

# Bell Bend Nuclear Power Plant Flood Study Report Walker Run

Salem Township, Luzerne County, PA  
LSI Doc. No. FS-WR-001



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Rev 2, September 14, 2011



# Walker Run Flood Study Report

PPL Bell Bend Nuclear Power Plant  
Salem Township, Luzerne County, PA  
Rev 2, September 14, 2011

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## A RECORD OF REVISIONS

Revision	Date	Pages/Sections Changed	Brief Description
0	January 2011	All	Initial release
1	August 2011	All	Text edits - No change to flood models
2	September 2011	All	Addressed comments received from FEMA dated July 1, 2011
2	September 2011	Appendix I	Peak discharges used have been calculated using Win TR-20.
2	September 2011	Appendix B Sheet 2	Enlargements of the existing structures with field surveyed spot elevations and descriptions have been provided.
2	September 2011	Appendix H	Bridge geometry data for all proposed bridges has been updated to be consistent with the bridge drawings.
2	September 2011	Appendix E, Appendix F	Two Duplicate Effective Models are now provided. Duplicate Effective Model A was run in HEC-2 to recreate the original model in the original software. Duplicate Effective Model B was run in HEC-RAS using input that was identical, to the greatest extent possible, to the effective model.
2	September 2011	Appendix H	The bridge modeling method has now been set to use the highest energy answer between the energy and momentum methods.
2	September 2011	Appendix G, Appendix H	The Existing Conditions (Corrected Effective) Model and the Proposed Conditions Model have been run using a subcritical flow regime.
2	September 2011	Appendix G, Appendix H	The encroachment analysis has been revised to eliminate surcharges greater than 1.0 ft. All negative surcharges at modeled cross sections have also been eliminated.
2	September 2011	Appendix F, Appendix G, Appendix H	The downstream boundary condition known water surface elevations have now been adjusted to the NAVD 88 vertical datum (NGVD 29, -0.75ft.) for all HEC-RAS models.
2	September 2011	Appendix G, Appendix H	The Existing and Proposed Condition Models now include an evaluation of the 10-year, 50-year, and 500-year floods.
2	September 2011	Appendix G, Appendix H	The junction at the confluence of the Unnamed Tributary with Walker Run has been removed. Normal depth has been used as the downstream boundary condition for the tributary. The backwater of Walker Run has been reflected in the delineation on the Floodplain Map.
2	September 2011	Appendix G, Appendix H	All Levees have been removed from the Existing and Proposed Models.
2	September 2011	Appendix G, Appendix H	Interpolated cross sections have been removed. Four additional cross sections have been added to better define the geometry of the Unnamed Tributary.
2	September 2011	Appendix B	The floodway and 0.2-percent-annual-chance flood delineations have been added to the Floodplain Map in Appendix B.
2	September 2011	Appendix B	Base Flood, Floodway and 0.2-percent- annual-chance flood delineations from the currently effective Flood Insurance Rate Maps have been overlaid on the Floodplain Map in Appendix B.
2	September 2011	Appendix B	Tie-ins from the effective flood hazard boundaries to the proposed delineations have been provided at the upstream and downstream ends of the study reach.



## **1 Introduction**

PPL is proposing a new facility, the Bell Bend Nuclear Power Plant (BBNPP), on a site near Berwick, PA. The site is located in Salem Township, Luzerne County, northeast of Berwick and north of Route 11. An existing nuclear power plant, Susquehanna Steam Electric Station (SSES), lies to the east of the proposed facility. The proposed site is primarily forested, with areas of field, meadow, and wetlands. Walker Run, which flows into the Susquehanna River at Beach Haven, PA, runs along the western edge of the proposed site and will be restored as part of the stream and wetland mitigation plan for the proposed nuclear facility. The Federal Emergency Management Agency (FEMA) conducted a flood study on Walker Run that was used as a basis for this hydraulic analysis. An unnamed tributary (Tributary #1) flows into Walker Run from the northeast and will also be impacted by several new bridges associated with the proposed facility.

The objectives of this study are to update the Current Effective Flood Insurance Study (FIS) prepared by FEMA in 1977 based on more detailed topographic information and to determine the hydraulic effects of the proposed project on Walker Run and Tributary #1. This report presents the Existing Conditions Model (Corrected Effective Model) and Proposed Conditions Model and compares those results to the Current Effective and Duplicate Effective Models.

### **1.1 Model Inputs**

The following inputs were used in this study:

- Bell Bend Nuclear Power Plant Stream and Wetland Mitigation Design Report, Walker Run Site, 2010, LandStudies, Inc.
- Conceptual Bridge Type Studies for Bell Bend Nuclear Power Plant, Salem Township, Luzerne County, PA, April 19, 2011, Pennoni Associates, Inc.
- Flood Insurance Study, Township of Salem, Pennsylvania, Luzerne County, 1979, FEMA Federal Insurance Administration
- FEMA FIS HEC-2 input data was acquired from the FEMA Engineering Library in the form of scans of output files.
- HEC-RAS River Analysis System Hydraulic Reference Manual, Version 4.0, March 2008, US Army Corps of Engineers Hydraulic Engineering Center



- Precipitation Frequency Data Server, National Oceanic and Atmospheric Administration (NOAA) National Weather Service Hydrometeorological Designs Studies Center, Website <http://hdsc.nws.noaa.gov/hdsc/pfds/>
- Probable Maximum Flood (PMF) Event Study, 2008, Paul C. Rizzo Associates, Inc.
- Soil Map 2, Penn State University College of Agricultural Sciences Cooperative Extension Geospatial Technology Program, Website [www.soilmap.psu.edu](http://www.soilmap.psu.edu)
- Detailed existing cross sections and structures on Walker Run and Tributary #1 were based on data collected by LandStudies, Inc between 6/2/2009 and 3/11/2010.
- One (1) foot topographic mapping produced by Peters Consultants, Inc. in November 2007, January 2008, and April 2010.
- Proposed contours, walls and bridges, as provided by Pennoni and as included in the Joint Permit Drawings for BBNPP dated June 15, 2011

## 2 Hydrology

The Walker Run watershed was evaluated in a Probable Maximum Flood (PMF) Event Study in 2008 by Paul C. Rizzo Associates, Inc. (Rizzo) for the Bell Bend Nuclear Power Plant project. Rizzo divided the watershed into three Sub Basins, based on watershed delineations on the United States Geological Survey (USGS) Berwick Quadrangle base map (Appendix A). The drainage area for Sub Basin A2 is the most upstream drainage area of Walker Run and measures 2.43 square miles. Tributary #1's drainage area is Sub Basin A3, measuring 0.68 square miles. The downstream drainage area to Walker Run, Sub basin A1, measures 0.98 square miles. Land use in the watershed is primarily woods, with meadow and some urban. LandStudies identified the land cover types and acreages for each sub basin.

Soils information and geology of the site were determined from the Rizzo report, then verified using Penn State University's online soil map tool ([www.soilmap.psu.edu](http://www.soilmap.psu.edu)). Several soils exist in the Walker Run watershed, including Chenango, Oquaga & Lordstown, and Wyoming, producing a mixture primarily of hydrologic soil groups "A" and "C". A soils map is included in Appendix A. Four distinct geologic formations exist within the Walker Run watershed, including the Hamilton Group, Trimmers Rock Formation, Irish Valley Member, and Sherman Creek Member. The underlying geology of the headwaters upstream of the project site consists of east to west trending bands of the upper Devonian-age Sherman Creek and Irish Valley Members. The Sherman Creek Member is composed of alternating grayish-red siltstone and claystone as well as minor intervals of gray sandstone. The Irish Valley Member consists of nonmarine, gray and grayish red sandstone and grayish-red claystone interbedded with minor, thin light-olive-gray marine siltstone. The underlying geology of the upstream portion of the project site consists of an east to west trending band of the upper Devonian-age Trimmers Rock Formation, which is composed of olive-gray siltstone and shale. The underlying geology of the downstream portion of the project site consists of an east to west trending band of the lower and middle Devonian-age Hamilton Group. The Hamilton Group is made up of two formations: the Mahantango Formation and the Marcellus Formation. The Mahantango Formation is composed of gray, brown and olive shale and



siltstone while the Marcellus Formation is composed of black, carbonaceous shale (Appendix A).

Hydrologic analyses of the contributing drainage areas to Walker Run and Tributary #1 were performed to confirm existing peak discharges for the combined drainage area and Walker Run's drainage area, which were provided in the FEMA FIS, and to determine the existing peak discharge for Tributary #1 (not provided in the FEMA FIS). The 100-year peak discharge used in the FEMA FIS for the total watershed (combined drainage area) is 1860 cfs and for Subbasin A2 (Walker Run watershed) is 1640 cfs.

Win TR-20 software was used to model the Walker Run Watershed area, as delineated by Rizzo. Land cover and soils information, as discussed above, were used to select appropriate Curve Numbers. Time of concentration paths were delineated on the USGS watershed maps and Tc values were calculated based on TR-55 procedures. Twenty-four hour rainfall depths of 2.89 in., 4.20 in., 6.08 in., 7.16 in., and 10.51 in. (for the 2, 10, 50, 100, and 500-year storm events, respectively, per National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Data Server) were used. With these inputs, the Win TR-20 model returned 100-year peak discharge rates of 1592 cfs for Walker Run above the Tributary, 300 cfs for the tributary, and 1862 cfs for Walker Run below the confluence. These values are extremely close to the flows used in the Current Effective Model. Therefore, Current Effective Model flow rates were used for Walker Run, and the WinTR-20 discharge rates were used for the tributary. Input data and Win TR-20 output is provided in Appendix I.

### 3 Hydraulics

#### 3.1 General Description

The US Army Corps of Engineers Hydrologic Engineering Centers River Analysis System (HEC-RAS) Version 4.1.0 software was used for the hydraulic analysis. HEC-RAS is intended for calculating water-surface profiles for steady or unsteady flow in natural or man-made channels. The computational procedure is based on the solution of the one-dimensional energy equation with energy loss due to friction computed using Manning's equation. The computational procedure is generally known as the Standard Step Method and can be used for subcritical as well as supercritical flow conditions.

For this project, the water-surface profile for steady, subcritical flow was calculated. The effects of various structures in the floodplain, notably the four existing bridges, existing culvert crossing and proposed bridge on Walker Run, as well as the two existing culvert crossings and four proposed bridges on Tributary #1 were also considered in the computations.

The Current Effective Model was prepared in the NGVD 29 vertical datum. Because all of the updated topographic data is in the NAVD 88 vertical datum, all HEC-RAS geometry data is also in NAVD 88. All geometry data copied from the current effective model was converted to NAVD 88 with a correction factor of -0.75 ft. All mapping is also in the NAVD 88 datum.

### 3.2 Duplicate Effective Model A (HEC-2)

The original FEMA FIS HEC-2 input data was acquired from the FEMA Engineering Library in the form of scans of output files. A new HEC-2 input file was created by copying the printout to the greatest extent possible, although some of the data was not legible due to the quality of the scan. The duplicate effective model includes from cross section BHJ to the upstream limit of the Current Effective Model. The HEC-2 input file was then run in HEC-2, as required by FEMA to create a "Duplicate Effective Model." The intent of this model was to recreate the original study, with the original software, on our equipment. Because Cross Section BHJ was the downstream limit of Duplicate Effective Model A, downstream boundary conditions at this section were set to match the modeled water surface elevations from the original FIS at this cross section for each profile. The HEC-2 input data and output text files for Duplicate Effective Model A are located in Appendix E.

### 3.3 Duplicate Effective Model B (HEC-RAS)

The Current Effective input data was entered into HEC-RAS to develop a "control" model for comparison with the more detailed existing and proposed models to be discussed later. The model includes HEC-2 cross-sections extending from Station 51+98 (FEMA FIS XS "BIA"; HEC-2 cross section 65.0) to Station -2+55 (FEMA FIS XS "BHJ"; HEC-2 cross section 44.0). The FEMA FIS model includes the bridge data original to the HEC-2 model. All elevation data was adjusted to the NAVD 88 vertical datum for entry into HEC-RAS. The 100-year peak flows used in the FEMA FIS were applied to the model. The 100-year water surface elevation of 652.54 ft, as listed in the FIS at cross section "BHJ" and adjusted to NAVD 88, was used as the downstream boundary condition. A mixed flow regime was selected, though the flow remained in subcritical flow for the majority of the model, keeping with the original HEC-2 model. HEC-RAS data for Duplicate Effective Model B is provided in Appendix F.

### 3.4 Existing Conditions Model (Corrected Effective Model)

Detailed existing cross sections of Walker Run and Tributary #1 were surveyed by LandStudies, Inc. and supplemented with one (1) foot existing contours produced by Peters Consultants, Inc. Cross sections were inserted into the Duplicate Effective HEC-RAS model to create an Existing Conditions Model (also the Corrected effective Model). Existing cross sections extend from Station 58+62 (upstream of FEMA FIS XS "BIA") to the downstream limit of the "control" model, Station -2+55 (FEMA FIS XS "BHJ"). Two LSI surveyed cross-sections (XS 35+32 and 51+98) overlapped with FEMA cross-sections, so the detailed surveyed channel information was substituted into the FEMA cross-section, while the floodplain and extended area of the FEMA cross-section were left intact.

Cross sections for Tributary #1 begin at the confluence of Walker Run and extend to Tributary Station 44+00, just south of Beach Grove Road. Manning's 'n' values for the surveyed



existing cross sections were kept consistent with FEMA FIS Manning's 'n' values, when possible. Manning's 'n' values for tributary #1 were chosen from the HEC-RAS Hydraulic Reference Manual based on existing conditions. Photographs illustrating selected 'n' values are provided in the Appendix J.

Four bridges and one farm road culvert cross Walker Run within the studied section, while two culverts cross Tributary #1. All crossings are characterized within the existing conditions model.

The 100-year peak flows from FEMA FIS of 1860 cfs for the total watershed and 1640 cfs for the Walker Run watershed were used in the HEC-RAS existing model, as well as the calculated flow of 300 cfs for the Tributary #1 watershed. For the Walker Run downstream boundary condition, the 100-year water surface elevation of 652.54 ft was used, as in Duplicate Effective Model B. Tributary #1 was not joined to Walker run with a junction because the peak discharges are not coincident. Instead, the downstream boundary condition was set to normal depth based on a slope of 0.0015 ft/ ft. A subcritical flow regime was considered in the HEC-RAS analysis.

An encroachment analysis was also included in the Existing Conditions Model to establish the Floodway based on the more accurate geometry data used in this study. The floodway was determined by first using the automated encroachment analysis within HEC-RAS to raise the level of water surface elevation one (1) foot (Method 4). After an initial run using the automated method, encroachment stations were fine-tuned manually to achieve a consistent increase in the water surface elevation of as close to one (1) foot as possible. The Existing Conditions data is located in Appendix G).

### 3.5 Proposed Conditions Model

The proposed condition involves lowering the floodplain and bankfull elevations of Walker Run, as well as constructing a stable plan and profile to reduce erosive shear stresses on the banks during high flows. Wetlands will border the channel throughout the floodplain and native, wet-tolerant herbaceous and woody vegetation will be installed throughout the project site. The proposed grading, primarily from the mitigation plan by LandStudies, Inc. and supplemented with proposed contours, walls and bridges, as provided by Pennoni and as included in the Joint Permit Drawings for BBNPP dated June 15, 2011, was used to generate cross-sections and profiles for the proposed condition geometry data. Tributary #1 has very minor grading changes affecting the floodplain.

Of the four bridges crossing Walker Run in existing conditions, three will remain and one will be replaced with a larger structure to span the 100-year floodplain. Beach Grove Road at the upstream end of the project will remain, Market Street Bridge which divides the restoration project will remain, and the lower Market Street Bridge at the downstream limit of the study will remain. The small farm road crossing bridge through the lower restoration will be replaced with a larger bridge to span the 100-year floodplain. The culvert crossing downstream of the Tributary #1 confluence with Walker Run will remain. Manning's 'n'



values were increased slightly from existing condition values through the restored reach to reflect the proposed vegetation of heavy brush and understory in a forested wetland environment.

Tributary #1 will have four (4) proposed bridges spanning its 100-year floodplain. The existing culvert crossing at Station 12+81 will be removed and replaced with a bridge to span the floodplain. The other culvert crossing upstream at Station 45+28 will remain. The three additional proposed bridges include a pipe bridge near Trib cross section 16+58, a road and pipe bridge near Trib cross section 28+34 and a railroad bridge near Trib cross section 33+56.

The same flow information and boundary conditions used in the existing conditions model were used in proposed conditions ( $Q_{100} = 1640$  cfs for Walker Run,  $Q_{100} = 300$  cfs for the Tributary #1 watershed, and  $Q_{100} = 1860$  cfs for total watershed with downstream WSEL<sub>100</sub> = 652.54 ft). A subcritical flow regime was considered in the HEC-RAS analysis.

An encroachment analysis was used to establish a revised floodway through the project reach in the proposed conditions model due to the extent of change in the channel plan-form. The floodway was determined by first using the automated encroachment analysis within HEC-RAS to raise the level of water surface elevation one (1) foot (Method 4). After an initial run using the automated method, encroachment stations were fine-tuned manually to achieve a consistent increase in the water surface elevation of as close to one (1) foot as possible.

Proposed HEC-RAS data can be found in Appendix H.

#### **4 Results and Conclusions**

A summary of 100-year flood elevations and velocities for all of the above models is provided in Appendix D. Duplicate Effective Model A successfully duplicates the flood elevations reported in the current FIS to a reasonable degree of accuracy. Minor deviations of up to 0.26 ft are likely the result of incorrect translation of illegible data on the original HEC-2 printouts. Duplicate Effective Model B also returns values generally similar to Duplicate effective Model A although there are a few significant discrepancies of up to 0.58 ft that are likely a result of slightly different modeling routines in HEC-2 and HEC-RAS.

The Corrected Effective Model has substantial deviation from the Duplicate Effective Model B, differing by up to 1.57 ft. This is expected, due to the significant differences in the geometry files. The existing conditions model contains more detail of the studied site due to the additional existing cross-sections. Also, geometric variation can be attributed to the amount of degradation that has occurred in Walker Run since 1977 when the FEMA FIS HEC-2 data was developed. Finally, the effective model does not include all of the structures on Walker Run. These structures, which are included in the Existing Conditions Model, are the cause for the greatest discrepancies between the two models.

The existing conditions model was then compared to the proposed conditions model. In the restored channel and floodplain section of Walker Run, the proposed conditions water surface elevations are lower than the existing conditions water surface elevations by as much as 2.29 ft. The additional storage provided in the proposed cross-section lowers the water surface elevations for the 100-year storm event substantially. In areas downstream of the Walker Run restoration, the water surface elevations for proposed and existing conditions are equal. Since the proposed water surface elevations are equal to or lower than the existing water surface elevations along Walker Run, it can be concluded that the proposed BBNPP and associated mitigation for Walker Run have no negative hydraulic effect on Walker Run or its floodplain.

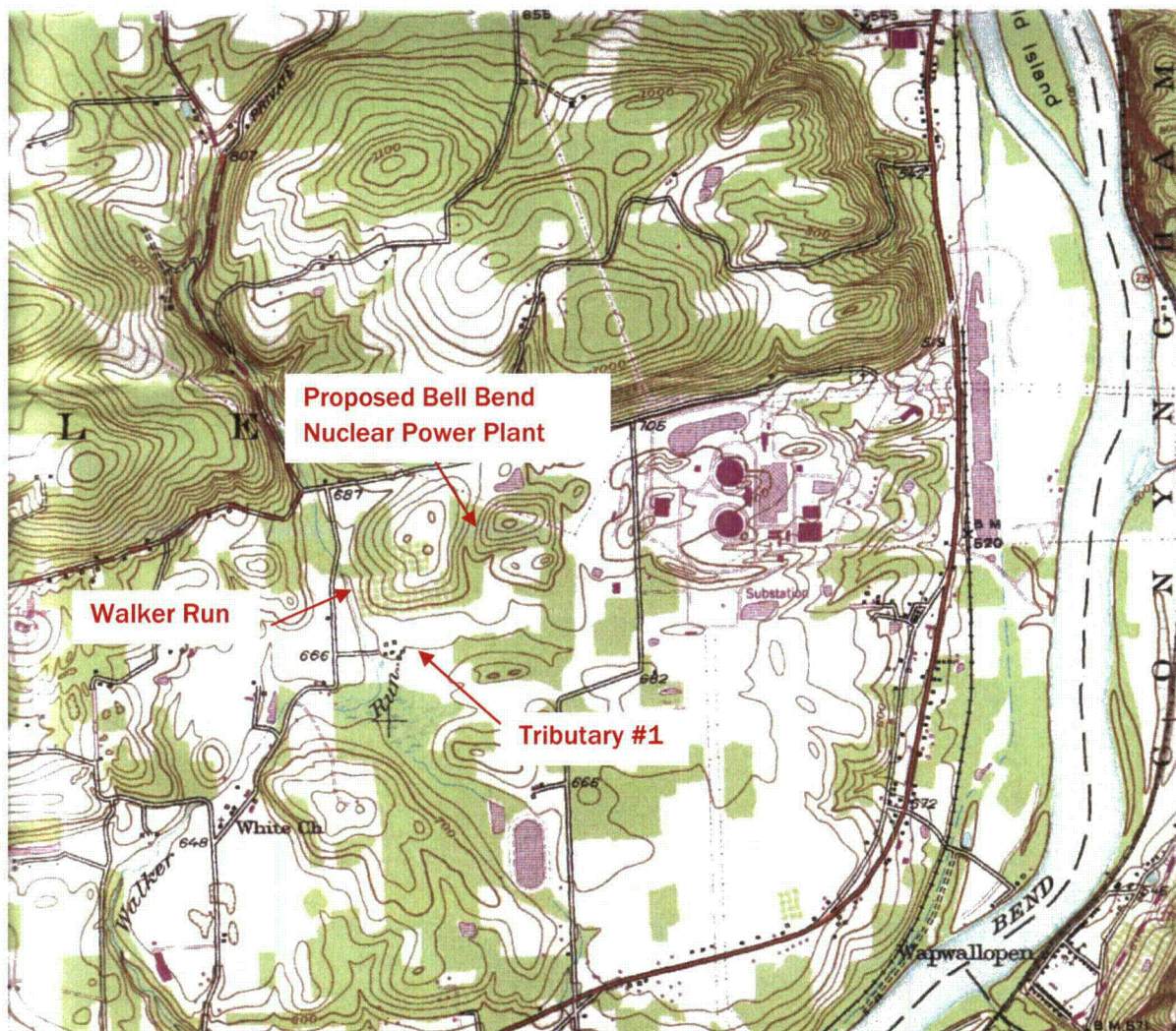
Along Tributary #1, proposed conditions water surface elevations are equal to existing conditions water surface elevations at most cross-sections. The removal of the existing culvert and installation of the four bridges between cross sections 12+81 and 33+56 changes the hydraulics of this reach such that water surface elevations fluctuate above and below the existing conditions. The proposed bridges span the 100-year floodplain, but there are piers that affect the floodplain hydraulics. The maximum increase in water surface in the proposed condition is 0.86 ft at Station 13+60. However, the upstream and downstream cross sections both show reductions in water surface elevation. All water surface elevation discrepancies between the existing and proposed conditions models on the unstudied Tributary #1 are less than one (1) foot and all increases are contained within the PPL property.

A new floodway was delineated due to the relocation of Walker Run in the proposed restoration plans. A floodway was assessed using the encroachment analysis in HEC-RAS with a target water surface elevation increase of one (1.0) foot and plotted with the existing and proposed 100-year storm event floodplain. The plot of the proposed floodway can be found on the Proposed 100 Year Floodplain Map in Appendix B.

## Appendix A: Maps

- Location Map
- Soils Map
- Geology Map
- Walker Run Watershed Map





Source: Berwick, PA USGS 7.5-minute topographic quadrangle

#### Location

41°05'14" N, 76°10'04" W

#### Scale

1" = 2000'

#### Project Location Map

BBNPP Proposed Site near Walker Run and Tributary #1



## Walker Run Flood Study Report

Bell Bend Nuclear Power Plant

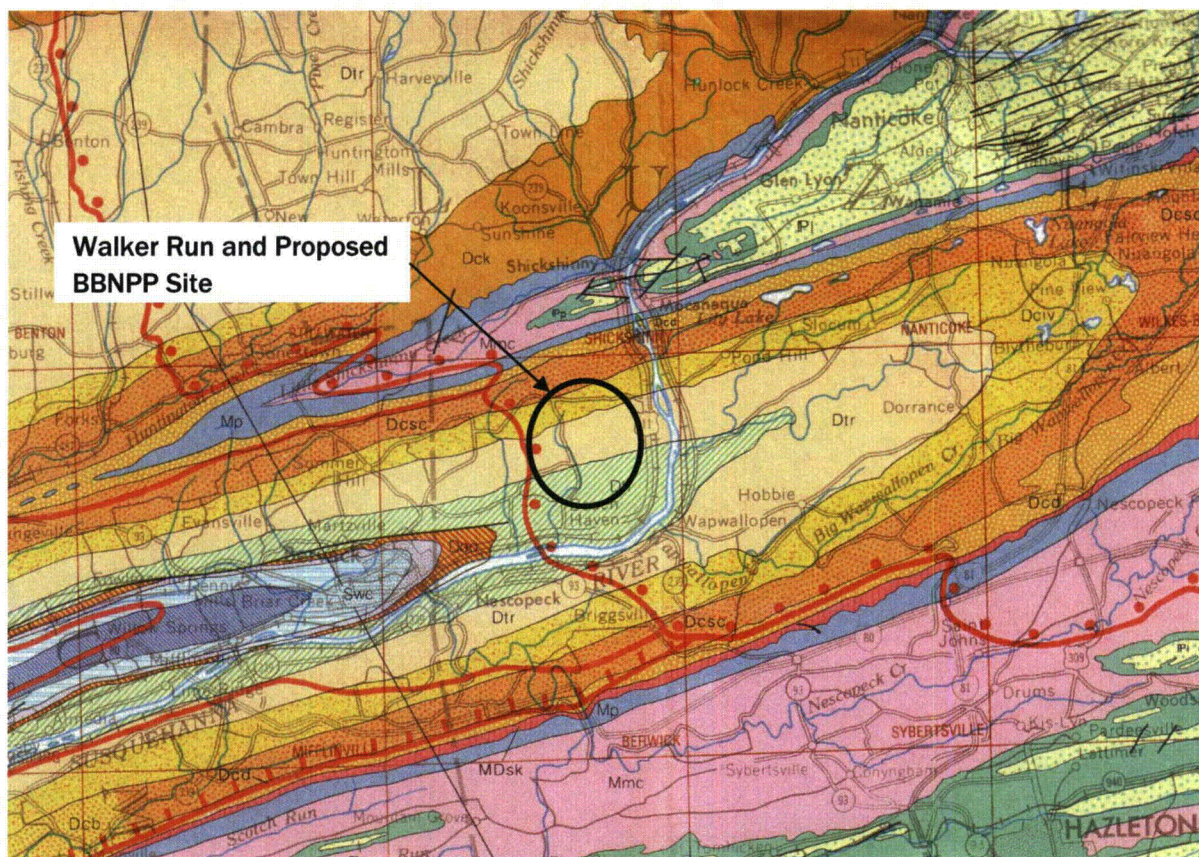
Salem Township, Luzerne County, PA

December 2010









**Walker Run and Proposed  
BBNPP Site**

Source: Geologic Map of Pennsylvania. 1980.

### Geologic Formation

Dh = Hamilton Group

### Location

41°05'14" N, 76°10'04" W

### Scale

1:250,000

### Geology Map

BBNPP Proposed Site near Walker Run and Tributary #1



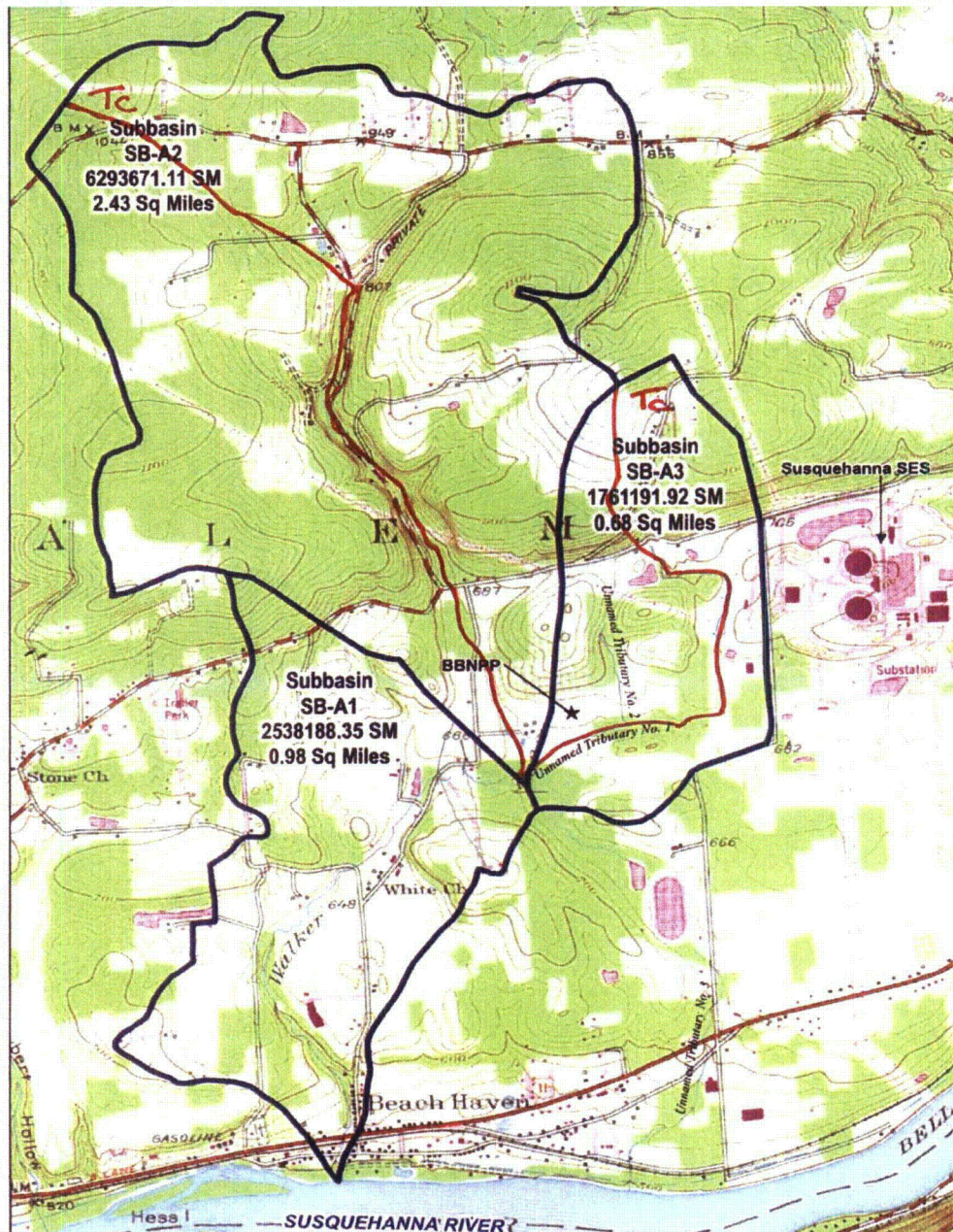
## Walker Run Flood Study Report

Bell Bend Nuclear Power Plant

Salem Township, Luzerne County, PA

December 2010





Source: Figure 2.4-3 from COLA; Berwick, PA USGS 7.5 minute topographic quadrangle

#### Location

41°05'17" N, 76°07'54" W

#### Scale

1" = 3,000'

### Walker Run Watershed Map

Drainage area of Walker Run and Tributary #1 showing time of concentration paths for each subdrainage area



## Walker Run Flood Study Report

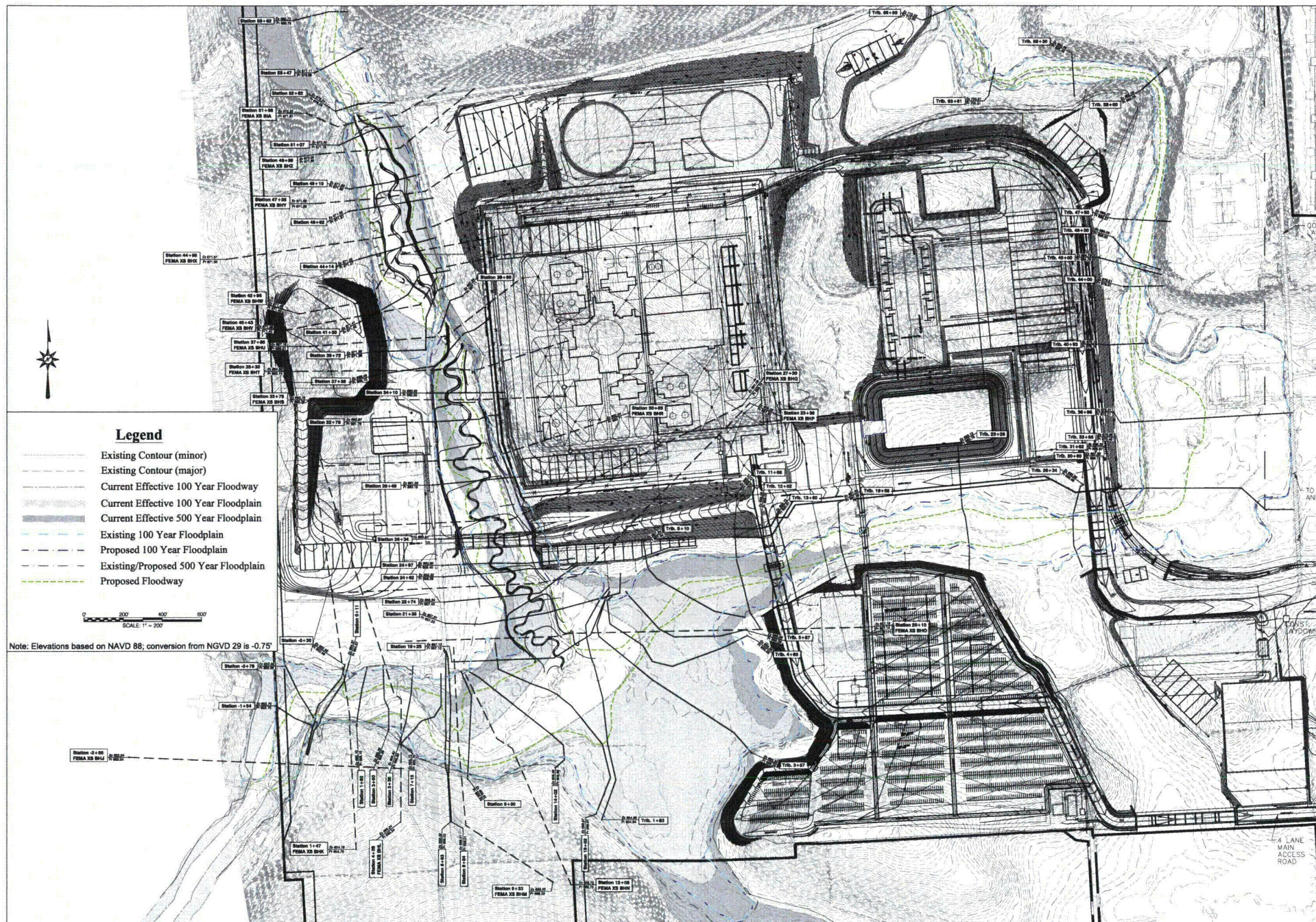
Bell Bend Nuclear Power Plant

Salem Township, Luzerne County, PA

December 2010

**Appendix B:  
Floodplain Map**





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**PROJECT:**  
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**FLOODPLAIN MAP  
FLOOD STUDY - WALKER RUN**  
SALEM TOWNSHIP  
LUZERNE COUNTY, PENNSYLVANIA

**SHEET TITLE:**

Revision	No.	Date	Description
1	11/18/10		Initial
2	02/11		PCMA comments

Project Number: E-726-LB  
Drawn by: EPL  
Checked by: BE  
Date: September 2, 2011  
Scale: 1" = 200'  
Drawing Number: FS-WR-P1  
Sheet Number: 1 OF 2



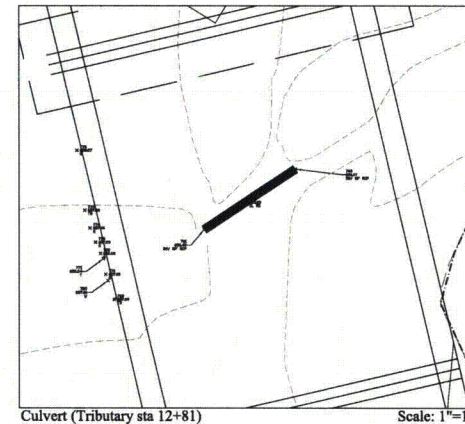
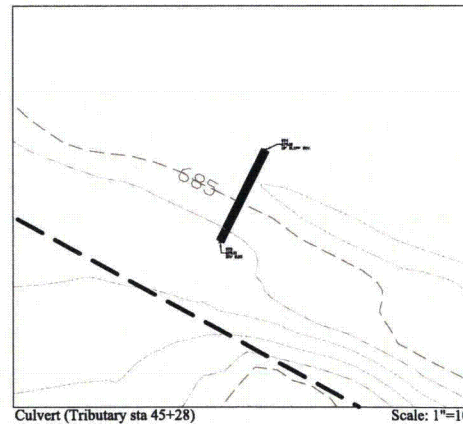
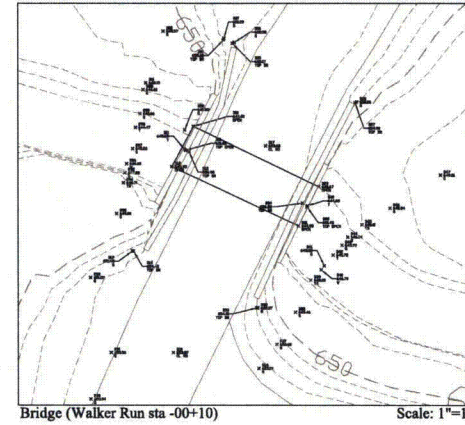
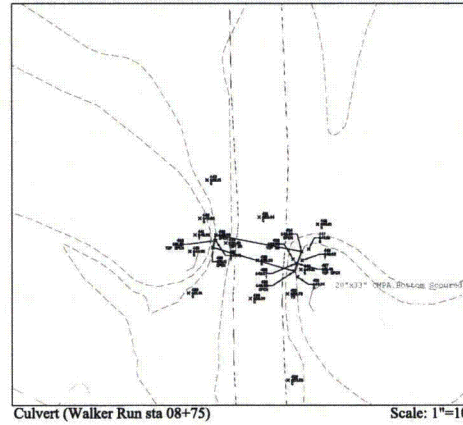
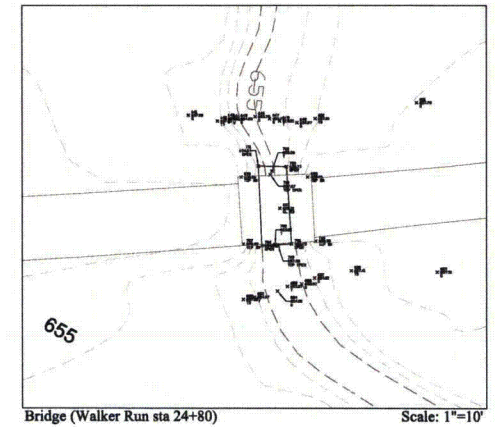
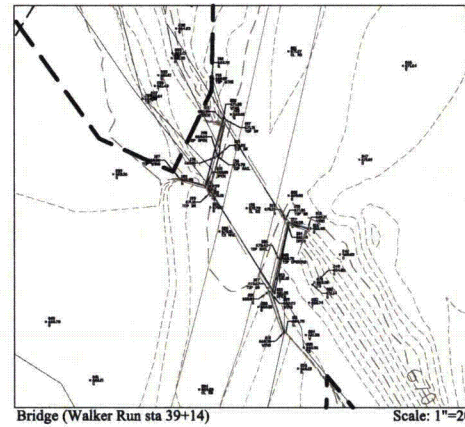
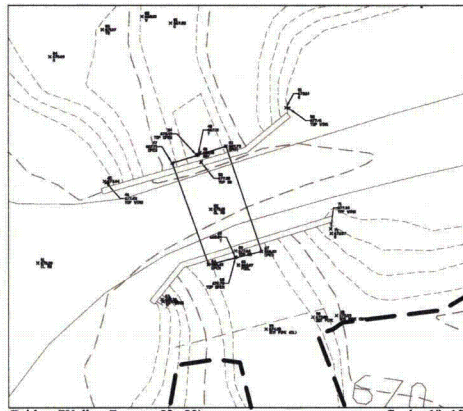
### Legend

- Existing Contour (minor)
- Existing Contour (major)
- Edge of Pavement (Paved)
- Edge of Pavement (Unpaved)

Note: Elevations based on NAVD 88; conversion from NGVD 29 is -0.75'

### Abbreviations

- CL RD Centerline of Road
- G Ground
- INV Invert
- OPEN Width of Span
- RCP Reinforced Concrete Pipe
- SLCPP Smooth Lined Corrugated Plastic Pipe
- T Thalweg
- Top Br Top of Bridge
- Top Open Low Chord of Bridge
- Top Wing Top of Wing Wall
- W Water Surface at Edge of Water (At Time of Survey)
- Wing Wing Wall



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PROJECT: BELL BEND NUCLEAR POWER  
PLANT  
PPL BELL BEND, LLC.  
38 BOMBOY LANE, SUITE 2  
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SHEET TITLE: EXISTING STRUCTURES PLAN  
FLOOD STUDY - WALKER RUN  
SALLEN TOWNSHIP  
LUZERNE COUNTY, PENNSYLVANIA

Rev.	Date	Description

Project Number: E-725-L8  
Drawn By: APK  
Checked By: BE  
Date: SEPTEMBER 2011  
Scale: AS NOTED  
Revised By: PS-SNWR-P2

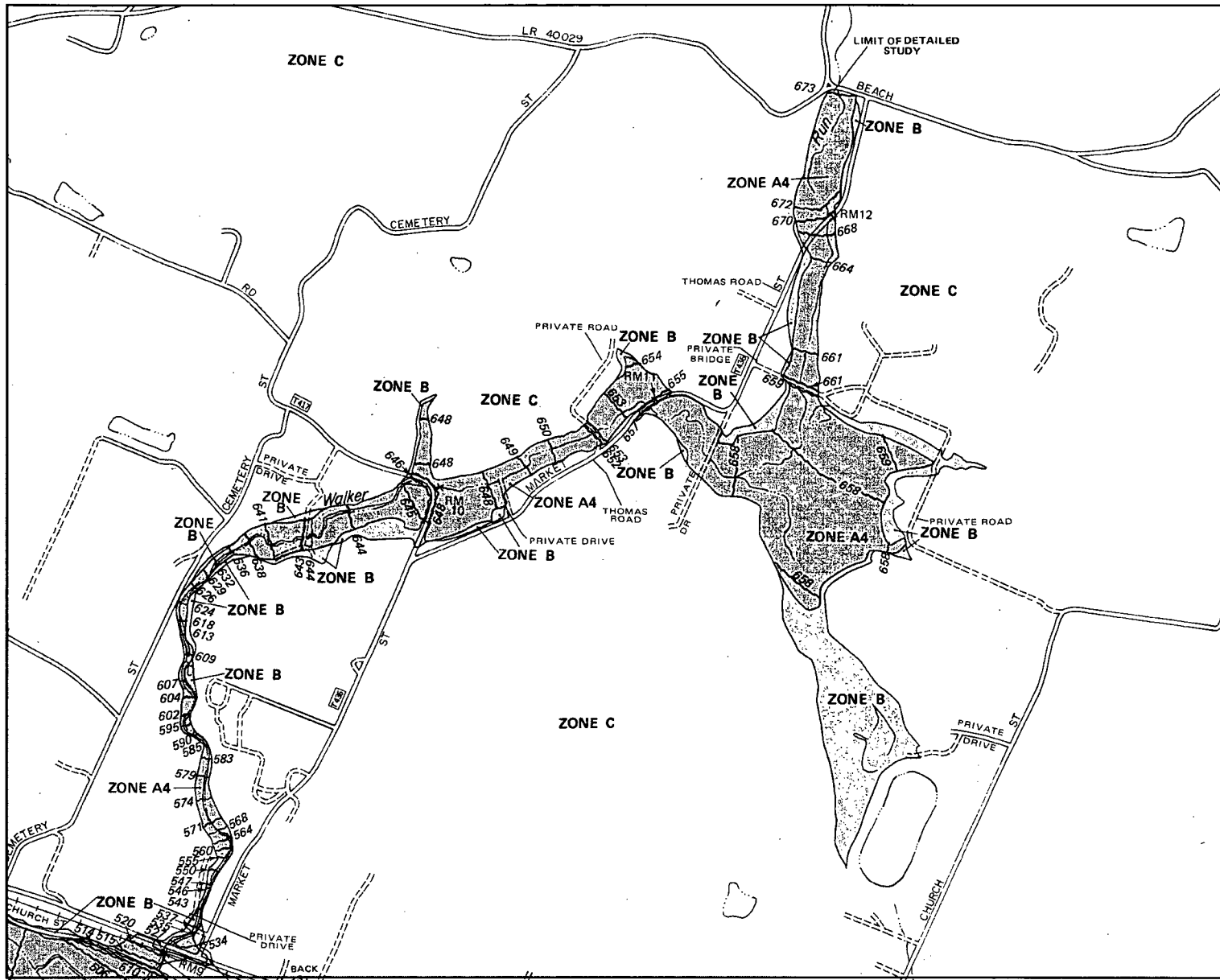
2  
OF 2

## Appendix C: Annotated FEMA Maps

- Floodway Map
- FIRM







APPROXIMATE SCALE

800 0 800 FEET

# KEY TO MAP

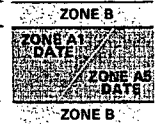
500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations\* With Date of Identification e.g., 12/2/74

100-Year Flood Boundary

500-Year Flood Boundary



Base Flood Elevation Line With Elevation in Feet\*\*

513

Base Flood Elevation in Feet Where Uniform Within Zone\*\*

(EL 987)

Elevation Reference Mark

RM7 x

River Mile

M1.5

\*\*Referenced to the National Geodetic Vertical Datum of 1929

## \*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



**Appendix D:**  
**Flood Model Summary Table**



### 100-Yr Flood Model Summary Table

(all elevations are NAVD 1988; FIS and Duplicate Effective A elevations have been converted from NGVD 1929 with a conversion factor of -0.75 ft. )

River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
<b>Walker Run</b>							
<b>5862</b>	Existing Conditions	1640	675.53	680.72		10.81	
	Proposed Conditions	1640	675.53	680.72	0.00	10.82	0.01
<b>5547</b>	Existing Conditions	1640	669.38	677.11		4.35	
	Proposed Conditions	1640	669.38	676.99	-0.12	4.5	0.15
<b>5282</b>	Existing Conditions	1640	667.03	676.24		6.02	
	Proposed Conditions	1640	667.03	676.03	-0.21	6.25	0.23
<b>5250</b>	Existing Bridge						
<b>5198</b> <b>HEC-2 XS 65.0, BIA</b>	FEMA (FIS)	1640		672.31		4.56	
	Duplicate Effective A (HEC-2)	1640		672.34	0.03	4.52	-0.04
	Duplicate Effective B (HEC-RAS)	1640		672.29	-0.05	4.57	0.05
	Corrected Effective/ Existing Conditions	1640	665.71	672.25	-0.04	11.33	6.76
	Proposed Conditions	1640	665.71	671.81	-0.44	10.83	-0.50
<b>5107</b>	Existing Conditions	1640	664.59	672.3		3.56	
	Proposed Conditions	1640	664.59	671.79	-0.51	3.88	0.32
<b>4995</b> <b>HEC-2 XS 64.0, BHZ</b>	FEMA (FIS)	1640		672.00		4.47	
	Duplicate Effective A (HEC-2)	1640	666.24	672.04	0.04	4.41	-0.06
	Duplicate Effective B (HEC-RAS)			671.98	-0.06	4.49	0.08
	Corrected Effective/ Existing Conditions	1640	666.24	672.05	0.07	4.39	-0.10
	Proposed Conditions	1640	666.24	671.69	-0.36	2.42	-1.97
<b>4810</b>	Existing Conditions	1640	663.49	671.8		3.19	
	Proposed Conditions	1640	662.87	671.62	-0.18	2.41	-0.78
<b>4735</b> <b>HEC-2 XS 63.0, BHY</b>	FEMA (FIS)	1640		671.47		3.90	
	Duplicate Effective A (HEC-2)	1640		671.55	0.08	3.80	-0.10
	Duplicate Effective B (HEC-RAS)			671.45	-0.10	3.93	0.13
	Corrected Effective/ Existing Conditions	1640	664.24	671.69	0.24	3.60	-0.33
	Proposed Conditions	1640	662.26	671.59	-0.10	2.37	-1.23
<b>4692</b>	Existing Conditions	1640	662.02	671.68		2.30	
	Proposed Conditions	1640	663.77	671.57	-0.11	2.29	-0.01
<b>4495</b> <b>HEC-2 XS 62.0, BHX</b>	FEMA (FIS)	1640		671.24		3.14	
	Duplicate Effective A (HEC-2)	1640		671.33	0.09	3.07	-0.07
	Duplicate Effective B (HEC-RAS)	1640		671.21	-0.12	3.17	0.10
	Corrected Effective/ Existing Conditions	1640	663.74	671.57	0.36	2.88	-0.29
	Proposed Conditions	1640	663.23	671.5	-0.07	2.27	-0.61
<b>4414</b>	Existing Conditions	1640	662.46	671.52		2.71	
	Proposed Conditions	1640	662.97	671.47	-0.05	2.03	-0.68
<b>4295</b> <b>HEC-2 XS 61.0, BHW</b>	FEMA (FIS)	1640		671.12		2.86	
	Duplicate Effective A (HEC-2)	1640		671.23	0.11	2.68	-0.18
	Duplicate Effective B (HEC-RAS)	1640		671.10	-0.13	2.78	0.10
	Corrected Effective/ Existing Conditions	1640	663.24	671.46	0.36	2.50	-0.28
	Proposed Conditions	1640	662.82	671.45	-0.01	1.70	-0.80



River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
4130	Existing Conditions	1640	661.54	671.41		1.82	
	Proposed Conditions	1640	662.26	671.42	0.01	1.68	-0.14
4043 HEC-2 XS 60.0, BHV	FEMA (FIS)	1640		670.97		2.71	
	Duplicate Effective A (HEC-2)	1640		671.10	0.13	2.48	-0.23
	Duplicate Effective B (HEC-RAS)	1640		670.96	-0.14	2.59	0.11
	Corrected Effective/ Existing Conditions	1640	662.24	671.38	0.42	2.27	-0.32
	Proposed Conditions	1640	662.24	671.40	0.02	2.15	-0.12
3972	Existing Conditions	1640	661.21	671.36		1.68	
	Proposed Conditions	1640	661.21	671.39	0.03	1.28	-0.40
3914	Existing Bridge						
3860	Existing Conditions	1640	660.73	667.84		8.79	
	Proposed Conditions	1640	660.73	667.11	-0.73	11.20	2.41
3785 HEC-2 XS 58.0, BHU	FEMA (FIS)	1640		667.22		8.50	
	Duplicate Effective A (HEC-2)	1640		667.25	0.03	8.36	-0.14
	Duplicate Effective B (HEC-RAS)	1640		666.72	-0.53	10.95	2.59
	Corrected Effective/ Existing Conditions	1640	660.24	667.18	0.46	7.39	-3.56
	Proposed Conditions	1640	660.24	665.21	-1.97	9.12	1.73
3735	Existing Conditions	1640	660.36	666.48		3.88	
	Proposed Conditions	1640	660.36	665.10	-1.38	6.73	2.85
3532 HEC-2 XS 57.0, BHT	FEMA (FIS)	1640		663.28		8.48	
	Duplicate Effective A (HEC-2)	1640		663.52	0.24	8.02	-0.46
	Duplicate Effective B (HEC-RAS)	1640		663.52	0.00	7.58	-0.44
	Corrected Effective/ Existing Conditions	1640	658.71	664.66	1.14	8.39	0.81
	Proposed Conditions	1640	658.87	663.74	-0.92	4.83	-3.56
3410	Existing Conditions	1640	657.83	663.82		4.24	
	Proposed Conditions	1640	658.92	662.82	-1.00	6.02	1.78
3375 HEC-2 XS 56.0, BHS	FEMA (FIS)	1640		662.35		4.24	
	Duplicate Effective A (HEC-2)	1640		662.09	-0.26	4.00	-0.24
	Duplicate Effective B (HEC-RAS)	1640		662.36	0.27	5.23	1.23
	Corrected Effective/ Existing Conditions	1640	657.24	663.78	1.42	3.46	-1.77
	Proposed Conditions	1640	657.97	662.38	-1.40	7.25	3.79
3278	Existing Conditions	1640	657.01	662.97		8.65	
	Proposed Conditions	1640	657.99	661.78	-1.19	4.54	-4.11
3065 HEC-2 XS 55.0, BHR	FEMA (FIS)	1640		661.02		5.92	
	Duplicate Effective A (HEC-2)	1640		660.93	-0.09	5.46	-0.46
	Duplicate Effective B (HEC-RAS)	1640		660.88	-0.05	5.55	0.09
	Corrected Effective/ Existing Conditions	1640	655.95	662.04	1.16	3.66	-1.89
	Proposed Conditions	1640	656.75	660.71	-1.33	5.08	1.42
2949	Existing Conditions	1640	655.77	661.56		5.83	
	Proposed Conditions	1640	656.74	660.19	-1.37	3.84	-1.99
2730 HEC-2 XS 54.0, BHQ	FEMA (FIS)	1640		659.89		4.18	
	Duplicate Effective A (HEC-2)	1640		659.89	0.00	4.15	-0.03
	Duplicate Effective B (HEC-RAS)	1640		659.53	-0.36	4.75	0.60
	Corrected Effective/ Existing Conditions	1640	654.74	661.09	1.56	3.4	-1.35
	Proposed Conditions	1640	655.66	659.73	-1.36	2.97	-0.43
2634	Existing Conditions	1640	653.74	660.84		4.68	
	Proposed Conditions - deleted for proposed bridge						

River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
2497	Existing Conditions	1640	653.51	660.69		2.72	
	Proposed Conditions	1640	654.75	658.40	-2.29	4.04	1.32
2480	Existing Bridge						
2462	Existing Conditions	1640	653.86	659.30		6.44	
	Proposed Conditions	1640	654.61	658.29	-1.01	3.54	-2.90
2339 HEC-2 XS 52.0, BHP	FEMA (FIS)	1640		657.75		2.55	
	Duplicate Effective A (HEC-2)	1640		657.74	-0.01	2.81	0.26
	Duplicate Effective B (HEC-RAS)	1640		657.94	0.20	2.59	-0.22
	Corrected Effective/ Existing Conditions	1640	653.24	659.26	1.32	1.65	-0.94
	Proposed Conditions	1640	654.38	657.82	-1.44	4.54	2.89
2274	Existing Conditions	1640	651.42	658.64		8.18	
	Proposed Conditions	1640	653.9	657.4	-1.24	5.18	-3.00
2139	Existing Conditions	1640	650.72	657.31		3.41	
	Proposed Conditions	1640	653.31	657.22	-0.09	2.11	-1.30
2010 HEC-2 XS 51.0, BHO	FEMA (FIS)	1640		657.43		1.85	
	Duplicate Effective A (HEC-2)	1640		657.38	-0.05	1.88	0.03
	Duplicate Effective B (HEC-RAS)	1640		657.72	0.34	1.50	-0.38
	Corrected Effective/ Existing Conditions	1640	652.24	657.18	-0.54	2.16	0.66
	Proposed Conditions	1640	652.70	657.14	-0.04	1.76	-0.40
1925	Existing Conditions	1640	651.09	657.12		1.79	
	Proposed Conditions	1640	652.07	657.10	-0.02	1.64	-0.15
1602	Existing Conditions	1640	650.67	656.97		1.47	
	Proposed Conditions	1640	650.67	656.97	0.00	1.47	0.00
1402	Existing Conditions	1640	649.80	656.86		1.60	
	Proposed Conditions	1640	649.80	656.86	0.00	1.60	0.00
1208 HEC-2 XS 50.0, BHN	FEMA (FIS)	1860		657.03		2.01	
	Duplicate Effective A (HEC-2)	1860		656.95	-0.08	2.06	0.05
	Duplicate Effective B (HEC-RAS)	1860		657.39	0.44	1.75	-0.31
	Corrected Effective/ Existing Conditions	1860	650.74	656.72	-0.67	2.31	0.56
	Proposed Conditions	1860	650.74	656.72	0.00	2.31	0.00
990	Existing Conditions	1860	649.47	656.52		2.3	
	Proposed Conditions	1860	649.47	656.52	0.00	2.3	0.00
933 HEC-2 XS 49.0, BHM	FEMA (FIS)	1860		656.68		4.84	
	Duplicate Effective A (HEC-2)	1860		656.57	-0.11	5.01	0.17
	Duplicate Effective B (HEC-RAS)	1860		657.15	0.58	4.17	-0.84
	Corrected Effective/ Existing Conditions	1860	649.74	656.22	-0.93	5.64	1.47
	Proposed Conditions	1860	649.74	656.22	0.00	5.64	0.00
884	Existing Conditions	1860	648.62	656.01		6.34	
	Proposed Conditions	1860	648.62	656.01	0.00	6.34	0.00
875	Existing Bridge						
863	Existing Conditions	1860	648.96	656.02		4.94	
	Proposed Conditions	1860	648.96	656.02	0.00	4.94	0.00
715	Existing Conditions	1860	647.90	655.75		3.87	
	Proposed Conditions	1860	647.90	655.75	0.00	3.87	0.00
536	Existing Conditions	1860	646.97	655.50		3.81	
	Proposed Conditions	1860	646.97	655.50	0.00	3.81	0.00



River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
<b>428</b> HEC-2 XS 47.0, BHL	FEMA (FIS)	1860		656.27		2.49	
	Duplicate Effective A (HEC-2)	1860		656.27	0.00	2.89	0.40
	Duplicate Effective B (HEC-RAS)	1860		656.63	0.36	2.64	-0.25
	Corrected Effective/ Existing Conditions	1860	647.24	655.34	-1.29	3.71	1.07
	Proposed Conditions	1860	647.24	655.34	0.00	3.71	0.00
<b>350</b>	Existing Conditions	1860	647.08	655.28		3.12	
	Proposed Conditions	1860	647.08	655.28	0.00	3.12	0.00
<b>185</b>	Existing Conditions	1860	646.40	655.10		3.49	
	Proposed Conditions	1860	646.40	655.10	0.00	3.49	0.00
<b>147</b> HEC-2 XS 46.0, BHK	FEMA (FIS)	1860		655.89		4.63	
	Duplicate Effective A (HEC-2)	1860		655.88	-0.01	4.52	-0.11
	Duplicate Effective B (HEC-RAS)	1860		656.36	0.48	3.95	-0.57
	Corrected Effective/ Existing Conditions	1860	646.74	654.79	-1.57	6.01	2.06
	Proposed Conditions	1860	646.74	654.79	0.00	6.01	0.00
<b>11</b>	Existing Conditions	1860	645.71	654.67		3.89	
	Proposed Conditions	1860	645.71	654.67	0.00	3.89	0.00
<b>-10</b>	Existing Bridge						
<b>-30</b>	Existing Conditions	1860	644.46	652.96		9.03	
	Proposed Conditions	1860	644.46	652.96	0.00	9.03	0.00
<b>-78</b>	Existing Conditions	1860	645.43	652.96		4.76	
	Proposed Conditions	1860	645.43	652.96	0.00	4.76	0.00
<b>-154</b>	Existing Conditions	1860	644.90	652.70		5.45	
	Proposed Conditions	1860	644.90	652.70	0.00	5.45	0.00
<b>-255</b> HEC-2 XS 44.0, BHJ	FEMA (FIS)	1860		652.54		4.72	
	Duplicate Effective A (HEC-2)	1860		652.54	0.00	4.79	0.07
	Duplicate Effective B (HEC-RAS)	1860		652.54	0.00	4.78	-0.01
	Corrected Effective/ Existing Conditions	1860	645.74	652.54	0.00	4.78	0.00
	Proposed Conditions	1860	645.74	652.54	0.00	4.78	0.00

River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
<b>Unnamed Tributary to Walker Run</b>							
6850	Existing Conditions	300	709.19	712.52		4.07	
	Proposed Conditions	300	709.19	712.52	0.00	4.07	0.00
6361	Existing Conditions	300	695.2	700.31		7.04	
	Proposed Conditions	300	695.2	700.31	0.00	7.04	0.00
5930	Existing Conditions	300	692.00	695.48		1.90	
	Proposed Conditions	300	692.00	695.48	0.00	1.90	0.00
5500	Existing Conditions	300	691.00	692.03		5.58	
	Proposed Conditions	300	691.00	692.03	0.00	5.58	0.00
4750	Existing Conditions	300	684.00	686.27		1.51	
	Proposed Conditions	300	684.00	686.27	0.00	1.51	0.00
4530	Existing Conditions	300	684.00	686.03		0.72	
	Proposed Conditions	300	684.00	686.03	0.00	0.72	0.00
4528	Existing Culvert						
4500	Existing Conditions	300	683.30	684.79		6.56	
	Proposed Conditions	300	683.30	684.79	0.00	6.56	0.00
4400	Existing Conditions	300	675.78	679.51		1.84	
	Proposed Conditions	300	675.78	679.51	0.00	1.84	0.00
4093	Existing Conditions	300	673.10	676.78		7.98	
	Proposed Conditions	300	673.10	676.78	0.00	7.98	0.00
3696	Existing Conditions	300	669.50	672.01		0.49	
	Proposed Conditions	300	669.50	672.01	0.00	0.49	0.00
3356	Existing Conditions	300	667.67	670.65		3.59	
	Proposed Conditions	300	667.67	670.46	-0.19	5.61	2.02
3162	Existing Conditions	300	666.50	668.28		3.65	
	Proposed Conditions	300	666.50	668.87	0.59	1.91	-1.74
3060	Existing Conditions	300	666.00	667.68		2.17	
	Proposed Conditions	300	666.00	668.13	0.45	1.57	-0.60
2834	Existing Conditions	300	664.89	665.98		4.12	
	Proposed Conditions	300	664.89	665.69	-0.29	7.07	2.95
2326	Existing Conditions	300	659.9	663.12		2.55	
	Proposed Conditions	300	659.9	663.75	0.63	1.64	-0.91
1658	Existing Conditions	300	657.96	661.63		2.92	
	Proposed Conditions	300	657.96	661.32	-0.31	3.75	0.83
1360	Existing Conditions	300	657.83	659.75		5.6	
	Proposed Conditions	300	657.83	660.61	0.86	2.11	-3.49
1281	Existing Culvert						
1252	Existing Conditions	300	656.64	659.55		1.06	
	Proposed Conditions	300	656.64	659.02	-0.53	1.62	0.56
1105	Existing Conditions	300	655.65	658.41		2.00	
	Proposed Conditions	300	655.65	658.41	0.00	1.99	-0.01
810	Existing Conditions	300	653.84	657.34		1.65	
	Proposed Conditions	300	653.84	657.34	0.00	1.65	0.00



River Station/ Cross Section	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Δ WSE (ft)	Vel Chnl (ft/s)	Δ V (ft/s)
587	Existing Conditions	300	653.78	656.09		2.87	
	Proposed Conditions	300	653.78	656.09	0.00	2.87	0.00
463	Existing Conditions	300	653.23	655.56		1.08	
	Proposed Conditions	300	653.23	655.56	0.00	1.08	0.00
357	Existing Conditions	300	652.4	655.30		1.62	
	Proposed Conditions	300	652.4	655.29	-0.01	1.65	0.03
183	Existing Conditions	300	652.14	654.95		1.05	
	Proposed Conditions	300	652.14	654.94	-0.01	1.06	0.01

Appendix E:  
Duplicate Effective Model A

- HEC-2 Input Data
- HEC-2 Output Data



WALKER RUN - INPUT										
SUSQUEHANNA RIVER BASIN COMMISSION										
BLOOMSBURG-BERWICK-SHICKSHINNY REACH										
WALKER RUN - 100 YR. FLOOD										
T1										
T2										
T3										
J1	0	4	0	0	0	0	0	0	653.29	0
J2	+1.0	0	-1.0	0	0	0	0	0	0	0
J3	38	43	1	9	50	3	61	36	21	22
J3	27	28	4	0	38	39	43	1	3	11
J3	12	10	26	20	50	51	4	0	200	0
QT	5	550	1320	1860	1860	3100				
NC	0.09	0.09	0.05	0.3	0.7					
ET					15.4					
X1	44.	22.	1405.	1412.	225.	200.	260.	0	0	0
GR	685.1	1000.	680.3	1092.	675.1	1128.	670.1	1170.	665.3	1230.
GR	660.8	1310.	658.3	1330.	655.4	1350.	650.5	1372.	648.	1405.
GR	646.5	1408.	648.7	1412.	650.4	1450.	650.	1490.	650.1	1525.
GR	649.8	1570.	650.6	1610.	655.1	1670.	660.1	1712.	665.6	1740.
GR	670.1	1750.	675.6	1790.	0	0	0	0	0	0
NC	0.09	0.09	0.05	0.3	0.7	0	0	0	0	0
ET	0	0	0	0	9.1	0	0	0	1656.	1815.
X1	46.01	40.	1655.5	1664.5	100.	850.	230.			
X3	10.							653.	653.	
GR	699.6	1000.	695.	1040.	691.7	1100.	689.7	1170.	684.7	1210.
GR	682.8	1260.	685.1	1340.	681.8	1400.	679.8	1440.	677.1	1490.
GR	675.	1530.	669.8	1555.	664.5	1580.	659.5	1610.	654.4	1635.
GR	652.9	1640.	652.9	1650.	648.1	1655.5	647.7	1656.	646.8	1657.
GR	646.7	1658.	646.7	1659.	646.7	1660.	646.7	1661.	646.7	1662.
GR	646.7	1663.	647.	1664.	647.4	1664.5	649.5	1670.	649.8	1680.
GR	649.8	1690.	651.9	1750.	654.4	1815.	655.	1830.	656.	1870.
GR	654.8	1900.	659.5	1925.	661.7	2100.	666.1	2240.	666.9	2450.
SB		1.5	2.5		9.		42.		646.7	646.7
ET					9.1				1656.	1815.
X1	46.02				30.	30.	30.			
X2			1.	652.5	654.4					
X3	10.							654.4	654.4	
BT	30.	1530.	675.	675.	1555.	669.8	669.8	1580.	664.5	664.5
BT	1610.	659.5	659.5	1635.	654.4	654.4	1640.	654.4	652.9	1650.
BT	656.	652.9	1655.5	657.5	648.1	1656.	657.6	650.3	1657.	657.7
BT	651.4	1658.	657.8	652.1	1659.	657.9	652.4	1660.	658.	652.5
BT	1661.	657.8	652.4	1662.	657.8	652.1	1663.	657.7	651.3	1664.
BT	657.6	650.	1664.5	657.5	647.4	1670.	657.	649.5	1680.	656.
BT	649.8	1690.	654.4	649.8	1750.	654.4	651.9	1815.	654.4	654.4
BT	1830.	655.	655.	1870.	656.	656.	1900.	654.9	654.9	1925.
BT	659.5	659.5	2100.	661.7	661.7	2240.	665.1	665.1	2450.	666.9
BT	666.9									
NC	0.09	0.09	0.05	0.3	0.7					
ET					6.4					
X1	46.	36.	1650.	1670.	175.	50.	145.			
GR	700.2	1000.	695.6	1040.	692.3	1100.	690.3	1170.	688.3	1210.
GR	683.4	1260.	685.7	1340.	682.4	1400.	680.4	1440.	677.7	1490.
GR	675.6	1530.	670.4	1555.	665.1	1580.	660.	1610.	655.8	1640.
GR	650.2	1650.	647.5	1660.	650.1	1670.	652.5	1750.	655.8	1830.
GR	656.8	1870.	655.5	1900.	660.1	1925.	662.3	2100.	665.7	2240.
GR	667.5	2450.	670.4	2623.	675.4	2720.	680.1	2760.	655.3	2800.
GR	690.3	2838.	695.1	2848.	700.2	2900.	705.2	2940.	710.2	3010.
GR	715.2	3100.								
ET					9.1				1390.	1510.
X1	47.	28.	1410.	1440.	220.	240.	400.			
GR	687.3	1000.	685.6	1050.	680.6	1090.	675.2	1110.	670.4	1130.
GR	665.3	1150.	660.1	1210.	656.3	1250.	652.5	1350.	650.1	1410.
GR	648.	1430.	650.4	1440.	655.1	1550.	657.4	1605.	660.2	1630.
GR	662.5	1750.	665.2	1860.	667.3	2000.	668.1	2100.	668.6	2180.
GR	670.1	2365.	672.1	2450.	675.3	2540.	685.1	2640.	690.3	2700.
GR	700.1	2750.	705.4	2800.	710.2	2920.				

## WALKER RUN - INPUT

NC	0.09	0.09	0.05	0.3	0.7					
ET					9.1				1645.	1735.
X1	49.01	28.	1709.	1712.	350.	275.	450.			
X3	10.							653.7	653.7	
GR	725.	1000.	720.	1035.	715.2	1088.	709.9	1120.	704.8	1152.
GR	700.3	1200.	695.3	1238.	690.3	1270.	685.1	1290.	680.4	1340.
GR	675.4	1402.	669.8	1445.	664.9	1480.	660.2	1530.	664.9	1590.
GR	654.4	1609.	651.7	1709.	650.4	1709.5	650.2	1710.5	650.4	1711.5
GR	651.7	1712.	654.4	1890.	655.	1930.	660.3	2080.	663.9	2200.
GR	664.1	2300.	663.9	2400.	665.4	2500.				
SB		1.5	2.5		3.		7.1		650.2	650.2
ET					9.1				1645.	1709.
X1	49.02				20.	20.	20.			
X2			1.	653.2	654.4					
X3	10.							654.4	654.4	
BT	16.	1480.	664.9	664.9	1530.	660.2	660.2	1590.	654.9	654.9
BT	1609.	654.4	654.4	1709.	654.4	651.7	1709.5	654.4	653.	1710.5
BT	654.4	653.2	1711.5	654.4	653.	1712.	654.4	651.7	1890.	654.4
BT	654.4	1930.	655.	655.	2080.	660.3	660.3	2200.	663.9	663.9
BT	2300.	664.1	664.1	2400.	663.9	663.9	2500.	665.4	665.4	
ET					15.4					
X1	49.	26.	1700.	1720.	30.	30.	30.			
GR	725.3	1000.	720.3	1035.	715.5	1088.	710.8	1120.	705.1	1152.
GR	700.5	1200.	695.6	1238.	690.6	1270.	685.4	1290.	680.7	1340.
GR	675.7	1402.	670.1	1445.	665.2	1480.	660.5	1530.	655.2	1590.
GR	651.7	1700.	650.5	1710.	651.4	1720.	655.3	1750.	657.8	1900.
GR	660.6	2080.	664.2	2200.	664.4	2300.	664.2	2400.	665.7	2500.
GR	665.1	2590.								
NC	0.08	0.08	0.05	0.1	0.3					
ET					15.4					
X1	50.	22.	1740.	1765.	300.	175.	275.			
GR	725.3	1000.	720.1	1035.	715.4	1060.	710.1	1080.	705.8	1130.
GR	700.3	1165.	695.6	1190.	690.3	1225.	685.7	1265.	680.3	1345.
GR	675.3	1380.	670.4	1470.	665.9	1528.	660.2	1570.	655.5	1610.
GR	652.5	1680.	652.1	1740.	651.5	1752.	652.1	1765.	655.	1960.
GR	660.	2205.	665.	2330.						
QT	5.	480.	1160.	1640.	1640.	3600.				
NC	0.06	0.06	0.05	0.1	0.3					
ET					9.1				2350.	2800.
X1	51.	23.	2715.	2750.	1200.	200.	740.			
GR	690.1	1000.	687.3	1100.	685.1	1230.	680.2	1275.	675.6	1340.
GR	670.8	1450.	665.2	1635.	660.5	1798.	657.3	2030.	656.4	2295.
GR	655.1	2298.	656.7	2300.	656.7	2460.	655.1	2470.	656.7	2475.
GR	655.5	2600.	655.1	2715.	653.	2740.	655.3	2750.	658.1	2960.
GR	660.4	3230.	665.4	3345.	665.2	3360.				
NC	0.06	0.06	0.05	0.1	0.3					
ET					10.4					
X1	52.	34.	2145.	2268.	600.	350.	330.			
GR	725.1	1000.	720.1	1030.	715.4	1080.	710.9	1108.	705.3	1130.
GR	700.2	1150.	695.3	1170.	690.3	1195.	685.4	1225.	680.	1240.
GR	675.3	1295.	670.7	1400.	667.5	1500.	665.3	1590.	664.1	1630.
GR	665.1	1700.	665.7	1735.	665.2	1772.	660.	1825.	660.4	1888.
GR	658.1	2100.	656.1	2145.	654.	2250.	655.2	2268.	657.2	2350.
GR	660.6	2440.	662.1	2600.	665.3	2735.	667.3	2755.	668.1	2900.
GR	668.3	3100.	670.	3250.	672.1	3350.	675.4	3465.		
NC	0.06	0.06	0.05	0.3	0.7					
ET					9.1				2100.	2260.
X1	52.1	20.	2247.	2253.	175.	80.	133.			
X3	10.							657.	657.	
GR	666.2	1735.	665.7	1772.	660.5	1825.	660.	1888.	659.2	2045.
GR	658.6	2100.	655.6	2145.	654.6	2246.	654.6	2247.	654.6	2250.
GR	654.6	2253.	655.7	2268.	657.7	2350.	659.2	2390.	661.1	2440.
GR	662.6	2600.	665.8	2735.	667.8	2755.	668.6	2900.	668.8	3100.



WALKER RUN - INPUT									
SB	1.5	2.5	6.	23.4	654.6	654.6			
ET			9.1			2100.	2268.		
X1 52.2			12.	12.	12.				
X2		1.	658.5	659.2					
X3 10.						659.2	659.2		
BT 20.	1735.	666.2	666.2	1772.	665.7	665.7	1825.	660.5	660.5
BT 1888.	660.9	660.9	2045.	659.2	659.2	2100.	659.2	658.6	2145.
BT 659.2	655.6	2246.	659.2	654.6	2247.	659.2	658.5	2250.	659.2
BT 658.5	2253.	659.2	654.6	2268.	659.2	655.7	2350.	659.2	657.7
BT 2390.	659.2	659.2	2440.	661.1	661.1	2600.	662.6	662.6	2735.
BT 665.8	665.8	2755.	667.8	667.8	2900.	668.6	668.6	3100.	668.8
BT 668.8									
NC 0.06	0.06	0.05	0.3	0.7					
ET			10.4						
X1 54.	35.	1818.	1837.	300.	250.	245.			
GR 725.2	1000.	720.7	1120.	715.2	1198.	710.1	1242.	705.1	1262.
GR 700.6	1268.	695.3	1300.	690.3	1312.	685.3	1328.	680.1	1350.
GR 675.1	1368.	672.2	1470.	670.3	1588.	669.8	1595.	665.1	1669.
GR 657.5	1760.	657.	1818.	655.5	1830.	657.	1837.	657.5	1880.
GR 663.	2000.	665.1	2180.	668.1	2220.	667.	2300.	670.4	2465.
GR 672.4	2680.	675.5	2718.	680.3	2760.	685.3	2805.	690.	2840.
GR 695.7	2855.	700.7	2875.	705.1	2900.	710.	2980.	715.1	3015.
NC 0.06	0.06	0.05	0.1	0.3					
X1 55.	29.	1510.	1530.	340.	320.	330.			
GR 725.	1000.	720.6	1095.	715.5	1110.	710.1	1210.	705.1	1260.
GR 700.3	1290.	695.8	1300.	690.6	1315.	685.2	1330.	680.2	1355.
GR 675.7	1385.	670.5	1405.	665.3	1425.	657.5	1510.	656.7	1520.
GR 656.9	1530.	662.2	1670.	665.1	1805.	667.3	1828.	670.4	1978.
GR 672.1	2070.	675.4	2178.	680.1	2210.	688.3	2248.	690.7	2285.
GR 695.6	2310.	700.1	2355.	705.1	2420.	710.1	2525.		
NC 0.09	0.05	0.05	0.1	0.3					
ET			6.4						
X1 56.	29.	1443.	1460.	300.	325.	310.			
GR 725.1	1000.	720.1	1095.	715.2	1140.	710.6	1170.	705.2	1220.
GR 700.4	1275.	695.2	1285.	690.3	1305.	685.1	1320.	680.7	1338.
GR 675.4	1360.	665.3	1420.	660.	1443.	658.	1448.	659.1	1460.
GR 659.7	1550.	665.6	1680.	665.	1705.	667.5	1800.	670.2	1978.
GR 675.4	2042.	680.5	2080.	685.8	2100.	690.1	2125.	695.7	2140.
GR 700.2	2162.	705.6	2180.	710.6	2225.	715.1	2260.		
NC 0.09	0.06	0.06	0.4	0.8					
ET			4.4						
X1 57.	32.	1507.	1520.	160.	170.	160.			
GR 725.	1000.	720.1	1055.	715.9	1095.	710.2	1155.	705.6	1190.
GR 700.2	1240.	695.6	1280.	690.3	1330.	685.7	1368.	680.5	1390.
GR 675.1	1428.	665.1	1502.	661.	1507.	659.	1510.	660.6	1520.
GR 662.2	1600.	665.8	1730.	667.1	1750.	666.5	1770.	667.1	1850.
GR 670.1	1975.	675.5	2000.	680.1	2125.	685.1	2180.	690.9	2200.
GR 695.1	2222.	700.7	2252.	705.6	2262.	710.6	2285.	715.2	2325.
GR 720.7	2372.	725.1	2415.						
NC 0.1	0.09	0.055	0.4	0.8					
X1 58.	31.	1412.	1440.	250.	175.	250.			
GR 725.1	1000.	720.	1022.	715.6	1052.	710.2	1085.	705.2	1110.
GR 700.1	1140.	690.3	1172.	685.4	1260.	680.5	1290.	675.6	1318.
GR 670.1	1360.	665.7	1412.	661.	1430.	665.7	1440.	666.6	1500.
GR 668.	1550.	667.5	1580.	666.9	1650.	670.2	1760.	675.1	1800.
GR 677.3	1900.	680.3	1980.	685.4	2035.	690.2	2055.	695.3	2080.
GR 700.2	2095.	708.4	2108.	710.4	2118.	715.2	2130.	720.1	2140.
GR 725.1	2150.								
NC 0.1	0.09	0.05	0.4	0.8					
ET			9.1					1616.	1740.
X1 60.01	17.	1616.	1634.	250.	25.	105.			
X3 10.							670.5	668.4	
GR 679.5	1242.	676.7	1335.	672.7	1372.	671.7	1390.	668.9	1490.

WALKER RUN - INPUT

GR	668.	1520.	662.6	1615.	662.6	1616.	661.6	1625.	662.8	1634.
GR	662.8	1636.	667.8	1740.	668.7	1820.	669.7	1910.	674.8	1960.
GR	679.7	2040.	684.6	2125.						
SB		1.5	2.5		18.		143.			
ET					9.1				1616.	1740.
X1	60.02				41.	41.	41.			
X2			1.	670.1	608.7					
X3	10.							671.3	668.7	
BT	17.	1242.	679.5	679.5	1335.	674.7	674.7	1372.	672.7	672.7
BT	1390.	672.6	671.7	1490.	672.2	668.9	1520.	672.	668.	1615.
BT	671.3	662.6	1616.	672.1	670.1	1625.	672.1	670.1	1634.	672.1
BT	670.1	1636.	671.3	662.8	1740.	670.4	667.8	1820.	668.7	668.7
BT	1910.	669.7	669.7	1960.	674.8	674.8	2040.	679.7	679.7	2125.
BT	684.6	684.6								
NC	0.1	0.1	0.05	0.3	0.7					
ET					4.4					
X1	60.	29.	1620.	1630.	90.	125.	109.			
GR	725.	1000.	720.	1030.	715.2	1048.	710.2	1062.	705.7	1080.
GR	700.4	1102.	695.1	1128.	690.4	1150.	685.3	1205.	680.1	1242.
GR	675.3	1330.	672.3	1390.	668.6	1520.	665.1	1620.	663.	1625.
GR	665.6	1630.	668.	1740.	670.3	1910.	675.4	1960.	680.3	2040.
GR	685.2	2125.	690.1	2162.	695.5	2188.	700.1	2210.	705.3	2220.
GR	710.2	2245.	715.6	2258.	720.5	2270.	725.1	2295.		
NC	0.1	0.1	0.05	0.1	0.3					
ET					6.4					
X1	61.	29.	1730.	1745.	225.	225.	260.			
GR	725.6	1000.	720.5	1032.	715.	1052.	710.3	1075.	705.3	1100.
GR	700.1	1130.	695.	1158.	690.7	1180.	685.4	1210.	680.3	1262.
GR	675.	1370.	670.1	1408.	670.2	1470.	668.3	1600.	666.	1730.
GR	664.	1735.	666.2	1745.	667.2	1800.	675.	1820.	680.4	1875.
GR	685.4	1955.	690.5	1985.	695.	2015.	700.	2045.	705.3	2060.
GR	710.1	2075.	715.	2105.	720.3	2152.	725.1	2215.		
NC	0.1	0.1	0.05	0.1	0.3					
ET					6.4					
X1	62.	33.	2220.	2240.	125.	225.	200.			
GR	725.4	1000.	720.	1020.	715.	1038.	710.2	1050.	705.2	1058.
GR	704.5	1060.	700.	1100.	695.6	1148.	690.3	1208.	689.5	1315.
GR	685.5	1500.	684.5	1670.	680.5	1820.	674.5	1905.	675.	1910.
GR	672.5	1950.	670.1	1990.	668.5	2100.	665.5	2220.	664.5	2230.
GR	665.3	2240.	670.3	2280.	675.	2300.	680.4	2320.	685.	2360.
GR	690.2	2420.	695.	2450.	700.	2480.	705.2	2510.	710.1	2560.
GR	715.	2645.	720.2	2740.	725.2	2790.				
NC	0.1	0.1	0.05	0.1	0.3					
X1	63.	31.	1860.	1880.	200.	225.	240.			
GR	725.4	1000.	720.4	1015.	715.3	1030.	710.6	1058.	705.3	1068.
GR	702.5	1080.	700.2	1110.	695.4	1140.	690.1	1186.	687.5	1280.
GR	685.1	1390.	684.5	1430.	685.2	1478.	680.3	1620.	675.6	1660.
GR	670.3	1690.	668.6	1860.	665.	1870.	667.3	1880.	670.2	2000.
GR	675.4	2020.	680.6	2042.	685.2	2075.	690.2	2120.	695.5	2175.
GR	700.1	2225.	705.1	2240.	710.4	2280.	715.2	2330.	720.	2355.
GR	725.4	2410.								
NC	0.1	0.1	0.05	0.1	0.3					
X1	64.	33.	1430.	1450.	275.	225.	255.			
GR	725.1	1000.	720.3	1010.	715.3	1022.	710.4	1055.	705.2	1075.
GR	700.2	1100.	695.6	1120.	692.5	1140.	692.5	1150.	690.1	1180.
GR	685.5	1270.	677.5	1300.	675.6	1315.	670.1	1390.	668.4	1430.
GR	667.	1440.	669.4	1450.	670.4	1465.	670.3	1485.	668.5	1540.
GR	670.2	1610.	675.3	1635.	680.2	1662.	690.8	1685.	687.5	1725.
GR	690.2	1750.	695.2	1770.	700.1	1780.	705.1	1810.	710.6	1835.
GR	715.1	1850.	720.1	1870.	725.2	1895.				
NC	0.1	0.1	0.05	0.3	0.5					
ET					4.4					
X1	65.	29.	1420.	1448.	125.	90.	105.			



				WALKER RUN - INPUT					
GR 725.4	1000.	710.3	1050.	705.3	1070.	700.4	1120.	695.6	1130.
GR 690.4	1160.	685.4	1185.	680.2	1220.	678.3	1265.	678.3	1275.
GR 675.6	1285.	670.3	1305.	669.1	1350.	668.5	1420.	667.5	1430.
GR 670.2	1448.	672.5	1500.	675.2	1540.	677.5	1570.	680.2	1590.
GR 685.	1605.	690.1	1640.	695.3	1662.	700.1	1680.	705.4	1695.
GR 710.2	1720.	715.2	1740.	720.3	1755.	725.	1765.		
EJ									
ER									

# WALKER RUN - OUTPUT

1\*\*\*\*\*  
 \* HEC-2 WATER SURFACE PROFILES \*  
 \* \*  
 \* Version 4.6.2; May 1991 \*  
 \* \*  
 \* RUN DATE 11AUG11 TIME 12:33:43 \*  
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 \* U.S. ARMY CORPS OF ENGINEERS \*  
 \* HYDROLOGIC ENGINEERING CENTER \*  
 \* 609 SECOND STREET, SUITE D \*  
 \* DAVIS, CALIFORNIA 95616-4687 \*  
 \* (916) 756-1104 \*  
 \*\*\*\*\*

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      X   X   XXXXXXX   XXXXX
      X   X   X       X   X
      X   X   X       X
      XXXXXXX   XXXX   X   XXXXX
      X   X   X       X
      X   X   X       X   X
      X   X   XXXXXXX   XXXXX
  
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1 11AUG11 12:33:43

PAGE 1

\*\*\*\*\*  
 HEC-2 WATER SURFACE PROFILES  
 Version 4.6.2; May 1991  
 \*\*\*\*\*

THIS RUN EXECUTED 11AUG11 12:33:43

T1 SUSQUEHANNA RIVER BASIN COMMISSION  
 T2 BLOOMSBURG-BERWICK-SHICKSHINNY REACH  
 T3 WALKER RUN - 100 YR. FLOOD

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	4	0	0	0	0	0	0	653.29	0
J2	NPROF	IPLT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	+1.0	0	-1.0	0	0	0	0	0	0	0

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

38	43	1	9	50	3	61	36	21	22
27	28	4	0	38	39	43	1	3	11
12	10	26	20	50	51	4	0	200	0
QT	5	550	1320	1860	1860	3100			



WALKER RUN - OUTPUT										
NC	0.09	0.09	0.05	0.3	0.7					
ET					15.4					
X1	44.	22.	1405.	1412.	225.	200.	260.	0	0	0
GR	685.1	1000.	680.3	1092.	675.1	1128.	670.1	1170.	665.3	1230.
GR	660.8	1310.	658.3	1330.	655.4	1350.	650.5	1372.	648.	1405.
GR	646.5	1408.	648.7	1412.	650.4	1450.	650.	1490.	650.1	1525.
GR	649.8	1570.	650.6	1610.	655.1	1670.	660.1	1712.	665.6	1740.
GR	670.1	1750.	675.6	1790.	0	0	0	0	0	0
NC	0.09	0.09	0.05	0.3	0.7	0	0	0	0	0
ET	0	0	0	0	9.1	0	0	0	1656.	1815.
X1	46.01	40.	1655.5	1664.5	100.	850.	230.			
X3	10.							653.	653.	
GR	699.6	1000.	695.	1040.	691.7	1100.	689.7	1170.	684.7	1210.
GR	682.8	1260.	685.1	1340.	681.8	1400.	679.8	1440.	677.1	1490.
GR	675.	1530.	669.8	1555.	664.5	1580.	659.5	1610.	654.4	1635.
GR	652.9	1640.	652.9	1650.	648.1	1655.5	647.7	1656.	646.8	1657.
GR	646.7	1658.	646.7	1659.	646.7	1660.	646.7	1661.	646.7	1662.
GR	646.7	1663.	647.	1664.	647.4	1664.5	649.5	1670.	649.8	1680.
GR	649.8	1690.	651.9	1750.	654.4	1815.	655.	1830.	656.	1870.
GR	654.8	1900.	659.5	1925.	661.7	2100.	666.1	2240.	666.9	2450.
1	11AUG11	12:33:43								PAGE 2
SB		1.5	2.5		9.		42.		646.7	646.7
ET					9.1				1656.	1815.
X1	46.02				30.	30.	30.			
X2			1.	652.5	654.4					
X3	10.							654.4	654.4	
BT	30.	1530.	675.	675.	1555.	669.8	669.8	1580.	664.5	664.5
BT	1610.	659.5	659.5	1635.	654.4	654.4	1640.	654.4	652.9	1650.
BT	656.	652.9	1655.5	657.5	648.1	1656.	657.6	650.3	1657.	657.7
BT	651.4	1658.	657.8	652.1	1659.	657.9	652.4	1660.	658.	652.5
BT	1661.	657.8	652.4	1662.	657.8	652.1	1663.	657.7	651.3	1664.
BT	657.6	650.	1664.5	657.5	647.4	1670.	657.	649.5	1680.	656.
BT	649.8	1690.	654.4	649.8	1750.	654.4	651.9	1815.	654.4	654.4
BT	1830.	655.	655.	1870.	656.	656.	1900.	654.9	654.9	1925.
BT	659.5	659.5	2100.	661.7	661.7	2240.	665.1	665.1	2450.	666.9
BT	666.9									
NC	0.09	0.09	0.05	0.3	0.7					
ET					6.4					
X1	46.	36.	1650.	1670.	175.	50.	145.			
GR	700.2	1000.	695.6	1040.	692.3	1100.	690.3	1170.	688.3	1210.
GR	683.4	1260.	685.7	1340.	682.4	1400.	680.4	1440.	677.7	1490.
GR	675.6	1530.	670.4	1555.	665.1	1580.	660.	1610.	655.8	1640.
GR	650.2	1650.	647.5	1660.	650.1	1670.	652.5	1750.	655.8	1830.
GR	656.8	1870.	655.5	1900.	660.1	1925.	662.3	2100.	665.7	2240.
GR	667.5	2450.	670.4	2623.	675.4	2720.	680.1	2760.	655.3	2800.
GR	690.3	2838.	695.1	2848.	700.2	2900.	705.2	2940.	710.2	3010.
GR	715.2	3100.								
ET					9.1				1390.	1510.

## WALKER RUN - OUTPUT

X1	47.	28.	1410.	1440.	220.	240.	400.			
GR	687.3	1000.	685.6	1050.	680.6	1090.	675.2	1110.	670.4	1130.
GR	665.3	1150.	660.1	1210.	656.3	1250.	652.5	1350.	650.1	1410.
GR	648.	1430.	650.4	1440.	655.1	1550.	657.4	1605.	660.2	1630.
GR	662.5	1750.	665.2	1860.	667.3	2000.	668.1	2100.	668.6	2180.
GR	670.1	2365.	672.1	2450.	675.3	2540.	685.1	2640.	690.3	2700.
GR	700.1	2750.	705.4	2800.	710.2	2920.				
NC	0.09	0.09	0.05	0.3	0.7					
ET					9.1				1645.	1735.
X1	49.01	28.	1709.	1712.	350.	275.	450.			
X3	10.							653.7	653.7	
GR	725.	1000.	720.	1035.	715.2	1088.	709.9	1120.	704.8	1152.
GR	700.3	1200.	695.3	1238.	690.3	1270.	685.1	1290.	680.4	1340.
GR	675.4	1402.	669.8	1445.	664.9	1480.	660.2	1530.	664.9	1590.
GR	654.4	1609.	651.7	1709.	650.4	1709.5	650.2	1710.5	650.4	1711.5
GR	651.7	1712.	654.4	1890.	655.	1930.	660.3	2080.	663.9	2200.
GR	664.1	2300.	663.9	2400.	665.4	2500.				
1	11AUG11	12:33:43								
									PAGE	3
SB		1.5	2.5		3.		7.1		650.2	650.2
ET					9.1				1645.	1709.
X1	49.02				20.	20.	20.			
X2			1.	653.2	654.4					
X3	10.							654.4	654.4	
BT	16.	1480.	664.9	664.9	1530.	660.2	660.2	1590.	654.9	654.9
BT	1609.	654.4	654.4	1709.	654.4	651.7	1709.5	654.4	653.	1710.5
BT	654.4	653.2	1711.5	654.4	653.	1712.	654.4	651.7	1890.	654.4
BT	654.4	1930.	655.	655.	2080.	660.3	660.3	2200.	663.9	663.9
BT	2300.	664.1	664.1	2400.	663.9	663.9	2500.	665.4	665.4	
ET					15.4					
X1	49.	26.	1700.	1720.	30.	30.	30.			
GR	725.3	1000.	720.3	1035.	715.5	1088.	710.8	1120.	705.1	1152.
GR	700.5	1200.	695.6	1238.	690.6	1270.	685.4	1290.	680.7	1340.
GR	675.7	1402.	670.1	1445.	665.2	1480.	660.5	1530.	655.2	1590.
GR	651.7	1700.	650.5	1710.	651.4	1720.	655.3	1750.	657.8	1900.
GR	660.6	2080.	664.2	2200.	664.4	2300.	664.2	2400.	665.7	2500.
GR	665.1	2590.								
NC	0.08	0.08	0.05	0.1	0.3					
ET					15.4					
X1	50.	22.	1740.	1765.	300.	175.	275.			
GR	725.3	1000.	720.1	1035.	715.4	1060.	710.1	1080.	705.8	1130.
GR	700.3	1165.	695.6	1190.	690.3	1225.	685.7	1265.	680.3	1345.
GR	675.3	1380.	670.4	1470.	665.9	1528.	660.2	1570.	655.5	1610.
GR	652.5	1680.	652.1	1740.	651.5	1752.	652.1	1765.	655.	1960.
GR	660.	2205.	665.	2330.						
QT	5.	480.	1160.	1640.	1640.	3600.				
NC	0.06	0.06	0.05	0.1	0.3					
ET					9.1				2350.	2800.



WALKER RUN - OUTPUT										
X1	51.	23.	2715.	2750.	1200.	200.	740.			
GR	690.1	1000.	687.3	1100.	685.1	1230.	680.2	1275.	675.6	1340.
GR	670.8	1450.	665.2	1635.	660.5	1798.	657.3	2030.	656.4	2295.
GR	655.1	2298.	656.7	2300.	656.7	2460.	655.1	2470.	656.7	2475.
GR	655.5	2600.	655.1	2715.	653.	2740.	655.3	2750.	658.1	2960.
GR	660.4	3230.	665.4	3345.	665.2	3360.				
NC	0.06	0.06	0.05	0.1	0.3					
ET					10.4					
X1	52.	34.	2145.	2268.	600.	350.	330.			
GR	725.1	1000.	720.1	1030.	715.4	1080.	710.9	1108.	705.3	1130.
GR	700.2	1150.	695.3	1170.	690.3	1195.	685.4	1225.	680.	1240.
GR	675.3	1295.	670.7	1400.	667.5	1500.	665.3	1590.	664.1	1630.
GR	665.1	1700.	665.7	1735.	665.2	1772.	660.	1825.	660.4	1888.
GR	658.1	2100.	656.1	2145.	654.	2250.	655.2	2268.	657.2	2350.
GR	660.6	2440.	662.1	2600.	665.3	2735.	667.3	2755.	668.1	2900.
GR	668.3	3100.	670.	3250.	672.1	3350.	675.4	3465.		
1	11AUG11	12:33:43								
									PAGE	4
NC	0.06	0.06	0.05	0.3	0.7					
ET					9.1				2100.	2260.
X1	52.1	20.	2247.	2253.	175.	80.	133.			
X3	10.							657.	657.	
GR	666.2	1735.	665.7	1772.	660.5	1825.	660.	1888.	659.2	2045.
GR	658.6	2100.	655.6	2145.	654.6	2246.	654.6	2247.	654.6	2250.
GR	654.6	2253.	655.7	2268.	657.7	2350.	659.2	2390.	661.1	2440.
GR	662.6	2600.	665.8	2735.	667.8	2755.	668.6	2900.	668.8	3100.
SB		1.5	2.5		6.		23.4		654.6	654.6
ET					9.1				2100.	2268.
X1	52.2				12.	12.	12.			
X2			1.	658.5	659.2					
X3	10.							659.2	659.2	
BT	20.	1735.	666.2	666.2	1772.	665.7	665.7	1825.	660.5	660.5
BT	1888.	660.9	660.9	2045.	659.2	659.2	2100.	659.2	658.6	2145.
BT	659.2	655.6	2246.	659.2	654.6	2247.	659.2	658.5	2250.	659.2
BT	658.5	2253.	659.2	654.6	2268.	659.2	655.7	2350.	659.2	657.7
BT	2390.	659.2	659.2	2440.	661.1	661.1	2600.	662.6	662.6	2735.
BT	665.8	665.8	2755.	667.8	667.8	2900.	668.6	668.6	3100.	668.8
BT	668.8									
NC	0.06	0.06	0.05	0.3	0.7					
ET					10.4					
X1	54.	35.	1818.	1837.	300.	250.	245.			
GR	725.2	1000.	720.7	1120.	715.2	1198.	710.1	1242.	705.1	1262.
GR	700.6	1268.	695.3	1300.	690.3	1312.	685.3	1328.	680.1	1350.
GR	675.1	1368.	672.2	1470.	670.3	1588.	669.8	1595.	665.1	1669.
GR	657.5	1760.	657.	1818.	655.5	1830.	657.	1837.	657.5	1880.
GR	663.	2000.	665.1	2180.	668.1	2220.	667.	2300.	670.4	2465.
GR	672.4	2680.	675.5	2718.	680.3	2760.	685.3	2805.	690.	2840.
GR	695.7	2855.	700.7	2875.	705.1	2900.	710.	2980.	715.1	3015.

## WALKER RUN - OUTPUT

NC	0.06	0.06	0.05	0.1	0.3					
X1	55.	29.	1510.	1530.	340.	320.	330.			
GR	725.	1000.	720.6	1095.	715.5	1110.	710.1	1210.	705.1	1260.
GR	700.3	1290.	695.8	1300.	690.6	1315.	685.2	1330.	680.2	1355.
GR	675.7	1385.	670.5	1405.	665.3	1425.	657.5	1510.	656.7	1520.
GR	656.9	1530.	662.2	1670.	665.1	1805.	667.3	1828.	670.4	1978.
GR	672.1	2070.	675.4	2178.	680.1	2210.	688.3	2248.	690.7	2285.
GR	695.6	2310.	700.1	2355.	705.1	2420.	710.1	2525.		

NC	0.09	0.05	0.05	0.1	0.3					
ET					6.4					
X1	56.	29.	1443.	1460.	300.	325.	310.			
GR	725.1	1000.	720.1	1095.	715.2	1140.	710.6	1170.	705.2	1220.
GR	700.4	1275.	695.2	1285.	690.3	1305.	685.1	1320.	680.7	1338.
GR	675.4	1360.	665.3	1420.	660.	1443.	658.	1448.	659.1	1460.
GR	659.7	1550.	665.6	1680.	665.	1705.	667.5	1800.	670.2	1978.
GR	675.4	2042.	680.5	2080.	685.8	2100.	690.1	2125.	695.7	2140.
GR	700.2	2162.	705.6	2180.	710.6	2225.	715.1	2260.		

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NC	0.09	0.06	0.06	0.4	0.8					
ET					4.4					
X1	57.	32.	1507.	1520.	160.	170.	160.			
GR	725.	1000.	720.1	1055.	715.9	1095.	710.2	1155.	705.6	1190.
GR	700.2	1240.	695.6	1280.	690.3	1330.	685.7	1368.	680.5	1390.
GR	675.1	1428.	665.1	1502.	661.	1507.	659.	1510.	660.6	1520.
GR	662.2	1600.	665.8	1730.	667.1	1750.	666.5	1770.	667.1	1850.
GR	670.1	1975.	675.5	2000.	680.1	2125.	685.1	2180.	690.9	2200.
GR	695.1	2222.	700.7	2252.	705.6	2262.	710.6	2285.	715.2	2325.
GR	720.7	2372.	725.1	2415.						

NC	0.1	0.09	0.055	0.4	0.8					
X1	58.	31.	1412.	1440.	250.	175.	250.			
GR	725.1	1000.	720.	1022.	715.6	1052.	710.2	1085.	705.2	1110.
GR	700.1	1140.	690.3	1172.	685.4	1260.	680.5	1290.	675.6	1318.
GR	670.1	1360.	665.7	1412.	661.	1430.	665.7	1440.	666.6	1500.
GR	668.	1550.	667.5	1580.	666.9	1650.	670.2	1760.	675.1	1800.
GR	677.3	1900.	680.3	1980.	685.4	2035.	690.2	2055.	695.3	2080.
GR	700.2	2095.	708.4	2108.	710.4	2118.	715.2	2130.	720.1	2140.
GR	725.1	2150.								

NC	0.1	0.09	0.05	0.4	0.8					
ET					9.1				1616.	1740.
X1	60.01	17.	1616.	1634.	250.	25.	105.			
X3	10.							670.5	668.4	
GR	679.5	1242.	676.7	1335.	672.7	1372.	671.7	1390.	668.9	1490.
GR	668.	1520.	662.6	1615.	662.6	1616.	661.6	1625.	662.8	1634.
GR	662.8	1636.	667.8	1740.	668.7	1820.	669.7	1910.	674.8	1960.
GR	679.7	2040.	684.6	2125.						

SB		1.5	2.5		18.		143.			
ET					9.1				1616.	1740.

					WALKER RUN - OUTPUT					
X1	60.02				41.	41.	41.			
X2			1.	670.1	608.7					
X3	10.							671.3	668.7	
BT	17.	1242.	679.5	679.5	1335.	674.7	674.7	1372.	672.7	672.7
BT	1390.	672.6	671.7	1490.	672.2	668.9	1520.	672.	668.	1615.
BT	671.3	662.6	1616.	672.1	670.1	1625.	672.1	670.1	1634.	672.1
BT	670.1	1636.	671.3	662.8	1740.	670.4	667.8	1820.	668.7	668.7
BT	1910.	669.7	669.7	1960.	674.8	674.8	2040.	679.7	679.7	2125.
BT	684.6	684.6								

NC	0.1	0.1	0.05	0.3	0.7					
ET					4.4					
X1	60.	29.	1620.	1630.	90.	125.	109.			
GR	725.	1000.	720.	1030.	715.2	1048.	710.2	1062.	705.7	1080.
GR	700.4	1102.	695.1	1128.	690.4	1150.	685.3	1205.	680.1	1242.
GR	675.3	1330.	672.3	1390.	668.6	1520.	665.1	1620.	663.	1625.
GR	665.6	1630.	668.	1740.	670.3	1910.	675.4	1960.	680.3	2040.
GR	685.2	2125.	690.1	2162.	695.5	2188.	700.1	2210.	705.3	2220.
GR	710.2	2245.	715.6	2258.	720.5	2270.	725.1	2295.		

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NC	0.1	0.1	0.05	0.1	0.3					
ET					6.4					
X1	61.	29.	1730.	1745.	225.	225.	260.			
GR	725.6	1000.	720.5	1032.	715.	1052.	710.3	1075.	705.3	1100.
GR	700.1	1130.	695.	1158.	690.7	1180.	685.4	1210.	680.3	1262.
GR	675.	1370.	670.1	1408.	670.2	1470.	668.3	1600.	666.	1730.
GR	664.	1735.	666.2	1745.	667.2	1800.	675.	1820.	680.4	1875.
GR	685.4	1955.	690.5	1985.	695.	2015.	700.	2045.	705.3	2060.
GR	710.1	2075.	715.	2105.	720.3	2152.	725.1	2215.		

NC	0.1	0.1	0.05	0.1	0.3					
ET					6.4					
X1	62.	33.	2220.	2240.	125.	225.	200.			
GR	725.4	1000.	720.	1020.	715.	1038.	710.2	1050.	705.2	1058.
GR	704.5	1060.	700.	1100.	695.6	1148.	690.3	1208.	689.5	1315.
GR	685.5	1500.	684.5	1670.	680.5	1820.	674.5	1905.	675.	1910.
GR	672.5	1950.	670.1	1990.	668.5	2100.	665.5	2220.	664.5	2230.
GR	665.3	2240.	670.3	2280.	675.	2300.	680.4	2320.	685.	2360.
GR	690.2	2420.	695.	2450.	700.	2480.	705.2	2510.	710.1	2560.
GR	715.	2645.	720.2	2740.	725.2	2790.				

NC	0.1	0.1	0.05	0.1	0.3					
X1	63.	31.	1860.	1880.	200.	225.	240.			
GR	725.4	1000.	720.4	1015.	715.3	1030.	710.6	1058.	705.3	1068.
GR	702.5	1080.	700.2	1110.	695.4	1140.	690.1	1186.	687.5	1280.
GR	685.1	1390.	684.5	1430.	685.2	1478.	680.3	1620.	675.6	1660.
GR	670.3	1690.	668.6	1860.	665.	1870.	667.3	1880.	670.2	2000.
GR	675.4	2020.	680.6	2042.	685.2	2075.	690.2	2120.	695.5	2175.
GR	700.1	2225.	705.1	2240.	710.4	2280.	715.2	2330.	720.	2355.
GR	725.4	2410.								



## WALKER RUN - OUTPUT

	0.1	0.1	0.05	0.1	0.3					
NC	0.1	0.1	0.05	0.1	0.3					
X1	64.	33.	1430.	1450.	275.	225.	255.			
GR	725.1	1000.	720.3	1010.	715.3	1022.	710.4	1055.	705.2	1075.
GR	700.2	1100.	695.6	1120.	692.5	1140.	692.5	1150.	690.1	1180.
GR	685.5	1270.	677.5	1300.	675.6	1315.	670.1	1390.	668.4	1430.
GR	667.	1440.	669.4	1450.	670.4	1465.	670.3	1485.	668.5	1540.
GR	670.2	1610.	675.3	1635.	680.2	1662.	690.8	1685.	687.5	1725.
GR	690.2	1750.	695.2	1770.	700.1	1780.	705.1	1810.	710.6	1835.
GR	715.1	1850.	720.1	1870.	725.2	1895.				

	0.1	0.1	0.05	0.3	0.5					
NC	0.1	0.1	0.05	0.3	0.5					
ET					4.4					
X1	65.	29.	1420.	1448.	125.	90.	105.			
GR	725.4	1000.	710.3	1050.	705.3	1070.	700.4	1120.	695.6	1130.
GR	690.4	1160.	685.4	1185.	680.2	1220.	678.3	1265.	678.3	1275.
GR	675.6	1285.	670.3	1305.	669.1	1350.	668.5	1420.	667.5	1430.
GR	670.2	1448.	672.5	1500.	675.2	1540.	677.5	1570.	680.2	1590.
GR	685.	1605.	690.1	1640.	695.3	1662.	700.1	1680.	705.4	1695.
GR	710.2	1720.	715.2	1740.	720.3	1755.	725.	1765.		

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

\*PROF 1

0

CCHV=	.300	CEHV=	.700							
*SECNO	44.000									
44.000	6.79	653.29	.00	653.29	653.38	.09	.00	.00	648.00	
1860.0	319.8	195.8	1344.4	150.8	40.9	701.3	.0	.0	648.70	
.00	2.12	4.79	1.92	.090	.050	.090	.000	646.50	1359.47	
.002910	225.	260.	200.	0	0	0	.00	286.39	1645.87	

CCHV= .300 CEHV= .700  
 \*SECNO 46.010

3265 DIVIDED FLOW

46.010	8.51	655.21	.00	.00	655.44	.23	1.96	.10	648.10
1860.0	102.2	485.5	1272.3	58.2	74.9	551.7	12.8	4.2	647.40
.05	1.76	6.48	2.31	.090	.050	.090	.000	646.70	1631.08
.003105	100.	230.	850.	2	0	0	.00	219.07	1902.13

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
----	----	------	------	-------	-----	-----	-------	----	-------	-------

.00	1.50	2.50	.00	9.00	WALKER RUN - OUTPUT .00 42.00	.00	646.70	646.70
-----	------	------	-----	------	----------------------------------	-----	--------	--------

\*SECNO 46.020

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.61

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
700.89	655.44	.00	1537.	328.	42.	52.	652.50	654.40	264.
46.020	9.83	656.53	.00	.00	656.63	.09	1.19	.00	648.10
1860.0	123.7	385.4	1351.0	95.1	86.9	852.7	13.4	4.4	647.40
.06	1.30	4.43	1.58	.090	.050	.090	.000	646.70	1624.54
.001192	30.	30.	30.	2	0	8	.00	284.69	1909.23

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SECNO	DEPTH	CWSEL	CRISW	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV=.300 CEHV=.700  
\*SECNO 46.000

3265 DIVIDED FLOW

46.000	9.13	656.63	.00	.00	656.78	.15	.11	.04	650.20
1860.0	52.1	706.1	1101.8	38.8	156.2	659.8	14.9	4.8	650.10
.07	1.34	4.52	1.67	.090	.050	.090	.000	647.50	1634.05
.001564	175.	145.	50.	2	0	0	.00	265.14	2801.45

\*SECNO 47.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

47.000	9.02	657.02	.00	.00	657.08	.06	.27	.03	650.10
1860.0	651.5	686.6	521.9	609.2	237.8	514.9	21.6	6.6	650.40
.11	1.07	2.89	1.01	.090	.050	.090	.000	648.00	1242.34
.000607	220.	400.	240.	0	0	0	.00	353.75	1596.09

CCHV=.300 CEHV=.700  
\*SECNO 49.010

49.010	7.12	657.32	.00	.00	657.35	.03	.26	.01	651.70
1860.0	600.0	50.5	1209.5	434.7	20.3	940.9	31.7	9.2	651.70

.18	1.38	2.49	1.29	.090	WALKER RUN - OUTPUT		.000	650.20	1603.72
.001030	350.	450.	275.	2	.050	.090	.00	391.93	1995.65
					0	0			

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.50	.00	3.00	.00	7.10	.00	650.20	650.20

\*SECNO 49.020

6870 D.S. ENERGY OF 657.35 IS HIGHER THAN COMPUTED ENERGY OF 657.34  
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
2255.83	657.35	.00	1860.	6.	7.	9.	653.20	654.40	434.

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SECNO Q TIME SLOPE	DEPTH QLOB VLOB XLOBL	CWSEL QCH VCH XLCH	CRIWS QROB VROB XLOBR	WSELK ALOB XNL ITRIAL	EG ACH XNCH IDC	HV AROB XNR ICONT	HL VOL WTN CORAR	OLOSS TWA ELMIN TOPWID	L-BANK ELEV R-BANK ELEV SSTA ENDST
49.020	7.12	657.32	.00	.00	657.35	.03	.00	.00	651.70
1860.0	599.8	50.4	1209.8	435.7	20.3	943.6	32.3	9.4	651.70
.19	1.38	2.48	1.28	.090	.050	.090	.000	650.20	1603.70
.001021	20.	20.	20.	1	0	12	.00	392.22	1995.92

\*SECNO 49.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .64

49.000	6.82	657.32	.00	.00	657.49	.17	.05	.10	651.70
1860.0	883.0	631.7	345.3	451.6	126.0	242.1	33.1	9.6	651.40
.19	1.96	5.01	1.43	.090	.050	.090	.000	650.50	1565.96
.002465	30.	30.	30.	2	0	0	.00	305.45	1871.41

CCHV=.100 CEHV=.300

\*SECNO 50.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.34

50.000	6.20	657.70	.00	.00	657.73	.02	.22	.01	652.10
1860.0	646.1	303.6	910.4	604.1	147.6	988.9	40.1	11.7	652.10
.25	1.07	2.06	.92	.080	.050	.080	.000	651.50	1591.25
.000450	300.	275.	175.	2	0	0	.00	501.21	2092.46



## WALKER RUN - OUTPUT

CCHV= .100 CEHV= .300

\*SECNO 51.000

51.000	5.13	658.13	.00	.00	658.15	.02	.42	.00	655.10
1640.0	1137.7	266.2	236.0	1216.6	141.8	300.2	70.6	25.8	655.30
.46	.94	1.88	.79	.060	.050	.060	.000	653.00	1969.88
.000626	1200.	740.	200.	3	0	0	.00	993.55	2963.43

CCHV= .100 CEHV= .300

\*SECNO 52.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

52.000	4.49	658.49	.00	.00	658.59	.10	.42	.02	656.10
1640.0	81.4	1210.9	347.6	69.7	431.4	209.9	83.7	33.4	655.20
.51	1.17	2.81	1.66	.060	.050	.060	.000	654.00	2063.94
.001675	600.	330.	350.	2	0	0	.00	320.24	2384.18

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

CCHV= .300 CEHV= .700

\*SECNO 52.100

52.100	4.15	658.75	.00	.00	658.84	.09	.25	.00	654.60
1640.0	1100.2	85.8	454.0	448.9	24.9	237.4	85.8	34.3	654.60
.53	2.45	3.44	1.91	.060	.050	.060	.000	654.60	2085.80
.002010	175.	133.	80.	2	0	0	.00	292.34	2378.13

## SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.50	.00	6.00	.00	23.40	.00	654.60	654.60

\*SECNO 52.200

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.39

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID	ELLC	ELTRD	WEIRLN
						AREA			
773.16	725.95	.00	1442.	201.	23.	23.	658.50	659.20	497.

## WALKER RUN - OUTPUT

52.200	5.86	660.46	.00	.00	660.48	.02	1.64	.00	654.60
1640.0	1050.3	63.8	525.9	932.2	35.2	489.1	86.1	34.4	654.60
.53	1.13	1.81	1.08	.060	.050	.060	.000	654.60	1830.17
.000353	12.	12.	12.	2	0	10	.00	592.96	2423.13

CCHV= .300 CEHV= .700  
 \*SECNO 54.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .36

54.000	5.14	660.64	.00	.00	660.77	.14	.21	.08	657.00
1640.0	679.2	345.5	615.3	255.2	83.3	252.8	92.7	37.1	657.00
.55	2.66	4.15	2.43	.060	.050	.060	.000	655.50	1722.46
.002760	300.	245.	250.	2	0	0	.00	225.95	1948.41

CCHV= .100 CEHV= .300

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SECNO	DEPTH	CWSEL	CRWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

\*SECNO 55.000

55.000	4.98	661.68	.00	.00	661.91	.23	1.11	.03	657.50
1640.0	251.1	516.7	872.2	95.3	94.6	301.9	96.7	38.6	656.90
.58	2.64	5.46	2.89	.060	.050	.060	.000	656.70	1464.44
.004260	340.	330.	320.	2	0	0	.00	191.86	1656.29

CCHV= .100 CEHV= .300

\*SECNO 56.000

56.000	4.84	662.84	.00	.00	663.01	.17	1.09	.01	660.00
1640.0	18.9	282.4	1338.6	17.5	70.6	417.7	100.4	40.0	659.10
.61	1.08	4.00	3.20	.090	.050	.050	.000	658.00	1430.69
.002803	300.	310.	325.	2	0	0	.00	188.43	1619.12

CCHV= .400 CEHV= .800

\*SECNO 57.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .39

57.000	4.73	663.73	.00	.00	664.31	.58	.97	.32	661.00
1640.0	10.6	405.2	1224.2	4.6	50.5	229.2	101.9	40.7	660.60
.61	2.33	8.02	5.34	.090	.060	.060	.000	659.00	1503.67
.018442	160.	160.	170.	2	0	0	.00	151.72	1655.38

## WALKER RUN - OUTPUT

CCHV= .400 CEHV= .800  
 \*SECNO 58.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

58.000	7.00	668.00	668.00	.00	668.74	.74	3.28	.13	665.70
1640.0	58.6	1088.1	493.3	31.2	130.1	229.1	103.5	41.7	665.70
.62	1.88	8.36	2.15	.100	.055	.090	.000	661.00	1384.85
.013329	250.	250.	175.	4	11	0	.00	301.51	1686.59

CCHV= .400 CEHV= .800  
 \*SECNO 60.010

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.17

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 670.50 ELREA= 668.40

60.010	7.47	669.07	.00	.00	669.32	.25	.39	.20	662.60
1640.0	.0	713.1	926.9	.0	124.7	477.7	104.1	41.9	662.80
.63	.00	5.72	1.94	.000	.050	.090	.000	661.60	1616.00
.002834	250.	105.	25.	2	0	0	.00	237.84	1853.84

SPECIAL BRIDGE

5070, VARIABLE ELCHU OR ELCHD ON SB CARD NOT SPECIFIED

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.00	1.50	2.50	.00	18.00	.00	143.00	.00	661.60	661.60

\*SECNO 60.020

6070, LOW FLOW BY NORMAL BRIDGE

EGPRS= .000 EGLWC= 669.325 ELLC= 670.100 PCWSE= 669.071 ELTRD= 608.700

4575 CRITICAL DEPTH ASSUMED BELOW ELLC OF 670.100 EGLC= 671.339 EGC= 671.342 WSEL= 670.247

3301 HV CHANGED MORE THAN HVINS



## WALKER RUN - OUTPUT

3370 NORMAL BRIDGE, NRD= 17 MIN ELTRD= 608.70 MAX ELLC= 670.10

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 671.30 ELREA= 668.70

60.020	8.50	670.10	670.10	.00	671.34	1.24	.23	.79	662.60
1640.0	.0	1385.9	254.1	.0	143.1	135.2	104.5	42.2	662.80
.63	.00	9.68	1.88	.000	.050	.090	.000	661.60	1616.00
.016948	41.	41.	41.	2	14	0	-608.38	297.92	1913.92

CCHV= .300 CEHV= .700

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

\*SECNO 60.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 5.68

60.000	8.85	671.85	.00	.00	671.87	.02	.17	.37	665.10
1640.0	585.6	190.3	864.1	686.1	76.8	1027.0	107.1	43.3	665.60
.66	.85	2.48	.84	.100	.050	.100	.000	663.00	1405.72
.000525	90.	109.	125.	2	0	0	.00	519.50	1925.22

CCHV= .100 CEHV= .300

\*SECNO 61.000

61.000	7.98	671.98	.00	.00	672.01	.03	.13	.00	666.00
1640.0	1010.0	277.7	352.4	1106.7	103.6	319.0	115.8	45.7	666.20
.71	.91	2.68	1.10	.100	.050	.100	.000	664.00	1393.49
.000654	225.	260.	225.	2	0	0	.00	418.74	1812.23

CCHV= .100 CEHV= .300

\*SECNO 62.000

62.000	7.58	672.08	.00	.00	672.13	.05	.11	.01	665.50
1640.0	1013.2	437.7	189.1	948.8	142.7	178.1	120.6	46.9	665.30
.74	1.07	3.07	1.06	.100	.050	.100	.000	664.50	1956.95
.000780	125.	200.	225.	1	0	0	.00	330.63	2287.59

CCHV= .100 CEHV= .300

## WALKER RUN - OUTPUT

\*SECNO 63.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

63.000	7.30	672.30	.00	.00	672.38	.08	.24	.01	668.60
1640.0	594.2	442.5	603.3	495.1	116.4	434.0	126.2	48.5	667.30
.77	1.20	3.80	1.39	.100	.050	.100	.000	665.00	1678.70
.001655	200.	240.	225.	2	0	0	.00	329.36	2008.06

CCHV= .100 CEHV= .300

\*SECNO 64.000

64.000	5.79	672.79	.00	.00	672.90	.11	.52	.01	668.40
1640.0	303.5	427.0	909.5	191.1	96.8	536.3	131.5	50.2	669.40
.80	1.59	4.41	1.70	.100	.050	.100	.000	667.00	1353.28
.002754	275.	255.	225.	2	0	0	.00	269.42	1622.71

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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK	ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK	ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA	
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST	

CCHV= .300 CEHV= .500

\*SECNO 65.000

65.000	5.59	673.09	.00	.00	673.24	.15	.32	.02	668.50
1640.0	956.3	574.6	109.2	467.3	127.2	93.0	133.3	50.8	670.20
.81	2.05	4.52	1.17	.100	.050	.100	.000	667.50	1294.48
.003109	125.	105.	90.	2	0	0	.00	214.24	1508.72

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991

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THIS RUN EXECUTED 11AUG11 12:33:43

NOTE- ASTERISK (\*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

WALKER RUN - 100 YR. FLO

## WALKER RUN - OUTPUT

## SUMMARY PRINTOUT

SECNO	Q	CWSEL	WSELK	DIFWSP	EG	DIFEG	PERENC	STCHL	STCHR	STENCL	STENCR	TOPWID
44.000	1860.00	653.29	653.29	.00	653.38	.00	.00	1405.00	1412.00	.00	.00	286.39
46.010	1860.00	655.21	.00	.00	655.44	.00	.00	1655.50	1664.50	.00	.00	219.07
*46.020	1860.00	656.53	.00	.00	656.63	.00	.00	1655.50	1664.50	.00	.00	284.69
46.000	1860.00	656.63	.00	.00	656.78	.00	.00	1650.00	1670.00	.00	.00	265.14
*47.000	1860.00	657.02	.00	.00	657.08	.00	.00	1410.00	1440.00	.00	.00	353.75
49.010	1860.00	657.32	.00	.00	657.35	.00	.00	1709.00	1712.00	.00	.00	391.93
49.020	1860.00	657.32	.00	.00	657.35	.00	.00	1709.00	1712.00	.00	.00	392.22
*49.000	1860.00	657.32	.00	.00	657.49	.00	.00	1700.00	1720.00	.00	.00	305.45
*50.000	1860.00	657.70	.00	.00	657.73	.00	.00	1740.00	1765.00	.00	.00	501.21
51.000	1640.00	658.13	.00	.00	658.15	.00	.00	2715.00	2750.00	.00	.00	993.55
*52.000	1640.00	658.49	.00	.00	658.59	.00	.00	2145.00	2268.00	.00	.00	320.24
52.100	1640.00	658.75	.00	.00	658.84	.00	.00	2247.00	2253.00	.00	.00	292.34
*52.200	1640.00	660.46	.00	.00	660.48	.00	.00	2247.00	2253.00	.00	.00	592.96
*54.000	1640.00	660.64	.00	.00	660.77	.00	.00	1818.00	1837.00	.00	.00	225.95
55.000	1640.00	661.68	.00	.00	661.91	.00	.00	1510.00	1530.00	.00	.00	191.86
56.000	1640.00	662.84	.00	.00	663.01	.00	.00	1443.00	1460.00	.00	.00	188.43
*57.000	1640.00	663.73	.00	.00	664.31	.00	.00	1507.00	1520.00	.00	.00	151.72

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SECNO	Q	CWSEL	WSELK	DIFWSP	EG	DIFEG	PERENC	STCHL	STCHR	STENCL	STENCR	TOPWID
*58.000	1640.00	668.00	.00	.00	668.74	.00	.00	1412.00	1440.00	.00	.00	301.51
*60.010	1640.00	669.07	.00	.00	669.32	.00	.00	1616.00	1634.00	.00	.00	237.84
*60.020	1640.00	670.10	.00	.00	671.34	.00	.00	1616.00	1634.00	.00	.00	297.92
*60.000	1640.00	671.85	.00	.00	671.87	.00	.00	1620.00	1630.00	.00	.00	519.50

WALKER RUN - OUTPUT												
61.000	1640.00	671.98	.00	.00	672.01	.00	.00	1730.00	1745.00	.00	.00	418.74
62.000	1640.00	672.08	.00	.00	672.13	.00	.00	2220.00	2240.00	.00	.00	330.63
*63.000	1640.00	672.30	.00	.00	672.38	.00	.00	1860.00	1880.00	.00	.00	329.36
64.000	1640.00	672.79	.00	.00	672.90	.00	.00	1430.00	1450.00	.00	.00	269.42
65.000	1640.00	673.09	.00	.00	673.24	.00	.00	1420.00	1448.00	.00	.00	214.24

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WALKER RUN - 100 YR. FLO

SUMMARY PRINTOUT

SECNO	XLCH	Q	CWSEL	EG	HL	OLOSS	HV	VCH	CASE	DIFWSP	DIFWSX	TOPWID
44.000	.00	1860.00	653.29	653.38	.00	.00	.09	4.79	.00	.00	.00	286.39
46.010	230.00	1860.00	655.21	655.44	1.96	.10	.23	6.48	.00	.00	1.92	219.07
*46.020	30.00	1860.00	656.53	656.63	1.19	.00	.09	4.43	16384.00	.00	1.33	284.69
46.000	145.00	1860.00	656.63	656.78	.11	.04	.15	4.52	.00	.00	.10	265.14
*47.000	400.00	1860.00	657.02	657.08	.27	.03	.06	2.89	16384.00	.00	.39	353.75
49.010	450.00	1860.00	657.32	657.35	.26	.01	.03	2.49	.00	.00	.30	391.93
49.020	20.00	1860.00	657.32	657.35	.00	.00	.03	2.48	.00	.00	.00	392.22
*49.000	30.00	1860.00	657.32	657.49	.05	.10	.17	5.01	16384.00	.00	.00	305.45
*50.000	275.00	1860.00	657.70	657.73	.22	.01	.02	2.06	16384.00	.00	.38	501.21
51.000	740.00	1640.00	658.13	658.15	.42	.00	.02	1.88	.00	.00	.43	993.55
*52.000	330.00	1640.00	658.49	658.59	.42	.02	.10	2.81	16384.00	.00	.36	320.24
52.100	133.00	1640.00	658.75	658.84	.25	.00	.09	3.44	.00	.00	.26	292.34
*52.200	12.00	1640.00	660.46	660.48	1.64	.00	.02	1.81	16384.00	.00	1.70	592.96
*54.000	245.00	1640.00	660.64	660.77	.21	.08	.14	4.15	16384.00	.00	.18	225.95
55.000	330.00	1640.00	661.68	661.91	1.11	.03	.23	5.46	.00	.00	1.05	191.86
56.000	310.00	1640.00	662.84	663.01	1.09	.01	.17	4.00	.00	.00	1.16	188.43
*57.000	160.00	1640.00	663.73	664.31	.97	.32	.58	8.02	16384.00	.00	.89	151.72



## WALKER RUN - OUTPUT

*58.000	250.00	1640.00	668.00	668.74	3.28	.13	.74	8.36	4097.00	.00	4.27	301.51
*60.010	105.00	1640.00	669.07	669.32	.39	.20	.25	5.72	16384.00	.00	1.07	237.84
*60.020	41.00	1640.00	670.10	671.34	.23	.79	1.24	9.68	4097.00	.00	1.03	297.92
*60.000	109.00	1640.00	671.85	671.87	.17	.37	.02	2.48	16384.00	.00	1.75	519.50
61.000	260.00	1640.00	671.98	672.01	.13	.00	.03	2.68	.00	.00	.13	418.74
62.000	200.00	1640.00	672.08	672.13	.11	.01	.05	3.07	.00	.00	.10	330.63
*63.000	240.00	1640.00	672.30	672.38	.24	.01	.08	3.80	16384.00	.00	.22	329.36

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SECNO	XLCH	Q	CWSEL	EG	HL	OLOSS	HV	VCH	CASE	DIFWSP	DIFWSX	TOPWID
64.000	255.00	1640.00	672.79	672.90	.52	.01	.11	4.41	.00	.00	.50	269.42
65.000	105.00	1640.00	673.09	673.24	.32	.02	.15	4.52	.00	.00	.30	214.24

1

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## SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO=	46.020	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	47.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	49.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	50.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	52.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	52.200	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	54.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	57.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO=	58.000	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	58.000	PROFILE=	1	MINIMUM SPECIFIC ENERGY
WARNING SECNO=	60.010	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WALKER RUN - OUTPUT

CAUTION SECNO=	60.020	PROFILE=	1	CRITICAL DEPTH ASSUMED
CAUTION SECNO=	60.020	PROFILE=	1	MINIMUM SPECIFIC ENERGY
WARNING SECNO=	60.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO=	63.000	PROFILE=	1	CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

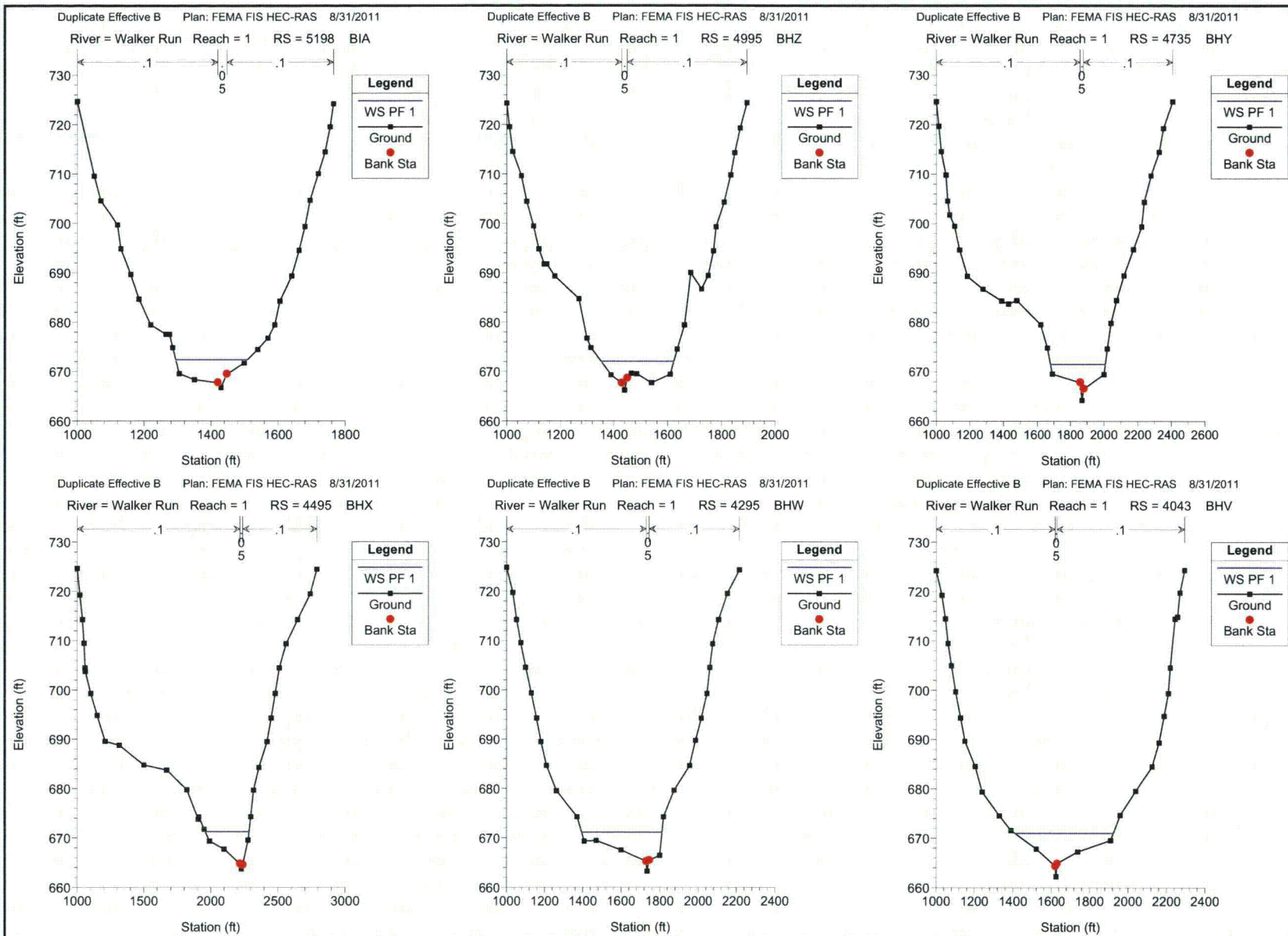
Appendix F:  
Duplicate Effective Model B

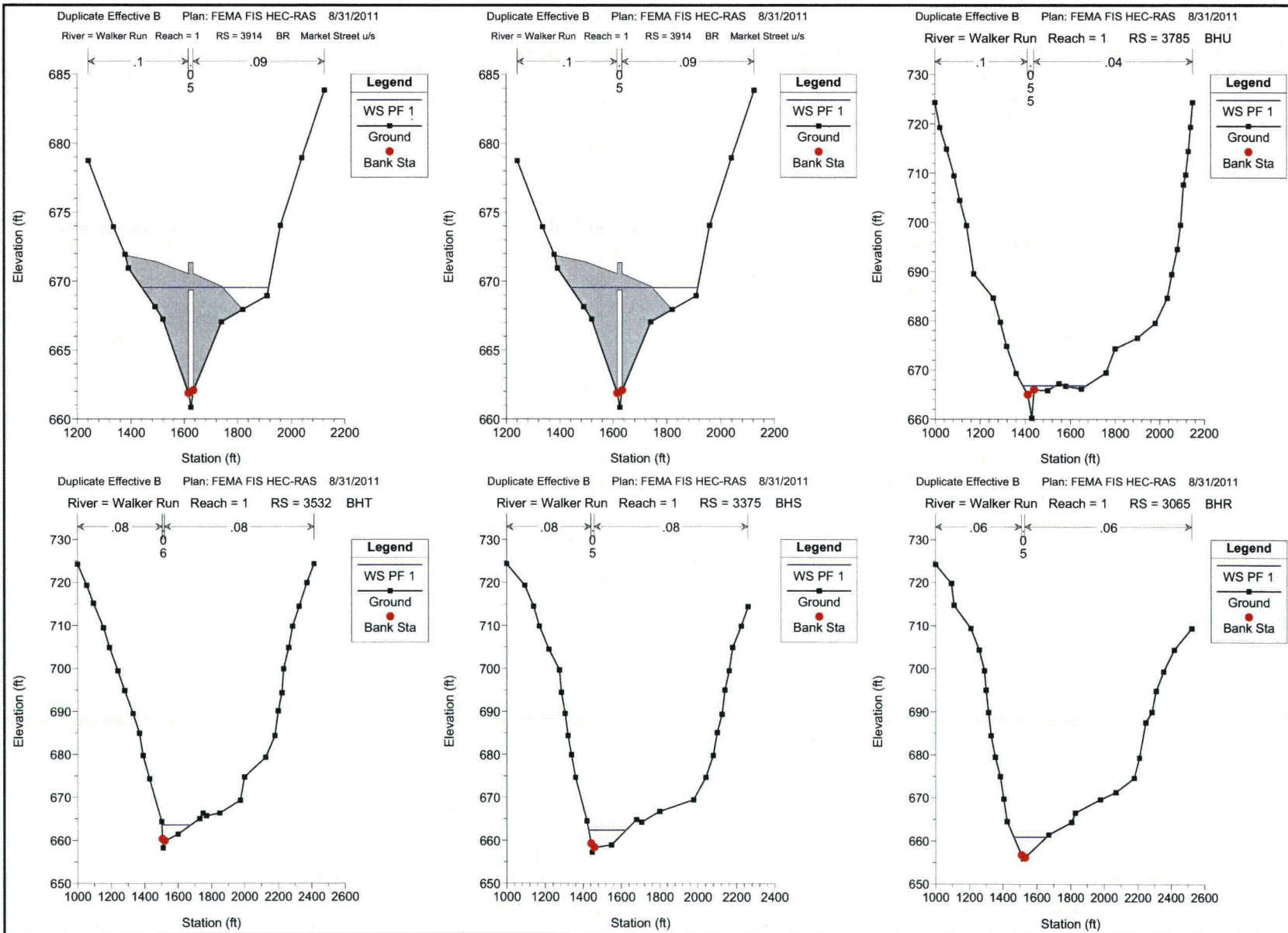
- HEC-RAS Reports
- HEC-RAS Cross-Sections
- HEC-RAS Profiles

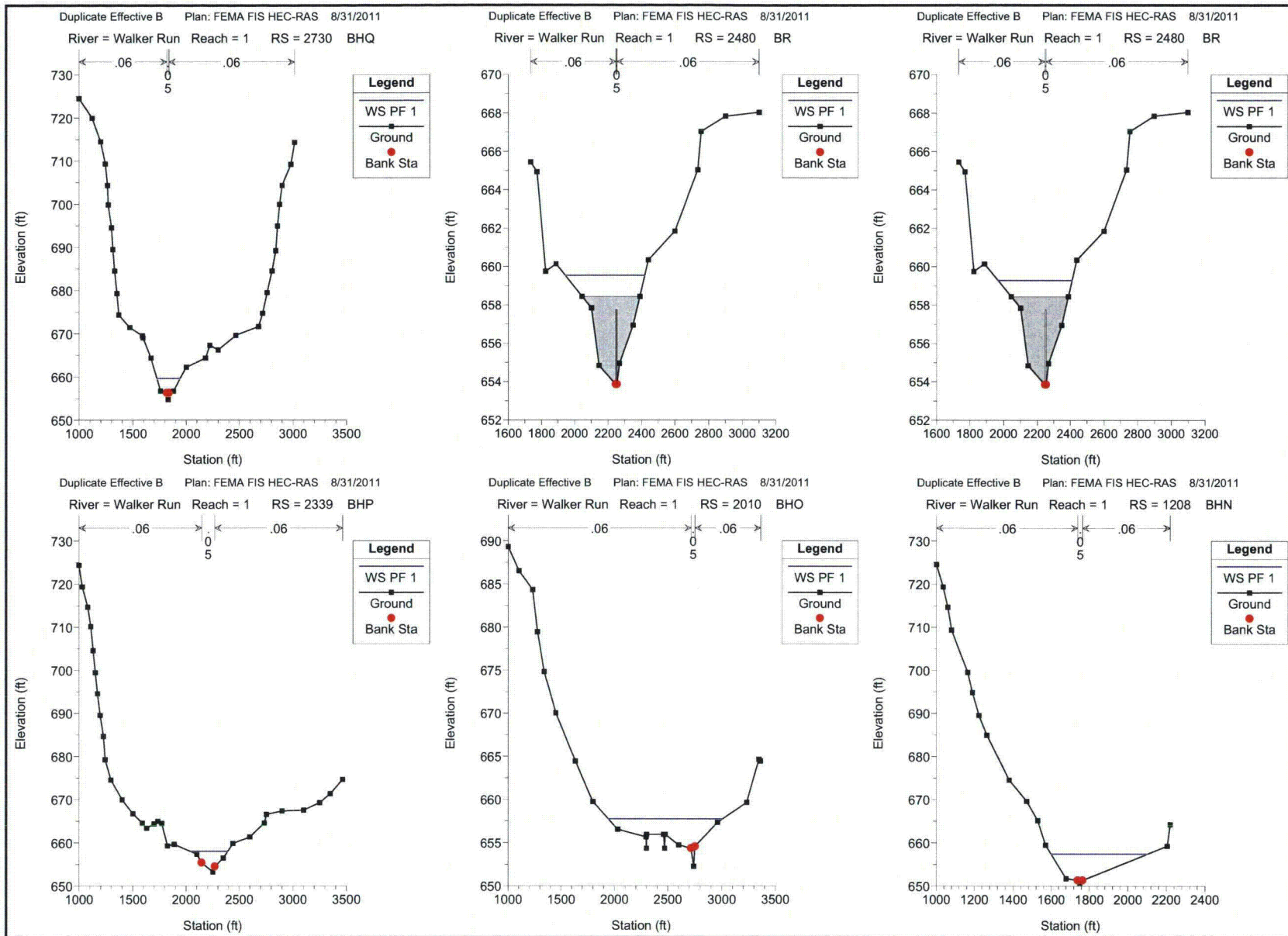
HEC-RAS Plan: FEMA HECRAS River: Walker Run Reach: 1 Profile: PF 1

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
1	5198	PF 1	1640.00	666.74	672.29	670.21	672.45	0.003216	4.57	679.39	213.54	0.38
1	4995	PF 1	1640.00	666.24	671.98		672.10	0.002904	4.49	809.61	268.46	0.36
1	4735	PF 1	1640.00	664.24	671.45		671.53	0.001808	3.93	1014.88	328.46	0.29
1	4495	PF 1	1640.00	663.74	671.21		671.26	0.000850	3.17	1231.26	328.20	0.21
1	4295	PF 1	1640.00	663.24	671.10		671.13	0.000716	2.78	1481.19	417.58	0.19
1	4043	PF 1	1640.00	662.24	670.96	667.76	670.98	0.000586	2.59	1720.34	513.42	0.17
1	3914		Bridge									
1	3785	PF 1	1640.00	660.24	666.72	667.18	668.16	0.029062	10.95	215.96	226.04	0.97
1	3532	PF 1	1640.00	658.24	663.52	662.84	663.92	0.013863	7.58	371.00	171.79	0.63
1	3375	PF 1	1640.00	657.24	662.36		662.54	0.004393	5.23	558.84	195.75	0.44
1	3065	PF 1	1640.00	655.95	660.88		661.12	0.004460	5.55	483.23	190.20	0.45
1	2730	PF 1	1640.00	654.74	659.53	658.23	659.72	0.004037	4.75	516.14	214.41	0.42
1	2480		Bridge									
1	2339	PF 1	1640.00	653.24	657.94		658.02	0.001326	2.59	778.58	344.43	0.24
1	2010	PF 1	1640.00	652.24	657.72		657.73	0.000358	1.50	2013.20	1059.62	0.13
1	1208	PF 1	1860.00	650.74	657.39		657.41	0.000294	1.75	1757.12	502.62	0.12
1	933	PF 1	1860.00	649.74	657.15	654.65	657.26	0.001516	4.17	1010.32	347.88	0.28
1	875		Bridge									
1	428	PF 1	1860.00	647.24	656.63		656.68	0.000478	2.64	1493.37	366.16	0.16
1	147	PF 1	1860.00	646.74	656.36	652.93	656.46	0.001100	3.95	1003.21	278.18	0.24
1	-10		Bridge									
1	-255	PF 1	1860.00	645.74	652.54	650.73	652.63	0.002892	4.78	894.50	286.08	0.35

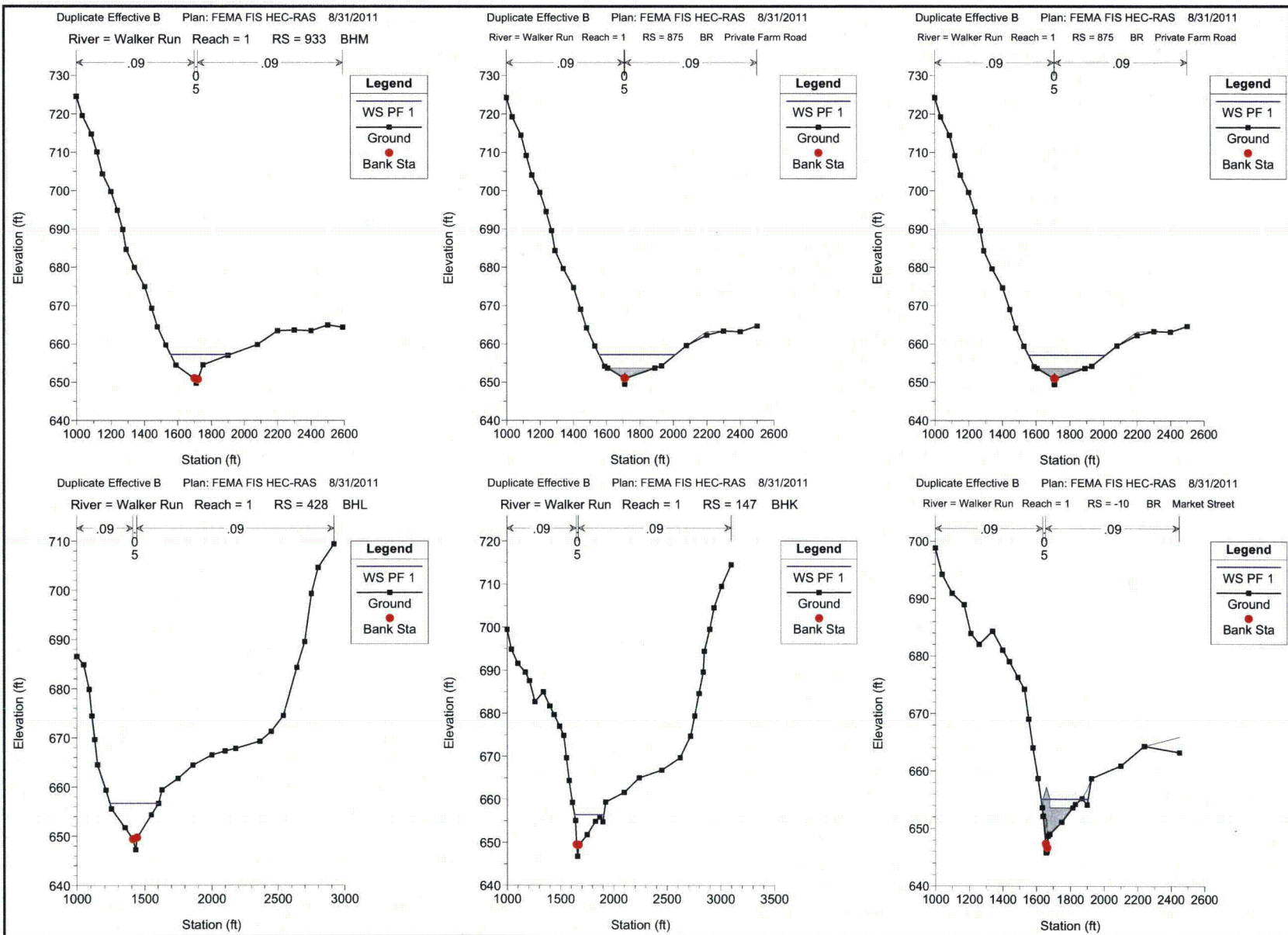




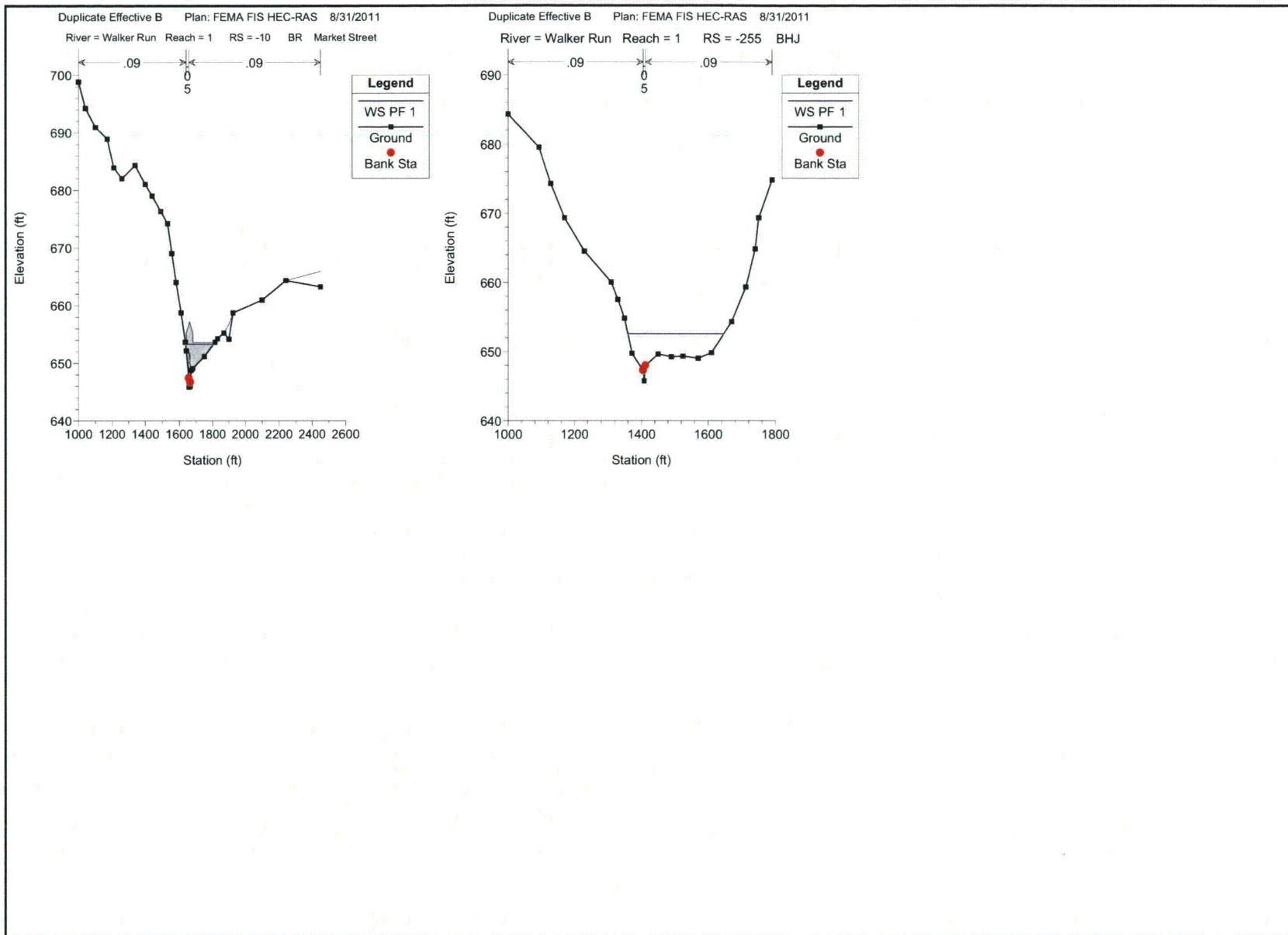






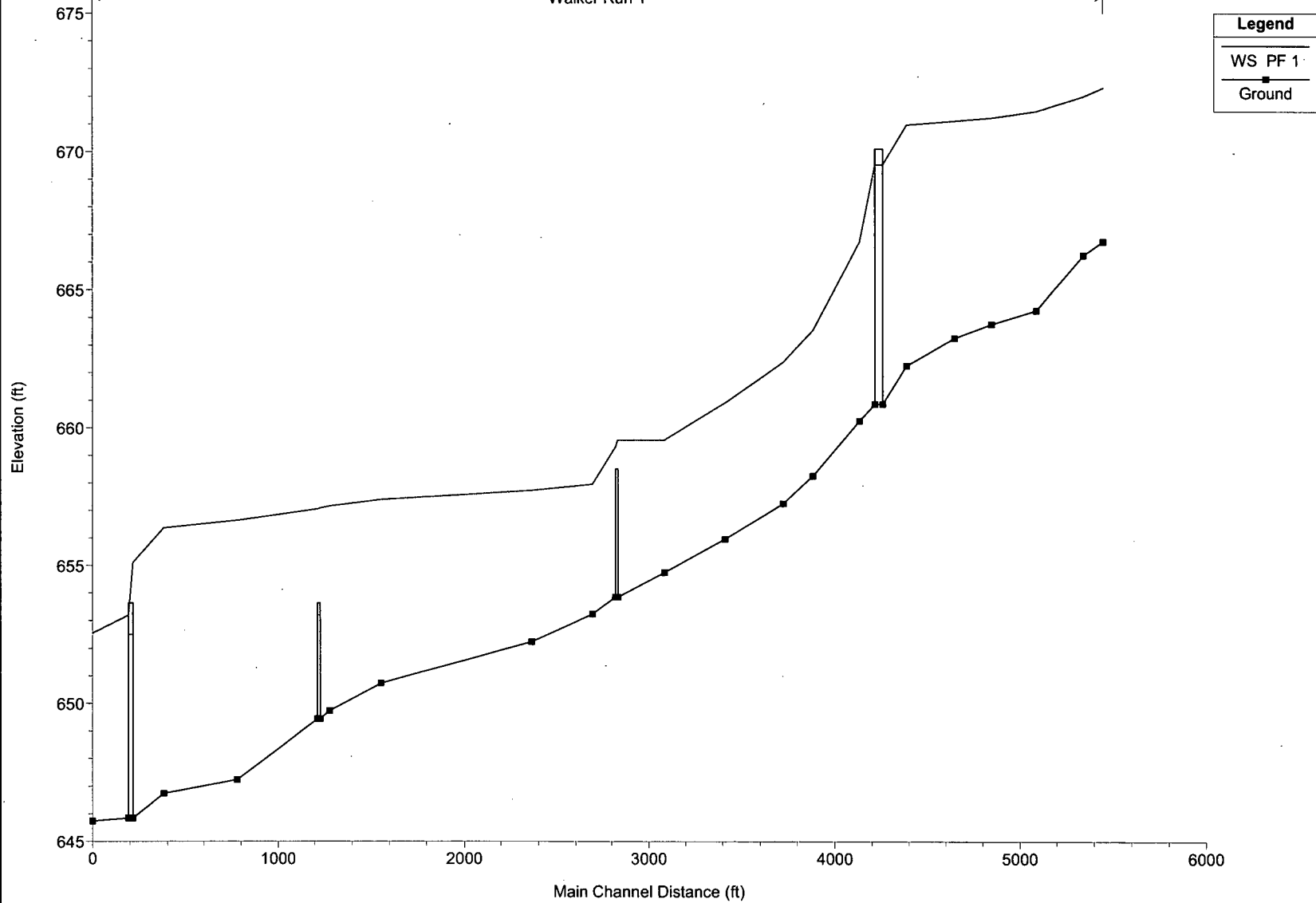






Duplicate Effective B Plan: FEMA FIS HEC-RAS 8/31/2011

Walker Run 1



DupEffectiveB.rep

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

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
X      X  X      X      X      X      X      X
X      X  X      X      X      X      X      X
XXXXXXXX XXXX      XXX XXXX XXXXXX XXXX
X      X  X      X      X      X      X      X
X      X  X      X      X      X      X      X
X      X  XXXXXX  XXXX      X      X      X      XXXXX

```

PROJECT DATA

Project Title: Duplicate Effective B  
Project File : DupEffectiveB.prj  
Run Date and Time: 8/31/2011 12:51:51 PM

Project in English units

PLAN DATA

Plan Title: FEMA FIS HEC-RAS

Plan File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\Walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\DupEffectiveB.p07

Geometry Title: FEMA FIS HEC-RAS

Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\Walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\DupEffectiveB.g05

Flow Title : FEMA Flow Data

Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\Walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\DupEffectiveB.f04

Plan Summary Information:

Number of: Cross Sections	= 18	Multiple Openings	= 0
Culverts	= 0	Inline Structures	= 0
Bridges	= 4	Lateral Structures	= 0

Computational Information

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

Computation Options

Critical depth computed only where necessary  
Conveyance Calculation Method: Between every coordinate point (HEC2 Style)  
Friction Slope Method: Average Conveyance  
Computational Flow Regime: Mixed Flow

# DupEffectiveB.rep

## FLOW DATA

Flow Title: FEMA Flow Data

Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\Walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\DupEffectiveB.f04

## Flow Data (cfs)

River	Reach	RS	PF 1
walker Run	1	5198	1640
walker Run	1	1208	1860

## Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Walker Run	1	PF 1	Known WS = 673.06
Known WS = 652.54			

## GEOMETRY DATA

Geometry Title: FEMA FIS HEC-RAS

Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\Walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\DupEffectiveB.g05

## CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 5198

## INPUT

Description: BIA

Station	Elevation	Data	num=	29	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.65	1050	709.54	1070	704.54	1120	699.65	1130	694.84	
1160	689.65	1185	684.65	1220	679.45	1265	677.54	1275	677.54	
1285	674.84	1305	669.54	1350	668.34	1420	667.74	1430	666.74	
1448	669.45	1500	671.74	1540	674.45	1570	676.74	1590	679.45	
1605	684.24	1640	689.34	1662	694.54	1680	699.34	1695	704.65	
1720	710.04	1740	714.45	1755	719.54	1765	724.24			

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1420	.05	1448	.1

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1420	1448		125	105	90		.3	.5

## CROSS SECTION



# DupEffectiveB.rep

RIVER: Walker Run  
REACH: 1

RS: 4995

## INPUT

Description: BHZ

Station Elevation Data

num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1010	719.54	1022	714.54	1055	709.65	1075	704.45
1100	699.45	1120	694.84	1140	691.74	1150	691.74	1180	689.34
1270	684.74	1300	676.74	1315	674.84	1390	669.34	1430	667.65
1440	666.24	1450	668.65	1465	669.65	1485	669.54	1540	667.74
1610	669.45	1635	674.54	1662	679.45	1685	690.04	1725	686.74
1750	689.45	1770	694.45	1780	699.34	1810	704.34	1835	709.84
1850	714.34	1870	719.34	1895	724.45				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1430	.05	1450	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1430	1450		275	255		.1	.3

## CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4735

## INPUT

Description: BHY

Station Elevation Data

num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.65	1015	719.65	1030	714.54	1058	709.84	1068	704.54
1080	701.74	1110	699.45	1140	694.65	1186	689.34	1280	686.74
1390	684.34	1430	683.74	1478	684.45	1620	679.54	1660	674.84
1690	669.54	1860	667.84	1870	664.24	1880	666.54	2000	669.45
2020	674.65	2042	679.84	2075	684.45	2120	689.45	2175	694.74
2225	699.34	2240	704.34	2280	709.65	2330	714.45	2355	719.24
2410	724.65								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1860	.05	1880	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1860	1880		200	240		.1	.3

## CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4495

## INPUT

Description: BHX

Station Elevation Data

num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.65	1020	719.24	1038	714.24	1050	709.45	1058	704.45
1060	703.74	1100	699.24	1148	694.84	1208	689.54	1315	688.74
1500	684.74	1670	683.74	1820	679.74	1905	673.74	1910	674.24
1950	671.74	1990	669.34	2100	667.74	2220	664.74	2230	663.74

				DupEffectiveB.rep					
2240	664.54	2280	669.54	2300	674.24	2320	679.65	2360	684.24
2420	689.45	2450	694.24	2480	699.24	2510	704.45	2560	709.34
2645	714.24	2740	719.45	2790	724.45				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	2220	.05	2240	.1

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

2220	2240	125	200	225	.1	.3
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#### CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 4295

#### INPUT

Description: BHW

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.84	1032	719.74	1052	714.24	1075	709.54	1100	704.54
1130	699.34	1158	694.24	1180	689.45	1210	684.65	1262	679.54
1370	674.24	1408	669.34	1470	669.45	1600	667.54	1730	665.24
1735	663.24	1745	665.45	1800	666.45	1820	674.24	1875	679.65
1955	684.65	1985	689.74	2015	694.24	2045	699.24	2060	704.54
2075	709.34	2105	714.24	2152	719.54	2215	724.34		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1730	.05	1745	.1

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

1730	1745	225	260	225	.1	.3
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#### CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 4043

#### INPUT

Description: BHW

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1030	719.24	1048	714.45	1062	709.45	1080	704.95
1102	699.65	1128	694.34	1150	689.65	1205	684.54	1242	679.34
1330	674.54	1390	671.54	1520	667.84	1620	664.34	1625	662.24
1630	664.84	1740	667.24	1910	669.54	1960	674.65	2040	679.54
2125	684.45	2162	689.34	2188	694.74	2210	699.34	2220	704.54
2245	714.45	2258	714.84	2270	719.74	2295	724.34		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1620	.05	1630	.1

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

1620	1630	381	255	191	.3	.7
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#### BRIDGE

RIVER: Walker Run

REACH: 1

RS: 3914

## INPUT

Description: Market Street u/s

Distance from Upstream XS = 128.4

Deck/Roadway Width = 43.1

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num= 17

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1242	678.745	678.745	1335	673.945	673.945	1372	671.945	671.945
1390	671.845	670.945	1490	671.445	668.145	1520	671.245	667.245
1616	670.545	661.845	1616	671.345	669.345	1625	671.345	669.345
1634	671.345	669.345	1634	670.545	662.045	1740	669.645	667.045
1820	667.945	667.945	1910	668.945	668.945	1960	674.045	674.045
2040	678.945	678.945	2125	683.845	683.845			

Upstream Bridge Cross Section Data

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1242	678.745	1335	673.945	1378	671.945	1390	670.945	1490	668.145
1520	667.245	1616	661.845	1625	660.845	1634	662.045	1740	667.045
1820	667.945	1910	668.945	1960	674.045	2040	678.945	2125	683.845

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1242	.1	1616	.05	1634	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1616	1634		.3	.7

Downstream Deck/Roadway Coordinates

num= 17

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1242	678.745	678.745	1335	673.945	673.945	1372	671.945	671.945
1390	671.845	670.945	1490	671.445	668.145	1520	671.245	667.245
1616	670.545	661.845	1616	671.345	669.345	1625	671.345	669.345
1634	671.345	669.345	1634	670.545	662.045	1740	669.645	667.045
1820	667.945	667.945	1910	668.945	668.945	1960	674.045	674.045
2040	678.945	678.945	2125	683.845	683.845			

Downstream Bridge Cross Section Data

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1242	678.745	1335	673.945	1378	671.945	1390	670.945	1490	668.145
1520	667.245	1616	661.845	1625	660.845	1634	662.045	1740	667.045
1820	667.945	1910	668.945	1960	674.045	2040	678.945	2125	683.845

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1242	.1	1616	.05	1634	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1616	1634		.4	.8

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 668.7  
 Energy head used in spillway design =  
 Spillway height used in design =  
 weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd = 1.5

Submerged Inlet + Outlet Cd = .8

Max Low Cord = 670.1

Additional Bridge Parameters

Add Friction component to Momentum

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

#### CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 3785

#### INPUT

Description: BHU

Station Elevation Data		num=	31								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1022	719.24	1052	714.84	1085	709.45	1110	704.45		
1140	699.34	1172	689.54	1260	684.65	1290	679.74	1318	674.84		
1360	669.34	1412	664.95	1430	660.24	1440	665.95	1500	665.84		
1550	667.24	1580	666.74	1650	666.15	1760	669.45	1800	674.34		
1900	676.54	1980	679.54	2035	684.65	2055	689.45	2080	694.54		
2095	699.45	2108	707.65	2118	709.65	2130	714.45	2140	719.34		
2150	724.34										

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1412	.055	1440	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1412	1440		250	250	175	.4 .8

#### CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 3532

#### INPUT

Description: BHT

Station Elevation Data		num=	32								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1055	719.34	1095	715.15	1155	709.45	1190	704.84		
1240	699.45	1280	694.84	1330	689.54	1368	684.95	1390	679.74		
1428	674.34	1502	664.34	1507	660.24	1510	658.24	1520	659.84		
1600	661.45	1730	665.04	1750	666.34	1770	665.74	1850	666.34		
1975	669.34	2000	674.74	2125	679.34	2180	684.34	2200	690.15		
2222	694.34	2232	699.95	2262	704.84	2285	709.84	2325	714.45		
2372	719.95	2415	724.34								

Manning's n Values

num=	3
------	---



				DupEffectiveB.rep					
Sta	n Val	Sta	n Val	Sta	n Val				
1000	.08	1507	.06	1520	.08				
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	1507	1520		160	160		.4	.8	

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 3375

INPUT

Description: BHS

Station	Elevation	Data	num=	29					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1095	719.34	1140	714.45	1170	709.84	1220	704.45
1275	699.65	1285	694.45	1305	689.54	1320	684.34	1338	679.95
1360	674.65	1420	664.54	1443	659.24	1448	657.24	1460	658.34
1550	658.95	1680	664.84	1705	664.24	1800	666.74	1978	669.45
2042	674.65	2080	679.74	2100	685.04	2125	689.34	2140	694.95
2162	699.45	2180	704.84	2225	709.84	2260	714.34		

Manning's	n Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
1000	.08	1443	.05	1460	.08				
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	1443	1460		300	310		.1	.3	

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 3065

INPUT

Description: BHR

Station	Elevation	Data	num=	29					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1095	719.84	1110	714.74	1210	709.34	1260	704.34
1290	699.54	1300	695.04	1315	689.84	1330	684.45	1355	679.45
1385	674.95	1405	669.74	1425	664.54	1510	656.74	1520	655.95
1530	656.15	1670	661.45	1805	664.34	1828	666.54	1978	669.65
2070	671.34	2178	674.65	2210	679.34	2248	687.54	2285	689.95
2310	694.84	2355	699.34	2420	704.34	2525	709.34		

Manning's	n Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
1000	.06	1510	.05	1530	.06				
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.	
	1510	1530		340	330		.1	.3	

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2730

INPUT

Description: BHQ

Station	Elevation	Data	num=	35					
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# DupEffectiveB.rep

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.45	1120	719.95	1198	714.45	1242	709.34	1262	704.34
1268	699.84	1300	694.54	1312	689.54	1328	684.54	1350	679.34
1368	674.34	1470	671.45	1588	669.54	1595	669.04	1669	664.34
1760	656.74	1818	656.24	1830	654.74	1837	656.24	1880	656.74
2000	662.24	2180	664.34	2220	667.34	2300	666.24	2465	669.65
2680	671.65	2718	674.74	2760	679.54	2805	684.54	2840	689.24
2855	694.95	2875	699.95	2900	704.34	2980	709.24	3015	714.34

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
1000 .06	1818 .05	1837 .06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1818	1837		487 390	342	.3	.7

## BRIDGE

RIVER: Walker Run  
REACH: 1 RS: 2480

## INPUT

Description:  
Distance from Upstream XS = 251  
Deck/Roadway width = 12.5  
Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates  
num= 20

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1735	665.445	665.445	1772	664.945	664.945	1825	659.745	659.745
1888	660.145	660.145	2045	658.445	658.445	2100	658.445	657.845
2145	658.445	654.845	2247	658.445	653.845	2247	658.445	657.745
2253	658.445	657.745	2253	658.445	653.845	2268	658.445	654.945
2350	658.445	656.945	2390	658.445	658.445	2440	660.345	660.345
2600	661.845	661.845	2735	665.045	665.045	2755	667.045	667.045
2900	667.845	667.845	3100	668.045	668.045			

## Upstream Bridge Cross Section Data

Station Elevation Data				num=	18								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
1735	665.445	1772	664.945	1825	659.745	1888	660.145	2045	658.445				
2100	657.845	2145	654.845	2247	653.845	2253	653.845	2268	654.945				
2350	656.945	2390	658.445	2440	660.345	2600	661.845	2735	665.045				
2755	667.045	2900	667.845	3100	668.045								

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
1735 .06	2247 .05	2253 .06

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	2247	2253	.3	.7

## Downstream Deck/Roadway Coordinates

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1735	665.445	665.445	1772	664.945	664.945	1825	659.745	659.745
1888	660.145	660.145	2045	658.445	658.445	2100	658.445	657.845
2145	658.445	654.845	2247	658.445	653.845	2247	658.445	657.745
2253	658.445	657.745	2253	658.445	653.845	2268	658.445	654.945
2350	658.445	656.945	2390	658.445	658.445	2440	660.345	660.345
2600	661.845	661.845	2735	665.045	665.045	2755	667.045	667.045
2900	667.845	667.845	3100	668.045	668.045			

# DupEffectiveB.rep

## Downstream Bridge Cross Section Data

Station Elevation Data		num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1735	665.445	1772	664.945	1825	659.745	1888	660.145	2045	658.445
2100	657.845	2145	654.845	2247	653.845	2253	653.845	2268	654.945
2350	656.945	2390	658.445	2440	660.345	2600	661.845	2735	665.045
2755	667.045	2900	667.845	3100	668.045				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
1735	.06	2247	.05	2253	.06

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	2247	2253	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins = 659.2  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

## Low Flow Methods and Data

Energy  
Selected Low Flow Methods = Highest Energy Answer

## High Flow Method

Pressure and Weir flow		
Submerged Inlet Cd	=	1.5
Submerged Inlet + Outlet Cd	=	.8
Max Low Cord	=	658.5

## Additional Bridge Parameters

Add Friction component to Momentum  
Do not add Weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end  
Criteria to check for pressure flow = Upstream energy grade line

## CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 2339

## INPUT

Description: BHP

Station Elevation Data		num= 34							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1030	719.34	1080	714.65	1108	710.15	1130	704.54
1150	699.45	1170	694.54	1195	689.54	1225	684.65	1240	679.24
1295	674.54	1400	669.95	1500	666.74	1590	664.54	1630	663.34
1700	664.34	1735	664.95	1772	664.45	1825	659.24	1888	659.65
2100	657.34	2145	655.34	2250	653.24	2268	654.45	2350	656.45
2440	659.84	2600	661.34	2735	664.54	2755	666.54	2900	667.34
3100	667.54	3250	669.24	3350	671.34	3465	674.65		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val

1000	.06	2145	.05	DupEffectiveB.rep 2268	.06			
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2145	2268		600 330	350		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 2010

INPUT

Description: BHO

Station Elevation Data	num=	23					
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev							
1000 689.34 1100 686.54 1230 684.34 1275 679.45 1340 674.84							
1450 670.04 1635 664.45 1798 659.74 2030 656.54 2295 655.65							
2298 654.34 2300 655.95 2460 655.95 2470 654.34 2475 655.95							
2600 654.74 2715 654.34 2740 652.24 2750 654.54 2960 657.34							
3230 659.65 3345 664.65 3360 664.45							

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
1000 .06 2715 .05 2750 .06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2715	2750		1200 809	740		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 1208

INPUT

Description: BHN

Station Elevation Data	num=	18
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1000 724.54 1035 719.34 1060 714.65 1080 709.34 1165 699.54		
1190 694.84 1225 689.54 1265 684.95 1380 674.54 1470 669.65		
1528 665.15 1570 659.45 1680 651.74 1740 651.34 1752 650.74		
1765 651.34 2205 659.24 2220 664.24		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
1000 .06 1740 .05 1765 .06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1740	1765		300 275	175		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 933

INPUT

Description: BHM

Station Elevation Data	num=	26
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
1000 724.54 1035 719.54 1088 714.74 1120 710.04 1152 704.34		
1200 699.74 1238 694.84 1270 689.84 1290 684.65 1340 679.95		
1402 674.95 1445 669.34 1480 664.45 1530 659.74 1590 654.45		

1700	650.95	1710	649.74	DupEffectiveB.rep	1720	650.65	1750	654.54	1900	657.04
2080	659.84	2200	663.45		2300	663.65	2400	663.45	2500	664.95
2590	664.34									

Manning's	n	Values	num=	3	
Sta	n	Val	Sta	n	Val
1000	.09	1700	.05	1720	.09

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	1700	1720		400	500	325		.3	.7

BRIDGE

RIVER: Walker Run  
 REACH: 1 RS: 875

INPUT

Description: Private Farm Road  
 Distance from Upstream XS = 50  
 Deck/Roadway Width = 14.9  
 Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num=	16													
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1400	664.145	664.145			1530	659.445	659.445			1590	654.145	654.145		
1609	653.645	653.645			1709	653.645	650.945			1709.5	653.645	652.245		
1710.5	653.645	652.445			1711.5	653.645	652.245			1712	653.645	650.945		
1890	653.645	653.645			1930	654.245	654.245			2080	659.545	659.545		
2200	663.145	663.145			2300	663.345	663.345			2400	663.145	663.145		
2500	664.645	664.645												

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	28							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.245	1035	719.245	1088	714.445	1120	709.145	1152	704.045		
1200	699.545	1238	694.545	1270	689.545	1290	684.345	1340	679.645		
1402	674.645	1445	669.045	1480	664.145	1530	659.445	1590	654.145		
1608	653.645	1709	650.945	1709.5	649.645	1710.5	649.445	1711.5	650.645		
1712	650.945	1890	653.645	1930	654.245	2080	659.545	2200	662.245		
2300	663.345	2400	663.145	2500	664.645						

Manning's	n	Values	num=	3	
Sta	n	Val	Sta	n	Val
1000	.09	1709	.05	1712	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1709	1712		.3	.7

Downstream Deck/Roadway Coordinates

num=	16													
Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
1400	664.145	664.145			1530	659.445	659.445			1590	654.145	654.145		
1609	653.645	653.645			1709	653.645	650.945			1709.5	653.645	652.245		
1710.5	653.645	652.445			1711.5	653.645	652.245			1712	653.645	650.945		
1890	653.645	653.645			1930	654.245	654.245			2080	659.545	659.545		
2200	663.145	663.145			2300	663.345	663.345			2400	663.145	663.145		
2500	664.645	664.645												

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	28							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.245	1035	719.245	1088	714.445	1120	709.145	1152	704.045		



				DupEffectiveB.rep					
1200	699.545	1238	694.545	1270	689.545	1290	684.345	1340	679.645
1402	674.645	1445	669.045	1480	664.145	1530	659.445	1590	654.145
1608	653.645	1709	650.945	1709.5	649.645	1710.5	649.445	1711.5	650.645
1712	650.945	1890	653.645	1930	654.245	2080	659.545	2200	662.245
2300	663.345	2400	663.145	2500	664.645				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1709	.05	1712	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	1709	1712	.3	.7	

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins = 654.4  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd	=	1.5
Submerged Inlet + Outlet Cd	=	.8
Max Low Cord	=	653.2

Additional Bridge Parameters

Add Friction component to Momentum

Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 428

INPUT

Description: BHL

Station Elevation Data		num=		28					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	686.54	1050	684.84	1090	679.84	1110	674.45	1130	669.65
1150	664.54	1210	659.34	1250	655.54	1350	651.74	1410	649.34
1430	647.24	1440	649.65	1550	654.34	1605	656.65	1630	659.45
1750	661.74	1860	664.45	2000	666.54	2100	667.34	2180	667.84
2365	669.34	2450	671.34	2540	674.54	2640	684.34	2700	689.54
2750	699.34	2800	704.65	2920	709.45				

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1410	.05	1440	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1410	1440		220	400		.3	.7

# DupEffectiveB.rep

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 147

### INPUT

Description: BHK

Station Elevation Data

num=

36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	699.45	1040	694.84	1100	691.54	1170	689.54	1210	687.54
1260	682.65	1340	684.95	1400	681.65	1440	679.65	1490	676.95
1530	674.84	1555	669.65	1580	664.34	1610	659.24	1640	655.04
1650	649.45	1660	646.74	1670	649.34	1750	651.74	1830	654.84
1870	655.84	1900	654.74	1925	659.34	2100	661.54	2240	664.95
2450	666.74	2623	669.65	2720	674.65	2760	679.34	2800	684.54
2838	689.54	2848	694.34	2900	699.45	2940	704.45	3010	709.45
3100	714.45								

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1650	.05	1670	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	1650	1670		305	380	405	.3	.7

### BRIDGE

RIVER: Walker Run

REACH: 1

RS: -10

### INPUT

Description: Market Street

Distance from Upstream XS = 163

Deck/Roadway Width = 23.7

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num=

30

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1530	674.245	674.245	1555	669.045	669.045	1560	663.745	663.745
1610	658.745	658.745	1635	653.645	653.645	1640	653.645	651.645
1640	655.245	652.145	1655.5	656.745	647.345	1656	656.745	649.545
1657	656.945	650.645	1658	657.045	651.345	1659	657.145	651.645
1660	657.245	651.745	1661	657.045	651.645	1662	657.045	651.345
1663	656.945	650.545	1664	656.845	649.245	1664.5	656.745	646.645
1670	656.245	648.745	1680	655.245	649.045	1680	653.645	649.045
1750	653.645	651.145	1845	653.645	653.645	1860	654.245	654.245
1870	655.245	655.245	1900	656.745	656.745	1925	658.745	658.745
2100	660.945	660.945	2240	664.345	664.345	2480	666.145	666.145

Upstream Bridge Cross Section Data

Station Elevation Data

num=

39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	698.845	1040	694.245	1100	690.945	1170	688.945	1210	683.945
1260	682.045	1340	684.345	1400	681.045	1440	679.045	1490	676.345
1530	674.245	1555	669.045	1580	664.045	1610	658.745	1635	653.645
1640	652.145	1641	652.145	1655.5	647.345	1656	646.945	1657	645.845
1658	645.945	1659	645.945	1660	645.945	1661	645.945	1662	645.945
1663	645.945	1664	646.245	1664.5	646.645	1670	648.745	1680	649.045
1750	651.145	1815	653.645	1830	654.245	1870	655.245	1900	654.145
1925	658.745	2100	660.945	2240	664.345	2450	663.245		

# DupEffectiveB.rep

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 1000 .09 1640 .05 1655.5 .09

Bank Sta: Left Right Coeff Contr. Expan.  
 1655.5 1664.5 .3 .7

## Downstream Deck/Roadway Coordinates

num= 30

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1530	674.245	674.245	1555	669.045	669.045	1560	663.745	663.745
1610	658.745	658.745	1635	653.645	653.645	1640	653.645	651.645
1640	655.245	652.145	1655.5	656.745	647.345	1656	656.745	649.545
1657	656.945	650.645	1658	657.045	651.345	1659	657.145	651.645
1660	657.245	651.745	1661	657.045	651.645	1662	657.045	651.345
1663	656.945	650.545	1664	656.845	649.245	1664.5	656.745	646.645
1670	656.245	648.745	1680	655.245	649.045	1680	653.645	649.045
1750	653.645	651.145	1845	653.645	653.645	1860	654.245	654.245
1870	655.245	655.245	1900	656.745	656.745	1925	658.745	658.745
2100	660.945	660.945	2240	664.345	664.345	2480	666.145	666.145

## Downstream Bridge Cross Section Data

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	698.845	1040	694.245	1100	690.945	1170	688.945	1210	683.945
1260	682.045	1340	684.345	1400	681.045	1440	679.045	1490	676.345
1530	674.245	1555	669.045	1580	664.045	1610	658.745	1635	653.645
1640	652.145	1641	652.145	1655.5	647.345	1656	646.945	1657	645.845
1658	645.945	1659	645.945	1660	645.945	1661	645.945	1662	645.945
1663	645.945	1664	646.245	1664.5	646.645	1670	648.745	1680	649.045
1750	651.145	1815	653.645	1830	654.245	1870	655.245	1900	654.145
1925	658.745	2100	660.945	2240	664.345	2450	663.245		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 1000 .09 1640 .05 1655.5 .09

Bank Sta: Left Right Coeff Contr. Expan.  
 1655.5 1664.5 .3 .7

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 654.4  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

## Low Flow Methods and Data

Energy  
 Selected Low Flow Methods = Highest Energy Answer

## High Flow Method

Pressure and weir flow  
 Submerged Inlet Cd = 1.5  
 Submerged Inlet + Outlet Cd = .8  
 Max Low Cord = 652.5

## Additional Bridge Parameters

Add Friction component to Momentum

# DupEffectiveB.rep

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: -255

### INPUT

Description: BHJ

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	684.34	1092	679.54	1128	674.34	1170	669.34	1230	664.54		
1310	660.04	1330	657.54	1350	654.84	1372	649.74	1405	647.24		
1408	645.74	1412	647.95	1450	649.65	1490	649.24	1525	649.34		
1570	649.04	1610	649.84	1670	654.34	1712	659.34	1740	664.84		
1750	669.34	1790	674.84								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1405	.05	1412	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1405	1412		225	260	200	.3
							.7

Appendix G:  
Corrected Effective/ Existing Conditions Model

- HEC-RAS Reports
- HEC-RAS Cross-Sections
- HEC-RAS Profiles



## HEC-RAS Plan: LSI Existing

River	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
Walker Run	1	5862	100 yr	1640.00	675.53	680.72	680.72	681.63	0.022527	10.81	321.01	162.84	0.92
Walker Run	1	5862	100 yr encroachment	1640.00	675.53	681.58	681.58	683.30	0.024616	12.77	206.82	58.12	0.99
Walker Run	1	5862	500 yr	3100.00	675.53	681.72	681.72	682.99	0.026752	13.57	488.34	170.44	1.04
Walker Run	1	5862	10-yr	480.00	675.53	679.13	679.13	679.75	0.020776	7.61	115.53	93.35	0.82
Walker Run	1	5862	50-yr	1180.00	675.53	680.22	680.22	681.07	0.022387	9.93	242.62	147.63	0.90
Walker Run	1	5547	100 yr	1640.00	669.38	677.11		677.20	0.001759	4.35	890.41	218.06	0.29
Walker Run	1	5547	100 yr encroachment	1640.00	669.38	677.66		677.99	0.006168	6.27	401.49	66.17	0.41
Walker Run	1	5547	500 yr	3100.00	669.38	679.27		679.39	0.001689	5.11	1372.22	228.43	0.30
Walker Run	1	5547	10-yr	480.00	669.38	673.93		674.09	0.004967	4.83	235.30	155.09	0.44
Walker Run	1	5547	50-yr	1180.00	669.38	676.01		676.10	0.002275	4.40	652.44	212.32	0.32
Walker Run	1	5282	100 yr	1640.00	667.03	676.24	673.33	676.58	0.002948	6.02	457.36	228.49	0.38
Walker Run	1	5282	100 yr encroachment	1640.00	667.03	676.58	673.30	676.93	0.002775	6.01	450.07	69.00	0.37
Walker Run	1	5282	500 yr	3100.00	667.03	678.77	674.99	678.95	0.001595	5.33	1348.37	287.95	0.29
Walker Run	1	5282	10-yr	480.00	667.03	673.12	671.21	673.27	0.002121	3.65	213.37	73.62	0.29
Walker Run	1	5282	50-yr	1180.00	667.03	675.13	672.64	675.41	0.002866	5.37	369.60	189.25	0.36
Walker Run	1	5250	Bridge										
Walker Run	1	5198	100 yr	1640.00	665.71	672.25	672.25	673.74	0.018505	11.33	231.39	223.91	0.87
Walker Run	1	5198	100 yr encroachment	1640.00	665.71	673.25	672.25	674.12	0.009118	8.92	304.14	73.00	0.63
Walker Run	1	5198	500 yr	3100.00	665.71	673.86	673.86	676.04	0.020957	14.38	348.50	243.61	0.96
Walker Run	1	5198	10-yr	480.00	665.71	670.29	669.82	670.99	0.012657	6.89	88.53	182.69	0.66
Walker Run	1	5198	50-yr	1180.00	665.71	671.59	671.59	672.84	0.017557	10.09	182.73	213.69	0.83
Walker Run	1	5107	100 yr	1640.00	664.59	672.30		672.39	0.001566	3.56	989.83	288.98	0.26
Walker Run	1	5107	100 yr encroachment	1640.00	664.59	673.25		673.34	0.001206	3.47	914.41	185.00	0.24
Walker Run	1	5107	500 yr	3100.00	664.59	673.40		673.55	0.002424	4.99	1311.89	300.72	0.34
Walker Run	1	5107	10-yr	480.00	664.59	670.15		670.21	0.001745	2.73	391.93	262.59	0.26
Walker Run	1	5107	50-yr	1180.00	664.59	671.43		671.51	0.001890	3.50	740.33	275.55	0.28
Walker Run	1	4995	100 yr	1640.00	666.24	672.05		672.16	0.002729	4.39	827.00	269.66	0.35
Walker Run	1	4995	100 yr encroachment	1640.00	666.24	672.86		673.10	0.003741	5.70	567.91	137.00	0.42
Walker Run	1	4995	500 yr	3100.00	666.24	672.97		673.18	0.004415	6.28	1083.80	286.78	0.46
Walker Run	1	4995	10-yr	480.00	666.24	669.68		669.85	0.003776	4.62	239.96	225.70	0.52
Walker Run	1	4995	50-yr	1180.00	666.24	671.07		671.21	0.004103	4.64	573.75	251.64	0.42
Walker Run	1	4810	100 yr	1640.00	663.49	671.80		671.86	0.001030	3.19	1208.63	329.14	0.21
Walker Run	1	4810	100 yr encroachment	1640.00	663.49	672.49		672.63	0.001707	4.36	795.12	174.33	0.27
Walker Run	1	4810	500 yr	3100.00	663.49	672.48		672.61	0.002218	4.97	1436.31	338.12	0.31
Walker Run	1	4810	10-yr	480.00	663.49	669.15		669.24	0.001804	3.12	379.83	299.55	0.26
Walker Run	1	4810	50-yr	1180.00	663.49	670.71		670.78	0.001421	3.36	858.69	314.85	0.24
Walker Run	1	4735	100 yr	1640.00	664.24	671.69		671.76	0.001435	3.60	1096.93	330.82	0.26
Walker Run	1	4735	100 yr encroachment	1640.00	664.24	672.47		672.52	0.000848	3.00	1253.73	289.99	0.20
Walker Run	1	4735	500 yr	3100.00	664.24	672.24		672.41	0.003241	5.74	1278.24	335.99	0.40
Walker Run	1	4735	10-yr	480.00	664.24	668.25	668.25	668.88	0.018154	7.23	119.04	131.13	0.80
Walker Run	1	4735	50-yr	1180.00	664.24	670.53		670.64	0.002544	4.15	719.20	319.78	0.33
Walker Run	1	4692	100 yr	1640.00	662.02	671.68		671.72	0.000512	2.30	1379.65	349.44	0.16
Walker Run	1	4692	100 yr encroachment	1640.00	662.02	672.46		672.49	0.000359	2.07	1437.17	264.48	0.13
Walker Run	1	4692	500 yr	3100.00	662.02	672.19		672.31	0.001301	3.85	1560.53	355.16	0.25
Walker Run	1	4692	10-yr	480.00	662.02	668.48		668.53	0.000986	2.09	385.39	259.68	0.19
Walker Run	1	4692	50-yr	1180.00	662.02	670.53		670.57	0.000640	2.27	992.25	323.37	0.17
Walker Run	1	4495	100 yr	1640.00	663.74	671.57		671.61	0.000657	2.88	1350.83	335.74	0.19
Walker Run	1	4495	100 yr encroachment	1640.00	663.74	672.33		672.40	0.000704	3.18	1049.36	165.00	0.20
Walker Run	1	4495	500 yr	3100.00	663.74	671.88		672.01	0.001901	5.03	1456.22	342.15	0.32
Walker Run	1	4495	10-yr	480.00	663.74	668.25		668.31	0.001343	2.76	386.05	204.61	0.24
Walker Run	1	4495	50-yr	1180.00	663.74	670.38		670.43	0.000850	2.91	967.86	310.96	0.21
Walker Run	1	4414	100 yr	1640.00	662.46	671.52		671.56	0.000656	2.71	1401.92	345.90	0.17
Walker Run	1	4414	100 yr encroachment	1640.00	662.46	672.21		672.32	0.001205	3.89	814.28	138.30	0.23
Walker Run	1	4414	500 yr	3100.00	662.46	671.73		671.86	0.002024	4.85	1475.35	349.28	0.30
Walker Run	1	4414	10-yr	480.00	662.46	668.04		668.16	0.002365	3.50	320.62	263.27	0.29
Walker Run	1	4414	50-yr	1180.00	662.46	670.32		670.36	0.000892	2.83	997.33	326.63	0.19
Walker Run	1	4295	100 yr	1640.00	663.24	671.46		671.49	0.000542	2.50	1632.15	421.29	0.16
Walker Run	1	4295	100 yr encroachment	1640.00	663.24	672.18		672.21	0.000463	2.46	1496.90	268.22	0.15
Walker Run	1	4295	500 yr	3100.00	663.24	671.53		671.62	0.001835	4.63	1662.73	422.04	0.30
Walker Run	1	4295	10-yr	480.00	663.24	667.76		667.85	0.002894	3.55	333.69	218.48	0.34
Walker Run	1	4295	50-yr	1180.00	663.24	670.23		670.26	0.000800	2.68	1121.25	408.58	0.19
Walker Run	1	4130	100 yr	1640.00	661.54	671.41		671.42	0.000268	1.82	2046.29	435.83	0.11
Walker Run	1	4130	100 yr encroachment	1640.00	661.54	672.09		672.13	0.000485	2.58	1302.17	203.36	0.15
Walker Run	1	4130	500 yr	3100.00	661.54	671.34		671.40	0.000998	3.49	2016.79	433.41	0.21
Walker Run	1	4130	10-yr	480.00	661.54	667.55		667.59	0.000903	2.20	572.16	341.50	0.18
Walker Run	1	4130	50-yr	1180.00	661.54	670.16		670.18	0.000326	1.80	1530.84	391.38	0.12
Walker Run	1	4043	100 yr	1640.00	662.24	671.38		671.39	0.000421	2.27	1939.12	532.22	0.14
Walker Run	1	4043	100 yr encroachment	1640.00	662.24	672.02		672.08	0.000882	3.46	1012.90	155.00	0.21
Walker Run	1	4043	500 yr	3100.00	662.24	671.22		671.29	0.001700	4.51	1855.32	525.10	0.28
Walker Run	1	4043	10-yr	480.00	662.24	667.32		667.43	0.003997	4.35	306.19	210.69	0.39
Walker Run	1	4043	50-yr	1180.00	662.24	670.11		670.14	0.000645	2.51	1303.39	475.54	0.17
Walker Run	1	3972	100 yr	1640.00	661.21	671.36	667.07	671.37	0.000195	1.68	2526.28	605.88	0.10
Walker Run	1	3972	100 yr encroachment	1640.00	661.21	671.97	667.07	672.03	0.000497	2.79	1173.69	177.25	0.15
Walker Run	1	3972	500 yr	3100.00	661.21	671.15	668.32	671.20	0.000807	3.36	2398.15	601.59	0.19
Walker Run	1	3972	10-yr	480.00	661.21	667.17	664.60	667.26	0.001259	2.91	314.38	332.72	0.22

HEC-RAS Plan: LSI Existing (Continued)

River	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
Walker Run	1	3972	50-yr	1180.00	661.21	669.99	666.55	670.07	0.000896	3.24	700.31	554.10	0.20
Walker Run	1	3914	Bridge										
Walker Run	1	3860	100 yr	1640.00	660.73	667.84	667.09	668.89	0.010036	8.79	216.92	96.28	0.61
Walker Run	1	3860	100 yr encroachment	1640.00	660.73	668.59	666.82	669.65	0.008311	8.62	209.59	34.78	0.57
Walker Run	1	3860	500 yr	3100.00	660.73	668.86	668.86	671.18	0.018154	13.05	274.55	107.59	0.85
Walker Run	1	3860	10-yr	480.00	660.73	666.42	663.83	666.64	0.002674	3.84	141.09	81.11	0.30
Walker Run	1	3860	50-yr	1180.00	660.73	667.45	665.92	668.12	0.006925	7.00	195.79	91.95	0.50
Walker Run	1	3785	100 yr	1640.00	660.24	667.18	667.18	667.74	0.011412	7.39	336.84	292.96	0.62
Walker Run	1	3785	100 yr encroachment	1640.00	660.24	667.41	667.41	668.71	0.019104	9.89	197.69	70.00	0.81
Walker Run	1	3785	500 yr	3100.00	660.24	667.76	667.76	668.49	0.013709	8.79	517.97	325.00	0.69
Walker Run	1	3785	10-yr	480.00	660.24	664.85	664.74	665.87	0.032266	6.09	59.30	25.71	0.94
Walker Run	1	3785	50-yr	1180.00	660.24	666.88	666.88	667.41	0.010766	8.85	255.53	250.82	0.60
Walker Run	1	3735	100 yr	1640.00	660.36	666.48		666.65	0.003069	3.88	503.01	298.66	0.31
Walker Run	1	3735	100 yr encroachment	1640.00	660.36	667.46		667.74	0.003636	4.78	406.40	147.43	0.35
Walker Run	1	3735	500 yr	3100.00	660.36	667.38		667.62	0.003196	4.44	807.31	370.70	0.32
Walker Run	1	3735	10-yr	480.00	660.36	665.10		665.21	0.002876	3.11	193.82	144.53	0.29
Walker Run	1	3735	50-yr	1180.00	660.36	666.06		666.21	0.003128	3.70	385.52	262.29	0.31
Walker Run	1	3532	100 yr	1640.00	658.71	664.66	664.66	665.29	0.025580	8.39	336.83	224.33	0.77
Walker Run	1	3532	100 yr encroachment	1640.00	658.71	665.25	665.25	666.15	0.027391	9.19	261.68	125.00	0.81
Walker Run	1	3532	500 yr	3100.00	658.71	665.48		666.20	0.027210	9.36	524.04	237.46	0.81
Walker Run	1	3532	10-yr	480.00	658.71	663.64	663.64	664.10	0.015044	5.87	128.63	173.38	0.58
Walker Run	1	3532	50-yr	1180.00	658.71	664.43	664.43	664.93	0.019959	7.26	285.43	218.15	0.68
Walker Run	1	3410	100 yr	1640.00	657.83	663.82		663.94	0.003002	4.24	712.26	265.45	0.35
Walker Run	1	3410	100 yr encroachment	1640.00	657.83	664.54		664.71	0.003043	4.64	547.81	130.00	0.35
Walker Run	1	3410	500 yr	3100.00	657.83	664.69		664.90	0.004564	5.76	955.45	288.18	0.44
Walker Run	1	3410	10-yr	480.00	657.83	662.54		662.59	0.001386	2.50	378.08	258.51	0.23
Walker Run	1	3410	50-yr	1180.00	657.83	663.43		663.52	0.002431	3.66	609.01	263.47	0.31
Walker Run	1	3375	100 yr	1640.00	657.24	663.78		663.86	0.001327	3.46	863.93	233.31	0.25
Walker Run	1	3375	100 yr encroachment	1640.00	657.24	664.56		664.63	0.000937	3.16	848.36	150.00	0.22
Walker Run	1	3375	500 yr	3100.00	657.24	664.60		664.77	0.002696	5.38	1068.18	283.33	0.37
Walker Run	1	3375	10-yr	480.00	657.24	662.54		662.56	0.000315	1.44	595.87	200.68	0.12
Walker Run	1	3375	50-yr	1180.00	657.24	663.41		663.45	0.000913	2.75	778.61	223.44	0.21
Walker Run	1	3278	100 yr	1640.00	657.01	662.97	662.97	663.49	0.014321	8.65	383.49	317.40	0.72
Walker Run	1	3278	100 yr encroachment	1640.00	657.01	663.34	663.34	664.29	0.017827	10.18	251.61	111.35	0.82
Walker Run	1	3278	500 yr	3100.00	657.01	663.74		664.23	0.012477	8.99	670.65	419.84	0.69
Walker Run	1	3278	10-yr	480.00	657.01	662.01	662.01	662.43	0.010073	6.18	141.01	180.59	0.58
Walker Run	1	3278	50-yr	1180.00	657.01	662.76	662.76	663.19	0.011503	7.51	321.85	290.03	0.64
Walker Run	1	3065	100 yr	1640.00	655.95	662.04		662.14	0.001448	3.66	730.89	245.14	0.27
Walker Run	1	3065	100 yr encroachment	1640.00	655.95	662.66		662.82	0.001528	4.03	537.17	98.00	0.28
Walker Run	1	3065	500 yr	3100.00	655.95	663.07		663.25	0.002162	4.99	1015.24	304.73	0.34
Walker Run	1	3065	10-yr	480.00	655.95	660.79		660.81	0.000421	1.68	465.51	186.69	0.14
Walker Run	1	3065	50-yr	1180.00	655.95	661.60		661.67	0.001144	3.09	629.12	219.93	0.23
Walker Run	1	2949	100 yr	1640.00	655.77	661.56		661.79	0.007289	5.83	509.80	329.00	0.50
Walker Run	1	2949	100 yr encroachment	1640.00	655.77	662.35		662.53	0.003935	4.81	513.29	181.80	0.38
Walker Run	1	2949	500 yr	3100.00	655.77	662.62		662.84	0.005547	5.92	901.15	411.40	0.46
Walker Run	1	2949	10-yr	480.00	655.77	660.30	660.30	660.64	0.012072	5.90	156.44	229.85	0.61
Walker Run	1	2949	50-yr	1180.00	655.77	661.08		661.34	0.009547	6.15	360.38	291.46	0.57
Walker Run	1	2730	100 yr	1640.00	654.74	661.09		661.18	0.001341	3.40	785.66	272.20	0.25
Walker Run	1	2730	100 yr encroachment	1640.00	654.74	662.03		662.12	0.001008	3.27	712.55	153.71	0.23
Walker Run	1	2730	500 yr	3100.00	654.74	661.91		662.08	0.002338	4.92	1019.64	298.61	0.34
Walker Run	1	2730	10-yr	480.00	654.74	659.92		659.94	0.000418	1.62	488.08	234.35	0.14
Walker Run	1	2730	50-yr	1180.00	654.74	660.74		660.79	0.000988	2.80	690.68	260.72	0.22
Walker Run	1	2634	100 yr	1640.00	653.74	660.84		660.97	0.003514	4.68	696.89	426.74	0.36
Walker Run	1	2634	100 yr encroachment	1640.00	653.74	661.67		661.93	0.004106	5.58	447.45	137.20	0.40
Walker Run	1	2634	500 yr	3100.00	653.74	661.62		661.79	0.004000	5.48	1044.97	467.87	0.40
Walker Run	1	2634	10-yr	480.00	653.74	659.77		659.85	0.002155	3.14	298.68	288.98	0.27
Walker Run	1	2634	50-yr	1180.00	653.74	660.50		660.63	0.003300	4.33	556.94	408.45	0.35
Walker Run	1	2497	100 yr	1640.00	653.51	660.89	659.26	660.73	0.000895	2.72	1150.78	507.16	0.19
Walker Run	1	2497	100 yr encroachment	1640.00	653.51	661.46	659.85	661.57	0.001496	3.81	736.05	229.28	0.26
Walker Run	1	2497	500 yr	3100.00	653.51	661.38	659.74	661.46	0.001431	3.69	1507.82	526.74	0.25
Walker Run	1	2497	10-yr	480.00	653.51	659.72	658.19	659.74	0.000339	1.50	677.31	471.84	0.12
Walker Run	1	2497	50-yr	1180.00	653.51	660.39	658.94	660.42	0.000695	2.32	1001.31	498.73	0.17
Walker Run	1	2480	Bridge										
Walker Run	1	2462	100 yr	1640.00	653.86	659.30		659.58	0.007353	6.44	519.57	459.79	0.54
Walker Run	1	2462	100 yr encroachment	1640.00	653.86	659.62	659.51	660.34	0.012540	8.81	297.72	150.00	0.71
Walker Run	1	2462	500 yr	3100.00	653.86	660.11		660.37	0.006251	6.65	908.97	505.66	0.51
Walker Run	1	2462	10-yr	480.00	653.86	658.17	658.17	658.53	0.008186	5.58	155.23	224.39	0.54
Walker Run	1	2462	50-yr	1180.00	653.86	658.91		659.25	0.008625	6.56	352.61	343.07	0.58
Walker Run	1	2339	100 yr	1640.00	653.24	659.26		659.29	0.000357	1.65	1335.67	503.26	0.13
Walker Run	1	2339	100 yr encroachment	1640.00	653.24	659.72		659.75	0.000291	1.58	1235.01	270.00	0.12
Walker Run	1	2339	500 yr	3100.00	653.24	659.98		660.05	0.000877	2.48	1760.43	637.42	0.18
Walker Run	1	2339	10-yr	480.00	653.24	657.57		657.58	0.000175	0.88	659.29	300.67	0.08
Walker Run	1	2339	50-yr	1180.00	653.24	658.92		658.94	0.000253	1.32	1171.53	460.03	0.11

HEC-RAS Plan: LSI Existing (Continued)

River	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
Walker Run	1	2274	100 yr	1840.00	651.42	658.64	658.64	659.17	0.009809	8.18	438.61	387.17	0.60
Walker Run	1	2274	100 yr encroachment	1640.00	651.42	659.54		659.69	0.002657	4.70	652.51	281.38	0.32
Walker Run	1	2274	500 yr	3100.00	651.42	659.27	659.27	659.88	0.012292	9.82	715.06	490.46	0.69
Walker Run	1	2274	10-yr	480.00	651.42	656.03	656.03	657.40	0.028384	9.45	52.66	22.99	0.94
Walker Run	1	2274	50-yr	1180.00	651.42	658.34	658.34	658.84	0.008584	7.38	330.96	338.52	0.56
Walker Run	1	2139	100 yr	1640.00	650.72	657.31		657.39	0.002189	3.41	857.42	547.48	0.28
Walker Run	1	2139	100 yr encroachment	1640.00	650.72	657.96	657.96	658.91	0.015830	9.99	258.58	110.00	0.76
Walker Run	1	2139	500 yr	3100.00	650.72	658.74		658.79	0.001147	2.94	1802.97	755.38	0.21
Walker Run	1	2139	10-yr	480.00	650.72	656.05		656.10	0.002047	2.69	325.45	278.44	0.25
Walker Run	1	2139	50-yr	1180.00	650.72	656.83		656.90	0.002573	3.44	612.49	451.28	0.29
Walker Run	1	2010	100 yr	1640.00	652.24	657.18		657.20	0.000883	2.16	1466.62	963.91	0.19
Walker Run	1	2010	100 yr encroachment	1640.00	652.24	658.05		658.10	0.000779	2.32	1004.06	295.00	0.19
Walker Run	1	2010	500 yr	3100.00	652.24	658.69		658.71	0.000364	1.73	3131.92	1243.60	0.13
Walker Run	1	2010	10-yr	480.00	652.24	655.81		655.85	0.001799	2.30	369.99	421.32	0.26
Walker Run	1	2010	50-yr	1180.00	652.24	656.61		656.65	0.001455	2.49	946.52	880.74	0.24
Walker Run	1	1925	100 yr	1640.00	651.09	657.12		657.14	0.000606	1.79	1622.91	846.22	0.15
Walker Run	1	1925	100 yr encroachment	1640.00	651.09	658.01		658.04	0.000545	1.92	1260.98	380.86	0.15
Walker Run	1	1925	500 yr	3100.00	651.09	658.66		658.68	0.000330	1.61	2977.00	903.59	0.12
Walker Run	1	1925	10-yr	480.00	651.09	655.68		655.71	0.001543	2.21	492.52	685.99	0.22
Walker Run	1	1925	50-yr	1180.00	651.09	656.53		656.55	0.000931	2.02	1128.05	813.20	0.18
Walker Run	1	1602	100 yr	1860.00	650.67	656.97		656.98	0.000461	1.47	2501.63	1079.73	0.11
Walker Run	1	1602	100 yr encroachment	1860.00	650.67	657.86		657.88	0.000507	1.72	1854.68	515.00	0.12
Walker Run	1	1602	500 yr	3600.00	650.67	658.57		658.58	0.000317	1.46	4342.97	1187.88	0.10
Walker Run	1	1602	10-yr	550.00	650.67	655.18		655.20	0.001764	2.18	702.89	884.86	0.21
Walker Run	1	1602	50-yr	1320.00	650.67	656.30		656.31	0.000643	1.59	1797.41	1037.52	0.13
Walker Run	1	1402	100 yr	1860.00	649.80	656.86		656.88	0.000512	1.60	2013.36	686.27	0.11
Walker Run	1	1402	100 yr encroachment	1860.00	649.80	657.75		657.77	0.000560	1.83	1605.43	381.35	0.12
Walker Run	1	1402	500 yr	3600.00	649.80	658.48		658.50	0.000477	1.80	3159.88	731.05	0.11
Walker Run	1	1402	10-yr	550.00	649.80	654.96		654.97	0.000738	1.51	788.84	592.35	0.13
Walker Run	1	1402	50-yr	1320.00	649.80	656.18		656.19	0.000572	1.56	1550.75	659.53	0.12
Walker Run	1	1208	100 yr	1860.00	650.74	656.72		656.75	0.000860	2.31	1435.61	455.67	0.17
Walker Run	1	1208	100 yr encroachment	1860.00	650.74	657.57		657.63	0.000935	2.64	999.38	174.97	0.18
Walker Run	1	1208	500 yr	3600.00	650.74	658.32		658.37	0.000987	2.92	2254.15	567.60	0.19
Walker Run	1	1208	10-yr	550.00	650.74	654.85		654.86	0.000488	1.33	705.05	324.67	0.12
Walker Run	1	1208	50-yr	1320.00	650.74	656.03		656.06	0.000793	2.04	1139.94	407.76	0.16
Walker Run	1	990	100 yr	1860.00	649.47	656.52		656.55	0.000981	2.30	1444.98	511.16	0.17
Walker Run	1	990	100 yr encroachment	1860.00	649.47	657.45		657.47	0.000491	1.80	1668.02	395.00	0.12
Walker Run	1	990	500 yr	3600.00	649.47	658.12		658.16	0.000909	2.60	2285.68	540.36	0.17
Walker Run	1	990	10-yr	550.00	649.47	654.68		654.71	0.001079	1.86	577.77	415.79	0.17
Walker Run	1	990	50-yr	1320.00	649.47	655.83		655.86	0.001105	2.24	1098.41	489.79	0.18
Walker Run	1	933	100 yr	1860.00	649.74	656.22		656.44	0.003361	5.64	717.40	280.88	0.41
Walker Run	1	933	100 yr encroachment	1860.00	649.74	657.16		657.40	0.002563	5.43	616.28	115.00	0.36
Walker Run	1	933	500 yr	3600.00	649.74	657.79		658.05	0.003412	6.64	1248.04	396.20	0.43
Walker Run	1	933	10-yr	550.00	649.74	654.53		654.62	0.001771	3.27	344.32	160.80	0.28
Walker Run	1	933	50-yr	1320.00	649.74	655.55		655.74	0.003227	5.10	544.46	232.85	0.39
Walker Run	1	884	100 yr	1860.00	648.62	656.01	654.99	656.23	0.006033	6.34	678.17	290.30	0.47
Walker Run	1	884	100 yr encroachment	1860.00	648.62	656.95	655.15	657.23	0.005037	6.41	545.13	126.77	0.44
Walker Run	1	884	500 yr	3600.00	648.62	657.63	655.84	657.84	0.004843	6.71	1210.15	366.36	0.44
Walker Run	1	884	10-yr	550.00	648.62	654.25	653.89	654.46	0.006581	5.17	247.74	198.84	0.46
Walker Run	1	884	50-yr	1320.00	648.62	655.26	654.63	655.51	0.007691	6.50	473.08	250.91	0.52
Walker Run	1	875		Culvert									
Walker Run	1	863	100 yr	1860.00	648.96	656.02	654.48	656.17	0.002977	4.94	831.30	301.91	0.37
Walker Run	1	863	100 yr encroachment	1860.00	648.96	656.89	654.67	657.14	0.003241	5.67	597.90	126.77	0.39
Walker Run	1	863	500 yr	3600.00	648.96	657.59	655.35	657.78	0.003036	5.88	1356.18	367.22	0.39
Walker Run	1	863	10-yr	550.00	648.96	654.04	653.30	654.16	0.003194	3.81	314.00	220.70	0.35
Walker Run	1	863	50-yr	1320.00	648.96	655.36	654.10	655.50	0.002981	4.54	641.32	274.47	0.36
Walker Run	1	715	100 yr	1860.00	647.90	655.75		655.82	0.001472	3.87	1100.65	356.91	0.25
Walker Run	1	715	100 yr encroachment	1860.00	647.90	656.61		656.73	0.001589	4.33	834.22	154.14	0.27
Walker Run	1	715	500 yr	3600.00	647.90	657.29		657.39	0.001712	4.75	1716.41	431.49	0.28
Walker Run	1	715	10-yr	550.00	647.90	653.83		653.87	0.000920	2.49	516.05	258.39	0.19
Walker Run	1	715	50-yr	1320.00	647.90	655.11		655.17	0.001315	3.43	884.12	320.99	0.24
Walker Run	1	536	100 yr	1860.00	646.97	655.50		655.57	0.001317	3.81	1088.97	304.97	0.24
Walker Run	1	536	100 yr encroachment	1860.00	646.97	656.34		656.44	0.001588	3.65	837.48	147.46	0.22
Walker Run	1	536	500 yr	3600.00	646.97	656.95		657.07	0.001824	5.03	1569.63	355.07	0.29
Walker Run	1	536	10-yr	550.00	646.97	653.71		653.74	0.000580	2.12	598.59	246.41	0.15
Walker Run	1	536	50-yr	1320.00	646.97	654.90		654.95	0.001077	3.26	912.20	284.07	0.22
Walker Run	1	428	100 yr	1860.00	647.24	655.34		655.45	0.001184	3.71	1049.06	318.66	0.25
Walker Run	1	428	100 yr encroachment	1860.00	647.24	656.12		656.29	0.001316	4.20	725.81	115.65	0.27
Walker Run	1	428	500 yr	3600.00	647.24	656.73		656.90	0.001687	4.99	1527.60	368.20	0.30
Walker Run	1	428	10-yr	550.00	647.24	653.66		653.69	0.000426	1.85	584.02	234.62	0.14
Walker Run	1	428	50-yr	1320.00	647.24	654.78		654.85	0.000930	3.11	876.59	290.27	0.22
Walker Run	1	350	100 yr	1860.00	647.08	655.28		655.34	0.000874	3.12	1233.20	300.57	0.20
Walker Run	1	350	100 yr encroachment	1860.00	647.08	656.07		656.16	0.000973	3.53	986.42	163.73	0.22
Walker Run	1	350	500 yr	3600.00	647.08	656.63		656.74	0.001403	4.43	1655.66	318.17	0.27
Walker Run	1	350	10-yr	550.00	647.08	653.64		653.65	0.000291	1.52	769.79	263.62	0.11

## HEC-RAS Plan: LSI Existing (Continued)

River	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/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Walker Run	1	350	50-yr	1320.00	647.08	654.73		654.77	0.000659	2.57	1070.73	287.64	0.17
Walker Run	1	185	100 yr	1860.00	646.40	655.10		655.17	0.000989	3.49	1114.61	263.65	0.22
Walker Run	1	185	100 yr encroachm	1860.00	646.40	655.87		655.96	0.001250	3.40	887.15	144.00	0.20
Walker Run	1	185	500 yr	3600.00	646.40	656.31		656.46	0.001775	5.14	1449.38	284.47	0.30
Walker Run	1	185	10-yr	550.00	646.40	653.59		653.60	0.000271	1.59	741.69	231.07	0.11
Walker Run	1	185	50-yr	1320.00	646.40	654.60		654.65	0.000705	2.82	985.59	251.03	0.18
Walker Run	1	147	100 yr	1860.00	646.74	654.79		655.08	0.003377	6.01	620.10	189.92	0.41
Walker Run	1	147	100 yr encroachm	1860.00	646.74	655.59		655.86	0.002538	5.62	588.14	110.00	0.36
Walker Run	1	147	500 yr	3600.00	646.74	655.68		656.28	0.006587	9.12	817.74	258.52	0.58
Walker Run	1	147	10-yr	550.00	646.74	653.52		653.58	0.000846	2.62	402.56	153.11	0.20
Walker Run	1	147	50-yr	1320.00	646.74	654.39		654.58	0.002305	4.77	547.52	177.32	0.33
Walker Run	1	011	100 yr	1860.00	645.71	654.67	652.69	654.75	0.001192	3.89	1149.74	380.16	0.24
Walker Run	1	011	100 yr encroachm	1860.00	645.71	655.54	652.68	655.61	0.000861	3.54	1114.92	207.00	0.21
Walker Run	1	011	500 yr	3600.00	645.71	655.44	653.02	655.61	0.002516	6.01	1464.61	441.92	0.35
Walker Run	1	011	10-yr	550.00	645.71	653.48	650.23	653.50	0.000286	1.72	754.81	282.23	0.11
Walker Run	1	011	50-yr	1320.00	645.71	654.31	651.84	654.36	0.000803	3.10	1017.14	350.92	0.20
Walker Run	1	-10	Bridge										
Walker Run	1	-30	100 yr	1860.00	644.46	652.96	652.28	653.77	0.007942	9.03	410.25	223.83	0.60
Walker Run	1	-30	100 yr encroachm	1860.00	644.46	653.95	652.28	654.44	0.004231	7.20	482.18	134.28	0.45
Walker Run	1	-30	500 yr	3600.00	644.46	654.46	654.09	655.27	0.008004	10.32	820.41	342.52	0.62
Walker Run	1	-30	10-yr	550.00	644.46	651.15	649.16	651.48	0.003532	4.95	144.71	62.75	0.38
Walker Run	1	-30	50-yr	1320.00	644.46	652.30	651.23	653.34	0.009101	9.06	198.30	187.62	0.63
Walker Run	1	-78	100 yr	1860.00	645.43	652.96		653.12	0.002643	4.76	831.07	309.34	0.35
Walker Run	1	-78	100 yr encroachm	1860.00	645.43	653.92		654.10	0.001984	4.57	713.35	147.00	0.31
Walker Run	1	-78	500 yr	3600.00	645.43	654.43		654.64	0.002923	5.82	1280.59	314.50	0.38
Walker Run	1	-78	10-yr	550.00	645.43	651.11		651.21	0.001979	3.20	316.39	200.24	0.28
Walker Run	1	-78	50-yr	1320.00	645.43	652.38		652.53	0.002413	4.25	655.02	303.74	0.33
Walker Run	1	-154	100 yr	1860.00	644.90	652.70		652.89	0.003359	5.45	715.54	212.18	0.37
Walker Run	1	-154	100 yr encroachm	1860.00	644.90	653.68		653.91	0.002922	5.56	621.98	125.27	0.35
Walker Run	1	-154	500 yr	3600.00	644.90	654.04		654.38	0.004626	7.21	1004.66	218.08	0.45
Walker Run	1	-154	10-yr	550.00	644.90	650.97		651.06	0.001902	3.37	361.19	196.50	0.26
Walker Run	1	-154	50-yr	1320.00	644.90	652.19		652.33	0.002704	4.64	607.30	207.53	0.33
Walker Run	1	-255	100 yr	1860.00	645.74	652.54	650.73	652.63	0.002892	4.78	894.50	286.08	0.35
Walker Run	1	-255	100 yr encroachm	1860.00	645.74	653.54	651.02	653.64	0.003170	3.76	736.35	165.00	0.25
Walker Run	1	-255	500 yr	3600.00	645.74	653.85	651.43	654.00	0.003642	6.13	1284.40	309.20	0.40
Walker Run	1	-255	10-yr	550.00	645.74	650.85	649.92	650.90	0.002179	3.30	436.23	256.25	0.29
Walker Run	1	-255	50-yr	1320.00	645.74	652.05	650.46	652.12	0.002417	4.12	756.44	277.43	0.31
Tributary	1	6850	100 yr	300.00	709.19	712.52	711.94	712.77	0.015944	4.07	75.34	49.89	0.47
Tributary	1	6850	100 yr encroachm	300.00	709.19	713.41		713.67	0.013347	4.08	73.55	22.87	0.40
Tributary	1	6850	500 yr	606.00	709.19	713.28	712.70	713.70	0.017491	5.15	117.26	58.92	0.52
Tributary	1	6850	10-yr	84.00	709.19	711.59		711.67	0.011452	2.45	35.54	34.70	0.37
Tributary	1	6850	50-yr	213.00	709.19	712.24	711.64	712.43	0.014270	3.54	62.07	45.58	0.44
Tributary	1	6361	100 yr	300.00	695.20	700.31	700.31	700.99	0.043607	7.04	46.38	32.43	0.71
Tributary	1	6361	100 yr encroachm	300.00	695.20	700.43	700.43	701.44	0.066815	8.25	37.45	18.18	0.80
Tributary	1	6361	500 yr	606.00	695.20	701.21	701.21	702.04	0.037067	7.70	83.09	50.21	0.68
Tributary	1	6361	10-yr	84.00	695.20	698.33	698.33	699.07	0.113477	6.86	12.24	8.37	1.00
Tributary	1	6361	50-yr	213.00	695.20	699.83	699.83	700.54	0.054318	7.00	32.89	23.87	0.77
Tributary	1	5930	100 yr	300.00	692.00	695.48		695.54	0.002368	1.90	154.46	105.46	0.19
Tributary	1	5930	100 yr encroachm	300.00	692.00	696.45		696.55	0.002007	2.09	121.46	37.00	0.18
Tributary	1	5930	500 yr	606.00	692.00	696.19		696.30	0.002826	2.37	235.56	120.79	0.21
Tributary	1	5930	10-yr	84.00	692.00	694.49	693.72	694.52	0.002139	1.42	64.11	72.76	0.17
Tributary	1	5930	50-yr	213.00	692.00	695.17	694.18	695.21	0.002326	1.76	122.83	98.23	0.18
Tributary	1	5500	100 yr	300.00	691.00	692.03	692.03	692.51	0.088747	5.58	54.10	56.46	0.98
Tributary	1	5500	100 yr encroachm	300.00	691.00	692.91	692.91	693.87	0.095138	7.85	38.21	20.00	1.00
Tributary	1	5500	500 yr	606.00	691.00	693.18		693.57	0.025311	4.94	122.22	61.93	0.59
Tributary	1	5500	10-yr	84.00	691.00	691.45	691.45	691.67	0.124231	3.75	22.41	51.87	1.00
Tributary	1	5500	50-yr	213.00	691.00	691.83	691.83	692.22	0.097457	5.03	42.58	54.90	0.98
Tributary	1	4750	100 yr	300.00	684.00	686.27		686.31	0.002741	1.51	199.39	105.15	0.19
Tributary	1	4750	100 yr encroachm	300.00	684.00	687.22		687.26	0.001696	1.56	191.95	60.00	0.15
Tributary	1	4750	500 yr	606.00	684.00	686.88		686.97	0.004422	2.30	265.43	110.81	0.25
Tributary	1	4750	10-yr	84.00	684.00	686.05		686.05	0.000322	0.48	176.32	103.09	0.06
Tributary	1	4750	50-yr	213.00	684.00	686.16		686.18	0.001693	1.14	187.42	104.08	0.15
Tributary	1	4530	100 yr	300.00	684.00	686.03	686.03	686.04	0.000644	0.72	414.95	219.51	0.09
Tributary	1	4530	100 yr encroachm	300.00	684.00	686.86	686.03	686.89	0.001547	1.40	214.20	75.00	0.15
Tributary	1	4530	500 yr	606.00	684.00	686.39	686.03	686.41	0.001468	1.23	495.11	223.27	0.14
Tributary	1	4530	10-yr	84.00	684.00	686.03	685.83	686.03	0.000050	0.20	415.50	219.53	0.03
Tributary	1	4530	50-yr	213.00	684.00	686.03	686.03	686.03	0.000325	0.51	414.95	219.51	0.07
Tributary	1	4528	Culvert										
Tributary	1	4500	100 yr	300.00	683.30	684.79	684.79	685.51	0.076821	6.56	44.75	145.99	0.96
Tributary	1	4500	100 yr encroachm	300.00	683.30	685.10	685.10	685.98	0.092363	7.49	40.04	22.79	1.00
Tributary	1	4500	500 yr	606.00	683.30	685.00	685.00	685.12	0.003934	1.63	226.99	148.77	0.22
Tributary	1	4500	10-yr	84.00	683.30	683.97	683.97	684.28	0.108219	4.43	18.88	123.12	0.99
Tributary	1	4500	50-yr	213.00	683.30	684.49	684.49	685.07	0.085122	5.92	35.37	143.27	0.98

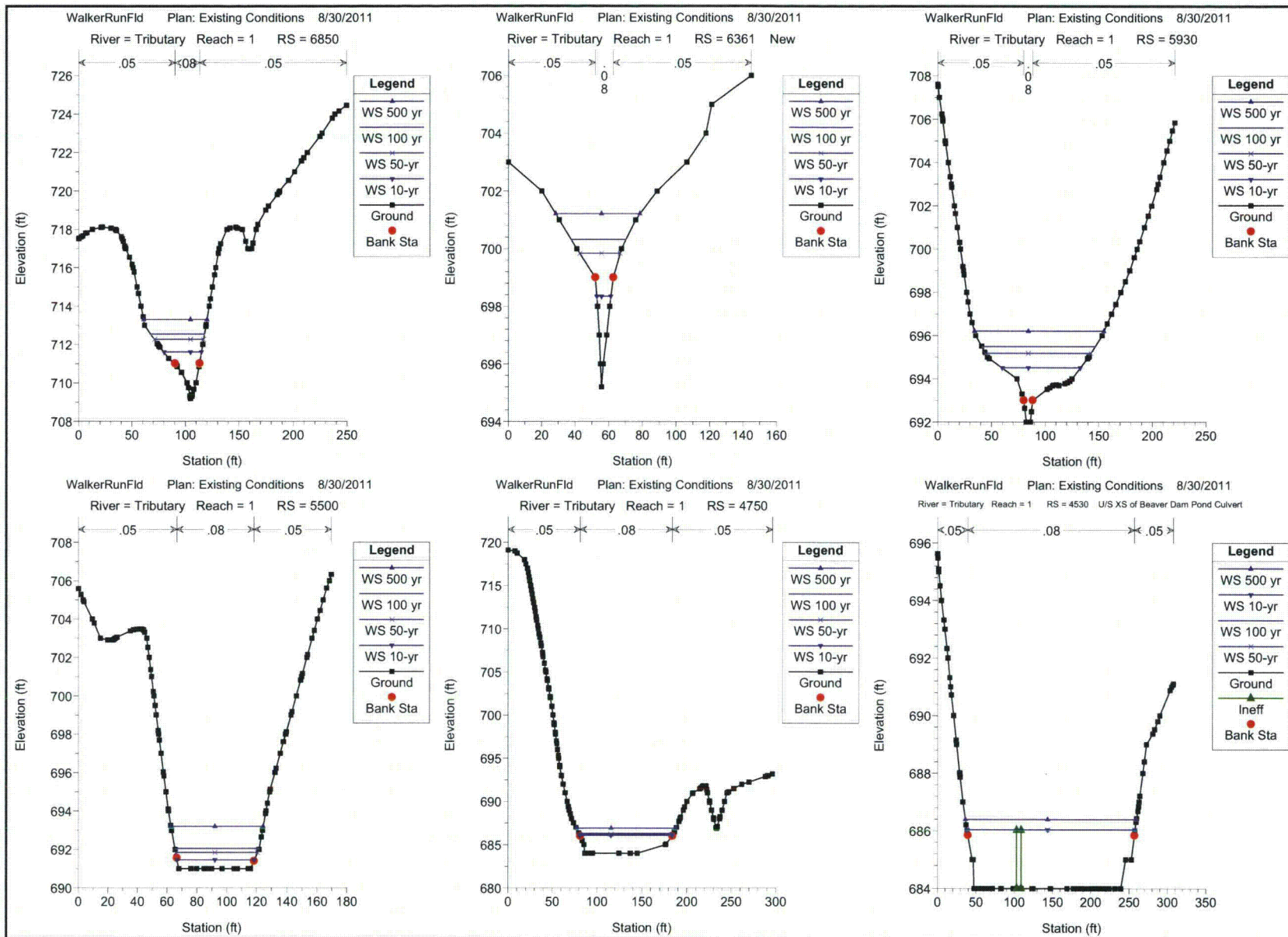
HEC-RAS Plan: LSI Existing (Continued)

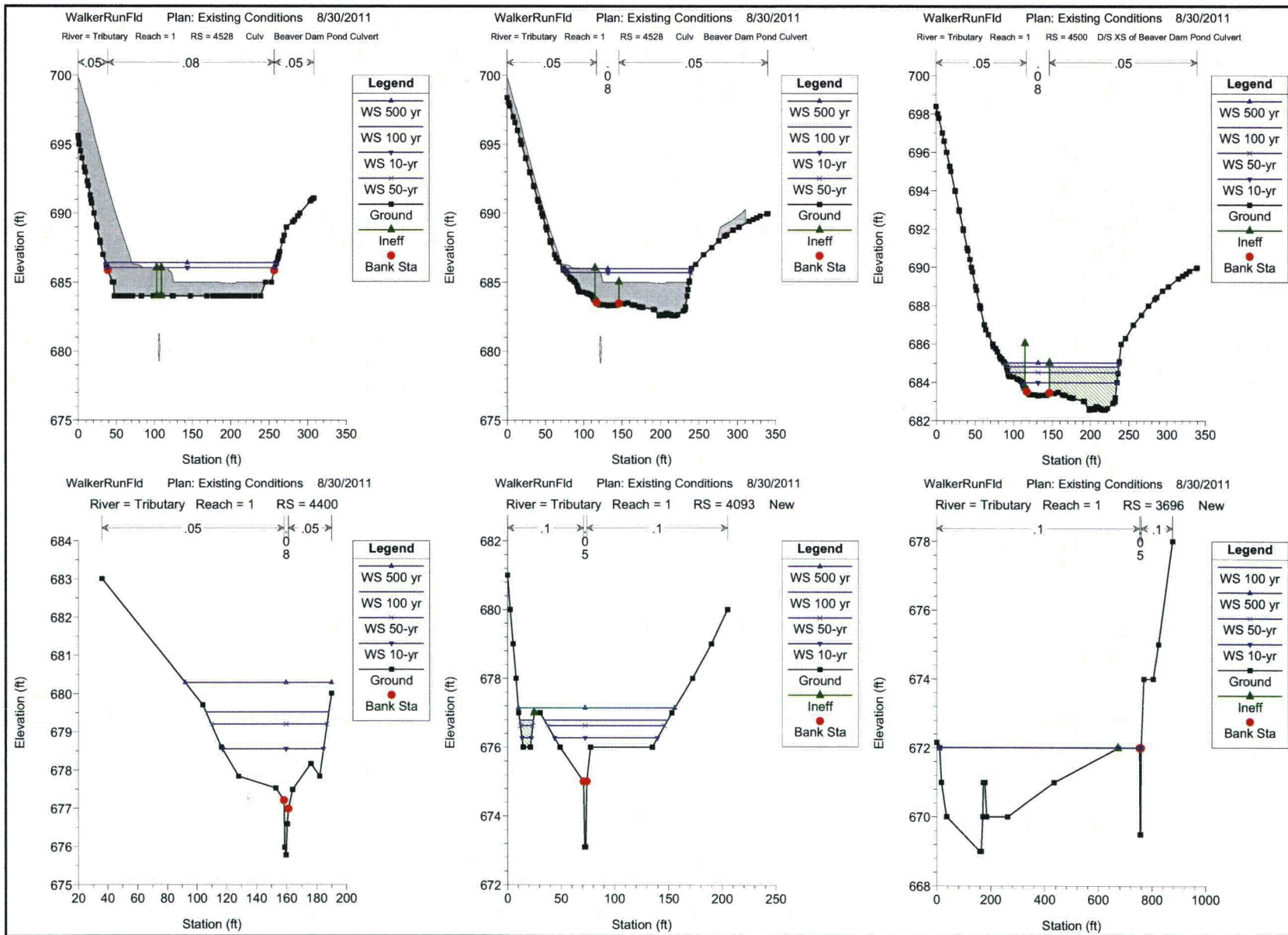
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Tributary	1	4400	100 yr	300.00	675.78	679.51		679.60	0.003404	1.84	126.60	81.92	0.18
Tributary	1	4400	100 yr encroachment	300.00	675.78	680.31		680.40	0.002070	1.66	124.48	45.00	0.15
Tributary	1	4400	500 yr	606.00	675.78	680.29		680.44	0.003779	2.24	195.97	97.88	0.20
Tributary	1	4400	10-yr	84.00	675.78	678.55		678.59	0.003503	1.47	54.62	67.28	0.17
Tributary	1	4400	50-yr	213.00	675.78	679.20		679.26	0.003369	1.71	101.40	77.18	0.18
Tributary	1	4093	100 yr	300.00	673.10	676.78	676.78	677.10	0.034829	7.98	97.48	127.18	0.81
Tributary	1	4093	100 yr encroachment	300.00	673.10	677.62	677.62	678.47	0.043242	10.46	54.66	26.83	0.93
Tributary	1	4093	500 yr	606.00	673.10	677.14	677.14	677.55	0.046087	9.89	154.16	145.51	0.94
Tributary	1	4093	10-yr	84.00	673.10	676.27	676.27	676.46	0.017947	5.06	43.63	104.52	0.56
Tributary	1	4093	50-yr	213.00	673.10	676.62	676.62	676.90	0.029220	7.05	79.89	120.21	0.73
Tributary	1	3696	100 yr	300.00	669.50	672.01	672.01	672.01	0.000215	0.49	935.25	749.55	0.07
Tributary	1	3696	100 yr encroachment	300.00	669.50	672.76	672.04	672.78	0.002077	1.85	378.44	325.50	0.21
Tributary	1	3696	500 yr	606.00	669.50	672.01	672.01	672.01	0.000878	0.99	935.25	749.55	0.14
Tributary	1	3696	10-yr	84.00	669.50	672.00	672.00	672.00	0.000017	0.14	929.67	749.00	0.02
Tributary	1	3696	50-yr	213.00	669.50	672.01	672.01	672.01	0.000108	0.35	935.25	749.55	0.05
Tributary	1	3356	100 yr	300.00	667.67	670.65	670.46	670.70	0.005936	3.59	313.07	530.72	0.41
Tributary	1	3356	100 yr encroachment	300.00	667.67	671.62	671.21	671.71	0.005208	4.21	206.93	180.88	0.41
Tributary	1	3356	500 yr	606.00	667.67	671.02	670.64	671.06	0.005811	3.91	523.43	615.35	0.42
Tributary	1	3356	10-yr	84.00	667.67	670.24	670.22	670.31	0.005683	3.09	114.12	439.25	0.39
Tributary	1	3356	50-yr	213.00	667.67	670.53	670.36	670.57	0.005643	3.37	247.58	500.61	0.40
Tributary	1	3162	100 yr	300.00	666.50	668.28		668.32	0.008264	3.65	228.46	273.98	0.50
Tributary	1	3162	100 yr encroachment	300.00	666.50	669.07		669.21	0.012285	4.49	106.51	50.07	0.51
Tributary	1	3162	500 yr	606.00	666.50	668.83		668.88	0.006738	3.99	385.87	297.24	0.47
Tributary	1	3162	10-yr	84.00	666.50	667.64		667.68	0.013744	3.39	73.54	181.40	0.60
Tributary	1	3162	50-yr	213.00	666.50	668.07		668.11	0.009806	3.63	172.48	265.22	0.53
Tributary	1	3060	100 yr	300.00	666.00	667.68		667.70	0.004024	2.17	250.63	219.64	0.34
Tributary	1	3060	100 yr encroachment	300.00	666.00	668.56		668.62	0.002870	2.62	186.00	85.00	0.32
Tributary	1	3060	500 yr	606.00	666.00	668.20		668.25	0.004955	3.04	370.12	234.02	0.40
Tributary	1	3060	10-yr	84.00	666.00	667.03		667.04	0.003166	1.18	115.72	199.33	0.27
Tributary	1	3060	50-yr	213.00	666.00	667.48		667.50	0.003617	1.83	207.42	213.48	0.32
Tributary	1	2834	100 yr	300.00	664.89	665.98		666.06	0.029018	4.12	141.17	216.22	0.82
Tributary	1	2834	100 yr encroachment	300.00	664.89	666.60	666.60	667.08	0.061996	8.79	68.50	65.00	1.31
Tributary	1	2834	500 yr	606.00	664.89	666.47		666.57	0.020102	4.70	254.28	243.83	0.73
Tributary	1	2834	10-yr	84.00	664.89	665.47		665.53	0.042863	3.38	49.22	141.59	0.91
Tributary	1	2834	50-yr	213.00	664.89	665.78		665.86	0.038225	4.12	100.56	191.12	0.91
Tributary	1	2326	100 yr	300.00	659.90	663.12		663.15	0.002102	2.55	306.30	224.32	0.27
Tributary	1	2326	100 yr encroachment	300.00	659.90	664.00		664.03	0.001279	2.39	277.28	110.59	0.22
Tributary	1	2326	500 yr	606.00	659.90	663.94		663.98	0.002004	2.96	512.59	286.89	0.27
Tributary	1	2326	10-yr	84.00	659.90	662.22		662.24	0.002220	2.02	120.41	186.73	0.26
Tributary	1	2326	50-yr	213.00	659.90	662.84		662.86	0.002035	2.34	243.84	212.43	0.26
Tributary	1	1658	100 yr	300.00	657.96	661.63		661.68	0.002271	2.92	260.14	197.54	0.29
Tributary	1	1658	100 yr encroachment	300.00	657.96	662.18		662.41	0.005808	4.61	95.17	32.56	0.42
Tributary	1	1658	500 yr	606.00	657.96	662.39		662.46	0.002535	3.57	417.46	210.42	0.32
Tributary	1	1658	10-yr	84.00	657.96	660.43		660.50	0.003065	2.48	70.19	108.34	0.31
Tributary	1	1658	50-yr	213.00	657.96	661.21		661.27	0.002771	2.93	179.81	176.21	0.31
Tributary	1	1360	100 yr	300.00	657.83	659.75	659.72	660.11	0.022194	5.60	89.72	125.06	0.82
Tributary	1	1360	100 yr encroachment	300.00	657.83	660.58	659.76	660.75	0.005260	3.70	113.17	59.98	0.43
Tributary	1	1360	500 yr	606.00	657.83	660.23	660.23	660.72	0.023295	6.97	162.48	168.75	0.89
Tributary	1	1360	10-yr	84.00	657.83	659.63	658.98	659.67	0.002517	1.78	76.10	113.22	0.27
Tributary	1	1360	50-yr	213.00	657.83	659.91	659.52	660.03	0.006952	3.36	110.78	140.98	0.47
Tributary	1	1281											
Tributary	1	1252	100 yr	300.00	656.64	659.55	658.71	659.56	0.001119	1.06	373.33	283.05	0.12
Tributary	1	1252	100 yr encroachment	300.00	656.64	660.31	658.89	660.45	0.006997	3.23	102.63	37.69	0.33
Tributary	1	1252	500 yr	606.00	656.64	659.59	659.25	659.63	0.004176	2.08	384.71	285.18	0.24
Tributary	1	1252	10-yr	84.00	656.64	658.60	658.08	658.65	0.007712	1.96	51.91	232.95	0.30
Tributary	1	1252	50-yr	213.00	656.64	659.16	658.51	659.27	0.010605	2.90	85.17	262.66	0.37
Tributary	1	1105	100 yr	300.00	655.65	658.41		658.44	0.004852	2.00	224.73	248.87	0.25
Tributary	1	1105	100 yr encroachment	300.00	655.65	659.27		659.40	0.007357	3.13	106.64	43.94	0.33
Tributary	1	1105	500 yr	606.00	655.65	658.89		658.94	0.005366	2.43	352.14	278.28	0.27
Tributary	1	1105	10-yr	84.00	655.65	657.78		657.80	0.004374	1.47	90.33	176.62	0.22
Tributary	1	1105	50-yr	213.00	655.65	658.21		658.24	0.004679	1.83	178.05	231.95	0.24
Tributary	1	810	100 yr	300.00	653.84	657.34		657.36	0.002846	1.65	338.11	491.45	0.19
Tributary	1	810	100 yr encroachment	300.00	653.84	658.16		658.20	0.002473	1.87	199.05	94.19	0.18
Tributary	1	810	500 yr	606.00	653.84	657.73		657.75	0.003102	1.90	540.98	556.09	0.20
Tributary	1	810	10-yr	84.00	653.84	656.87		656.89	0.002303	1.29	127.22	413.67	0.16
Tributary	1	810	50-yr	213.00	653.84	657.19		657.21	0.002708	1.55	267.14	466.72	0.18
Tributary	1	587	100 yr	300.00	653.78	656.09		656.15	0.013771	2.87	176.47	292.22	0.40
Tributary	1	587	100 yr encroachment	300.00	653.78	656.98		657.14	0.012100	3.61	94.73	45.89	0.40
Tributary	1	587	500 yr	606.00	653.78	656.51		656.57	0.010597	2.94	316.89	389.47	0.36
Tributary	1	587	10-yr	84.00	653.78	655.53		655.61	0.029817	3.16	44.72	153.45	0.55
Tributary	1	587	50-yr	213.00	653.78	656.91		655.97	0.016485	2.90	127.35	256.92	0.43
Tributary	1	463	100 yr	300.00	653.23	655.56		655.57	0.002215	1.08	364.03	449.37	0.16
Tributary	1	463	100 yr encroachment	300.00	653.23	656.48		656.51	0.002499	1.60	203.97	97.83	0.18
Tributary	1	463	500 yr	606.00	653.23	655.90		655.92	0.002977	1.45	537.25	551.44	0.19
Tributary	1	463	10-yr	84.00	653.23	655.08		655.09	0.001509	0.68	173.18	353.82	0.12

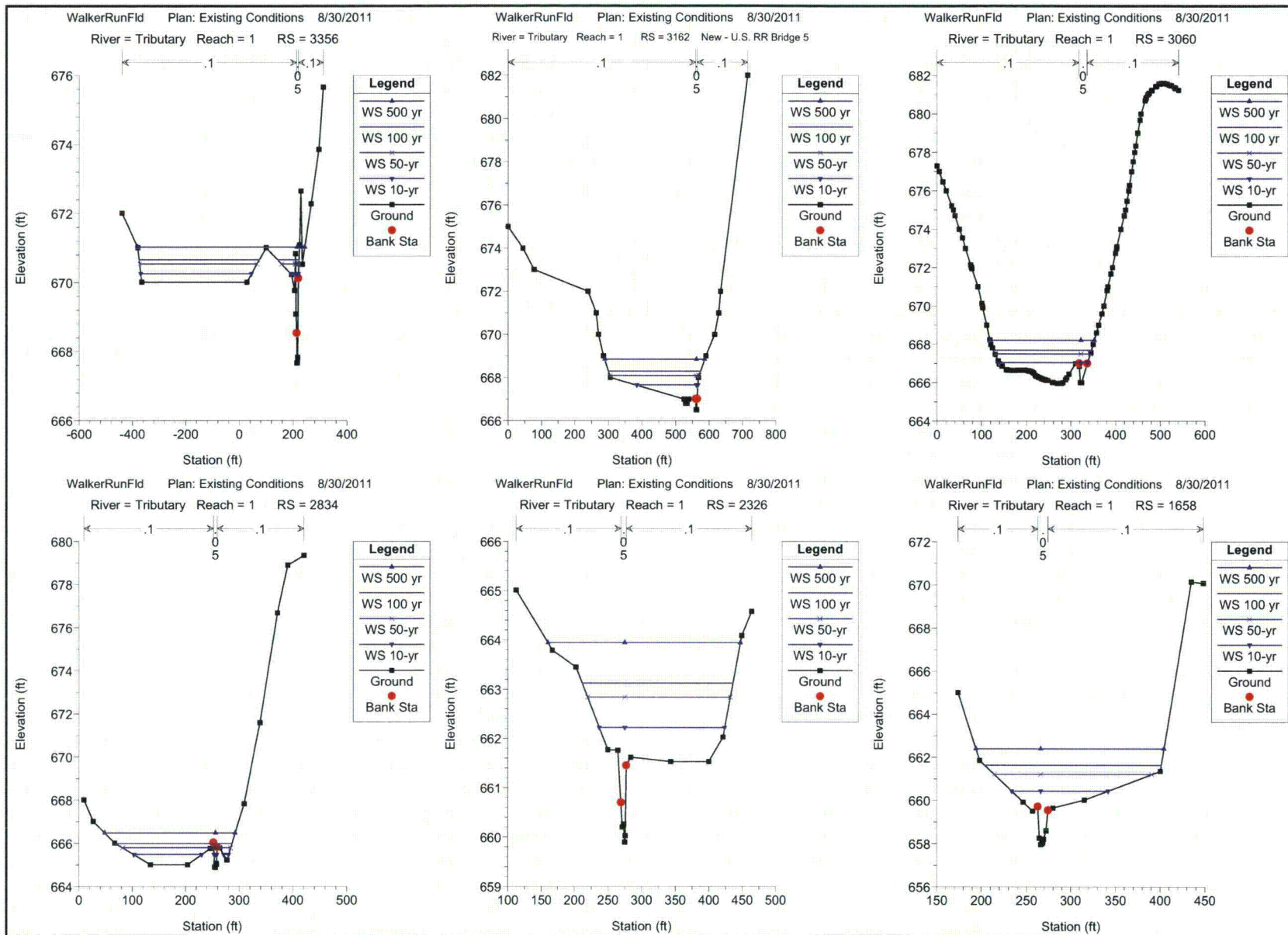


HEC-RAS Plan: LSI Existing (Continued)

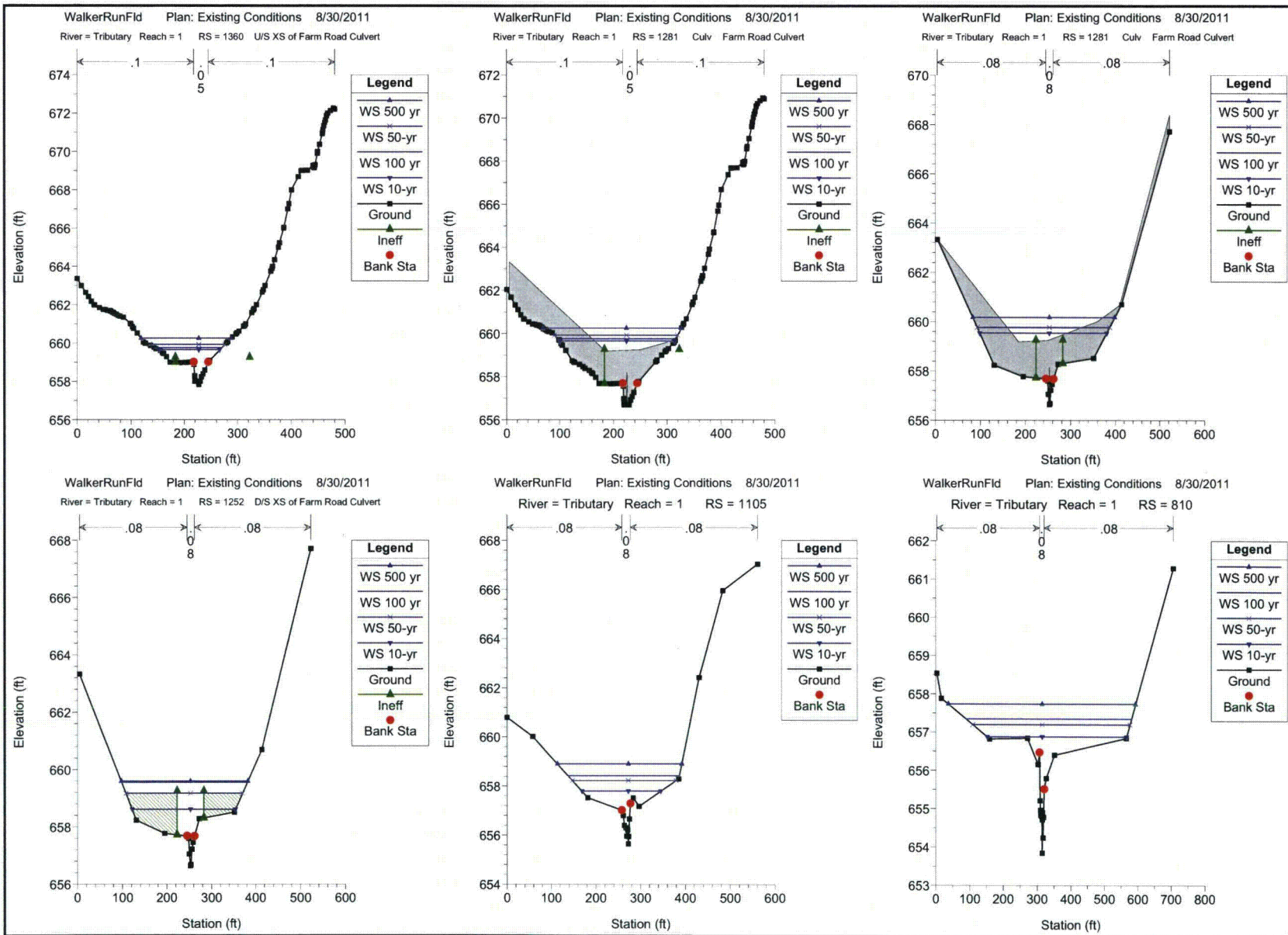
River	Reach	River Sta.	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Tributary	1	463	50-yr	213.00	653.23	655.42		655.43	0.001878	0.93	303.88	421.60	0.14
Tributary	1	357	100 yr	300.00	652.40	655.30		655.31	0.002783	1.62	417.22	911.63	0.19
Tributary	1	357	100 yr encroachment	300.00	652.40	656.18		656.22	0.003020	2.10	176.36	80.29	0.21
Tributary	1	357	500 yr	606.00	652.40	655.63		655.64	0.002402	1.85	735.35	1005.74	0.18
Tributary	1	357	10-yr	84.00	652.40	654.87		654.88	0.002718	1.40	119.64	287.22	0.18
Tributary	1	357	50-yr	213.00	652.40	655.17		655.18	0.002990	1.62	304.78	875.96	0.19
Tributary	1	183	100 yr	300.00	652.14	654.95	654.44	654.96	0.001501	1.05	524.13	843.07	0.14
Tributary	1	183	100 yr encroachment	300.00	652.14	655.94	654.74	655.95	0.000881	1.08	397.72	261.38	0.11
Tributary	1	183	500 yr	606.00	652.14	655.31	654.57	655.31	0.001501	1.18	844.08	953.12	0.14
Tributary	1	183	10-yr	84.00	652.14	654.52	654.22	654.52	0.001501	0.88	205.66	613.77	0.13
Tributary	1	183	50-yr	213.00	652.14	654.81	654.39	654.82	0.001502	1.00	410.02	775.59	0.14



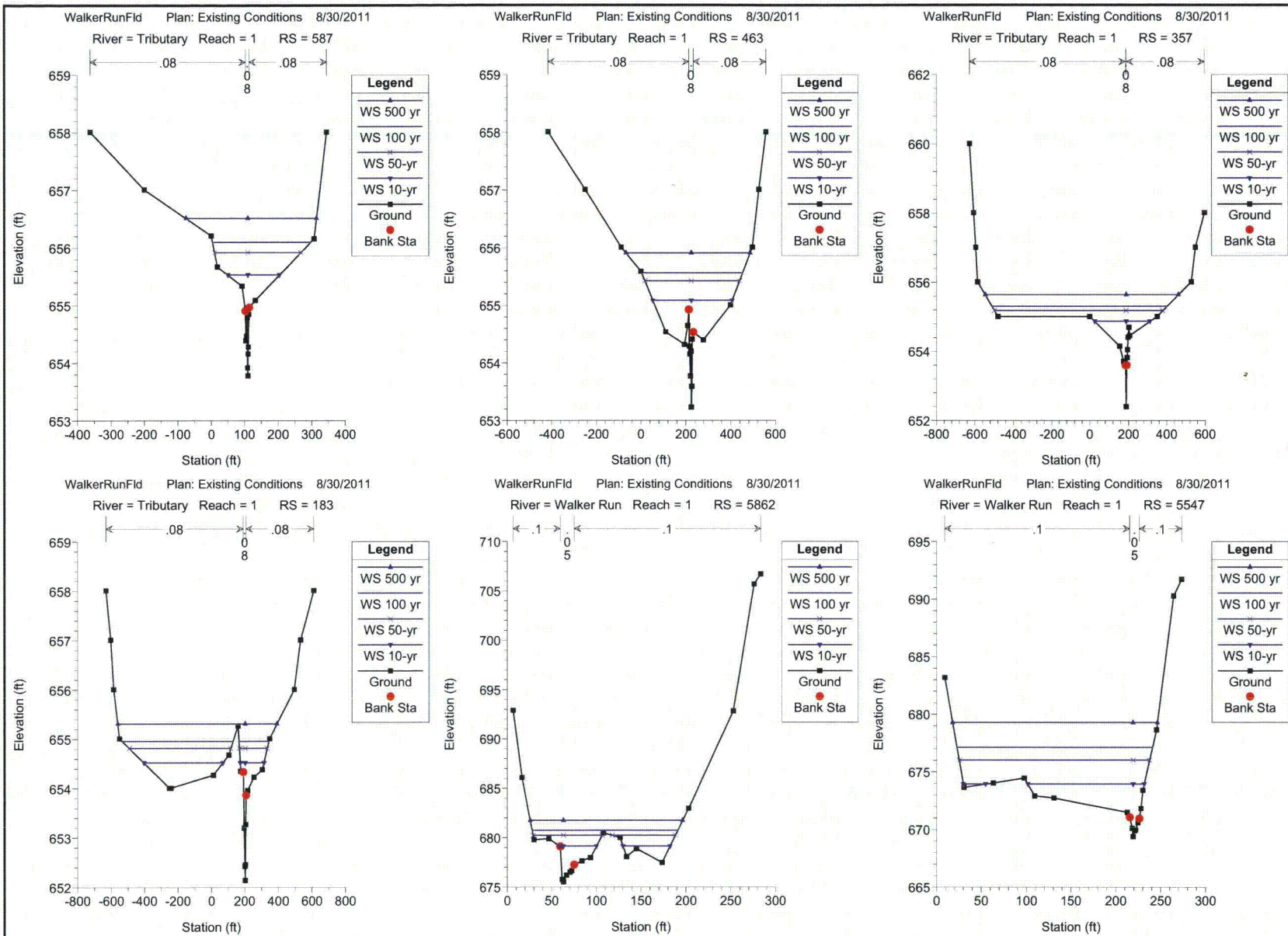


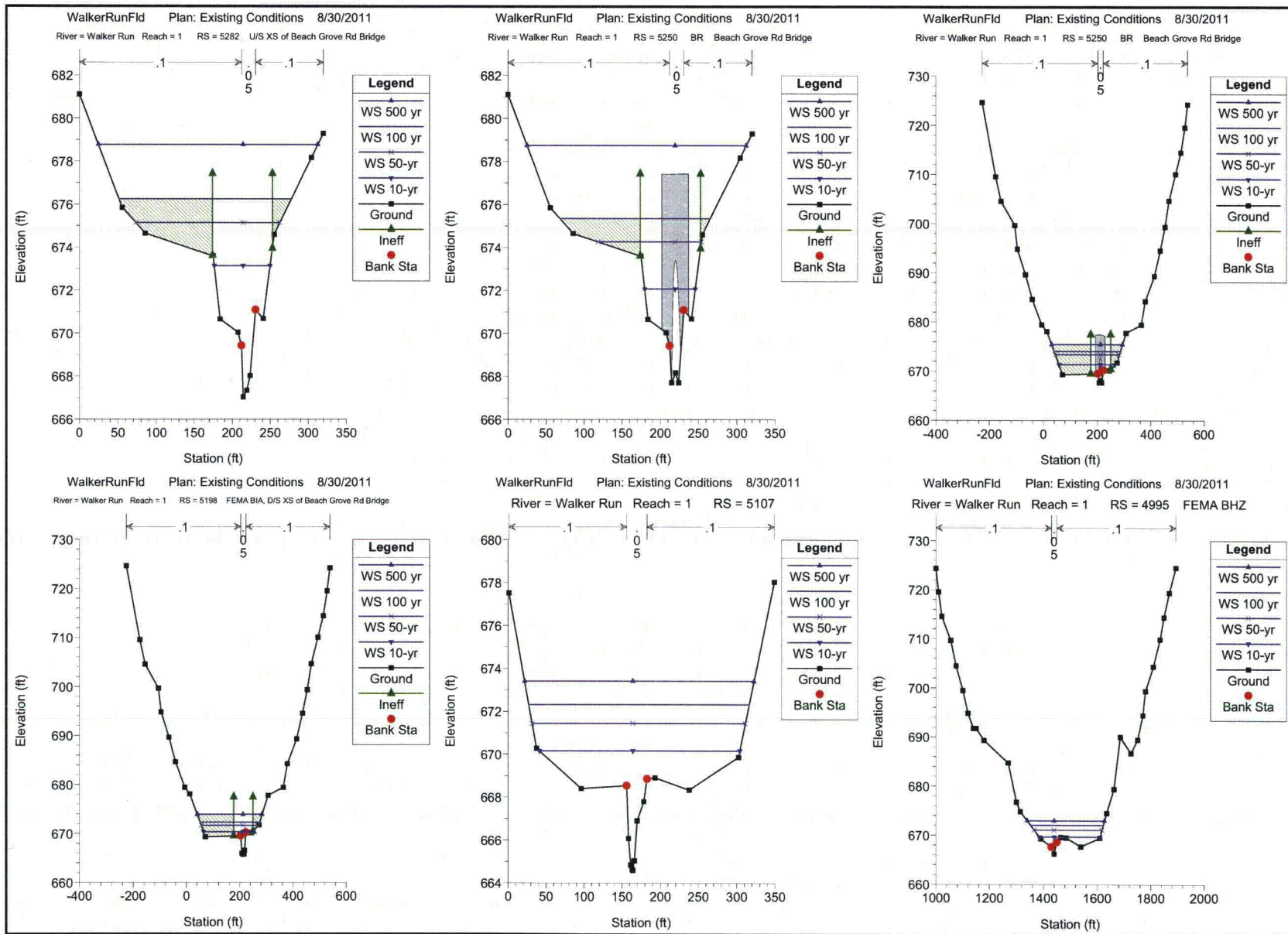


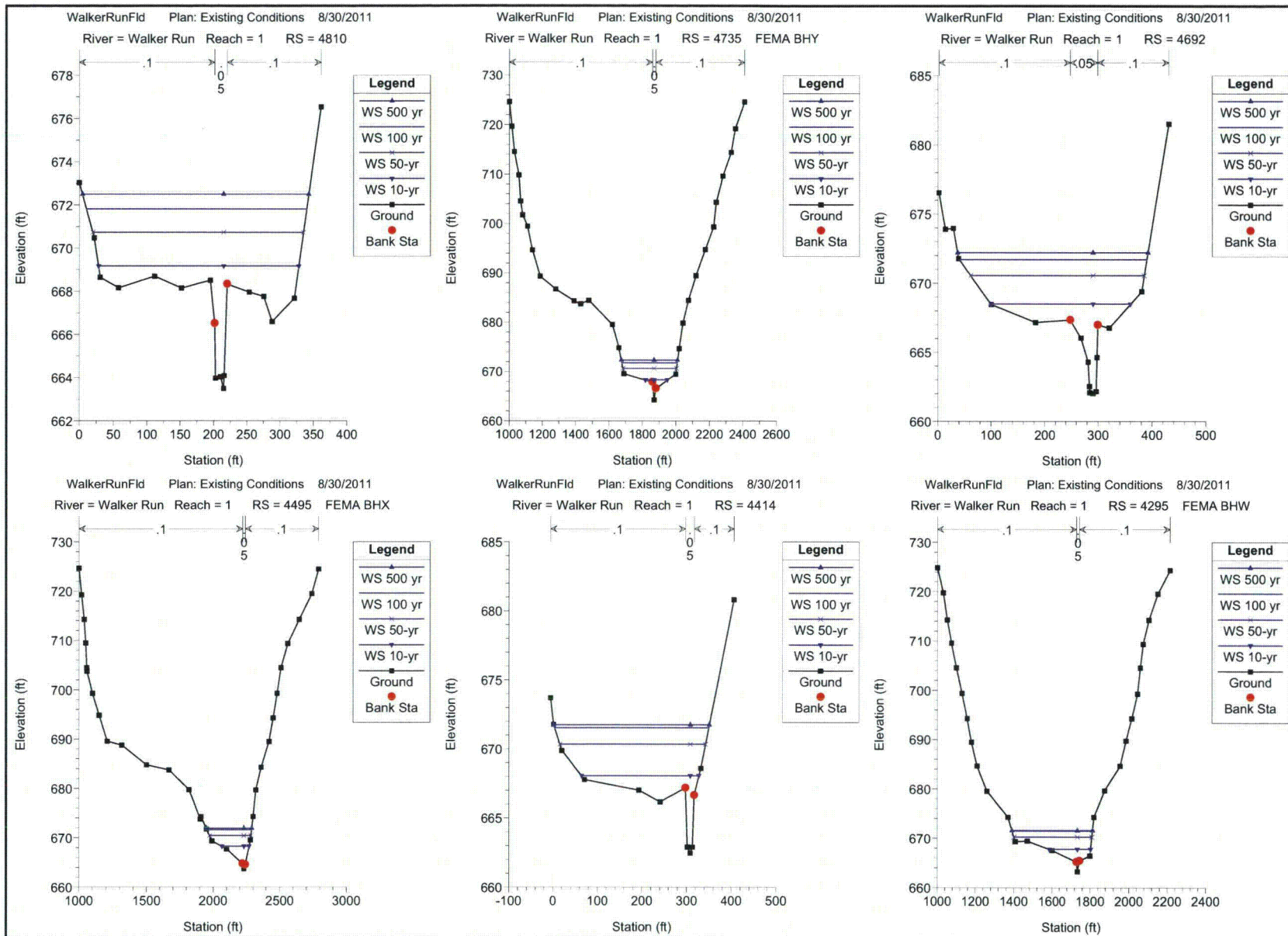




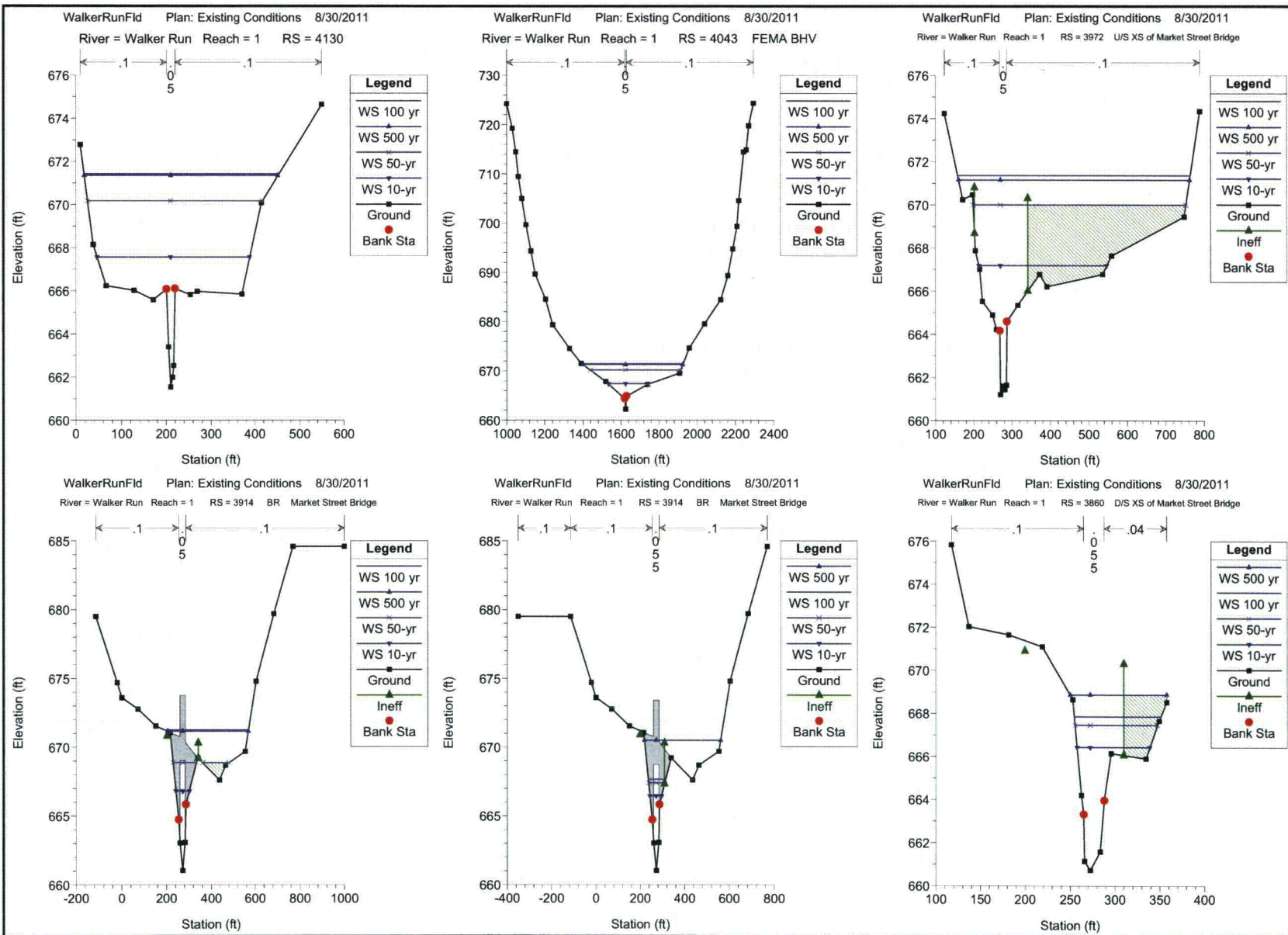


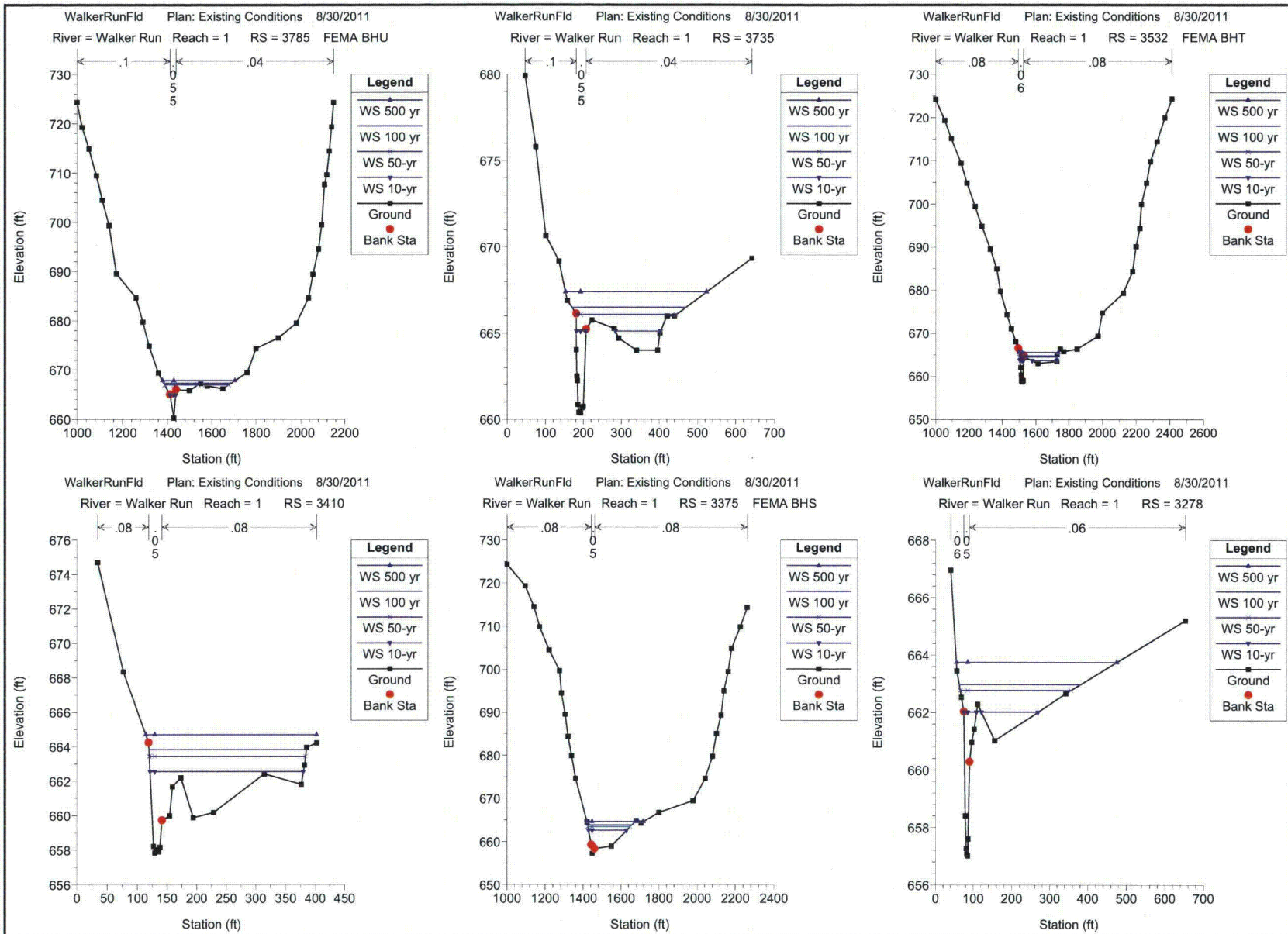




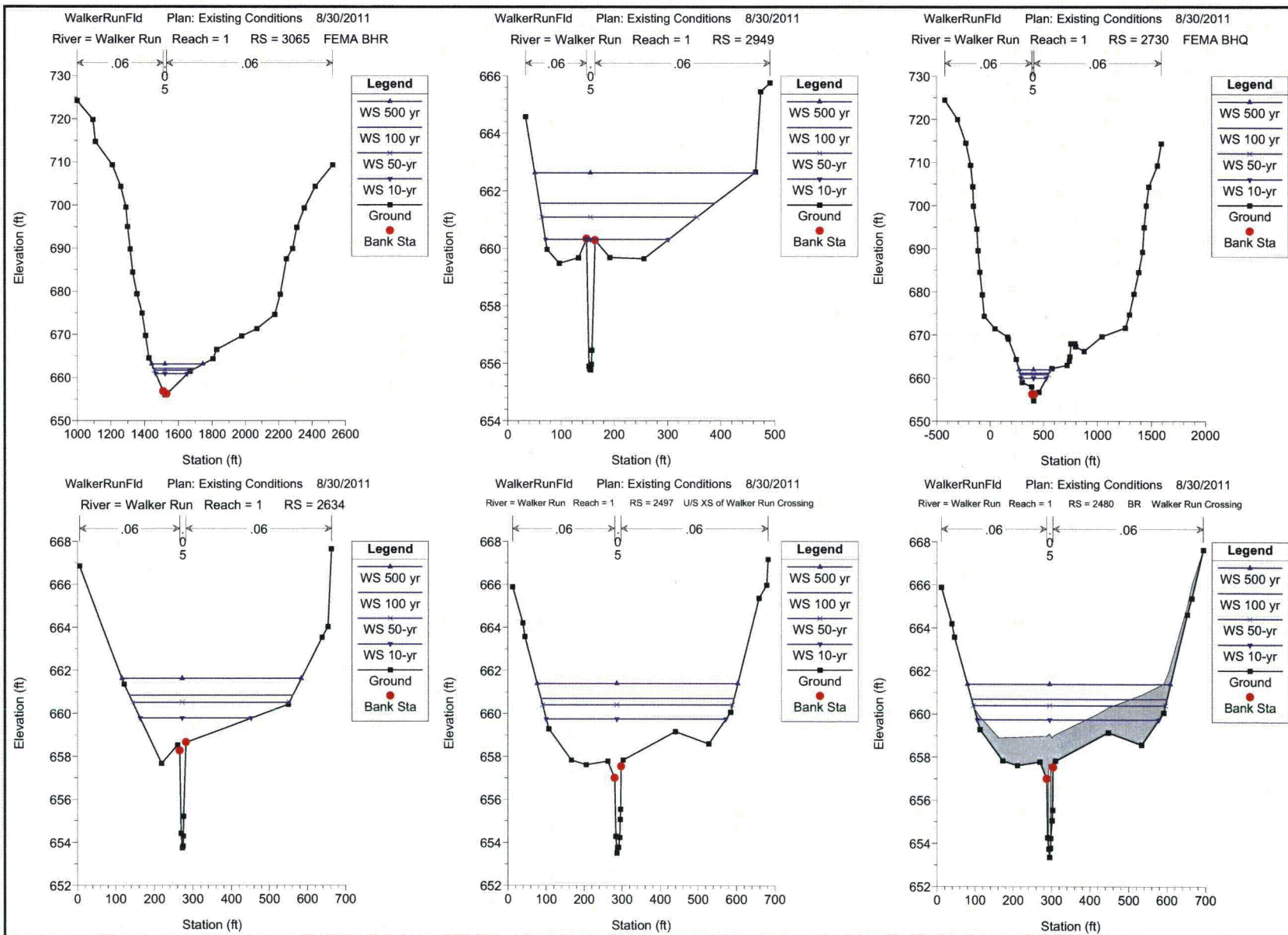




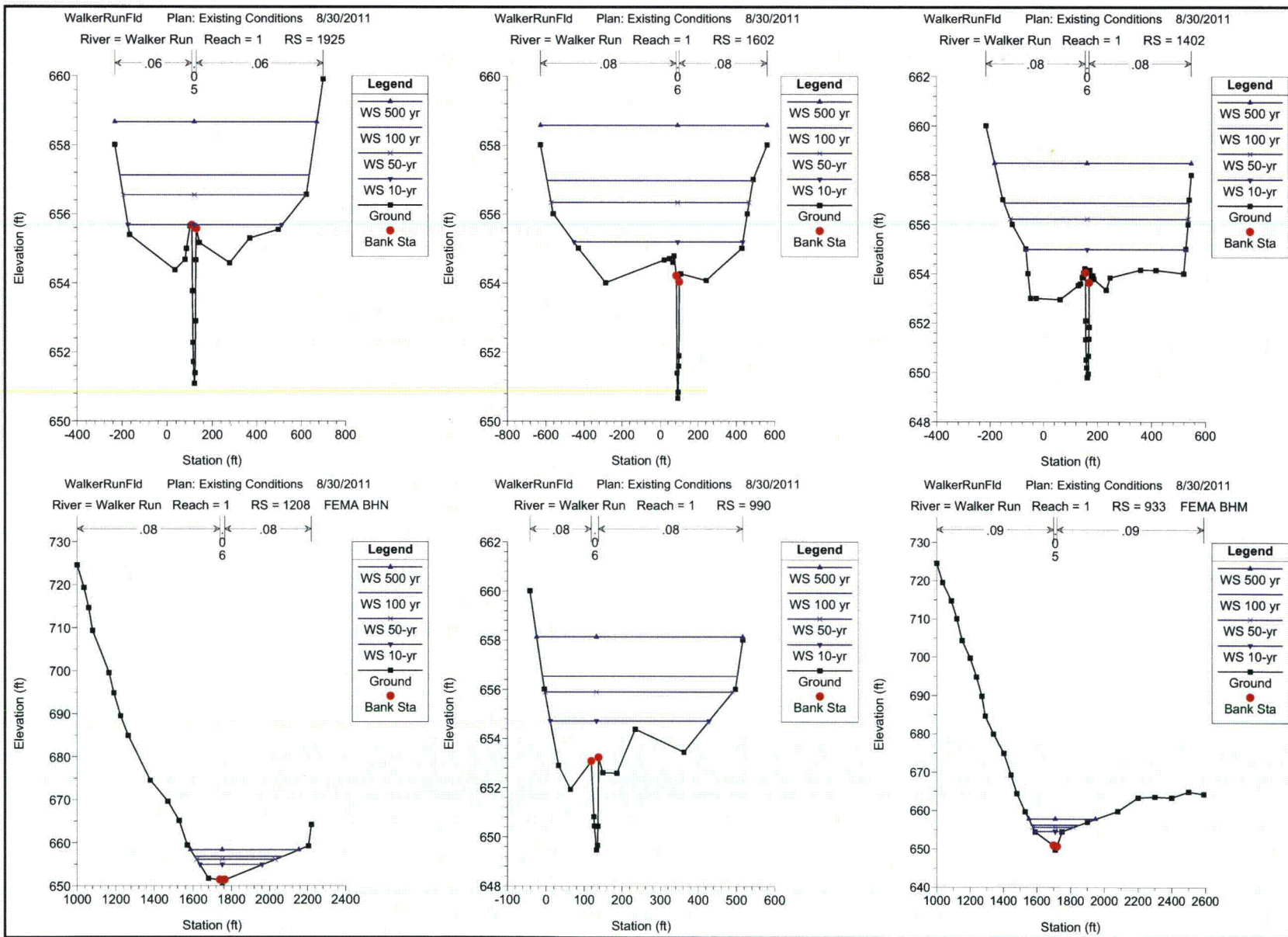




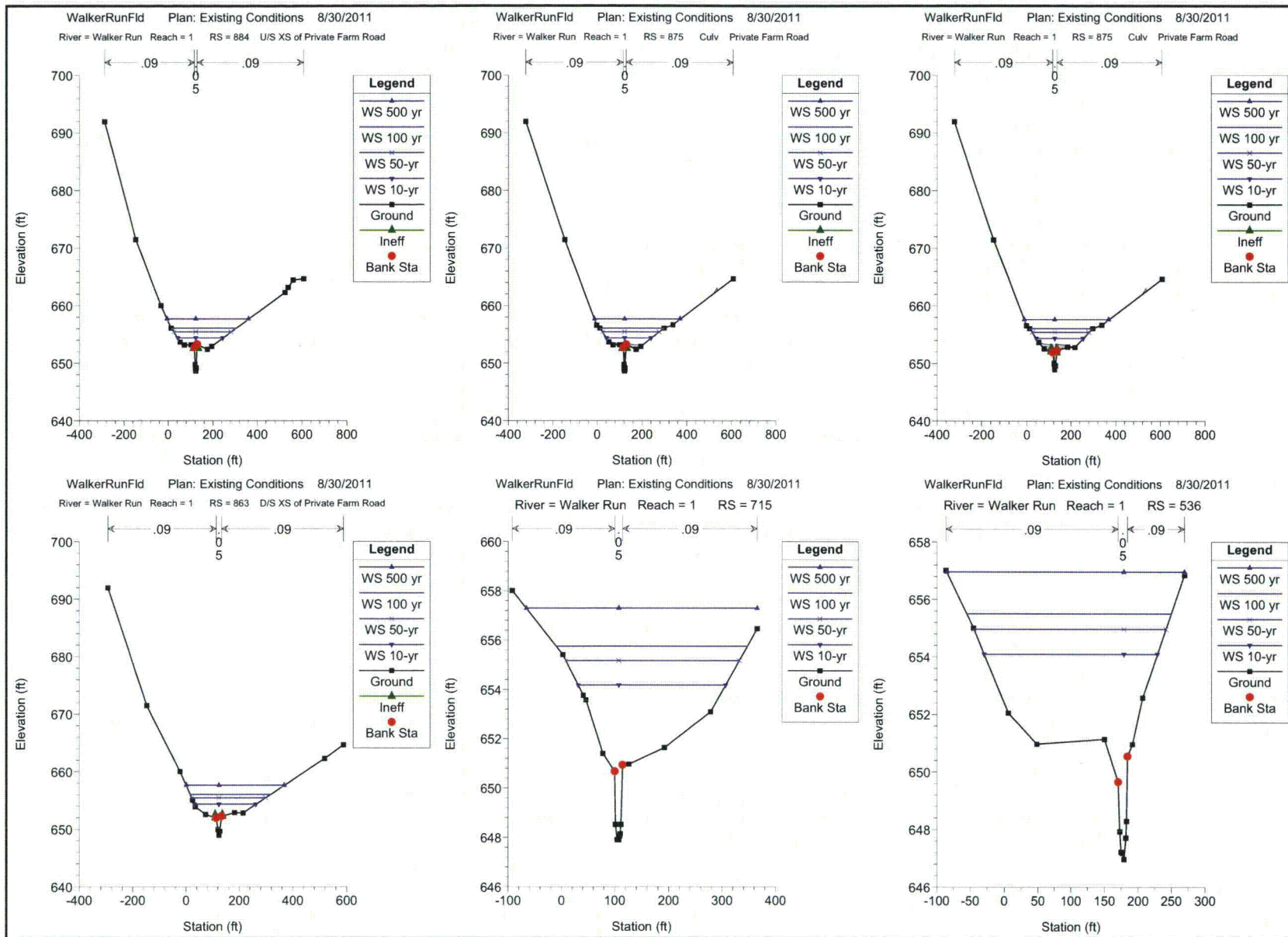


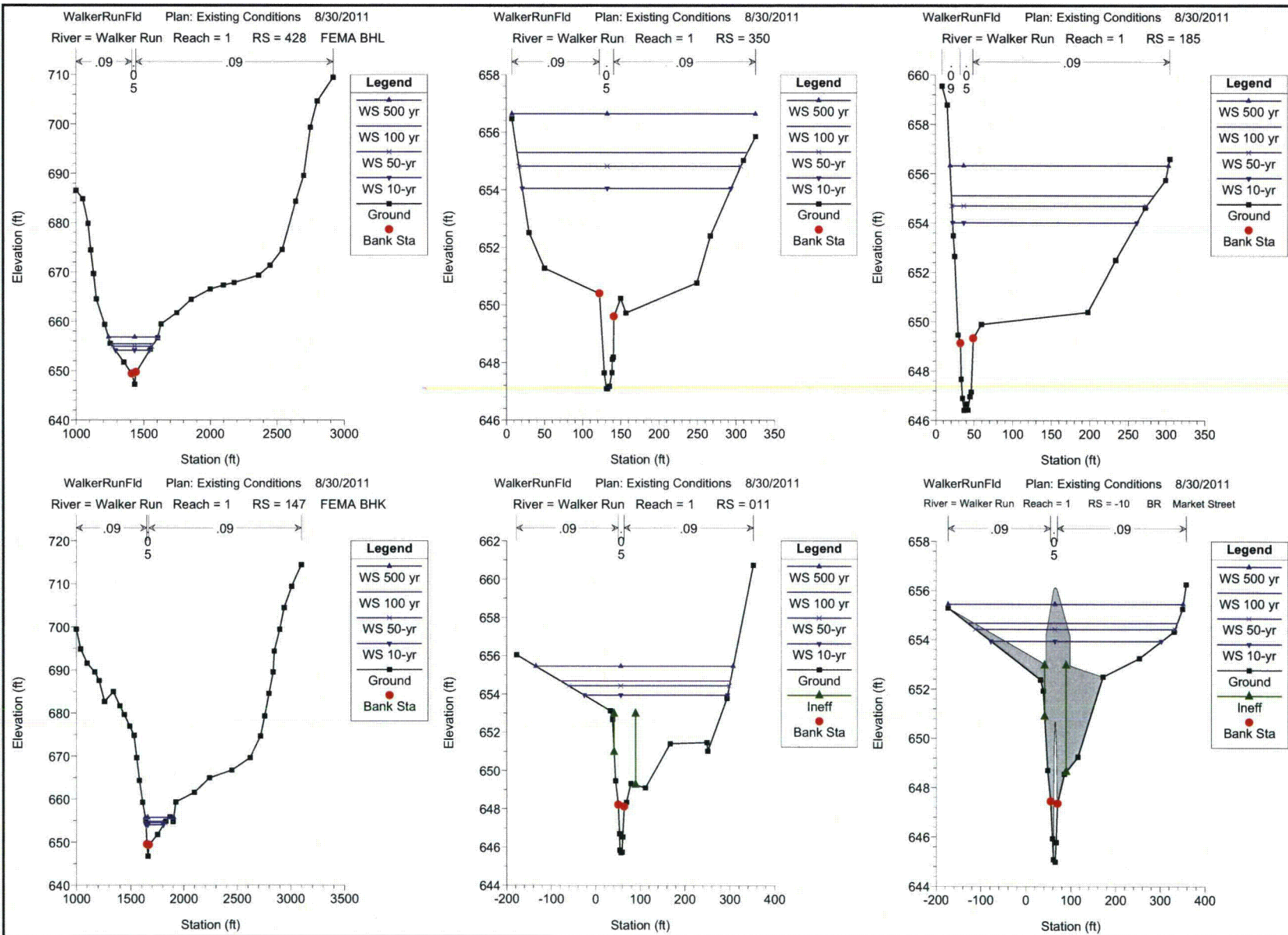




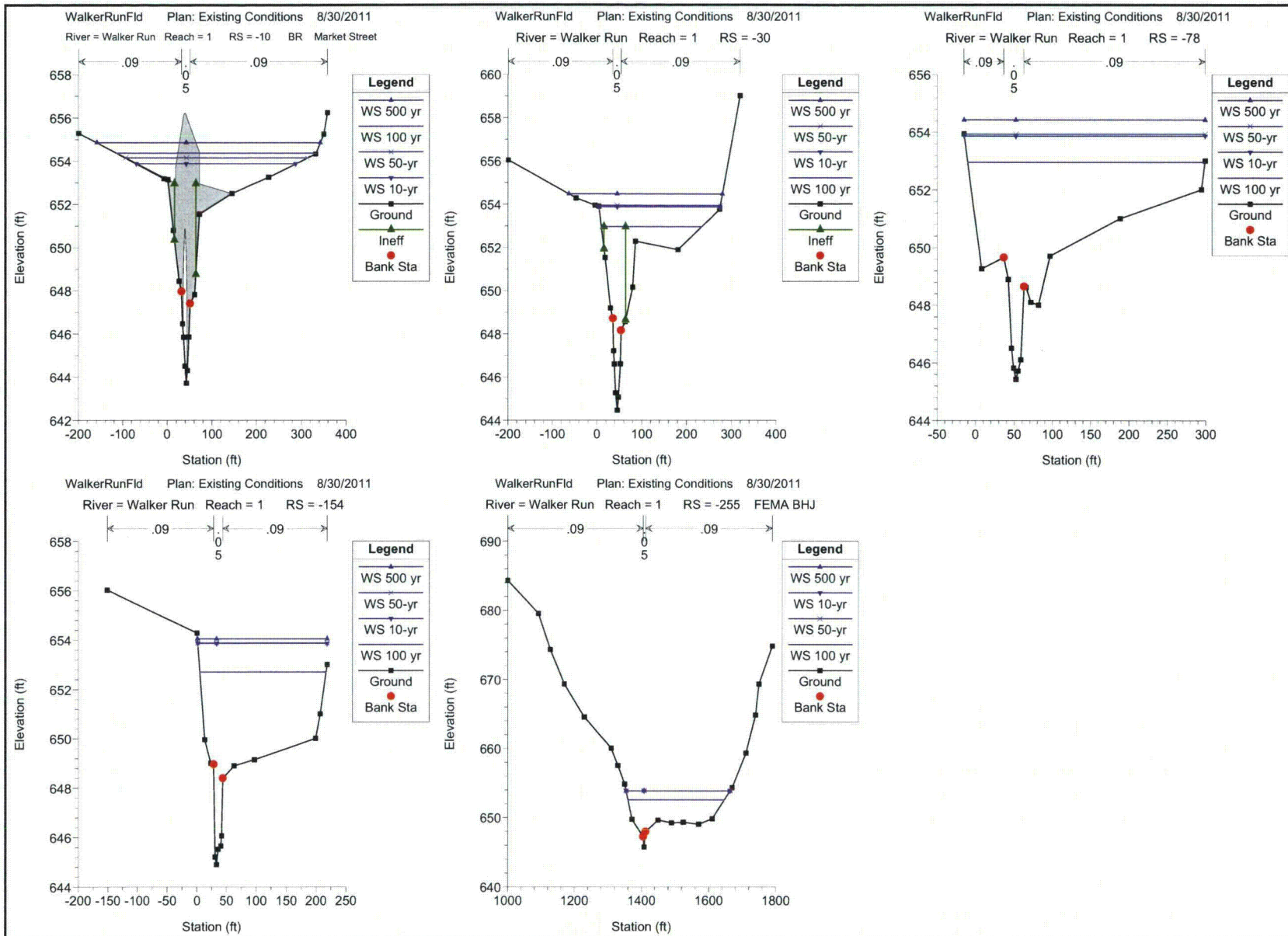


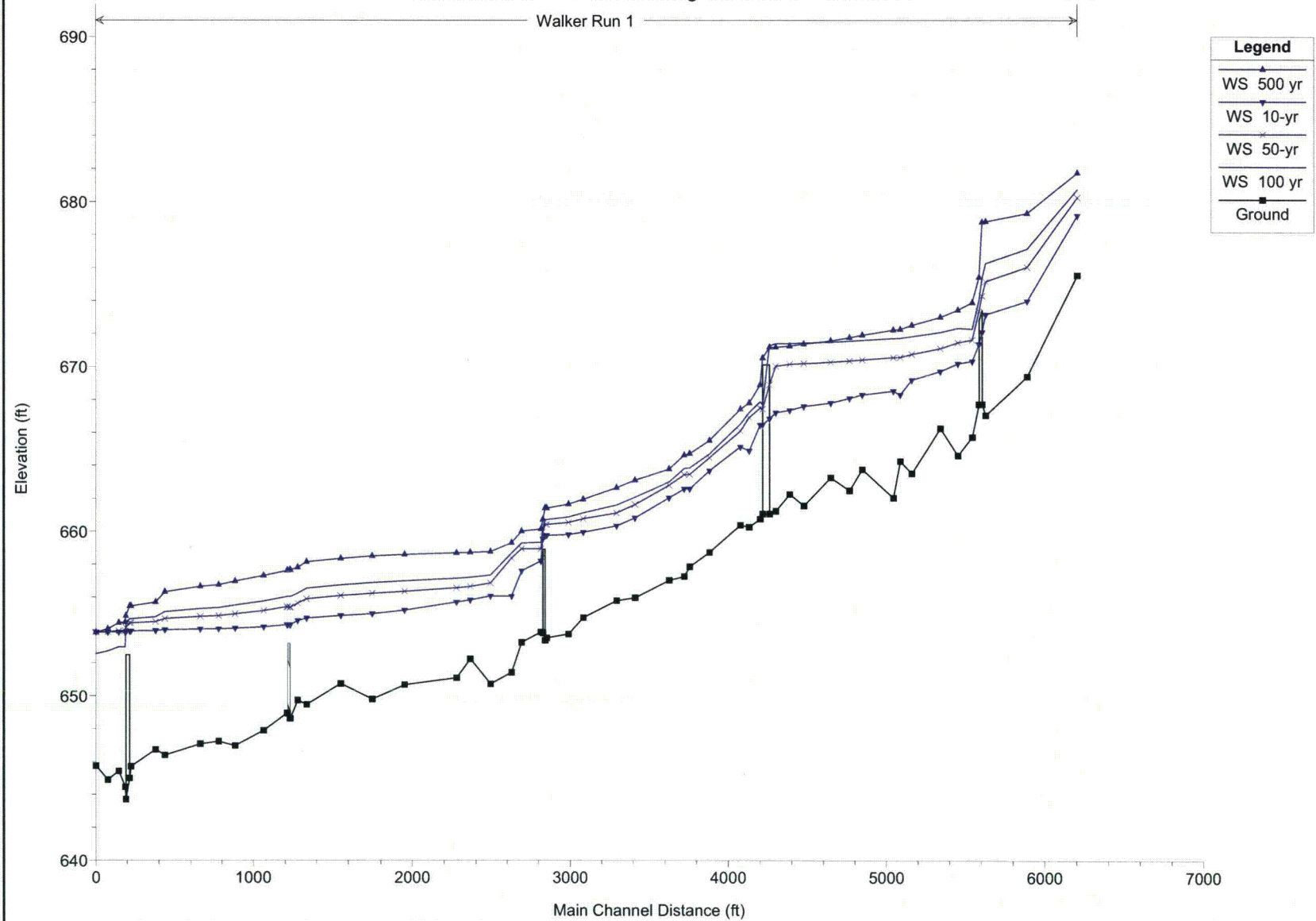






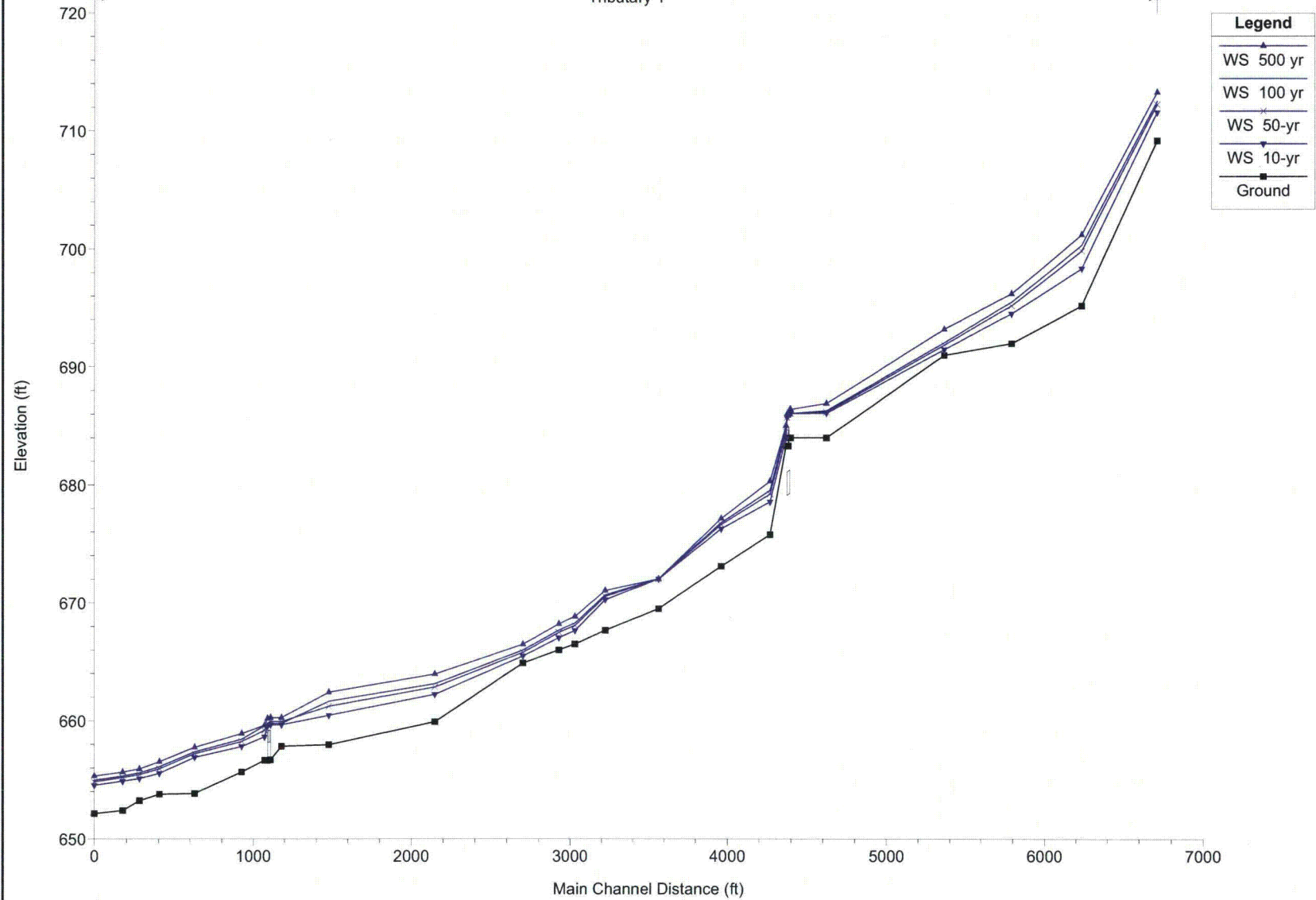






WalkerRunFld Plan: Existing Conditions 8/30/2011

Tributary 1



walkerRunFld.rep

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

```

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

```

PROJECT DATA

Project Title: walkerRunFld  
Project File : walkerRunFld.prj  
Run Date and Time: 9/1/2011 9:21:17 AM

Project in English units

PLAN DATA

Plan Title: Existing Conditions  
Plan File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.p05

Geometry Title: Existing Conditions  
Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.g04

Flow Title : Existing Conditions  
Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.f03

Plan Summary Information:

Number of:	Cross Sections =	75	Multiple Openings =	0
	Culverts =	3	Inline Structures =	0
	Bridges =	4	Lateral Structures =	0

Computational Information

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

Computation Options

Critical depth computed only where necessary  
Conveyance Calculation Method: Between every coordinate point (HEC2 Style)  
Friction Slope Method: Average Conveyance  
Computational Flow Regime: Subcritical Flow

walkerRunFld.rep

Encroachment Data

Equal Conveyance = True  
Left Offset = 0  
Right Offset = 0

River = Walker Run	Reach = 1	RS	Profile	Method	Value1	Value2
5862	100 yr encroachment	1	50	108.12		
5547	100 yr encroachment	1	160	226.17		
5282	100 yr encroachment	1	179	248		
5198	100 yr encroachment	1	176.89	249.89		
5107	100 yr encroachment	1	75	260		
4995	100 yr encroachment	1	1383	1520		
4810	100 yr encroachment	1	70.73	245.06		
4735	100 yr encroachment	1	1700.14	1990.13		
4692	100 yr encroachment	1	100.41	364.89		
4495	100 yr encroachment	1	2100	2265		
4414	100 yr encroachment	1	193.46	331.76		
4295	100 yr encroachment	1	1531.78	1800		
4130	100 yr encroachment	1	65.97	269.33		
4043	100 yr encroachment	1	1565	1720		
3972	100 yr encroachment	1	197.75	375		
3860	100 yr encroachment	1	261	295.78		
3785	100 yr encroachment	1	1400	1470		
3735	100 yr encroachment	1	167.57	315		
3532	100 yr encroachment	1	1500	1625		
3410	100 yr encroachment	1	120	250		
3375	100 yr encroachment	1	1435	1585		
3278	100 yr encroachment	1	68.65	180		
3065	100 yr encroachment	1	1482	1580		
2949	100 yr encroachment	1	74.16	255.96		
2730	100 yr encroachment	1	374.49	528.2		
2634	100 yr encroachment	1	234.91	372.11		
2497	100 yr encroachment	1	272.27	501.55		
2462	100 yr encroachment	1	275	425		
2339	100 yr encroachment	1	2100	2370		
2274	100 yr encroachment	1	67.54	348.92		
2139	100 yr encroachment	1	340	450		
2010	100 yr encroachment	1	2525	2820		
1925	100 yr encroachment	1	-60	320.86		
1602	100 yr encroachment	1	-285.48	229.52		
1402	100 yr encroachment	1	10.08	391.43		
1208	100 yr encroachment	1	1689.95	1864.92		
990	100 yr encroachment	1	15	410		
933	100 yr encroachment	1	1620	1735		
884	100 yr encroachment	1	81.4	208.17		
863	100 yr encroachment	1	81.31	208.08		
715	100 yr encroachment	1	83.8	237.94		
536	100 yr encroachment	1	36.84	184.3		
428	100 yr encroachment	1	1358.97	1474.62		
350	100 yr encroachment	1	74.21	237.94		
185	100 yr encroachment	1	32.38	176.38		
147	100 yr encroachment	1	1640	1750		
011	100 yr encroachment	1	42	249		
-30	100 yr encroachment	1	15.72	150		
-78	100 yr encroachment	1	3	150		
-154	100 yr encroachment	1	13.15	138.42		
-255	100 yr encroachment	1	1405	1570		

River = Tributary	Reach = 1	RS	Profile	Method	Value1	Value2
6850	100 yr encroachment	1	90.32	113.19		
6361	100 yr encroachment	1	53	610		



			walkerRunFld.rep	
5930	100 yr	encroachment	1	75 112
5500	100 yr	encroachment	1	90 110
4750	100 yr	encroachment	1	85 145
4530	100 yr	encroachment	1	75 150
4500	100 yr	encroachment	1	117.21 140
4400	100 yr	encroachment	1	125 170
4093	100 yr	encroachment	1	68.09 94.92
3696	100 yr	encroachment	1	434.5 760
3356	100 yr	encroachment	1	45 229.11
3162	100 yr	encroachment	1	513.93 564
3060	100 yr	encroachment	1	255 340
2834	100 yr	encroachment	1	220 285
2326	100 yr	encroachment	1	249.41 360
1658	100 yr	encroachment	1	262.44 295
1360	100 yr	encroachment	1	190 249.98
1252	100 yr	encroachment	1	235 272.69
1105	100 yr	encroachment	1	240 283.94
810	100 yr	encroachment	1	285 379.19
587	100 yr	encroachment	1	95 140.89
463	100 yr	encroachment	1	169.65 267.48
357	100 yr	encroachment	1	114.71 195
183	100 yr	encroachment	1	-6 255.38

#### FLOW DATA

Flow Title: Existing Conditions

Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
 E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
 HEC-RAS\walkerRunFld.f03

Flow Data (cfs)

River	Reach	RS	100 yr	100 yr encroachment
500 yr	10-yr	50-yr		
Tributary	1	6850	300	300
606	84	213		
Tributary	1	4400	300	300
606	84	213		
Tributary	1	1252	300	300
606	84	213		
walker Run	1	5862	1640	1640
3100	480	1180		
walker Run	1	5198	1640	1640
3100	480	1180		
walker Run	1	1602	1860	1860
3600	550	1320		

#### Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Tributary	1	100 yr	Critical
Normal S = 0.0015			
Tributary	1	100 yr encroachment	Critical

		walkerRunFld.rep	
Known WS = 655.94			
Tributary	1	500 yr	Critical
Normal S = 0.0015			
Tributary	1	10-yr	Critical
Normal S = 0.0015			
Tributary	1	50-yr	Critical
Normal S = 0.0015			
Walker Run	1	100 yr	Critical
Known WS = 652.54			
Walker Run	1	100 yr encroachment	Critical
Known WS = 653.54			
Walker Run	1	500 yr	Critical
Known WS = 653.85			
Walker Run	1	10-yr	Critical
Known WS = 650.85			
Walker Run	1	50-yr	Critical
Known WS = 652.05			

#### GEOMETRY DATA

Geometry Title: Existing Conditions  
 Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
 E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
 HEC-RAS\walkerRunFld.g04

#### CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 6850

#### INPUT

##### Description:

Station Elevation Data				num=	98				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	717.52	.35	717.54	2.18	717.61	3.78	717.66	6.3	717.8
7.85	717.82	12.81	718	20.71	718.1	21.89	718.12	30.23	718.06
30.44	718.06	34.3	718	34.95	717.97	35.49	717.93	40.01	717.62
40.91	717.52	41.61	717.38	43.04	717.13	43.18	717.1	43.68	717.04
43.98	717	47.48	716.55	50.04	716.18	50.95	716	52.04	715.78
54.81	715	56.01	714.66	58.49	714	60.5	713.45	61.8	713
73.57	712.06	74.45	712	75.39	711.91	76.44	711.85	84.53	711.28
90.32	711	91.39	710.93	91.8	710.91	92.02	710.89	92.48	710.85
96.49	710.55	101.47	710	102.88	709.75	104.15	709.32	104.25	709.26
104.43	709.22	104.66	709.19	104.87	709.2	105.86	709.3	106.32	709.38
107.84	709.67	109.84	710	112.63	710.84	113.19	711	113.34	711.06
116.12	712	118.92	712.94	119.09	713	119.23	713.05	122.01	714
123.04	714.38	124.97	715	126.95	715.63	128.05	716	130.39	716.75
131.16	717	132.68	717.25	138.64	718	141.42	718.08	146.9	718.11
148.71	718.06	153.13	718	156.17	717.38	157.97	717	159.64	716.99
159.72	716.99	161.24	717	161.76	717	162.96	717.28	166.09	718
167.49	718.26	174.81	719	177.43	719.22	185.26	719.81	186.71	719.92
187.13	719.95	187.68	720	195.49	720.55	201.16	721	207.47	721.56
209.54	721.73	212.78	722	224.62	722.84	226.57	723	236.08	723.8
238.51	724	242.33	724.16	249.45	724.46				

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	90.32	.08	113.19	.05

WalkerRunFld.rep

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	90.32	113.19		460 476	490	.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 6361

INPUT

Description: New

Station Elevation Data

num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	703	20	702	30.5	701	41	700	52	699
53.4	698	54.4	697	55.1	696	55.7	695.2	56.8	696
58.9	697	60.6	698	62.7	699	67.6	700	75.9	701
88.7	702	106.3	703	117.8	704	121.2	705	145	706

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	52	.08	62.7	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	52	62.7		438 444	454	.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 5930

INPUT

Description:

Station Elevation Data

num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	707.61	.21	707.52	1.49	707	3.75	706.23	4.35	706.04
4.46	706	4.67	705.91	6.78	705	7.13	704.87	9.64	704
11.48	703.34	12.46	703	12.85	702.86	15.32	702	16.31	701.64
18.18	701	20.11	700.31	21	700	23.24	699.19	23.8	699
24.33	698.81	26.66	698	27.99	697.57	29.87	697	31.89	696.61
35.21	696	40.81	695.52	43.76	695.24	46.22	695	47.88	694.93
73.56	694	78.44	693.3	80.01	693	80.83	692.64	82.4	692
83.33	692	84.28	692	84.3	692	84.31	692	86.28	692
87.21	692.48	88.27	693	101.79	693.51	104.21	693.59	106.79	693.68
108.18	693.72	110.29	693.73	112.58	693.7	112.72	693.69	118.36	693.78
120.92	693.83	122.97	693.9	125.05	694	139.58	694.93	140.72	695
141.28	695.05	153.31	696	158.07	696.55	162.09	697	166	697.45
170.75	698	174.95	698.5	179.08	699	183.24	699.61	185.81	700
188.27	700.35	192.66	701	196.14	701.53	199.34	702	204.09	702.76
205.4	703	207.13	703.33	210.72	704	213.77	704.54	216.32	705
218.9	705.47	221.12	705.84						

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	80.01	.08	88.27	.05

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	80.01	88.27		448.37 429.25	409.23	.1	.3

CROSS SECTION

walkerRunFld.rep

RIVER: Tributary  
REACH: 1

RS: 5500

INPUT

Description:

Station Elevation Data				num=	96				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	705.59	1.65	705.28	3.11	705	3.68	704.9	9.3	704
10.58	703.79	14.78	703	14.79	703	19.67	702.91	20.62	702.9
22.18	702.9	22.97	702.9	23.58	702.92	24.01	702.94	24.36	702.98
24.87	703	25.93	703.05	26.08	703.05	35.07	703.38	37.21	703.44
39.27	703.47	41.12	703.49	42.58	703.48	43.53	703.46	44.12	703.41
44.76	703.31	46.18	703	46.94	702.52	47.85	702	48.86	701.36
49.48	701	50.69	700.22	51.08	700	51.86	699.5	52.59	699
53.94	698.19	54.24	698	54.73	697.69	55.88	697	57.44	696.04
57.51	696	57.79	695.83	59.23	695	60.7	694.11	60.9	694
62.37	693.25	62.91	693	62.98	692.98	65.37	692	65.4	691.99
66.48	691.55	67.85	691	67.95	691	75.95	691	79.78	691
84.86	691	87.6	691	89.79	691	96.84	691	105.06	691
105.18	691	106.9	691	107.22	691	114.51	691	116.13	691
118.28	691.39	121.68	692	123.18	692.64	124.03	693	126.02	693.87
126.33	694	127.25	694.4	128.76	695	129.16	695.13	132.13	696
132.9	696.22	135.68	697	137.76	697.61	139.16	698	139.62	698.13
142.67	699	143.27	699.17	146.17	700	149.04	700.82	149.66	701
150.18	701.16	153.12	702	153.66	702.15	156.6	703	158.09	703.4
160.27	704	162.03	704.45	164.06	705	166.44	705.61	168.26	706
169.59	706.33								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	66.48	.08	118.28	.05

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	66.48	118.28		758.93	739.98	740.88		.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 4750

INPUT

Description:

Station Elevation Data				num=	130				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	719.11	7.68	719	10.17	718.76	18.45	718	20.03	717.49
21.92	717	22.84	716.49	23.71	716	24.48	715.58	25.43	715
26.3	714.49	27.18	714	28.1	713.46	28.92	713	29.88	712.44
30.65	712	31.64	711.37	32.27	711	33.35	710.38	33.99	710
35.06	709.39	35.7	709	36.83	708.35	37.43	708	38.7	707.26
39.13	707	39.54	706.76	40.87	706	42.26	705.19	42.58	705
43.96	704.19	44.31	704	45.75	703.16	46.03	703	47.5	702.13
47.72	702	49.25	701.01	49.26	701	49.27	700.99	50.71	700
51.78	699.09	51.92	699	52.06	698.89	53.27	698	53.57	697.79
54.58	697	55.07	696.68	55.87	696	56.82	695.31	57.23	695
58.25	694.16	58.5	694	60.18	693.01	60.19	693	60.23	692.98
62.33	692	64.4	691	64.41	691	66.77	690	68.03	689.39
68.88	689	70.28	688.56	71.66	688	73.93	687.54	76.53	687
79.74	686.35	81.27	686	83.57	685.49	85.56	685	86.56	684
89.9	684	94.99	684	124.36	684	137.07	684	144.81	684
176.24	685	176.89	685.09	183.88	686	186.34	686.5	188.39	687
191.16	687.7	192.31	688	193.07	688.2	196.16	689	197.57	689.37
200.05	690	206.17	690.93	206.7	691	214.37	691.48	215.87	691.59

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217.4	691.74	217.65	691.76	218.07	691.79	218.54	691.81	219.08	691.82
219.68	691.82	220.29	691.82	221.04	691.82	221.15	691.82	221.32	691.79
221.59	691.74	222.48	691.36	223.33	691	225.37	690.05	225.47	690
225.68	689.91	227.73	689	229.96	688.11	230.23	688	230.4	687.93
232.65	687	233.17	686.93	233.41	686.89	233.91	686.96	234.15	687
234.42	687.11	236.86	688	237.5	688.24	239.62	689	242.37	690
245.17	691	245.95	691.05	247.15	691.13	252.96	691.51	261.76	692
269.9	692.26	288.24	692.9	290.57	692.98	291.12	693	296.01	693.22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	81.27	.08	183.88	.05

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

81.27	183.88	238.3	226.5	190.7	.1	.3
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CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 4530

INPUT

Description: U/S XS of Beaver Dam Pond Culvert

Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	695.63	.38	695.48	1.28	695.09	1.48	695	3.09	694.51
5.01	694	8.08	693.32	9.54	693	12.07	692.33	13.44	692
15.74	691.32	16.91	691	18	690.72	20.83	690	24.22	689.15
24.81	689	28.69	688.02	28.78	688	28.95	687.96	29.27	687.87
32.8	687	37.18	686.21	38.3	686	39.25	685.85	44.98	685
46.66	685	47.66	684	49.21	684	50.78	684	51.95	684
53.56	684	58.64	684	62.64	684	65.43	684	71.47	684
82.7	684	83.09	684	98.62	684	101.48	684	107.38	684
109.3	684	123.54	684	124.7	684	147.47	684	168.98	684
177.3	684	180.32	684	182.51	684	188.98	684	190.4	684
193.03	684	193.27	684	193.44	684	194.9	684	194.96	684
195.01	684	195.13	684	196.34	684	196.91	684	203.33	684
207.17	684	210.36	684	211.96	684	215.52	684	218.11	684
220.77	684	224.16	684	231.87	684	239.24	684	245.5	685
253.07	685	256.85	685.84	257.54	686	258.89	686.31	259.73	686.43
261.48	686.68	262.26	686.84	263.03	687	264	687.21	267.77	688
269.77	688.4	272.58	689	280.78	689.37	283.12	689.52	287.24	689.8
289.93	690	303.56	690.88	305.27	691	307.07	691.07	307.94	691.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.25	.08	256.85	.05

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

39.25	256.85	26.8	29.2	29.5	.3	.5
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	103	686.02	F
109	307.94	686.02	F

CULVERT

RIVER: Tributary  
REACH: 1

RS: 4528

INPUT



## WalkerRunFld.rep

Description: Beaver Dam Pond Culvert

Distance from Upstream XS = 10.5

Deck/Roadway Width = 4

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 126

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	699.94		.08	699.93		.17	699.9	
.37	699.82		1.81	699.59		4.29	699.12	
4.86	699		5.91	698.73		7.54	698.44	
9.65	698		12.65	697.57		15.79	697	
17.04	696.74		19.94	696		20.51	695.88	
24.52	695		25.05	694.9		29.34	694	
29.78	693.91		34.3	693		38.09	692.22	
39.2	692		43.19	691.18		43.98	691	
44.34	690.93		44.67	690.88		49.26	690	
51.11	689.68		55.23	689		60.28	688.18	
61.36	688		65.16	687.39		67.46	687	
68.34	686.86		70.96	686.33		80.51	686.24	
80.67	686.24		84.94	686.05		86.72	686.04	
89.52	686.04		93.66	686.03		94.45	686.03	
95.14	686.02		96.47	686.02		97.36	686.02	
101.68	686.02		102.68	686.02		104.7	686.03	
105.44	686.03		109.35	686.02		114.19	686.01	
117.38	686		119.45	685.81		120.95	685.78	
123.15	685.61		123.97	685.38		125.3	685	
127.21	685		132.46	685		134.61	685	
139.57	685		141.83	685		144.59	685	
147.06	685		149.69	685		153.25	685	
155	685		158.41	685		163.68	685	
164.26	685		164.58	685		172.54	685	
173.23	685		174.29	685		182.66	685	
183.32	685		185.42	685		189.93	684.94	
190.82	684.95		198.27	684.93		198.45	684.93	
205.79	684.9		205.98	684.91		206.25	684.92	
207.99	685		214.82	685		215.17	685	
216.22	685		218.29	685		218.85	685	
220.55	685		221.47	685		221.8	685	
222.26	685		222.79	685		223.34	685	
225.66	685		229.27	685		229.91	685	
232.18	685		233.95	685		235.25	685	
238.49	685		239.5	685		240.33	685	
240.63	685		242.95	685		245.9	685	
246.88	685		249.8	685		250.83	685	
252.46	685		260.7	685		262.47	685.37	
265.16	686		268.07	686.63		269.63	687	
272.57	687.71		273.81	688		274.81	688.23	
278.02	689		278.88	689.03		292.31	689.45	
305.41	690		309.17	690.2		310.77	690.28	

Upstream Bridge Cross Section Data

Station Elevation Data

num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	695.63	.38	695.48	1.28	695.09	1.48	695	3.09	694.51
5.01	694	8.08	693.32	9.54	693	12.07	692.33	13.44	692
15.74	691.32	16.91	691	18	690.72	20.83	690	24.22	689.15
24.81	689	28.69	688.02	28.78	688	28.95	687.96	29.27	687.87
32.8	687	37.18	686.21	38.3	686	39.25	685.85	44.98	685
46.66	685	47.66	684	49.21	684	50.78	684	51.95	684
53.56	684	58.64	684	62.64	684	65.43	684	71.47	684
82.7	684	83.09	684	98.62	684	101.48	684	107.38	684
109.3	684	123.54	684	124.7	684	147.47	684	168.98	684
177.3	684	180.32	684	182.51	684	188.98	684	190.4	684

walkerRunFld.rep

193.03	684	193.27	684	193.44	684	194.9	684	194.96	684
195.01	684	195.13	684	196.34	684	196.91	684	203.33	684
207.17	684	210.36	684	211.96	684	215.52	684	218.11	684
220.77	684	224.16	684	231.87	684	239.24	684	245.5	685
253.07	685	256.85	685.84	257.54	686	258.89	686.31	259.73	686.43
261.48	686.68	262.26	686.84	263.03	687	264	687.21	267.77	688
269.77	688.4	272.58	689	280.78	689.37	283.12	689.52	287.24	689.8
289.93	690	303.56	690.88	305.27	691	307.07	691.07	307.94	691.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.25	.08	256.85	.05

Bank Sta: Left Right Coeff Contr. Expan.  
39.25 256.85 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	103	686.02	F
109	307.94	686.02	F

Downstream Deck/Roadway Coordinates

num=	126								
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	
0	699.94		.08	699.93		.17	699.9		
.37	699.82		1.81	699.59		4.29	699.12		
4.86	699		5.91	698.73		7.54	698.44		
9.65	698		12.65	697.57		15.79	697		
17.04	696.74		19.94	696		20.51	695.88		
24.52	695		25.05	694.9		29.34	694		
29.78	693.91		34.3	693		38.09	692.22		
39.2	692		43.19	691.18		43.98	691		
44.34	690.93		44.67	690.88		49.26	690		
51.11	689.68		55.23	689		60.28	688.18		
61.36	688		65.16	687.39		67.46	687		
68.34	686.86		70.96	686.33		80.51	686.24		
80.67	686.24		84.94	686.05		86.72	686.04		
89.52	686.04		93.66	686.03		94.45	686.03		
95.14	686.02		96.47	686.02		97.36	686.02		
101.68	686.02		102.68	686.02		104.7	686.03		
105.44	686.03		109.35	686.02		114.19	686.01		
117.38	686		119.45	685.81		120.95	685.78		
123.15	685.61		123.97	685.38		125.3	685		
127.21	685		132.46	685		134.61	685		
139.57	685		141.83	685		144.59	685		
147.06	685		149.69	685		153.25	685		
155	685		158.41	685		163.68	685		
164.26	685		164.58	685		172.54	685		
173.23	685		174.29	685		182.66	685		
183.32	685		185.42	685		189.93	684.94		
190.82	684.95		198.27	684.93		198.45	684.93		
205.79	684.9		205.98	684.91		206.25	684.92		
207.99	685		214.82	685		215.17	685		
216.22	685		218.29	685		218.85	685		
220.55	685		221.47	685		221.8	685		
222.26	685		222.79	685		223.34	685		
225.66	685		229.27	685		229.91	685		
232.18	685		233.95	685		235.25	685		
238.49	685		239.5	685		240.33	685		
240.63	685		242.95	685		245.9	685		
246.88	685		249.8	685		250.83	685		
252.46	685		260.7	685		262.47	685.37		
265.16	686		268.07	686.63		269.63	687		
272.57	687.71		273.81	688		274.81	688.23		

WalkerRunFld.rep  
 278.02 689 278.88 689.03 292.31 689.45  
 305.41 690 309.17 690.2 310.77 690.28

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	122	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	698.39	2.25	698	3.51	697.78	8.04	697	10.4	696.58			
13.75	696	17.58	695.27	19.01	695	24.3	694.01	24.35	694			
24.36	694	24.39	693.99	24.56	693.96	29.6	693	29.96	692.93			
34.84	692	35.26	691.92	40.08	691	40.93	690.86	43.54	690.41			
45.59	690	46.73	689.76	50.78	689	51.85	688.8	56.28	688			
56.66	687.94	56.88	687.91	57.21	687.86	62.06	687	64.06	686.74			
67.41	686.48	73.1	686	73.58	685.87	76.63	685.77	78.89	685.6			
81.72	685.36	82.81	685.28	83.36	685.25	84.22	685.21	84.7	685.21			
87.07	685.08	87.43	685.08	88.66	685	90.82	684.79	91.94	684.65			
92.9	684.44	93.35	684.38	94.01	684.33	94.9	684.3	99.29	684.28			
104.43	684.19	106.71	684.15	109.3	684.08	111.09	684	111.21	683.99			
112.38	683.85	113.67	683.78	114.6	683.71	115.76	683.68	117.21	683.5			
118.12	683.44	119.46	683.39	121.24	683.35	122.15	683.37	127.52	683.35			
131.92	683.3	134.65	683.33	135.14	683.32	139.51	683.33	140.67	683.32			
141.87	683.33	142.84	683.34	143.7	683.37	146.54	683.44	152.28	683.42			
157.84	683.49	163.36	683.36	165.79	683.33	166.88	683.33	172.36	683.22			
173.32	683.21	176.18	683.19	177.33	683.17	190.83	683.03	191.87	683			
198.11	682.59	198.65	682.57	200.68	682.65	201.32	682.65	205.33	682.59			
206.51	682.67	207.73	682.75	210.04	682.71	210.84	682.68	212.81	682.65			
213.82	682.63	213.87	682.6	216.59	682.57	219.18	682.57	222.09	682.65			
229.54	682.91	231.92	683	232.46	683.21	234.58	684	235.86	684.47			
237.43	685	237.7	685.1	240.19	686	245.86	686.3	256.09	687			
266.97	687.52	275.91	688	283.94	688.34	286.47	688.44	294.52	688.78			
302.29	689	315.27	689.42	320.65	689.56	325.31	689.67	329.74	689.81			
338.75	689.97	339.92	689.99									

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .05 117.21 .08 146.54 .05

Bank Sta: Left Right Coeff Contr. Expan.  
 117.21 146.54 .3 .5

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 115 686.02 F  
 146.54 339.92 685 F

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	
FHWA Chart # 55- Circular Culvert			
FHWA Scale # 1 - Smooth tapered inlet throat			
Solution Criteria = Highest U.S. EG			
Culvert Upstrm Dist	Length	Top n	Bottom n
4.3	18	.013	.013
Depth Blocked	Entrance Loss Coef		
0	.9		
1			
Upstream Elevation =	679.28		

walkerRunFld.rep  
 Centerline Station = 106  
 Downstream Elevation = 679.1  
 Centerline Station = 122

# CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 4500

INPUT  
 Description: D/S XS of Beaver Dam Pond Culvert  
 Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	698.39	2.25	698	3.51	697.78	8.04	697	10.4	696.58
13.75	696	17.58	695.27	19.01	695	24.3	694.01	24.35	694
24.36	694	24.39	693.99	24.56	693.96	29.6	693	29.96	692.93
34.84	692	35.26	691.92	40.08	691	40.93	690.86	43.54	690.41
45.59	690	46.73	689.76	50.78	689	51.85	688.8	56.28	688
56.66	687.94	56.88	687.91	57.21	687.86	62.06	687	64.06	686.74
67.41	686.48	73.1	686	73.58	685.87	76.63	685.77	78.89	685.6
81.72	685.36	82.81	685.28	83.36	685.25	84.22	685.21	84.7	685.21
87.07	685.08	87.43	685.08	88.66	685	90.82	684.79	91.94	684.65
92.9	684.44	93.35	684.38	94.01	684.33	94.9	684.3	99.29	684.28
104.43	684.19	106.71	684.15	109.3	684.08	111.09	684	111.21	683.99
112.38	683.85	113.67	683.78	114.6	683.71	115.76	683.68	117.21	683.5
118.12	683.44	119.46	683.39	121.24	683.35	122.15	683.37	127.52	683.35
131.92	683.3	134.65	683.33	135.14	683.32	139.51	683.33	140.67	683.32
141.87	683.33	142.84	683.34	143.7	683.37	146.54	683.44	152.28	683.42
157.84	683.49	163.36	683.36	165.79	683.33	166.88	683.33	172.36	683.22
173.32	683.21	176.18	683.19	177.33	683.17	190.83	683.03	191.87	683
198.11	682.59	198.65	682.57	200.68	682.65	201.32	682.65	205.33	682.59
206.51	682.67	207.73	682.75	210.04	682.71	210.84	682.68	212.81	682.65
213.82	682.63	213.87	682.6	216.59	682.57	219.18	682.57	222.09	682.65
229.54	682.91	231.92	683	232.46	683.21	234.58	684	235.86	684.47
237.43	685	237.7	685.1	240.19	686	245.86	686.3	256.09	687
266.97	687.52	275.91	688	283.94	688.34	286.47	688.44	294.52	688.78
302.29	689	315.27	689.42	320.65	689.56	325.31	689.67	329.74	689.81
338.75	689.97	339.92	689.99						

Manning's n values num= 3  
 Sta n Val Sta n Val  
 0 .05 117.21 .08 146.54 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 117.21 146.54 87.5 99.4 102.5 .3 .5  
 Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 115 686.02 F  
 146.54 339.92 685 F

# CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 4400

INPUT  
 Description:  
 Station Elevation Data num= 14  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
36	683.01	104	679.71	116.53	678.6	128.1	677.84	152.93	677.53
158.35	677.2	158.8	675.98	159.72	675.78	160.48	676.59	161.3	676.98

163.98 677.49 176.22 678.17 walkerRunFld.rep 181.98 677.84 190 680.01

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
36	.05	158.35	.08	161.3	.05

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

158.35	161.3	307	307	307	.3	.5
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#### CROSS SECTION

RIVER: Tributary  
REACH: 1 RS: 4093

#### INPUT

Description: New

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	681	2.6	680	5.25	679	8	678	10.5	677
14.7	676	21.5	676	25	677	30.5	677	49	676
71	675	72	673.1	73	673.1	74	675	77.5	676
135	676	153	677	172.5	678	190	679	205	680

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	71	.05	74	.1

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

71	74	397	397	397	.1	.3
----	----	-----	-----	-----	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	25	677	F

#### CROSS SECTION

RIVER: Tributary  
REACH: 1 RS: 3696

#### INPUT

Description: New

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	672.16	11	672	18	671	37	670	160	669
165	669	170	670	172.25	671	178	671	185	670
263	670	434.5	671	674	672	754	672	756	669.5
758	669.5	760	672	770	674	805	674	825	675
878	678								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	754	.05	760	.1

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

754	760	340	340	340	.1	.3
-----	-----	-----	-----	-----	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	674	672	F

#### CROSS SECTION



walkerRunFld.rep

RIVER: Tributary  
REACH: 1

RS: 3356

INPUT

Description:

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
-438.69	672.01	-380.28	671.01	22	-365.82	670.01	28	670.01
194.18	670.23	205.77	669.77		208.9	670.84	210.78	669.09
214.16	667.67	215.07	667.67		215.68	667.68	216.52	667.72
219.51	670.12	224.24	671.09		229.11	672.65	234.42	670.53
295.86	673.86	312.17	675.66				267.47	672.28

Manning's n Values				num=				
Sta	n Val	Sta	n Val		Sta	n Val		
-438.69	.1	213.43	.05	3	219.51	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	213.43	219.51		366	194		.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 3162

INPUT

Description: New - U.S. RR Bridge 5

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
0	675	44	674	22	77.6	673	239.6	672
270.3	670	285.6	669		305.8	668	525.6	667
534	666.8	539	667		559.7	667	561	666.5
564	667	568	668		590	669	617	670
634.4	672	714.8	682				628.5	671

Manning's n Values				num=				
Sta	n Val	Sta	n Val		Sta	n Val		
0	.1	559.7	.05	3	564	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	559.7	564		110	102		.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 3060

INPUT

Description:

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
0	677.29	4.96	677	134	13.14	676.458	20.5	676
37.14	675	40.85	674.703		50.32	674	57.58	673.547
75.95	672.148	77.44	672.043		78.01	672	78.74	671.948
100.82	670.131	102.13	670		102.99	669.907	111.76	669
120.59	668	124.12	667.815		130.23	667.473	136.79	667.132
140.16	666.969	145.2	666.863		154.44	666.68	155.26	666.666
158.55	666.654	168.04	666.64		173.87	666.635	180.69	666.647
190.3	666.653	194.79	666.65		196.46	666.646	201.96	666.623
206.76	666.606	209.03	666.59		211.59	666.565	213.97	666.531
218.49	666.39	220.78	666.337		223.52	666.327	226.26	666.277
							229.89	666.254

WalkerRunFld.rep

232.73	666.212	234.22	666.204	237.2	666.171	240.44	666.159	242.97	666.138
246.63	666.115	247.3	666.111	257.44	666.02	257.53	666.019	259.69	666
269.27	665.969	273.25	665.96	275.98	665.958	277.93	665.962	279.6	665.973
282.51	666	288.25	666.162	290.98	666.257	296.08	666.443	311.06	667
315.34	667	318.74	667	319.25	666.857	321.78	666	322.5	666
323.1	666	323.83	666	324.35	666	336.57	666.947	337.11	666.988
337.27	667	344.9	667.568	350.35	668	357.48	668.597	362.17	669
369.51	669.588	373.99	670	381.08	670.809	383.04	671	389.62	671.675
393.01	672	399.88	672.75	402.18	673	402.92	673.096	411.81	674
419.61	674.697	422.64	675	425.8	675.465	429.64	676	431.45	676.282
436.25	677	439.62	677.517	442.85	678	445.29	678.334	449.9	679
454.89	679.674	456.91	680	466.37	680.694	467.68	680.787	467.98	680.804
469.08	680.847	469.4	680.864	472.54	681	475.1	681.07	475.6	681.085
480.77	681.211	482.1	681.238	489.99	681.417	492.27	681.436	497.6	681.559
500.74	681.561	502.8	681.594	504.57	681.607	506.26	681.606	507.99	681.597
509.84	681.581	515.93	681.561	520.86	681.502	523.99	681.484	525.21	681.47
532.36	681.376	533.63	681.355	534.84	681.329	541.81	681.241		

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .1 318.74 .05 337.11 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 318.74 337.11 188 226 141 .1 .3

CROSS SECTION

RIVER: Tributary  
 REACH: 1

RS: 2834

INPUT

Description:

Station	Elevation	Data	num=	19	Sta	Elev	Sta	Elev	Sta	Elev
9.3	668.01	26.89	667.01	67.11	666.01	134	665.01	204	665.01	
246.49	665.76	252.14	666.03	254.24	664.9	255.77	664.89	256.85	665.07	
257.71	665.03	258.87	665.82	263.61	665.79	277.29	665.23	309.05	667.83	
338.85	671.59	371.24	676.68	390.72	678.9	420.6	679.35			

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 9.3 .1 252.14 .05 258.87 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 252.14 258.87 555.44 553.2 557.68 .1 .3

CROSS SECTION

RIVER: Tributary  
 REACH: 1

RS: 2326

INPUT

Description:

Station	Elevation	Data	num=	17	Sta	Elev	Sta	Elev	Sta	Elev
112.13	665.01	166.8	663.79	202.29	663.45	249.41	661.77	264.83	661.76	
269.31	660.7	271.41	660.2	273.33	660.26	274.88	659.9	275.72	660.03	
277.04	661.45	283.76	661.62	343.16	661.53	399.81	661.53	420.98	662.03	
448.82	664.09	463.58	664.58							

Manning's n Values num= 3

## WalkerRunFld.rep

Sta	n Val	Sta	n Val	Sta	n Val
112.13	.1	269.31	.05	277.04	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	269.31	277.04		673.02 669.78	671.58		.1	.3

## CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 1658

## INPUT

Description:

Station	Elevation	Data	num=	17	Sta	Elev	Sta	Elev	Sta	Elev
173.75	665.01	198.13	661.86	245.91	659.93	256.45	659.51	262.44	659.72	
264.16	658.26	265.67	657.96	267.08	657.99	268.29	658.05	269.24	658.2	
271.93	658.6	274.07	659.54	279.61	659.65	315.47	660.02	400.34	661.36	
434.93	670.15	448.28	670.08							

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
173.75	.1	262.44	.05	274.07	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	262.44	274.07		289.98 298.02	301.02		.1	.3

## CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 1360

## INPUT

Description: U/S XS of Farm Road Culvert

Station	Elevation	Data	num=	133	Sta	Elev	Sta	Elev	Sta	Elev
0	663.365	8.11	663	15.93	662.641	21.14	662.423	26.61	662.185	
31.61	662	32.7	661.981	41.37	661.85	48.82	661.755	52.16	661.744	
55.89	661.708	58.08	661.707	59.26	661.703	60.41	661.694	61.58	661.68	
62.81	661.661	65.38	661.618	66.49	661.595	68.85	661.538	72.65	661.501	
75.75	661.436	79.04	661.405	85.46	661.35	98.24	661.027	98.37	661.025	
99.34	661	102.23	660.857	104.38	660.771	111.18	660.526	123.04	660.053	
126.01	660	127.18	659.98	136.22	659.885	136.56	659.877	142.99	659.783	
146.79	659.703	155.28	659.601	159.01	659.499	161.23	659.46	166.49	659.282	
173.2	659	174.09	658.999	174.21	658.999	191.49	658.982	191.85	658.982	
196.28	658.984	198.06	658.985	201.95	658.992	202.85	658.992	204.56	658.995	
206.92	659	210.16	659.002	211.98	659.003	212.84	659.002	214.84	659.001	
216.87	659.001	217.64	659	217.94	658.88	219.24	658.295	219.7	658.07	
219.84	658	220.21	658	226.9	657.83	229.38	658	231.64	658.227	
231.99	658.242	234.8	658.391	238.12	658.584	244.74	659	247.18	659.09	
278.53	660	280.97	660.065	281.4	660.078	290.08	660.31	296.63	660.471	
298.54	660.529	302.43	660.616	311.2	660.867	313.3	660.914	315.27	661	
326.87	661.587	329.7	661.73	331.06	661.792	335.65	662	346.63	662.658	
348.5	662.778	351.83	663	362.64	663.75	364.72	663.894	365.98	664	
369.59	664.346	376.67	665	378.66	665.236	386.46	666	386.77	666.037	
394.3	667	396.29	667.279	400.99	668	413.48	668.692	418.73	669	
419.36	669.003	420.17	669.006	420.4	669.006	426.91	669.016	427.87	669.017	
428.87	669.016	429.6	669.015	429.99	669.014	440.45	669.262	440.86	669.198	
442.35	669.153	442.92	669.198	442.99	669.211	443.05	669.248	443.3	669.29	
444.34	669.314	448.02	669.897	448.28	669.923	448.73	670	452.25	670.375	
457.45	670.92	458.12	671	458.89	671.131	460.41	671.347	461.87	671.508	

WalkerRunFld.rep  
 463.6 671.644 465.55 671.859 465.76 671.885 467.9 672 472.53 672.128  
 478.07 672.263 479.32 672.227 480.67 672.21

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 0 .1 217.64 .05 244.74 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 217.64 244.74 110 108 100 .3 .5  
 Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 0 183.25 659.25 F  
 322.75 480.67 659.25 F

# CULVERT

RIVER: Tributary  
 REACH: 1 RS: 1281

## INPUT

Description: Farm Road Culvert  
 Distance from Upstream XS = 69  
 Deck/Roadway width = 19.5  
 Weir Coefficient = 2.6  
 Upstream Deck/Roadway Coordinates

num= 6  
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord  
 5 663.33 185 659.19 250 659.25  
 360 660.01 410 660.68 530 668.88

## Upstream Bridge Cross Section Data

Station Elevation Data num= 132  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	662.045	8.11	661.68	15.93	661.321	21.14	661.103	26.61	660.865
31.61	660.68	32.7	660.661	41.37	660.53	48.82	660.435	52.16	660.424
55.89	660.388	58.08	660.387	59.26	660.383	60.41	660.374	61.58	660.36
62.81	660.341	65.38	660.298	66.49	660.275	68.85	660.218	72.65	660.181
75.75	660.116	79.04	660.085	85.46	660.03	98.24	659.707	98.37	659.705
99.34	659.68	102.23	659.537	104.38	659.451	111.18	659.206	123.04	658.733
126.01	658.68	127.18	658.66	136.22	658.565	136.56	658.557	142.99	658.463
146.79	658.383	155.28	658.281	159.01	658.179	161.23	658.14	166.49	657.962
173.2	657.68	174.09	657.679	174.21	657.679	191.49	657.662	191.85	657.662
196.28	657.664	198.06	657.665	201.95	657.672	202.85	657.672	204.56	657.675
206.92	657.68	210.16	657.682	211.98	657.683	212.84	657.682	214.84	657.681
216.87	657.681	217.64	657.68	217.94	657.56	219.24	656.975	219.7	656.75
219.84	656.68	220.21	656.68	229.38	656.68	231.64	656.907	231.99	656.922
234.8	657.071	238.12	657.264	244.74	657.68	247.18	657.77	278.53	658.68
280.97	658.745	281.4	658.758	290.08	658.99	296.63	659.151	298.54	659.209
302.43	659.296	311.2	659.547	313.3	659.594	315.27	659.68	326.87	660.267
329.7	660.41	331.06	660.472	335.65	660.68	346.63	661.338	348.5	661.458
351.83	661.68	362.64	662.43	364.72	662.574	365.98	662.68	369.59	663.026
376.67	663.68	378.66	663.916	386.46	664.68	386.77	664.717	394.3	665.68
396.29	665.959	400.99	666.68	413.48	667.372	418.73	667.68	419.36	667.683
420.17	667.686	420.4	667.686	426.91	667.696	427.87	667.697	428.87	667.696
429.6	667.695	429.99	667.694	440.45	667.942	440.86	667.878	442.35	667.833
442.92	667.878	442.99	667.891	443.05	667.928	443.3	667.97	444.34	667.994
448.02	668.577	448.28	668.603	448.73	668.68	452.25	669.055	457.45	669.6
458.12	669.68	458.89	669.811	460.41	670.027	461.87	670.188	463.6	670.324
465.55	670.539	465.76	670.565	467.9	670.68	472.53	670.808	478.07	670.943
479.32	670.907	480.67	670.89						

Manning's n Values num= 3

WalkerRunFld.rep

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	217.64	.05	244.74	.1

Bank Sta: Left Right Coeff Contr. Expan.  
217.64 244.74 .3 .5

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 183.25 659.25 F  
322.75 480.67 659.25 F

Downstream Deck/Roadway Coordinates  
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5	663.33		185	659.19		250	659.25	
360	660.01		410	660.68		530	668.88	

Downstream Bridge Cross Section Data  
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.92	663.33	130.71	658.23	195.23	657.77	245.69	657.68	249.14	657.6
250.31	657.05	253.09	656.64	254.08	656.68	256.22	657.22	258.88	657.46
262.11	657.67	272.66	658.28	351.77	658.51	414.17	660.7	522.68	667.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4.92	.08	245.69	.08	262.11	.08

Bank Sta: Left Right Coeff Contr. Expan.  
245.69 262.11 .3 .5

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
4.92 223.26 659.25 F  
282.75 522.68 659.25 F

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

Number of Culverts = 1

Culvert Name Shape Rise Span  
Culvert #1 Circular 1.5

FHWA Chart # 1 - Concrete Pipe Culvert  
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill  
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef
Exit Loss Coef	69	19.5	.017	.017	0
1					.5

Upstream Elevation = 656.68  
Centerline Station = 225  
Downstream Elevation = 656.64  
Centerline Station = 253

# CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 1252



WalkerRunFld.rep

INPUT

Description: D/S XS of Farm Road Culvert

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.92	663.33	130.71	658.23	195.23	657.77	245.69	657.68	249.14	657.6		
250.31	657.05	253.09	656.64	254.08	656.68	256.22	657.22	258.88	657.46		
262.11	657.67	272.66	658.28	351.77	658.51	414.17	660.7	522.68	667.71		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4.92	.08	245.69	.08	262.11	.08		

Bank Sta: Left Right		Lengths: Left Channel Right		Coeff Contr.		Expan.	
245.69	262.11	144	147	148	.3	.5	

Ineffective Flow num= 2

Sta L Sta R Elev		Permanent	
4.92	223.26	659.25	F
282.75	522.68	659.25	F

CROSS SECTION

RIVER: Tributary

REACH: 1 RS: 1105

INPUT

Description:

Station Elevation Data		num= 20		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	660.79	58	660.01	182.03	657.52	258.26	657.01	261.27	656.79		
263.66	656.39	267.27	656.3	269.06	655.96	270.58	656.29	271.28	656.21		
272.59	655.65	273.38	655.95	275.14	656.65	277.45	657.28	283.91	657.51		
296.89	657.17	385.44	658.29	430.88	662.41	483.44	665.95	561.11	667.03		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.08	258.26	.08	277.45	.08		

Bank Sta: Left Right		Lengths: Left Channel Right		Coeff Contr.		Expan.	
258.26	277.45	287	295	303	.1	.3	

CROSS SECTION

RIVER: Tributary

REACH: 1 RS: 810

INPUT

Description:

Station Elevation Data		num= 21		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3.67	658.53	16.9	657.88	160	656.82	271.95	656.84	302.8	656.15		
307.34	656.47	308.53	655.21	309.94	654.96	311.1	654.83	313.17	654.83		
314.06	654.79	314.94	653.84	315.53	654.71	316.36	654.9	317.37	654.24		
318.8	654.78	320.94	655.51	327.28	655.79	351.67	656.4	565.4	656.84		
707	661.28										

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3.67	.08	307.34	.08	320.94	.08		

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

307.34 320.94

walkerRunFld.rep

228 224 222

.1 .3

# CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 587

## INPUT

Description:

Station Elevation Data

num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-362	658.01	-200	657.01	0	656.21	18.41	655.67	92.6	655.34
102.91	654.9	103.88	654.39	105.93	654.47	108.13	654.79	109.33	653.92
110.17	653.78	110.56	654.16	111.32	654.28	112.69	654.85	114.18	654.96
132.53	655.09	307.17	656.16	344.29	658.01				

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-362	.08	102.91	.08	114.18	.08

Bank Sta: Left

Right

Lengths: Left Channel

Right

Coeff Contr.

Expan.

102.91 114.18

122 126

127

.1

.3

# CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 463

## INPUT

Description:

Station Elevation Data

num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-416	658.01	-250	657.01	-87	656.01	0	655.59	109.8	654.54
194.42	654.32	208.54	654.65	213.7	654.92	215.61	654.29	217.64	654.15
219.79	653.77	223.31	654.2	224.25	653.23	226.46	653.59	227.82	654.41
233.37	654.53	278.57	654.4	400	655.01	496.5	656.01	525.1	657.01
557	658.01								

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-416	.08	213.7	.08	233.37	.08

Bank Sta: Left

Right

Lengths: Left Channel

Right

Coeff Contr.

Expan.

213.7 233.37

105 105

104

.1

.3

# CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 357

## INPUT

Description:

Station Elevation Data

num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-626.5	660.01	-604.5	658.01	-594.5	657.01	-584.5	656.01	-479.5	655.01
0	655.01	153.93	654.15	175.05	653.71	185.31	653.59	188.41	652.4
191.14	653.59	193.32	653.82	195.38	654.05	198.28	654.41	202.04	654.7
206.36	654.46	350	655.01	528.59	656.01	549.3	657.01	596.9	658.01

Manning's n Values

num= 3

## WalkerRunFld.rep

Sta	n Val	Sta	n Val	Sta	n Val
-626.5	.08	185.31	.08	191.14	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	185.31	191.14		179	175		.1	.3

## CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 183

## INPUT

## Description:

Station Elevation Data				num=	24				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-631.8	658.01	-603	657.01	-586	656.01	-551	655.01	-252	654.01
-242	654.01	11.07	654.27	105.3	654.68	160.67	655.27	176.42	654.35
191.7	654.33	196.59	653.2	201.52	652.43	202.85	652.14	204.43	652.46
205.71	653.27	208.19	653.86	217.88	653.96	255.38	654.23	305.72	654.38
349	655.01	494	656.01	531.9	657.01	611	658.01		

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
-631.8	.08	191.7	.08	208.19	.08

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	191.7	208.19		.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 5862

## INPUT

## Description:

Station Elevation Data				num=	22				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
6.57	692.9	16.52	686.09	30.12	679.79	46.8	679.9	59.74	679.08
61.77	675.79	63.16	675.53	66.68	676.21	70.59	676.51	72.5	676.66
75.29	677.24	83.9	677.66	93.4	677.98	108.12	680.46	126.96	680.02
134.28	678.08	144.98	678.89	173.49	677.49	203.06	682.96	252.93	692.83
275.94	705.68	283.35	706.71						

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
6.57	.1	59.74	.05	75.29	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	59.74	75.29		200.9	314.2		.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 5547

## INPUT

## Description:

Station Elevation Data				num=	19				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9.27	683.2	30.72	673.65	63.49	674.03	97.47	674.46	108.85	672.92

walkerRunFld.rep

130.75	672.73	212.69	671.49	215.49	671.05	218.29	670.1	219.35	669.38
220.92	669.9	222.1	669.99	224.66	670.6	226.17	670.93	227.99	671.82
230.09	673.4	245.5	678.64	264.68	690.27	273.75	691.73		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9.27	.1	215.49	.05	226.17	.1

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

215.49	226.17	266.1	262	254.2	.1	.3
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# CROSS SECTION

RIVER: Walker Run  
REACH: 1 RS: 5282

## INPUT

Description: U/S XS of Beach Grove Rd Bridge

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	681.12	55.69	675.84	85.36	674.65	174.96	673.59	184.04	670.66
207.55	670.04	212.26	669.41	214.34	667.03	219.14	667.34	223.57	668.03
230.88	671.08	241.05	670.68	255.44	674.6	304.55	678.17	320	679.29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	212.26	.05	230.88	.1

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

212.26	230.88	82	83.7	86.2	.3	.5
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	174	677.42	F
253	320	677.42	F

## BRIDGE

RIVER: Walker Run  
REACH: 1 RS: 5250

## INPUT

Description: Beach Grove Rd Bridge

Distance from Upstream XS = 22.3

Deck/Roadway width = 19.3

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
201.96	677.41	0	202.64	677.41	0	214.6	677.42	667.71
216.27	677.42	671.5	217.27	677.42	672.7	218.96	677.42	673.3
219.96	677.43	673.4	220.96	677.43	673.3	222.65	677.43	672.7
224.11	677.43	671.5	226.87	677.43	668.95	226.9	677.43	0
237.26	677.43	0						

Upstream Bridge Cross Section Data

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	681.12	55.69	675.84	85.36	674.65	174.96	673.59	184.04	670.66
207.55	670.04	212.26	669.41	214.61	667.71	220.04	668.18	223.99	667.71
230.88	671.08	241.05	670.68	255.44	674.6	304.55	678.17	320	679.29

WalkerRunFld.rep  
Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
0 .1 212.26 .05 230.88 .1

Bank Sta: Left Right Coeff Contr. Expan.  
212.26 230.88 .3 .5

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
0 174 677.42 F  
253 320 677.42 F

Downstream Deck/Roadway Coordinates  
num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
193.8	677.34	0	194.48	677.4	0	206.44	677.49	0
207.04	677.48	667.76	208.11	677.42	670.88	209.11	677.42	672.08
210.8	677.42	672.68	211.8	677.64	672.78	212.8	677.43	672.68
214.49	677.43	672.08	215.95	677.43	670.88	218.1	677.43	668.66
229.29	677.19	0						

Downstream Bridge Cross Section Data

Station	Elevation	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-226.11	724.65	-176.11	709.54	-156.11	704.54	-106.11	699.65	-96.11	694.84
-66.11	689.65	-41.11	684.65	-6.11	679.45	13.04	678.07	71.2	669.33
203.09	669.53	207.96	667.71	212.14	668.18	215.99	667.71	222.6	670.21
244.99	670.15	272.89	671.76	306.75	677.78	363.89	679.45	378.89	684.24
413.89	689.34	435.89	694.54	453.89	699.34	468.89	704.65	493.89	710.04
513.89	714.45	528.89	719.54	538.89	724.24				

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-226.11 .1 203.09 .05 222.6 .1

Bank Sta: Left Right Coeff Contr. Expan.  
203.09 222.6 .3 .7

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
-226.11 176.89 677.42 F  
249.89 538.89 677.42 F

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy  
Selected Low Flow Methods = Highest Energy Answer

High Flow Method  
Energy Only

Additional Bridge Parameters

Add Friction component to Momentum  
Do not add weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end



WalkerRunFld.rep

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 5198

INPUT

Description: FEMA BIA, D/S XS of Beach Grove Rd Bridge

Station Elevation Data		num= 29		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
-226.11	724.65	-176.11	709.54	-156.11	704.54	-106.11	699.65	-96.11	694.84		
-66.11	689.65	-41.11	684.65	-6.11	679.45	13.04	678.07	71.2	669.33		
203.09	669.53	207.96	665.96	212.14	665.71	215.99	665.85	217.97	666.58		
222.6	670.21	244.99	670.15	272.89	671.76	306.75	677.78	363.89	679.45		
378.89	684.24	413.89	689.34	435.89	694.54	453.89	699.34	468.89	704.65		
493.89	710.04	513.89	714.45	528.89	719.54	538.89	724.24				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
-226.11	.1	203.09	.05	222.6	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	203.09	222.6		89.8	90.1		.3	.7

Ineffective Flow		num= 2		Sta L Sta R		Elev Permanent	
-226.11	176.89	677.42	F				
249.89	538.89	677.42	F				

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 5107

INPUT

Description:

Station Elevation Data		num= 17		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
1.11	677.51	37.49	670.27	96.16	668.4	156.22	668.53	158.69	666.07		
161.58	664.84	163.25	664.65	164.42	664.59	165.79	665.03	166.43	665.04		
169.94	666.9	178.46	667.79	182.69	668.84	193.2	668.9	238.09	668.33		
302.28	669.86	349	678.03								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
1.11	.1	156.22	.05	182.69	.1		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	156.22	182.69		112	112		.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 4995

INPUT

Description: FEMA BHZ

Station Elevation Data		num= 33		Sta Elev		Sta Elev		Sta Elev	
1000	724.34	1010	719.54	1022	714.54	1055	709.65	1075	704.45

WalkerRunFld.rep

1100	699.45	1120	694.84	1140	691.74	1150	691.74	1180	689.34
1270	684.74	1300	676.74	1315	674.84	1390	669.34	1430	667.65
1440	666.24	1450	668.65	1465	669.65	1485	669.54	1540	667.74
1610	669.45	1635	674.54	1662	679.45	1685	690.04	1725	686.74
1750	689.45	1770	694.45	1780	699.34	1810	704.34	1835	709.84
1850	714.34	1870	719.34	1895	724.45				

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1430	.05	1450	.1

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

	1430	1450	180.8	181.3	177.9	.1	.3
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CROSS SECTION

RIVER: Walker Run  
REACH: 1      RS: 4810

INPUT  
Description:

Station Elevation Data      num=      18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.03	22.15	670.47	30.66	668.65	57.63	668.16	111.49	668.7
152.11	668.15	195.12	668.51	201.6	666.51	202.75	663.97	210.2	664.04
214.86	663.49	215.85	664.09	220.3	668.33	253.63	667.96	275.4	667.76
288.1	666.6	321.23	667.68	361.14	676.54				

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	201.6	.05	220.3	.1

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

	201.6	220.3	74	73.7	76	.1	.3
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CROSS SECTION

RIVER: Walker Run  
REACH: 1      RS: 4735

INPUT  
Description: FEMA BHY

Station Elevation Data      num=      31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.65	1015	719.65	1030	714.54	1058	709.84	1068	704.54
1080	701.74	1110	699.45	1140	694.65	1186	689.34	1280	686.74
1390	684.34	1430	683.74	1478	684.45	1620	679.54	1660	674.84
1690	669.54	1860	667.84	1870	664.24	1880	666.54	2000	669.45
2020	674.65	2042	679.84	2075	684.45	2120	689.45	2175	694.74
2225	699.34	2240	704.34	2280	709.65	2330	714.45	2355	719.24
2410	724.65								

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1860	.05	1880	.1

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

	1860	1880	41.8	43	43	.1	.3
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CROSS SECTION

walkerRunFld.rep

RIVER: Walker Run  
REACH: 1

RS: 4692

INPUT

Description:

Station Elevation Data				num=	18				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2.2	676.54	14.2	673.9	29.44	673.96	39.22	671.77	100.41	668.46
182.33	667.17	248.38	667.34	268.47	666.03	281.75	664.29	284.12	662.53
284.81	662.09	290.66	662.02	296.54	662.16	298.07	664.62	299.42	666.98
320.4	666.76	380.91	669.4	431.24	681.51				

Manning's n Values				num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
2.2	.1	248.38	.05	299.42	.1				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	248.38	299.42		188.7	197		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4495

INPUT

Description: FEMA BHX

Station Elevation Data				num=	33				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.65	1020	719.24	1038	714.24	1050	709.45	1058	704.45
1060	703.74	1100	699.24	1148	694.84	1208	689.54	1315	688.74
1500	684.74	1670	683.74	1820	679.74	1905	673.74	1910	674.24
1950	671.74	1990	669.34	2100	667.74	2220	664.74	2230	663.74
2240	664.54	2280	669.54	2300	674.24	2320	679.65	2360	684.24
2420	689.45	2450	694.24	2480	699.24	2510	704.45	2560	709.34
2645	714.24	2740	719.45	2790	724.45				

Manning's n Values				num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	2220	.05	2240	.1				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2220	2240		77.5	81		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4414

INPUT

Description:

Station Elevation Data				num=	13				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5.7	673.7	1.31	671.76	19.96	669.88	70.87	667.77	193.46	667.01
240.89	666.16	297.49	667.18	302.08	662.9	308.32	662.46	313.21	662.89
316.82	666.65	331.76	668.59	406.27	680.82				

Manning's n Values				num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-5.7	.1	297.49	.05	316.82	.1				

WalkerRunFld.rep

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
297.49	316.82	114.9	119	117.5	.1		.3

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 4295

INPUT

Description: FEMA BHW  
 Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.84	1032	719.74	1052	714.24	1075	709.54	1100	704.54
1130	699.34	1158	694.24	1180	689.45	1210	684.65	1262	679.54
1370	674.24	1408	669.34	1470	669.45	1600	667.54	1730	665.24
1735	663.24	1745	665.45	1800	666.45	1820	674.24	1875	679.65
1955	684.65	1985	689.74	2015	694.24	2045	699.24	2060	704.54
2075	709.34	2105	714.24	2152	719.54	2215	724.34		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1730	.05	1745	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1730	1745	160.8	170.5	164.4	.1		.3

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 4130

INPUT

Description:  
 Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9.79	672.78	38.19	668.15	65.97	666.24	127.28	666.03	170.88	665.59
200.6	666.07	205.29	663.4	210.07	661.54	214.21	661.99	216.84	662.54
219.86	666.1	253.95	665.83	269.33	665.98	370.38	665.85	415.17	670.09
549.86	674.65								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9.79	.1	200.6	.05	219.86	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
200.6	219.86	87.5	89.5	81.1	.1		.3

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 4043

INPUT

Description: FEMA BHW  
 Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1030	719.24	1048	714.45	1062	709.45	1080	704.95
1102	699.65	1128	694.34	1150	689.65	1205	684.54	1242	679.34
1330	674.54	1390	671.54	1520	667.84	1620	664.34	1625	662.24
1630	664.84	1740	667.24	1910	669.54	1960	674.65	2040	679.54

walkerRunFld.rep

2125	684.45	2162	689.34	2188	694.74	2210	699.34	2220	704.54
2245	714.45	2258	714.84	2270	719.74	2295	724.34		

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1620	.05	1630	.1

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

1620	1630	67.9	88.3	73.6	.1	.3
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# CROSS SECTION

RIVER: Walker Run  
REACH: 1                      RS: 3972

## INPUT

Description: U/S XS of Market Street Bridge

Station	Elevation	Data	num=	21							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
123.85	674.24	171.83	670.24	197.75	670.47	204.44	667.88	215.91	667.02		
223.06	665.53	249.69	664.89	259.88	664.22	268.46	664.16	270.18	661.21		
277.41	661.6	281.39	661.43	285.52	661.64	287.08	664.59	315.58	665.35		
372.3	666.78	391.2	666.21	536	666.78	559	667.64	748.66	669.45		
788.66	674.34										

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
123.85	.1	268.46	.05	287.08	.1

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

268.46	287.08	101.2	98.1	100.6	.3	.7
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Ineffective Flow      num=      2

Sta L	Sta R	Elev	Permanent
123.85	202.37	670.8	F
341.4	788.66	670.3	F

## BRIDGE

RIVER: Walker Run  
REACH: 1                      RS: 3914

## INPUT

Description: Market Street Bridge

Distance from Upstream XS =    40.1

Deck/Roadway width            =    43.1

Weir Coefficient                =    2.5

Upstream Deck/Roadway Coordinates

num=	16										
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	673.611	673.611	71.3	672.778	672.278	151.64	671.546	671.546			
216.18	671.069	671.069	254.71	670.8	664.72	260.35	670.8	663.3			
260.36	673.78	663.04	260.37	673.78	669.04	272.2	673.78	669.04			
283.42	673.78	669.04	283.43	673.78	663.08	285	673.78	664.36			
285.1	670.45	664.36	287.02	670.3	665.83	339.19	669.234	669.234			
435.84	667.629	667.629									

Upstream Bridge Cross Section Data

Station	Elevation	Data	num=	19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-113.65	679.5	-20.65	674.7	0	673.611	71.3	672.778	151.64	671.546		
216.18	671.069	254.71	664.72	261	663.04	272.49	661.04	283.42	663.08		



WalkerRunFld.rep

287.02	665.83	339.19	669.234	435.84	667.629	464.35	668.7	554.35	669.7
604.35	674.8	684.35	679.7	769.35	684.6	1000	684.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-113.65	.1	254.71	.05	287.02	.1

Bank Sta: Left Right Coeff Contr. Expan.

254.71	287.02	.3	.7
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-113.65	202.37	670.8	F
341.4	1000	670.3	F

#### Downstream Deck/Roadway Coordinates

num= 15

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	673.611	673.611	71.3	672.778	672.278	151.64	671.546	671.546
216.18	671.069	671.069	254.71	670.8	664.72	260.35	670.8	661.95
260.36	673.42	668.72	272.2	673.42	668.72	283.42	673.42	668.72
283.43	673.42	661.35	285	673.42	664.36	285.1	670.45	664.36
289.14	670.3	664.78	339.19	669.234	669.234	435.84	667.629	667.629

#### Downstream Bridge Cross Section Data

Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-350	679.5	-113.65	679.5	-20.65	674.7	0	673.611	71.3	672.778
151.64	671.546	216.18	671.069	254.71	664.72	261	663.04	272.49	661.04
283.42	663.08	287.02	665.83	339.19	669.234	435.84	667.629	464.35	668.7
554.35	669.7	604.35	674.8	684.35	679.7	769.35	684.6		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-350	.1	-113.65	.1	254.71	.055	287.02	.1

Bank Sta: Left Right Coeff Contr. Expan.

254.71	287.02	.4	.8
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Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-350	200	670.9	F
310	769.35	670.3	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 668.7  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

#### Low Flow Methods and Data

Energy  
 Selected Low Flow Methods = Highest Energy Answer

#### High Flow Method

Pressure and weir flow  
 Submerged Inlet Cd = 1.5  
 Submerged Inlet + Outlet Cd = .8  
 Max Low Cord = 670.1

#### Additional Bridge Parameters

walkerRunFld.rep

Add Friction component to Momentum

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3860

INPUT

Description: D/S XS of Market Street Bridge

Station Elevation Data		num= 15		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
117.66	675.84	137.05	672.03	181.62	671.65	219.23	671.09	253.06	668.65		
262.64	664.21	265.16	663.32	266.08	661.15	272.52	660.73	283.67	661.59		
288.12	663.96	295.78	666.15	334.66	665.91	349.26	667.65	357.79	668.52		

Manning's n Values

Sta n Val		num= 3		Sta n Val	
117.66	.1	265.16	.055	288.12	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	265.16	288.12		75.5	68.6	74.8	.4

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev			
117.66	200	670.9	F		
310	357.79	670.3	F		

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3785

INPUT

Description: FEMA BHU

Station Elevation Data		num= 31		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
1000	724.34	1022	719.24	1052	714.84	1085	709.45	1110	704.45		
1140	699.34	1172	689.54	1260	684.65	1290	679.74	1318	674.84		
1360	669.34	1412	664.95	1430	660.24	1440	665.95	1500	665.84		
1550	667.24	1580	666.74	1650	666.15	1760	669.45	1800	674.34		
1900	676.54	1980	679.54	2035	684.65	2055	689.45	2080	694.54		
2095	699.45	2108	707.65	2118	709.65	2130	714.45	2140	719.34		
2150	724.34										

Manning's n Values

Sta n Val		num= 3		Sta n Val	
1000	.1	1412	.055	1440	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1412	1440		63.5	56.1	58.3	.1

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3735

INPUT

walkerRunFld.rep

Description:

Station Elevation Data			num= 25							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
46.72	679.91	74.63	675.8	101.02	670.65	135.38	669.18	157.56	666.89	
181.15	666.12	181.25	664.03	182.71	662.51	184.32	662.24	185.67	660.86	
187.89	660.4	192.29	660.36	196.75	660.67	199.82	660.74	207.26	665.22	
222.51	665.76	281.32	665.28	293.21	664.71	340	664	396	664	
402	665	420	666	422	666	440	666	642.15	669.34	

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
46.72	.1	181.15	.055	207.26	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	181.15	207.26		208.1	193.9		.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3532

INPUT

Description: FEMA BHT

Station Elevation Data			num=		40						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1055	719.34	1095	715.15	1155	709.45	1190	704.84		
1240	699.45	1280	694.84	1330	689.54	1368	684.95	1390	679.74		
1428	674.34	1455	671.09	1479.93	668.1	1496.1	666.46	1510.17	662.05		
1513.34	660.29	1514.53	659.03	1518.38	658.71	1519.83	658.78	1524.51	659.04		
1527.37	664.82	1537.93	664.34	1612.95	662.99	1728.54	663.46	1730	665.04		
1750	666.34	1770	665.74	1850	666.34	1975	669.34	2000	674.74		
2125	679.34	2180	684.34	2200	690.15	2222	694.34	2232	699.95		
2262	704.84	2285	709.84	2325	714.45	2372	719.95	2415	724.34		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.08	1496.1	.06	1527.37	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1496.1	1527.37		123.6	125		.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3410

INPUT

Description:

Station Elevation Data				num=	19						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev		
33.79	674.7	76.45	668.35	118.62	664.23	127.12	658.22	129.14	657.83		
131.86	658.02	136.11	657.9	138.1	658.16	141.34	659.72	154.15	659.99		
159.04	661.67	173.29	662.2	193.85	659.88	228.32	660.18	314.35	662.42		
376	661.82	381.4	662.93	385.18	663.96	402.12	664.21				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
33.79	.08	118.62	.05	141.34	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	118.62	141.34		36.2	35		.1	.3

walkerRunFld.rep

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3375

INPUT

Description: FEMA BHS

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1095	719.34	1140	714.45	1170	709.84	1220	704.45
1275	699.65	1285	694.45	1305	689.54	1320	684.34	1338	679.95
1360	674.65	1420	664.54	1443	659.24	1448	657.24	1460	658.34
1550	658.95	1680	664.84	1705	664.24	1800	666.74	1978	669.45
2042	674.65	2080	679.74	2100	685.04	2125	689.34	2140	694.95
2162	699.45	2180	704.84	2225	709.84	2260	714.34		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.08	1443	.05	1460	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1443	1460		92.9	96	103.3	.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3278

INPUT

Description:

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40.42	666.96	56.89	663.45	68.65	662.53	75.07	662.03	79.29	658.4
81.65	657.27	82.94	657.07	85.53	657.01	86.77	657.6	90.32	660.28
96.28	660.96	102.77	661.42	111.91	662.29	155.88	661.02	343	662.66
653	665.2								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
40.42	.06	75.07	.05	90.32	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	75.07	90.32		195.6	214	204.6	.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3065

INPUT

Description: FEMA BHR

Station Elevation Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.24	1095	719.84	1110	714.74	1210	709.34	1260	704.34
1290	699.54	1300	695.04	1315	689.84	1330	684.45	1355	679.45
1385	674.95	1405	669.74	1425	664.54	1510	656.74	1520	655.95
1530	656.15	1670	661.45	1805	664.34	1828	666.54	1978	669.65
2070	671.34	2178	674.65	2210	679.34	2248	687.54	2285	689.95
2310	694.84	2355	699.34	2420	704.34	2525	709.34		

walkerRunFld.rep

Manning's n Values  
 Sta n Val Sta n Val  
 1000 .06 1510 .05 1530 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 1510 1530 129.8 116.6 121.4 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 2949

INPUT

Description:

Station	Elevation	Data	num=	16	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
34.18	664.58	74.16	659.96	96.72	659.48	132.97	659.67	148.16	660.33			
152.24	655.9	153.74	655.8	155.46	655.77	156.94	655.96	158.15	656.45			
164.41	660.28	192.14	659.68	255.96	659.64	464.54	662.65	474.11	665.45			
491.53	665.76											

Manning's n Values  
 Sta n Val Sta n Val  
 34.18 .06 148.16 .05 164.41 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 148.16 164.41 211 213.4 221.1 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 2730

INPUT

Description: FEMA BHQ

Station	Elevation	Data	num=	41	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-421.78	724.45	-301.78	719.95	-223.78	714.45	-179.78	709.34	-159.78	704.34			
-153.78	699.84	-121.78	694.54	-109.78	689.54	-93.78	684.54	-71.78	679.34			
-53.78	674.34	48.22	671.45	166.22	669.54	173.22	669.04	247.22	664.34			
302.74	659	389.32	658	396.22	656.24	408.22	654.74	415.22	656.24			
458.22	656.74	578.22	662.24	717.97	663	739.24	664	745.24	665			
754.54	668	774.2	668	792.47	668	798.22	667.34	878.22	666.24			
1043.22	669.65	1258.22	671.65	1296.22	674.74	1338.22	679.54	1383.22	684.54			
1418.22	689.24	1433.22	694.95	1453.22	699.95	1478.22	704.34	1558.22	709.24			
1593.22	714.34											

Manning's n Values  
 Sta n Val Sta n Val  
 -421.78 .06 396.22 .05 415.22 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 396.22 415.22 99.6 93.9 94.4 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 2634



# walkerRunFld.rep

## INPUT

Description:

Station	Elevation	Data	num=	15							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
5.46	666.85	121.54	661.36	218.2	657.67	260.41	658.53	265.68	658.26		
269.53	654.41	272.46	653.74	274.6	653.83	275.22	654.29	275.87	655.2		
282.17	658.65	550.04	660.42	638.28	663.53	654	664.03	663	667.65		

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
5.46	.06	265.68	.05	282.17	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
265.68	282.17	137.8	138	136.4		.1	.3

## CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 2497

## INPUT

Description: U/S XS of walker Run Crossing

Station	Elevation	Data	num=	23							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
12.53	665.89	39.47	664.2	44.97	663.57	107.45	659.28	166.22	657.83		
205.6	657.61	262.97	657.78	280.78	656.99	283.96	654.28	286.94	653.51		
288.71	653.76	291.25	653.78	294.33	654.23	295.69	655.07	296.61	655.54		
297.97	657.53	303.08	657.83	439.74	659.15	528.78	658.58	585.34	660.05		
658.58	665.36	678.36	665.96	682.31	667.16						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
12.53	.06	280.78	.05	297.97	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
280.78	297.97	33.8	35.1	35.9		.3	.7

## BRIDGE

RIVER: walker Run

REACH: 1

RS: 2480

## INPUT

Description: walker Run Crossing

Distance from Upstream XS = 9.5

Deck/Roadway width = 13.8

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num=	29										
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord			
11.87	665.82	665.82	47.14	662.724	662.724	74.04	660.848	660.848			
113.05	659.88	659.28	162.23	658.903	658.06	172.76	658.91	657.83			
211.42	658.93	657.61	287.93	658.98	657	289.31	658.99	655			
290	659.02	654.27	292.65	659.05	653.74	292.65	659.05	657.67			
294.77	659.103	657.67	297.73	659	657.67	297.74	659	654.24			
297.95	659	654.24	301.58	658.9	655	301.83	658.9	655.06			
303.52	658.95	655.54	304.43	658.97	657.53	310.59	659.05	657.82			
422.97	660.036	657.82	447.67	660.3	659.14	533.91	660.9	658.57			
591.63	661.4	660.06	605.41	662.027	661	653	665	664.61			
665.09	666	665.37	694.26	667.627	667.627						

## WalkerRunFld.rep

## Upstream Bridge Cross Section Data

Station Elevation Data		num= 24							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
11.87	665.882	39.22	664.19	46.11	663.57	113.05	659.28	172.76	657.83
211.42	657.61	270.23	657.78	287.93	657	290	654.27	293.2	653.74
295.57	653.36	295.74	653.75	297.74	653.79	297.95	654.24	301.83	655.06
303.52	655.54	304.43	657.53	310.59	657.82	447.67	659.14	533.91	658.57
591.63	660.06	653	664.61	665.09	665.37	694.25	667.63		

## Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
11.87	.06	287.93	.05	304.43	.06

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	287.93	304.43		.3	.7

## Downstream Deck/Roadway Coordinates

num= 31									
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	
11.87	665.82	665.82	47.14	662.724	662.724	62.28	661.7	659.98	
74.04	660.848	658.43	114.78	659.4	658.43	162.23	658.903	657	
222.04	658.91	657.5	268.28	658.96	657.91	282.83	658.98	657.41	
289.31	658.99	654	290.86	659.01	654.02	292.33	659.02	653.93	
292.65	659.05	653.74	292.66	659.05	657.67	294.77	659.103	657.67	
297.73	659	657.67	297.74	659	654.24	298.39	659	654.38	
301.58	658.9	655	302.27	658.9	657.21	365.85	659.8	658.01	
380.66	659.9	659.03	418.1	659.99	659.03	422.97	660.036	658.78	
520.51	661	658.78	538.81	661.1	659.14	544.9	661.2	659.31	
605.41	662.027	660	615.07	662.1	661.25	669.45	665	664.61	
694.26	667.627	667.627							

## Downstream Bridge Cross Section Data

Station Elevation Data		num= 24							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	665.882	11.87	665.882	50.11	662.78	62.28	659.98	114.78	658.43
222.04	657.5	268.28	657.91	282.83	657.41	290.86	654.02	292.33	653.93
293.18	653.85	295.81	653.81	296.52	654.02	298.39	654.38	302.27	657.21
365.85	658.01	380.66	659.03	418.1	659.03	520.51	658.78	538.81	659.14
544.9	659.31	615.07	661.25	669.45	664.61	694.25	667.63		

## Manning's n Values

num= 4					
Sta	n Val	Sta	n Val	Sta	n Val
-10	.06	11.87	.06	282.83	.05
				302.27	.06

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	282.83	302.27		.3	.7

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 659.2  
 Energy head used in spillway design =  
 Spillway height used in design =  
 weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

## Low Flow Methods and Data

Energy  
 Selected Low Flow Methods = Highest Energy Answer

## High Flow Method

Pressure and weir flow

WalkerRunFld.rep

Submerged Inlet Cd = 1.5  
 Submerged Inlet + Outlet Cd = .8  
 Max Low Cord = 658.5

Additional Bridge Parameters

Add Friction component to Momentum  
 Do not add weight component to Momentum  
 Class B flow critical depth computations use critical depth  
 inside the bridge at the upstream end  
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Walker Run  
 REACH: 1

RS: 2462

INPUT

Description: D/S XS of walker Run Crossing

Station Elevation Data		num= 22		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9.2	666.86	49.93	662.78	70.39	659.98	130.3	658.42	237.98	657.49		
283.65	657.9	298.45	657.41	305.06	654.03	307.41	653.92	309.95	653.86		
311.78	654.02	315.94	654.96	317.95	657.21	381.94	658.01	396.57	659.03		
433.04	659.03	535.44	658.78	555.06	659.14	560.39	659.8	629.95	661.26		
684.19	664.6	700.62	665.24								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9.2	.06	298.45	.05	317.95	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	298.45	317.95		117	123	126.5	.3
							.7

CROSS SECTION

RIVER: Walker Run  
 REACH: 1

RS: 2339

INPUT

Description: FEMA BHP

Station Elevation Data		num= 34		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1030	719.34	1080	714.65	1108	710.15	1130	704.54		
1150	699.45	1170	694.54	1195	689.54	1225	684.65	1240	679.24		
1295	674.54	1400	669.95	1500	666.74	1590	664.54	1630	663.34		
1700	664.34	1735	664.95	1772	664.45	1825	659.24	1888	659.65		
2100	657.34	2145	655.34	2250	653.24	2268	654.45	2350	656.45		
2440	659.84	2600	661.34	2735	664.54	2755	666.54	2900	667.34		
3100	667.54	3250	669.24	3350	671.34	3465	674.65				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.06	2145	.05	2268	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	2145	2268		62.3	64.8	61.8	.1
							.3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 2274

## INPUT

Description:

Station Elevation Data			num=	19						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-85.7	666.85	-46.1	663.17	-23	659.97	16.47	657.72	45.83	658.28	
67.54	658.17	89.33	656.46	91.41	654.78	92.23	652.48	95.09	651.42	
99.01	652.22	102.9	653.21	104.42	653.39	105.71	655.36	121.29	656.82	
507.83	659.46	557.25	660.35	636	663.34	650.4	665.34			

Manning's n Values			num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
-85.7	.06	89.33	.05	105.71	.06				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	89.33	105.71		136.2	136.2		.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 2139

## INPUT

Description:

Station Elevation Data			num=	23						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-101	660.01	41.82	658.6	77.75	655.4	217.23	654.68	305.8	654.64	
307.09	656.3	314.38	656.84	327.19	656.9	354.66	655.54	357.53	654.39	
358.78	652.08	360.05	651.18	362.06	650.72	364.09	651.21	366.47	651.49	
369.75	654.6	370.25	655.38	374.79	656.34	396.01	655.99	767.34	658.35	
818.4	659.6	905	662.46	916.1	663.58					

Manning's n Values			num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
-101	.06	354.66	.05	370.25	.06				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	354.66	370.25		126.7	129		.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 2010

## INPUT

Description: FEMA BHO

Station Elevation Data			num=	23						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
1000	689.34	1100	686.54	1230	684.34	1275	679.45	1340	674.84	
1450	670.04	1635	664.45	1798	659.74	2030	656.54	2295	655.65	
2298	654.34	2300	655.95	2460	655.95	2470	654.34	2475	655.95	
2600	654.74	2715	654.34	2740	652.24	2750	654.54	2960	657.34	
3230	659.65	3345	664.65	3360	664.45					

Manning's n Values			num=	3					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val		
1000	.06	2715	.05	2750	.06				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	2715	2750		84.1	85.6		.1	.3

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CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 1925

INPUT

Description:

Station Elevation Data				num=	21				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-232.06	658.01	-166.67	655.4	34.55	654.38	78.78	654.68	85.55	655
101.09	655.65	109.35	655.67	111.58	653.77	113.72	652.28	115.93	651.72
120.12	651.09	123.07	651.4	125.43	652.9	126.09	654.67	128.49	655.57
142.56	655.17	278.44	654.58	368.74	655.3	496.43	655.55	623.92	656.57
700.01	659.91								

Manning's n Values				num=	3		
Sta	n Val	Sta	n Val	Sta	n Val		
-232.06	.06	109.35	.05	128.49	.06		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	109.35	128.49		282.6	325.9	.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 1602

INPUT

Description:

Station Elevation Data				num=	21				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-627.1	658.01	-562.09	656.01	-429.8	655.01	-285.4	654.01	20.81	654.67
48.57	654.71	66.44	654.61	72.14	654.79	85.07	654.21	87.82	651.4
91.51	650.67	93.9	650.84	96.86	651.6	98.18	651.9	100.7	654.03
108.02	654.27	243	654.08	428.23	655.01	456.83	656.01	487.78	657.01
560.78	658.01								

Manning's n Values				num=	3		
Sta	n Val	Sta	n Val	Sta	n Val		
-627.1	.08	85.07	.06	100.7	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85.07	100.7		202.2	203.5	.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 1402

INPUT

Description:

Station Elevation Data				num=	38				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-214.73	660.01	-151.73	657.01	-116.53	656.01	-65.33	655.01	-57.33	654.01
-47.9	653.01	-26.6	653.01	61.72	652.96	129.69	653.53	136.69	653.6
143.69	653.86	148.69	654.03	153.69	654.21	156.09	654.04	156.39	652.1
156.89	651.34	158.69	650.52	160.49	650.2	161.99	649.8	163.69	649.82
165.69	649.95	166.99	650.67	168.49	651.36	169.29	651.84	169.89	653.64
172.09	654.15	177.99	653.93	183.69	653.92	187.1	653.79	232.35	653.34



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246.57	653.84	359.8	654.16	416.89	654.15	519.9	654.01	527.8	655.01
536.5	656.01	540.2	657.01	548.5	658.01				

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
-214.73	.08	156.09	.06	169.89	.08

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

156.09	169.89	183	194	196.3	.1	.3
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CROSS SECTION

RIVER: Walker Run  
REACH: 1      RS: 1208

INPUT

Description: FEMA BHN

Station Elevation Data	num=	18							
Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev									
1000      724.54      1035      719.34      1060      714.65      1080      709.34      1165      699.54									
1190      694.84      1225      689.54      1265      684.95      1380      674.54      1470      669.65									
1528      665.15      1570      659.45      1680      651.74      1740      651.34      1752      650.74									
1765      651.34      2205      659.24      2220      664.24									

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.08	1740	.06	1765	.08

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

1740	1765	228.9	218.5	209.9	.1	.3
------	------	-------	-------	-------	----	----

CROSS SECTION

RIVER: Walker Run  
REACH: 1      RS: 990

INPUT

Description:

Station Elevation Data	num=	17							
Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev									
-41.4      660.01      -4.3      656.01      32.63      652.9      63.74      651.93      118.97      653.07									
125.76      650.82      126.92      650.45      132.87      649.47      135.28      649.66      136.76      650.43									
138.23      653.22      149.36      652.61      186.43      652.59      234.63      654.38      362.19      653.45									
497.17      656.01      516.5      658.01									

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
-41.4	.08	118.97	.06	138.23	.08

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

118.97	138.23	56.8	56.5	58.9	.1	.3
--------	--------	------	------	------	----	----

CROSS SECTION

RIVER: Walker Run  
REACH: 1      RS: 933

INPUT

Description: FEMA BHM

Station Elevation Data	num=	26
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.54	1035	719.54	1088	714.74	1120	710.04	1152	704.34
1200	699.74	1238	694.84	1270	689.84	1290	684.65	1340	679.95
1402	674.95	1445	669.34	1480	664.45	1530	659.74	1590	654.45
1700	650.95	1710	649.74	1720	650.65	1750	654.54	1900	657.04
2080	659.84	2200	663.45	2300	663.65	2400	663.45	2500	664.95
2590	664.34								

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
1000 .09	1700 .05	1720 .09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	1700	1720		48.7	48.4	45.9	.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 884

INPUT

Description: U/S XS of Private Farm Road

Station Elevation Data			num=	19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-288	691.97	-147.11	671.47	-33	660.01	12.49	656.08	52.79	653.68
71.68	653.18	101.89	653.2	117.08	652.72	120.1	649.74	121.4	649.01
123.02	648.62	125.03	649.16	129.44	653.21	174.49	652.41	194.38	652.9
524	662.27	538	663.17	560.8	664.45	607.89	664.67		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
-288 .09	117.08 .05	129.44 .09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	117.08	129.44		20.6	19.1	19.6	.3	.7

Ineffective Flow	num=	2
Sta L Sta R Elev	Permanent	
-288 112.93 652.53	F	
133.68 607.89 652.53	F	

CULVERT

RIVER: Walker Run  
REACH: 1

RS: 875

INPUT

Description: Private Farm Road

Distance from Upstream XS = 1.6

Deck/Roadway width = 15.1

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num= 17											
Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord				Sta Hi Cord Lo Cord			
12.14	656.071	656.071		52.52	653.686	653.686		71.38	653.5	653.18	
115.86	653.386	649.74		122.61	652.528	648.62		122.83	652.53	648.66	
124.23	652.54	648.9		130.22	653.444	653.21		173.58	653.2	652.41	
194.42	653.1	652.9		217.91	652.805	652.805		378.6	653.084	653.084	
465.08	656.47	656.47		522.51	662.265	662.265		535.78	663.101	663.101	
535.81	663.177	663.177		535.99	663.037	663.037					

Upstream Bridge Cross Section Data

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Station Elevation Data				num=	20			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-322.11	691.97	-147.11	671.47	-2.11	656.57	12.14	656.071	
71.38	653.18	101.3	653.2	116.89	652.72	120.15	649.74	
121.18	649.01	122.65	648.62	124.23	648.9	124.43	649.16	
173.58	652.41	194.42	652.9	297.89	656.07	337.89	656.67	

Manning's n Values				num=	3	
Sta	n Val	Sta	n Val	Sta	n Val	
-322.11	.09	116.89	.05	129.48	.09	

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	116.89	129.48		.3	.7

Ineffective Flow				num=	2	
Sta L	Sta R	Elev	Permanent			
-322.11	112.93	652.53	F			
133.68	607.89	652.53	F			

Downstream Deck/Roadway Coordinates								
num= 24								
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
12.14	656.071	656.071	52.52	653.686	653.686	77.11	653.4	652.55
115.86	653.386	651.91	122.61	652.528	649.92	122.73	652.53	650.54
122.85	652.53	651.24	123.07	652.53	651.64	123.32	652.53	651.8
123.57	652.53	651.64	123.79	652.53	651.24	123.91	652.53	650.54
124.03	652.53	650.11	126.1	652.53	648.93	130.22	653.444	649.62
136.9	653.4	652.21	185.27	653.2	652.86	217.91	652.805	652.8
378.6	653.084	653.084	465.08	656.47	656.47	522.51	662.265	662.265
535.78	663.101	663.101	535.81	663.177	663.177	535.99	663.037	663.037

Downstream Bridge Cross Section Data							
num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-322.11	691.97	-147.11	671.47	-2.11	656.57	12.14	656.071
77.11	652.55	116.71	651.91	123.34	649.92	124.03	650.11
126.1	648.93	130.12	649.62	136.9	652.21	185.27	652.86
297.89	656.07	337.89	656.67	607.89	664.667		

Manning's n Values				num=	3	
Sta	n Val	Sta	n Val	Sta	n Val	
-322.11	.09	116.71	.05	136.9	.09	

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	116.71	136.9		.3	.7

Ineffective Flow				num=	2	
Sta L	Sta R	Elev	Permanent			
-322.11	109	652.53	F			
136	607.89	652.53	F			

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins = 654.4  
Energy head used in spillway design =  
Spillway height used in design =  
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2.75	
FHWA Chart # 2 - Corrugated Metal Pipe Culvert			
FHWA Scale # 3 - Pipe projecting from fill			

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Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef  
Exit Loss Coef

2.2 14.9 .023 .023 .1 .9

1  
Upstream Elevation = 648.96  
Centerline Station = 123.3  
Downstream Elevation = 649.411  
Centerline Station = 123.2

CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 863

INPUT

Description: D/S XS of Private Farm Road

Station Elevation Data num= 15  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
-294 691.97 -147.11 671.47 -22.2 660.01 24.99 655.04 34.67 653.86  
72.57 652.55 113.12 651.91 120.43 649.92 123.41 648.96 126.4 649.62  
133.22 652.21 182 652.85 214.18 652.8 518.46 662.27 588 664.67

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-294 .09 113.12 .05 133.22 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
113.12 133.22 157.2 147.1 138.4 .3 .7

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
-294 109 652.53 F  
136 588 652.53 F

CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 715

INPUT

Description:

Station Elevation Data num= 17  
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
-92.4 658.01 2.21 655.41 40.88 653.76 46.14 653.57 77.95 651.4  
100.08 650.67 101.47 648.52 104.64 647.91 107.47 647.9 108.96 648.04  
110.34 648.14 111.67 648.52 114.47 650.93 126.37 650.97 191.93 651.64  
278.3 653.09 365.34 656.46

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-92.4 .09 100.08 .05 114.47 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
100.08 114.47 172 178.4 188.1 .1 .3

CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 536

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INPUT

Description:

Station Elevation Data		num= 16							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-86.6	657.01	-45.02	655.01	5.76	652.05	48.16	650.97	149.99	651.14
170.47	649.65	172.89	647.93	174.84	647.22	176.44	647.18	179.25	646.97
182.05	647.71	182.91	648.29	184.3	650.54	191.59	650.96	206.95	652.58
269.71	656.85								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-86.6	.09	170.47	.05	184.3	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	170.47	184.3		89.9	107		.1	.3

CROSS SECTION

RIVER: walker Run

REACH: 1 RS: 428

INPUT

Description: FEMA BHL

Station Elevation Data		num= 28							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	686.54	1050	684.84	1090	679.84	1110	674.45	1130	669.65
1150	664.54	1210	659.34	1250	655.54	1350	651.74	1410	649.34
1430	647.24	1440	649.65	1550	654.34	1605	656.65	1630	659.45
1750	661.74	1860	664.45	2000	666.54	2100	667.34	2180	667.84
2365	669.34	2450	671.34	2540	674.54	2640	684.34	2700	689.54
2750	699.34	2800	704.65	2920	709.45				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1410	.05	1440	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1410	1440		84.2	119.6		.1	.3

CROSS SECTION

RIVER: walker Run

REACH: 1 RS: 350

INPUT

Description:

Station Elevation Data		num= 18							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
7.67	656.47	30.04	652.51	50.26	651.27	122.31	650.39	128.41	647.64
131.05	647.09	132.71	647.08	135.14	647.17	138.64	647.65	139.08	648.11
140.48	648.18	141.29	649.59	150.13	650.23	156.97	649.72	249.39	650.76
267.01	652.4	309.86	655.02	325.84	655.85				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
7.67	.09	122.31	.05	141.29	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	122.31	141.29		169.4	222.4		.1	.3

CROSS SECTION

walkerRunFld.rep

RIVER: Walker Run  
REACH: 1

RS: 185

INPUT

Description:

Station	Elevation	Data	num=	20	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8.8	659.55	15.53	658.78	23.2	653.48	25.13	652.64	29.31	649.46			
32.38	649.12	33.4	647.67	34.97	646.89	37.17	646.4	40.26	646.66			
42.19	646.41	44.77	646.96	46.4	647.15	49.26	649.32	59.74	649.89			
197.88	650.38	234.08	652.49	273.02	654.62	299.87	655.74	305.41	656.59			

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
8.8	.09	32.38	.05	49.26	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	32.38	49.26		39.3	58		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 147

INPUT

Description: FEMA BHK

Station	Elevation	Data	num=	36	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	699.45	1040	694.84	1100	691.54	1170	689.54	1210	687.54			
1260	682.65	1340	684.95	1400	681.65	1440	679.65	1490	676.95			
1530	674.84	1555	669.65	1580	664.34	1610	659.24	1640	655.04			
1650	649.45	1660	646.74	1670	649.34	1750	651.74	1830	654.84			
1870	655.84	1900	654.74	1925	659.34	2100	661.54	2240	664.95			
2450	666.74	2623	669.65	2720	674.65	2760	679.34	2800	684.54			
2838	689.54	2848	694.34	2900	699.45	2940	704.45	3010	709.45			
3100	714.45											

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1650	.05	1670	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1650	1670		138.5	154.5		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 011

INPUT

Description:

Station	Elevation	Data	num=	19	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-177.52	656.04	33.24	653.12	38.49	652.67	45.07	649.46	51.29	648.2			
53.81	646.7	54.7	645.84	57.12	645.71	59.41	645.74	61.18	646.53			
64.38	648.11	69.53	648.34	79.21	649.32	111.92	649.09	167.8	651.4			
249.3	651.46	251.06	651.01	293.8	653.77	352.41	660.72					

Manning's n Values

num= 3



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Sta	n Val	Sta	n Val	Sta	n Val
-177.52	.09	51.29	.05	64.38	.09

Bank Sta: Left 51.29 Right 64.38 Lengths: Left 39.9 Channel 38 Right 43.7 Coeff Contr. .3 Expan. .7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-177.52	42	652.95	F
90	352.41	652.95	F

BRIDGE

RIVER: walker Run  
REACH: 1 RS: -10

INPUT

Description: Market Street  
Distance from Upstream XS = 8.5  
Deck/Roadway width = 24.9  
Weir Coefficient = 2.5  
Upstream Deck/Roadway Coordinates  
num= 19

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-172.52	655.288		32.59	653.113		44.69	652.945	
44.69	654.155		62.11	656.025	644.195	62.5	656.045	646.915
62.61	656.065	647.975	63.5	656.085	649.645	65.5	656.125	650.645
65.9	656.125	650.675	66.3	656.125	650.645	68.3	656.085	649.645
69.6	656.065	647.975	70	656.045	646.915	70.35	656.025	644.915
98.44	654.145		98.45	652.945		172.12	652.5	
253.49	653.245							

Upstream Bridge Cross Section Data

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-172.52	655.288	32.43	652.375	38.83	651.925	48.62	648.705	55.15	647.445
59.2	645.945	61.39	645.095	65.45	644.995	67.71	645.785	70.85	647.355
86.15	648.555	116.5	649.245	172.12	652.5	253.49	653.245	332.2	654.325
350.6	655.245	358.85	656.245						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-172.52	.09	55.15	.05	70.85	.09

Bank Sta: Left 55.15 Right 70.85 Coeff Contr. .3 Expan. .7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-172.52	42	652.95	F
90	358.85	652.95	F

Downstream Deck/Roadway Coordinates

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-199.02	655.288		6.09	653.113		18.19	652.945	
18.19	653.665		35.61	656.025	645.195	36	656.075	647.915
36.11	656.095	648.765	37	656.165	649.835	39	656.225	650.835
39.4	656.225	650.865	39.8	656.225	650.835	41.8	656.165	649.835
43.1	656.095	648.765	43.5	656.075	647.995	43.85	656.025	646.665
71.94	654.415		71.95	652.945		145.62	652.5	
226.99	653.245							

Downstream Bridge Cross Section Data

# walkerRunFld.rep

Station Elevation Data				num=	20				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-199.02	655.288	-6.99	653.185	1.13	653.145	13.19	650.795	26.39	648.445
31.8	647.955	33.72	646.465	36.22	645.845	39.63	644.505	42.3	643.715
44.81	644.305	48.1	645.855	51	647.395	61.17	647.815	72.07	651.545
145.62	652.5	226.99	653.245	332.2	654.325	350.6	655.245	358.85	656.245

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
-199.02	.09	31.8	.05	51	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	31.8	51		.3	.7

Ineffective Flow				num=	2
Sta L	Sta R	Elev	Permanent		
-199.02	15.72	652.95	F		
63.89	358.85	652.95	F		

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
Maximum allowable submergence for weir flow = .98  
Elevation at which weir flow begins = 654.4  
Energy head used in spillway design =  
Spillway height used in design =  
weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

## Low Flow Methods and Data

Energy  
Selected Low Flow Methods = Highest Energy Answer

## High Flow Method

Pressure and weir flow	
Submerged Inlet Cd	= 1.5
Submerged Inlet + Outlet Cd	= .8
Max Low Cord	= 652.5

## Additional Bridge Parameters

Add Friction component to Momentum  
Do not add weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end  
Criteria to check for pressure flow = Upstream energy grade line

## CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: -30

## INPUT

### Description:

Station Elevation Data				num=	20				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-199.02	656.04	-46.68	654.28	-4.4	653.95	4.43	653.9	17.96	651.54
30.08	649.2	35.6	648.71	37.35	647.22	38.98	646.6	41.82	645.27
45.52	644.46	48.05	645.07	52.27	646.61	53.56	648.15	63.11	648.57
79.88	650.16	85.95	652.29	181.4	651.9	273.84	653.77	319.73	659.02

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
-199.02	.09	35.6	.05	53.56	.09

walkerRunFld.rep

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	35.6	53.56		39.8	41.7		.3	.7
Ineffective Flow	num=		2					
Sta L	Sta R	Elev	Permanent					
-199.02	15.72	652.95	F					
63.89	319.73	652.95	F					

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: -78

INPUT

Description:

Station	Elevation	Data	num=	17						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-15	653.95	8.17	649.27	36.56	649.66	42.24	648.9	46.48	646.51	
49.12	645.82	52.33	645.43	54.96	645.72	58.47	646.11	62.68	648.65	
65.38	648.62	71.37	648.11	81.36	648.01	96.66	649.71	189	651.01	
294.7	652.01	299.5	653.01							

Manning's	n Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-15	.09	36.56	.05	62.68	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	36.56	62.68		70.8	70.8		.1	.3

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: -154

INPUT

Description:

Station	Elevation	Data	num=	16						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-151.5	656.03	0	654.28	13.15	649.96	23.45	649.01	28.15	648.96	
30.73	645.21	33.05	644.9	35.85	645.52	40.46	645.66	41.74	646.07	
43.72	648.39	63.07	648.9	97	649.15	199.07	650.01	206.89	651.01	
218.8	653.01									

Manning's	n Values	num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
-151.5	.09	28.15	.05	43.72	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	28.15	43.72		75	75		.1	.3

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: -255

INPUT

Description: FEMA BHJ

Station	Elevation	Data	num=	22						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
1000	684.34	1092	679.54	1128	674.34	1170	669.34	1230	664.54	

walkerRunFld.rep									
1310	660.04	1330	657.54	1350	654.84	1372	649.74	1405	647.24
1408	645.74	1412	647.95	1450	649.65	1490	649.24	1525	649.34
1570	649.04	1610	649.84	1670	654.34	1712	659.34	1740	664.84
1750	669.34	1790	674.84						

Manning's	n Values		num=	3					
Sta	n Val	Sta	n Val	Sta	n Val				
1000	.09	1405	.05	1412	.09				

Bank Sta:	Left	Right	Coeff	Contr.	Expan.				
	1405	1412		.1	.3				

## Appendix H: Proposed Conditions Model

- HEC-RAS Reports
- HEC-RAS Cross-Sections
- HEC-RAS Profiles

HEC-RAS Plan: Prop

River	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
Walker Run	1	5862	100 yr	1640.00	675.53	680.72	680.72	681.63	0.022574	10.82	320.74	162.83	0.92
Walker Run	1	5862	100 yr encroachm	1640.00	675.53	681.58	681.58	683.30	0.024616	12.77	206.82	58.12	0.99
Walker Run	1	5862	500 yr	3100.00	675.53	681.72	681.72	682.99	0.026752	13.57	488.34	170.44	1.04
Walker Run	1	5862	10-yr	480.00	675.53	679.13	679.13	679.75	0.020726	7.60	115.65	93.39	0.82
Walker Run	1	5862	50-yr	1180.00	675.53	680.22	680.22	681.07	0.022387	9.93	242.62	147.63	0.90
Walker Run	1	5547	100 yr	1640.00	669.38	676.99		677.09	0.001925	4.50	863.91	217.43	0.31
Walker Run	1	5547	100 yr encroachm	1640.00	669.38	677.59		677.92	0.006418	6.37	396.25	66.17	0.41
Walker Run	1	5547	500 yr	3100.00	669.38	679.69		679.79	0.001368	4.74	1469.00	230.07	0.27
Walker Run	1	5547	10-yr	480.00	669.38	673.94		674.10	0.004911	4.81	236.43	155.81	0.44
Walker Run	1	5547	50-yr	1180.00	669.38	675.99		676.09	0.002297	4.41	650.27	212.27	0.32
Walker Run	1	5282	100 yr	1640.00	667.03	676.03	673.33	676.41	0.003289	6.25	440.99	221.46	0.40
Walker Run	1	5282	100 yr encroachm	1640.00	667.03	676.43	673.30	676.80	0.002979	6.15	439.67	69.00	0.38
Walker Run	1	5282	500 yr	3100.00	667.03	679.31	674.99	679.45	0.001201	4.79	1508.25	300.90	0.25
Walker Run	1	5282	10-yr	480.00	667.03	673.14	671.21	673.29	0.002084	3.63	214.82	73.76	0.29
Walker Run	1	5282	50-yr	1180.00	667.03	675.11	672.64	675.40	0.002900	5.39	368.08	188.50	0.37
Walker Run	1	5250	Bridge										
Walker Run	1	5198	100 yr	1640.00	665.71	671.81	671.47	673.01	0.016321	10.83	252.34	218.53	0.83
Walker Run	1	5198	100 yr encroachm	1640.00	665.71	672.59	671.50	673.42	0.009649	9.13	309.27	73.00	0.65
Walker Run	1	5198	500 yr	3100.00	665.71	673.09	673.09	675.26	0.023463	15.02	345.73	234.24	1.03
Walker Run	1	5198	10-yr	480.00	665.71	669.45	669.25	670.15	0.017404	7.51	91.77	151.46	0.78
Walker Run	1	5198	50-yr	1180.00	665.71	670.98	670.81	672.08	0.017767	10.07	191.37	199.14	0.84
Walker Run	1	5107	100 yr	1640.00	664.59	671.79		671.89	0.001709	3.88	962.24	283.50	0.28
Walker Run	1	5107	100 yr encroachm	1640.00	664.59	672.56		672.66	0.001337	3.72	904.08	185.00	0.26
Walker Run	1	5107	500 yr	3100.00	664.59	672.58		672.80	0.003337	5.90	1187.88	291.92	0.41
Walker Run	1	5107	10-yr	480.00	664.59	668.74		668.95	0.005961	4.39	200.56	169.91	0.47
Walker Run	1	5107	50-yr	1180.00	664.59	670.86		670.96	0.002123	3.84	701.01	273.42	0.31
Walker Run	1	4995	100 yr	1640.00	666.24	671.69		671.76	0.000760	2.42	984.70	269.32	0.19
Walker Run	1	4995	100 yr encroachm	1640.00	666.24	672.46		672.55	0.000671	2.50	746.76	137.00	0.18
Walker Run	1	4995	500 yr	3100.00	666.24	672.34		672.53	0.001719	3.94	1162.71	280.04	0.29
Walker Run	1	4995	10-yr	480.00	666.24	667.99		668.16	0.008077	3.30	150.96	131.98	0.50
Walker Run	1	4995	50-yr	1180.00	666.24	670.74		670.81	0.000870	2.25	736.25	253.58	0.20
Walker Run	1	4810	100 yr	1640.00	662.87	671.62		671.64	0.000461	2.41	1625.52	326.75	0.15
Walker Run	1	4810	100 yr encroachm	1640.00	662.87	672.38		672.43	0.000560	2.83	1236.84	174.33	0.17
Walker Run	1	4810	500 yr	3100.00	662.87	672.16		672.24	0.001204	4.08	1805.73	333.93	0.25
Walker Run	1	4810	10-yr	480.00	662.87	667.44		667.50	0.001932	2.95	396.94	221.70	0.27
Walker Run	1	4810	50-yr	1180.00	662.87	670.66		670.68	0.000445	2.17	1319.14	314.17	0.15
Walker Run	1	4735	100 yr	1640.00	662.26	671.59		671.61	0.000397	2.37	1712.11	329.82	0.14
Walker Run	1	4735	100 yr encroachm	1640.00	662.26	672.37		672.39	0.000278	2.10	1867.17	289.99	0.12
Walker Run	1	4735	500 yr	3100.00	662.26	672.09		672.15	0.001076	4.05	1877.03	334.54	0.24
Walker Run	1	4735	10-yr	480.00	662.26	667.34		667.38	0.001197	2.60	465.61	219.52	0.22
Walker Run	1	4735	50-yr	1180.00	662.26	670.63		670.65	0.000372	2.12	1401.54	320.75	0.14
Walker Run	1	4692	100 yr	1640.00	663.77	671.57		671.59	0.000392	2.29	1734.04	347.88	0.15
Walker Run	1	4692	100 yr encroachm	1640.00	663.77	672.36		672.38	0.000290	2.10	1798.51	264.48	0.13
Walker Run	1	4692	500 yr	3100.00	663.77	672.04		672.10	0.001076	3.95	1899.10	354.85	0.24
Walker Run	1	4692	10-yr	480.00	663.77	667.30		667.32	0.001213	2.35	488.66	223.26	0.22
Walker Run	1	4692	50-yr	1180.00	663.77	670.62		670.64	0.000365	2.02	1412.78	325.94	0.14
Walker Run	1	4495	100 yr	1640.00	663.23	671.50		671.52	0.000374	2.27	1749.20	344.35	0.14
Walker Run	1	4495	100 yr encroachm	1640.00	663.23	672.26		672.30	0.000532	2.88	1184.05	150.65	0.17
Walker Run	1	4495	500 yr	3100.00	663.23	671.82		671.89	0.001117	4.03	1862.35	350.63	0.25
Walker Run	1	4495	10-yr	480.00	663.23	667.06		667.09	0.001244	2.38	454.70	214.39	0.23
Walker Run	1	4495	50-yr	1180.00	663.23	670.55		670.57	0.000343	1.99	1431.57	326.06	0.13
Walker Run	1	4414	100 yr	1640.00	662.97	671.47		671.49	0.000298	2.03	1828.00	347.54	0.13
Walker Run	1	4414	100 yr encroachm	1640.00	662.97	672.23		672.26	0.000358	2.37	1356.38	168.58	0.14
Walker Run	1	4414	500 yr	3100.00	662.97	671.75		671.81	0.000921	3.65	1923.19	352.12	0.22
Walker Run	1	4414	10-yr	480.00	662.97	666.98		667.01	0.000891	2.01	500.85	214.05	0.19
Walker Run	1	4414	50-yr	1180.00	662.97	670.53		670.54	0.000267	1.77	1507.09	331.63	0.12
Walker Run	1	4295	100 yr	1640.00	662.82	671.45		671.46	0.000189	1.70	2348.50	421.23	0.10
Walker Run	1	4295	100 yr encroachm	1640.00	662.82	672.22		672.23	0.000172	1.72	2154.53	268.22	0.10
Walker Run	1	4295	500 yr	3100.00	662.82	671.68		671.72	0.000600	3.09	2445.08	423.59	0.18
Walker Run	1	4295	10-yr	480.00	662.82	666.92		666.93	0.000416	1.53	737.48	274.18	0.13
Walker Run	1	4295	50-yr	1180.00	662.82	670.51		670.52	0.000164	1.47	1955.80	411.49	0.09
Walker Run	1	4130	100 yr	1640.00	662.26	671.42		671.43	0.000176	1.68	2348.81	437.36	0.10
Walker Run	1	4130	100 yr encroachm	1640.00	662.26	672.17		672.19	0.000268	2.19	1612.36	203.36	0.12
Walker Run	1	4130	500 yr	3100.00	662.26	671.58		671.62	0.000579	3.08	2418.19	443.10	0.18
Walker Run	1	4130	10-yr	480.00	662.26	666.83		666.85	0.000574	1.85	627.81	323.40	0.16
Walker Run	1	4130	50-yr	1180.00	662.26	670.48		670.49	0.000155	1.46	1954.05	403.16	0.09
Walker Run	1	4043	100 yr	1640.00	662.24	671.40		671.41	0.000301	2.15	2097.08	533.11	0.13
Walker Run	1	4043	100 yr encroachm	1640.00	662.24	672.11		672.16	0.000528	3.00	1173.86	155.00	0.17
Walker Run	1	4043	500 yr	3100.00	662.24	671.49		671.56	0.001007	3.96	2149.79	537.54	0.24
Walker Run	1	4043	10-yr	480.00	662.24	666.69		666.77	0.001916	3.20	337.29	171.09	0.29
Walker Run	1	4043	50-yr	1180.00	662.24	670.46		670.47	0.000306	2.01	1615.80	490.89	0.13
Walker Run	1	3972	100 yr	1640.00	661.21	671.39	664.72	671.40	0.000099	1.28	2677.34	606.41	0.07
Walker Run	1	3972	100 yr encroachm	1640.00	661.21	672.12	664.72	672.14	0.000089	1.28	2311.63	352.25	0.07
Walker Run	1	3972	500 yr	3100.00	661.21	671.46	666.20	671.51	0.000339	2.39	2721.99	607.90	0.14
Walker Run	1	3972	10-yr	480.00	661.21	666.57	663.19	666.70	0.000317	1.42	386.00	282.44	0.12



HEC-RAS Plan: Prop (Continued)

River	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 S <sub>c</sub> (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Walker Run	1	3972	50-yr	1180.00	661.21	670.45	664.20	670.46	0.000090	1.14	2110.26	584.86	0.07
Walker Run	1	3914	Bridge										
Walker Run	1	3860	100 yr	1640.00	660.73	667.11	667.11	668.87	0.019139	11.20	177.55	88.38	0.83
Walker Run	1	3860	100 yr encroachm	1640.00	660.73	667.65	667.11	670.15	0.027591	12.72	132.96	21.00	0.88
Walker Run	1	3860	500 yr	3100.00	660.73	669.10	669.10	671.50	0.018935	13.62	289.53	110.97	0.87
Walker Run	1	3860	10-yr	480.00	660.73	664.66	663.83	665.31	0.013534	6.46	77.05	28.92	0.64
Walker Run	1	3860	50-yr	1180.00	660.73	666.17	665.89	667.76	0.020937	10.37	127.74	78.39	0.84
Walker Run	1	3785	100 yr	1640.00	660.24	665.21	665.10	666.50	0.027449	9.12	182.10	76.65	0.93
Walker Run	1	3785	100 yr encroachm	1640.00	660.24	665.77	665.77	667.62	0.031083	10.94	153.41	47.75	0.97
Walker Run	1	3785	500 yr	3100.00	660.24	667.19	667.19	668.08	0.011474	8.30	490.03	294.27	0.66
Walker Run	1	3785	10-yr	480.00	660.24	663.86		664.19	0.011735	4.64	103.39	50.89	0.57
Walker Run	1	3785	50-yr	1180.00	660.24	664.95		665.75	0.019164	7.20	163.95	60.31	0.77
Walker Run	1	3735	100 yr	1640.00	660.36	665.10		665.37	0.008758	6.73	523.26	241.04	0.57
Walker Run	1	3735	100 yr encroachm	1640.00	660.36	665.98		666.23	0.005905	6.24	557.06	147.43	0.48
Walker Run	1	3735	500 yr	3100.00	660.36	666.30		666.62	0.007784	7.46	835.56	298.85	0.56
Walker Run	1	3735	10-yr	480.00	660.36	663.44		663.60	0.007895	4.64	207.42	108.51	0.50
Walker Run	1	3735	50-yr	1180.00	660.36	664.60		664.86	0.009173	6.35	404.01	235.39	0.57
Walker Run	1	3532	100 yr	1640.00	658.87	663.74		663.88	0.006219	4.83	638.14	254.48	0.43
Walker Run	1	3532	100 yr encroachm	1640.00	658.87	664.71		664.98	0.006758	5.83	464.04	112.15	0.46
Walker Run	1	3532	500 yr	3100.00	658.87	664.93		665.15	0.006773	6.01	949.40	268.43	0.47
Walker Run	1	3532	10-yr	480.00	658.87	662.24		662.31	0.005270	3.25	290.41	206.26	0.36
Walker Run	1	3532	50-yr	1180.00	658.87	663.25		663.37	0.005935	4.33	516.29	248.81	0.41
Walker Run	1	3410	100 yr	1640.00	658.92	662.82		663.00	0.008221	6.02	594.26	254.07	0.58
Walker Run	1	3410	100 yr encroachm	1640.00	658.92	663.74		664.05	0.008161	7.05	453.69	119.96	0.60
Walker Run	1	3410	500 yr	3100.00	658.92	663.92		664.19	0.008803	7.52	881.95	265.73	0.63
Walker Run	1	3410	10-yr	480.00	658.92	661.52		661.60	0.006221	3.80	279.35	212.73	0.46
Walker Run	1	3410	50-yr	1180.00	658.92	662.38		662.53	0.007800	5.36	484.90	251.41	0.55
Walker Run	1	3375	100 yr	1640.00	657.97	662.38		662.64	0.011758	7.25	531.65	255.90	0.67
Walker Run	1	3375	100 yr encroachm	1640.00	657.97	663.36		663.73	0.009599	7.68	425.30	120.52	0.63
Walker Run	1	3375	500 yr	3100.00	657.97	663.49		663.83	0.011213	8.47	820.51	269.46	0.69
Walker Run	1	3375	10-yr	480.00	657.97	661.04		661.26	0.014095	5.82	200.33	225.46	0.68
Walker Run	1	3375	50-yr	1180.00	657.97	661.94		662.18	0.012231	6.77	418.82	252.92	0.67
Walker Run	1	3278	100 yr	1640.00	657.99	661.78		661.90	0.004811	4.54	649.70	264.05	0.44
Walker Run	1	3278	100 yr encroachm	1640.00	657.99	662.57		662.89	0.007640	6.59	404.86	113.78	0.57
Walker Run	1	3278	500 yr	3100.00	657.99	662.87		663.07	0.005201	5.71	945.74	286.17	0.48
Walker Run	1	3278	10-yr	480.00	657.99	660.51		660.56	0.003929	2.97	318.08	255.41	0.37
Walker Run	1	3278	50-yr	1180.00	657.99	661.35		661.45	0.004587	4.04	536.76	261.78	0.42
Walker Run	1	3065	100 yr	1640.00	656.75	660.71		660.83	0.005870	5.08	644.44	304.16	0.48
Walker Run	1	3065	100 yr encroachm	1640.00	656.75	661.59		661.73	0.004096	4.93	596.41	182.62	0.42
Walker Run	1	3065	500 yr	3100.00	656.75	661.84		662.01	0.005233	5.79	1006.99	327.92	0.48
Walker Run	1	3065	10-yr	480.00	656.75	659.45	659.09	659.53	0.006839	4.05	277.45	282.74	0.48
Walker Run	1	3065	50-yr	1180.00	656.75	660.27		660.38	0.006179	4.76	514.17	292.94	0.48
Walker Run	1	2949	100 yr	1640.00	656.74	660.19		660.28	0.003365	3.84	782.64	349.99	0.37
Walker Run	1	2949	100 yr encroachm	1640.00	656.74	660.96		661.18	0.004615	5.17	500.29	144.61	0.45
Walker Run	1	2949	500 yr	3100.00	656.74	661.38		661.50	0.003125	4.54	1201.31	355.34	0.38
Walker Run	1	2949	10-yr	480.00	656.74	658.76		658.82	0.004753	3.14	304.60	313.62	0.40
Walker Run	1	2949	50-yr	1180.00	656.74	659.72		659.80	0.003548	3.56	619.31	340.68	0.37
Walker Run	1	2730	100 yr	1640.00	655.66	659.73	657.87	659.77	0.001630	2.97	1012.83	370.56	0.26
Walker Run	1	2730	100 yr encroachm	1640.00	655.66	660.09	658.22	660.25	0.003919	4.89	547.76	153.71	0.42
Walker Run	1	2730	500 yr	3100.00	655.66	660.90	658.39	660.98	0.001847	3.77	1449.71	376.10	0.29
Walker Run	1	2730	10-yr	480.00	655.66	658.33	657.28	658.35	0.001193	1.90	502.31	347.92	0.21
Walker Run	1	2730	50-yr	1180.00	655.66	659.27	657.66	659.31	0.001500	2.63	843.83	368.40	0.25
Walker Run	1	2620	Bridge										
Walker Run	1	2497	100 yr	1640.00	654.75	658.40		658.48	0.004215	4.04	771.98	367.48	0.40
Walker Run	1	2497	100 yr encroachm	1640.00	654.75	659.24		659.31	0.002374	3.54	812.92	251.55	0.31
Walker Run	1	2497	500 yr	3100.00	654.75	659.54		659.65	0.003710	4.64	1200.52	391.13	0.39
Walker Run	1	2497	10-yr	480.00	654.75	657.07		657.12	0.006392	3.49	307.10	323.67	0.45
Walker Run	1	2497	50-yr	1180.00	654.75	657.97		658.04	0.004461	3.78	614.93	359.81	0.40
Walker Run	1	2462	100 yr	1640.00	654.61	658.29		658.36	0.002697	3.54	837.74	383.31	0.33
Walker Run	1	2462	100 yr encroachm	1640.00	654.61	659.16		659.23	0.001898	3.45	787.07	200.00	0.29
Walker Run	1	2462	500 yr	3100.00	654.61	659.44		659.53	0.002628	4.23	1332.17	466.30	0.35
Walker Run	1	2462	10-yr	480.00	654.61	656.97		657.00	0.001837	2.13	415.90	287.60	0.25
Walker Run	1	2462	50-yr	1180.00	654.61	657.86		657.92	0.002467	3.10	687.57	322.81	0.31
Walker Run	1	2339	100 yr	1640.00	654.38	657.82		657.91	0.005265	4.54	716.76	445.14	0.45
Walker Run	1	2339	100 yr encroachm	1640.00	654.38	658.49		658.77	0.009362	6.90	424.10	150.07	0.63
Walker Run	1	2339	500 yr	3100.00	654.38	659.11		659.19	0.002991	4.31	1394.75	611.28	0.36
Walker Run	1	2339	10-yr	480.00	654.38	656.57		656.63	0.008061	3.45	274.98	244.36	0.45
Walker Run	1	2339	50-yr	1180.00	654.38	657.37		657.46	0.006232	4.45	526.45	401.24	0.48
Walker Run	1	2274	100 yr	1640.00	653.90	657.40		657.54	0.006722	5.18	598.41	281.13	0.51
Walker Run	1	2274	100 yr encroachm	1640.00	653.90	658.39		658.46	0.002185	3.53	828.66	252.44	0.30
Walker Run	1	2274	500 yr	3100.00	653.90	658.82		658.96	0.004320	5.29	1085.47	436.52	0.43
Walker Run	1	2274	10-yr	480.00	653.90	656.06		656.15	0.009769	4.36	239.08	253.91	0.56
Walker Run	1	2274	50-yr	1180.00	653.90	656.89		657.02	0.008073	5.06	457.04	271.65	0.54

## HEC-RAS Plan: Prop (Continued)

River	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
Walker Run	1	2139	100 yr	1640.00	653.31	657.22		657.24	0.000942	2.11	1338.11	561.08	0.20
Walker Run	1	2139	100 yr encroachm	1640.00	653.31	658.21		658.25	0.001170	2.76	1035.62	279.75	0.23
Walker Run	1	2139	500 yr	3100.00	653.31	658.72		658.75	0.000653	2.22	2322.80	752.74	0.17
Walker Run	1	2139	10-yr	480.00	653.31	655.69		655.71	0.001532	1.85	526.02	500.73	0.23
Walker Run	1	2139	50-yr	1180.00	653.31	656.64		656.66	0.001148	2.07	1024.69	540.05	0.21
Walker Run	1	2010	100 yr	1640.00	652.70	657.14		657.15	0.000515	1.76	1915.81	1020.09	0.15
Walker Run	1	2010	100 yr encroachm	1640.00	652.70	658.13		658.15	0.000486	1.97	1435.23	353.62	0.15
Walker Run	1	2010	500 yr	3100.00	652.70	658.68		658.69	0.000276	1.59	3682.80	1269.11	0.12
Walker Run	1	2010	10-yr	480.00	652.70	655.55		655.56	0.000909	1.71	592.92	486.07	0.19
Walker Run	1	2010	50-yr	1180.00	652.70	656.53		656.54	0.000757	1.93	1316.69	959.10	0.18
Walker Run	1	1925	100 yr	1640.00	652.07	657.10		657.11	0.000410	1.64	1921.32	845.15	0.14
Walker Run	1	1925	100 yr encroachm	1640.00	652.07	658.04		658.09	0.000984	2.88	963.20	199.27	0.22
Walker Run	1	1925	500 yr	3100.00	652.07	658.65		658.67	0.000279	1.64	3289.12	903.45	0.12
Walker Run	1	1925	10-yr	480.00	652.07	655.49		655.50	0.000595	1.48	682.71	633.04	0.15
Walker Run	1	1925	50-yr	1180.00	652.07	656.48		656.49	0.000529	1.69	1406.43	805.96	0.15
Walker Run	1	1602	100 yr	1860.00	650.67	656.97		656.98	0.000461	1.47	2501.63	1079.73	0.11
Walker Run	1	1602	100 yr encroachm	1860.00	650.67	657.86		657.88	0.000507	1.72	1854.68	515.00	0.12
Walker Run	1	1602	500 yr	3600.00	650.67	658.57		658.58	0.000317	1.46	4342.97	1187.88	0.10
Walker Run	1	1602	10-yr	550.00	650.67	655.18		655.20	0.001764	2.18	702.89	884.86	0.21
Walker Run	1	1602	50-yr	1320.00	650.67	656.30		656.31	0.000643	1.59	1797.41	1037.52	0.13
Walker Run	1	1402	100 yr	1860.00	649.80	656.86		656.88	0.000512	1.60	2013.36	686.27	0.11
Walker Run	1	1402	100 yr encroachm	1860.00	649.80	657.75		657.77	0.000560	1.83	1605.43	381.35	0.12
Walker Run	1	1402	500 yr	3600.00	649.80	658.48		658.50	0.000477	1.80	3159.88	731.05	0.11
Walker Run	1	1402	10-yr	550.00	649.80	654.96		654.97	0.000738	1.51	788.84	592.35	0.13
Walker Run	1	1402	50-yr	1320.00	649.80	656.18		656.19	0.000572	1.56	1550.75	659.53	0.12
Walker Run	1	1208	100 yr	1860.00	650.74	656.72		656.75	0.000860	2.31	1435.61	455.67	0.17
Walker Run	1	1208	100 yr encroachm	1860.00	650.74	657.57		657.63	0.000935	2.64	999.38	174.97	0.18
Walker Run	1	1208	500 yr	3600.00	650.74	658.32		658.37	0.000987	2.92	2254.15	567.60	0.19
Walker Run	1	1208	10-yr	550.00	650.74	654.85		654.86	0.000488	1.33	705.05	324.67	0.12
Walker Run	1	1208	50-yr	1320.00	650.74	656.03		656.06	0.000793	2.04	1139.94	407.76	0.16
Walker Run	1	990	100 yr	1860.00	649.47	656.52		656.55	0.000981	2.30	1444.98	511.16	0.17
Walker Run	1	990	100 yr encroachm	1860.00	649.47	657.45		657.47	0.000491	1.80	1668.02	395.00	0.12
Walker Run	1	990	500 yr	3600.00	649.47	658.12		658.16	0.000909	2.60	2285.68	540.36	0.17
Walker Run	1	990	10-yr	550.00	649.47	654.68		654.71	0.001079	1.86	577.77	415.79	0.17
Walker Run	1	990	50-yr	1320.00	649.47	655.83		655.86	0.001105	2.24	1096.41	489.79	0.18
Walker Run	1	933	100 yr	1860.00	649.74	656.22		656.44	0.003361	5.64	717.40	280.88	0.41
Walker Run	1	933	100 yr encroachm	1860.00	649.74	657.16		657.40	0.002563	5.43	616.28	115.00	0.36
Walker Run	1	933	500 yr	3600.00	649.74	657.79		658.05	0.003412	6.64	1248.04	396.20	0.43
Walker Run	1	933	10-yr	550.00	649.74	654.53		654.62	0.001771	3.27	344.32	160.80	0.28
Walker Run	1	933	50-yr	1320.00	649.74	655.55		655.74	0.003227	5.10	544.46	232.85	0.39
Walker Run	1	884	100 yr	1860.00	648.62	656.01	654.99	656.23	0.006033	6.34	678.17	290.30	0.47
Walker Run	1	884	100 yr encroachm	1860.00	648.62	656.95	655.15	657.23	0.005037	6.41	545.13	126.77	0.44
Walker Run	1	884	500 yr	3600.00	648.62	657.63	655.84	657.84	0.004843	6.71	1210.15	366.36	0.44
Walker Run	1	884	10-yr	550.00	648.62	654.25	653.89	654.46	0.006581	5.17	247.74	198.84	0.46
Walker Run	1	884	50-yr	1320.00	648.62	655.26	654.63	655.51	0.007691	6.50	473.08	250.91	0.52
Walker Run	1	875	Culvert										
Walker Run	1	863	100 yr	1860.00	648.96	656.02	654.48	656.17	0.002977	4.94	831.30	301.91	0.37
Walker Run	1	863	100 yr encroachm	1860.00	648.96	656.89	654.67	657.14	0.003241	5.67	597.90	126.77	0.39
Walker Run	1	863	500 yr	3600.00	648.96	657.59	655.35	657.78	0.003036	5.88	1356.18	367.22	0.39
Walker Run	1	863	10-yr	550.00	648.96	654.04	653.30	654.16	0.003194	3.81	314.00	220.70	0.35
Walker Run	1	863	50-yr	1320.00	648.96	655.36	654.10	655.50	0.002981	4.54	641.32	274.47	0.36
Walker Run	1	715	100 yr	1860.00	647.90	655.75		655.82	0.001472	3.87	1100.65	356.91	0.25
Walker Run	1	715	100 yr encroachm	1860.00	647.90	656.61		656.73	0.001589	4.33	834.22	154.14	0.27
Walker Run	1	715	500 yr	3600.00	647.90	657.29		657.39	0.001712	4.75	1716.41	431.49	0.28
Walker Run	1	715	10-yr	550.00	647.90	653.83		653.87	0.000920	2.49	516.05	258.39	0.19
Walker Run	1	715	50-yr	1320.00	647.90	655.11		655.17	0.001315	3.43	884.12	320.99	0.24
Walker Run	1	536	100 yr	1860.00	646.97	655.50		655.57	0.001317	3.81	1088.97	304.97	0.24
Walker Run	1	536	100 yr encroachm	1860.00	646.97	656.34		656.44	0.001588	3.65	837.48	147.46	0.22
Walker Run	1	536	500 yr	3600.00	646.97	656.95		657.07	0.001824	5.03	1569.63	355.07	0.29
Walker Run	1	536	10-yr	550.00	646.97	653.71		653.74	0.000580	2.12	598.59	246.41	0.15
Walker Run	1	536	50-yr	1320.00	646.97	654.90		654.95	0.001077	3.26	912.20	284.07	0.22
Walker Run	1	428	100 yr	1860.00	647.24	655.34		655.45	0.001184	3.71	1049.06	318.66	0.25
Walker Run	1	428	100 yr encroachm	1860.00	647.24	656.12		656.29	0.001316	4.20	725.81	115.65	0.27
Walker Run	1	428	500 yr	3600.00	647.24	656.73		656.90	0.001687	4.99	1527.60	368.20	0.30
Walker Run	1	428	10-yr	550.00	647.24	653.66		653.69	0.000426	1.85	584.02	234.62	0.14
Walker Run	1	428	50-yr	1320.00	647.24	654.78		654.85	0.000930	3.11	876.59	290.27	0.22
Walker Run	1	350	100 yr	1860.00	647.08	655.28		655.34	0.000874	3.12	1233.20	300.57	0.20
Walker Run	1	350	100 yr encroachm	1860.00	647.08	656.07		656.16	0.000973	3.53	986.42	163.73	0.22
Walker Run	1	350	500 yr	3600.00	647.08	656.63		656.74	0.001403	4.43	1655.66	318.17	0.27
Walker Run	1	350	10-yr	550.00	647.08	653.64		653.65	0.000291	1.52	769.79	263.62	0.11
Walker Run	1	350	50-yr	1320.00	647.08	654.73		654.77	0.000659	2.57	1070.73	287.64	0.17
Walker Run	1	185	100 yr	1860.00	646.40	655.10		655.17	0.000889	3.49	1114.61	263.65	0.22
Walker Run	1	185	100 yr encroachm	1860.00	646.40	655.87		655.96	0.001250	3.40	887.15	144.00	0.20
Walker Run	1	185	500 yr	3600.00	646.40	656.31		656.46	0.001775	5.14	1449.38	284.47	0.30
Walker Run	1	185	10-yr	550.00	646.40	653.59		653.60	0.000271	1.59	741.69	231.07	0.11

## HEC-RAS Plan: Prop (Continued)

River	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
Walker Run	1	185	50-yr	1320.00	646.40	654.60		654.65	0.000705	2.82	965.59	251.03	0.18
Walker Run	1	147	100 yr	1860.00	646.74	654.79		655.08	0.003377	6.01	620.10	189.92	0.41
Walker Run	1	147	100 yr encroachm	1860.00	646.74	655.59		655.86	0.002538	5.62	588.14	110.00	0.38
Walker Run	1	147	500 yr	3600.00	646.74	655.68		656.28	0.006587	9.12	817.74	258.52	0.58
Walker Run	1	147	10-yr	550.00	646.74	653.52		653.58	0.000846	2.62	402.56	153.11	0.20
Walker Run	1	147	50-yr	1320.00	646.74	654.39		654.58	0.002305	4.77	547.52	177.32	0.33
Walker Run	1	011	100 yr	1860.00	645.71	654.67	652.69	654.75	0.001192	3.89	1149.74	380.16	0.24
Walker Run	1	011	100 yr encroachm	1860.00	645.71	655.54	652.68	655.61	0.000861	3.54	1114.92	207.00	0.21
Walker Run	1	011	500 yr	3600.00	645.71	655.44	653.02	655.61	0.002516	6.01	1464.61	441.92	0.35
Walker Run	1	011	10-yr	550.00	645.71	653.48	650.23	653.50	0.000286	1.72	754.81	282.23	0.11
Walker Run	1	011	50-yr	1320.00	645.71	654.31	651.84	654.36	0.000803	3.10	1017.14	350.92	0.20
Walker Run	1	-10	Bridge										
Walker Run	1	-30	100 yr	1860.00	644.46	652.96	652.28	653.77	0.007942	9.03	410.25	223.83	0.60
Walker Run	1	-30	100 yr encroachm	1860.00	644.46	653.95	652.28	654.44	0.004231	7.20	482.18	134.28	0.45
Walker Run	1	-30	500 yr	3600.00	644.46	654.46	654.09	655.27	0.008004	10.32	820.41	342.52	0.62
Walker Run	1	-30	10-yr	550.00	644.46	651.15	649.16	651.48	0.003532	4.95	144.71	62.75	0.38
Walker Run	1	-30	50-yr	1320.00	644.46	652.30	651.23	653.34	0.009101	9.06	198.30	187.62	0.63
Walker Run	1	-78	100 yr	1860.00	645.43	652.96		653.12	0.002643	4.76	831.07	309.34	0.35
Walker Run	1	-78	100 yr encroachm	1860.00	645.43	653.92		654.10	0.001984	4.57	713.35	147.00	0.31
Walker Run	1	-78	500 yr	3600.00	645.43	654.43		654.64	0.002923	5.82	1290.59	314.50	0.38
Walker Run	1	-78	10-yr	550.00	645.43	651.11		651.21	0.001979	3.20	316.39	200.24	0.28
Walker Run	1	-78	50-yr	1320.00	645.43	652.38		652.53	0.002413	4.25	655.02	303.74	0.33
Walker Run	1	-154	100 yr	1860.00	644.90	652.70		652.89	0.003359	5.45	715.54	212.18	0.37
Walker Run	1	-154	100 yr encroachm	1860.00	644.90	653.68		653.91	0.002922	5.56	621.88	125.27	0.35
Walker Run	1	-154	500 yr	3600.00	644.90	654.04		654.36	0.004626	7.21	1004.66	218.08	0.45
Walker Run	1	-154	10-yr	550.00	644.90	650.97		651.06	0.001902	3.37	361.19	196.50	0.26
Walker Run	1	-154	50-yr	1320.00	644.90	652.19		652.33	0.002704	4.64	607.30	207.53	0.33
Walker Run	1	-255	100 yr	1860.00	645.74	652.54	650.73	652.63	0.002892	4.78	894.50	286.08	0.35
Walker Run	1	-255	100 yr encroachm	1860.00	645.74	653.54	651.02	653.64	0.003170	3.76	736.35	165.00	0.25
Walker Run	1	-255	500 yr	3600.00	645.74	653.85	651.43	654.00	0.003642	6.13	1284.40	309.20	0.40
Walker Run	1	-255	10-yr	550.00	645.74	650.85	649.92	650.90	0.002179	3.30	436.23	256.25	0.29
Walker Run	1	-255	50-yr	1320.00	645.74	652.05	650.46	652.12	0.002417	4.12	756.44	277.43	0.31
Tributary	1	6850	100 yr	300.00	709.19	712.52	711.94	712.77	0.015944	4.07	75.34	49.89	0.47
Tributary	1	6850	100 yr encroachm	300.00	709.19	713.41		713.67	0.013347	4.08	73.55	22.87	0.40
Tributary	1	6850	500 yr	606.00	709.19	713.28	712.70	713.70	0.017491	5.15	117.26	58.92	0.52
Tributary	1	6850	10-yr	84.00	709.19	711.59		711.67	0.011452	2.45	35.54	34.70	0.37
Tributary	1	6850	50-yr	213.00	709.19	712.24	711.64	712.43	0.014270	3.54	62.07	45.58	0.44
Tributary	1	6361	100 yr	300.00	695.20	700.31	700.31	700.99	0.043607	7.04	46.38	32.43	0.71
Tributary	1	6361	100 yr encroachm	300.00	695.20	700.43	700.43	701.44	0.066815	8.25	37.45	18.18	0.80
Tributary	1	6361	500 yr	606.00	695.20	701.21	701.21	702.04	0.037067	7.70	83.09	50.21	0.68
Tributary	1	6361	10-yr	84.00	695.20	698.33	698.33	699.07	0.113477	6.86	12.24	8.37	1.00
Tributary	1	6361	50-yr	213.00	695.20	699.83	699.83	700.54	0.054318	7.00	32.89	23.87	0.77
Tributary	1	5930	100 yr	300.00	692.00	695.48		695.54	0.002368	1.90	154.46	105.46	0.19
Tributary	1	5930	100 yr encroachm	300.00	692.00	696.45		696.55	0.002007	2.09	121.46	37.00	0.18
Tributary	1	5930	500 yr	606.00	692.00	696.19		696.30	0.002826	2.37	235.56	120.79	0.21
Tributary	1	5930	10-yr	84.00	692.00	694.49	693.72	694.52	0.002139	1.42	64.11	72.76	0.17
Tributary	1	5930	50-yr	213.00	692.00	695.17	694.18	695.21	0.002326	1.76	122.63	98.23	0.18
Tributary	1	5500	100 yr	300.00	691.00	692.03	692.03	692.51	0.088747	5.58	54.10	56.46	0.98
Tributary	1	5500	100 yr encroachm	300.00	691.00	692.91	692.91	693.87	0.095138	7.85	38.21	20.00	1.00
Tributary	1	5500	500 yr	606.00	691.00	693.18		693.57	0.025311	4.94	122.22	61.93	0.59
Tributary	1	5500	10-yr	84.00	691.00	691.45	691.45	691.67	0.124231	3.75	22.41	51.87	1.00
Tributary	1	5500	50-yr	213.00	691.00	691.83	691.83	692.22	0.097457	5.03	42.58	54.90	0.98
Tributary	1	4750	100 yr	300.00	684.00	686.27		686.31	0.002741	1.51	199.39	105.15	0.19
Tributary	1	4750	100 yr encroachm	300.00	684.00	687.22		687.26	0.001696	1.56	191.95	60.00	0.15
Tributary	1	4750	500 yr	606.00	684.00	686.88		686.97	0.004422	2.30	265.43	110.81	0.25
Tributary	1	4750	10-yr	84.00	684.00	686.05		686.05	0.000322	0.48	176.32	103.09	0.06
Tributary	1	4750	50-yr	213.00	684.00	686.16		686.18	0.001693	1.14	187.42	104.08	0.15
Tributary	1	4530	100 yr	300.00	684.00	686.03	686.03	686.04	0.000644	0.72	414.95	219.51	0.09
Tributary	1	4530	100 yr encroachm	300.00	684.00	686.86	686.03	686.89	0.001547	1.40	214.20	75.00	0.15
Tributary	1	4530	500 yr	606.00	684.00	686.39	686.03	686.41	0.001468	1.23	495.11	223.27	0.14
Tributary	1	4530	10-yr	84.00	684.00	686.03	685.83	686.03	0.000050	0.20	415.50	219.53	0.03
Tributary	1	4530	50-yr	213.00	684.00	686.03	686.03	686.03	0.000325	0.51	414.95	219.51	0.07
Tributary	1	4528	Culvert										
Tributary	1	4500	100 yr	300.00	683.30	684.79	684.79	685.51	0.076821	6.56	44.75	145.99	0.96
Tributary	1	4500	100 yr encroachm	300.00	683.30	685.10	685.10	685.98	0.092363	7.49	40.04	22.79	1.00
Tributary	1	4500	500 yr	606.00	683.30	685.00	685.00	685.12	0.003934	1.63	226.99	148.77	0.22
Tributary	1	4500	10-yr	84.00	683.30	683.97	683.97	684.28	0.108219	4.43	18.88	123.12	0.99
Tributary	1	4500	50-yr	213.00	683.30	684.49	684.49	685.07	0.085122	5.92	35.37	143.27	0.98
Tributary	1	4400	100 yr	300.00	675.78	679.51		679.60	0.003404	1.84	126.60	81.92	0.18
Tributary	1	4400	100 yr encroachm	300.00	675.78	680.31		680.40	0.002070	1.66	124.48	45.00	0.15
Tributary	1	4400	500 yr	606.00	675.78	680.29		680.44	0.003779	2.24	195.97	97.88	0.20
Tributary	1	4400	10-yr	84.00	675.78	678.55		678.59	0.003503	1.47	54.62	67.28	0.17
Tributary	1	4400	50-yr	213.00	675.78	679.20		679.26	0.003369	1.71	101.40	77.18	0.18

## HEC-RAS Plan: Prop (Continued)

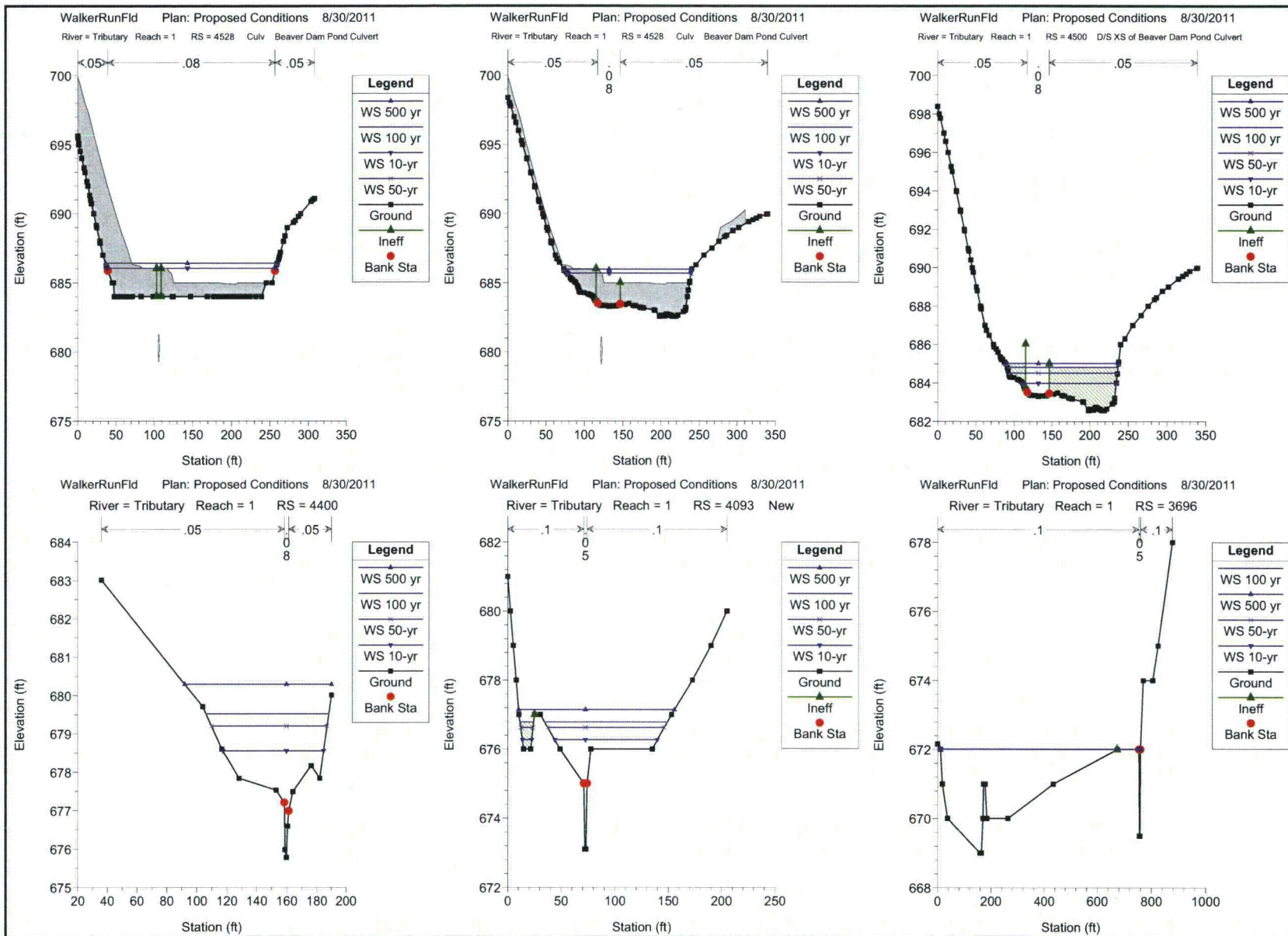
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/m)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Tributary	1	4093	100 yr	300.00	673.10	676.78	676.78	677.10	0.034829	7.98	97.48	127.18	0.81
Tributary	1	4093	100 yr encroachm	300.00	673.10	677.62	677.62	678.47	0.043242	10.46	54.66	26.83	0.93
Tributary	1	4093	500 yr	606.00	673.10	677.14	677.14	677.55	0.046087	9.89	154.16	145.51	0.94
Tributary	1	4093	10-yr	84.00	673.10	676.27	676.27	676.46	0.017947	5.06	43.63	104.52	0.56
Tributary	1	4093	50-yr	213.00	673.10	676.62	676.62	676.90	0.029220	7.05	79.89	120.21	0.73
Tributary	1	3696	100 yr	300.00	669.50	672.01	672.01	672.01	0.000215	0.49	935.25	749.55	0.07
Tributary	1	3696	100 yr encroachm	300.00	669.50	672.72	672.04	672.74	0.002336	1.94	364.52	325.50	0.22
Tributary	1	3696	500 yr	606.00	669.50	672.01	672.01	672.01	0.000878	0.99	935.25	749.55	0.14
Tributary	1	3696	10-yr	84.00	669.50	672.00	672.00	672.00	0.000017	0.14	929.67	749.00	0.02
Tributary	1	3696	50-yr	213.00	669.50	672.01	672.01	672.01	0.000108	0.35	935.25	749.55	0.05
Tributary	1	3356	100 yr	300.00	667.67	670.46	670.46	670.60	0.016207	5.61	215.11	486.39	0.67
Tributary	1	3356	100 yr encroachm	300.00	667.67	671.46		671.55	0.005629	4.24	213.13	205.40	0.42
Tributary	1	3356	500 yr	606.00	667.67	670.79		670.88	0.013715	5.65	384.86	561.93	0.63
Tributary	1	3356	10-yr	84.00	667.67	670.22	670.22	670.31	0.006971	3.40	103.06	434.87	0.43
Tributary	1	3356	50-yr	213.00	667.67	670.36	670.36	670.51	0.016005	5.39	164.61	463.42	0.66
Tributary	1	3162	100 yr	300.00	666.50	668.87	667.83	668.88	0.001514	1.91	396.93	298.81	0.23
Tributary	1	3162	100 yr encroachm	300.00	666.50	669.31	668.13	669.44	0.007634	4.85	122.77	52.07	0.52
Tributary	1	3162	500 yr	606.00	666.50	669.49	668.11	669.51	0.001806	2.46	592.16	325.26	0.26
Tributary	1	3162	10-yr	84.00	666.50	668.12	667.47	668.13	0.001215	1.31	185.90	267.35	0.19
Tributary	1	3162	50-yr	213.00	666.50	668.62	667.72	668.63	0.001406	1.71	325.31	288.51	0.21
Tributary	1	3108	Bridge										
Tributary	1	3060	100 yr	300.00	666.00	668.13	666.85	668.15	0.001394	1.57	353.92	232.54	0.21
Tributary	1	3060	100 yr encroachm	300.00	666.00	668.80	667.10	668.84	0.002060	2.38	205.80	85.00	0.27
Tributary	1	3060	500 yr	606.00	666.00	668.79	667.13	668.82	0.001816	2.23	512.11	246.18	0.26
Tributary	1	3060	10-yr	84.00	666.00	667.36	666.45	667.36	0.000834	0.81	182.12	209.58	0.15
Tributary	1	3060	50-yr	213.00	666.00	667.87	666.75	667.89	0.001229	1.32	295.09	225.80	0.19
Tributary	1	3010	Bridge										
Tributary	1	2834	100 yr	300.00	664.89	665.69	665.69	665.93	0.128132	7.07	83.11	176.43	1.64
Tributary	1	2834	100 yr encroachm	300.00	664.89	666.36	666.36	666.78	0.075105	8.54	71.00	80.00	1.40
Tributary	1	2834	500 yr	606.00	664.89	665.99	665.99	666.31	0.115951	8.27	142.21	216.71	1.63
Tributary	1	2834	10-yr	84.00	664.89	665.34	665.34	665.47	0.154641	5.41	31.37	119.20	1.66
Tributary	1	2834	50-yr	213.00	664.89	665.57	665.57	665.78	0.132442	6.55	64.02	157.76	1.63
Tributary	1	2326	100 yr	300.00	659.90	663.75	662.27	663.76	0.000666	1.64	458.46	273.29	0.16
Tributary	1	2326	100 yr encroachm	300.00	659.90	664.40	662.42	664.42	0.000532	1.65	443.06	220.72	0.14
Tributary	1	2326	500 yr	606.00	659.90	664.58	662.59	664.60	0.000818	2.11	710.47	332.36	0.18
Tributary	1	2326	10-yr	84.00	659.90	662.72	661.85	662.72	0.000435	1.04	218.12	207.34	0.12
Tributary	1	2326	50-yr	213.00	659.90	663.42	662.14	663.43	0.000597	1.45	373.96	236.52	0.15
Tributary	1	1790	Bridge										
Tributary	1	1658	100 yr	300.00	657.96	661.32		661.42	0.004289	3.75	200.85	186.43	0.39
Tributary	1	1658	100 yr encroachm	300.00	657.96	662.30		662.33	0.000961	2.16	301.95	125.00	0.19
Tributary	1	1658	500 yr	606.00	657.96	662.06		662.17	0.004291	4.37	346.90	206.47	0.41
Tributary	1	1658	10-yr	84.00	657.96	660.35		660.43	0.004004	2.75	60.90	100.50	0.35
Tributary	1	1658	50-yr	213.00	657.96	661.02		661.12	0.004214	3.45	148.67	159.89	0.38
Tributary	1	1360	100 yr	300.00	657.83	660.61	659.66	660.65	0.001675	2.11	230.92	193.50	0.24
Tributary	1	1360	100 yr encroachm	300.00	657.83	660.63	660.28	661.46	0.024403	7.30	41.08	16.00	0.80
Tributary	1	1360	500 yr	606.00	657.83	661.28	660.13	661.34	0.001910	2.66	373.12	232.53	0.27
Tributary	1	1360	10-yr	84.00	657.83	659.77	659.07	659.79	0.001279	1.36	92.94	127.15	0.20
Tributary	1	1360	50-yr	213.00	657.83	660.35	659.48	660.38	0.001563	1.88	182.22	176.03	0.23
Tributary	1	1281	Bridge										
Tributary	1	1252	100 yr	300.00	656.64	659.02		659.05	0.003665	1.62	231.64	254.98	0.22
Tributary	1	1252	100 yr encroachm	300.00	656.64	660.02		660.08	0.003127	2.02	157.02	70.00	0.21
Tributary	1	1252	500 yr	606.00	656.64	659.54		659.58	0.003692	1.93	370.60	282.41	0.23
Tributary	1	1252	10-yr	84.00	656.64	658.40		658.42	0.004164	1.29	86.50	188.91	0.21
Tributary	1	1252	50-yr	213.00	656.64	658.82		658.85	0.003715	1.50	182.39	244.51	0.21
Tributary	1	1105	100 yr	300.00	655.65	658.41		658.44	0.004849	1.99	224.78	248.88	0.25
Tributary	1	1105	100 yr encroachm	300.00	655.65	659.27		659.40	0.007358	3.13	106.63	43.94	0.33
Tributary	1	1105	500 yr	606.00	655.65	658.89		658.94	0.005365	2.43	352.16	278.28	0.27
Tributary	1	1105	10-yr	84.00	655.65	657.79		657.81	0.004353	1.47	90.50	176.74	0.22
Tributary	1	1105	50-yr	213.00	655.65	658.21		658.24	0.004677	1.83	178.07	231.97	0.24
Tributary	1	810	100 yr	300.00	653.84	657.34		657.36	0.002850	1.65	337.94	491.41	0.19
Tributary	1	810	100 yr encroachm	300.00	653.84	658.16		658.20	0.002473	1.87	199.06	94.19	0.18
Tributary	1	810	500 yr	606.00	653.84	657.73		657.75	0.003103	1.90	540.90	556.11	0.20
Tributary	1	810	10-yr	84.00	653.84	656.87		656.89	0.002319	1.30	126.74	413.48	0.16
Tributary	1	810	50-yr	213.00	653.84	657.19		657.21	0.002710	1.55	267.09	466.72	0.18
Tributary	1	587	100 yr	300.00	653.78	656.09		656.15	0.013760	2.87	176.52	292.25	0.40
Tributary	1	587	100 yr encroachm	300.00	653.78	656.98		657.14	0.012115	3.61	94.69	45.89	0.40
Tributary	1	587	500 yr	606.00	653.78	656.51		656.57	0.010588	2.94	316.99	389.54	0.36
Tributary	1	587	10-yr	84.00	653.78	655.53		655.62	0.029074	3.13	45.27	154.83	0.54
Tributary	1	587	50-yr	213.00	653.78	655.91		655.97	0.016458	2.90	127.43	256.98	0.43
Tributary	1	463	100 yr	300.00	653.23	655.56		655.57	0.002222	1.08	363.62	449.19	0.16
Tributary	1	463	100 yr encroachm	300.00	653.23	656.48		656.51	0.002511	1.60	203.67	97.83	0.18
Tributary	1	463	500 yr	606.00	653.23	655.90		655.92	0.002991	1.45	536.34	550.94	0.19
Tributary	1	463	10-yr	84.00	653.23	655.08		655.08	0.001535	0.68	172.21	353.27	0.12

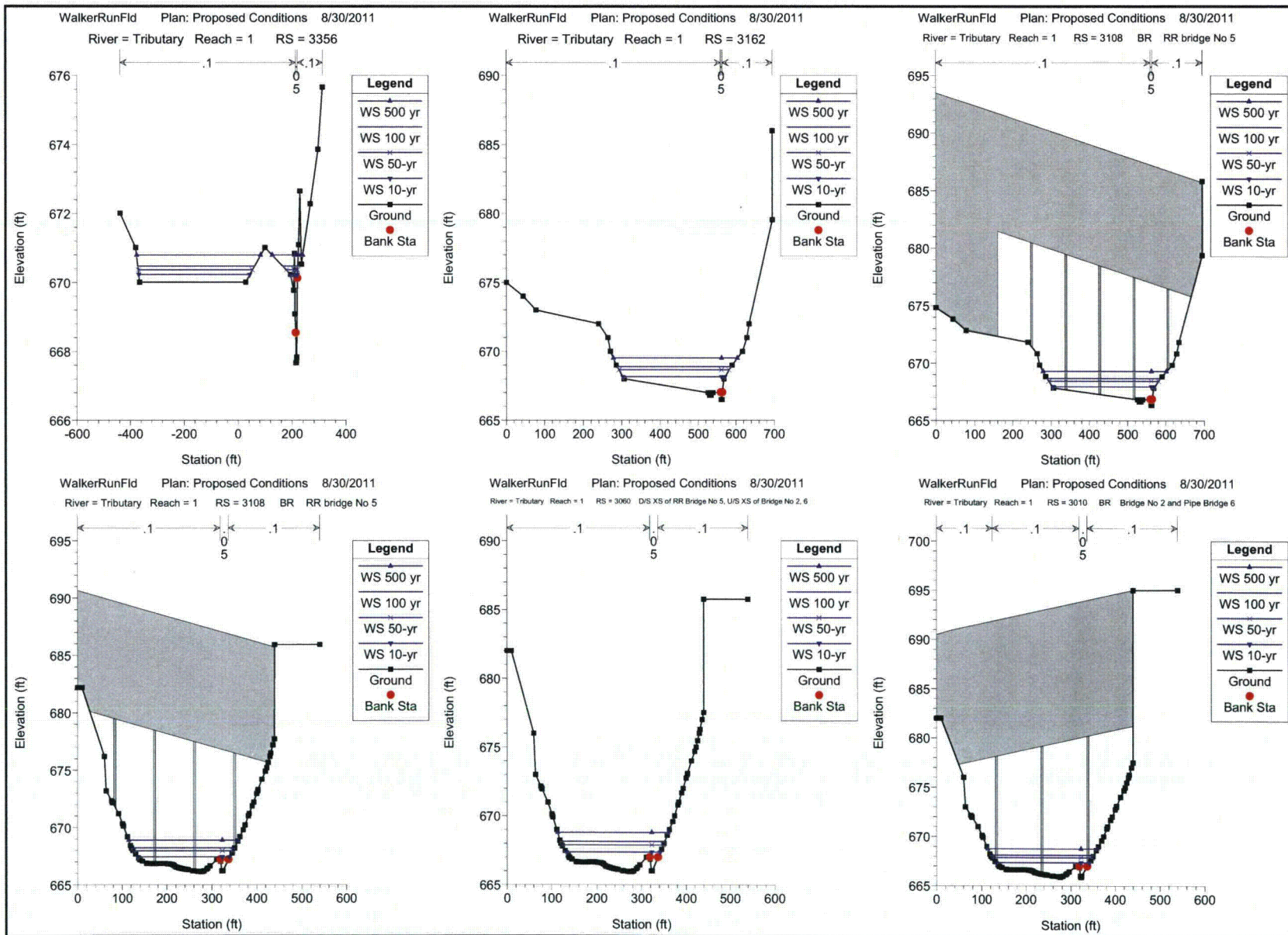
HEC-RAS Plan: Prop (Continued)

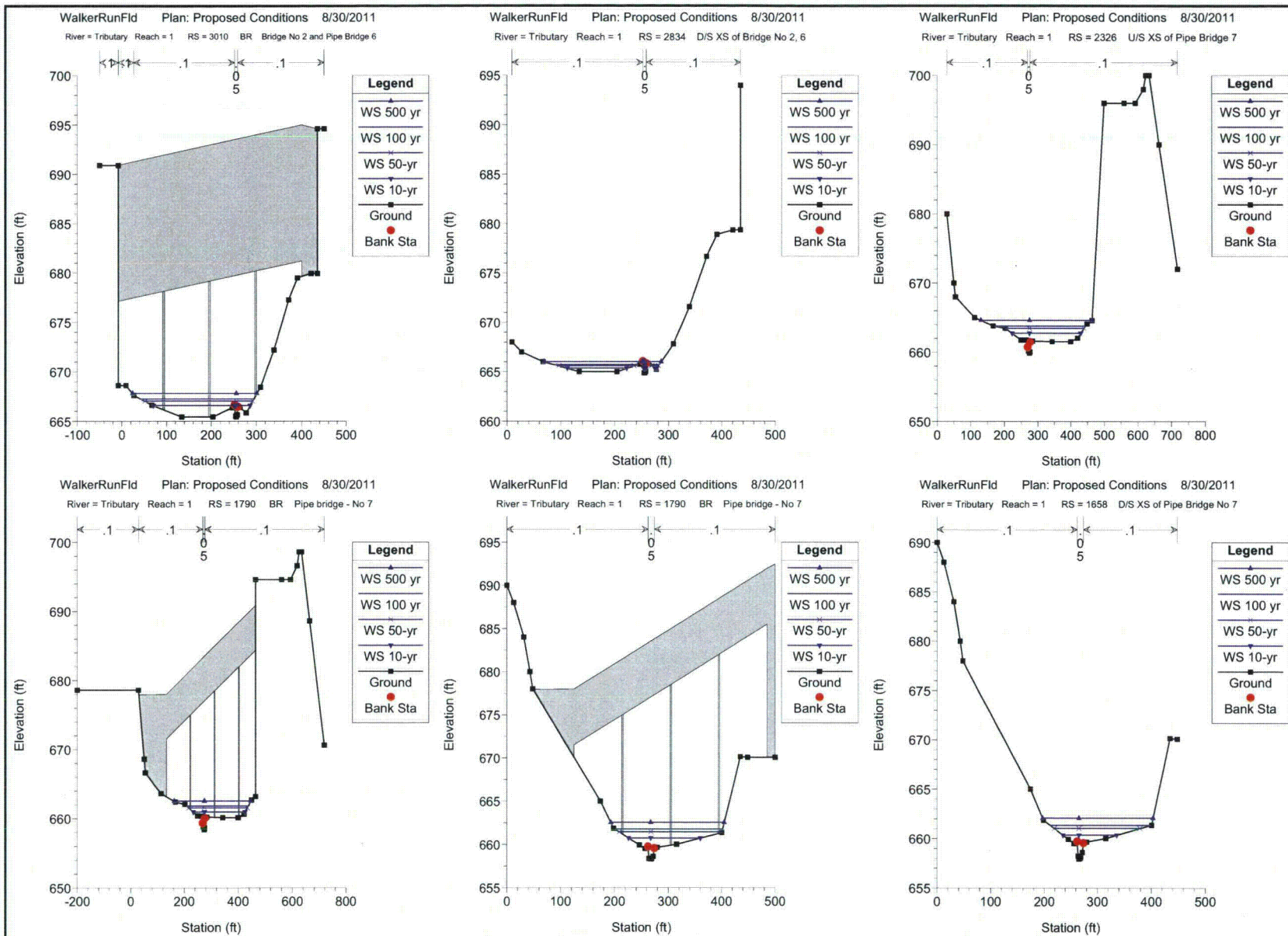
River	Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Tributary	1	483	50-yr	213.00	653.23	655.42		655.43	0.001883	0.93	303.57	421.45	0.14
Tributary	1	357	100 yr	300.00	652.40	655.29		655.30	0.002865	1.65	412.49	910.16	0.19
Tributary	1	357	100 yr encroachment	300.00	652.40	656.17		656.22	0.003042	2.10	175.96	80.29	0.21
Tributary	1	357	500 yr	606.00	652.40	655.63		655.64	0.002452	1.66	730.08	1004.25	0.18
Tributary	1	357	10-yr	84.00	652.40	654.86		654.87	0.002852	1.43	116.93	283.02	0.18
Tributary	1	357	50-yr	213.00	652.40	655.17		655.18	0.003080	1.64	300.72	874.64	0.20
Tributary	1	183	100 yr	300.00	652.14	654.94	654.43	654.95	0.001501	1.06	522.99	838.75	0.14
Tributary	1	183	100 yr encroachment	300.00	652.14	655.94	654.72	655.95	0.000853	1.06	401.20	261.38	0.11
Tributary	1	183	500 yr	606.00	652.14	655.30	654.57	655.31	0.001501	1.19	843.10	951.71	0.14
Tributary	1	183	10-yr	84.00	652.14	654.51	654.20	654.51	0.001501	0.88	206.34	607.95	0.13
Tributary	1	183	50-yr	213.00	652.14	654.80	654.38	654.81	0.001503	1.00	409.26	771.12	0.14



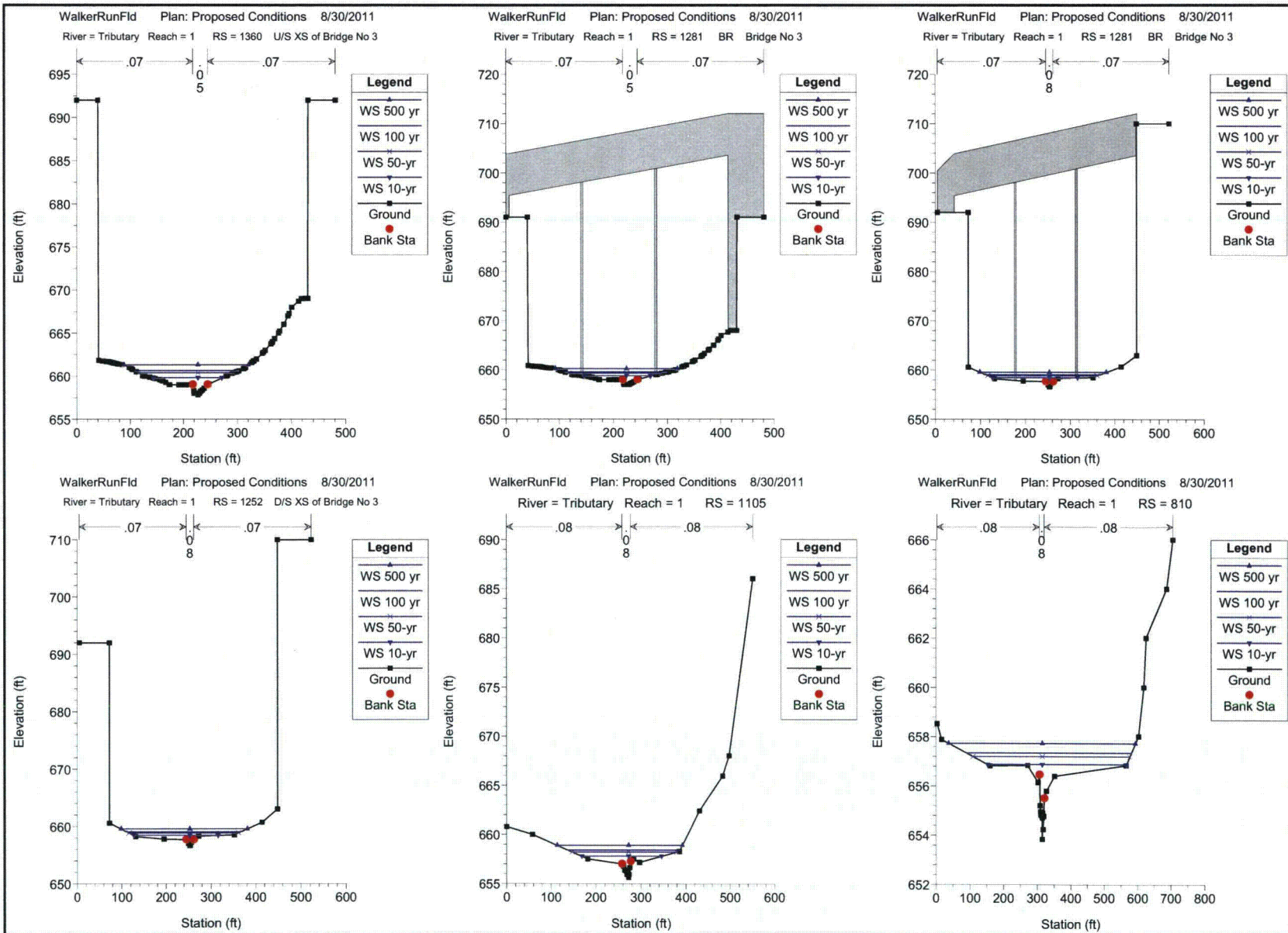


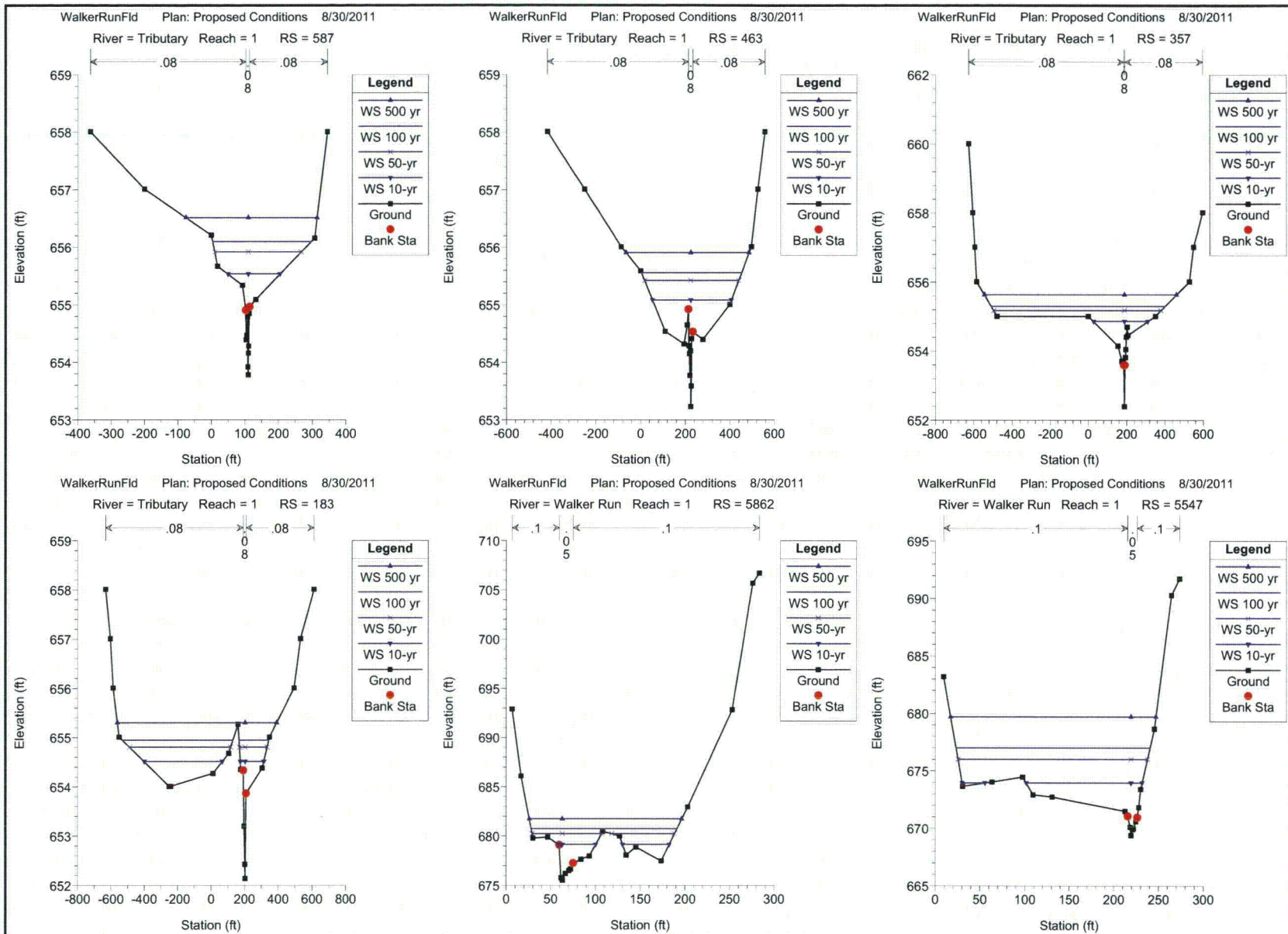


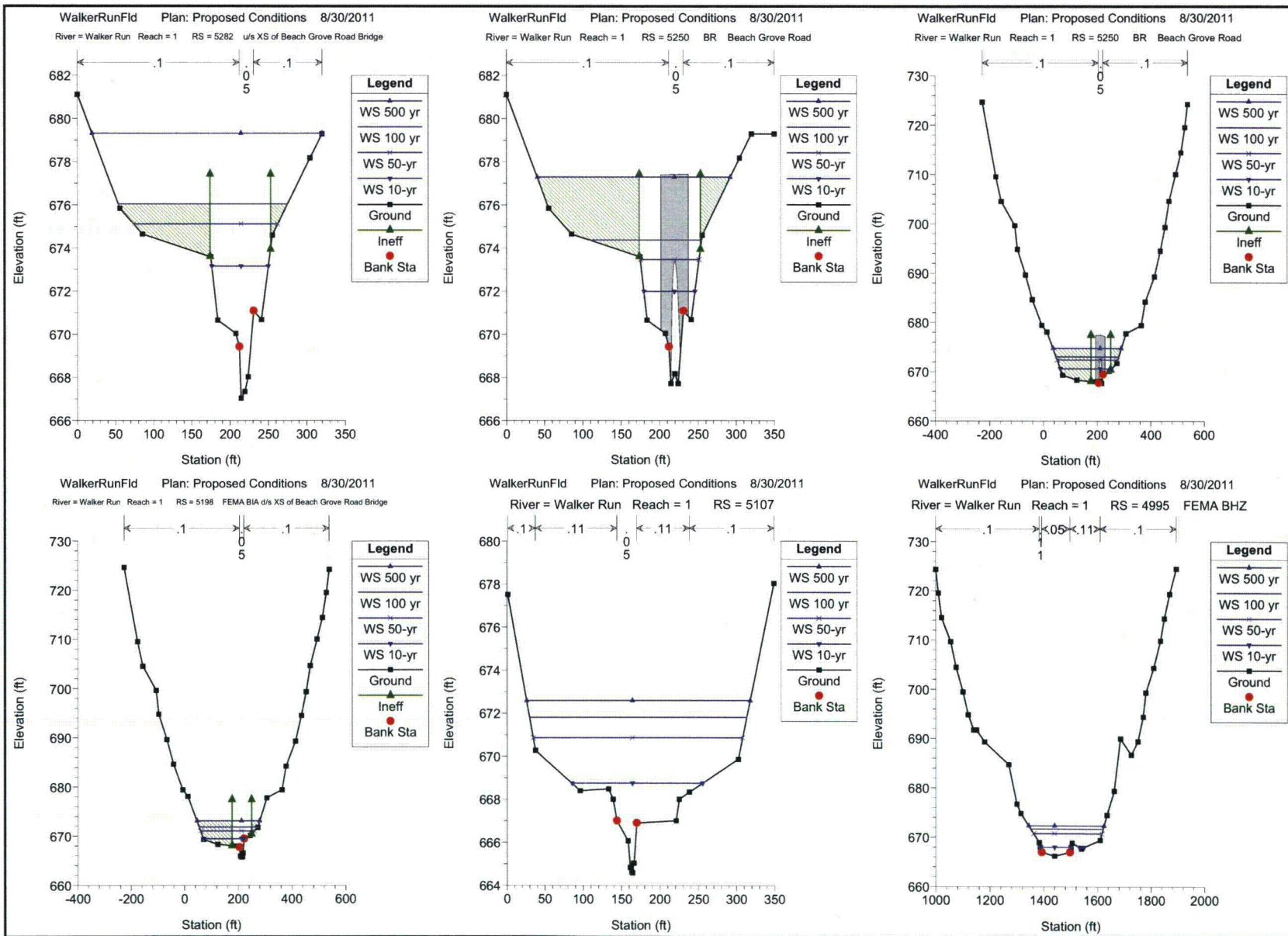




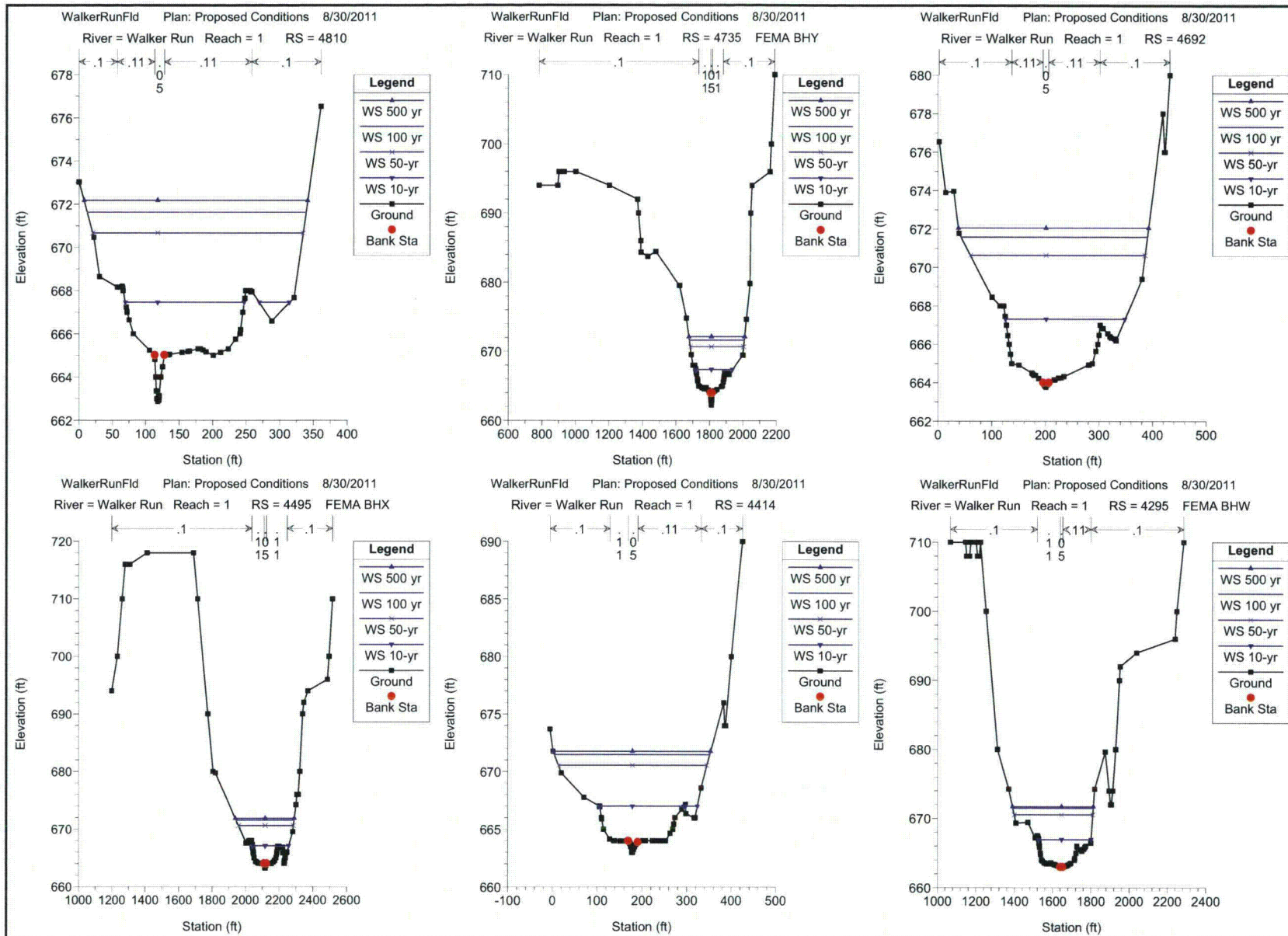


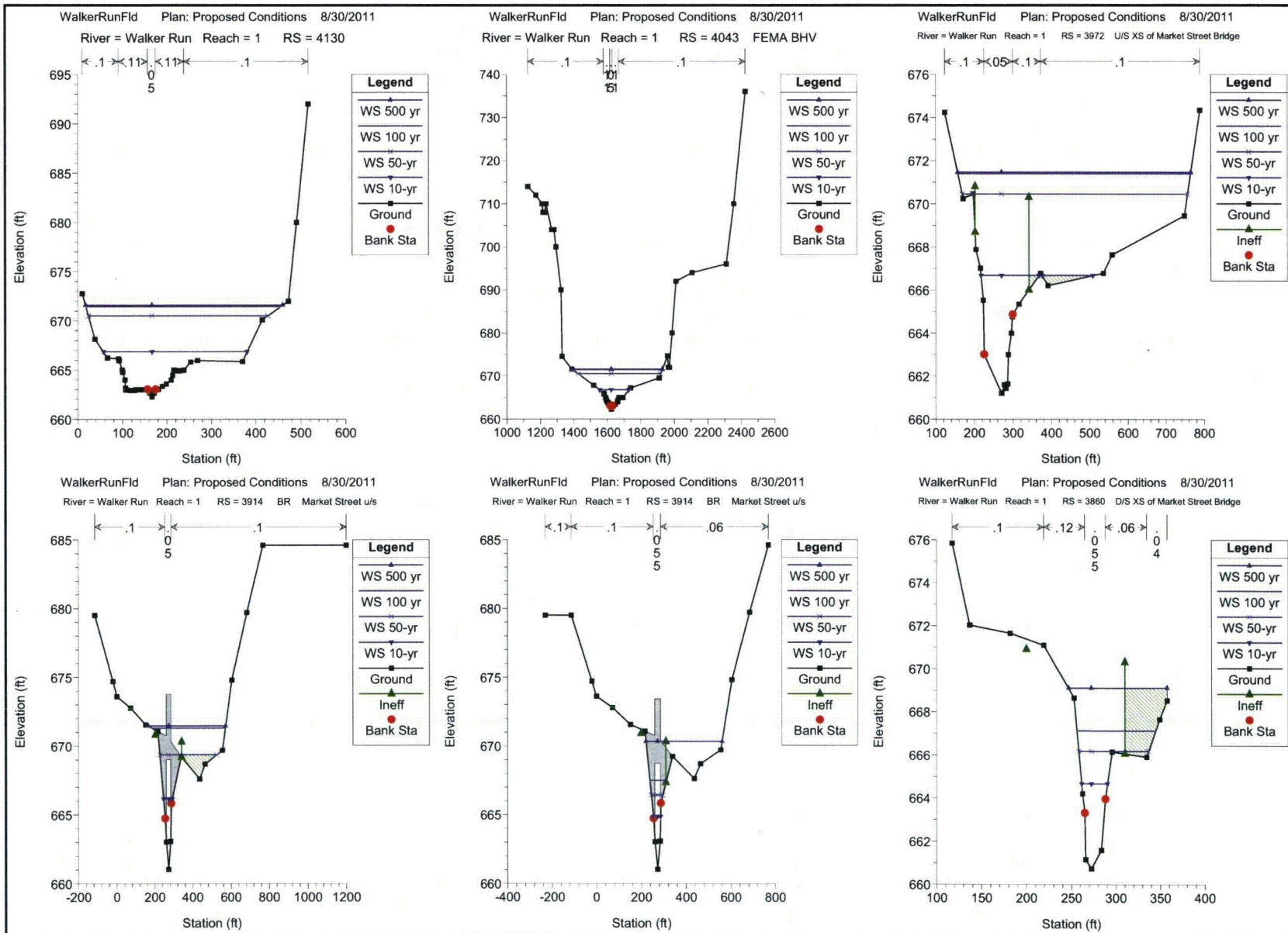


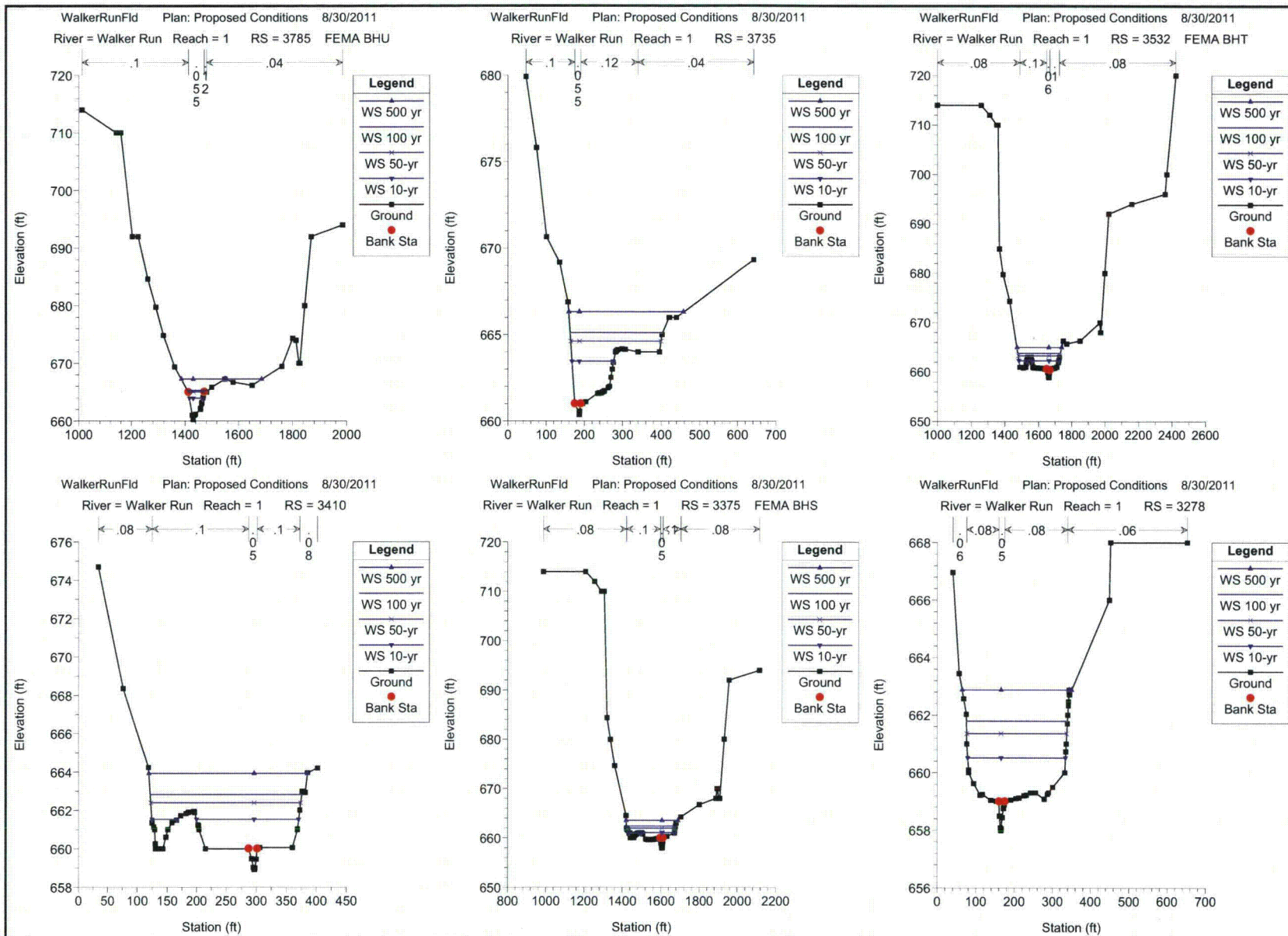




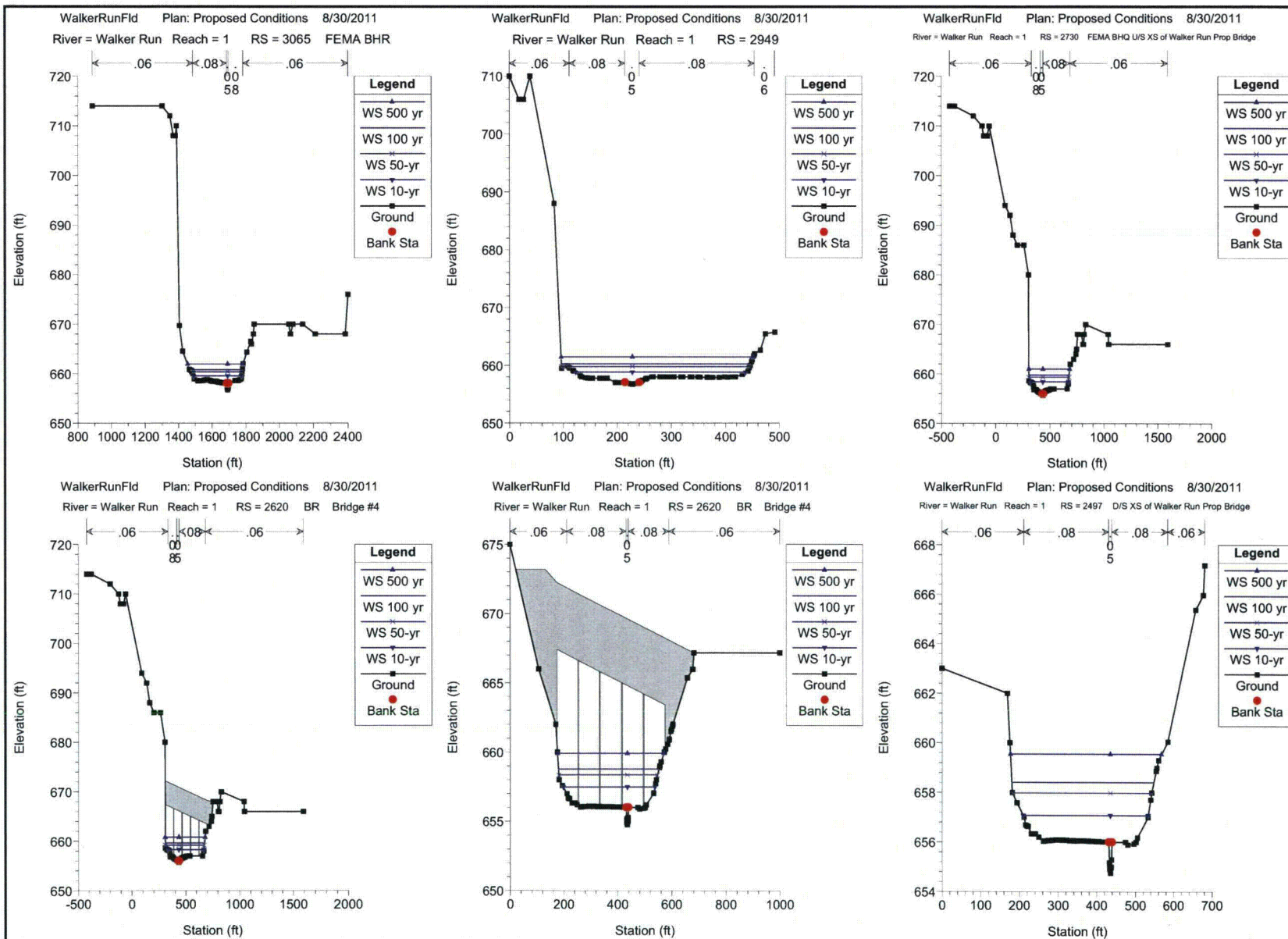


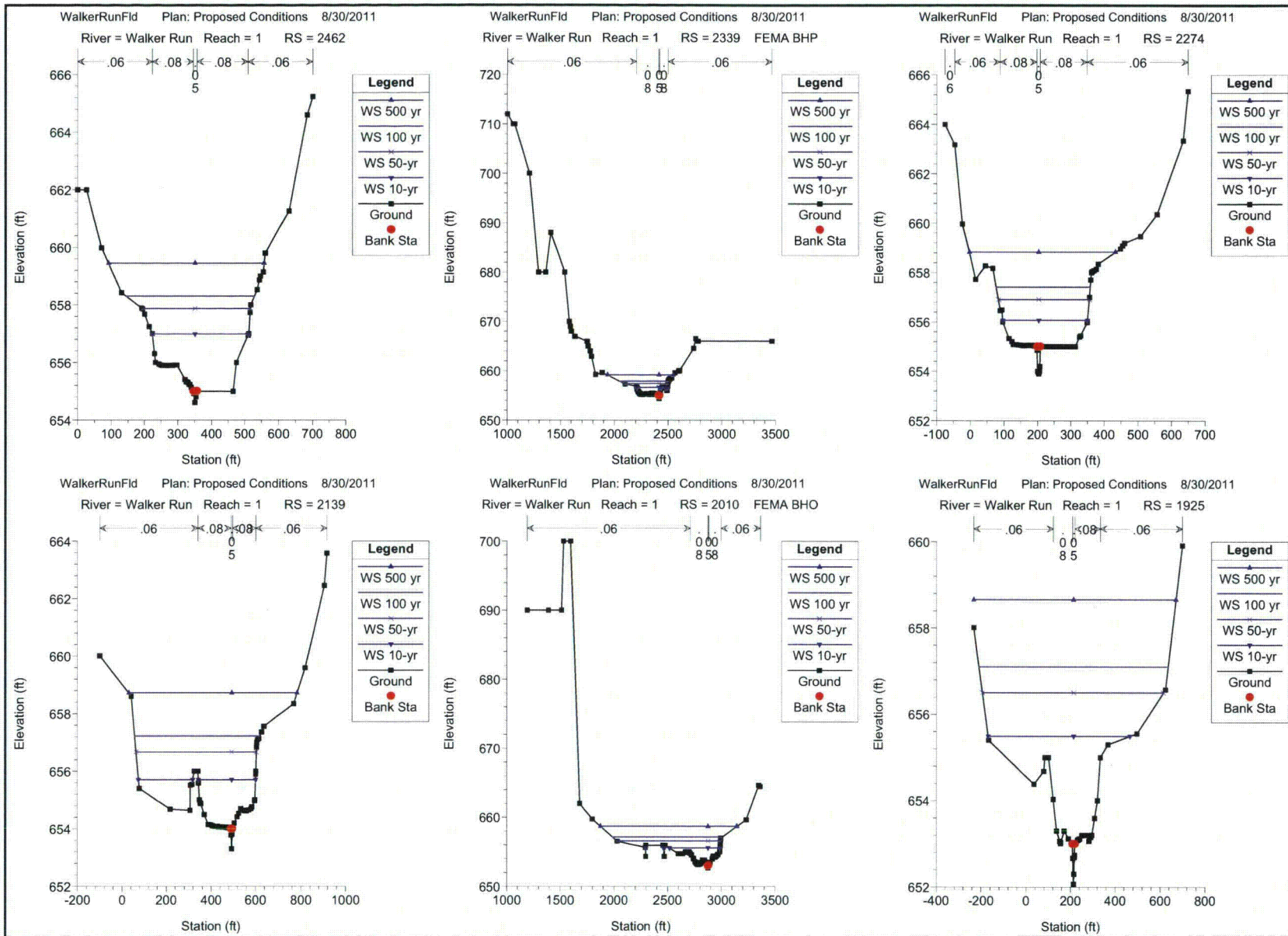


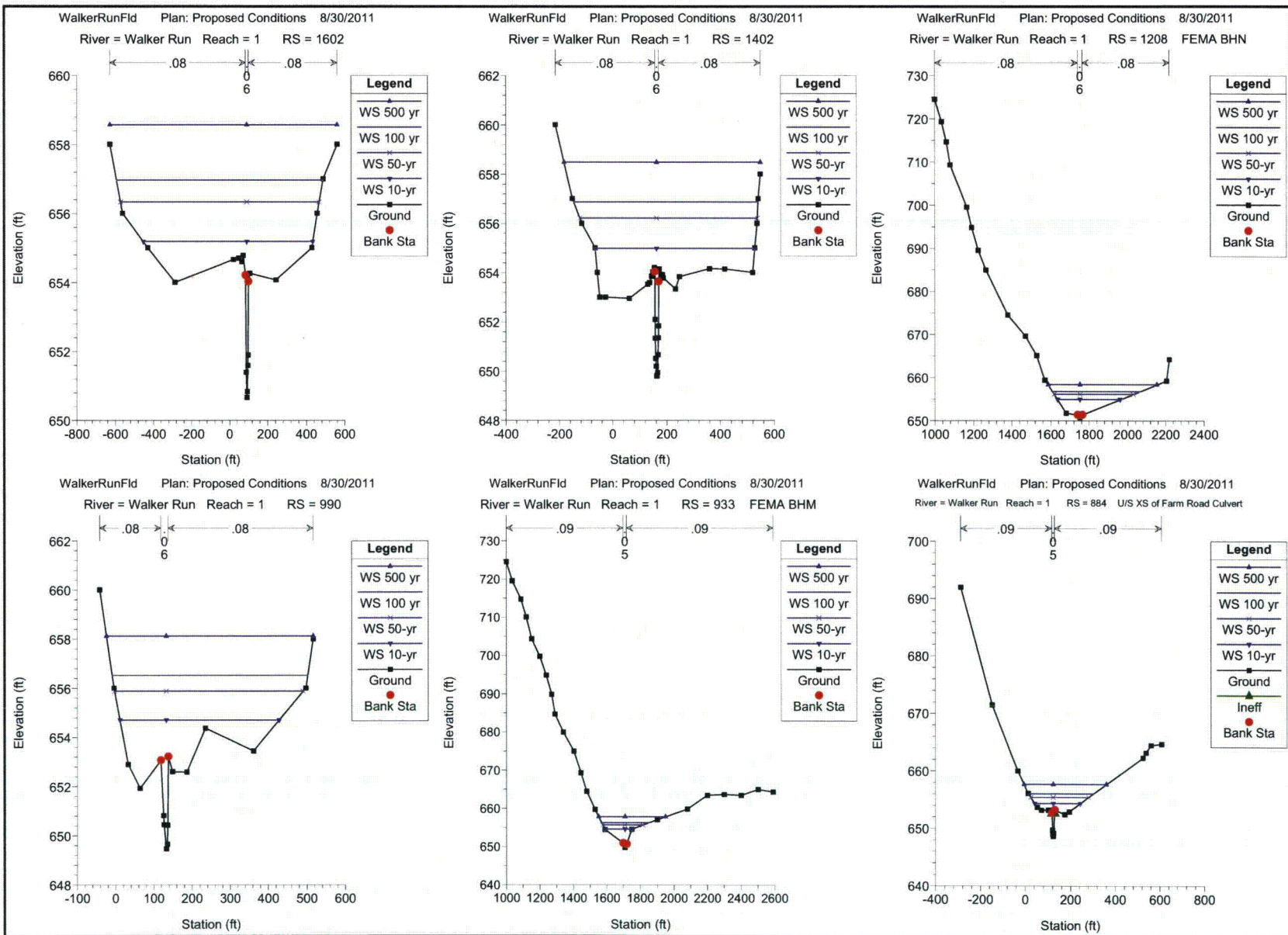




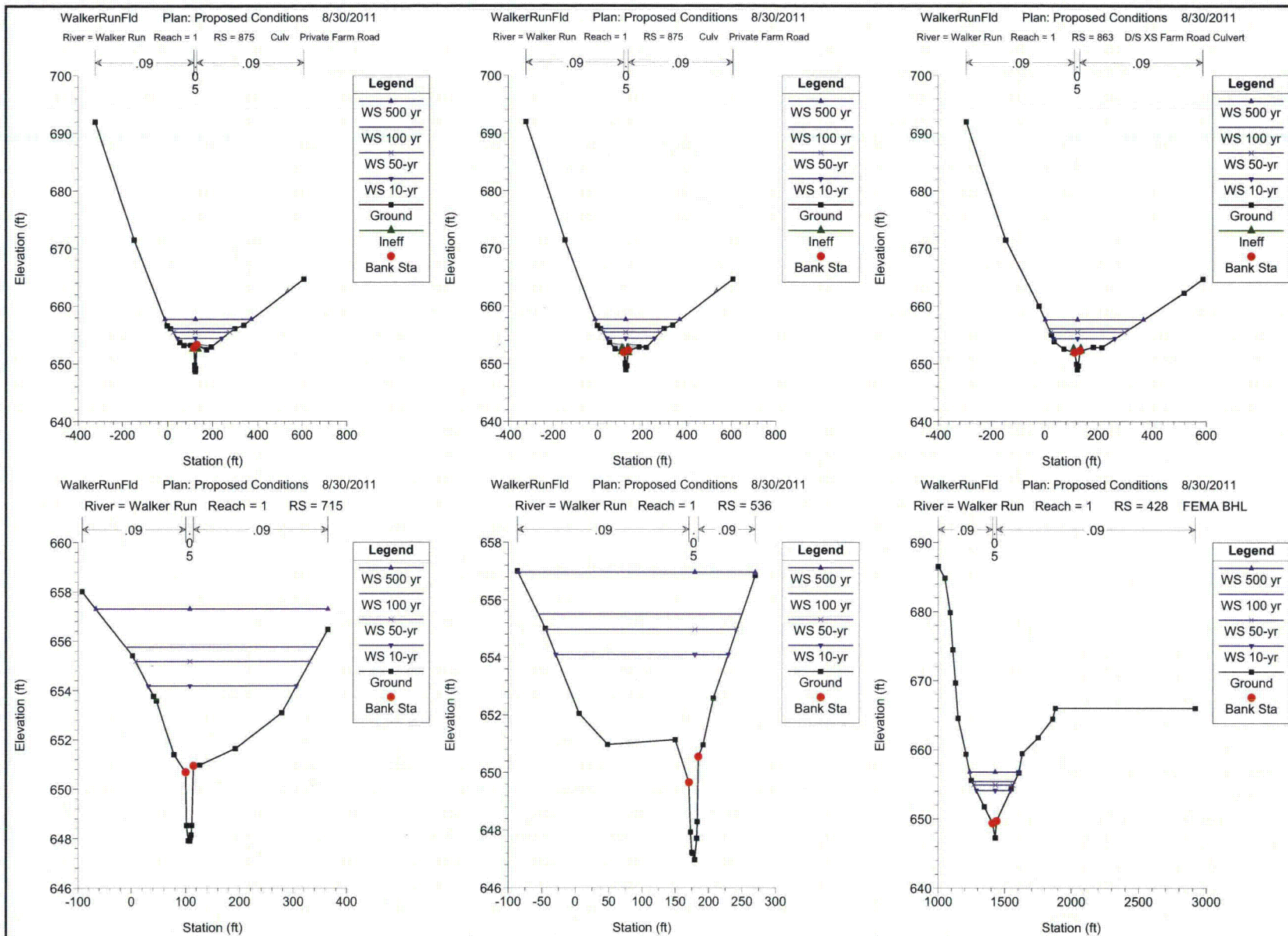


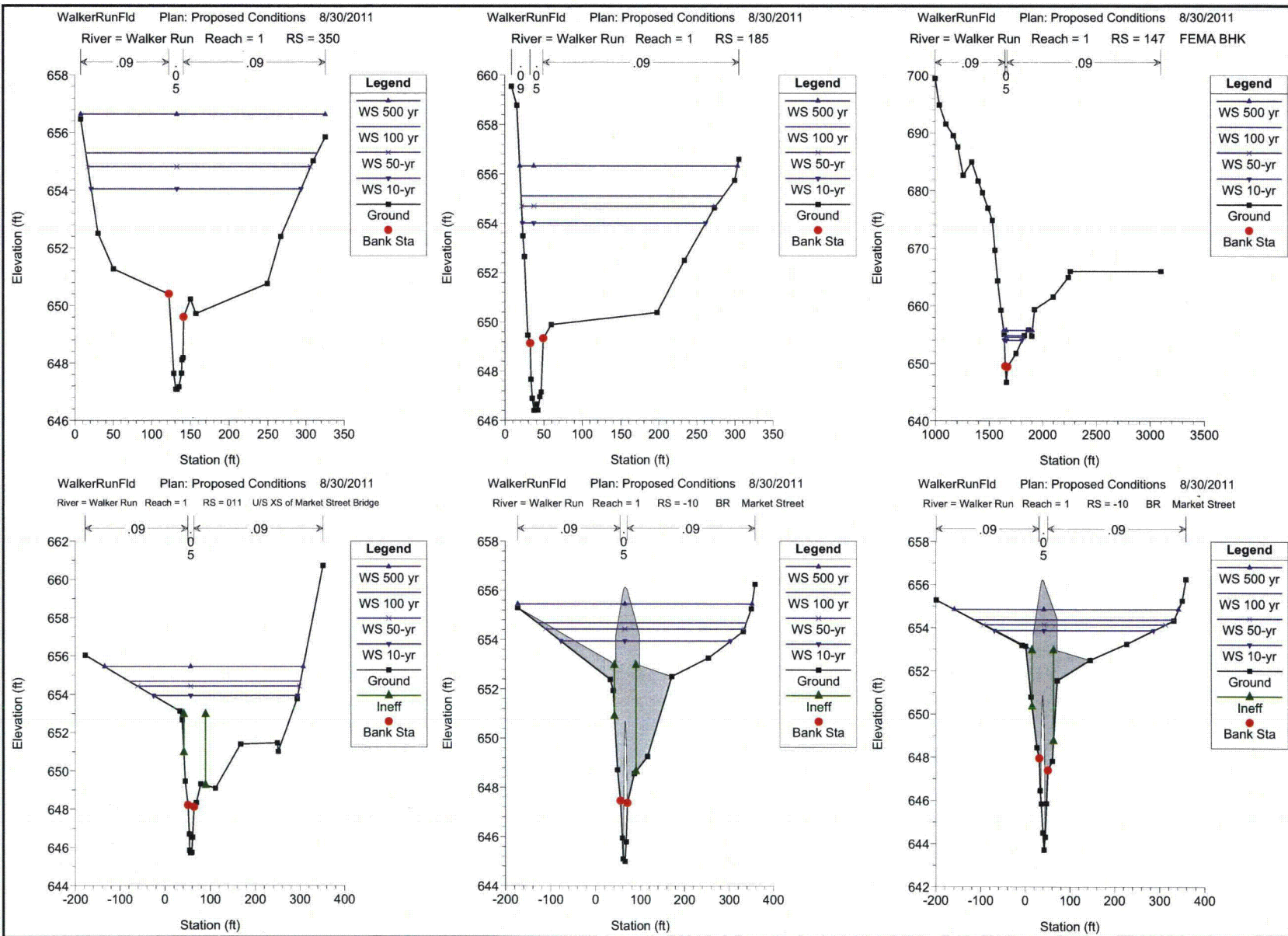


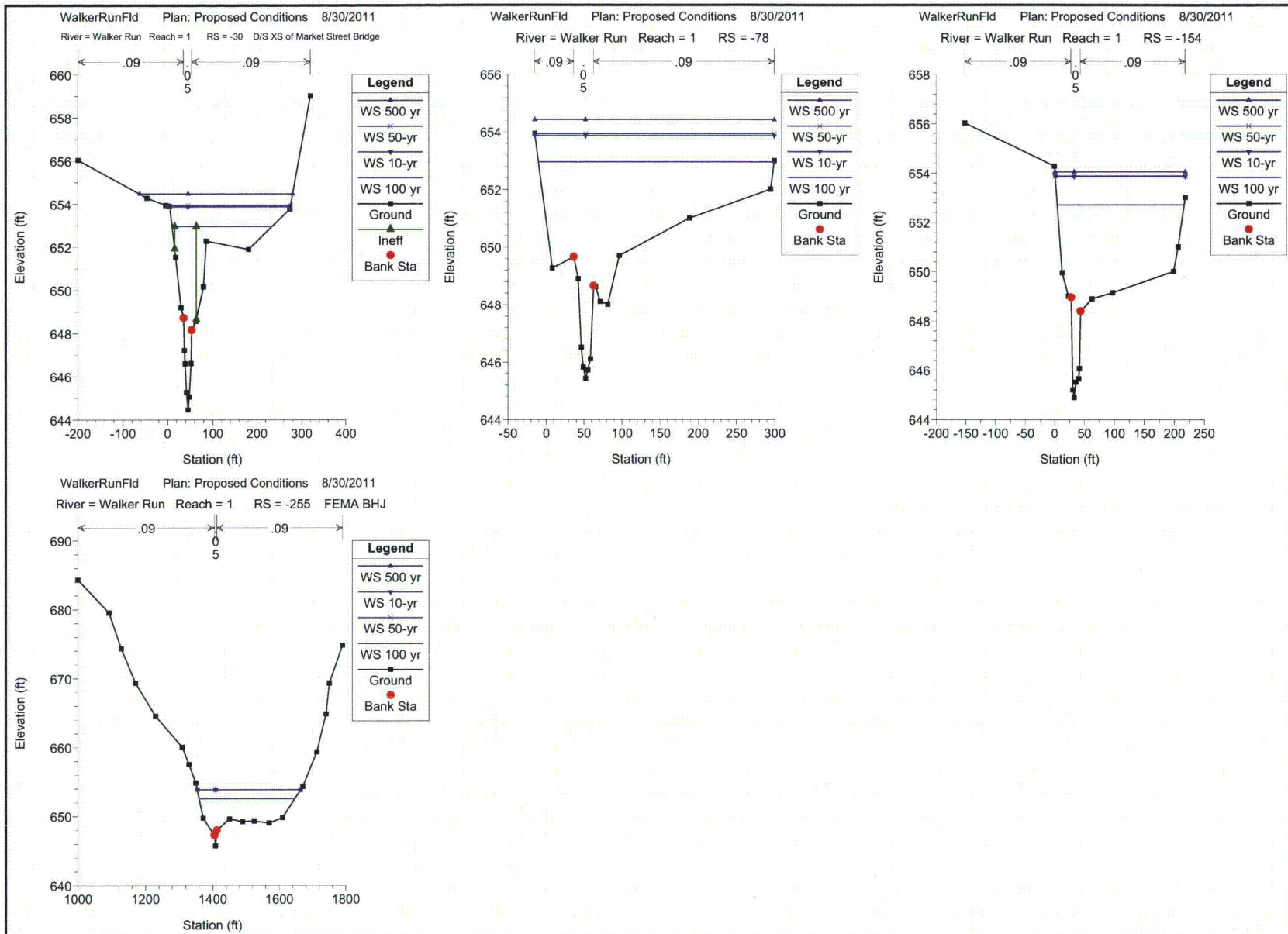








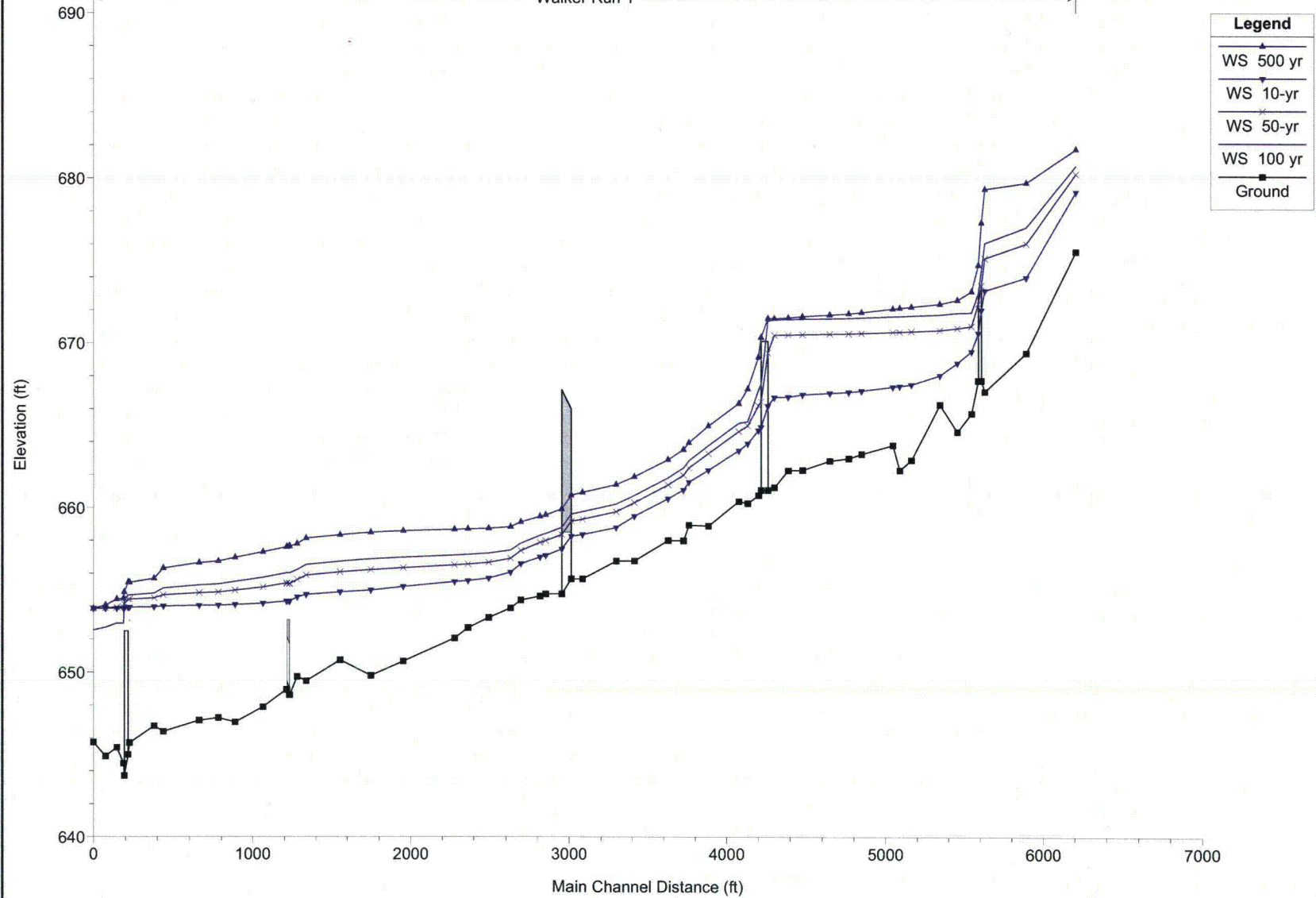




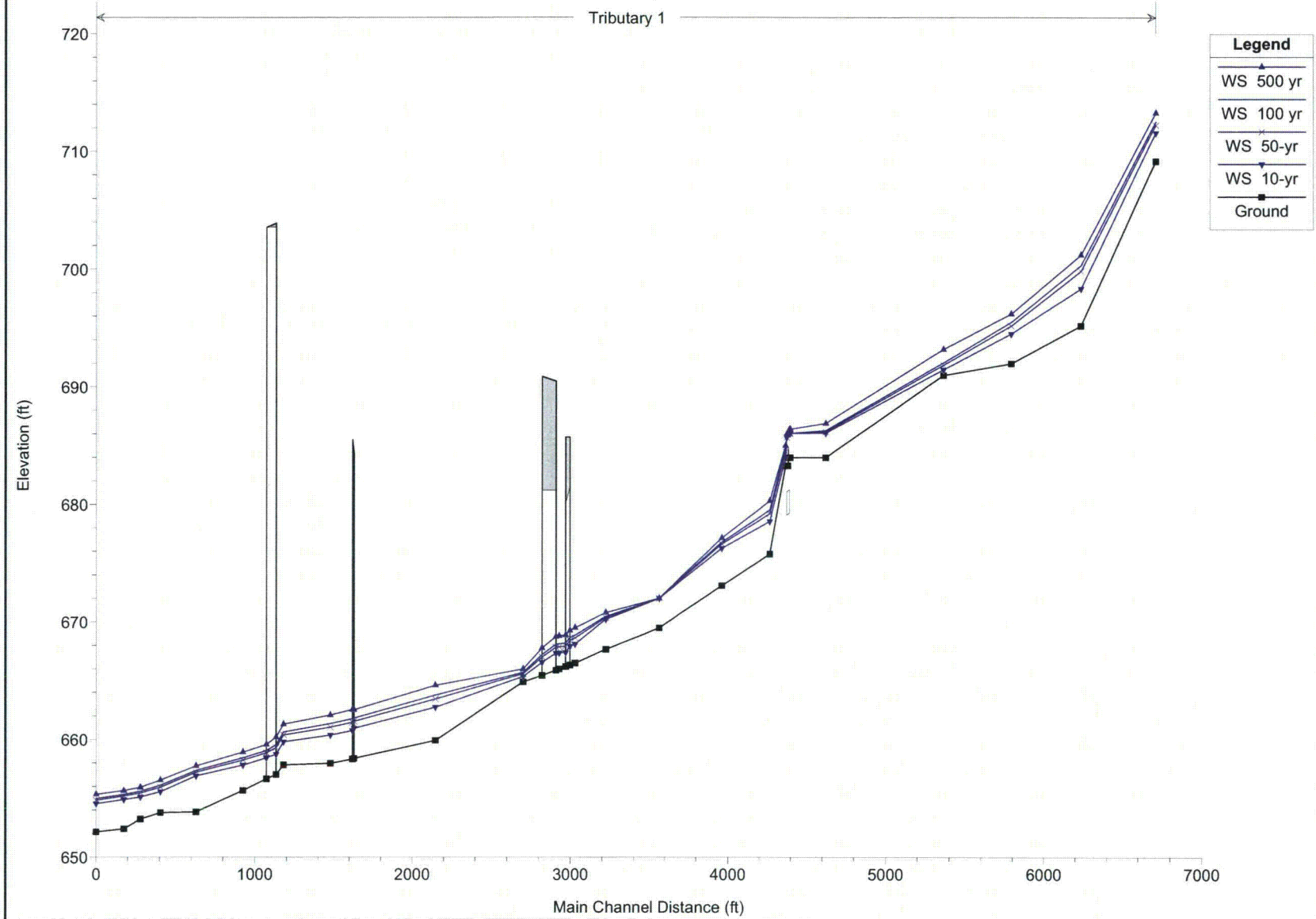


WalkerRunFld Plan: Proposed Conditions 8/30/2011

Walker Run 1



WalkerRunFld Plan: Proposed Conditions 8/30/2011



walkerRunFld.rep

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

```

X      X  XXXXXX  XXXX      XXXX      XX      XXXX
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PROJECT DATA

Project Title: walkerRunFld  
Project File : walkerRunFld.prj  
Run Date and Time: 9/1/2011 9:23:48 AM

Project in English units

PLAN DATA

Plan Title: Proposed Conditions  
Plan File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.p09

Geometry Title: Proposed Conditions  
Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.g07

Flow Title : Existing Conditions  
Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting  
Oversight E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.f03

Plan Summary Information:

Number of:	Cross Sections =	74	Multiple Openings =	0
	Culverts =	2	Inline Structures =	0
	Bridges =	8	Lateral Structures =	0

Computational Information

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

Computation Options

Critical depth computed only where necessary  
Conveyance Calculation Method: Between every coordinate point (HEC2 Style)  
Friction Slope Method: Average Conveyance  
Computational Flow Regime: Subcritical Flow



walkerRunFld.rep

Encroachment Data

Equal Conveyance = True  
Left Offset = 0  
Right Offset = 0

River = Walker Run Reach = 1

RS	Profile	Method	Value1	Value2
5862	100 yr encroachment	1	50	108.12
5547	100 yr encroachment	1	160	226.17
5282	100 yr encroachment	1	179	248
5198	100 yr encroachment	1	176.89	249.89
5107	100 yr encroachment	1	75	260
4995	100 yr encroachment	1	1383	1520
4810	100 yr encroachment	1	70.73	245.06
4735	100 yr encroachment	1	1700.14	1990.13
4692	100 yr encroachment	1	100.41	364.89
4495	100 yr encroachment	1	2041.17	2191.82
4414	100 yr encroachment	1	105.71	274.29
4295	100 yr encroachment	1	1531.78	1800
4130	100 yr encroachment	1	65.97	269.33
4043	100 yr encroachment	1	1565	1720
3972	100 yr encroachment	1	197.75	550
3860	100 yr encroachment	1	264	285
3785	100 yr encroachment	1	1400	1450
3735	100 yr encroachment	1	167.57	315
3532	100 yr encroachment	1	1577.02	1689.17
3410	100 yr encroachment	1	235.04	355
3375	100 yr encroachment	1	1528.63	1649.15
3278	100 yr encroachment	1	117.52	231.3
3065	100 yr encroachment	1	1567.38	1750
2949	100 yr encroachment	1	155	299.61
2730	100 yr encroachment	1	374.49	528.2
2497	100 yr encroachment	1	250	501.55
2462	100 yr encroachment	1	275	475
2339	100 yr encroachment	1	2325	2475.07
2274	100 yr encroachment	1	96.48	348.92
2139	100 yr encroachment	1	324.93	604.68
2010	100 yr encroachment	1	2600	2953.62
1925	100 yr encroachment	1	121.59	320.86
1602	100 yr encroachment	1	-285.48	229.52
1402	100 yr encroachment	1	10.08	391.43
1208	100 yr encroachment	1	1689.95	1864.92
990	100 yr encroachment	1	15	410
933	100 yr encroachment	1	1620	1735
884	100 yr encroachment	1	81.4	208.17
863	100 yr encroachment	1	81.31	208.08
715	100 yr encroachment	1	83.8	237.94
536	100 yr encroachment	1	36.84	184.3
428	100 yr encroachment	1	1358.97	1474.62
350	100 yr encroachment	1	74.21	237.94
185	100 yr encroachment	1	32.38	176.38
147	100 yr encroachment	1	1640	1750
011	100 yr encroachment	1	42	249
-30	100 yr encroachment	1	15.72	150
-78	100 yr encroachment	1	3	150
-154	100 yr encroachment	1	13.15	138.42
-255	100 yr encroachment	1	1405	1570

River = Tributary Reach = 1

RS	Profile	Method	Value1	Value2
6850	100 yr encroachment	1	90.32	113.19
6361	100 yr encroachment	1	53	610
5930	100 yr encroachment	1	75	112

			walkerRunFld.rep		
5500	100	yr encroachment	1	90	110
4750	100	yr encroachment	1	85	145
4530	100	yr encroachment	1	75	150
4500	100	yr encroachment	1	117.21	140
4400	100	yr encroachment	1	125	170
4093	100	yr encroachment	1	68.09	94.92
3696	100	yr encroachment	1	434.5	760
3356	100	yr encroachment	1	20	229.11
3162	100	yr encroachment	1	513.93	566
3060	100	yr encroachment	1	255	340
2834	100	yr encroachment	1	205	285
2326	100	yr encroachment	1	125	360
1658	100	yr encroachment	1	225	350
1360	100	yr encroachment	1	220	236
1252	100	yr encroachment	1	218	288
1105	100	yr encroachment	1	240	283.94
810	100	yr encroachment	1	285	379.19
587	100	yr encroachment	1	95	140.89
463	100	yr encroachment	1	169.65	267.48
357	100	yr encroachment	1	114.71	195
183	100	yr encroachment	1	-6	255.38

#### FLOW DATA

Flow Title: Existing Conditions  
Flow File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
HEC-RAS\walkerRunFld.f03

#### Flow Data (cfs)

River	Reach	RS	100 yr	100 yr encroachment
500 yr	10-yr	50-yr		
Tributary	1	6850	300	300
606	84	213		
Tributary	1	4400	300	300
606	84	213		
Tributary	1	1252	300	300
606	84	213		
walker Run	1	5862	1640	1640
3100	480	1180		
walker Run	1	5198	1640	1640
3100	480	1180		
walker Run	1	1602	1860	1860
3600	550	1320		

#### Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Tributary	1	100 yr	Critical
Normal S = 0.0015			
Tributary	1	100 yr encroachment	Critical
Known WS = 655.94			

		walkerRunFld.rep	
Tributary	1	500 yr	Critical
Normal S = 0.0015			
Tributary	1	10-yr	Critical
Normal S = 0.0015			
Tributary	1	50-yr	Critical
Normal S = 0.0015			
walker Run	1	100 yr	Critical
Known WS = 652.54			
walker Run	1	100 yr encroachment	Critical
Known WS = 653.54			
walker Run	1	500 yr	Critical
Known WS = 653.85			
walker Run	1	10-yr	Critical
Known WS = 650.85			
walker Run	1	50-yr	Critical
Known WS = 652.05			

#### GEOMETRY DATA

Geometry Title: Proposed Conditions  
 Geometry File : p:\PROJECTS\Environmental\PPL - Wetland Permitting Oversight  
 E-726-L8\TASKS\Task 10 - Floodplain\walker Run HEC-RAS\FEMA REV DATA\REV 3  
 HEC-RAS\walkerRunFld.g07

#### CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 6850

#### INPUT

##### Description:

Station	Elevation	Data	num=	98					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	717.52	.35	717.54	2.18	717.61	3.78	717.66	6.3	717.8
7.85	717.82	12.81	718	20.71	718.1	21.89	718.12	30.23	718.06
30.44	718.06	34.3	718	34.95	717.97	35.49	717.93	40.01	717.62
40.91	717.52	41.61	717.38	43.04	717.13	43.18	717.1	43.68	717.04
43.98	717	47.48	716.55	50.04	716.18	50.95	716	52.04	715.78
54.81	715	56.01	714.66	58.49	714	60.5	713.45	61.8	713
73.57	712.06	74.45	712	75.39	711.91	76.44	711.85	84.53	711.28
90.32	711	91.39	710.93	91.8	710.91	92.02	710.89	92.48	710.85
96.49	710.55	101.47	710	102.88	709.75	104.15	709.32	104.25	709.26
104.43	709.22	104.66	709.19	104.87	709.2	105.86	709.3	106.32	709.38
107.84	709.67	109.84	710	112.63	710.84	113.19	711	113.34	711.06
116.12	712	118.92	712.94	119.09	713	119.23	713.05	122.01	714
123.04	714.38	124.97	715	126.95	715.63	128.05	716	130.39	716.75
131.16	717	132.68	717.25	138.64	718	141.42	718.08	146.9	718.11
148.71	718.06	153.13	718	156.17	717.38	157.97	717	159.64	716.99
159.72	716.99	161.24	717	161.76	717	162.96	717.28	166.09	718
167.49	718.26	174.81	719	177.43	719.22	185.26	719.81	186.71	719.92
187.13	719.95	187.68	720	195.49	720.55	201.16	721	207.47	721.56
209.54	721.73	212.78	722	224.62	722.84	226.57	723	236.08	723.8
238.51	724	242.33	724.16	249.45	724.46				

Manning's	n	Values	num=	3
Sta	n Val	Sta	n Val	Sta
0	.05	90.32	.08	113.19
				n Val

walkerRunFld.rep

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
90.32	113.19	460	476	490	.1		.3

CROSS SECTION

RIVER: Tributary  
REACH: 1 RS: 6361

INPUT

Description: New

Station	Elevation	Data	num=	20						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	703	20	702	30.5	701	41	700	52	699	
53.4	698	54.4	697	55.1	696	55.7	695.2	56.8	696	
58.9	697	60.6	698	62.7	699	67.6	700	75.9	701	
88.7	702	106.3	703	117.8	704	121.2	705	145	706	

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .05 52	.08 62.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
52	62.7	438	444	454	.1		.3

CROSS SECTION

RIVER: Tributary  
REACH: 1 RS: 5930

INPUT

Description:

Station	Elevation	Data	num=	77						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	707.61	.21	707.52	1.49	707	3.75	706.23	4.35	706.04	
4.46	706	4.67	705.91	6.78	705	7.13	704.87	9.64	704	
11.48	703.34	12.46	703	12.85	702.86	15.32	702	16.31	701.64	
18.18	701	20.11	700.31	21	700	23.24	699.19	23.8	699	
24.33	698.81	26.66	698	27.99	697.57	29.87	697	31.89	696.61	
35.21	696	40.81	695.52	43.76	695.24	46.22	695	47.88	694.93	
73.56	694	78.44	693.3	80.01	693	80.83	692.64	82.4	692	
83.33	692	84.28	692	84.3	692	84.31	692	86.28	692	
87.21	692.48	88.27	693	101.79	693.51	104.21	693.59	106.79	693.68	
108.18	693.72	110.29	693.73	112.58	693.7	112.72	693.69	118.36	693.78	
120.92	693.83	122.97	693.9	125.05	694	139.58	694.93	140.72	695	
141.28	695.05	153.31	696	158.07	696.55	162.09	697	166	697.45	
170.75	698	174.95	698.5	179.08	699	183.24	699.61	185.81	700	
188.27	700.35	192.66	701	196.14	701.53	199.34	702	204.09	702.76	
205.4	703	207.13	703.33	210.72	704	213.77	704.54	216.32	705	
218.9	705.47	221.12	705.84							

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .05 80.01	.08 88.27	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
80.01	88.27	448.37	429.25	409.23	.1		.3

CROSS SECTION

RIVER: Tributary

# walkerRunFld.rep

REACH: 1

RS: 5500

## INPUT

### Description:

Station Elevation Data		num= 96							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	705.59	1.65	705.28	3.11	705	3.68	704.9	9.3	704
10.58	703.79	14.78	703	14.79	703	19.67	702.91	20.62	702.9
22.18	702.9	22.97	702.9	23.58	702.92	24.01	702.94	24.36	702.98
24.87	703	25.93	703.05	26.08	703.05	35.07	703.38	37.21	703.44
39.27	703.47	41.12	703.49	42.58	703.48	43.53	703.46	44.12	703.41
44.76	703.31	46.18	703	46.94	702.52	47.85	702	48.86	701.36
49.48	701	50.69	700.22	51.08	700	51.86	699.5	52.59	699
53.94	698.19	54.24	698	54.73	697.69	55.88	697	57.44	696.04
57.51	696	57.79	695.83	59.23	695	60.7	694.11	60.9	694
62.37	693.25	62.91	693	62.98	692.98	65.37	692	65.4	691.99
66.48	691.55	67.85	691	67.95	691	75.95	691	79.78	691
84.86	691	87.6	691	89.79	691	96.84	691	105.06	691
105.18	691	106.9	691	107.22	691	114.51	691	116.13	691
118.28	691.39	121.68	692	123.18	692.64	124.03	693	126.02	693.87
126.33	694	127.25	694.4	128.76	695	129.16	695.13	132.13	696
132.9	696.22	135.68	697	137.76	697.61	139.16	698	139.62	698.13
142.67	699	143.27	699.17	146.17	700	149.04	700.82	149.66	701
150.18	701.16	153.12	702	153.66	702.15	156.6	703	158.09	703.4
160.27	704	162.03	704.45	164.06	705	166.44	705.61	168.26	706
169.59	706.33								

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.05	66.48	.08	118.28	.05

Bank Sta:	Left	Right	Lengths:	Left	Channel	Right	Coeff	Contr.	Expan.
	66.48	118.28		758.93	739.98	740.88		.1	.3

## CROSS SECTION

## RIVER: Tributary

REACH: 1

RS: 4750

## INPUT

### Description:

Station Elevation Data		num= 130							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	719.11	7.68	719	10.17	718.76	18.45	718	20.03	717.49
21.92	717	22.84	716.49	23.71	716	24.48	715.58	25.43	715
26.3	714.49	27.18	714	28.1	713.46	28.92	713	29.88	712.44
30.65	712	31.64	711.37	32.27	711	33.35	710.38	33.99	710
35.06	709.39	35.7	709	36.83	708.35	37.43	708	38.7	707.26
39.13	707	39.54	706.76	40.87	706	42.26	705.19	42.58	705
43.96	704.19	44.31	704	45.75	703.16	46.03	703	47.5	702.13
47.72	702	49.25	701.01	49.26	701	49.27	700.99	50.71	700
51.78	699.09	51.92	699	52.06	698.89	53.27	698	53.57	697.79
54.58	697	55.07	696.68	55.87	696	56.82	695.31	57.23	695
58.25	694.16	58.5	694	60.18	693.01	60.19	693	60.23	692.98
62.33	692	64.4	691	64.41	691	66.77	690	68.03	689.39
68.88	689	70.28	688.56	71.66	688	73.93	687.54	76.53	687
79.74	686.35	81.27	686	83.57	685.49	85.56	685	86.56	684
89.9	684	94.99	684	124.36	684	137.07	684	144.81	684
176.24	685	176.89	685.09	183.88	686	186.34	686.5	188.39	687
191.16	687.7	192.31	688	193.07	688.2	196.16	689	197.57	689.37
200.05	690	206.17	690.93	206.7	691	214.37	691.48	215.87	691.59
217.4	691.74	217.65	691.76	218.07	691.79	218.54	691.81	219.08	691.82

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219.68	691.82	220.29	691.82	221.04	691.82	221.15	691.82	221.32	691.79
221.59	691.74	222.48	691.36	223.33	691	225.37	690.05	225.47	690
225.68	689.91	227.73	689	229.96	688.11	230.23	688	230.4	687.93
232.65	687	233.17	686.93	233.41	686.89	233.91	686.96	234.15	687
234.42	687.11	236.86	688	237.5	688.24	239.62	689	242.37	690
245.17	691	245.95	691.05	247.15	691.13	252.96	691.51	261.76	692
269.9	692.26	288.24	692.9	290.57	692.98	291.12	693	296.01	693.22

Manning's n Values      num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	81.27	.08	183.88	.05

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

81.27	183.88	238.3	226.5	190.7	.1	.3
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# CROSS SECTION

RIVER: Tributary  
 REACH: 1      RS: 4530

## INPUT

Description: U/S XS of Beaver Dam Pond Culvert

Station	Elevation	Data	num=	90	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	695.63	.38	695.48	1.28	695.09	1.48	695	3.09	694.51			
5.01	694	8.08	693.32	9.54	693	12.07	692.33	13.44	692			
15.74	691.32	16.91	691	18	690.72	20.83	690	24.22	689.15			
24.81	689	28.69	688.02	28.78	688	28.95	687.96	29.27	687.87			
32.8	687	37.18	686.21	38.3	686	39.25	685.85	44.98	685			
46.66	685	47.66	684	49.21	684	50.78	684	51.95	684			
53.56	684	58.64	684	62.64	684	65.43	684	71.47	684			
82.7	684	83.09	684	98.62	684	101.48	684	107.38	684			
109.3	684	123.54	684	124.7	684	147.47	684	168.98	684			
177.3	684	180.32	684	182.51	684	188.98	684	190.4	684			
193.03	684	193.27	684	193.44	684	194.9	684	194.96	684			
195.01	684	195.13	684	196.34	684	196.91	684	203.33	684			
207.17	684	210.36	684	211.96	684	215.52	684	218.11	684			
220.77	684	224.16	684	231.87	684	239.24	684	245.5	685			
253.07	685	256.85	685.84	257.54	686	258.89	686.31	259.73	686.43			
261.48	686.68	262.26	686.84	263.03	687	264	687.21	267.77	688			
269.77	688.4	272.58	689	280.78	689.37	283.12	689.52	287.24	689.8			
289.93	690	303.56	690.88	305.27	691	307.07	691.07	307.94	691.11			

Manning's n Values      num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	39.25	.08	256.85	.05

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

39.25	256.85	26.8	29.2	29.5	.3	.5
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Ineffective Flow      num= 2

Sta L	Sta R	Elev	Permanent
0	103	686.02	F
109	307.94	686.02	F

## CULVERT

RIVER: Tributary  
 REACH: 1      RS: 4528

## INPUT

Description: Beaver Dam Pond Culvert



Distance from Upstream XS = 10.5

Deck/Roadway width = 4

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 126

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	699.94		.08	699.93		.17	699.9	
.37	699.82		1.81	699.59		4.29	699.12	
4.86	699		5.91	698.73		7.54	698.44	
9.65	698		12.65	697.57		15.79	697	
17.04	696.74		19.94	696		20.51	695.88	
24.52	695		25.05	694.9		29.34	694	
29.78	693.91		34.3	693		38.09	692.22	
39.2	692		43.19	691.18		43.98	691	
44.34	690.93		44.67	690.88		49.26	690	
51.11	689.68		55.23	689		60.28	688.18	
61.36	688		65.16	687.39		67.46	687	
68.34	686.86		70.96	686.33		80.51	686.24	
80.67	686.24		84.94	686.05		86.72	686.04	
89.52	686.04		93.66	686.03		94.45	686.03	
95.14	686.02		96.47	686.02		97.36	686.02	
101.68	686.02		102.68	686.02		104.7	686.03	
105.44	686.03		109.35	686.02		114.19	686.01	
117.38	686		119.45	685.81		120.95	685.78	
123.15	685.61		123.97	685.38		125.3	685	
127.21	685		132.46	685		134.61	685	
139.57	685		141.83	685		144.59	685	
147.06	685		149.69	685		153.25	685	
155	685		158.41	685		163.68	685	
164.26	685		164.58	685		172.54	685	
173.23	685		174.29	685		182.66	685	
183.32	685		185.42	685		189.93	684.94	
190.82	684.95		198.27	684.93		198.45	684.93	
205.79	684.9		205.98	684.91		206.25	684.92	
207.99	685		214.82	685		215.17	685	
216.22	685		218.29	685		218.85	685	
220.55	685		221.47	685		221.8	685	
222.26	685		222.79	685		223.34	685	
225.66	685		229.27	685		229.91	685	
232.18	685		233.95	685		235.25	685	
238.49	685		239.5	685		240.33	685	
240.63	685		242.95	685		245.9	685	
246.88	685		249.8	685		250.83	685	
252.46	685		260.7	685		262.47	685.37	
265.16	686		268.07	686.63		269.63	687	
272.57	687.71		273.81	688		274.81	688.23	
278.02	689		278.88	689.03		292.31	689.45	
305.41	690		309.17	690.2		310.77	690.28	

## Upstream Bridge Cross Section Data

Station Elevation Data

num=

90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	695.63	.38	695.48	1.28	695.09	1.48	695	3.09	694.51
5.01	694	8.08	693.32	9.54	693	12.07	692.33	13.44	692
15.74	691.32	16.91	691	18	690.72	20.83	690	24.22	689.15
24.81	689	28.69	688.02	28.78	688	28.95	687.96	29.27	687.87
32.8	687	37.18	686.21	38.3	686	39.25	685.85	44.98	685
46.66	685	47.66	684	49.21	684	50.78	684	51.95	684
53.56	684	58.64	684	62.64	684	65.43	684	71.47	684
82.7	684	83.09	684	98.62	684	101.48	684	107.38	684
109.3	684	123.54	684	124.7	684	147.47	684	168.98	684
177.3	684	180.32	684	182.51	684	188.98	684	190.4	684
193.03	684	193.27	684	193.44	684	194.9	684	194.96	684

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195.01	684	195.13	684	196.34	684	196.91	684	203.33	684
207.17	684	210.36	684	211.96	684	215.52	684	218.11	684
220.77	684	224.16	684	231.87	684	239.24	684	245.5	685
253.07	685	256.85	685.84	257.54	686	258.89	686.31	259.73	686.43
261.48	686.68	262.26	686.84	263.03	687	264	687.21	267.77	688
269.77	688.4	272.58	689	280.78	689.37	283.12	689.52	287.24	689.8
289.93	690	303.56	690.88	305.27	691	307.07	691.07	307.94	691.11

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
0 .05	39.25 .08	256.85 .05

Bank Sta: Left	Right	Coeff Contr.	Expan.
39.25	256.85	.3	.5

Ineffective Flow	num=	2	
Sta L	Sta R	Elev	Permanent
0	103	686.02	F
109	307.94	686.02	F

# Downstream Deck/Roadway Coordinates

num=	126				
Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	699.94	.08	699.93	.17	699.9
.37	699.82	1.81	699.59	4.29	699.12
4.86	699	5.91	698.73	7.54	698.44
9.65	698	12.65	697.57	15.79	697
17.04	696.74	19.94	696	20.51	695.88
24.52	695	25.05	694.9	29.34	694
29.78	693.91	34.3	693	38.09	692.22
39.2	692	43.19	691.18	43.98	691
44.34	690.93	44.67	690.88	49.26	690
51.11	689.68	55.23	689	60.28	688.18
61.36	688	65.16	687.39	67.46	687
68.34	686.86	70.96	686.33	80.51	686.24
80.67	686.24	84.94	686.05	86.72	686.04
89.52	686.04	93.66	686.03	94.45	686.03
95.14	686.02	96.47	686.02	97.36	686.02
101.68	686.02	102.68	686.02	104.7	686.03
105.44	686.03	109.35	686.02	114.19	686.01
117.38	686	119.45	685.81	120.95	685.78
123.15	685.61	123.97	685.38	125.3	685
127.21	685	132.46	685	134.61	685
139.57	685	141.83	685	144.59	685
147.06	685	149.69	685	153.25	685
155	685	158.41	685	163.68	685
164.26	685	164.58	685	172.54	685
173.23	685	174.29	685	182.66	685
183.32	685	185.42	685	189.93	684.94
190.82	684.95	198.27	684.93	198.45	684.93
205.79	684.9	205.98	684.91	206.25	684.92
207.99	685	214.82	685	215.17	685
216.22	685	218.29	685	218.85	685
220.55	685	221.47	685	221.8	685
222.26	685	222.79	685	223.34	685
225.66	685	229.27	685	229.91	685
232.18	685	233.95	685	235.25	685
238.49	685	239.5	685	240.33	685
240.63	685	242.95	685	245.9	685
246.88	685	249.8	685	250.83	685
252.46	685	260.7	685	262.47	685.37
265.16	686	268.07	686.63	269.63	687
272.57	687.71	273.81	688	274.81	688.23
278.02	689	278.88	689.03	292.31	689.45

305.41 690 309.17 690.2 310.77 690.28

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# Downstream Bridge Cross Section Data

Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	698.39	2.25	698	3.51	697.78	8.04	697	10.4	696.58
13.75	696	17.58	695.27	19.01	695	24.3	694.01	24.35	694
24.36	694	24.39	693.99	24.56	693.96	29.6	693	29.96	692.93
34.84	692	35.26	691.92	40.08	691	40.93	690.86	43.54	690.41
45.59	690	46.73	689.76	50.78	689	51.85	688.8	56.28	688
56.66	687.94	56.88	687.91	57.21	687.86	62.06	687	64.06	686.74
67.41	686.48	73.1	686	73.58	685.87	76.63	685.77	78.89	685.6
81.72	685.36	82.81	685.28	83.36	685.25	84.22	685.21	84.7	685.21
87.07	685.08	87.43	685.08	88.66	685	90.82	684.79	91.94	684.65
92.9	684.44	93.35	684.38	94.01	684.33	94.9	684.3	99.29	684.28
104.43	684.19	106.71	684.15	109.3	684.08	111.09	684	111.21	683.99
112.38	683.85	113.67	683.78	114.6	683.71	115.76	683.68	117.21	683.5
118.12	683.44	119.46	683.39	121.24	683.35	122.15	683.37	127.52	683.35
131.92	683.3	134.65	683.33	135.14	683.32	139.51	683.33	140.67	683.32
141.87	683.33	142.84	683.34	143.7	683.37	146.54	683.44	152.28	683.42
157.84	683.49	163.36	683.36	165.79	683.33	166.88	683.33	172.36	683.22
173.32	683.21	176.18	683.19	177.33	683.17	190.83	683.03	191.87	683
198.11	682.59	198.65	682.57	200.68	682.65	201.32	682.65	205.33	682.59
206.51	682.67	207.73	682.75	210.04	682.71	210.84	682.68	212.81	682.65
213.82	682.63	213.87	682.6	216.59	682.57	219.18	682.57	222.09	682.65
229.54	682.91	231.92	683	232.46	683.21	234.58	684	235.86	684.47
237.43	685	237.7	685.1	240.19	686	245.86	686.3	256.09	687
266.97	687.52	275.91	688	283.94	688.34	286.47	688.44	294.52	688.78
302.29	689	315.27	689.42	320.65	689.56	325.31	689.67	329.74	689.81
338.75	689.97	339.92	689.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	117.21	.08	146.54	.05

Bank Sta: Left Right Coeff Contr. Expan.  
117.21 146.54 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	115	686.02	F
146.54	339.92	685	F

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	
FHWA Chart # 55- Circular Culvert			
FHWA Scale # 1 - Smooth tapered inlet throat			
Solution Criteria = Highest U.S. EG			
Culvert Upstrm Dist	Length	Top n	Bottom n
Exit Loss Coef	4.3	18	.013
			.013
			0
			.9

1  
Upstream Elevation = 679.28  
Centerline Station = 106

Downstream Elevation = 679.1  
Centerline Station = 122

## CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 4500

## INPUT

Description: D/S XS of Beaver Dam Pond Culvert

Station Elevation Data		num= 122		Station Elevation Data		num= 122		Station Elevation Data		num= 122	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	698.39	2.25	698	3.51	697.78	8.04	697	10.4	696.58		
13.75	696	17.58	695.27	19.01	695	24.3	694.01	24.35	694		
24.36	694	24.39	693.99	24.56	693.96	29.6	693	29.96	692.93		
34.84	692	35.26	691.92	40.08	691	40.93	690.86	43.54	690.41		
45.59	690	46.73	689.76	50.78	689	51.85	688.8	56.28	688		
56.66	687.94	56.88	687.91	57.21	687.86	62.06	687	64.06	686.74		
67.41	686.48	73.1	686	73.58	685.87	76.63	685.77	78.89	685.6		
81.72	685.36	82.81	685.28	83.36	685.25	84.22	685.21	84.7	685.21		
87.07	685.08	87.43	685.08	88.66	685	90.82	684.79	91.94	684.65		
92.9	684.44	93.35	684.38	94.01	684.33	94.9	684.3	99.29	684.28		
104.43	684.19	106.71	684.15	109.3	684.08	111.09	684	111.21	683.99		
112.38	683.85	113.67	683.78	114.6	683.71	115.76	683.68	117.21	683.5		
118.12	683.44	119.46	683.39	121.24	683.35	122.15	683.37	127.52	683.35		
131.92	683.3	134.65	683.33	135.14	683.32	139.51	683.33	140.67	683.32		
141.87	683.33	142.84	683.34	143.7	683.37	146.54	683.44	152.28	683.42		
157.84	683.49	163.36	683.36	165.79	683.33	166.88	683.33	172.36	683.22		
173.32	683.21	176.18	683.19	177.33	683.17	190.83	683.03	191.87	683		
198.11	682.59	198.65	682.57	200.68	682.65	201.32	682.65	205.33	682.59		
206.51	682.67	207.73	682.75	210.04	682.71	210.84	682.68	212.81	682.65		
213.82	682.63	213.87	682.6	216.59	682.57	219.18	682.57	222.09	682.65		
229.54	682.91	231.92	683	232.46	683.21	234.58	684	235.86	684.47		
237.43	685	237.7	685.1	240.19	686	245.86	686.3	256.09	687		
266.97	687.52	275.91	688	283.94	688.34	286.47	688.44	294.52	688.78		
302.29	689	315.27	689.42	320.65	689.56	325.31	689.67	329.74	689.81		
338.75	689.97	339.92	689.99								

Manning's n Values		num= 3		Manning's n Values		num= 3	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	117.21	.08	146.54	.05		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	117.21	146.54		87.5	99.4		.3	.5

Ineffective Flow		num= 2		Permanent	
Sta L	Sta R	Elev			
0	115	686.02	F		
146.54	339.92	685	F		

## CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 4400

## INPUT

Description:

Station Elevation Data		num= 14		Station Elevation Data		num= 14		Station Elevation Data		num= 14	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
36	683.01	104	679.71	116.53	678.6	128.1	677.84	152.93	677.53		
158.35	677.2	158.8	675.98	159.72	675.78	160.48	676.59	161.3	676.98		
163.98	677.49	176.22	678.17	181.98	677.84	190	680.01				

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Manning's n Values  
 Sta n Val Sta n Val  
 36 .05 158.35 .08 161.3 .05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 158.35 161.3 307 307 307 .3 .5

CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 4093

INPUT

Description: New  
 Station Elevation Data num= 20  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 681 2.6 680 5.25 679 8 678 10.5 677  
 14.7 676 21.5 676 25 677 30.5 677 49 676  
 71 675 72 673.1 73 673.1 74 675 77.5 676  
 135 676 153 677 172.5 678 190 679 205 680

Manning's n Values  
 Sta n Val Sta n Val Sta n Val  
 0 .1 71 .05 74 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 71 74 397 397 397 .1 .3

Ineffective Flow num= 1  
 Sta L Sta R Elev Permanent  
 0 25 677 F

CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 3696

INPUT

Description:  
 Station Elevation Data num= 21  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 0 672.16 11 672 18 671 37 670 160 669  
 165 669 170 670 172.25 671 178 671 185 670  
 263 670 434.5 671 674 672 754 672 756 669.5  
 758 669.5 760 672 770 674 805 674 825 675  
 878 678

Manning's n Values  
 Sta n Val Sta n Val Sta n Val  
 0 .1 754 .05 760 .1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 754 760 340 340 340 .1 .3

Ineffective Flow num= 1  
 Sta L Sta R Elev Permanent  
 0 674 672 F

CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 3356

## INPUT

## Description:

Station Elevation Data				num=	22			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
-438.69	672.01	-380.28	671.01	-365.82	670.01	28	670.01	
194.18	670.23	205.77	669.77	208.9	670.84	210.78	669.09	
214.16	667.67	215.07	667.67	215.68	667.68	216.52	667.72	
219.51	670.12	224.24	671.09	229.11	672.65	234.42	670.53	
295.86	673.86	312.17	675.66					

Manning's n Values				num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
-438.69	.1	213.43	.05	219.51	.1			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	213.43	219.51		366	194		.1	.3

## CROSS SECTION

## RIVER: Tributary

REACH: 1

RS: 3162

## INPUT

## Description:

Station Elevation Data				num=	23			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
0	675	44	674	77.6	673	239.6	672	
270.3	670	285.6	669	305.8	668	525.6	667	
534	666.8	539	667	559.7	667	561	666.5	
564	667	568	668	590	669	617	670	
634.4	672	695	679.55	695.1	686			

Manning's n Values				num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	
0	.1	559.7	.05	564	.1			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	559.7	564		110	102		.1	.3

## BRIDGE

## RIVER: Tributary

REACH: 1

RS: 3108

## INPUT

## Description: RR bridge No 5

Distance from Upstream XS = 32

Deck/Roadway width = 28

Weir Coefficient = 2.6

## Upstream Deck/Roadway Coordinates

num=				11			
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord
-134.4	695	0	160.28	691.73	0	160.29	691.73
249.4	690.73	680.48	338.52	689.73	679.48	427.63	688.73
516.75	687.74	677.49	605.86	686.74	676.49	695	685.74
695	685.74	0	904.29	691.8	0		

## Upstream Bridge Cross Section Data

Station Elevation Data num= 23



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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	674.84	44	673.84	77.6	672.84	239.6	671.84	263.8	670.84
270.3	669.84	285.6	668.84	305.8	667.84	525.6	666.84	530	666.64
534	666.64	539	666.84	559.7	666.84	561	666.34	563	666.34
564	666.84	568	667.84	590	668.84	617	669.84	628.5	670.84
634.4	671.84	695	679.39	695.1	685.84				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	559.7	.05	564	.1

Bank Sta: Left Right Coeff Contr. Expan.

559.7	564	.1	.3
-------	-----	----	----

Downstream Deck/Roadway Coordinates

num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-94.72	691.73	0	-94.71	691.73	681.48	-5.6	690.73	680.48
83.52	689.73	679.48	172.63	688.73	678.48	261.75	687.74	677.49
350.86	686.74	676.49	440	685.74	675.49			

Downstream Bridge Cross Section Data

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	682.2	10	682.2	60	676.2	64.18	673.2	75.95	672.348
77.44	672.243	78.01	672.2	78.74	672.148	91.82	671.2	100.82	670.331
102.13	670.2	102.99	670.107	111.76	669.2	118.45	668.431	120.59	668.2
124.12	668.015	130.23	667.673	136.79	667.332	138.85	667.2	140.16	667.169
145.2	667.063	154.44	666.88	155.26	666.866	156.3	666.86	158.55	666.854
168.04	666.84	173.87	666.835	180.69	666.847	185.3	666.853	190.3	666.853
194.79	666.85	196.46	666.846	201.96	666.823	205.02	666.814	206.76	666.806
209.03	666.79	211.59	666.765	213.97	666.731	215.69	666.69	218.49	666.59
220.78	666.537	223.52	666.527	226.26	666.477	229.89	666.454	232.73	666.412
234.22	666.404	237.2	666.371	240.44	666.359	242.97	666.338	246.63	666.315
247.3	666.311	257.44	666.22	257.53	666.219	259.69	666.2	269.27	666.169
273.25	666.16	275.98	666.158	277.93	666.162	279.6	666.173	282.51	666.2
288.25	666.362	290.98	666.457	296.08	666.643	311.06	667.2	315.34	667.2
318.74	667.2	319.25	667.057	321.78	666.2	322.5	666.2	323.1	666.2
323.83	666.2	324.35	666.2	336.57	667.147	337.11	667.188	337.27	667.2
344.9	667.768	350.35	668.2	357.48	668.797	362.17	669.2	369.51	669.788
373.99	670.2	381.08	671.009	383.04	671.2	389.62	671.875	393.01	672.2
399.88	672.95	402.18	673.2	402.92	673.296	411.81	674.2	419.61	674.897
422.64	675.2	425.8	675.665	429.64	676.2	431.45	676.482	436.25	677.2
439.62	677.717	440	685.94	540	685.94				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	318.74	.05	337.11	.1

Bank Sta: Left Right Coeff Contr. Expan.

318.74	337.11	.1	.3
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Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins =  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Piers = 5

Pier Data

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Pier Station	Upstream=	249.39	Downstream=	-5.6
Upstream	num=	2		
width	Elev	width	Elev	
5	0	5	680.48	
Downstream	num=	2		
width	Elev	width	Elev	
5	0	5	680.48	

Pier Data

Pier Station	Upstream=	338.52	Downstream=	83.52
Upstream	num=	2		
width	Elev	width	Elev	
5	0	5	679.48	
Downstream	num=	2		
width	Elev	width	Elev	
5	0	5	679.48	

Pier Data

Pier Station	Upstream=	427.63	Downstream=	172.63
Upstream	num=	2		
width	Elev	width	Elev	
5	0	5	678.48	
Downstream	num=	2		
width	Elev	width	Elev	
5	0	5	678.48	

Pier Data

Pier Station	Upstream=	516.75	Downstream=	261.75
Upstream	num=	2		
width	Elev	width	Elev	
5	0	5	677.49	
Downstream	num=	2		
width	Elev	width	Elev	
5	0	5	677.49	

Pier Data

Pier Station	Upstream=	605.86	Downstream=	350.86
Upstream	num=	2		
width	Elev	width	Elev	
5	0	5	676.49	
Downstream	num=	2		
width	Elev	width	Elev	
5	0	5	676.49	

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy		
Momentum	Cd =	2

Selected Low Flow Methods = Highest Energy Answer

High Flow Method  
Energy Only

Additional Bridge Parameters

Add Friction component to Momentum  
Do not add weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end  
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

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RIVER: Tributary  
REACH: 1

RS: 3060

INPUT

Description: D/S XS of RR Bridge No 5, U/S XS of Bridge No 2, 6

Station Elevation Data num= 98											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	682	10	682	60	676	64.18	673	75.95	672.148		
77.44	672.043	78.01	672	78.74	671.948	91.82	671	100.82	670.131		
102.13	670	102.99	669.907	111.76	669	118.45	668.231	120.59	668		
124.12	667.815	130.23	667.473	136.79	667.132	138.85	667	140.16	666.969		
145.2	666.863	154.44	666.68	155.26	666.666	156.3	666.66	158.55	666.654		
168.04	666.64	173.87	666.635	180.69	666.647	185.3	666.653	190.3	666.653		
194.79	666.65	196.46	666.646	201.96	666.623	205.02	666.614	206.76	666.606		
209.03	666.59	211.59	666.565	213.97	666.531	215.69	666.49	218.49	666.39		
220.78	666.337	223.52	666.327	226.26	666.277	229.89	666.254	232.73	666.212		
234.22	666.204	237.2	666.171	240.44	666.159	242.97	666.138	246.63	666.115		
247.3	666.111	257.44	666.02	257.53	666.019	259.69	666	269.27	665.969		
273.25	665.96	275.98	665.958	277.93	665.962	279.6	665.973	282.51	666		
288.25	666.162	290.98	666.257	296.08	666.443	311.06	667	315.34	667		
318.74	667	319.25	666.857	321.78	666	322.5	666	323.1	666		
323.83	666	324.35	666	336.57	666.947	337.11	666.988	337.27	667		
344.9	667.568	350.35	668	357.48	668.597	362.17	669	369.51	669.588		
373.99	670	381.08	670.809	383.04	671	389.62	671.675	393.01	672		
399.88	672.75	402.18	673	402.92	673.096	411.81	674	419.61	674.697		
422.64	675	425.8	675.465	429.64	676	431.45	676.282	436.25	677		
439.62	677.517	440	685.74	540	685.74						

Manning's n Values num= 3							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	318.74	.05	337.11	.1		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
318.74 337.11 188 226 141 .1 .3

BRIDGE

RIVER: Tributary  
REACH: 1

RS: 3010

INPUT

Description: Bridge No 2 and Pipe Bridge 6

Distance from Upstream XS = 20

Deck/Roadway Width = 87

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num= 7											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
0	690.5	0		31.83	690.94	0		31.84	690.94	677.14	
133.42	691.95	678.15		235.92	692.97	679.17		338.42	694	680.2	
440	695.01	681.21									

Upstream Bridge Cross Section Data

Station Elevation Data num= 98											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	682	10	682	60	676	64.18	673	75.95	672.148		
77.44	672.043	78.01	672	78.74	671.948	91.82	671	100.82	670.131		
102.13	670	102.99	669.907	111.76	669	118.45	668.231	120.59	668		
124.12	667.815	130.23	667.473	136.79	667.132	138.85	667	140.16	666.969		
145.2	666.863	154.44	666.68	155.26	666.666	156.3	666.66	158.55	666.654		
168.04	666.64	173.87	666.635	180.69	666.647	185.3	666.653	190.3	666.653		

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194.79	666.65	196.46	666.646	201.96	666.623	205.02	666.614	206.76	666.606
209.03	666.59	211.59	666.565	213.97	666.531	215.69	666.49	218.49	666.39
220.78	666.337	223.52	666.327	226.26	666.277	229.89	666.254	232.73	666.212
234.22	666.204	237.2	666.171	240.44	666.159	242.97	666.138	246.63	666.115
247.3	666.111	257.44	666.02	257.53	666.019	259.69	666	269.27	665.969
273.25	665.96	275.98	665.87	277.93	665.962	279.6	665.973	282.51	666
288.25	666.162	290.98	666.257	296.08	666.443	311.06	667	315.34	667
318.74	667	319.25	666.857	321.78	666	322.5	665.89	323.1	665.89
323.83	665.89	324.35	666	336.57	666.947	337.11	666.988	337.27	667
344.9	667.568	350.35	668	357.48	668.597	362.17	669	369.51	669.588
373.99	670	381.08	670.809	383.04	671	389.62	671.675	393.01	672
399.88	672.75	402.18	673	402.92	673.096	411.81	674	419.61	674.697
422.64	675	425.8	675.465	429.64	676	431.45	676.282	436.25	677
439.62	677.517	440	695	540	695				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	124.12	.1	318.74	.05	337.11	.1

Bank Sta: Left Right Coeff Contr. Expan.

318.74	337.11	.1	.3
--------	--------	----	----

Downstream Deck/Roadway Coordinates

num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-8.16	690.94	677.14	93.42	691.95	678.15	195.92	692.97	679.17
298.42	694	680.2	400	695.01	681.21	400.01	695.01	0
435	694.61	0						

Downstream Bridge Cross Section Data

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-50	690.9	-8.16	690.9	-8.16	668.62	9.3	668.62	26.89	667.62
67.11	666.62	134	665.44	204	665.44	246.49	666.37	252.14	666.64
254.24	665.51	255.77	665.44	256.85	665.68	257.71	665.64	258.87	666.43
263.61	666.4	277.29	665.84	309.05	668.44	338.85	672.2	371.24	677.29
390.72	679.51	420.6	679.96	435	679.96	435	694.61	450	694.61

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-50	.1	-8.16	.1	26.89	.1	252.14	.05	258.87	.1

Bank Sta: Left Right Coeff Contr. Expan.

252.14	258.87	.1	.3
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Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins =  
 Energy head used in spillway design =  
 Spillway height used in design =  
 weir crest shape = Broad Crested

Number of Piers = 3

Pier Data

Pier Station	Upstream=	Downstream=
133.42	93.42	

Upstream num= 2

width	Elev	width	Elev
4.5	0	4.5	678.15

Downstream num= 2

width	Elev	width	Elev
4.5	0	4.5	678.15

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Pier Data  
 Pier Station Upstream= 235.92 Downstream= 195.92  
 Upstream num= 2  
 width Elev width Elev  
 4.5 0 4.5 679.17  
 Downstream num= 2  
 width Elev width Elev  
 4.5 0 4.5 679.17

Pier Data  
 Pier Station Upstream= 338.42 Downstream= 298.42  
 Upstream num= 2  
 width Elev width Elev  
 4.5 0 4.5 680.2  
 Downstream num= 2  
 width Elev width Elev  
 4.5 0 4.5 680.2

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy  
 Momentum Cd = 2  
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method  
 Energy Only

Additional Bridge Parameters

Add Friction component to Momentum  
 Do not add weight component to Momentum  
 Class B flow critical depth computations use critical depth  
 inside the bridge at the upstream end  
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Tributary  
 REACH: 1 RS: 2834

INPUT

Description: D/S XS of Bridge No 2, 6

Station	Elevation	Data	num=	21
Sta	Elev	Sta	Elev	Sta
9.3	668.01	26.89	667.01	67.11
246.49	665.76	252.14	666.03	254.24
257.71	665.03	258.87	665.82	263.61
338.85	671.59	371.24	676.68	390.72
435.1	694			

Manning's	n Values	num=	3
Sta	n Val	Sta	n Val
9.3	.1	252.14	.05
		258.87	.1

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	252.14	258.87	555.48	553.2	557.76	.1	.3	

CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 2326

## INPUT

Description: U/S XS of Pipe Bridge 7

Station Elevation Data

num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
29	680	50	670	54	668	112.13	665.01	166.8	663.79
202.29	663.45	249.41	661.77	264.83	661.76	269.31	660.7	271.41	660.2
273.33	660.26	274.88	659.9	275.72	660.03	277.04	661.45	283.76	661.62
343.16	661.53	399.81	661.53	420.98	662.03	448.82	664.09	463.58	664.58
500	696	560	696	593	696	617	698	624	700
634	700	663	690	718	672				

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
29	.1	269.31	.05	277.04	.1

Bank Sta: Left

Right

Lengths: Left Channel

Right

Coeff Contr.

Expan.

269.31 277.04

673.04 669.86

671.65

.1

.3

## BRIDGE

RIVER: Tributary

REACH: 1

RS: 1790

## INPUT

Description: Pipe bridge - No 7

Distance from Upstream XS = 519

Deck/Roadway width = 10

Weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

num=

9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	677.93		0	132.99	678	0	133	678	671.5					
223	681.5		675	313	685	678.5	403	688.5	682					
493	692		685.5	493.01	692	0	500	692.5	0					

Upstream Bridge Cross Section Data

Station Elevation Data

num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-200	678.6	29	678.6	50	668.6	54	666.6	112.13	663.61
166.8	662.39	202.29	662.05	249.41	660.37	264.83	660.36	269.31	659.3
271.41	658.8	273.33	658.86	274.88	658.38	275.72	658.63	277.04	660.05
283.76	660.22	343.16	660.13	399.81	660.13	420.98	660.63	448.82	662.69
463.58	663.18	463.58	694.6	560	694.6	593	694.6	617	696.6
624	698.6	634	698.6	663	688.6	718	670.6		

Manning's n Values

num=

4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-200	.1	29	.1	269.31	.05	277.04	.1

Bank Sta: Left

Right

Coeff Contr.

Expan.

269.31 277.04

.1

.3

Downstream Deck/Roadway Coordinates

num=

9

Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord	Sta	Hi	Cord	Lo	Cord
0	677.93		0	124.77	678	0	124.78	678	671.5					
214.78	681.5		675	304.78	685	678.5	394.78	688.5	682					
484.78	692		685.5	484.79	692	0	500	692.5	0					

Downstream Bridge Cross Section Data



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Station Elevation Data				num=	23				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	690	12.63	688	31.4	684	43	680	48	678
173.75	665.01	198.13	661.86	245.91	659.93	256.45	659.51	262.44	659.72
264.16	658.38	265.67	658.38	267.08	658.32	268.29	658.32	269.24	658.38
271.93	658.6	274.07	659.54	279.61	659.65	315.47	660.02	400.34	661.36
434.93	670.15	448.28	670.08	500	670.08				

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	262.44	.05	274.07	.1

Bank Sta:	Left	Right	Coeff Contr.	Expan.
	262.44	274.07	.1	.3

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

Number of Piers = 3

Pier Data					
Pier Station	Upstream=	223	Downstream=	214.78	
Upstream	num=	2			
width	Elev	width	Elev		
3	0	3	675		
Downstream	num=	2			
width	Elev	width	Elev		
3	0	3	675		

Pier Data					
Pier Station	Upstream=	313	Downstream=	304.78	
Upstream	num=	2			
width	Elev	width	Elev		
3	0	3	678.5		
Downstream	num=	2			
width	Elev	width	Elev		
3	0	3	678.5		

Pier Data					
Pier Station	Upstream=	403	Downstream=	394.78	
Upstream	num=	2			
width	Elev	width	Elev		
3	0	3	682		
Downstream	num=	2			
width	Elev	width	Elev		
3	0	3	682		

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy  
 Momentum Cd = 1.2  
 Selected Low Flow Methods = Highest Energy Answer

High Flow Method  
 Energy Only

Additional Bridge Parameters

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Add Friction component to Momentum  
Do not add weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end  
Criteria to check for pressure flow = Upstream energy grade line

## CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 1658

### INPUT

Description: D/S XS of Pipe Bridge No 7

Station Elevation Data num= 22									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	690	12.63	688	31.4	684	43	680	48	678
173.75	665.01	198.13	661.86	245.91	659.93	256.45	659.51	262.44	659.72
264.16	658.26	265.67	657.96	267.08	657.99	268.29	658.05	269.24	658.2
271.93	658.6	274.07	659.54	279.61	659.65	315.47	660.02	400.34	661.36
434.93	670.15	448.28	670.08						

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
0	.1	262.44	.05	274.07	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	262.44	274.07		290.04	297.96	300.96	.1 .3

## CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 1360

### INPUT

Description: U/S XS of Bridge No 3

Station Elevation Data num= 105									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	692	40	692	41.37	661.85	48.82	661.755	52.16	661.744
55.89	661.708	58.08	661.707	59.26	661.703	60.41	661.694	61.58	661.68
62.81	661.661	65.38	661.618	66.49	661.595	68.85	661.538	72.65	661.501
75.75	661.436	79.04	661.405	85.46	661.35	98.24	661.027	98.37	661.025
99.34	661	102.23	660.857	104.38	660.771	111.18	660.526	123.04	660.053
126.01	660	127.18	659.98	136.22	659.885	136.56	659.877	142.99	659.783
146.79	659.703	155.28	659.601	159.01	659.499	161.23	659.46	166.49	659.282
173.2	659	174.09	658.999	174.21	658.999	191.49	658.982	191.85	658.982
196.28	658.984	198.06	658.985	201.95	658.992	202.85	658.992	204.56	658.995
206.92	659	210.16	659.002	211.98	659.003	212.84	659.002	214.84	659.001
216.87	659.001	217.64	659	217.94	658.88	219.24	658.295	219.7	658.07
219.84	658	220.21	658	226.9	657.83	229.38	658	231.64	658.227
231.99	658.242	234.8	658.391	238.12	658.584	244.74	659	247.18	659.09
278.53	660	280.97	660.065	281.4	660.078	290.08	660.31	296.63	660.471
298.54	660.529	302.43	660.616	311.2	660.867	313.3	660.914	315.27	661
326.87	661.587	329.7	661.73	331.06	661.792	335.65	662	346.63	662.658
348.5	662.778	351.83	663	362.64	663.75	364.72	663.894	365.98	664
369.59	664.346	376.67	665	378.66	665.236	386.46	666	386.77	666.037
394.3	667	396.29	667.279	400.99	668	413.48	668.692	418.73	669
419.36	669.003	420.17	669.006	420.4	669.006	426.91	669.016	427.87	669.017
428.87	669.016	429.6	669.015	429.99	669.014	431	692	481	692

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val

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0 .07 217.64 .05 244.74 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 217.64 244.74 110 108 100 .1 .3

BRIDGE

RIVER: Tributary  
 REACH: 1 RS: 1281

INPUT

Description: Bridge No 3  
 Distance from Upstream XS = 47  
 Deck/Roadway Width = 60  
 Weir Coefficient = 2.6  
 Upstream Deck/Roadway Coordinates

num= 8											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
0	703.91	0		5.92	703.91	0		5.92	703.9	695.4	
141.67	706.62	698.12		278.34	709.35	700.85		414.08	712.06	703.56	
414.08	712.06	0		500	712.06						

Upstream Bridge Cross Section Data

Station Elevation Data num= 104											
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	691	40	691	41.37	660.85	48.82	660.755	52.16	660.744		
55.89	660.708	58.08	660.707	59.26	660.703	60.41	660.694	61.58	660.68		
62.81	660.661	65.38	660.618	66.49	660.595	68.85	660.538	72.65	660.501		
75.75	660.436	79.04	660.405	85.46	660.35	98.24	660.027	98.37	660.025		
99.34	660	102.23	659.857	104.38	659.771	111.18	659.526	123.04	659.053		
126.01	659	127.18	658.98	136.22	658.885	136.56	658.877	142.99	658.783		
146.79	658.703	155.28	658.601	159.01	658.499	161.23	658.46	166.49	658.282		
173.2	658	174.09	657.999	174.21	657.999	191.49	657.982	191.85	657.982		
196.28	657.984	198.06	657.985	201.95	657.992	202.85	657.992	204.56	657.995		
206.92	658	210.16	658.002	211.98	658.003	212.84	658.002	214.84	658.001		
216.87	658.001	217.64	658	217.94	657.88	219.24	657.295	219.7	657.07		
219.84	657	220.21	657	229.38	657	231.64	657.227	231.99	657.242		
234.8	657.391	238.12	657.584	244.74	658	247.18	658.09	278.53	659		
280.97	659.065	281.4	659.078	290.08	659.31	296.63	659.471	298.54	659.529		
302.43	659.616	311.2	659.867	313.3	659.914	315.27	660	326.87	660.587		
329.7	660.73	331.06	660.792	335.65	661	346.63	661.658	348.5	661.778		
351.83	662	362.64	662.75	364.72	662.894	365.98	663	369.59	663.346		
376.67	664	378.66	664.236	386.46	665	386.77	665.037	394.3	666		
396.29	666.279	400.99	667	413.48	667.692	418.73	668	419.36	668.003		
420.17	668.006	420.4	668.006	426.91	668.016	427.87	668.017	428.87	668.016		
429.6	668.015	429.99	668.014	431	691	481	691				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.07	217.64	.05	244.74	.07

Bank Sta: Left Right Coeff Contr. Expan.  
 217.64 244.74 .1 .3

Downstream Deck/Roadway Coordinates

num= 7											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
0	700	0		41.84	703.9	0		41.84	703.9	695.4	
177.59	706.62	698.12		314.26	709.35	700.85		450	712.06	703.56	
450	712.06	0									

Downstream Bridge Cross Section Data

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Station Elevation Data				num=	19				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.92	692	73	692	73	660.58	130.71	658.23	195.23	657.77
245.69	657.68	249.14	657.6	250.31	657.05	253.09	656.64	254.08	656.68
256.22	657.22	258.88	657.46	262.11	657.67	272.66	658.28	351.77	658.51
414.17	660.7	449	663	449	710	522.68	710		

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
4.92	.07	245.69	.08	262.11	.07

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	245.69	262.11	.1	.3	

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

Number of Piers = 2

Pier Data					
Pier Station	Upstream=	141.67	Downstream=	177.59	
Upstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	698.12		
Downstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	698.12		

Pier Data					
Pier Station	Upstream=	278.34	Downstream=	314.26	
Upstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	700.85		
Downstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	700.85		

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy	Momentum	Cd	=	2

Selected Low Flow Methods = Highest Energy Answer

High Flow Method  
 Energy Only

Additional Bridge Parameters

Add Friction component to Momentum  
 Do not add weight component to Momentum  
 Class B flow critical depth computations use critical depth  
 inside the bridge at the upstream end  
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 1252

## INPUT

Description: D/S XS of Bridge No 3

Station Elevation Data		num= 19		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.92	692	73	692	73	660.58	130.71	658.23	195.23	657.77		
245.69	657.68	249.14	657.6	250.31	657.05	253.09	656.64	254.08	656.68		
256.22	657.22	258.88	657.46	262.11	657.67	272.66	658.28	351.77	658.51		
414.17	660.7	449	663	449	710	522.68	710				

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4.92	.07	245.69	.08	262.11	.07		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	245.69	262.11		144	147		.1	.3

## CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 1105

## INPUT

Description:

Station Elevation Data		num= 21		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	660.79	58	660.01	182.03	657.52	258.26	657.01	261.27	656.79		
263.66	656.39	267.27	656.3	269.06	655.96	270.58	656.29	271.28	656.21		
272.59	655.65	273.38	655.95	275.14	656.65	277.45	657.28	283.91	657.51		
296.89	657.17	385.44	658.29	430.88	662.41	483.44	665.95	498	668		
551	686										

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.08	258.26	.08	277.45	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	258.26	277.45		287	295		.1	.3

## CROSS SECTION

RIVER: Tributary

REACH: 1

RS: 810

## INPUT

Description:

Station Elevation Data		num= 25		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3.67	658.53	16.9	657.88	160	656.82	271.95	656.84	302.8	656.15		
307.34	656.47	308.53	655.21	309.94	654.96	311.1	654.83	313.17	654.83		
314.06	654.79	314.94	653.84	315.53	654.71	316.36	654.9	317.37	654.24		
318.8	654.78	320.94	655.51	327.28	655.79	351.67	656.4	565.4	656.84		
602.78	658.01	619	660	626	662	688	664	707	666		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3.67	.08	307.34	.08	320.94	.08		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	307.34	320.94		228	224		.1	.3

walkerRunFld.rep

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 587

INPUT

Description:

Station Elevation Data				num=	18				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-362	658.01	-200	657.01	0	656.21	18.41	655.67	92.6	655.34
102.91	654.9	103.88	654.39	105.93	654.47	108.13	654.79	109.33	653.92
110.17	653.78	110.56	654.16	111.32	654.28	112.69	654.85	114.18	654.96
132.53	655.09	307.17	656.16	344.29	658.01				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-362	.08	102.91	.08	114.18	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	102.91	114.18		122	126		.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 463

INPUT

Description:

Station Elevation Data				num=	21				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-416	658.01	-250	657.01	-87	656.01	0	655.59	109.8	654.54
194.42	654.32	208.54	654.65	213.7	654.92	215.61	654.29	217.64	654.15
219.79	653.77	223.31	654.2	224.25	653.23	226.46	653.59	227.82	654.41
233.37	654.53	278.57	654.4	400	655.01	496.5	656.01	525.1	657.01
557	658.01								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-416	.08	213.7	.08	233.37	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	213.7	233.37		105	105		.1	.3

CROSS SECTION

RIVER: Tributary  
REACH: 1

RS: 357

INPUT

Description:

Station Elevation Data				num=	20				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-626.5	660.01	-604.5	658.01	-594.5	657.01	-584.5	656.01	-479.5	655.01
0	655.01	153.93	654.15	175.05	653.71	185.31	653.59	188.41	652.4
191.14	653.59	193.32	653.82	195.38	654.05	198.28	654.41	202.04	654.7
206.36	654.46	350	655.01	528.59	656.01	549.3	657.01	596.9	658.01

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val





WalkerRunFld.rep

230.09	673.4	245.5	678.64	264.68	690.27	273.75	691.73
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Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
9.27	.1	215.49	.05	226.17	.1

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

215.49	226.17	266.1	262	254.2	.1	.3
--------	--------	-------	-----	-------	----	----

# CROSS SECTION

RIVER: Walker Run  
 REACH: 1      RS: 5282

## INPUT

Description: u/s XS of Beach Grove Road Bridge

Station Elevation Data      num=      15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	681.12	55.69	675.84	85.36	674.65	174.96	673.59	184.04	670.66
207.55	670.04	212.26	669.41	214.34	667.03	219.14	667.34	223.57	668.03
230.88	671.08	241.05	670.68	255.44	674.6	304.55	678.17	320	679.29

Manning's n Values      num=      3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	212.26	.05	230.88	.1

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

212.26	230.88	82	83.7	86.2	.3	.5
--------	--------	----	------	------	----	----

Ineffective Flow      num=      2

Sta L	Sta R	Elev	Permanent
0	174	677.42	F
253	320	677.42	F

## BRIDGE

RIVER: Walker Run  
 REACH: 1      RS: 5250

## INPUT

Description: Beach Grove Road

Distance from Upstream XS =      22.3  
 Deck/Roadway width      =      19.3  
 Weir Coefficient      =      2.5

Upstream Deck/Roadway Coordinates

num=      13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
201.96	677.41	0	202.64	677.41	0	214.6	677.42	667.71
216.27	677.42	671.5	217.27	677.42	672.7	218.96	677.42	673.3
219.96	677.43	673.4	220.96	677.43	673.3	222.65	677.43	672.7
224.11	677.43	671.5	226.87	677.43	668.95	226.9	677.43	0
237.26	677.43	0						

Upstream Bridge Cross Section Data

Station Elevation Data      num=      16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	681.12	55.69	675.84	85.36	674.65	174.96	673.59	184.04	670.66
207.55	670.04	212.26	669.41	214.61	667.71	220.04	668.18	223.99	667.71
230.88	671.08	241.05	670.68	255.44	674.6	304.55	678.17	320	679.29
350	679.29								

Manning's n Values      num=      3

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Sta	n Val	Sta	n Val	Sta	n Val
0	.1	212.26	.05	230.88	.1

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	212.26	230.88		.3	.5

Ineffective Flow	num=	2
Sta L	Sta R	Elev
0	174	677.42
253	350	677.42
		F
		F

Downstream Deck/Roadway Coordinates

num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
193.8	677.34	0	194.48	677.4	0	206.44	677.49	0
207.04	677.48	667.76	208.11	677.42	670.88	209.11	677.42	672.08
210.8	677.42	672.68	211.8	677.64	672.78	212.8	677.43	672.68
214.49	677.43	672.08	215.95	677.43	670.88	218.1	677.43	668.66
229.29	677.19	0						

Downstream Bridge Cross Section Data

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-226.11	724.65	-176.11	709.54	-156.11	704.54	-106.11	699.65	-96.11	694.84
-66.11	689.65	-41.11	684.65	-6.11	679.45	13.04	678.07	71.2	669.33
123.89	668.34	186.89	668	204.89	667.74	207.05	667.71	212.14	668.18
216.09	667.71	221.89	669.45	244.99	670.15	272.89	671.76	306.75	677.78
363.89	679.45	378.89	684.24	413.89	689.34	435.89	694.54	453.89	699.34
468.89	704.65	493.89	710.04	513.89	714.45	528.89	719.54	538.89	724.24

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-226.11	.1	204.89	.05	221.89	.1

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	204.89	221.89		.3	.7

Ineffective Flow	num=	2
Sta L	Sta R	Elev
-226.11	176.89	677.42
249.89	538.89	677.42
		F
		F

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Energy Only

Additional Bridge Parameters

Add Friction component to Momentum

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

walkerRunFld.rep

CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 5198

INPUT

Description: FEMA BIA d/s XS of Beach Grove Road Bridge

Station Elevation Data

num=

31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-226.11	724.65	-176.11	709.54	-156.11	704.54	-106.11	699.65	-96.11	694.84
-66.11	689.65	-41.11	684.65	-6.11	679.45	13.04	678.07	71.2	669.33
123.89	668.34	186.89	668	204.89	667.74	207.96	665.96	212.14	665.71
215.99	665.85	217.97	666.58	221.89	669.45	244.99	670.15	272.89	671.76
306.75	677.78	363.89	679.45	378.89	684.24	413.89	689.34	435.89	694.54
453.89	699.34	468.89	704.65	493.89	710.04	513.89	714.45	528.89	719.54
538.89	724.24								

Manning's n Values

num=

3

Sta	n Val	Sta	n Val	Sta	n Val
-226.11	.1	204.89	.05	221.89	.1

Bank Sta: Left Right

Lengths: Left Channel Right

Coeff Contr.

Expan.

204.89 221.89

89.8 90.1 89.3

.3

.7

Ineffective Flow

num=

2

Sta L Sta R Elev

Permanent

-226.11 176.89 677.42

F

249.89 538.89 677.42

F

CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 5107

INPUT

Description:

Station Elevation Data

num=

18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1.11	677.51	37.49	670.27	96.16	668.4	133.14	668.48	139	668
144	667	158.69	666.07	161.58	664.84	163.25	664.65	164.42	664.59
165.79	665.03	166.43	665.04	169.94	666.9	221	667	225	668
238.09	668.33	302.28	669.86	349	678.03				

Manning's n Values

num=

5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1.11	.1	37.49	.11	144	.05	169.94	.11
						238.09	.1

Bank Sta: Left Right

Lengths: Left Channel Right

Coeff Contr.

Expan.

144 169.94

112 112 112

.1

.3

CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 4995

INPUT

Description: FEMA BHZ

Station Elevation Data

num=

34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	724.34	1010	719.54	1022	714.54	1055	709.65
						1075	704.45

walkerRunFld.rep

1100	699.45	1120	694.84	1140	691.74	1150	691.74	1180	689.34
1270	684.74	1300	676.74	1315	674.84	1383	669	1387	668
1392	667	1440	666.24	1497	667	1501	668	1505	668.9
1540	667.74	1610	669.45	1635	674.54	1662	679.45	1685	690.04
1725	686.74	1750	689.45	1770	694.45	1780	699.34	1810	704.34
1835	709.84	1850	714.34	1870	719.34	1895	724.45		

Manning's n Values      num=      5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1000	.1	1383	.11	1392	.05	1497	.11	1610	.1

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

1392	1497	180.8	181.3	177.9	.1	.3
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#### CROSS SECTION

RIVER: walker Run  
REACH: 1

RS: 4810

#### INPUT

Description:

Station Elevation Data		num=      60							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	673.03	22.15	670.47	30.66	668.65	57.63	668.16	64.81	668.208
65.68	668.122	66.08	668	70.73	667.243	71.83	667.059	72.15	667
75.4	666.647	81.53	666	105.92	665.242	113.64	665	113.91	664.818
115.25	664	116.22	663.356	116.96	663	118.18	662.871	119.73	662.932
120.24	663	120.56	663.14	122.83	664	125.34	664.475	128.1	665
133.43	665.032	135.86	665.045	154.3	665.142	162.99	665.18	165.61	665.201
178.31	665.3	180.17	665.3	180.7	665.3	181.83	665.3	185.8	665.25
190.21	665.165	200.97	665	211.96	665.141	223.37	665.3	234.5	665.753
241.06	666	241.82	666.19	245.06	667	247.93	667.645	249.2	668
249.5	668	250	668.001	252.44	668.004	252.46	668.004	252.53	668.004
255.19	668.001	255.55	668.001	256.08	668	257.45	667.938	257.73	667.957
257.9	667.966	258.59	667.961	288.1	666.6	321.23	667.68	361.14	676.54

Manning's n Values      num=      5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	57.63	.11	113.64	.05	128.1	.11	258.59	.1

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

113.64	128.1	74	73.7	76	.1	.3
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#### CROSS SECTION

RIVER: walker Run  
REACH: 1

RS: 4735

#### INPUT

Description: FEMA BHY

Station Elevation Data		num=      70							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
783	694	895	694	902	696	933	696	1003	696
1203	694	1369	692	1375	690	1388	686	1390	684.34
1430	683.74	1478	684.45	1620	679.54	1660	674.84	1690	669.54
1700.14	668	1706.48	668	1706.71	668	1707.21	668	1708.07	668
1708.72	668	1709.45	668	1710.13	668	1716.64	667.49	1719.92	667
1721.48	666.749	1726.83	666	1728.55	665.722	1734.13	665	1739.14	664.952
1752.79	664.8	1756.71	664.732	1767.42	664.59	1769.17	664.59	1771.11	664.599
1772.15	664.613	1775.69	664.672	1781.28	664.8	1793.07	664.416	1805.05	664
1807.11	663.406	1808.61	663	1809.81	662.542	1811.01	662.258	1812.45	662.633

WalkerRunFld.rep

1813.53	663	1813.83	663.21	1814.96	664	1821.41	664.218	1825.33	664.237
1830.8	664.295	1844.45	664.489	1871.09	664.907	1876.95	665	1882.27	665.608
1885.67	666	1886.97	666.323	1889.7	667	1890.9	667.064	1909.49	666.951
1909.55	666.956	1917.09	666.674	2000	669.45	2020	674.65	2042	679.84
2046	690	2054	694	2163	696	2171	700	2191	710

Manning's n Values		num= 5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
783	.1	1734.13	.11	1805.05	.05	1814.96	.11	1882.27	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1805.05	1814.96		41.8	43		.1	.3

#### CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4692

#### INPUT

Description:

Station Elevation Data		num= 52							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2.2	676.54	14.2	673.9	29.44	673.96	39.22	671.77	100.41	668.46
115.19	668	117.8	668	120.39	668	122.3	668	124.73	667.454
126.96	667	129.52	666.456	131.99	666	134.43	665.482	136.94	665
150.39	664.915	174.31	664.51	176.11	664.456	178.71	664.392	181.33	664.388
187.44	664.226	195.53	664	197.09	663.916	198.85	663.834	200.84	663.787
201.06	663.773	203.64	663.897	206.14	664	216.1	664.145	218.05	664.16
224.56	664.251	229.54	664.259	234.53	664.327	280.45	664.929	282.17	664.936
287.78	665	294.26	665.639	297.98	666	300.25	666.484	302.51	667
307.96	666.83	316.64	666.554	320.98	666.408	322.95	666.329	329.57	666.282
329.66	666.29	331.96	666.203	380.91	669.4	419.8	678	423	676
424	676	433	680						

Manning's n Values		num= 5							
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
2.2	.1	136.94	.11	195.53	.05	206.14	.11	302.51	.1

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	195.53	206.14		188.7	197		.1	.3

#### CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 4495

#### INPUT

Description: FEMA BHX

Station Elevation Data		num= 86							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1198	694	1232	700	1261	710	1279	716	1307	716
1411	718	1688	718	1713	710	1774	690	1805	680
1820	679.74	2003	667.576	2006.92	667.612	2011.35	667.652	2018.97	667.902
2020.87	667.974	2021.45	667.975	2022.29	667.977	2025.06	667.984	2026.78	667.987
2027.89	667.99	2029.03	667.99	2032.09	667.994	2033	667.996	2035.46	667.999
2036.6	668	2039.69	667.326	2041.17	667	2042.52	666.736	2046.49	666
2047.63	665.765	2051.55	665	2061.5	664.353	2067.59	664.252	2073.17	664.091
2073.93	664.089	2078.82	664.087	2080.05	664.084	2083.21	664.075	2091.76	664.056
2097.57	664.038	2101.06	664.028	2109.99	664	2114.37	663.524	2116.41	663.305
2117.18	663.233	2121.29	663.713	2123.77	664	2124.99	664	2125.39	664
2138.05	664	2142.26	664	2146.61	664	2149.65	664	2152.42	664



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2164.57	664.267	2171.35	664.553	2173.93	664.594	2181.16	665	2184.58	665.607
2186.64	666	2189.87	666.635	2191.82	667	2199.16	667.003	2219.84	666.825
2222.42	665.866	2230	664.079	2231.69	664.473	2232.04	664.556	2235.56	665.015
2242.2	665.926	2242.71	666	2244.28	666	2244.52	666	2244.73	666
2280	669.54	2300	674.24	2306	676	2313	676	2321	680
2338	690	2345	692	2370	694	2486	696	2495	700
2515	710								

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1198	.1	2036.6	.11	2109.99	.05	2123.77	.11	2244.73	.1		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 2109.99 2123.77 77.5 81 77.6 .1 .3

#### CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 4414

#### INPUT

##### Description:

Station Elevation Data		num= 68		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-5.7	673.7	1.31	671.76	19.96	669.88	70.87	667.77	105.71	667		
105.98	666.94	109.83	666	110.36	665.876	114.28	665	128.45	664.158		
137.09	664.014	137.29	664.006	138.95	664	151.88	663.973	152.23	663.974		
164.32	663.974	164.86	663.977	169.07	663.978	172.77	663.817	173.49	663.764		
174.35	663.649	175.33	663.466	177.51	663.013	177.55	663.014	178.12	663		
178.49	662.971	178.66	663	179.14	663.063	181.06	663.262	181.27	663.281		
183.82	663.485	186.11	663.666	187.66	663.778	188.15	663.78	188.44	663.796		
189.28	663.798	189.93	663.833	190.54	663.877	202.44	664	207.78	664		
207.97	664	208.27	664	223.32	664	224.04	664	226.1	664		
236.4	664	239.7	664	246.89	664	252.71	664	263.16	664.644		
269.13	665	271.32	665.454	274.29	666	289.21	666.75	296.88	667.165		
298.28	666.355	316.64	665.969	317.16	665.968	317.2	666	317.52	666		
318.14	666	318.59	666	331.76	668.59	383	676	385	674		
387	674	400	680	425	690						

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-5.7	.1	128.45	.11	169.07	.05	190.54	.11	331.76	.1		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 169.07 190.54 114.9 119 117.5 .1 .3

#### CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 4295

#### INPUT

##### Description: FEMA BHW

Station Elevation Data		num= 88		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1067	710	1145	710	1151	708	1167	708	1173	710		
1201	710	1208	708	1218	708	1223	710	1253	700		
1312	680	1370	674.24	1408	669.34	1470	669.45	1507.95	667.187		
1509.22	667.198	1510.67	667.211	1513.14	667.293	1519.31	667.527	1520.9	667.476		
1522.86	667.413	1524.07	667.283	1525.97	667.08	1526.72	667	1528.93	666.464		
1530.85	666	1531.78	665.82	1535.97	665	1537.1	664.796	1541.24	664		

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1546.87	663.846	1555.86	663.6	1558.07	663.572	1565.76	663.496	1569.64	663.469
1573.24	663.451	1577.76	663.46	1582.84	663.507	1589.02	663.6	1590.11	663.585
1590.4	663.581	1606.93	663.395	1611.2	663.343	1614.72	663.297	1626.09	663.162
1639.19	663	1641.48	662.948	1646.47	662.823	1650.69	662.977	1651.36	663
1651.82	663.016	1652.1	663.018	1652.17	663.02	1654.85	663.027	1658.85	663.056
1659.58	663.044	1660.07	663.041	1660.66	663.046	1669.22	663.127	1672.44	663.169
1680.77	663.278	1689.02	663.437	1695.4	663.554	1714.18	664	1714.51	664.043
1715.85	664.216	1721.6	665	1726.29	665.903	1726.69	666	1744.06	665.521
1753	665.29	1762.02	665.598	1769.22	665.843	1773.58	666	1800	666.45
1820	674.24	1875	679.65	1896	674	1903	672	1908	672
1915	674	1930	680	1949	690	1953	692	2038	694
2241	696	2250	700	2285	710				

Manning's n Values			num= 5								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1067	.1	1519.31	.11	1639.19	.05	1652.17	.11	1800			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1639.19	1652.17		160.8	170.5		.1	.3

#### CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 4130

#### INPUT

Description:

Station Elevation Data			num= 51								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9.79	672.78	38.19	668.15	65.97	666.24	90.55	666.158	91.61	666.009		
91.72	666	92.08	665.946	98.82	665	100.19	664.775	105.05	664		
106.39	663.159	106.76	663	107.96	662.985	116.25	662.936	120.19	662.935		
124.72	662.947	127.3	662.968	130.71	663	136.98	663	145.11	663		
151.76	663	154.8	663	156.55	663	160.84	662.674	166.49	662.262		
171.27	662.654	174.9	663	179.99	663.043	180.66	663.04	190	663.361		
198.82	663.597	210.12	664	213.33	664.489	215.93	665	218.2	664.985		
218.74	664.983	220.89	664.961	221.71	664.955	226.08	664.933	227.28	664.933		
229.38	664.933	237.05	664.971	238.12	664.969	239.02	665	253.95	665.83		
269.33	665.98	370.38	665.85	415.17	670.09	473	672	491	680		
517	692										

Manning's n Values			num= 5								
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9.79	.1	90.55	.11	156.55	.05	174.9	.11	239.02			

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	156.55	174.9		87.5	89.5		.1	.3

#### CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 4043

#### INPUT

Description: FEMA BHV

Station Elevation Data			num= 54								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1127	714	1175	712	1211	710	1217	708	1228	708		
1235	710	1269	704	1282	704	1294	700	1324	690		
1330	674.54	1390	671.54	1520	667.84	1580.33	666	1582.28	665.776		
1590.68	665	1594.63	664.551	1600.28	664	1606.73	663.761	1610.6	663.475		

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1618.4	663	1621.16	662.919	1623.52	662.858	1625.01	662.24	1629.53	662.932
1631.2	662.974	1631.53	662.982	1632.7	663	1648.17	663.419	1662.23	664
1664.92	664.369	1670	665	1670.44	665	1673.62	664.991	1673.97	664.99
1676.78	664.988	1680.44	664.98	1680.85	664.98	1681.37	664.978	1682.77	664.977
1689.01	664.975	1692.57	664.975	1693.29	665	1740	667.24	1910	669.54
1960	674.65	1965	672	1971	672	1987	680	2011	692
2107	694	2310	696	2355	710	2425	736		

Manning's n Values      num=      5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1127	.1	1580.33	.11	1618.4	.05	1632.7	.11	1670	.1

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

1618.4	1632.7	67.9	88.3	73.6	.1	.3
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# CROSS SECTION

RIVER: Walker Run  
 REACH: 1

RS: 3972

## INPUT

Description: U/S XS of Market Street Bridge

Station Elevation Data      num=      22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
123.85	674.24	171.83	670.24	197.75	670.47	204.44	667.88	215.91	667.02
223.06	665.53	225.4	663	270.18	661.21	277.41	661.6	281.39	661.43
285.52	661.64	287.4	663	295.4	664	298.04	664.769	299.32	664.863
315.58	665.35	372.3	666.78	391.2	666.21	536	666.78	559	667.64
748.66	669.45	788.66	674.34						

Manning's n Values      num=      4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
123.85	.1	225.4	.05	299.32	.1	372.3	.1

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

225.4	299.32	101.2	98.1	100.6	.3	.7
-------	--------	-------	------	-------	----	----

Ineffective Flow      num=      2

Sta L	Sta R	Elev	Permanent
123.85	202.37	670.8	F
341.4	788.66	670.3	F

## BRIDGE

RIVER: Walker Run  
 REACH: 1

RS: 3914

## INPUT

Description: Market Street u/s

Distance from Upstream XS = 40.1  
 Deck/Roadway Width = 43.1  
 Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num=      16

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	673.611	673.611	71.3	672.778	672.278	151.64	671.546	671.546
216.18	671.069	671.069	254.71	670.8	664.72	260.35	670.8	663.3
260.36	673.78	663.04	260.37	673.78	669.04	272.2	673.78	669.04
283.42	673.78	669.04	283.43	673.78	663.08	285	673.78	664.36
285.1	670.45	664.36	287.02	670.3	665.83	339.19	669.234	669.234
435.84	667.629	667.629						

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Upstream Bridge Cross Section Data

Station Elevation Data		num= 19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-113.65	679.5	-20.65	674.7	0	673.611	71.3	672.778	151.64	671.546
216.18	671.069	254.71	664.72	261	663.04	272.49	661.04	283.42	663.08
287.02	665.83	339.19	669.234	435.84	667.629	464.35	668.7	554.35	669.7
604.35	674.8	684.35	679.7	769.35	684.6	1200	684.6		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
-113.65	.1	254.71	.05	287.02	.1

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	254.71	287.02		.3	.7

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
-113.65	202.37	670.8	F		
341.4	1200	670.3	F		

Downstream Deck/Roadway Coordinates

num= 15									
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta
0	673.611	673.611	71.3	672.778	672.278	151.64	671.546	671.546	
216.18	671.069	671.069	254.71	670.8	664.72	260.35	670.8	661.95	
260.36	673.42	668.72	272.2	673.42	668.72	283.42	673.42	668.72	
283.43	673.42	661.35	285	673.42	664.36	285.1	670.45	664.36	
289.14	670.3	664.78	339.19	669.234	669.234	435.84	667.629	667.629	

Downstream Bridge Cross Section Data

Station Elevation Data		num= 19							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-230	679.5	-113.65	679.5	-20.65	674.7	0	673.611	71.3	672.778
151.64	671.546	216.18	671.069	254.71	664.72	261	663.04	272.49	661.04
283.42	663.08	287.02	665.83	339.19	669.234	435.84	667.629	464.35	668.7
554.35	669.7	604.35	674.8	684.35	679.7	769.35	684.6		

Manning's n Values		num= 4					
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-230	.1	-113.65	.1	254.71	.055	287.02	.06

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	254.71	287.02		.4	.8

Ineffective Flow		num= 2			
Sta L	Sta R	Elev	Permanent		
-230	200	670.9	F		
310	769.35	670.3	F		

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 668.7  
 Energy head used in spillway design =  
 Spillway height used in design =  
 weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

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Submerged Inlet Cd = 1.5  
 Submerged Inlet + Outlet Cd = .8  
 Max Low Cord = 670.1

Additional Bridge Parameters  
 Add Friction component to Momentum  
 Do not add Weight component to Momentum  
 Class B flow critical depth computations use critical depth  
 inside the bridge at the upstream end  
 Criteria to check for pressure flow = Upstream energy grade line

#### CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 3860

#### INPUT

Description: D/S XS of Market Street Bridge

Station		Elevation Data		num= 15		Sta		Elev		Sta		Elev	
117.66	675.84	137.05	672.03	181.62	671.65	219.23	671.09	253.06	668.65				
262.64	664.21	265.16	663.32	266.08	661.15	272.52	660.73	283.67	661.59				
288.12	663.96	295.78	666.15	334.66	665.91	349.26	667.65	357.79	668.52				

Manning's n Values		num= 5		Sta		n Val		Sta		n Val	
117.66	.1	219.23	.12	265.16	.055	288.12	.06	334.66	.04		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	265.16	288.12		75.5	68.6	74.8	.4	.8

Ineffective Flow			num= 2	
Sta L	Sta R	Elev	Permanent	
117.66	200	670.9	F	
310	357.79	670.3	F	

#### CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 3785

#### INPUT

Description: FEMA BHU

Station		Elevation Data		num= 42		Sta		Elev		Sta		Elev	
1012	714	1143	710	1160	710	1203	692	1225	692				
1260	684.65	1290	679.74	1318	674.84	1360	669.34	1412	664.95				
1426.79	661	1430.1	660.24	1431.45	660.96	1431.99	661	1435.13	661				
1436.82	661	1439.14	661.16	1457.87	662	1458.82	662.19	1462.77	663				
1463.66	663.18	1467.67	664	1469.67	664.41	1472.57	665	1474.69	665				
1477.84	665	1477.88	665	1477.94	665	1479.92	665	1480.99	665				
1500	665.84	1550	667.24	1580	666.74	1650	666.15	1760	669.45				
1800	674.34	1812	674	1823	670	1827	670	1845	680				
1869	692	1985	694										

Manning's n Values		num= 4		Sta		n Val		Sta		n Val	
1012	.1	1412	.055	1472.57	.12	1480.99	.04				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.	
	1412	1472.57		63.5	56.1	58.3	.1	.3

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CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 3735

INPUT

Description:

Station Elevation Data			num=	41						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
46.72	679.91	74.63	675.8	101.02	670.65	135.38	669.18	157.56	666.89	
174.59	661	186.31	660.48	186.72	660.36	187.27	660.56	190.57	661	
193.83	661	195.08	661	203.49	661.11	234.44	661.6	236.03	661.59	
238.97	661.63	240.01	661.61	241.57	661.64	242.67	661.63	244.2	661.62	
247.27	661.68	250.62	661.71	252.67	661.76	261.64	661.92	262.33	661.94	
265.73	662	269.46	662.52	272.84	663	275.62	663.39	281.52	664	
284.12	664.07	287.2	664.13	298.4	664.17	306.64	664.14	340	664	
396	664	402	665	420	666	422	666	440	666	
642.15	669.34									

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
46.72	.1	174.59	.055	190.57	.12
				340	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	174.59	190.57		208.1	193.9		.1	.3

CROSS SECTION

RIVER: Walker Run  
REACH: 1

RS: 3532

INPUT

Description: FEMA BHT

Station Elevation Data			num=	86						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	
1000	714	1260	714	1310	712	1352	710	1360	710	
1368	684.95	1390	679.74	1428	674.34	1489.73	661	1490.27	661	
1492.15	661	1494.56	661	1497.2	661	1497.87	661	1499.76	661	
1502.81	661	1503.38	661	1505.44	661	1508.4	661	1509.25	661	
1509.96	660.87	1510.56	660.88	1513.01	661	1523.66	661	1526.48	661.71	
1527.55	662	1531.58	662.51	1535.35	663	1540.62	663	1557.67	663	
1560.38	662.32	1561.67	662	1566.52	661.07	1567.04	661	1570.41	660.94	
1573.77	660.89	1577.02	660.87	1590.62	660.85	1591.26	660.84	1604.01	660.81	
1606.68	660.8	1616.06	660.79	1618.17	660.79	1627.35	660.78	1629.71	660.77	
1630.88	660.76	1632.64	660.73	1635.02	660.68	1637.73	660.62	1648.78	660.62	
1650.3	660.51	1653.61	660.19	1655.15	660	1658.81	659.3	1660.1	659	
1661.18	658.94	1662	658.87	1662.85	658.95	1663.54	659	1665.67	659.9	
1665.93	660	1665.97	660.02	1666.12	660.03	1668.34	660.42	1674.49	660.46	
1677.45	660.63	1678.76	660.71	1689.17	660.75	1696.73	660.82	1710.74	661	
1711.27	661.02	1719.48	662	1722.58	662.37	1726.32	663	1750	666.34	
1770	665.74	1850	666.34	1970	670	1973	668	1976	668	
2000	680	2024	692	2161	694	2360	696	2369	700	
2425	720									

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.08	1489.73	.1	1648.78	.06
				1668.34	.1
				1726.32	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1648.78	1668.34		123.6	125		.1	.3



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CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3410

INPUT

Description:

Station	Elevation	Data	num=	51	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
33.79	674.7	76.45	668.35	118.62	664.23	124.75	661.35	124.85	661.36			
127.56	661.14	129.03	661	130.2	660.26	130.68	660	138.5	660			
142.94	660	147.75	660.61	151	661	157.96	661.36	165.48	661.49			
172.81	661.72	182.05	661.83	185.53	661.89	186.48	661.9	195.32	661.95			
195.65	661.95	195.89	661.95	196.08	661.94	196.17	661.94	196.63	661.89			
202.22	661.25	203.08	661.21	203.57	661.16	203.9	661.1	204.29	661			
215	660	286.94	660	292.1	659.48	292.19	659.47	295.01	659.02			
296.11	658.92	296.16	658.92	297.06	658.95	297.65	659	299.62	659.46			
301.23	660	305.18	660.06	360	660.06	368.41	661	368.55	661.04			
372.42	662	372.5	662.02	376.43	663	381.4	662.93	385.18	663.96			
402.12	664.21											

Manning's	n	Values	num=	5	Sta	n	Val	Sta	n	Val	Sta	n	Val
33.79	.08	124.75	.1	286.94	.05	301.23	.1	372.42	.08				

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

286.94 301.23 36.2 35 34.9 .1 .3

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3375

INPUT

Description: FEMA BHS

Station	Elevation	Data	num=	90	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
988	714	1208	714	1255	712	1291	710	1305	710			
1320	684.34	1338	679.95	1360	674.65	1420	664.54	1421.52	661.96			
1421.81	661.99	1423.45	661.86	1424.56	661.76	1424.89	661.79	1426.25	661.7			
1430.45	661.52	1435.64	661	1437.79	661	1438.89	661	1439.66	661			
1440	660.83	1441.57	660	1447.71	660	1451.29	660	1458.24	660			
1464.7	660.48	1468.14	660.71	1468.6	660.73	1469.2	660.75	1470.03	660.75			
1472.79	660.82	1479.61	660.94	1480.67	660.94	1483.28	661	1489.17	661.04			
1489.6	661.05	1495.46	661.07	1499.84	661.05	1502.67	661	1503.12	660.98			
1503.38	660.98	1506.72	660.81	1522.07	659.77	1528.63	659.69	1531.51	659.69			
1537.4	659.65	1538.88	659.65	1545.07	659.65	1546.45	659.64	1554.57	659.67			
1555.42	659.67	1558.24	659.69	1560.46	659.7	1563.93	659.75	1569.61	659.77			
1572.96	659.78	1575.61	659.82	1580.07	659.85	1586.63	659.9	1598.22	660			
1599.68	659.66	1601.63	659	1604.09	658.53	1605.43	658.03	1606.47	657.99			
1606.53	657.97	1607.99	658	1608.43	658.08	1610.14	659	1610.55	659.3			
1611.37	660	1631.33	660.32	1671.63	661	1673.22	661.4	1675.64	662			
1677.17	662.38	1679.64	663	1679.72	663	1680.1	663	1680.34	663			
1705	664.24	1800	666.74	1888	668	1893	670	1897	670			
1901	668	1908	668	1932	680	1957	692	2116	694			

Manning's	n	Values	num=	5	Sta	n	Val	Sta	n	Val	Sta	n	Val
988	.08	1421.52	.1	1598.22	.05	1611.37	.1	1705	.08				

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

1598.22 1611.37

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92.9 96 103.3

.1

.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3278

## INPUT

Description:

Station Elevation Data

num=

52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40.42	666.96	56.89	663.45	68.42	662.57	75.07	662.03	76.37	661
81.04	660.09	81.46	660	94.29	659.62	111.19	659.22	111.85	659.22
111.94	659.22	112.62	659.22	117.52	659.24	139.22	659.04	153.04	659.01
156.74	659.01	160.34	659	161.5	658.49	163.91	658.08	164.9	658
166.03	657.99	166.14	658.05	168.81	658.44	172.27	658.76	173.42	658.88
173.99	658.91	175.26	659	190.83	659.05	204.68	659.1	212.3	659.12
225	659.2	231.3	659.22	242	659.3	255.25	659.3	277.78	659.08
286.69	659.25	289.27	659.3	300.2	659.49	332.26	660	335.19	660.73
336.28	661	339.14	661.71	340.3	662	341.7	662.33	342.25	662.47
343.67	662.84	343.81	662.88	344.38	662.72	345.42	662.71	450	666
453	668	653	668						

Manning's n Values

num=

5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
40.42	.06	76.37	.08	160.34	.05	175.26	.08	340.3	.06

Bank Sta: Left

Right

Lengths: Left Channel

Right

Coeff Contr.

Expan.

160.34 175.26

195.6 214

204.6

.1

.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: 3065

## INPUT

Description: FEMA BHR

Station Elevation Data

num=

102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
888	714	1301	714	1348	712	1368	708	1382	708
1388	710	1405	669.74	1425	664.54	1465.04	660.87	1473.01	660.71
1474.43	660.71	1475.09	660.7	1475.71	660.68	1476.78	660.64	1478.13	660.59
1479.96	660.54	1481.67	660.42	1483.06	660.33	1484.98	660.2	1486.52	660
1493.71	659.08	1494.24	659	1495.27	658.97	1495.79	658.96	1516.92	658.58
1519.95	658.53	1527.95	658.62	1531.7	658.6	1534.1	658.59	1542.56	658.61
1544.34	658.63	1554.25	658.69	1567.38	658.77	1567.62	658.77	1567.88	658.78
1568.87	658.79	1569.18	658.78	1570.26	658.78	1570.92	658.78	1581.03	658.72
1590.33	658.6	1593.99	658.56	1601.9	658.5	1605.27	658.47	1613.35	658.5
1619.49	658.49	1620.03	658.48	1626.57	658.43	1627.51	658.41	1628.55	658.39
1637.92	658.31	1639.65	658.28	1641.75	658.26	1649.82	658.24	1652.44	658.22
1655.88	658.19	1663.41	658.17	1665.27	658.12	1676.69	658.1	1680.99	658.07
1684.91	658.03	1687.34	658	1689.5	657.5	1690.38	657	1690.5	657
1692.56	656.75	1692.59	656.75	1692.65	656.75	1694.85	657	1695.87	657.33
1697.34	658	1701.15	658.05	1735.89	658.61	1746.13	658.59	1749	658.59
1750.69	658.6	1752.38	658.61	1754.21	658.63	1756.59	658.68	1765.02	658.86
1766.8	658.85	1771.75	659	1773.09	659.33	1775.76	660	1777.05	660.32
1779.76	661	1780.08	661.09	1782.79	662	1805	664.34	1828	666.54
1831	666	1833	666	1844	668	1849	670	2056	670
2066	668	2068	668	2081	670	2138	670	2211	668
2384	668	2400	676						

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Manning's n	Values	num=	5
Sta	n Val	Sta	n Val
888	.06	1486.52	.08
1687.34		1687.34	.05
1697.34		1697.34	.08
1782.79		1782.79	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
1687.34	1697.34	129.8	116.6	121.4		.1	.3

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2949

INPUT

Description:

Station	Elevation	Data	num=	74
Sta	Elev	Sta	Elev	Sta
0	710	17.6	706	26.4
96.72	659.48	106.73	659.92	109.72
118.87	659.08	119.65	659	131.83
145.97	657.82	150.6	657.78	154.47
174.36	657.76	181.6	657.76	196.62
208.06	657	214.52	657	216.28
225.97	656.79	227.96	656.74	235.14
240.15	656.85	241.06	657	244.18
254.33	657.76	263.53	658	266.22
282.15	658	290.8	658	299.61
321.61	658	335.13	658	335.56
353.11	657.96	366.29	657.93	376.49
403.1	657.96	412.2	658	418.32
444	659.6	445.6	660	448.16
453.68	662	464.54	662.65	474.11

Manning's n	Values	num=	5
Sta	n Val	Sta	n Val
0	.06	111.72	.08
214.52		214.52	.05
241.06		241.06	.08
453.68		453.68	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
214.52	241.06	211	213.4	221.1		.1	.3

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2730

INPUT

Description: FEMA BHQ U/S XS of Walker Run Prop Bridge

Station	Elevation	Data	num=	83
Sta	Elev	Sta	Elev	Sta
-421.78	714	-377.17	714	-201.17
-75.17	708	-57.17	710	89.83
202.83	686	262.83	686	304.83
322.31	658.33	325.72	658.28	329.58
345.48	658.01	346.25	658	350.92
360.52	656.83	362.38	656.82	367.4
373.85	656.81	374.49	656.86	382.57
412.81	656.25	416.6	656.02	430
434.92	655.66	436.88	655.83	439.81
464.73	656.57	466.97	656.61	469.29
476.14	656.72	478.25	656.73	479.98
484.7	656.77	486.72	656.78	490.65
505.42	656.98	515.12	656.98	516.8

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538.41	657	658.42	657	668.42	658	687.12	662	717.97	663
739.24	664	745.24	665	754.54	668	774.2	668	792.47	668
805.47	666	810.47	666	818.47	668	829.47	670	832.47	670
1040.47	668	1043.47	666	1593.22	666				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-421.78	.06	334	.08	416.6	.05	439.81	.08	687.12	.06

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

430	439.81	237.4	231.9	230.8	.3	.5
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# BRIDGE

RIVER: Walker Run  
REACH: 1 RS: 2620

## INPUT

Description: Bridge #4  
Distance from Upstream XS = 70  
Deck/Roadway Width = 60  
Weir Coefficient = 2.5  
Upstream Deck/Roadway Coordinates

num= 11

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	673.19	0	160	673.19	0	304.99	672.23	0
305	672.23	667.4	385	671.43	666.6	465	670.63	665.8
545	669.83	665	625	669.03	664.2	705	668.23	663.4
705.01	668.23	0	754.54	668	0			

## Upstream Bridge Cross Section Data

Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-421.78	714	-377.17	714	-201.17	712	-122.17	710	-107.17	708
-75.17	708	-57.17	710	89.83	694	135.83	692	162.83	688
202.83	686	262.83	686	304.83	680	306	658.64	319.28	658.36
322.31	658.33	325.72	658.28	329.58	658.24	334	658.18	339.2	658.11
345.48	658.01	346.25	658	350.92	657.34	352.81	656.8	355.33	656.83
360.52	656.83	362.38	656.82	367.4	656.8	370.87	656.82	373.25	656.81
373.85	656.81	374.49	656.86	382.57	656.59	395.38	656.32	409.31	656.27
412.81	656.25	416.6	656.02	430	656.02	430.27	656	431.42	655.78
434.92	655.66	436.88	655.83	439.81	656	442.6	656.32	456.04	656.53
464.73	656.57	466.97	656.61	469.29	656.64	472.01	656.67	474.24	656.69
476.14	656.72	478.25	656.73	479.98	656.75	481.47	656.75	482.95	656.76
484.7	656.77	486.72	656.78	490.65	656.79	491.55	656.79	492.37	656.8
505.42	656.98	515.12	656.98	516.8	656.99	528.2	657	538.29	657
538.41	657	658.42	657	668.42	658	687.12	662	717.97	663
739.24	664	745.24	665	754.54	668	774.2	668	792.47	668
805.47	666	810.47	666	818.47	668	829.47	670	832.47	670
1040.47	668	1043.47	666	1593.22	666				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-421.78	.06	334	.08	416.6	.05	439.81	.08	687.12	.06

Bank Sta: Left Right Coeff Contr. Expan.

430	439.81	.3	.5
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## Downstream Deck/Roadway Coordinates

num= 11

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	673.19	0	130	673.19	0	174.99	672.23	0

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175	672.23	667.4	255	671.43	666.6	335	670.63	665.8
415	669.83	665	495	669.03	664.2	575	668.23	663.4
575.01	668.23	0	682.31	667.16	0			

Downstream Bridge Cross Section Data

Station	Elevation	Data	num=	82					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	675	105	666	169.7	662	176	660	182	658
194.31	657.58	211.95	657	216.39	656.69	219.45	656.65	222.52	656.63
231.11	656.33	241.63	656.33	250.53	656.2	262.61	656.04	264.91	656.05
272.27	656.06	275.1	656.07	279.86	656.07	285.09	656.08	293.79	656.09
295.78	656.09	306.04	656.09	308.92	656.08	310.65	656.09	312.14	656.09
319.96	656.08	322.32	656.08	328.92	656.06	333.01	656.06	337.43	656.07
341.59	656.05	347.14	656.05	350.97	656.06	354.99	656.06	355.25	656.06
355.57	656.06	356.3	656.06	365.12	656.06	371.78	656.05	378.51	656.05
383.44	656.04	386.2	656.04	390.9	656.04	397.79	656.03	406.48	656.03
418.61	656.01	431.55	656	433.09	655.17	433.4	655	433.64	654.95
433.9	654.9	435.69	654.75	436.92	654.97	437.79	655	438.31	655.29
439.78	656	442.48	656	474.44	656	480.93	655.89	496.46	655.94
501.55	656	505.3	656.18	532.81	657	533.28	657.05	540.1	657.71
542.97	658	554.45	658.87	555.99	659	560.72	659.3	572.87	660
577.28	660.22	584.19	660.56	590.14	660.86	591.26	660.92	597.54	661.5
599.58	661.63	603.22	661.88	605.32	662	658.58	665.36	678.36	665.96
682.31	667.16	1000	667.16						

Manning's	n	Values	num=	5							
Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta	n	Val
0	.06	211.95	.08	431.55	.05	439.78	.08	590.14	.06		

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	431.55	439.78	.3	.5	

Upstream Embankment side slope	=	0 horiz. to 1.0 vertical
Downstream Embankment side slope	=	0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow	=	.98
Elevation at which weir flow begins	=	659.2
Energy head used in spillway design	=	
Spillway height used in design	=	
weir crest shape	=	Broad Crested

Number of Piers = 4

Pier Data					
Pier Station	Upstream=	385	Downstream=	255	
Upstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	666.6		
Downstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	666.6		

Pier Data					
Pier Station	Upstream=	465	Downstream=	335	
Upstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	665.8		
Downstream	num=	2			
width	Elev	width	Elev		
4.5	0	4.5	665.8		

Pier Data					
Pier Station	Upstream=	545	Downstream=	415	
Upstream	num=	2			

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width Elev width Elev  
4.5 0 4.5 665  
Downstream num= 2  
width Elev width Elev  
4.5 0 4.5 665

Pier Data  
Pier Station Upstream= 625 Downstream= 495  
Upstream num= 2  
width Elev width Elev  
4.5 0 4.5 664.2  
Downstream num= 2  
width Elev width Elev  
4.5 0 4.5 664.2

Number of Bridge Coefficient Sets = 1

## Low Flow Methods and Data

Energy  
Momentum Cd = 2  
Selected Low Flow Methods = Highest Energy Answer

## High Flow Method

Pressure and Weir flow  
Submerged Inlet Cd = 1.5  
Submerged Inlet + Outlet Cd = .8  
Max Low Cord = 658.5

## Additional Bridge Parameters

Add Friction component to Momentum  
Do not add weight component to Momentum  
Class B flow critical depth computations use critical depth  
inside the bridge at the upstream end  
Criteria to check for pressure flow = Upstream energy grade line

## CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 2497

## INPUT

Description: D/S XS of Walker Run Prop Bridge

Station	Elevation	Data	num=	72	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	663	169.7	662	176	660	182	658	194.31	657.58			
211.95	657	216.39	656.69	219.45	656.65	222.52	656.63	231.11	656.33			
241.63	656.33	250.53	656.2	262.61	656.04	264.91	656.05	272.27	656.06			
275.1	656.07	279.86	656.07	285.09	656.08	293.79	656.09	295.78	656.09			
306.04	656.09	308.92	656.08	310.65	656.09	312.14	656.09	319.96	656.08			
322.32	656.08	328.92	656.06	333.01	656.06	337.43	656.07	341.59	656.05			
347.14	656.05	350.97	656.06	354.99	656.06	355.25	656.06	355.57	656.06			
356.3	656.06	365.12	656.06	371.78	656.05	378.51	656.05	383.44	656.04			
386.2	656.04	390.9	656.04	397.79	656.03	406.48	656.03	418.61	656.01			
431.55	656	433.09	655.17	433.4	655	433.64	654.95	433.9	654.9			
435.69	654.75	436.92	654.97	437.79	655	438.31	655.29	439.78	656			
442.48	656	474.44	656	480.93	655.89	496.46	655.94	501.55	656			
505.3	656.18	532.81	657	533.28	657.05	540.1	657.71	542.97	658			
554.45	658.87	555.99	659	560.72	659.3	585.34	660.05	658.58	665.36			
678.36	665.96	682.31	667.16									

Manning's n Values Sta n Val Sta n Val 5 Sta n Val Sta n Val Sta n Val  
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0	.06	211.95	.08	431.55	.05	439.78	.08	585.34	.06
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.		
431.55	439.78	33.8	35.1	35.9		.3	.5		

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2462

INPUT

Description:

Station	Elevation	Data	num=	51					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	662	26	662	70.39	659.98	130.3	658.42	191.55	657.89
194.47	657.86	200.62	657.68	214.06	657.25	223.61	657	230.7	656.3
233.59	656	244.38	655.94	249.84	655.91	254.12	655.9	258.8	655.9
262.67	655.9	264.18	655.9	270.27	655.9	276.39	655.9	283.92	655.9
289.65	655.91	298.05	655.91	321.59	655.41	325.07	655.33	330.35	655.31
333.33	655.24	335.99	655.23	339.76	655.14	344.9	655.03	345.18	655.02
345.99	655	347.04	654.92	350.97	654.61	354.06	654.81	357.06	655
358	655	465	655	475	656	510.01	656.95	510.72	656.94
512.02	657	515.93	657.74	517.81	658	537.09	658.53	543.64	658.86
546.52	659	555.06	659.14	560.39	659.8	629.95	661.26	684.19	664.6
700.62	665.24								

Manning's	n	Values	num=	5					
Sta	n	Val	Sta	n	Val	Sta	n	Val	Sta
0	.06	223.61	.08	345.99	.05	357.06	.08	510.01	.06
Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.		
345.99	357.06	117	123	126.5		.1	.3		

CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2339

INPUT

Description: FEMA BHP

Station	Elevation	Data	num=	101					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1002.3	712	1055.3	710	1070.3	710	1208.3	700	1293.3	680
1360.3	680	1410.3	688	1538.7	680	1583.6	670	1592.4	669
1601.8	668	1634.5	667	1747.5	666	1757	665	1776	664
1787.68	662.91	1824.83	659.26	1888	659.65	2100	657.34	2209.01	656.91
2212.33	656.29	2214.36	656.48	2216.73	656.27	2220.07	656	2226.21	655.77
2228.06	655.7	2234.48	655.47	2237.75	655.41	2241.37	655.39	2244.6	655.27
2250.48	655.26	2254.59	655.31	2257.14	655.25	2262.59	655.21	2264.25	655.23
2264.33	655.23	2266.6	655.24	2299.05	655.35	2300.54	655.33	2303.12	655.31
2308.41	655.33	2315.43	655.3	2321.54	655.27	2325.04	655.26	2333.98	655.23
2337.74	655.21	2341.08	655.21	2343.81	655.21	2345.91	655.23	2347.67	655.25
2348.65	655.28	2349.76	655.35	2350.65	655.43	2351.77	655.48	2352.92	655.48
2354.43	655.49	2356.55	655.48	2358.37	655.47	2361.11	655.46	2364	655.44
2367.03	655.42	2369.84	655.4	2376.71	655.34	2387.47	655.24	2413.3	655.01
2414.16	655	2414.9	654.86	2415.59	654.76	2417.73	654.4	2417.86	654.38
2418.2	654.44	2421.13	655	2428.82	655.89	2433.17	656.4	2444.82	656.9
2450.38	656.73	2463.09	656.67	2475.07	656.57	2488.7	656	2495.47	656.87
2496.25	657	2496.41	656.97	2498.07	657.31	2501.16	657.84	2502.1	658
2503.07	658.03	2506.82	658.16	2512.61	658.29	2516.9	658.38	2523.42	658.48
2528.18	658.55	2530.86	658.57	2534.06	658.59	2563.54	659.61	2599.59	659.96



2603.04 660.02 2606.09 660.08 walkerRunFld.rep 2735 664.54 2755 666.54 2778 666  
 3465 666

Manning's n Values num= 5  
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val  
 1002.3 .06 2209.01 .08 2413.3 .05 2421.13 .08 2501.16 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 2413.3 2421.13 62.3 64.8 61.8 .1 .3

# CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2274

## INPUT

### Description:

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-75	664	-46.1	663.17	-23	659.97	16.47	657.72	45.83	658.28
67.54	658.17	89.33	656.46	93.94	656.49	96.48	656	115.41	655.33
123.78	655.21	127.83	655.09	128.92	655.09	136.61	655.09	138.38	655.08
145.96	655.07	151.42	655.06	157.67	655.04	158.35	655.04	167.72	655.05
171.56	655.05	174.69	655.06	177.39	655.06	177.46	655.06	177.55	655.06
178.01	655.06	178.84	655.06	180.13	655.06	181.79	655.06	183.41	655.05
185.32	655.05	187.03	655.05	188.39	655.04	190.37	655.03	197.78	655
198	654.86	199.56	654	201.75	653.95	203.12	653.9	205.3	653.98
206.05	654	206.47	654.2	208.38	655	216.7	655	220.33	655
222.84	655	226.47	655	228.67	655	231.37	655	234.06	655
236.43	655	238.01	655	239.75	655	241.29	655	243.55	655
249.93	655	253.81	655	256.01	655	257.29	655	258.3	655
259.56	655	260.69	655	262.07	655	263.95	655	267.98	655
274.42	655	279.63	655	285.91	655	289.82	655	292.73	655
297.33	655	299.5	655	301.91	655	303.86	655	306.15	655
308.81	655	310.99	655	314	655	326.12	655.4	329.29	655.44
348.92	655.98	349.06	655.98	349.18	655.99	349.26	655.99	349.69	656
349.83	656.02	356.2	657	360.13	657.7	362.04	658	364.41	658.04
369.84	658.08	376.37	658.13	382.25	658.34	448.6	658.96	455.12	659.08
460.9	659.19	507.83	659.46	557.25	660.35	636	663.34	650.4	665.34

Manning's n Values num= 6  
 Sta n Val Sta n Val Sta n Val Sta n Val Sta n Val  
 -75 .06 -46.1 .06 89.33 .08 197.78 .05 208.38 .08  
 349.83 .06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 197.78 208.38 136.2 136.2 129.1 .1 .3

# CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 2139

## INPUT

### Description:

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-101	660.01	41.82	658.6	77.75	655.4	217.23	654.68	305.8	654.64
306.47	655.5074	313.91	655.54	324.93	656	334.22	656	336.38	656
340.14	656	343.15	655.59	347.59	655	350.81	654.89	353.02	654.87
368.38	654.49	386.15	654.15	388.45	654.14	394.41	654.14	394.86	654.14

walkerRunFld.rep

396.46	654.13	397.8	654.13	405.14	654.11	406.63	654.1	413.09	654.09
414.8	654.09	416.99	654.08	422.83	654.08	425.39	654.08	428.92	654.08
432.95	654.07	441.66	654.07	446.94	654.07	449.97	654.06	460.16	654.06
463.62	654.06	467.64	654.05	471.35	654.05	476.36	654.03	488.21	654
489.58	653.78	492.25	653.31	495.12	653.81	495.94	654	503.87	654.2
518.06	654.42	524.76	654.54	534.26	654.7	548.38	654.64	555.21	654.62
556.53	654.62	558.69	654.62	569.44	654.65	579.37	654.7	583.54	654.76
595.53	654.97	596.52	654.99	597.08	655	600.77	655.89	601.22	656
604.68	656.84	605.35	657	608.39	657.09	614.45	657.14	626.18	657.36
636.66	657.56	767.34	658.35	818.4	659.6	905	662.46	916.1	663.58

Manning's n Values      num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-101	.06	340.14	.08	488.21	.05	495.94	.08	600.77	.06

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

488.21	495.94	126.7	129	129.7	.1	.3
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# CROSS SECTION

RIVER: walker Run  
 REACH: 1      RS: 2010

INPUT  
 Description: FEMA BHO

Station	Elevation	Data	num=	96	Station	Elevation	Data	num=	96
1190	690	1390	690	1512	690	1531	700	1598	700
1682	662	1798	659.74	2030	656.54	2295	655.65	2298	654.34
2300	655.95	2460	655.95	2470	654.34	2475	655.95	2600	654.74
2636.82	654.74	2662.58	654.93	2666	655	2667.83	655	2668.6	655
2682.97	655	2685.25	655	2690.83	655	2698.43	655	2698.91	655
2707.11	654.81	2722.01	654.57	2737.58	654.07	2738.89	654.03	2739.78	654
2753.12	653.59	2760.72	653.46	2761.93	653.44	2767.05	653.33	2777.08	653.22
2779.62	653.17	2783.13	653.15	2790.43	653.22	2794.01	653.22	2796.97	653.23
2800.7	653.35	2803.83	653.39	2806.44	653.46	2821.7	653.76	2824.31	653.82
2825.18	653.85	2832.33	653.8	2832.84	653.8	2833.41	653.81	2833.78	653.81
2834.88	653.81	2835.73	653.81	2836.34	653.81	2836.82	653.81	2837.31	653.81
2837.86	653.8	2838.52	653.8	2839.4	653.78	2840.29	653.77	2841.12	653.75
2842.43	653.72	2849.7	653.54	2860.7	653.33	2870.92	653	2872.72	652.83
2874.36	652.7	2876.58	652.91	2877.55	653	2879.56	653.08	2880.69	653.09
2882.28	653.13	2896.3	653.49	2916.66	654	2922.94	654.29	2925.09	654.39
2926.94	654.39	2929.89	654.32	2931.58	654.29	2933.44	654.27	2935.57	654.26
2938.69	654.26	2941.81	654.27	2947.37	654.35	2953.62	654.41	2962.72	654.58
2969.66	654.66	2984.34	655	2984.5	655.03	2985.31	655.19	2988.79	655.86
2989.51	656	2993.12	656.7	2994.67	657	3230	659.65	3345	664.65
3360	664.45								

Manning's n Values      num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1190	.06	2707.11	.08	2870.92	.05	2879.56	.08	2994.67	.06

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

2870.92	2879.56	84.1	85.6	88.3	.1	.3
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# CROSS SECTION

RIVER: walker Run  
 REACH: 1      RS: 1925

INPUT

walkerRunFld.rep

Description:

Station Elevation Data				num= 54			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-232.06	658.01	-166.67	655.4	34.55	654.38	78.78	654.68
83.73	655	84.22	655	84.97	655	85.45	655
88.89	655	93.3	655	100.05	655	121.59	654.03
152.32	653.06	154.68	653.02	155.34	653.01	155.95	653.02
172.47	653.3	191.08	653.12	204.42	653	209.26	653
214.31	652.07	215.72	652.3	218.15	652.69	218.56	652.74
232.09	653.08	233.06	653.09	233.24	653.09	236.42	653.1
241.45	653.12	250.54	653.19	250.85	653.19	251.07	653.19
258.5	653.2	261.07	653.2	268.26	653.2	272.82	653.2
291.28	653.15	296.08	653.2	308.29	653.59	320.86	654
368.74	655.3	496.43	655.55	623.92	656.57	700.01	659.91

Manning's n Values

num= 5			
Sta	n Val	Sta	n Val
-232.06	.06	121.59	.08
		209.26	.05
		219.85	.08
		334	.06

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	209.26	219.85		282.6	325.9		.1	.3

CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 1602

INPUT

Description:

Station Elevation Data				num= 21			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-627.1	658.01	-562.09	656.01	-429.8	655.01	-285.4	654.01
48.57	654.71	66.44	654.61	72.14	654.79	85.07	654.21
91.51	650.67	93.9	650.84	96.86	651.6	98.18	651.9
108.02	654.27	243	654.08	428.23	655.01	456.83	656.01
560.78	658.01					487.78	657.01

Manning's n Values

num= 3			
Sta	n Val	Sta	n Val
-627.1	.08	85.07	.06
		100.7	.08

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	85.07	100.7		202.2	203.5		.1	.3

CROSS SECTION

RIVER: walker Run

REACH: 1

RS: 1402

INPUT

Description:

Station Elevation Data				num= 38			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-214.73	660.01	-151.73	657.01	-116.53	656.01	-65.33	655.01
-47.9	653.01	-26.6	653.01	61.72	652.96	129.69	653.53
143.69	653.86	148.69	654.03	153.69	654.21	156.09	654.04
156.89	651.34	158.69	650.52	160.49	650.2	161.99	649.8
165.69	649.95	166.99	650.67	168.49	651.36	169.29	651.84
172.09	654.15	177.99	653.93	183.69	653.92	187.1	653.79
246.57	653.84	359.8	654.16	416.89	654.15	519.9	654.01
536.5	656.01	540.2	657.01	548.5	658.01		

walkerRunFld.rep

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 -214.73 .08 156.09 .06 169.89 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 156.09 169.89 183 194 196.3 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 1208

INPUT

Description: FEMA BHN  
 Station Elevation Data num= 18  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 1000 724.54 1035 719.34 1060 714.65 1080 709.34 1165 699.54  
 1190 694.84 1225 689.54 1265 684.95 1380 674.54 1470 669.65  
 1528 665.15 1570 659.45 1680 651.74 1740 651.34 1752 650.74  
 1765 651.34 2205 659.24 2220 664.24

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 1000 .08 1740 .06 1765 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 1740 1765 228.9 218.5 209.9 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 990

INPUT

Description:  
 Station Elevation Data num= 17  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 -41.4 660.01 -4.3 656.01 32.63 652.9 63.74 651.93 118.97 653.07  
 125.76 650.82 126.92 650.45 132.87 649.47 135.28 649.66 136.76 650.43  
 138.23 653.22 149.36 652.61 186.43 652.59 234.63 654.38 362.19 653.45  
 497.17 656.01 516.5 658.01

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 -41.4 .08 118.97 .06 138.23 .08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 118.97 138.23 56.8 56.5 58.9 .1 .3

CROSS SECTION

RIVER: walker Run  
 REACH: 1 RS: 933

INPUT

Description: FEMA BHM  
 Station Elevation Data num= 26  
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev  
 1000 724.54 1035 719.54 1088 714.74 1120 710.04 1152 704.34

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1200	699.74	1238	694.84	1270	689.84	1290	684.65	1340	679.95
1402	674.95	1445	669.34	1480	664.45	1530	659.74	1590	654.45
1700	650.95	1710	649.74	1720	650.65	1750	654.54	1900	657.04
2080	659.84	2200	663.45	2300	663.65	2400	663.45	2500	664.95
2590	664.34								

Manning's n Values			num=	3		
Sta	n Val	Sta	n Val	Sta	n Val	
1000	.09	1700	.05	1720	.09	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1700	1720		48.7	48.4		.1	.3

# CROSS SECTION

RIVER: Walker Run  
 REACH: 1 RS: 884

## INPUT

Description: U/S XS of Farm Road Culvert

Station Elevation Data			num=	19					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-288	691.97	-147.11	671.47	-33	660.01	12.49	656.08	52.79	653.68
71.68	653.18	101.89	653.2	117.08	652.72	120.1	649.74	121.4	649.01
123.02	648.62	125.03	649.16	129.44	653.21	174.49	652.41	194.38	652.9
524	662.27	538	663.17	560.8	664.45	607.89	664.67		

Manning's n Values			num=	3		
Sta	n Val	Sta	n Val	Sta	n Val	
-288	.09	117.08	.05	129.44	.09	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	117.08	129.44		20.6	19.1		.3	.7

Ineffective Flow	num=	2		
Sta L	Sta R	Elev	Permanent	
-288	112.93	652.53	F	
133.68	607.89	652.53	F	

## CULVERT

RIVER: Walker Run  
 REACH: 1 RS: 875

## INPUT

Description: Private Farm Road  
 Distance from Upstream XS = 1.6  
 Deck/Roadway width = 15.1  
 Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num=	17								
Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	
12.14	656.071	656.071	52.52	653.686	653.686	71.38	653.5	653.18	
115.86	653.386	649.74	122.61	652.528	648.62	122.83	652.53	648.66	
124.23	652.54	648.9	130.22	653.444	653.21	173.58	653.2	652.41	
194.42	653.1	652.9	217.91	652.805	652.805	378.6	653.084	653.084	
465.08	656.47	656.47	522.51	662.265	662.265	535.78	663.101	663.101	
535.81	663.177	663.177	535.99	663.037	663.037				

Upstream Bridge Cross Section Data

Station Elevation Data			num=	20					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

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-322.11	691.97	-147.11	671.47	-2.11	656.57	12.14	656.071	52.52	653.686
71.38	653.18	101.3	653.2	116.89	652.72	120.15	649.74	120.82	648.93
121.18	649.01	122.65	648.62	124.23	648.9	124.43	649.16	129.48	653.21
173.58	652.41	194.42	652.9	297.89	656.07	337.89	656.67	607.89	664.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-322.11	.09	116.89	.05	129.48	.09

Bank Sta: Left Right Coeff Contr. Expan.

116.89	129.48	.3	.7
--------	--------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-322.11	112.93	652.53	F
133.68	607.89	652.53	F

Downstream Deck/Roadway Coordinates num= 24

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
12.14	656.071	656.071	52.52	653.686	653.686	77.11	653.4	652.55
115.86	653.386	651.91	122.61	652.528	649.92	122.73	652.53	650.54
122.85	652.53	651.24	123.07	652.53	651.64	123.32	652.53	651.8
123.57	652.53	651.64	123.79	652.53	651.24	123.91	652.53	650.54
124.03	652.53	650.11	126.1	652.53	648.93	130.22	653.444	649.62
136.9	653.4	652.21	185.27	653.2	652.86	217.91	652.805	652.8
378.6	653.084	653.084	465.08	656.47	656.47	522.51	662.265	662.265
535.78	663.101	663.101	535.81	663.177	663.177	535.99	663.037	663.037

Downstream Bridge Cross Section Data

Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-322.11	691.97	-147.11	671.47	-2.11	656.57	12.14	656.071	52.52	653.686
77.11	652.55	116.71	651.91	123.34	649.92	124.03	650.11	125.51	649.41
126.1	648.93	130.12	649.62	136.9	652.21	185.27	652.86	218.62	652.8
297.89	656.07	337.89	656.67	607.89	664.667				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-322.11	.09	116.71	.05	136.9	.09

Bank Sta: Left Right Coeff Contr. Expan.

116.71	136.9	.3	.7
--------	-------	----	----

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-322.11	109	652.53	F
136	607.89	652.53	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 654.4  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2.75	
FHWA Chart # 2 - Corrugated Metal Pipe Culvert			
FHWA Scale # 3 - Pipe projecting from fill			
Solution Criteria = Highest U.S. EG			
Culvert Upstrm Dist	Length	Top n	Bottom n
Depth Blocked	Entrance Loss Coef		

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Exit Loss Coef 2.2 14.9 .023 .023 .1 .9

1  
Upstream Elevation = 648.96  
Centerline Station = 123.3  
Downstream Elevation = 649.411  
Centerline Station = 123.2

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 863

INPUT

Description: D/S XS Farm Road Culvert

Station	Elevation	Data	num=	15	Sta	Elev	Sta	Elev	Sta	Elev
-294	691.97	-147.11	671.47	-22.2	660.01	24.99	655.04	34.67	653.86	
72.57	652.55	113.12	651.91	120.43	649.92	123.41	648.96	126.4	649.62	
133.22	652.21	182	652.85	214.18	652.8	518.46	662.27	588	664.67	

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-294 .09 113.12 .05 133.22 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
113.12 133.22 157.2 147.1 138.4 .3 .7

Ineffective Flow num= 2  
Sta L Sta R Elev Permanent  
-294 109 652.53 F  
136 588 652.53 F

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 715

INPUT

Description:

Station	Elevation	Data	num=	17	Sta	Elev	Sta	Elev	Sta	Elev
-92.4	658.01	2.21	655.41	40.88	653.76	46.14	653.57	77.95	651.4	
100.08	650.67	101.47	648.52	104.64	647.91	107.47	647.9	108.96	648.04	
110.34	648.14	111.67	648.52	114.47	650.93	126.37	650.97	191.93	651.64	
278.3	653.09	365.34	656.46							

Manning's n Values num= 3  
Sta n Val Sta n Val Sta n Val  
-92.4 .09 100.08 .05 114.47 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
100.08 114.47 172 178.4 188.1 .1 .3

CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 536

INPUT

Description:



walkerRunFld.rep

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
-86.6	657.01	-45.02	655.01	16	5.76	652.05	48.16	650.97
170.47	649.65	172.89	647.93		174.84	647.22	176.44	647.18
182.05	647.71	182.91	648.29		184.3	650.54	191.59	650.96
269.71	656.85						206.95	652.58

Manning's n Values				num=		
Sta	n Val	Sta	n Val		Sta	n Val
-86.6	.09	170.47	.05	3	184.3	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	170.47	184.3		89.9	107		.1	.3

#### CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 428

#### INPUT

Description: FEMA BHL

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
1000	686.54	1050	684.84	19	1090	679.84	1110	674.45
1150	664.54	1210	659.34		1250	655.54	1350	651.74
1430	647.24	1440	649.65		1550	654.34	1605	656.65
1750	661.74	1860	664.45		1880	666	2920	666

Manning's n Values				num=		
Sta	n Val	Sta	n Val		Sta	n Val
1000	.09	1410	.05	3	1440	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1410	1440		84.2	119.6		.1	.3

#### CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 350

#### INPUT

Description:

Station Elevation Data				num=				
Sta	Elev	Sta	Elev		Sta	Elev	Sta	Elev
7.67	656.47	30.04	652.51	18	50.26	651.27	122.31	650.39
131.05	647.09	132.71	647.08		135.14	647.17	138.64	647.65
140.48	648.18	141.29	649.59		150.13	650.23	156.97	649.72
267.01	652.4	309.86	655.02		325.84	655.85	249.39	650.76

Manning's n Values				num=		
Sta	n Val	Sta	n Val		Sta	n Val
7.67	.09	122.31	.05	3	141.29	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	122.31	141.29		169.4	222.4		.1	.3

#### CROSS SECTION

RIVER: walker Run  
REACH: 1 RS: 185

walkerRunFld.rep

INPUT

Description:

Station Elevation Data		num=	20								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8.8	659.55	15.53	658.78	23.2	653.48	25.13	652.64	29.31	649.46		
32.38	649.12	33.4	647.67	34.97	646.89	37.17	646.4	40.26	646.66		
42.19	646.41	44.77	646.96	46.4	647.15	49.26	649.32	59.74	649.89		
197.88	650.38	234.08	652.49	273.02	654.62	299.87	655.74	305.41	656.59		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
8.8	.09	32.38	.05	49.26	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	32.38	49.26		39.3	58		.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 147

INPUT

Description: FEMA BHK

Station Elevation Data		num=	27								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	699.45	1040	694.84	1100	691.54	1170	689.54	1210	687.54		
1260	682.65	1340	684.95	1400	681.65	1440	679.65	1490	676.95		
1530	674.84	1555	669.65	1580	664.34	1610	659.24	1640	655.04		
1650	649.45	1660	646.74	1670	649.34	1750	651.74	1830	654.84		
1870	655.84	1900	654.74	1925	659.34	2100	661.54	2240	664.95		
2260	666	3100	666								

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
1000	.09	1650	.05	1670	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	1650	1670		138.5	154.5		.1	.3

CROSS SECTION

RIVER: Walker Run

REACH: 1 RS: 011

INPUT

Description: U/S XS of Market Street Bridge

Station Elevation Data		num=	19								
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-177.52	656.04	33.24	653.12	38.49	652.67	45.07	649.46	51.29	648.2		
53.81	646.7	54.7	645.84	57.12	645.71	59.41	645.74	61.18	646.53		
64.38	648.11	69.53	648.34	79.21	649.32	111.92	649.09	167.8	651.4		
249.3	651.46	251.06	651.01	293.8	653.77	352.41	660.72				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-177.52	.09	51.29	.05	64.38	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	51.29	64.38		39.9	38		.3	.7

Ineffective Flow num= 2

## WalkerRunFld.rep

Sta L	Sta R	Elev	Permanent
-177.52	42	652.95	F
90	352.41	652.95	F

## BRIDGE

RIVER: Walker Run

REACH: 1

RS: -10

## INPUT

Description: Market Street

Distance from Upstream XS = 8.5

Deck/Roadway Width = 24.9

Weir Coefficient = 2.5

Upstream Deck/Roadway Coordinates

num= 19											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
-172.52	655.288			32.59	653.113			44.69	652.945		
44.69	654.155			62.11	656.025	644.195		62.5	656.045	646.915	
62.61	656.065	647.975		63.5	656.085	649.645		65.5	656.125	650.645	
65.9	656.125	650.675		66.3	656.125	650.645		68.3	656.085	649.645	
69.6	656.065	647.975		70	656.045	646.915		70.35	656.025	644.915	
98.44	654.145			98.45	652.945			172.12	652.5		
253.49	653.245										

## Upstream Bridge Cross Section Data

Station Elevation Data num= 17									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-172.52	655.288	32.43	652.375	38.83	651.925	48.62	648.705	55.15	647.445
59.2	645.945	61.39	645.095	65.45	644.995	67.71	645.785	70.85	647.355
86.15	648.555	116.5	649.245	172.12	652.5	253.49	653.245	332.2	654.325
350.6	655.245	358.85	656.245						

## Manning's n Values

num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
-172.52	.09	55.15	.05	70.85	.09

Bank Sta:	Left	Right	Coeff	Contr.	Expan.
	55.15	70.85	.3		.7

## Ineffective Flow

num= 2			
Sta L	Sta R	Elev	Permanent
-172.52	42	652.95	F
90	358.85	652.95	F

## Downstream Deck/Roadway Coordinates

num= 19											
Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord		Sta	Hi Cord	Lo Cord	
-199.02	655.288			6.09	653.113			18.19	652.945		
18.19	653.665			35.61	656.025	645.195		36	656.075	647.915	
36.11	656.095	648.765		37	656.165	649.835		39	656.225	650.835	
39.4	656.225	650.865		39.8	656.225	650.835		41.8	656.165	649.835	
43.1	656.095	648.765		43.5	656.075	647.995		43.85	656.025	646.665	
71.94	654.415			71.95	652.945			145.62	652.5		
226.99	653.245										

## Downstream Bridge Cross Section Data

Station Elevation Data num= 20									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-199.02	655.288	-6.99	653.185	1.13	653.145	13.19	650.795	26.39	648.445
31.8	647.955	33.72	646.465	36.22	645.845	39.63	644.505	42.3	643.715
44.81	644.305	48.1	645.855	51	647.395	61.17	647.815	72.07	651.545
145.62	652.5	226.99	653.245	332.2	654.325	350.6	655.245	358.85	656.245

walkerRunFld.rep

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 -199.02 .09 31.8 .05 51 .09

Bank Sta: Left Right Coeff Contr. Expan.  
 31.8 51 .3 .7

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 -199.02 15.72 652.95 F  
 63.89 358.85 652.95 F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical  
 Maximum allowable submergence for weir flow = .98  
 Elevation at which weir flow begins = 654.4  
 Energy head used in spillway design =  
 Spillway height used in design =  
 Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and Weir flow

Submerged Inlet Cd = 1.5  
 Submerged Inlet + Outlet Cd = .8  
 Max Low Cord = 652.5

Additional Bridge Parameters

Add Friction component to Momentum

Do not add weight component to Momentum

Class B flow critical depth computations use critical depth

inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: -30

INPUT

Description: D/S XS of Market Street Bridge

Station Elevation Data num= 20  

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-199.02	656.04	-46.68	654.28	-4.4	653.95	4.43	653.9	17.96	651.54
30.08	649.2	35.6	648.71	37.35	647.22	38.98	646.6	41.82	645.27
45.52	644.46	48.05	645.07	52.27	646.61	53.56	648.15	63.11	648.57
79.88	650.16	85.95	652.29	181.4	651.9	273.84	653.77	319.73	659.02

Manning's n Values num= 3  
 Sta n Val Sta n Val Sta n Val  
 -199.02 .09 35.6 .05 53.56 .09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.  
 35.6 53.56 39.8 41.7 52.9 .3 .7

Ineffective Flow num= 2  
 Sta L Sta R Elev Permanent  
 -199.02 15.72 652.95 F

63.89 319.73 652.95

F

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: -78

## INPUT

Description:

Station Elevation Data				num=	17
Sta	Elev	Sta	Elev	Sta	Elev
-15	653.95	8.17	649.27	36.56	649.66
49.12	645.82	52.33	645.43	54.96	645.72
65.38	648.62	71.37	648.11	81.36	648.01
294.7	652.01	299.5	653.01		

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-15	.09	36.56	.05	62.68	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	36.56	62.68		70.8	80.2	.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: -154

## INPUT

Description:

Station Elevation Data				num=	16
Sta	Elev	Sta	Elev	Sta	Elev
-151.5	656.03	0	654.28	13.15	649.96
30.73	645.21	33.05	644.9	35.85	645.52
43.72	648.39	63.07	648.9	97	649.15
218.8	653.01			199.07	650.01

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
-151.5	.09	28.15	.05	43.72	.09

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	28.15	43.72		75	75	.1	.3

## CROSS SECTION

RIVER: Walker Run

REACH: 1

RS: -255

## INPUT

Description: FEMA BHJ

Station Elevation Data				num=	22
Sta	Elev	Sta	Elev	Sta	Elev
1000	684.34	1092	679.54	1128	674.34
1310	660.04	1330	657.54	1350	654.84
1408	645.74	1412	647.95	1450	649.65
1570	649.04	1610	649.84	1670	654.34
1750	669.34	1790	674.84	1712	659.34

Manning's n Values

num= 3

walkerRunFld.rep						
	Sta	n	Val	Sta	n	Val
	1000		.09	1405		.05
				1412		.09
Bank Sta:	Left		Right			
	1405		1412	Coeff	Contr.	Expan.
					.1	.3

Appendix I:  
Hydrology Data



**Walker Run Flood Study Report**

PPL Bell Bend Nuclear Power Plant

Salem Township, Luzerne County, PA

**TR-20 Input Data****Tc and Land Use Computations****Time of concentration****Tributary****Tc = 166.4 min****Walker Run****Tc = 128.6 min**

<b>Tributary</b>			<b>Walker Run</b>		
<b>Sheet Flow</b>	<b>Shallow Concentrated Flow</b>	<b>Channel</b>	<b>Sheet Flow</b>	<b>Shallow Concentrated Flow</b>	<b>Channel</b>
L = 300 feet	L = 4,100 feet	L = 6,600 feet	L = 300 feet	L = 7,000 feet	L = 10,000 feet
S = 2.5 %	S = 7.3 %	S = 0.7 %	S = 0.8 %	S = 4.5 %	S = 1.4 %
n = 0.24	unpaved	n = 0.08	n = 0.24	unpaved	n = 0.05
		A = 70 ft <sup>2</sup>			A = 100 ft <sup>2</sup>
		P = 150 ft			P = 80 ft

**Land Use**

<b>Tributary</b>			<b>Walker Run</b>	
<b>DA</b>	438.4 ac		1557.1 ac	
<b>Woods</b>	50% (219.2 ac)		60 % (934.3 ac)	
<b>Meadow</b>	50% (219.2 ac)		40% (622.8 ac)	
<b>A Soils</b>	20%		10%	
<b>B/D Soils</b>	10%		-	
<b>C Soils</b>	70%		90%	
<b>Woods</b>		<b>CN*A</b>		<b>CN*A</b>
<b>A Soils (CN=30)</b>	43.84 ac	1315.2	93.43 ac	2803
<b>B Soils (CN=55)</b>	21.92 ac	1205.6	-	
<b>C Soils (CN= 70)</b>	153.44 ac	10740.8	840.87 ac	58861
<b>Meadow</b>				
<b>A Soils (CN=30)</b>	43.84 ac	1315.2	62.28 ac	1868
<b>B Soils (CN= 58)</b>	21.92 ac	1271.36	-	
<b>C Soils (CN= 71)</b>	153.44 ac	10894.24	560.52 ac	39797
<b>Total</b>		<b>26742</b>		<b>103329</b>
<b>Weighted CN</b>		<b>61</b>		<b>66</b>





# POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14



**BERWICK, PENNSYLVANIA (36-0611) 41.0667 N 76.25 W 587 feet**

from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M. Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland, 2004

Extracted: Fri May 22 2009

[Confidence Limits](#)
[Seasonality](#)
[Location Maps](#)
[Other Info.](#)
[GIS data](#)
[Maps](#)
[Docs](#)
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## Precipitation Frequency Estimates (inches)

ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.34	0.52	0.64	0.84	1.03	1.21	1.32	1.66	2.04	2.41	2.84	3.18	3.75	4.33	5.90	7.34	9.28	11.17
2	0.40	0.62	0.76	1.01	1.25	1.46	1.58	1.98	2.44	2.89	3.40	3.80	4.47	5.14	6.96	8.62	10.83	12.98
5	0.47	0.72	0.89	1.22	1.53	1.80	1.96	2.43	3.01	3.58	4.21	4.65	5.43	6.19	8.14	9.92	12.26	14.58
10	0.52	0.80	0.98	1.36	1.74	2.08	2.27	2.82	3.50	4.20	4.92	5.41	6.28	7.09	9.15	11.02	13.46	15.93
25	0.58	0.89	1.10	1.55	2.01	2.50	2.74	3.40	4.25	5.18	6.07	6.61	7.61	8.48	10.68	12.66	15.23	17.91
50	0.63	0.96	1.19	1.70	2.23	2.85	3.15	3.91	4.92	6.08	7.12	7.72	8.82	9.74	12.02	14.08	16.73	19.59
100	0.69	1.03	1.28	1.85	2.47	3.26	3.63	4.50	5.69	7.16	8.37	9.03	10.24	11.19	13.54	15.64	18.36	21.39
200	0.74	1.10	1.37	2.00	2.72	3.72	4.17	5.17	6.59	8.43	9.87	10.58	11.91	12.86	15.25	17.38	20.13	23.34
500	0.82	1.21	1.50	2.23	3.08	4.42	5.02	6.24	8.01	10.51	12.29	13.08	14.57	15.48	17.86	19.98	22.72	26.17
1000	0.88	1.28	1.61	2.41	3.38	5.05	5.77	7.19	9.29	12.45	14.55	15.39	17.01	17.84	20.14	22.21	24.90	28.53

\* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting forces estimates near zero to appear as zero.

## \* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.37	0.58	0.71	0.94	1.15	1.35	1.48	1.87	2.31	2.69	3.23	3.59	4.23	4.83	6.45	7.99	10.04	11.99
2	0.44	0.69	0.84	1.13	1.38	1.63	1.78	2.24	2.76	3.23	3.88	4.28	5.05	5.74	7.60	9.36	11.71	13.94
5	0.52	0.81	0.99	1.35	1.70	2.01	2.20	2.74	3.40	4.00	4.79	5.24	6.12	6.90	8.87	10.77	13.25	15.65
10	0.57	0.89	1.09	1.51	1.93	2.33	2.54	3.17	3.94	4.67	5.59	6.08	7.06	7.89	9.96	11.96	14.55	17.10
25	0.65	0.99	1.22	1.72	2.23	2.79	3.07	3.82	4.77	5.73	6.86	7.38	8.52	9.41	11.60	13.71	16.45	19.21
50	0.70	1.07	1.32	1.89	2.48	3.19	3.54	4.39	5.52	6.70	8.02	8.59	9.85	10.77	13.02	15.22	18.07	20.97
100	0.76	1.15	1.42	2.06	2.75	3.65	4.07	5.05	6.39	7.85	9.40	10.01	11.41	12.34	14.63	16.89	19.81	22.88
200	0.82	1.23	1.53	2.23	3.03	4.17	4.69	5.83	7.41	9.21	11.03	11.69	13.22	14.14	16.46	18.76	21.70	24.98
500	0.92	1.35	1.68	2.49	3.45	4.98	5.67	7.06	9.05	11.42	13.69	14.39	16.11	17.00	19.23	21.55	24.45	28.03
1000	0.99	1.44	1.80	2.71	3.80	5.72	6.56	8.17	10.56	13.44	16.16	16.88	18.77	19.56	21.68	23.94	26.79	30.57

\* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.

\*\* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

## \* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)

ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.30	0.47	0.57	0.76	0.93	1.09	1.19	1.48	1.83	2.18	2.54	2.87	3.38	3.94	5.44	6.82	8.67	10.50
2	0.36	0.56	0.68	0.91	1.12	1.31	1.43	1.78	2.19	2.61	3.04	3.43	4.04	4.68	6.41	7.99	10.11	12.21
5	0.42	0.65	0.80	1.09	1.37	1.61	1.76	2.17	2.70	3.23	3.75	4.19	4.89	5.62	7.48	9.18	11.43	13.70
10	0.47	0.72	0.88	1.23	1.56	1.86	2.03	2.51	3.12	3.77	4.38	4.87	5.63	6.41	8.39	10.18	12.54	14.95
25	0.52	0.80	0.98	1.39	1.80	2.22	2.43	3.00	3.76	4.61	5.36	5.90	6.79	7.63	9.76	11.67	14.16	16.78
50	0.56	0.85	1.06	1.51	1.99	2.52	2.78	3.43	4.32	5.37	6.24	6.85	7.82	8.72	10.95	12.95	15.52	18.31
100	0.61	0.91	1.13	1.64	2.19	2.86	3.17	3.91	4.95	6.27	7.27	7.96	9.02	9.96	12.26	14.32	16.99	19.94
200	0.65	0.97	1.21	1.77	2.40	3.23	3.61	4.46	5.66	7.32	8.49	9.22	10.41	11.36	13.75	15.84	18.57	21.70
500	0.71	1.05	1.31	1.94	2.69	3.80	4.27	5.29	6.76	8.98	10.43	11.26	12.56	13.53	15.97	18.09	20.86	24.23
1000	0.76	1.11	1.39	2.08	2.92	4.28	4.84	6.01	7.73	10.48	12.18	13.10	14.51	15.46	17.89	19.98	22.75	26.30

\* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

WinTR-20: Version 1.11 0 0 1. 0  
 Walker Run

SUB-AREA:

Walker RunOutlet	Berwick	2.43	66.	2.14
Trib Outlet	Berwick	.68	61.	2.77

STORM ANALYSIS:

2-yr	Berwick	0.	2.89	Type II	2	2.89
10-yr	Berwick	0.	4.2	Type II	2	2.89
50-yr	Berwick	0.	6.08	Type II	2	2.89
100-yr	Berwick	0.	7.16	Type II	2	2.89
500-yr	Berwick	0.	10.51	Type II	2	2.89

GLOBAL OUTPUT:

10. .08 YNNNN NNNNNN

VERIFICATION:

PROCESSING Y Y

WinTR-20 Printed Page File End of Input Data List

Walker Run

Name of printed page file:

C:\Program Files (x86)\USDA\WinTR-20 version 1.11.11\Walker Run.out

STORM 2-yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Walker Run	2.430	Berwick	0.493		13.46	179.1	73.72

Line Start Time (hr)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)
12.080	10.7	17.0	24.1	33.8	44.6	57.9	72.6
12.640	88.5	104.1	119.2	132.6	144.5	154.9	162.7
13.200	169.6	174.3	177.4	178.8	178.6	177.8	175.3
13.760	172.0	167.4	161.5	155.0	148.6	142.4	136.9
14.320	131.6	126.5	121.9	117.4	113.3	109.4	105.6
14.880	102.0	98.4	95.2	92.1	89.2	86.5	83.9
15.440	81.5	79.2	77.0	75.0	73.1	71.2	69.5
16.000	67.8	66.3	64.8	63.4	62.0	60.7	59.4
16.560	58.2	57.0	55.9	54.8	53.7	52.7	51.8
17.120	50.9	50.0	49.2	48.4	47.6	46.9	46.3
17.680	45.6	45.0	44.4	43.9	43.3	42.8	42.3
18.240	41.8	41.3	40.8	40.3	39.8	39.4	39.0
18.800	38.6	38.2	37.8	37.4	37.1	36.7	36.4
19.360	36.0	35.6	35.3	34.9	34.6	34.2	33.9
19.920	33.5	33.2	32.8	32.5	32.2	31.8	31.5
20.480	31.1	30.8	30.5	30.1	29.8	29.5	29.2
21.040	28.9	28.6	28.4	28.1	27.9	27.7	27.5
21.600	27.3	27.1	26.9	26.7	26.6	26.5	26.3
22.160	26.2	26.1	26.0	25.9	25.8	25.7	25.6
22.720	25.5	25.4	25.3	25.2	25.1	25.0	25.0
23.280	24.9	24.8	24.8	24.7	24.6	24.5	24.5
23.840	24.4	24.3	24.3	24.2	24.1	23.9	23.7
24.400	23.4	23.0	22.6	22.1	21.4	20.7	19.9
24.960	18.9	18.0	16.9	15.9	14.8	13.8	12.7
25.520	11.7	10.7					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Trib	0.680	Berwick	0.322		14.08	23.6	34.72

Line

Start Time (hr)	Flow Values @ time increment of 0.080 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.880	10.1	11.7	13.2	14.6	16.0	17.2	18.4
13.440	19.4	20.4	21.2	21.9	22.5	22.9	23.2
14.000	23.4	23.6	23.6	23.6	23.4	23.2	22.9
14.560	22.4	22.0	21.5	21.0	20.5	20.0	19.6
15.120	19.1	18.7	18.3	17.9	17.5	17.2	16.8

## Walker Run

Line Start Time (hr)	Flow Values @ time increment of 0.080 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
15.680	16.5	16.2	15.8	15.5	15.2	14.9	14.6
16.240	14.3	14.1	13.8	13.6	13.3	13.1	12.8
16.800	12.6	12.4	12.2	12.0	11.8	11.6	11.4
17.360	11.2	11.1	10.9	10.7	10.6	10.4	10.3
17.920	10.1	10.0					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	3.110		0.455		13.60	199.1	64.01

Line Start Time (hr)	Flow Values @ time increment of 0.080 hr						
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12.080	11.3	18.1	25.7	36.1	47.6	61.7	77.5
12.640	94.4	111.3	127.9	142.7	156.1	168.0	177.3
13.200	185.6	191.5	195.8	198.2	198.9	199.0	197.2
13.760	194.5	190.2	184.7	178.5	172.1	166.0	160.5
14.320	155.1	149.8	144.7	139.8	135.3	130.9	126.6
14.880	122.5	118.5	114.8	111.2	107.9	104.8	101.8
15.440	99.1	96.4	93.9	91.5	89.2	87.1	85.0
16.000	83.0	81.2	79.4	77.7	76.1	74.5	73.0
16.560	71.5	70.1	68.7	67.4	66.2	64.9	63.8
17.120	62.7	61.6	60.6	59.6	58.7	57.8	57.0
17.680	56.2	55.4	54.7	54.0	53.3	52.7	52.0
18.240	51.4	50.8	50.2	49.6	49.0	48.5	48.0
18.800	47.5	47.0	46.5	46.1	45.6	45.2	44.7
19.360	44.3	43.9	43.4	43.0	42.6	42.1	41.7
19.920	41.3	40.9	40.4	40.0	39.6	39.1	38.7
20.480	38.3	37.9	37.5	37.1	36.7	36.3	35.9
21.040	35.6	35.3	34.9	34.6	34.3	34.0	33.8
21.600	33.5	33.3	33.1	32.9	32.7	32.5	32.3
22.160	32.1	32.0	31.8	31.7	31.6	31.4	31.3
22.720	31.2	31.1	31.0	30.9	30.8	30.7	30.6
23.280	30.5	30.4	30.3	30.2	30.1	30.0	29.9
23.840	29.9	29.8	29.7	29.6	29.4	29.2	29.0
24.400	28.7	28.3	27.8	27.2	26.5	25.6	24.7
24.960	23.7	22.5	21.4	20.2	18.9	17.7	16.5
25.520	15.3	14.2	13.0	12.0	11.0	10.0	

## STORM 10-yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	Peak Flow			
				Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
Walker Run	2.430	Berwick	1.207		13.29	521.3	214.54



## Walker Run

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)
11.920	17.0	31.1	47.6	71.2	97.8	129.8	167.8
12.480	209.0	256.3	303.1	348.7	389.5	427.1	455.7
13.040	481.1	498.4	511.2	519.9	520.8	519.2	512.0
13.600	502.4	490.1	473.4	455.2	432.9	410.7	388.9
14.160	369.4	350.9	334.6	318.9	304.4	291.0	278.4
14.720	266.8	255.5	244.8	234.7	225.0	216.4	208.2
15.280	200.6	193.4	186.6	180.3	174.3	168.8	163.6
15.840	158.6	154.0	149.6	145.5	141.6	137.9	134.5
16.400	131.1	128.0	124.9	122.0	119.2	116.5	113.9
16.960	111.5	109.2	107.0	104.9	102.9	101.0	99.3
17.520	97.6	96.1	94.6	93.1	91.7	90.4	89.1
18.080	87.8	86.6	85.4	84.2	83.1	82.0	80.9
18.640	79.9	79.0	78.1	77.3	76.5	75.7	74.9
19.200	74.1	73.3	72.5	71.8	71.0	70.3	69.5
19.760	68.8	68.0	67.3	66.6	65.8	65.1	64.4
20.320	63.6	62.9	62.2	61.5	60.8	60.1	59.4
20.880	58.8	58.2	57.6	57.0	56.5	55.9	55.4
21.440	55.0	54.5	54.1	53.7	53.4	53.0	52.7
22.000	52.4	52.1	51.8	51.6	51.3	51.1	50.9
22.560	50.7	50.4	50.2	50.0	49.9	49.7	49.5
23.120	49.3	49.2	49.0	48.8	48.7	48.5	48.4
23.680	48.2	48.1	47.9	47.8	47.6	47.4	47.1
24.240	46.8	46.3	45.8	45.1	44.2	43.2	41.9
24.800	40.5	38.8	37.0	35.1	33.8	31.0	29.0
25.360	26.9	24.9	22.9	21.0	19.2	17.5	15.8
25.920	14.4	12.9	11.7	10.6			

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Trib	0.680	Berwick	0.914		13.86	84.2	123.88

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)
12.320	11.6	15.1	18.7	23.4	28.0	33.8	39.5
12.880	45.4	51.2	56.6	61.7	66.3	70.3	73.9
13.440	76.7	79.3	81.1	82.9	83.5	84.1	84.0
14.000	83.7	83.0	82.0	80.8	79.1	77.3	74.8
14.560	72.3	69.7	67.2	64.8	62.6	60.5	58.5
15.120	56.6	54.8	53.1	51.5	50.0	48.6	47.2
15.680	45.8	44.5	43.2	42.0	40.9	39.8	38.7
16.240	37.8	36.8	35.9	35.0	34.2	33.4	32.6
16.800	31.9	31.2	30.5	29.8	29.2	28.5	28.0
17.360	27.4	26.9	26.4	25.9	25.4	25.0	24.5
17.920	24.1	23.7	23.3	23.0	22.6	22.3	22.0
18.480	21.7	21.4	21.1	20.8	20.5	20.3	20.0
19.040	19.8	19.5	19.3	19.1	18.9	18.6	18.4
19.600	18.2	18.0	17.8	17.6	17.4	17.2	17.0
20.160	16.7	16.5	16.3	16.1	15.9	15.7	15.6

## Walker Run

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)
20.720	15.4	15.2	15.0	14.9	14.7	14.6	14.4
21.280	14.3	14.1	14.0	13.8	13.7	13.6	13.5
21.840	13.4	13.3	13.2	13.1	13.0	12.9	12.8
22.400	12.7	12.7	12.6	12.5	12.4	12.4	12.3
22.960	12.3	12.2	12.2	12.1	12.1	12.0	12.0
23.520	11.9	11.9	11.8	11.8	11.7	11.7	11.7
24.080	11.6	11.6	11.5	11.4	11.3	11.2	11.1
24.640	10.9	10.8	10.6	10.4	10.1		

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	3.110		1.143		13.43	596.5	191.81

Line Start Time (hr)	----- (cfs)	Flow (cfs)	Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)
11.920	18.4	33.8	51.9	77.8	106.8	141.6	183.0
12.480	227.8	279.6	331.4	382.5	429.0	472.5	506.7
13.040	537.7	560.1	577.4	590.2	594.4	595.8	591.0
13.600	583.5	572.8	557.0	539.2	516.7	494.3	471.8
14.160	451.4	431.7	413.7	396.1	379.2	363.3	348.1
14.720	334.1	320.4	307.4	295.2	283.5	273.1	263.0
15.280	253.7	244.9	236.6	228.9	221.5	214.7	208.1
15.840	201.8	196.0	190.4	185.3	180.4	175.7	171.3
16.400	167.0	163.0	159.1	155.3	151.8	148.3	145.1
16.960	141.9	139.0	136.2	133.4	130.9	128.4	126.2
17.520	124.0	121.9	120.0	118.1	116.3	114.5	112.8
18.080	111.2	109.6	108.0	106.5	105.0	103.6	102.2
18.640	101.0	99.8	98.7	97.6	96.5	95.4	94.4
19.200	93.4	92.4	91.4	90.4	89.4	88.5	87.5
19.760	86.6	85.6	84.7	83.7	82.8	81.8	80.9
20.320	80.0	79.0	78.1	77.2	76.3	75.5	74.6
20.880	73.8	73.0	72.3	71.6	70.9	70.2	69.6
21.440	68.9	68.4	67.8	67.3	66.8	66.4	66.0
22.000	65.6	65.2	64.8	64.5	64.1	63.8	63.5
22.560	63.2	63.0	62.7	62.4	62.2	61.9	61.7
23.120	61.5	61.3	61.0	60.8	60.6	60.4	60.2
23.680	60.0	59.8	59.6	59.5	59.3	59.0	58.7
24.240	58.3	57.8	57.1	56.3	55.3	54.2	52.7
24.800	51.0	49.1	47.1	44.9	42.6	40.2	37.8
25.360	35.4	32.9	30.6	28.3	26.1	24.0	22.0
25.920	20.1	18.3	16.8	15.3	14.0	12.8	11.7
26.480	10.7						

STORM 50-yr



## Walker Run

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Walker Run	2.430	Berwick	2.499		13.34	1170.3	481.60

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	----- (cfs)
11.200	11.5	14.1	17.0	20.3	24.7	37.0
11.760	48.6	64.3	93.3	127.6	177.0	298.5
12.320	377.6	462.3	562.3	663.5	766.7	948.5
12.880	1015.0	1074.1	1116.5	1145.5	1166.0	1166.3
13.440	1149.0	1125.7	1097.4	1059.6	1018.5	916.4
14.000	862.5	813.7	767.1	727.2	689.2	621.5
14.560	590.7	563.6	537.2	512.2	488.6	445.6
15.120	426.3	408.8	392.3	376.5	362.2	336.0
15.680	324.2	313.0	302.6	292.6	283.7	267.0
16.240	259.5	252.1	245.4	238.9	232.7	220.9
16.800	215.6	210.5	205.6	201.0	196.6	188.5
17.360	184.8	181.4	178.1	175.1	172.1	166.5
17.920	163.9	161.3	158.8	156.4	154.0	149.4
18.480	147.2	145.3	143.4	141.7	140.1	137.0
19.040	135.4	133.9	132.5	131.0	129.6	126.8
19.600	125.4	124.0	122.6	121.3	119.9	117.2
20.160	115.8	114.5	113.2	111.8	110.5	108.0
20.720	106.7	105.5	104.3	103.2	102.1	100.1
21.280	99.1	98.2	97.3	96.5	95.8	94.4
21.840	93.7	93.1	92.6	92.0	91.5	90.6
22.400	90.2	89.7	89.3	89.0	88.6	87.9
22.960	87.5	87.2	86.9	86.5	86.2	85.6
23.520	85.3	85.0	84.7	84.5	84.2	83.6
24.080	83.2	82.8	82.1	81.4	80.4	77.7
24.640	75.7	73.6	71.0	68.0	64.9	58.0
25.200	54.4	50.8	47.2	43.6	40.1	33.6
25.760	30.6	27.8	25.1	22.7	20.5	16.9
26.320	15.3	13.9	12.6	11.4	10.4	

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Trib	0.680	Berwick	2.057		13.76	213.3	313.61

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	----- (cfs)
12.000	11.5	17.2	23.4	31.0	39.4	60.4
12.560	72.3	86.4	100.5	115.8	131.0	158.2
13.120	169.7	180.2	189.0	196.2	202.5	210.3
13.680	211.7	213.2	211.8	210.3	207.6	200.5
14.240	195.8	190.3	183.8	177.1	169.6	155.5
14.800	148.9	143.1	137.6	132.4	127.4	118.3
15.360	114.1	110.3	106.6	103.1	99.6	93.1

## Walker Run

Line Start Time (hr)	----- Flow Values @ time increment of 0.080 hr ----- (cfs) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)						
15.920	90.1	87.2	84.6	82.1	79.6	77.4	75.1
16.480	73.0	71.0	69.1	67.2	65.5	63.8	62.2
17.040	60.6	59.1	57.8	56.4	55.2	53.9	52.8
17.600	51.7	50.6	49.6	48.7	47.7	46.9	46.0
18.160	45.2	44.4	43.7	43.0	42.3	41.6	41.0
18.720	40.4	39.8	39.3	38.7	38.2	37.7	37.2
19.280	36.7	36.3	35.8	35.3	34.9	34.4	34.0
19.840	33.6	33.1	32.7	32.2	31.8	31.4	31.0
20.400	30.5	30.1	29.7	29.4	29.0	28.7	28.3
20.960	28.0	27.7	27.4	27.1	26.8	26.5	26.3
21.520	26.0	25.8	25.5	25.3	25.1	24.9	24.7
22.080	24.5	24.3	24.1	24.0	23.8	23.7	23.5
22.640	23.4	23.3	23.1	23.0	22.9	22.8	22.7
23.200	22.6	22.5	22.4	22.3	22.2	22.1	22.0
23.760	21.9	21.8	21.8	21.7	21.6	21.5	21.3
24.320	21.2	21.0	20.8	20.6	20.3	20.0	19.6
24.880	19.2	18.7	18.2	17.6	17.0	16.3	15.6
25.440	14.9	14.2	13.5	12.8	12.1	11.4	10.7

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Peak Flow ----- Elevation (ft)	Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	3.110		2.402		13.34	1364.9	438.87

Line Start Time (hr)	----- Flow Values @ time increment of 0.080 hr ----- (cfs) (cfs) (cfs) (cfs) (cfs) (cfs) (cfs)						
11.200	11.5	14.1	17.0	20.3	25.0	30.6	38.8
11.760	51.6	68.9	101.2	139.3	194.4	257.2	329.8
12.320	417.5	511.4	622.7	736.1	853.1	960.9	1064.2
12.880	1145.4	1218.7	1274.5	1315.2	1346.2	1357.5	1362.2
13.440	1350.7	1332.0	1307.3	1271.3	1231.2	1179.9	1126.3
14.000	1070.0	1017.9	967.6	923.0	879.5	837.6	798.3
14.560	760.3	726.0	692.7	661.2	631.7	603.3	578.1
15.120	553.8	531.6	510.7	490.7	472.6	455.1	439.1
15.680	423.8	409.3	395.8	382.7	370.9	359.7	349.1
16.240	339.1	329.5	320.6	311.9	303.7	295.8	288.2
16.800	281.2	274.3	267.8	261.7	255.8	250.3	244.9
17.360	240.0	235.3	230.9	226.8	222.7	218.9	215.2
17.920	211.6	208.2	204.8	201.6	198.4	195.4	192.4
18.480	189.5	186.9	184.4	182.1	179.9	177.7	175.7
19.040	173.6	171.6	169.7	167.8	165.9	164.0	162.1
19.600	160.3	158.4	156.6	154.8	153.0	151.2	149.4
20.160	147.6	145.9	144.1	142.4	140.7	139.0	137.3
20.720	135.7	134.2	132.7	131.2	129.8	128.5	127.2
21.280	125.9	124.7	123.6	122.6	121.5	120.6	119.7
21.840	118.8	118.0	117.2	116.5	115.9	115.2	114.6
22.400	114.0	113.4	112.9	112.3	111.8	111.3	110.9
22.960	110.4	110.0	109.5	109.1	108.7	108.3	107.9
23.520	107.5	107.1	106.8	106.4	106.0	105.6	105.3

## Walker Run

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.080 hr (cfs)	----- (cfs)	(cfs)	(cfs)
24.080	104.8	104.3	103.5	102.5	101.4	99.9	98.3
24.640	96.0	93.5	90.5	87.2	83.6	79.7	75.6
25.200	71.4	67.1	62.8	58.5	54.3	50.3	46.4
25.760	42.7	39.2	35.8	32.7	29.9	27.3	25.0
26.320	22.8	20.9	19.1	17.4	15.9	14.5	13.3
26.880	12.2	11.1	10.2				

## STORM 100-yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Walker Run	2.430	Berwick	3.330		13.23	1592.0	655.13

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.080 hr (cfs)	----- (cfs)	(cfs)	(cfs)
10.560	11.7	13.7	16.0	18.4	21.3	24.3	27.8
11.120	31.6	35.7	40.6	45.9	51.8	58.9	66.6
11.680	78.9	94.9	120.9	159.9	208.8	277.6	353.2
12.240	446.3	551.6	669.4	802.5	939.2	1074.8	1200.3
12.800	1312.3	1401.1	1480.0	1528.1	1566.0	1585.5	1587.8
13.360	1581.5	1552.3	1518.5	1474.9	1422.3	1363.8	1293.4
13.920	1221.5	1148.2	1080.4	1017.5	962.8	910.6	863.4
14.480	819.0	778.0	740.7	704.8	671.4	639.3	609.0
15.040	581.5	555.3	532.2	509.8	489.0	469.7	451.2
15.600	434.7	418.7	404.0	390.1	376.8	364.9	353.5
16.160	342.9	332.8	323.2	314.2	305.6	297.5	289.6
16.720	282.1	275.1	268.3	262.0	255.9	250.2	244.8
17.280	239.6	234.8	230.3	226.1	222.1	218.2	214.6
17.840	211.0	207.5	204.2	200.9	197.8	194.7	191.7
18.400	188.7	185.9	183.4	180.9	178.8	176.7	174.7
18.960	172.7	170.8	168.9	167.0	165.2	163.3	161.5
19.520	159.7	157.9	156.2	154.4	152.7	150.9	149.2
20.080	147.5	145.8	144.1	142.4	140.7	139.0	137.4
20.640	135.8	134.2	132.7	131.2	129.7	128.3	127.0
21.200	125.7	124.5	123.4	122.3	121.3	120.3	119.4
21.760	118.5	117.7	117.0	116.2	115.6	114.9	114.3
22.320	113.7	113.2	112.6	112.1	111.6	111.1	110.7
22.880	110.2	109.8	109.3	108.9	108.5	108.1	107.7
23.440	107.3	107.0	106.6	106.2	105.9	105.5	105.1
24.000	104.7	104.3	103.7	102.9	101.9	100.6	99.1
24.560	97.2	94.8	92.1	88.8	85.2	81.2	77.0
25.120	72.6	68.1	63.6	59.1	54.6	50.2	46.1
25.680	42.1	38.3	34.8	31.4	28.5	25.7	23.3
26.240	21.1	19.1	17.4	15.8	14.4	13.0	11.8
26.800	10.7						

## Walker Run

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Trib	0.680	Berwick	2.816		13.79	300.3	441.55

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.080 hr (cfs)	----- (cfs)	----- (cfs)
11.840	10.7	15.9	22.1	30.0	39.7	50.4
12.400	76.6	93.3	110.0	130.1	150.3	171.1
12.960	211.3	229.3	245.6	259.1	271.7	280.4
13.520	293.6	298.2	299.4	300.0	298.2	295.1
14.080	285.7	279.8	272.2	264.4	254.5	244.6
14.640	223.3	213.7	204.4	195.9	188.0	180.5
15.200	166.7	160.7	154.6	149.3	144.0	139.0
15.760	129.5	125.0	120.8	116.9	113.1	109.6
16.320	103.0	99.9	97.0	94.2	91.6	89.0
16.880	84.3	82.0	79.9	77.8	76.0	74.1
17.440	70.7	69.1	67.6	66.2	64.8	63.5
18.000	61.1	60.0	58.8	57.8	56.8	55.8
18.560	54.0	53.2	52.4	51.6	50.8	50.1
19.120	48.7	48.1	47.5	46.8	46.2	45.6
19.680	44.4	43.8	43.2	42.6	42.1	41.5
20.240	40.3	39.8	39.2	38.7	38.2	37.7
20.800	36.8	36.4	35.9	35.5	35.1	34.8
21.360	34.0	33.7	33.3	33.0	32.7	32.4
21.920	31.9	31.6	31.3	31.1	30.9	30.7
22.480	30.3	30.1	29.9	29.7	29.6	29.4
23.040	29.1	29.0	28.9	28.7	28.6	28.5
23.600	28.2	28.1	28.0	27.9	27.8	27.7
24.160	27.4	27.2	27.0	26.8	26.6	26.2
24.720	25.5	25.0	24.4	23.8	23.2	22.4
25.280	20.8	19.9	19.0	18.1	17.2	16.3
25.840	14.5	13.6	12.7	11.9	11.1	10.3

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
OUTLET	3.110		3.218		13.36	1862.0	598.72

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment of (cfs)	0.080 hr (cfs)	----- (cfs)	----- (cfs)
10.560	11.7	13.7	16.0	18.4	21.3	24.5
11.120	32.5	37.0	42.3	48.0	54.5	62.4
11.680	84.9	103.0	132.0	175.8	230.9	308.2
12.240	497.5	615.2	746.6	895.8	1049.5	1205.0
12.800	1483.5	1592.5	1691.3	1757.3	1811.6	1844.6
13.360	1861.9	1839.7	1812.0	1772.3	1721.7	1663.8
13.920	1516.3	1438.7	1365.8	1297.1	1235.1	1174.9
14.480	1063.4	1012.0	964.5	918.4	875.9	835.2
15.040	762.2	728.8	699.2	670.5	643.8	619.0

## Walker Run

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	----- (cfs)
15.600	573.7	552.9	533.5	515.2	497.6	481.8
16.160	452.5	439.0	426.2	414.2	402.6	391.7
16.720	371.2	361.7	352.6	344.1	335.9	328.1
17.280	313.7	307.2	301.0	295.3	289.8	284.4
17.840	274.5	269.8	265.3	260.9	256.6	252.5
18.400	244.6	240.8	237.4	234.2	231.2	228.3
18.960	222.8	220.2	217.6	215.1	212.6	210.2
19.520	205.3	202.9	200.6	198.2	195.9	193.6
20.080	189.0	186.7	184.4	182.2	179.9	177.7
20.640	173.5	171.5	169.5	167.6	165.7	163.9
21.200	160.5	158.9	157.4	156.0	154.6	153.3
21.760	150.9	149.8	148.8	147.8	146.9	146.0
22.320	144.4	143.6	142.9	142.2	141.5	140.9
22.880	139.6	139.0	138.5	137.9	137.4	136.8
23.440	135.8	135.3	134.8	134.3	133.9	133.4
24.000	132.4	131.8	131.1	130.1	129.0	127.4
24.560	123.4	120.6	117.6	113.8	109.6	105.1
25.120	95.1	89.7	84.4	79.0	73.7	68.4
25.680	58.4	53.7	49.3	45.1	41.2	37.6
26.240	31.5	28.8	26.3	24.0	22.0	20.1
26.800	16.8	15.3	14.0	12.8	11.7	10.7

## STORM 500-yr

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Walker Run	2.430	Berwick	6.142		13.17	2995.8	1232.82

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	----- (cfs)
8.640	10.1	11.6	13.3	15.2	17.1	19.3
9.200	24.1	26.7	29.4	32.4	35.5	38.8
9.760	45.7	49.4	53.2	57.2	61.3	65.6
10.320	74.8	79.8	85.1	90.7	96.7	103.0
10.880	117.3	125.5	134.2	143.6	154.1	165.1
11.440	192.0	207.8	228.0	250.4	289.5	339.4
12.000	516.8	635.8	790.0	957.0	1156.9	1377.7
12.560	1867.6	2115.9	2338.2	2534.7	2701.2	2820.3
13.120	2967.3	2995.2	2993.9	2958.8	2909.1	2828.9
13.680	2635.0	2513.6	2382.9	2240.5	2100.7	1970.3
14.240	1743.1	1646.6	1554.1	1471.3	1394.0	1322.2
14.800	1192.0	1132.6	1076.4	1024.2	977.1	932.1
15.360	852.9	817.0	783.9	752.1	723.8	696.4
15.920	647.3	624.9	604.7	585.1	567.0	549.8
16.480	518.3	503.5	489.6	476.3	463.6	451.8
17.040	429.8	419.7	410.1	401.1	392.4	384.8
17.600	370.3	363.6	357.1	350.9	344.8	339.0
18.160	327.7	322.4	317.1	312.1	307.3	302.7

## Walker Run

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)	(cfs)
18.720	295.0	291.5	288.0	284.7	281.4	278.2	275.0
19.280	271.9	268.8	265.8	262.7	259.7	256.8	253.8
19.840	250.9	248.0	245.1	242.2	239.4	236.5	233.7
20.400	230.9	228.1	225.4	222.7	220.0	217.5	215.0
20.960	212.6	210.3	208.1	206.0	203.9	202.0	200.2
21.520	198.5	196.9	195.3	193.9	192.5	191.3	190.1
22.080	188.9	187.8	186.8	185.8	184.9	184.0	183.1
22.640	182.3	181.4	180.7	179.9	179.2	178.4	177.7
23.200	177.0	176.3	175.7	175.0	174.4	173.8	173.1
23.760	172.5	171.9	171.3	170.7	169.9	168.9	167.6
24.320	165.9	164.0	161.3	158.2	154.5	149.8	144.7
24.880	138.6	132.2	125.3	118.1	110.8	103.4	96.1
25.440	88.8	81.8	74.9	68.5	62.3	56.5	51.2
26.000	46.1	41.8	37.8	34.3	31.2	28.2	25.7
26.560	23.3	21.2	19.2	17.4	15.8	14.3	13.0
27.120	11.8	10.7					

Area or Reach Identifier	Drainage Area (sq mi)	Rain Gage ID or Location	Runoff Amount (in)	----- Elevation (ft)	Peak Flow Time (hr)	Rate (cfs)	Rate (csm)
Trib	0.680	Berwick	5.452		13.67	606.0	891.16

Line Start Time (hr)	----- (cfs)	Flow Values @ time (cfs)	increment (cfs)	of 0.080 hr (cfs)	----- (cfs)	(cfs)	(cfs)
10.720	10.4	11.5	12.6	13.9	15.3	16.9	18.5
11.280	20.3	22.3	24.5	27.1	30.2	34.3	39.2
11.840	48.4	57.5	73.4	89.5	110.4	132.7	158.9
12.400	187.8	219.7	255.9	293.2	334.3	375.3	413.9
12.960	452.4	484.4	515.2	539.6	560.8	577.4	589.1
13.520	598.5	602.4	605.6	601.2	596.9	587.4	577.5
14.080	564.6	550.6	534.2	515.6	495.9	473.8	451.8
14.640	430.6	409.4	391.5	373.8	357.9	342.5	328.3
15.200	314.9	302.2	290.6	279.3	269.0	258.7	249.2
15.760	239.7	231.0	222.5	214.8	207.4	200.4	193.8
16.320	187.4	181.5	175.7	170.4	165.1	160.3	155.5
16.880	151.1	146.7	142.7	138.8	135.1	131.7	128.3
17.440	125.2	122.1	119.3	116.6	114.1	111.6	109.3
18.000	107.0	104.8	102.8	100.8	99.0	97.1	95.5
18.560	93.8	92.3	90.8	89.3	87.9	86.5	85.3
19.120	84.0	82.9	81.7	80.6	79.4	78.3	77.2
19.680	76.1	75.1	74.0	72.9	71.9	70.9	69.8
20.240	68.8	67.8	66.8	65.8	65.0	64.1	63.3
20.800	62.6	61.8	61.1	60.3	59.7	59.0	58.3
21.360	57.7	57.1	56.5	56.0	55.4	54.9	54.4
21.920	53.9	53.5	53.1	52.7	52.3	51.9	51.5
22.480	51.2	50.9	50.6	50.3	50.0	49.7	49.4
23.040	49.2	48.9	48.7	48.5	48.2	48.0	47.8
23.600	47.6	47.4	47.2	47.0	46.8	46.6	46.4
24.160	46.2	45.9	45.6	45.2	44.7	44.2	43.6

## Walker Run

Line	Flow Values @ time increment of 0.080 hr						
Start Time	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
(hr)							
24.720	42.9	42.1	41.2	40.1	39.0	37.7	36.4
25.280	35.0	33.5	32.0	30.5	29.0	27.4	25.9
25.840	24.4	22.8	21.4	20.0	18.7	17.3	16.1
26.400	14.9	13.8	12.8	11.8	10.9	10.1	

Area or	Drainage	Rain Gage	Runoff	Peak Flow			
Reach	Area	ID or	Amount	Elevation	Time	Rate	Rate
Identifier	(sq mi)	Location	(in)	(ft)	(hr)	(cfs)	(csm)
OUTLET	3.110		5.991		13.30	3560.5	1144.87

Line	Flow Values @ time increment of 0.080 hr						
Start Time	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
(hr)							
8.640	10.1	11.6	13.3	15.2	17.1	19.3	21.6
9.200	24.1	26.8	29.9	33.3	36.8	40.4	44.1
9.760	48.0	52.1	56.3	60.8	65.5	70.4	75.5
10.320	80.8	86.7	92.7	99.2	106.1	113.4	121.5
10.880	129.9	139.4	149.5	160.4	172.7	185.5	200.4
11.440	216.5	234.9	258.5	284.7	330.4	388.2	474.6
12.000	590.1	725.3	900.8	1090.6	1317.0	1566.8	1837.4
12.560	2123.7	2409.1	2672.5	2909.2	3114.9	3270.0	3404.8
13.120	3480.9	3534.8	3554.7	3534.9	3498.1	3425.2	3342.2
13.680	3238.4	3114.8	2979.8	2827.9	2677.4	2534.4	2401.7
14.240	2276.9	2161.9	2050.0	1945.1	1846.1	1752.8	1666.9
14.800	1583.6	1507.0	1434.2	1366.7	1305.6	1247.0	1194.3
15.360	1143.7	1096.7	1052.9	1010.8	973.0	936.3	902.0
15.920	870.1	839.7	812.2	785.5	760.8	737.4	715.0
16.480	694.2	673.9	654.8	636.6	619.2	602.9	587.1
17.040	572.6	558.6	545.3	532.8	520.7	510.0	499.5
17.600	489.7	480.3	471.1	462.5	454.1	446.0	438.1
18.160	430.5	423.2	416.1	409.3	402.8	396.5	391.0
18.720	385.7	380.8	375.9	371.2	366.7	362.2	357.9
19.280	353.6	349.4	345.2	341.1	337.0	332.9	328.9
19.840	324.9	320.9	317.0	313.1	309.2	305.3	301.5
20.400	297.7	294.0	290.4	286.8	283.4	280.1	276.8
20.960	273.7	270.6	267.7	265.0	262.2	259.7	257.3
21.520	255.0	252.8	250.7	248.8	247.0	245.2	243.6
22.080	242.0	240.5	239.1	237.7	236.4	235.2	234.0
22.640	232.8	231.7	230.6	229.6	228.6	227.6	226.7
23.200	225.7	224.8	223.9	223.0	222.2	221.4	220.5
23.760	219.7	218.9	218.1	217.3	216.3	215.0	213.5
24.320	211.4	209.1	206.0	202.4	198.1	192.7	186.8
24.880	179.8	172.3	164.3	155.9	147.3	138.4	129.6
25.440	120.8	112.3	103.8	95.9	88.2	80.9	74.1
26.000	67.5	61.9	56.4	51.7	47.3	43.2	39.5
26.560	36.1	33.0	30.2	27.6	25.2	23.0	21.1
27.120	19.3	17.6	16.2	14.7	13.5	12.3	11.3
27.680	10.3						



## Walker Run

Area or Reach Identifier	Drainage Area (sq mi)	Alternate	----- Peak Flow by Storm -----				
			2-yr (cfs)	10-yr (cfs)	50-yr (cfs)	100-yr (cfs)	500-yr (cfs)
Walker Run	2.430		179.1	521.3	1170.3	1592.0	2995.8
Trib	0.680		23.6	84.2	213.3	300.3	606.0
OUTLET	3.110		199.1	596.5	1364.9	1862.0	3560.5

Appendix J:  
Manning's Roughness Coefficient Conditions



## Walker Run Existing Conditions Manning's "n" Values

Bell Bend Nuclear Power Plant  
Salem Township, Luzerne County, PA  
December 2010

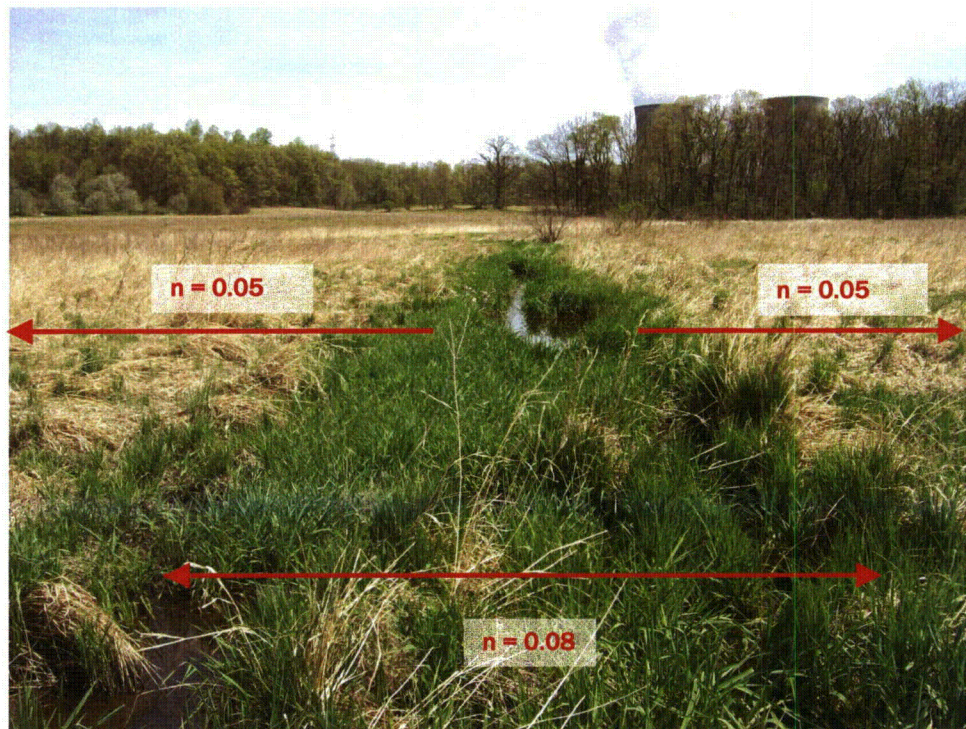


Photo #1: Tributary #1 through open field in lower reach



Photo #2: Tributary #1 through woods in upper reach