reach	2335.331	Q=1500	1500.00	324.65	332.53		332.78	0.000938	3.37	404.73	69.63	0.22
Upper Reach	2335.331	Q=1300	1300.00	324.65	332.12		332.32	0.000885	3.21	375.93	68.53	0.22
Upper Reach	2335.331	Q=1100	1100.00	324.65	331.66		331.83	0.000825	3.02	345.02	67.35	0.21
Upper Reach	2317.214		Lat Struct									
Upper Reach	2308.404	Q=2100	2100.00	326.14	333.29		333.91	0.002737	6.35	330.77	61.47	0.48
Upper Reach	2308.404	Q=1900	1900.00	326.14	332.96		333.54	0.002693	6.11	310.87	60.29	0.47
Upper Reach	2308.404	Q=1700	1700.00	326.14	332.60		333.14	0.002660	5.87	289.68	59.00	0.47
Upper Reach	2308.404	Q=1500	1500.00	326.14	332.23		332.71	0.002624	5.60	267.65	57.64	0.46
Upper Reach	2308.404	Q=1300	1300.00	326.14	331.82		332.26	0.002583	5.32	244.58	56.17	0.45
Upper Reach	2308.404	Q=1100	1100.00	326.14	331.38		331.77	0.002534	4.99	220.33	54.59	0.44
Upper Reach	2287.614	Q=2100	2100.00	326.23	333.20	330.87	333.78	0.019791	6.10	346.21	78.90	0.47
Upper Reach	2287.614	Q=1900	1900.00	326.23	332.87	330.61	333.41	0.019962	5.91	321.46	67.77	0.47
Upper Reach	2287.614	Q=1700	1700.00	326.23	332.51	330.34	333.01	0.019949	5.70	298.07	64.17	0.47
Upper Reach	2287.614	Q=1500	1500.00	326.23	332.12	330.06	332.59	0.019905	5.48	273.85	62.66	0.46
Upper Reach	2287.614	Q=1300	1300.00	326.23	331.72	329.76	332.14	0.019896	5.23	248.51	61.05	0.46
Upper Reach	2287.614	Q=1100	1100.00	326.23	331.27	329.43	331.65	0.019883	4.96	221.92	59.21	0.45
Upper Reach	2084.121	Q=2100	2100.00	323.64	331.00		331.44	0.007271	5.30	395.93	72.57	0.40
Upper Reach	2084.121	Q=1900	1900.00	323.64	330.65		331.06	0.007328	5.13	370.29	71.01	0.40
Upper Reach	2084.121	Q=1700	1700.00	323.64	330.27		330.65	0.007380	4.94	343.99	69.36	0.39
Upper Reach	2084.121	Q=1500	1500.00	323.64	329.87		330.22	0.007437	4.74	316.71	67.62	0.39
Upper Reach	2084.121	Q=1300	1300.00	323.64	329.45		329.76	0.007507	4.51	288.21	65.75	0.38
Upper Reach	2084.121	Q=1100	1100.00	323.64	328.99		329.27	0.007555	4.25	258.63	63.75	0.37
Upper Reach	1873.917	Q=2100	2100.00	320.65	328.56		329.52	0.011141	7.84	267.82	55.25	0.63
Upper Reach	1873.917	Q=1900	1900.00	320.65	328.19		329.10	0.011484	7.68	247.38	53.40	0.63
Upper Reach	1873.917	Q=1700	1700.00	320.65	327.79		328.66	0.011853	7.50	226.71	51.45	0.63
Upper Reach	1873.917	Q=1500	1500.00	320.65	327.38		328.20	0.012251	7.29	205.77	49.40	0.63
Upper Reach	1873.917	Q=1300	1300.00	320.65	326.94		327.71	0.012678	7.05	184.50	47.25	0.63
Upper Reach	1873.917	Q=1100	1100.00	320.65	326.46		327.17	0.013135	6.76	162.81	44.96	0.63
Upper Reach	1798.381	Q=2100	2100.00	318.55	325.79	325.79	328.07	0.030938	12.12	173.23	38.06	1.00
Upper Reach	1798.381	Q=1900	1900.00	318.55	325.45	325.45	327.62	0.031681	11.84	160.45	36.90	1.00
Upper Reach	1798.381	Q=1700	1700.00	318.55	325.08	325.08	327.15	0.032556	11.54	147.35	35.68	1.00
Upper Reach	1798.381	Q=1500	1500.00	318.55	324.70	324.70	326.65	0.033593	11.20	133.90	34.37	1.00
Upper Reach	1798.381	Q=1300	1300.00	318.55	324.29	324.29	326.11	0.034864	10.83	120.03	32.98	1.00
Upper Reach	1798.381	Q=1100	1100.00	318.55	323.84	323.84	325.53	0.036474	10.41	105.64	31.47	1.00
Upper Reach	1641.59	Q=2100	2100.00	315.77	323.12	320.51	323.61	0.005926	5.62	373.75	71.12	0.43
Upper Reach	1641.59	Q=1900	1900.00	315.77	322.63	320.26	323.12	0.006399	5.59	339.87	69.16	0.44
Upper Reach	1641.59	Q=1700	1700.00	315.77	322.19	320.02	322.66	0.006737	5.49	309.51	67.36	0.45
Upper Reach	1641.59	Q=1500	1500.00	315.77	321.73	319.76	322.18	0.007140	5.38	278.74	65.49	0.46

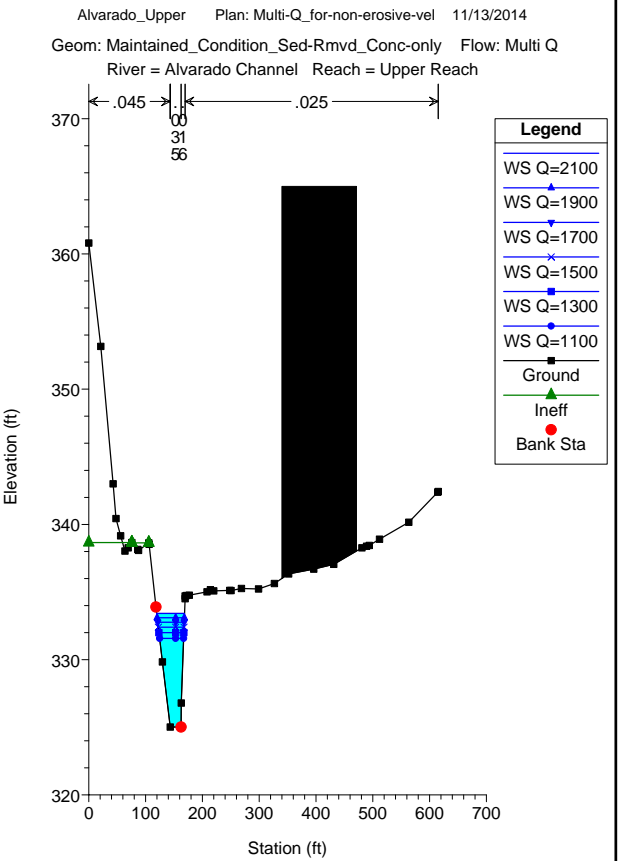
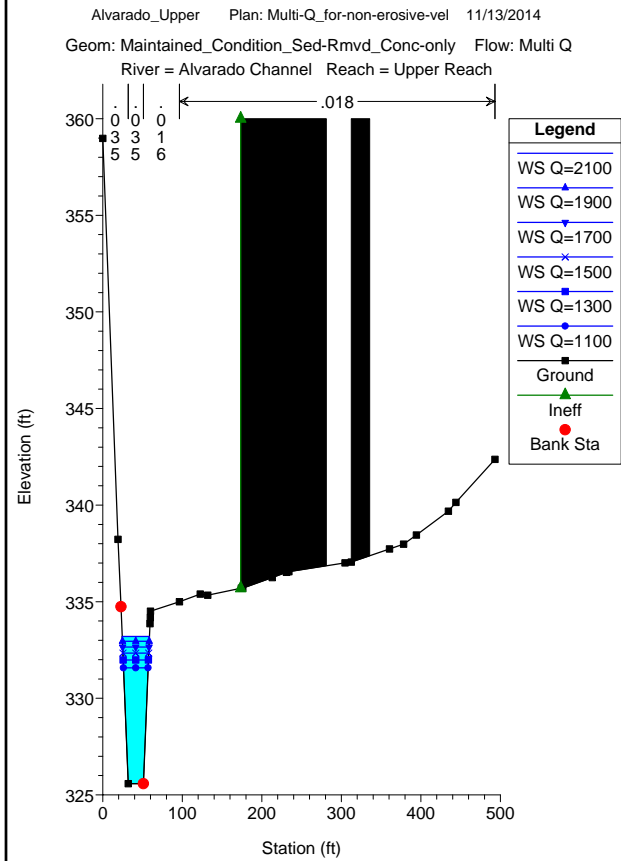
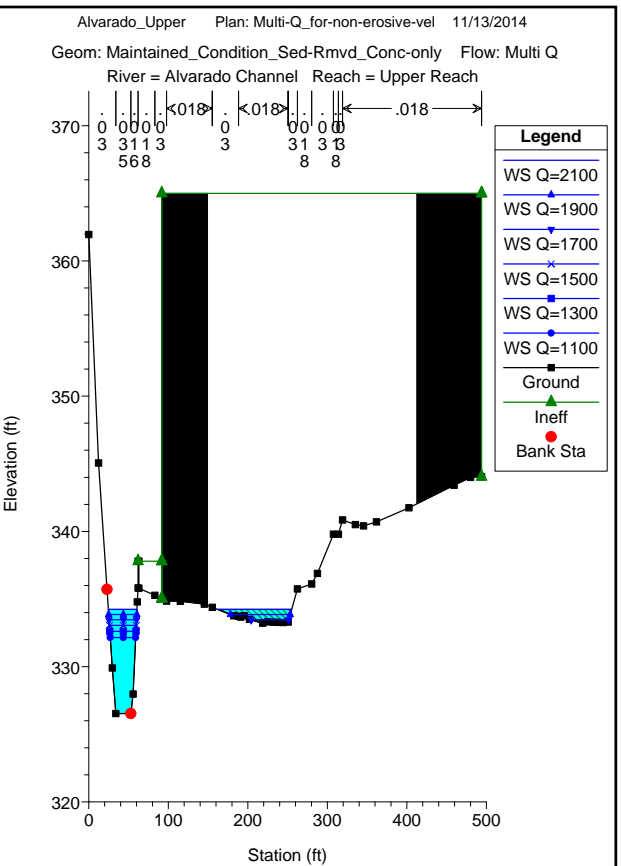
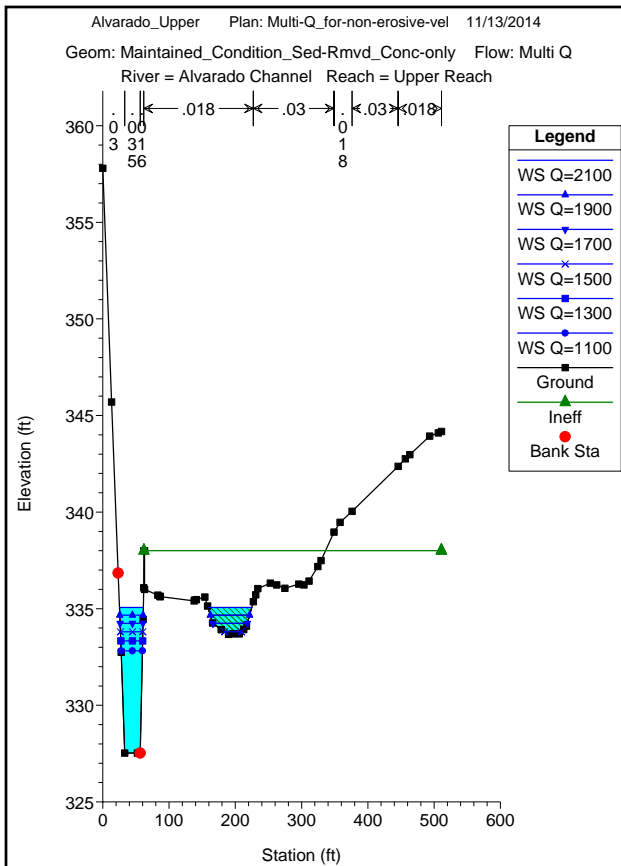
HEC-RAS Plan: multiQ-non-erosi River: Alvarado Channel Reach: Upper Reach (Continued)

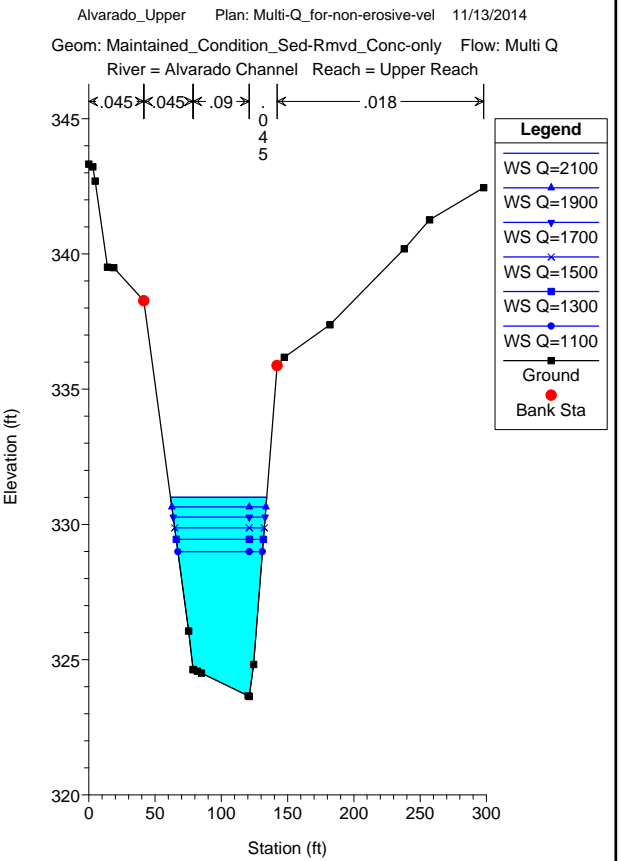
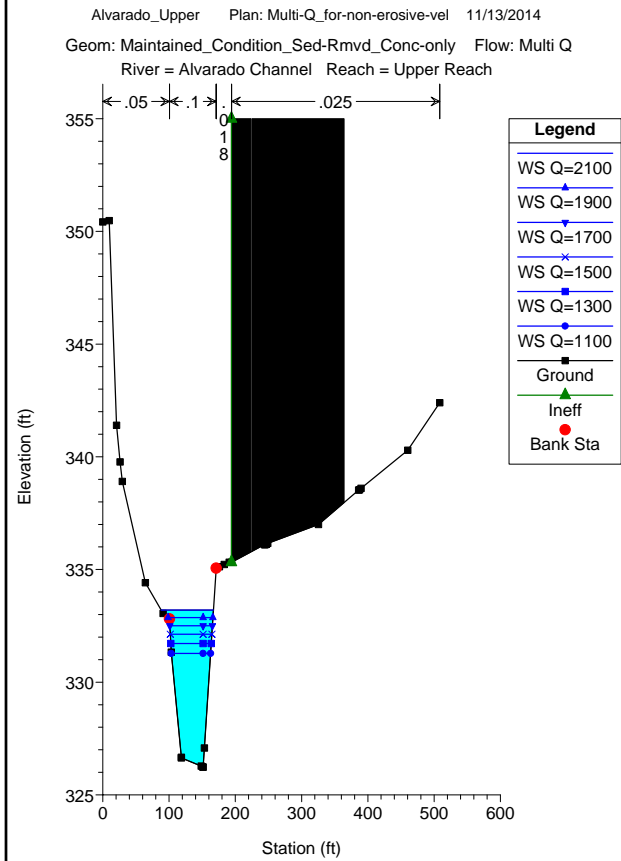
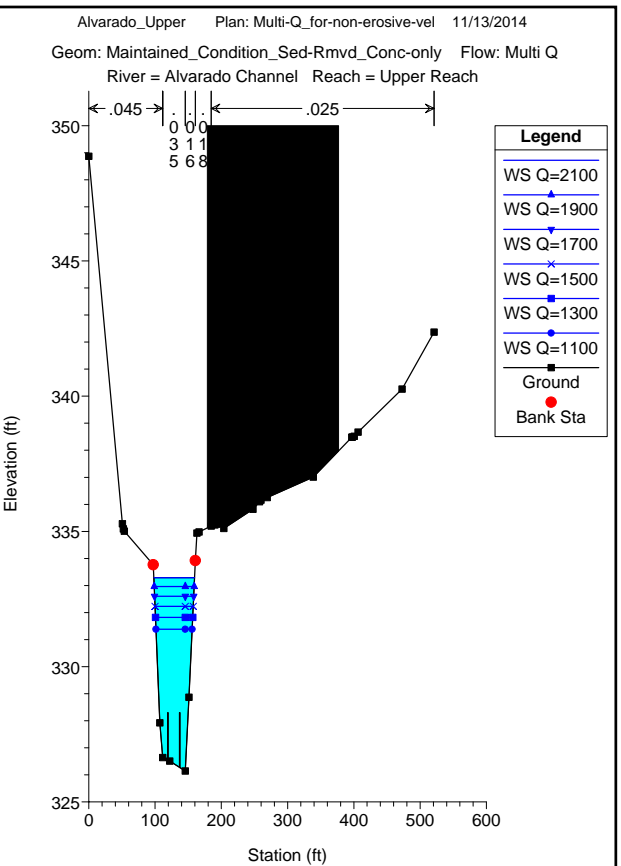
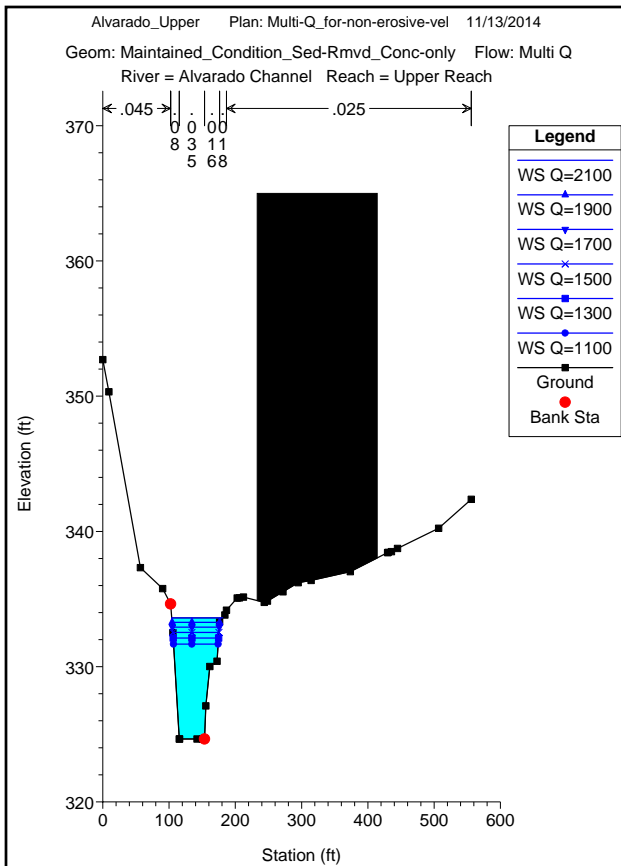
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper Reach	1641.59	Q=1300	1300.00	315.77	321.24	319.46	321.67	0.007630	5.25	247.49	63.53	0.47
Upper Reach	1641.59	Q=1100	1100.00	315.77	320.73	319.14	321.14	0.008244	5.10	215.64	61.46	0.48
Upper Reach	1489.686	Q=2100	2100.00	312.84	320.86		322.00	0.021215	8.56	245.27	36.98	0.59
Upper Reach	1489.686	Q=1900	1900.00	312.84	320.25		321.38	0.023434	8.53	222.85	36.06	0.60
Upper Reach	1489.686	Q=1700	1700.00	312.84	319.83		320.87	0.023326	8.18	207.89	35.44	0.59
Upper Reach	1489.686	Q=1500	1500.00	312.84	319.39		320.33	0.023198	7.80	192.31	34.78	0.58
Upper Reach	1489.686	Q=1300	1300.00	312.84	318.91		319.76	0.023015	7.38	176.07	34.07	0.57
Upper Reach	1489.686	Q=1100	1100.00	312.84	318.41		319.15	0.022789	6.92	158.92	33.31	0.56
Upper Reach	1439.048	Q=2100	2100.00	311.46	317.56	317.56	320.05	0.073656	12.66	165.84	33.41	1.00
Upper Reach	1439.048	Q=1900	1900.00	311.46	318.17	317.19	319.78	0.041640	10.18	186.68	34.35	0.77
Upper Reach	1439.048	Q=1700	1700.00	311.46	317.83	316.83	319.29	0.040765	9.71	175.04	33.83	0.75
Upper Reach	1439.048	Q=1500	1500.00	311.46	317.48	316.47	318.79	0.039564	9.19	163.14	33.29	0.73
Upper Reach	1439.048	Q=1300	1300.00	311.46	317.11	316.05	318.26	0.037920	8.61	150.97	32.72	0.71
Upper Reach	1439.048	Q=1100	1100.00	311.46	316.71	315.62	317.70	0.035931	7.96	138.13	32.12	0.68
Upper Reach	1288.123	Q=2100	2100.00	306.79	315.30	312.03	315.87	0.008812	6.03	348.24	56.68	0.43
Upper Reach	1288.123	Q=1900	1900.00	306.79	312.55		313.87	0.035890	9.23	205.88	46.63	0.77
Upper Reach	1288.123	Q=1700	1700.00	306.79	312.24		313.46	0.035850	8.87	191.64	45.51	0.76
Upper Reach	1288.123	Q=1500	1500.00	306.79	311.89		313.02	0.036288	8.52	176.06	44.24	0.75
Upper Reach	1288.123	Q=1300	1300.00	306.79	311.50		312.53	0.037455	8.18	158.94	42.80	0.75
Upper Reach	1288.123	Q=1100	1100.00	306.79	311.06		312.01	0.039288	7.82	140.63	41.21	0.75
Upper Reach	1111.63	Q=2100	2100.00	303.43	315.25	307.72	315.33	0.000976	2.27	923.84	106.89	0.14
Upper Reach	1111.63	Q=1900	1900.00	303.43	309.74	307.53	310.11	0.012381	4.87	390.15	86.90	0.41
Upper Reach	1111.63	Q=1700	1700.00	303.43	309.52	307.34	309.85	0.011691	4.59	370.66	86.08	0.39
Upper Reach	1111.63	Q=1500	1500.00	303.43	309.31	307.13	309.59	0.010713	4.26	352.41	85.31	0.37
Upper Reach	1111.63	Q=1300	1300.00	303.43	309.10	306.92	309.34	0.009457	3.88	335.22	84.57	0.34
Upper Reach	1111.63	Q=1100	1100.00	303.43	308.88	306.68	309.07	0.008140	3.47	316.66	83.77	0.31
Upper Reach	826.8154	Q=2100	2100.00	301.19	315.19		315.21	0.000185	1.28	1634.92	164.04	0.07
Upper Reach	826.8154	Q=1900	1900.00	301.19	307.26		307.49	0.006907	3.87	490.58	121.44	0.34
Upper Reach	826.8154	Q=1700	1700.00	301.19	306.69		306.94	0.008851	4.02	422.62	115.83	0.37
Upper Reach	826.8154	Q=1500	1500.00	301.19	306.10		306.37	0.011866	4.21	356.04	110.05	0.41
Upper Reach	826.8154	Q=1300	1300.00	301.19	305.49		305.80	0.016875	4.46	291.42	104.14	0.47
Upper Reach	826.8154	Q=1100	1100.00	301.19	304.88		305.24	0.025996	4.79	229.47	98.13	0.55
Upper Reach	676.0353	Q=2100	2100.00	296.69	315.16		315.19	0.000147	1.38	1526.08	123.71	0.07
Upper Reach	676.0353	Q=1900	1900.00	296.69	306.82		306.97	0.001929	3.09	615.04	92.86	0.21
Upper Reach	676.0353	Q=1700	1700.00	296.69	306.19		306.34	0.002081	3.05	557.70	89.59	0.22
Upper Reach	676.0353	Q=1500	1500.00	296.69	305.53		305.67	0.002271	3.00	499.44	86.14	0.22
Upper Reach	676.0353	Q=1300	1300.00	296.69	304.83		304.96	0.002517	2.95	440.08	82.48	0.23
Upper Reach	676.0353	Q=1100	1100.00	296.69	304.07		304.20	0.002847	2.90	379.37	78.41	0.23
Upper Reach	611.5112	Q=2100	2100.00	295.46	314.90	303.85	315.15	0.001111	4.07	569.76	86.17	0.19
Upper Reach	611.5112	Q=1900	1900.00	295.46	303.95	303.40	306.42	0.030015	12.61	150.73	24.04	0.89
Upper Reach	611.5112	Q=1700	1700.00	295.46	303.47	302.92	305.78	0.030017	12.20	139.31	23.39	0.88
Upper Reach	611.5112	Q=1500	1500.00	295.46	302.96	302.41	305.11	0.030021	11.76	127.54	22.70	0.87
Upper Reach	611.5112	Q=1300	1300.00	295.46	302.41	301.87	304.39	0.030031	11.27	115.34	21.96	0.87
Upper Reach	611.5112	Q=1100	1100.00	295.46	301.82	301.27	303.61	0.030039	10.72	102.57	21.07	0.86



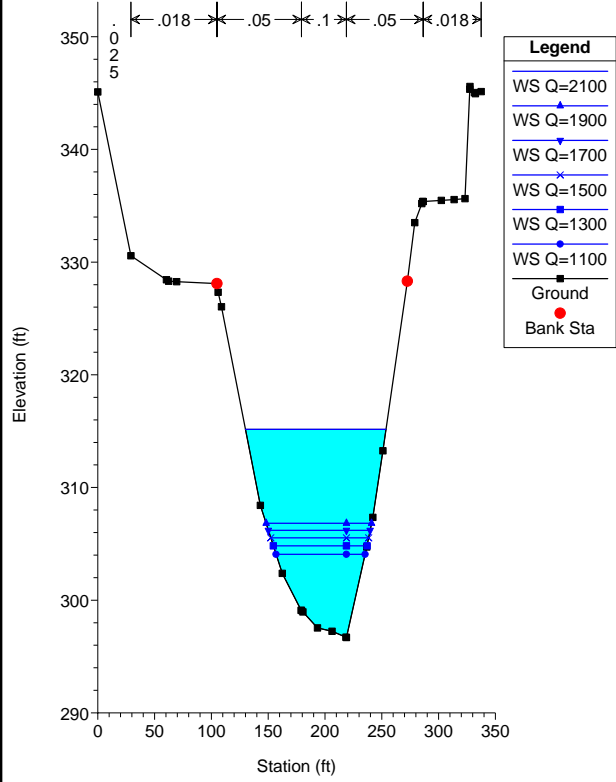




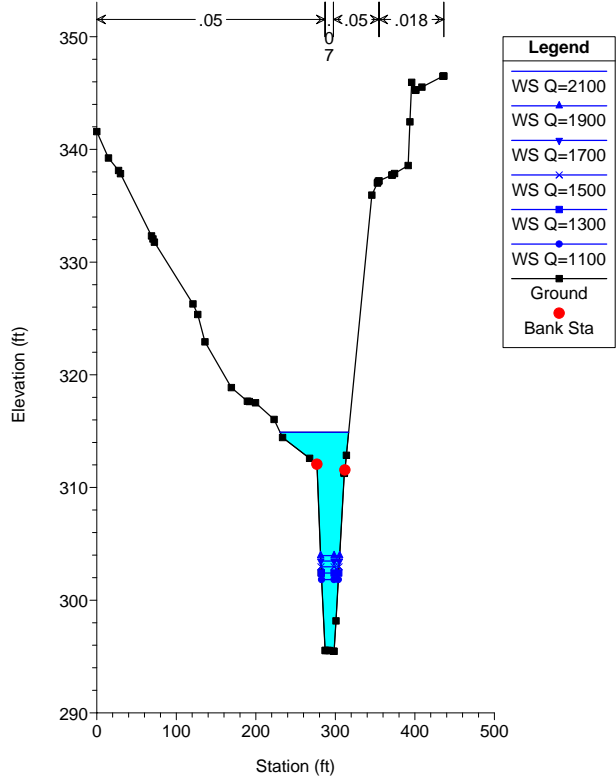




Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Multi Q
 River = Alvarado Channel Reach = Upper Reach



Geom: Maintained_Condition_Sed-Rmvd_Conc-only Flow: Multi Q
 River = Alvarado Channel Reach = Upper Reach



HEC-RAS Version 4.1.0 Jan 2010
 U.S. Army Corps of Engineers
 Hydrologic Engineering Center
 609 Second Street
 Davis, California

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PROJECT DATA
 Project Title: Alvarado_Upper
 Project File : Alvarado_Upper.prj
 Run Date and Time: 11/13/2014 1:51:16 PM

Project in English units

PLAN DATA

Plan Title: Multi-Q_for-non-erosive-vel
 Plan File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.p09

Geometry Title: Maintained_Condition_Sed-Rmvd_Conc-only
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g05

Flow Title : Multi Q
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f03

Plan Summary Information:
 Number of: Cross Sections = 30 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 0 Lateral Structures = 2

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: Mixed Flow

FLOW DATA

Flow Title: Multi Q
 Flow File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.f03

Flow Data (cfs)

River	Reach	RS	Q=2100	Q=1900	Q=1700	Q=1500
Alvarado ChannelUpper	Reach	4559.274	2100	1900	1700	1500
1300	1100	1000	800			
River	Reach	RS	Q=600	Q=400		
Alvarado ChannelUpper	Reach	4559.274	600	400		

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alvarado ChannelUpper	Reach	Q=2100	Critical	Known WS = 314.9
Alvarado ChannelUpper	Reach	Q=1900	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=1700	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=1500	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=1300	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=1100	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=1000	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=800	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=600	Critical	Normal S = 0.03
Alvarado ChannelUpper	Reach	Q=400	Critical	Normal S = 0.03

GEOMETRY DATA

Geometry Title: Maintained_Condition_Sed-Rmvd_Conc-only
 Geometry File : w:\17204-
 B_Alvarado_Tripp_BeaverChannels\WaterResources\UpperAlvaradoCreekChannel\Hydraulics\HecRas\Alvarado_Upper.g05

CROSS SECTION

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4559.274

INPUT

Description:
 Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.14	29.96	356.03	43.39	355.31	51.59	354.99	79.65	352.77
92.38	352.108.38	352	108.38	340.4	117.38	340.4	117.38	351	
118.08	351.118.08	340.4	126.68	340.4	126.68	351	127.38	351	
127.38	340.4.136.38	340.4	136.38	352	149.38	352	197.38	352	
244.46	352.12.267.11	352.83	268.8	352.79	276.98	352.19	297.78	353.19	
301.32	353.34.304.91	353.41	319.7	353.68	327.66	355.65	328.6	355.94	
329.79	356.2.348.2	362.06	362.49	365.16					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	108.38	.016	136.38	.018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 108.38 136.38 56.75 57.06 57.78 .1 .3

Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 267.11 362.49 352.83 P

Blocked Obstructions num= 2
 Sta L Sta R Elev Sta L Sta R Elev
 0 52.12 370 193.09 238.03 370

LATERAL STRUCTURE

RIVER: Alvarado Channel
 REACH: Upper Reach RS: 4543.777

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 = 203

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.5	.83	348.58	10.81	349.02	22.4	349.53	27.07	349.73
31.71	350	40.82	350.51	44.34	350.71	45.02	350.72	48.86	352.49
52.22	352.52	70.64	352.63	77.84	352.68	78.89	352.65	81.56	352.48
89.46	351.98	97.53	351.48	105.21	350.99	113.21	350.48	115.88	350.31
120.9	350.75	128.26	350.75	128.9	350.75	129.15	350.75	141.03	350.75
153.52	350.75	166.17	350.75	169.89	350.75	178.27	350.75	186.26	350.75
186.87	350.75	195.1	350.75	219.92	350.75	223.63	350.75	251.79	350.75

254.05	350.75	254.31	350.75	254.71	350.75	290.58	350.75	296.86	350.75
327.71	350.75	327.93	350.75	350.28	350.75	360.35	350.75	368.22	350.75
404.6	350.75	404.8	350.75	422.76	350.75	452.1	350.75	452.46	350.75
456.68	350.75	471.57	350.75	473.77	350.75	492.41	350.75	516.13	350.75
516.23	350.75	516.59	350.75	522.51	350.75	539.11	350.75	549.25	350.75
549.32	350.75	558.71	350.75	579.2	350.75	579.31	350.75	609.37	350.75
610.53	350.75	617.33	350.75	627.34	350.75	629.16	350.75	640.78	350.75
663.27	350.75	704.77	350.75	705.43	350.75	705.63	350.75	738.21	350.75
745.28	350.75	747.81	350.75	766.89	350.75	774.54	350.75	791.3	350.75
798.34	350.75	798.44	350.75	806.05	342.21	824.56	342.42	831.13	342.4
834.8	342.39	841.83	342.48	845.14	342.47	852.47	342.45	881.19	342.63
883.91	342.67	888.99	342.7	914.11	342.63	915.46	342.64	916.9	342.64
943.08	342.71	956.52	342.69	961.84	342.68	984.81	342.62	996.17	342.6
1039.53	342.61	1041.22	342.57	1051.83	342.56	1054.35	342.49	1071.41	342.01
1080.87	341.73	1080.97	341.73	1089.68	341.48	1090.13	343.24	1104.19	342.73
1107.14	342.65	1111.61	342.54	1112.29	342.49	1118.42	342.02	1125.08	341.6
1143.81	341.46	1172.73	341.01	1189.75	340.78	1190.03	340.77	1209.23	340.5
1222.66	340.31	1242.76	340.02	1243.67	340.01	1244.17	340.01	1281.9	339.68
1303.51	339.49	1317.24	339.37	1318.46	339.25	1334.74	339.05	1338.29	339.14
1338.73	339.14	1340.43	339.12	1358.91	339.21	1360.58	339.23	1380.76	339.32
1383.26	339.33	1402.58	339.47	1402.66	339.48	1402.94	339.51	1424.28	339.59
1425.78	339.61	1431.99	339.64	1456.77	339.72	1480.92	339.81	1481.21	339.81
1482.02	339.81	1510.23	339.5	1516.07	339.43	1530.16	339.27	1534.16	339.23
1536.2	339.2	1568.9	336.99	1574.89	336.96	1583.15	336.91	1594.19	336.58
1594.66	336.57	1595.16	336.55	1599.95	336.75	1615.33	336.48	1626.9	336.3
1629.06	336.28	1645.02	338.03	1649.7	338	1670.97	337.84	1672.21	337.83
1698.62	337.63	1700.47	337.62	1711.67	337.69	1714.21	337.69	1747.45	337.71
1759.86	337.71	1772.68	337.71	1781.11	337.71	1782.4	337.72	1820.04	337.81
1836.01	337.85	1848.77	337.88	1863	337.91	1864.29	337.9	1884.35	337.74
1892.49	337.67	1910.37	337.51	1911.23	337.51	1911.83	337.51	1923.17	337.25
1933.28	337.01	1944.46	338.77	1955.37	338.52	1955.46	338.52	1989.64	334.52
1991.34	334.52	2003.05	334.52	2008.48	334.52	2010.8	334.5	2041.06	334.36
2044.44	334.35	2057.44	334.49	2074.53	334.72	2075.16	334.73	2097.91	334.55
2101.7	334.66	2107.61	334.96	2116.86	335.42				

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach

RS: 4502.213

INPUT

Description:

Station Elevation Data	num=	32
Sta Elev Sta Elev Sta Elev Sta Elev		
0 356.61 3.08 356.69 28.65 355.75 31.72 355.63 63.35 353.68		
83.88 352 99.88 352 99.88 339.3 108.88 339.3 108.88 351.3		
109.58 351.3 109.58 339.3 118.18 339.3 118.18 351.3 118.88 351.3		
118.88 339.3 127.88 339.3 127.88 352 140.88 352 284.1 352.54		
292.86 352.97 302.84 352.34 303.17 352.3 305.15 352.39 326.64 353.31		
340.96 353.56 344.97 353.63 350.68 355.05 369.55 361.22 369.63 361.24		
388.16 365.26 393.87 365.13		

Manning's n Values

Sta n Val Sta n Val Sta n Val	num=	3
0 .018 83.88 .016 118.18 .018		

Bank Sta: Left Right Lengths: Left Channel Right	Coeff Contr.	Expan.
99.88 127.88 35.29 35.3 35.1	.1	.3

Ineffective Flow

Sta L Sta R Elev	num=	1
292.86 388.16 352.97	Permanent	

Blocked Obstructions

Sta L Sta R Elev Sta L Sta R Elev	num=	2
0 67.09 370 170.25 263.29 370		

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach

RS: 4466.915

INPUT

Description:

Station Elevation Data	num=	37
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		

0 356.17 3.48 356.03 16.93 355.21 59.49 352.4 65.6 352.58		
65.6 338.93 93.6 340.06 93.6 352.47 99.74 352.67 100.22 352.66		
128.96 350.55 134.07 350.6 144 350.85 149.79 350.83 153.84 350.82		
159.12 350.8 169.61 350.62 183.5 350.64 185.1 350.64 187.4 350.39		
192.63 349.44 196.36 349.71 198.79 349.76 223.65 350.52 279.35 352.27		
294.86 353.02 303.29 352.49 305.64 352.27 320.46 352.91 329.31 353.29		
334.68 353.38 347.85 353.59 350.6 354.26 359.32 357.09 367.82 359.67		
383.59 363.56 387.54 364.41		

Manning's n Values

Sta n Val Sta n Val Sta n Val	num=	3
0 .018 65.6 .016 93.6 .018		

Bank Sta: Left Right Lengths: Left Channel Right	Coeff Contr.	Expan.
65.6 93.6 27.81 27.21 26.73	.1	.3

Ineffective Flow

Sta L Sta R Elev	num=	2
99.74 294.86 352.67	Permanent	
294.86 387.54 353.03	F	

Blocked Obstructions

Sta L Sta R Elev Sta L Sta R Elev	num=	2
0 56.31 365 163.1 265.25 365		

CROSS SECTION

RIVER: Alvarado Channel

REACH: Upper Reach RS: 4439.706

INPUT

Description:

Station Elevation Data	num=	40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 354.58 6.49 354.62 43.7 353.43 63.26 352.14 68.58 347.37		
79.62 339.79 80.46 339.21 84.3 339.14 93.29 338.71 93.9 338.68		
103.12 346.81 104.83 351 123.71 350.67 132.91 350 140.83 350.1		
168.65 350.77 180.3 350.74 186.5 350.72 188.43 350.09 191.29 349.16		
193.19 348.49 208.75 348.56 222.54 349.54 241.1 349.97 258.98 350.52		
301.03 351.86 326.23 353.09 332.55 352.69 337.36 352.22 355.74 353.03		
360.73 353.26 378.14 353.54 379.1 353.55 379.16 353.57 379.37 353.63		
395 358.43 421.51 365.05 421.67 365.08 421.9 365.16 425.59 365.07		

Manning's n Values

Sta n Val Sta n Val Sta n Val	num=	3
0 .018 63.26 .016 104.83 .018		

Bank Sta: Left Right Lengths: Left Channel Right	Coeff Contr.	Expan.
63.26 104.83 164.21 164.68 167.58	.1	.3

Ineffective Flow

Sta L Sta R Elev	num=	2
104.83 326.23 351	Permanent	
326.23 421.9 353.09	F	

Blocked Obstructions

Sta L Sta R Elev Sta L Sta R Elev	num=	2
0 59.44 370 164.66 297.32 370		

CROSS SECTION

RIVER: Alvarado Channel

REACH: Upper Reach RS: 4275.023

INPUT

Description:

Station Elevation Data	num=	18
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
0 352.28 9.37 352.35 33.63 351.69 67.57 350.52 74.43 345.73		
86.46 337.33 86.87 337.04 86.93 337.04 87.27 337.05 98.97 337.33		
99.46 337.34 104.04 341.31 109.33 345.95 115.33 346.05 121.22 345.95		
150.31 346.3 156.99 350.75 536.99 350.75		

Manning's n Values

Sta n Val Sta n Val Sta n Val Sta n Val	num=	4
0 .018 67.57 .03 74.43 .016 109.33 .018		

Bank Sta: Left Right Lengths: Left Channel Right	Coeff Contr.	Expan.
74.43 109.33 381.65 361.63 347.98	.1	.3

Ineffective Flow

Sta L Sta R Elev	num=	1
	Permanent	

115.33 233.87 346.05 F
Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
0 61.02 354 156.99 520.69 354

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3913.392

INPUT
Description:
Station Elevation Data num= 21
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 365.86 16.26 353.45 32.29 341.36 38.14 336.95 41.63 333.87
42.22 333.86 57.31 333.57 57.59 333.56 64.94 340.73 66.19 341.59
69.85 341.68 70.47 343.4 75.47 343.3 96.47 344 104.47 344.1
104.47 350.25 113.47 350.25 113.47 350.76 478.56 350.76 478.56 347.5
762.56 351

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .03 32.29 .016 66.19 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
32.29 66.19 160.29 155.35 151.31 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
121.74 762 350.76 F

Blocked Obstructions num= 1
Sta L Sta R Elev
121.74 406.35 370

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3758.046

INPUT
Description:
Station Elevation Data num= 16
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 360.08 24.76 342.73 38.72 332.95 39.06 332.94 52 332.69
55.04 332.61 55.85 332.58 61.28 337.51 65.85 341.63 66 342
71.24 342.44 80.82 342.3 103.66 342.5 103.66 350.75 107 350.75
342.68 350.75

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 24.76 .016 38.72 .02 55.85 .016

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
24.76 71.24 156.2 157.14 158.25 .1 .3

Blocked Obstructions num= 2
Sta L Sta R Elev Sta L Sta R Elev
106 129.29 365 129.29 271.93 365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3600.906

INPUT
Description:
Station Elevation Data num= 25
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.57 21.79 345.71 29.74 340.6 36.61 336.19 41.1 331.7
43.59 331.7 43.71 331.62 56.66 331.09 60.41 330.93 60.88 330.91
71.14 340.13 71.45 340.42 79.54 342.57 80.33 342.77 81.75 342.81
118.62 343.84 192.97 343.58 209.41 343.65 277.88 343.1 295.07 343.01
300.31 343.06 368.05 343.52 394.52 343.56 434.26 343.52 442.68 343.45

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .03 29.74 .016 71.45 .02 209.41 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.74 71.45 183.48 182.29 181.14 .1 .3
Ineffective Flow num= 1
Sta L Sta R Elev Permanent
118.62 442.68 343.84 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3418.613

INPUT
Description:
Station Elevation Data num= 40
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 359.83 25.85 340.86 29.47 338.04 38.09 331.33 38.76 330.66
38.95 330.66 39.31 330.38 39.47 330.38 53.23 330.13 56.6 330.09
56.92 330.09 57.6 330.66 57.76 330.66 58.56 331.46 67.04 338.54
68.39 339.66 69.63 339.89 75.76 341.24 75.77 343.24 76.77 343.24
76.77 341.24 79.11 341.33 103.2 341.93 115.27 341.94 134.16 342.42
146.31 342.7 177.81 343.05 189.09 343.18 253.73 343.18 261.47 343.22
306.56 343.78 321.66 343.97 326.01 343.93 364.07 343.94 376.97 343.95
379.8 343.94 389.33 343.7 410.09 342.8 421.87 343.03 428.88 343.16

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .05 29.47 .016 75.76 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
29.47 67.04 188.22 188.31 208.19 .1 .3

Ineffective Flow num= 1
Sta L Sta R Elev Permanent
75.77 428.88 343.24 F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3230.305

INPUT
Description:
Station Elevation Data num= 30
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 349.55 15.53 339.93 19.43 337.64 28.72 332.19 31.32 329.59
38.33 329.59 45.6 329.33 51.53 329.09 52.41 329.06 59.04 334.91
62.21 337.64 62.22 339.64 63.22 339.64 63.22 337.64 95.9 337.03
96.15 337.01 96.9 337.04 137.52 339.32 162.33 338.17 178.31 338.08
189.7 338.27 200.4 338.42 220.32 338.78 246.45 339.28 298.6 340.95
310.42 341.33 347.72 342 358.94 342.14 362.36 342.19 368.47 342.31

Manning's n Values num= 4
Sta n Val Sta n Val Sta n Val Sta n Val
0 .05 31.32 .035 52.41 .016 62.21 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
19.43 52.41 213.1 211.63 234.86 .1 .3

Ineffective Flow num= 2
Sta L Sta R Elev Permanent
63.22 68.42 339.64 F
68.42 368.47 345 F
Blocked Obstructions num= 1
Sta L Sta R Elev
68.42 145.82 350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 3018.677

INPUT
Description:
Station Elevation Data num= 38
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 351.63 6.26 347.24 20.56 337.22 20.93 336.96 29.73 328.16
48.73 328.16 48.97 328.4 49.21 328.39 51.59 331.53 57.89 337.63
61.86 337.58 61.86 339.58 62.86 339.58 62.86 337.39 75.24 337.39

91.39	336.99	131.08	336.38	142.66	336.41	159.33	336.04	163.29	335.96
188.72	335.64	192.7	335.57	205	335.6	208.43	335.97	218.96	337.16
242.63	337.75	248.26	337.75	255.89	337.79	285.47	337.83	313.92	338.26
340.9	338.14	346.6	338.38	352.33	338.65	363.42	340.11	406.82	341.23
414.83	341.55	423.62	341.79	441.87	342.13				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	29.73	.035	48.73	.016	62.86	.018	218.96	.03
242.63	.018								

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

20.56	48.73		146.85	145.44	131.99			.1	.3
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Ineffective Flow num= 3

Sta L	Sta R	Elev	Permanent
57.89	62.86	337.63	F
62.86	71.22	339.58	T
71.22	441	355	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
71.22	171.59	355	373.64	376.97	355	410.97	439.07	355
232.63	342.17	355						

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2969.225

INPUT

Description:

Station	Elevation	Data	num=	40					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	356.18	21.74	337.2	30.35	329.68	31.17	329.1	31.35	329.09
31.38	329.09	32.39	328.08	51.39	328.08	53.58	328.09	54.27	328.83
62.04	337.14	62.1	339.14	63.1	339.14	63.1	337.14	67.96	336.95
88.97	336.63	117.23	336.41	137.39	336.13	161.66	335.69	166.55	335.6
183.27	335.55	191.42	335.3	198.28	335.05	202.99	335.06	210.13	334.92
215.7	334.95	221.61	335.05	227.44	335.25	235.84	335.33	244.24	334.42
264.47	335.71	299.23	337.95	328.34	337.67	346.84	337.59	351.58	338.13
359.81	339.41	390.03	340.55	403.82	341.1	440.67	342.11	449.14	342.35

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.39	.035	53.58	.016	62.1	.018	137.39	.03
183.27	.018	264.47	.03	346.84	.018				

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

21.74	53.58		48.12	46.59	34.68			.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62.1	449.14	339.14	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
232	449.14	355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2873.24

INPUT

Description:

Station	Elevation	Data	num=	48					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	357.8	13.19	345.7	23.23	336.84	27.87	332.74	33.08	327.53
52.08	327.53	56.49	327.53	60.79	334.44	61.93	336.08	62	338
63	338	63	336	83	335.7	86.08	335.64	86.44	335.63
86.75	335.63	137.86	335.4	138.65	335.44	141.22	335.47	154.05	335.6
158.2	335.14	165.58	334.26	178.77	333.91	189.74	333.67	196.35	333.7
205.98	333.7	212.66	333.92	216.87	334.1	227.31	335.36	230.72	335.72
233.9	336.04	252.75	336.32	262.38	336.23	274.67	336.06	295.69	336.27
303.61	336.23	311.15	336.43	324.47	337.18	329.24	337.49	348.87	338.96
358.14	339.47	376.13	340.04	445.64	342.37	456.48	342.76	463.45	342.97
493.24	343.93	506.32	344.1	511.1	344.17				

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.39	.035	53.58	.016	62.1	.018	137.39	.03
183.27	.018	264.47	.03	346.84	.018				

0	.03	33.08	.035	56.49	.016	61.93	.018	227.31	.03
348.87	.018	376.13	.03	445.64	.018				

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

23.23	56.49		179.7	177.4	154.96			.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
62	511	338	F

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2695.84

INPUT

Description:

Station	Elevation	Data	num=	41					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	361.95	12.31	345.06	22.84	335.71	29.49	329.9	34	326.53
53	326.53	55.74	327.97	61.02	334.79	61.88	335.82	62	337.8
63	337.8	63	335.8	83.16	335.28	97.88	334.85	115.03	334.84
145.23	334.62	155.42	334.39	182.3	333.76	188.41	333.72	191.22	333.67
195.43	333.76	202.05	333.5	218.7	333.21	224.74	333.31	232.14	333.29
237.4	333.28	244.5	333.26	250.72	333.3	262.29	335.75	280.25	336.11
287.55	336.9	307.71	339.79	313.94	339.8	319.15	340.85	335.15	340.5
345.45	340.41	361.78	340.7	402.63	341.75	459.27	343.42	480.11	343.99
493.96	344.04								

Manning's n Values num= 14

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.03	34	.035	53	.016	62	.018	83.16	.03
97.88	.018	155.42	.03	188.41	.018	250.72	.03	262.29	.018
280.25	.03	307.71	.018	313.94	.03	319.15	.018		

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

22.84	53		161.84	166.46	226.33			.1	.3
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
62	91.85	337.8	F
91.85	493.96	365	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
91.85	149.36	365	412.55	493.45	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2529.382

INPUT

Description:

Station	Elevation	Data	num=	25					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	358.98	19.08	338.23	22.86	334.74	32.02	325.58	51.02	325.58
59.3	333.86	59.67	334.18	60.05	334.51	96.28	335	122.48	335.39
131.97	335.34	174.16	335.7	176.05	335.7	213.04	336.25	231.04	336.52
231.23	336.53	234.1	336.55	304.7	337.01	312.5	337.05	360.6	337.73
378.26	337.98	394.39	338.45	434.7	339.68	444.02	340.14	493.08	342.37

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	32.02	.035	51.02	.016	96.28	.018

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

22.86	51.02		109.52	94.32	36.08			.1	.3
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Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
173.53	493.08	360	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
173.53	281.08	360	312.57	335.65	360

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2435.063

INPUT

Description:

Station Elevation Data		num= 39		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	360.81	21.23	353.16	42.85	343	47.85	340.43	55.92	339.16		
63.64	338.03	69.33	338.27	75.76	338.66	86.2	338.15	87.49	338.08		
105.77	338.63	106.06	338.53	118.18	333.89	129.64	329.83	143.51	325.02		
162.51	325.02	162.8	326.79	169.52	334.5	169.71	334.91	172.01	334.74		
176.82	334.77	208.21	335.01	214.18	335.17	220.1	335.08	248.23	335.12		
250.33	335.11	268.76	335.26	298.81	335.23	326.83	335.63	351.83	336.34		
396.17	336.69	431.25	337.05	480.79	338.27	488.97	338.39	493.94	338.45		
511.78	338.91	563.4	340.16	614.31	342.38	615.33	342.43				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	143.51	.035	162.51	.016	169.71	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	118.18	162.51		112	100		.1	.3

Ineffective Flow

Sta L	Sta R	Elev	Permanent
0	75.76	338.66	F
75.76	105.77	338.63	F

Blocked Obstructions

Sta L	Sta R	Elev
340.09	471.21	365

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2335.331

INPUT

Description:

Station Elevation Data		num= 32		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	352.7	9.23	350.32	56.77	337.32	90.36	335.77	102.47	334.64		
105.72	332.51	115.37	324.65	115.96	324.65	142.3	324.65	150.28	324.65		
153.68	324.65	155.57	327.1	161.47	330.01	172.37	330.4	176.37	333.3		
184.12	333.82	186.57	334.18	202.82	335.07	206.31	335.09	212.23	335.15		
243.69	334.75	248.57	334.85	271.99	335.54	294.77	336.21	314.25	336.38		
373.55	337.02	429.88	338.43	430.41	338.44	435.56	338.5	444.84	338.74		
506.87	340.23	555.95	342.37								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	102.47	.08	115.37	.035	153.68	.016
186.57	.025						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	102.47	153.68		28.83	29		.1	.3

Blocked Obstructions

Sta L	Sta R	Elev
233	414	365

LATERAL STRUCTURE

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2317.214

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

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	334.92	6.35	334.92	8.86	334.93	13.49	334.96	22.41	335
40.08	335.13	67.61	335.32	68.4	335.32	84.51	335.32	84.77	335.32
85.1	335.32	115.11	335.14	115.84	335.13	116.81	335.14	149.38	335.33
154.61	335.47	180.16	336.17	190	336.05	202.93	335.86	212.46	335.02
230.27	335.73	239.09	335.78	240.24	335.81	270.34	335.93	276.22	335.95
277.23	335.94	300.76	335.82	321.34	335.54	322.18	335.51	327.72	335.66
340.91	335.51	360.18	335.29	371.42	335.16	374.56	335.19	377.1	335.13

385.69	335.09	403.81	335.01	423.78	334.94	466.91	334.51	466.99	334.51
467.67	334.5	497.39	333.98	500.36	333.92	546.13	333.54	548.13	333.51
548.49	333.51	583.86	333.32	585.48	333.32	631.24	333.14	632.48	333.14
634.11	333.11	634.57	333.1	647.67	332.53	657.49	332.11		

Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2308.404

INPUT

Description:

Station Elevation Data		num= 28		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	348.87	50.64	335.28	52.16	335.09	53.58	335.01	97.37	333.77		
107.31	327.92	111.54	326.64	122.23	326.51	145.7	326.14	151.2	328.87		
160.87	333.92	163.21	334.94	166.35	334.98	184.8	335.2	190.27	335.24		
193.34	335.27	203.7	335.11	247.82	335.82	257.56	336.1	259.76	336.16		
269.28	336.25	338.64	337.01	397.05	338.48	397.76	338.49	400.6	338.52		
406.38	338.67	472.69	340.26	520.97	342.37						

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.045	111.54	.035	145.7	.016	160.87	.018
184.8	.025						

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	97.37	160.87		25.93	20.79		.1	.3

Blocked Obstructions

Sta L	Sta R	Elev
179	377	350

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2287.614

INPUT

Description:

Station Elevation Data		num= 32		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	350.42	9.72	350.48	20.73	341.4	26.07	339.77	29.4	338.91		
64.12	334.41	91.01	333.05	100.71	332.81	103.26	331.33	118.55	326.67		
118.63	326.64	148.47	326.28	150.81	326.24	151.43	326.23	153.32	327.08		
171.09	335.06	176.12	335.12	183.15	335.22	190.68	335.32	194.36	335.32		
243.97	336.1	244.76	336.1	245.06	336.11	246.29	336.12	246.7	336.12		
248.99	336.16	325.44	337	386.01	338.52	387.43	338.54	389.78	338.6		
460.26	340.29	508.6	342.4								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	100.71	.1	171.09	.018	194.36	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	100.71	171.09		192.47	203.49		.1	.3

Ineffective Flow

Sta L	Sta R	Elev	Permanent
194.19	508.6	355	F

Blocked Obstructions

Sta L	Sta R	Elev
224.96	364.18	355

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 2084.121

INPUT

Description:

Station Elevation Data		num= 20		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	343.32	3.03	343.22	4.86	342.69	14.12	339.51	18.89	339.49		
41.5	338.27	75.39	326.06	78.71	324.63	78.88	324.63	81.99	324.57		
84.94	324.5	120.3	323.66	121.04	323.64	124.81	324.82	142.05	335.87		

147.5 336.18 181.97 337.38 238.05 340.19 257.12 341.26 297.91 342.45

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .045 41.5 .045 78.71 .09 121.04 .045 142.05 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
41.5 142.05 210.13 210.2 208.24 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1873.917

INPUT
Description:
Station Elevation Data num= 26
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 340.21 17.09 339.65 39.55 338.56 61.14 337.05 81.03 336.14
115.12 334.57 134.63 333.59 142.49 333.41 173.44 333.29 183.84 333.18
187.67 331.71 213.06 322.4 237.63 321.2 216.73 320.65 216.93 321.56
219.6 320.91 236.95 322.4 237.63 322.46 247.85 327.08 264.56 334.38
268.74 334.51 291.21 334.95 349.13 338.03 359.34 338.6 382.09 339.7
400.21 340.57

Manning's n Values num= 5
Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 187.67 .045 216.73 .07 237.63 .045 264.56 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
183.84 264.56 71.62 75.54 93.1 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1798.381

INPUT
Description:
Station Elevation Data num= 28
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 339.93 20.76 338.33 34.9 337.29 43.91 336.86 80.21 336.29
106.62 334.56 108.42 334.49 111.81 334.03 120.4 332.53 130.3 332.43
145.23 332.41 162.57 332.46 189.06 332.11 209.47 320.89 212.4 319.12
213.36 318.55 217.53 319.07 230.09 320.47 230.3 320.49 241.01 327.31
251.36 333.45 261.86 333.65 282.99 334.07 311.3 335.51 337.2 336.66
361.35 337.67 376.05 338.28 385 338.34

Manning's n Values num= 7
Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 111.81 .03 145.23 .018 189.06 .045 213.36 .07
230.09 .045 251.36 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
189.06 251.36 119.25 156.79 237.15 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1641.59

INPUT
Description:
Station Elevation Data num= 35
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 340.68 1.61 340.61 18.07 339.34 51.19 338.49 64.73 338.25
76.62 338.37 96.55 334.06 102.18 332.66 107 332.47 132.46 331.7
173.79 330.79 192.62 330.21 201.99 326.01 214.26 319.86 233.15 317.02
240.74 315.81 240.97 315.77 250.34 315.79 263.52 315.86 263.99 315.86
286.95 327.05 291.75 328.69 305.69 329.86 312.05 330.08 316.94 331.88
325.73 334.89 331.83 335.09 343.08 335.52 348.82 335.8 358.59 336.23
362.71 336.34 367.96 336.49 384.52 343.09 390.68 345.64 392.33 345.74

Manning's n Values num= 8
Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 76.62 .03 102.18 .018 173.79 .045 192.62 .06

291.75 .04 331.83 .018 367.96 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
192.62 305.69 133.84 151.9 183 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1489.686

INPUT
Description: U/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 44
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 341.18 5.24 341.09 9.17 340.94 29.19 341.04 51.52 341.21
54.59 341.23 57.81 340.42 90.09 332.29 97.19 331.92 105.34 331.24
124.03 331.03 143.5 330.35 152.39 330.19 161.87 329.95 181.33 330.22
189.35 329.44 194.28 329.6 209.49 329.36 212.54 329.44 223.08 313.17
223.09 313.09 223.19 313.09 223.63 313.09 245.83 312.88 247.67 312.85
248.3 312.84 259.06 325.58 266.06 329.87 270.18 333.4 273.74 333.42
279.01 333.51 284.93 333.58 288.34 333.54 304.18 333.87 316.96 334
320.02 334.03 330.36 334.72 331.8 334.82 332.71 335.29 349.96 344.38
366.14 344.7 372.42 344.79 374.69 345.11 376.49 345.4

Manning's n Values num= 9
Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 57.81 .03 90.09 .018 152.39 .045 223.09 .1
248.3 .045 279.01 .025 320.02 .035 349.96 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
212.54 266.06 50.44 50.64 51.04 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1439.048

INPUT
Description: D/S entrance into parking lot from Alvarado Road
Station Elevation Data num= 41
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 343.43 40.16 343.19 78.69 333.68 83.72 332.42 89.53 332.28
116.49 332.58 122.27 333.43 134.23 333.5 135.38 333.64 140.72 334.1
151.34 334.51 154.27 332.63 158.9 332.13 161.85 331.85 162.38 331.92
179.21 323.2 179.22 323.2 181.06 322.49 188.67 311.46 189.58 311.49
208.3 312.1 212.7 312.15 213.36 312.16 218.98 318.88 229.67 325.7
239.35 332.77 245.09 332.94 254.59 333.31 269.24 333.47 270.27 333.47
271.27 333.45 271.68 333.45 273.42 333.49 287.61 333.76 294.66 333.88
299.61 333.98 314.16 342.13 317.45 343.9 320.98 343.95 340.1 344.22
343.78 344.69

Manning's n Values num= 7
Sta n Val Sta n Val Sta n Val Sta n Val
0 .018 40.16 .04 151.34 .025 162.38 .05 188.67 .1
213.36 .05 239.35 .018

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
162.38 239.35 146.36 150.92 160.49 .1 .3

CROSS SECTION

RIVER: Alvarado Channel
REACH: Upper Reach RS: 1288.123

INPUT
Description:
Station Elevation Data num= 29
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
0 342.6 14.55 338.01 21.13 337.7 27.84 338.08 79.31 338.07
88.69 337.05 91.87 336.74 110.15 329.23 117.39 326.25 125.52 322.94
136.54 316.75 156.79 307 156.94 307 180.63 306.79 182.71 306.8
183.29 306.8 185.93 308.74 210.07 324.11 228.7 330.05 244.22 331.52
244.99 331.6 245.97 331.64 260.21 332.16 263.18 332.11 269.92 331.99
284.82 338.34 291.98 341.35 303.02 342.02 312.33 342.94

Manning's n Values num= 5

Upper Reach	1439.048	.018	.04	.025	.05	.1	.05	.018
Upper Reach	1288.123	.018	.045	.05	.1	.05		
Upper Reach	1111.63	.045	.018	.05	.1	.05	.03	.018
.025	.018							
Upper Reach	826.8154	.035	.018	.045	.1	.045	.018	
Upper Reach	676.0353	.025	.018	.05	.1	.05	.018	
Upper Reach	611.5112	.05	.07	.05	.018			

Upper Reach	2287.614	.1	.3
Upper Reach	2084.121	.1	.3
Upper Reach	1873.917	.1	.3
Upper Reach	1798.381	.1	.3
Upper Reach	1641.59	.1	.3
Upper Reach	1489.686	.1	.3
Upper Reach	1439.048	.1	.3
Upper Reach	1288.123	.1	.3
Upper Reach	1111.63	.1	.3
Upper Reach	826.8154	.1	.3
Upper Reach	676.0353	.1	.3
Upper Reach	611.5112	.3	.5

SUMMARY OF REACH LENGTHS

River: Alvarado Channel

Reach	River Sta.	Left	Channel	Right
Upper Reach	4559.274	56.75	57.06	57.78
Upper Reach	4543.777	Lat Struct		
Upper Reach	4502.213	35.29	35.3	35.1
Upper Reach	4466.915	27.81	27.21	26.73
Upper Reach	4439.706	164.21	164.68	167.58
Upper Reach	4275.023	381.65	361.63	347.98
Upper Reach	3913.392	160.29	155.35	151.31
Upper Reach	3758.046	156.2	157.14	158.25
Upper Reach	3600.906	183.48	182.29	181.14
Upper Reach	3418.613	188.22	188.31	208.19
Upper Reach	3230.305	213.1	211.63	234.86
Upper Reach	3018.677	146.85	145.44	131.99
Upper Reach	2969.225	48.12	46.59	34.68
Upper Reach	2873.24	179.7	177.4	154.96
Upper Reach	2695.84	161.84	166.46	226.33
Upper Reach	2529.382	109.52	94.32	36.08
Upper Reach	2435.063	112	100	22
Upper Reach	2335.331	28.83	29	6.18
Upper Reach	2317.214	Lat Struct		
Upper Reach	2308.404	25.93	20.79	5.61
Upper Reach	2287.614	192.47	203.49	166.15
Upper Reach	2084.121	210.13	210.2	208.24
Upper Reach	1873.917	71.62	75.54	93.1
Upper Reach	1798.381	119.25	156.79	237.15
Upper Reach	1641.59	133.84	151.9	183
Upper Reach	1489.686	50.44	50.64	51.04
Upper Reach	1439.048	146.36	150.92	160.49
Upper Reach	1288.123	168.1	176.49	194.32
Upper Reach	1111.63	256.29	284.82	327.16
Upper Reach	826.8154	157.21	150.78	167.76
Upper Reach	676.0353	122.82	64.52	43.7
Upper Reach	611.5112	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Alvarado Channel

Reach	River Sta.	Contr.	Expan.
Upper Reach	4559.274	.1	.3
Upper Reach	4543.777	Lat Struct	
Upper Reach	4502.213	.1	.3
Upper Reach	4466.915	.1	.3
Upper Reach	4439.706	.1	.3
Upper Reach	4275.023	.1	.3
Upper Reach	3913.392	.1	.3
Upper Reach	3758.046	.1	.3
Upper Reach	3600.906	.1	.3
Upper Reach	3418.613	.1	.3
Upper Reach	3230.305	.1	.3
Upper Reach	3018.677	.1	.3
Upper Reach	2969.225	.1	.3
Upper Reach	2873.24	.1	.3
Upper Reach	2695.84	.1	.3
Upper Reach	2529.382	.1	.3
Upper Reach	2435.063	.1	.3
Upper Reach	2335.331	.1	.3
Upper Reach	2317.214	Lat Struct	
Upper Reach	2308.404	.1	.3

