Floodplain Development Permit

Doddridge County, WV Floodplain Management

This permit gives approval for the development/ project listed that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. ***This permit must be posted at the site of work as to be clearly visible and must remain posted during entirety of development.***

Permit #: 18-539

Date Approved: January 23, 2019 **Expires: January 23, 2020**

Issued to: Mark West Liberty Midstream & Resources LLC **POC: Richard Lowry**

Company Address: 320 South View Drive, Suite 200 Bridgeport, WV 26330

Project Address: 218 Swisher Lane, West Union, WV 26456

Firm: 54017C0140C **Lat/Long: 39.277695N, -80.687849W**

Purpose of development: New Construction of a Temporary Parking Lot

Issued by: George C. Eidel, Doddridge County FPM (*or designee*)

George C. Eidel

Date: January 23, 2019

For additional information regarding this permit, please contact Doddridge County Floodplain Manager at 304.873.1343, or via email at doddridgecountyfpm@gmail.com
105Court Street Suite3; West Union, WV 26456

146307

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
333 BALDWIN ROAD
PITTSBURGH, PA 15205
(412) 429-2324

PNC BANK, N.A.
Pittsburgh, PA

8-9/430

EZShield™ Check Fraud Protection for Business

CHECK DATE 12/21/2018

PAY Two Thousand Ninety Eight and 25/100 Dollars

AMOUNT 2,098.25

TO Doddridge County Commission

AUTHORIZED SIGNATURE

Security features. Details on back.

COPY COPY COPY COPY COPY

⑈146307⑈ ⑆043000096⑆ 000227240 5⑈

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

146307

Check Date: 12/21/2018

Invoice Number	Date	Voucher	Amount	Discounts	Previous Pay	Net Amount
12202018	12/20/2018	000000327201	2,098.25			2,098.25
Doddridge County Commission		TOTAL	2,098.25			2,098.25
- Operating Account	60	11261				

FP# 18-539

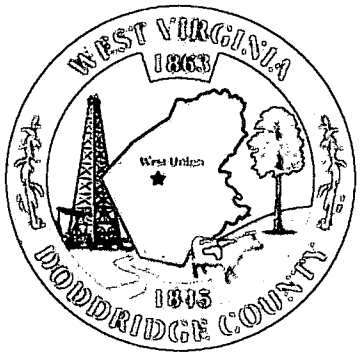
DEC26 18 9:02AM

COPY COPY

FLOODPLAIN PERMIT #18-539

Mark West, Temporary Parking Lot, 39.277695/-80.687849, 54017C0140C/54017C0145C

TASK	COMPLETE (DATE)	NOTES
CHECK RECEIVED	12/26/2018	
US ARMY CORP. ENGINEERS (USACE)		
US FISH & WILDLIFE SERVICES (USFWS)		
WV DEPT. NATURAL RESOURCES (WVDNR)		
WV DEPT. ENVIROMENTAL PROTECTION (WVDEP)		
STATE HISTORIC & PRESERVATION OFFICE (SHPO)		
OFFICE of LAND & STREAM (OLS)		
DATE OF COMMISSION READING	01/03/2019	
DATE AVAILABLE TO BE GRANTED	01/23/2019	
PERMIT GRANTED		
COMPLETE		



Doddridge County Floodplain Permits

(Week of December 31, 2018)

Please take notice that on the **(26th)** of **(December), 2018, (Mark West Liberty Midstream)** filed an application for a Floodplain Permit **(#18-18-539)** to develop land located at or about **(218 Swisher Lane); Coordinates: 39.277695 N, -80.687849 W.** The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29B Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by **(January 23, 2019)** (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Floodplain Manager of the County at 105 Court Street, Suite #3, West Union, WV 26456. **This project is for a Temporary Parking Lot**

GEORGE C. EIDEL, CFM

Doddridge County Floodplain Manager

December 21, 2018

Mr. George Eidel
Doddridge County Floodplain Manager
105 Court Street, Suite #3
West Union, WV 26456

Dear Mr. Eidel:

Subject: Floodplain Development Permit
Commercial/Industrial Floodplain Development Permit
Sherwood Natural Gas Processing Plant - Temporary Parking Lot and Laydown Area
Doddridge County, West Virginia
CEC Project 110-811

On behalf of Markwest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. (CEC) is submitting a Commercial/Industrial Floodplain Development Permit associated with the Sherwood Natural Gas Processing Plant, located in Doddridge County, West Virginia. Please find enclosed two (2) copies of the following information:

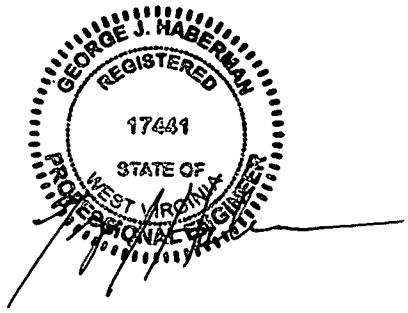
- Permit Application Fee in the amount of $2,098.25 (Construction costs approximately $319,650);
- Hydraulic Study Report of Buckeye Creek; and
- Doddridge County Floodplain Development Permit Application (Appendix–F in the above report).

Should you have any questions or require additional information, do not hesitate to contact us at 412-429-2324.
Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

George J. Haberman, P.E.
Senior Consultant

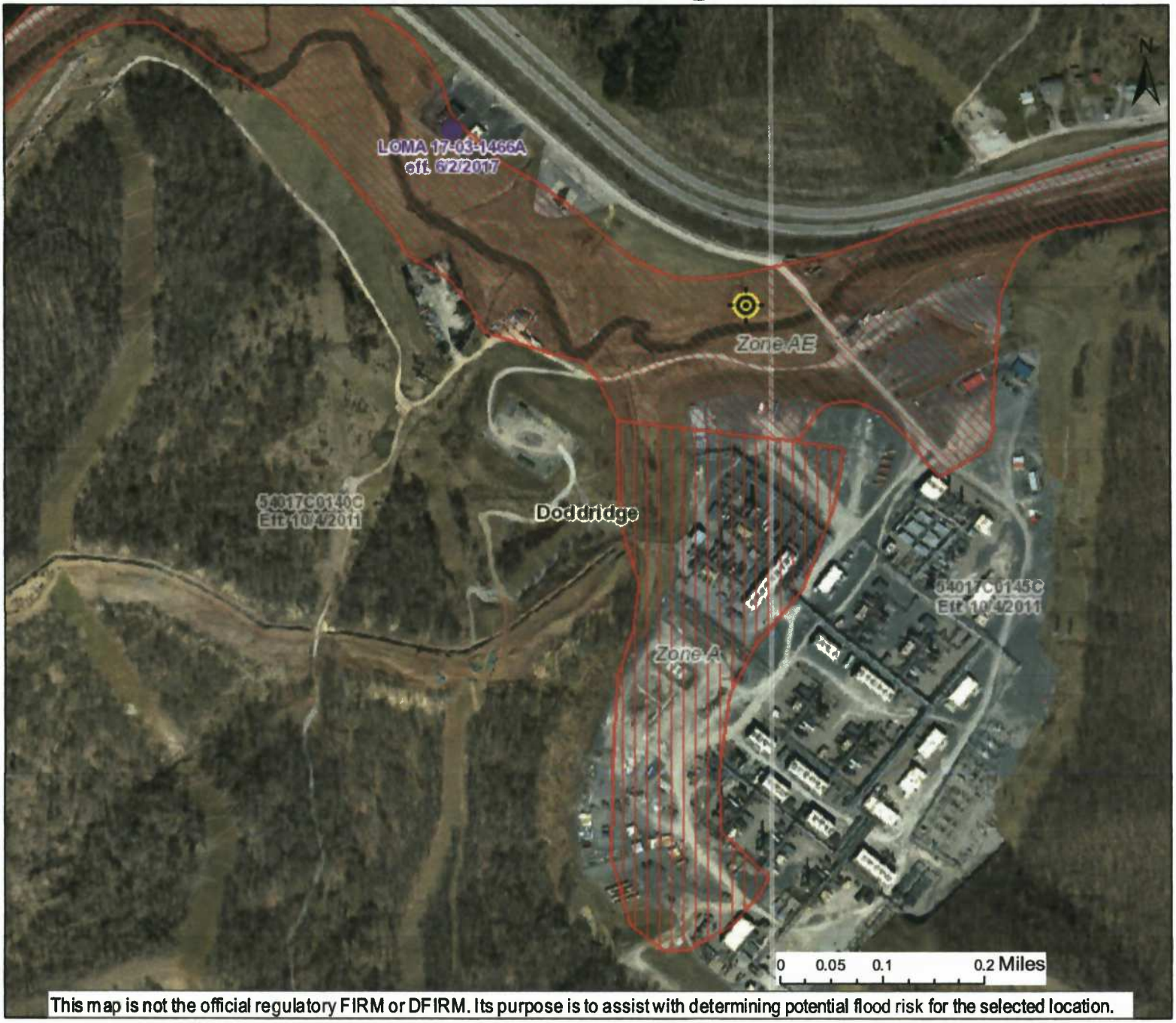
Richard P. Celender, RLA, C.E.T., CPESC, CPSWQ
Vice President



Enclosures

110-811-L-Floodplain Dev. Permit/P

WV Flood Map



This map is not the official regulatory FIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

LOMAs
- Incorporated
- Superseded
- Not incorporated
- No Revalidation Status
- Reevaluated
- Contact Community for Revalidation Status

0.2 Pct Annual Chance Flood Hazard
- 0.2 Pct Annual Chance Flood Hazard

FEMA Effective Floodplains
- Zone AE FLOODWAY
- Zone AE (AH, AO)
- Zone A
- DFIRM Panel Index

Flood Depth (Ft)
- High : 864.11
- Low : 0

LOMRs
- Effective

Flood Info Location

Map created on 12/26/2018

User Notes:

Flood Hazard Area:
Location is **WITHIN** the FEMA 100-year floodplain.

Flood Hazard Zone: AE
Stream: Buckeye Creek
Watershed (HUC8): Little Musringum-Middle Island (503020
Flood Height: Refer to FIS report for BFE
Water Depth: About 4.0 ft (Source: HAZUS)
Elevation: About 809 ft (Source: SAMS 2003)
Location (long, lat): (-80.687849, 39.277695)
Community&ID: Doddridge County (540024)

FEMA Flood Map: 54017C0140C **EFF:** 10/4/2011
Parcel Number: 09-03-0019-0031-0000
Address: multiple addresses

Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. **WV Flood Tool (*https://www.MapWV.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.**

HYDRAULIC STUDY OF BUCKEYE CREEK

SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared for:

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
PITTSBURGH, PENNSYLVANIA

CEC Project 110-811

January 2014
(Revised March 25, 2014)
(Revised April 15, 2014)
(Revised November 14, 2014)
(REVISED DECEMBER 2018)

Civil & Environmental Consultants, Inc.

Pittsburgh | 333 Baldwin Road | Pittsburgh, PA 15205 | p: 412-429-2324 f: 412-429-2114 | www.cecinc.com

HYDRAULIC STUDY OF BUCKEYE CREEK

SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

Prepared for:

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January 2014
(Revised March 25, 2014)
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(REVISED DECEMBER 2018)

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TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

Markwest Liberty Midstream Services, LLC (Markwest) has contracted Civil & Environmental Consultants, Inc. (CEC) to perform a flood study as part of the construction of the Sherwood Natural Gas Processing Plant Parking Lot Expansion and Laydown Area. The proposed temporary parking lot and laydown area currently consists of meadow areas within the previously calculated 100-year floodplain. The Sherwood Gas Processing Plant is located approximately one-half-mile east of the intersection of U.S. Route 50 and County Route 20 along County Route 50/34 in Doddridge County, West Virginia. A site location map has been provided in Appendix A.

A Floodplain Permit was issued on August 28, 2013 to MarkWest Liberty Midstream & Resources, LLC (MarkWest) for the Sherwood Gas Processing Plants 4 and 5 Expansion. This permit included grading improvements for Plants 1-5, the truck unloading area, an access road with a new bridge from County Road 50/34, and temporary stockpiles. An update to the Floodplain Permit was approved on March 4, 2014 to include additional temporary stockpiles as part of the construction of the gas processing plants. The original master plan floodplain permit (Permit No. 14-123) included all previously permitted proposed development in addition to site grading associated with the construction of Sherwood Gas Processing Plants 6 through 11 (including de-ethanizers, and substation expansion).

MarkWest contracted CEC in November 2014 to perform a modification to the master plan flood study as part of the final buildout of the Sherwood Gas Processing Plant. The final buildout included the construction of Plants 6 through 11, De-ethanizer Plants 1-3, an administration building, warehouse, and additional equipment. CEC conducted a Hydrologic and Hydraulic (H&H) analysis of the existing 100-year floodplain of Buckeye Creek to include the effect on the floodplain by the final grading as part of the final buildout of the Sherwood Gas Processing plant. The modification was approved on February 9, 2015. The master plan floodplain permit was approved on April 24, 2014. The active floodplain permit (Permit No. 18-513) was approved on June 25, 2018. The previous permits and current permit are included in Appendix F.

As part of the previously revised flood study of December 2013, CEC performed an additional survey to acquire more accurate and current topography for the stream, overbanks, and newly constructed bridge between stations 25+54.54 (Section T) and 0+00 (Section OO). Because the topography was no longer consistent with the original DEM data from the August 28, 2013 Floodplain Permit, water surface elevations could not be compared between the original flood study and the master plan flood study. However, the existing conditions model in the master plan flood study represents the site prior to development, so the current study represents the cumulative impact of the final Sherwood Gas Processing Plant development on the floodplain.

1.2 PURPOSE

The purpose of this study is to update the previously approved H&H analysis of the existing 100-year floodplain of Buckeye Creek to include the effect on the floodplain by the proposed temporary parking lot and laydown area in addition to the proposed breaker station that currently has a floodplain permit under review. The H&H analysis will be used to compare the existing and proposed 100-year floodplain water surface elevations (WSELs) of Buckeye Creek upstream and downstream of the proposed temporary parking lot and laydown area. This comparison will show the cumulative theoretical impacts, if any, of the proposed construction along the study area of the tributary as it relates to the 100-year floodplain WSELs.

1.3 SCOPE OF SERVICES

CEC has performed this H&H analysis of the existing and proposed conditions along a portion of Buckeye Creek upstream and downstream of the proposed temporary parking lot and laydown area for the 100-year floodplain WSELs. The following scope of services was performed in order to achieve the above-stated purpose:

- Performance of hydraulic analyses utilizing the Hydrologic Engineering Center River Analysis System (HEC-RAS) program to perform a detailed backwater analysis of Buckeye Creek for the existing and proposed conditions during the 100-year, 24-hour storm event. The study included:

- Development of an appropriate number of stream cross-sections for use in the HEC-RAS model;
- Development of HEC-RAS proposed cross-sections utilizing the topographic base map previously prepared for the original study, updated to include the proposed grading and structures located within the study area.
- Development of proposed floodplain 100-year water surface elevations

- Preparation of this hydraulic analysis report that summarizes our calculations and findings.

1.4 AUTHORIZATION

This study was performed as authorized by MarkWest.

1.5 STANDARD OF CARE

The services provided by CEC were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the civil engineering profession practicing contemporaneously under similar conditions in the locality of the project. No warranty, express or implied, is made.

1.6 NECESSARY PERMITS FROM GOVERNMENT AGENCIES

As a part of this floodplain permit submission, Markwest is required to modify the previously approved WVDEP General Water Pollution Control Permit prior to initiating construction. This permit approval will be forwarded to Doddridge County under separate cover upon receipt from the WVDEP.

2.0 HYDROLOGIC ANALYSIS

2.1 METHODOLOGY

The Federal Emergency Management Agency (FEMA) conducted a Flood Insurance Study (FIS) for Doddridge County, West Virginia, October 4, 2011. According to this study, Buckeye Creek discharges 5,150 cubic feet per second (cfs) at its upstream confluence with Long Run during the 100-year, 24-hour storm event. The FEMA FIS is included in Appendix B.

In order to maintain conditions similar to the FIS, the discharge of 5,150 cfs and the known water surface elevation of 811 at the downstream extents of the study area were used during the hydraulic analysis, as described in Section 4. The FEMA Flood Insurance Rate Map is provided in Appendix B.

3.0 HYDRAULIC ANALYSIS

THE U.S. ARMY CORPS OF ENGINEERS HEC-RAS COMPUTER SOFTWARE WAS UTILIZED TO ANALYZE THE HYDRAULIC CAPACITY AND PROJECT WATER SURFACE ELEVATIONS (WSELS) ALONG BUCKEYE CREEK DURING THE 100-YEAR, 24-HOUR DESIGN STORM EVALUATIONS. THE BUCKEYE CREEK STUDY AREA BOUNDARY EXTENDED FROM APPROXIMATELY 2,460 FEET DOWNSTREAM TO APPROXIMATELY 1,045 FEET UPSTREAM OF THE PREVIOUSLY PERMITTED BRIDGE LOCATION. A MAP OF THE CROSS SECTION LOCATIONS UTILIZED FOR THE HYDRAULIC ANALYSIS IS LOCATED IN APPENDIX D.

3.1 EXISTING CONDITIONS

A HEC-RAS model for the existing conditions was created using as-built survey information collected by CEC, DEM data, and the FEMA FIS for Doddridge County, WV dated October 4, 2011.

An existing bridge at Station 26+25.35, between cross-sections R and S, was previously permitted to be removed once the proposed bridge was constructed. The existing bridge is included in the existing conditions model, however it was removed on November 13, 2013.

New topography was also collected for the stream and overbanks between stations 25+54.54 (Section T) and 0+00 (Section NN) during the survey conducted in 2014. This topography is more accurate and current than the DEM topography used in the original flood study, so it is used in place of the DEM topography in the existing flood study model, except in the area of the existing bridge.

The existing conditions HEC-RAS model is the same as the model included in the previously approved master plan floodplain permit. The HEC-RAS input and output data for the model is provided in Appendix C. The map in Appendix D also shows the estimated lateral extent of the floodplain resulting from the 100-year, 24-hour design storm.

Included in Appendix E is the HEC-RAS summary table for the estimated water surface elevations in Buckeye Creek resulting from the 100-year, 24-hour design storm at each analyzed cross-section based on the existing conditions.

3.2 PROPOSED CONDITIONS

The HEC-RAS model for the proposed conditions was developed by revising the Buckeye Creek cross-sections to include the proposed parking lot grading, laydown area grading, and proposed breaker station that currently has a floodplain permit under review. The elevations of the parking lot grading is shown on the map in Appendix D. The proposed changes are located between cross-sections V (24+17.85) and BB (21+05.74). The proposed changes are shown on the map in Appendix D.

The HEC-RAS input and output data for the proposed conditions model have been provided in Appendix C. The HEC-RAS summary table for proposed conditions for each cross section is summarized in the hydraulic calculations in Appendix E. In addition, a summary table for the comparison of the 100-year existing and proposed water surface elevations is located at the end of Appendix E.

4.0 CONCLUSIONS

The following conclusions are presented based on the results of engineering analyses using the HEC-RAS model.

4.1 EXISTING CONDITIONS

The existing conditions, as previously described, were evaluated to estimate the WSEL near the proposed parking lot and laydown areas. The water surface elevation at Station 26+03.43 (Section S), one cross section downstream of the existing bridge, is 811.11 feet, based on the HEC-RAS existing conditions model. Appendix E contains a summary table of the HEC-RAS results. Also provided are graphical results of the HEC-RAS analysis for the 100-year design storm at numerous sections along Buckeye Creek. Based on these analyses, the following conclusions were developed:

- The 100-year, 24-hour design storm will not overtop the existing bridge at Station 26+25.35; and
- The 100-year, 24-hour design storm will inundate approximately 53 acres, as shown in Drawing SP01 in Appendix D.

4.2 PROPOSED CONDITIONS

The proposed HEC-RAS model was setup to analyze the proposed parking lot and laydown area in addition to the proposed breaker station that currently has a floodplain permit under review. The water surface elevation at Station 26+03.43 (Section S), two cross sections upstream of the new bridge, is 813.55 feet. Appendix E contains a summary table of the HEC-RAS results for Buckeye Creek considering the proposed parking lot and laydown area. Also provided are graphical results of the HEC-RAS analysis for the 100-year design storm at numerous sections along Buckeye Creek. The section locations are shown in drawing SP01 in Appendix D.

The increase in WSEL between existing and proposed conditions at Station 21+05.74 (BB) is 0.10 feet. Station 21+05.74 (BB) is the location of the furthest downstream cross section to be impacted by the proposed parking lot grading. The increase in WSEL between existing and proposed conditions at Station 23+54.53 (Section W) is 0.08 feet. Station 23+54.53 (Section W) is the cross section immediately upstream of the parking lot and laydown area and shows that the backwater effects of the proposed grading will not significantly impact the 100-year floodplain. Additionally, the increase in WSEL at the constructed bridge will not overtop the bridge, as was shown in previous analyses.

Based on these analyses, the following conclusions were developed:

- The 100-year, 24-hour design storm will not overtop the constructed bridge at Station 24+60.04;
- The 100-year, 24-hour design storm will inundate approximately 31.5 acres as shown on Drawing SP01 in Appendix D.
- The 100-year, 24-hour design storm will increase the flood elevation 0.08 feet at Station 23+54.53 (Section W), one section upstream of the proposed parking lot and laydown area.
- The water surface elevation increase at Station 35+04.54 (Section A), approximately 315 feet downstream from the subject property line, is 0.50 feet.

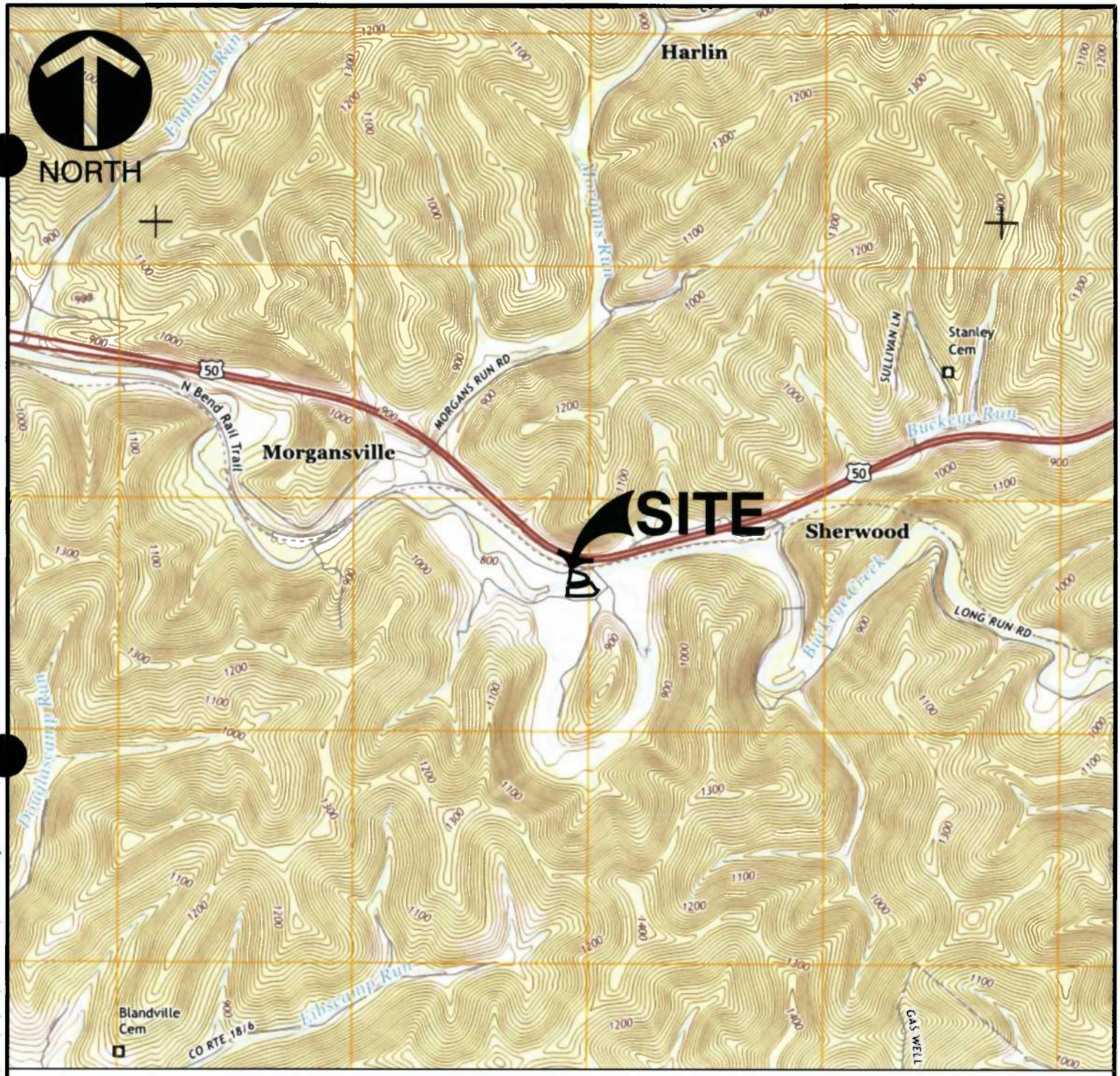
4.3 SUMMARY

The hydraulic analysis was prepared to provide a comparison between the post-development floodplain conditions along Buckeye Creek and the existing conditions. The proposed parking lot and laydown area will increase the WSEL at the constructed bridge located approximately 50ft upstream of the proposed improvements but is not anticipated to overtop the bridge. The WSEL at station 23+54.53 (Section W) immediately upstream of the proposed parking lot will increase by 0.08 feet over the existing conditions. The WSEL increase at Station 35+04.54 (Section A), approximately 315 feet downstream from the subject property line, is 0.50 feet. The

proposed temporary parking lot and laydown area should not adversely impact the flooding threat to life, property, or the environment of properties upstream of the subject property.

APPENDIX A

SITE LOCATION AND SOILS MAPS



REFERENCE

1. U.S.G.S. 7.5' TOPOGRAPHIC MAP, SMITHBURG QUADRANGLE, WV DATED: 2006, PHOTOREVISED: JUNE 2014

SCALE IN FEET

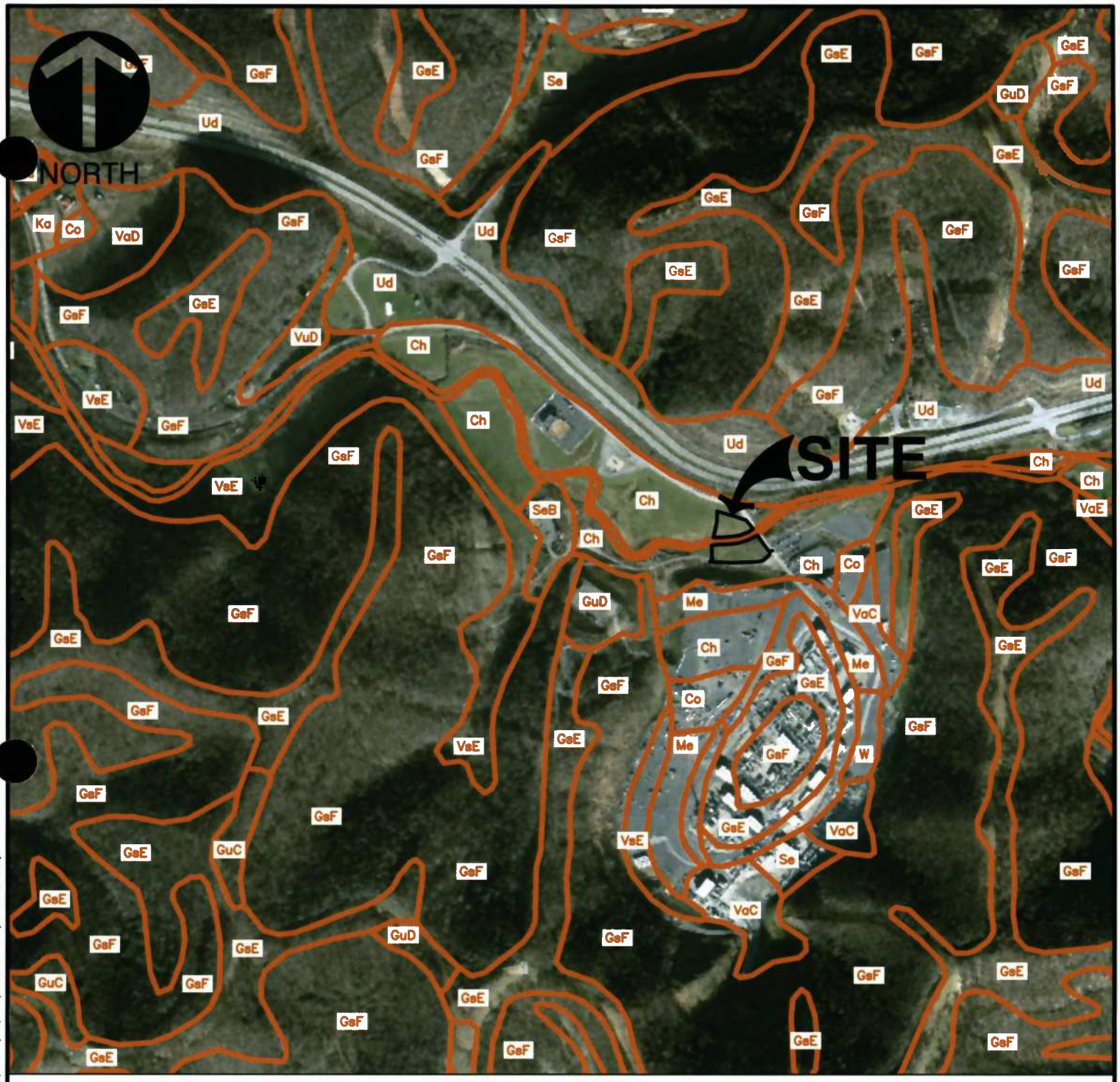
0 2000 4000

Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205
412-429-2324 · 800-365-2324
www.cecinc.com

MARKWEST LIBERTY
MIDSTREAM & RESOURCES, LLC.
PARKING LOT EXPANSION
DODDRIDGE COUNTY, WEST VIRGINIA

SITE LOCATION MAP

DRAWN BY:	PJH	CHECKED BY:	TGJ	APPROVED BY:	RPC	FIGURE NO.:	1
DATE:	DECEMBER 2018	DWG SCALE:	1"=2,000'	PROJECT NO:	110-811		



REFERENCE

1. SOIL MAP INFORMATION BASED UPON USDA WEB SOIL SURVEY; DODDRIDGE COUNTY, WV SURVEY AREA DATA: VERSION 9: NOVEMBER 27, 2018.

LEGEND

LIMIT OF DISTURBANCE
SOIL TYPE BOUNDARY
ShF — SOIL TYPE

SCALE IN FEET

0 500 1000

Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205
412-429-2324 · 800-365-2324
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC. PARKING LOT EXPANSION DODDRIDGE COUNTY, WEST VIRGINIA

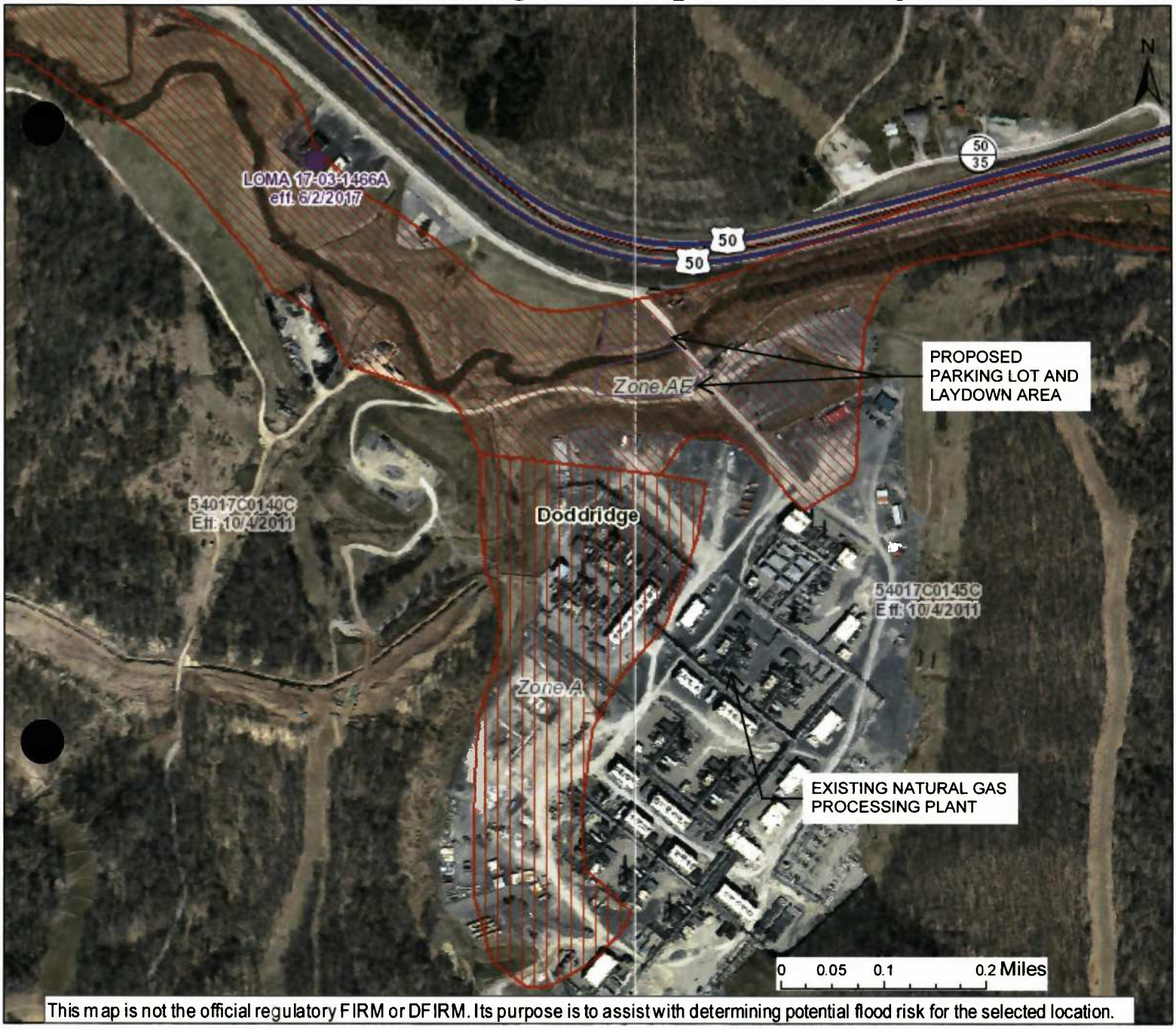
SOILS MAP

DRAWN BY:	PJH	CHECKED BY:	TGJ	APPROVED BY:	RPC	FIGURE NO.:
DATE:	DECEMBER 2018	DWG SCALE:	1"=2,000'	PROJECT NO:	110-811	2

APPENDIX B

FEMA FLOOD INFORMATION STUDY AND RATE MAP

Sherwood Parking Lot Expansion Project



LOMAs
- Incorporated
- Superseded
- Not incorporated
- No Revalidation Status
- Reevaluated

Contact Community for Revalidation Status

0.2 Pct Annual Chance Flood Hazard
- 0.2 Pct Annual Chance Flood Hazard

FEMA Effective Floodplains
- Zone AE FLOODWAY
- Zone AE (AH, AO)
- Zone A

DFIRM Panel Index

Flood Depth (Ft)
- High : 864.11
- Low : 0

LOMRs
- Effective

Flood Info Location

Map created on 12/4/2018

User Notes:

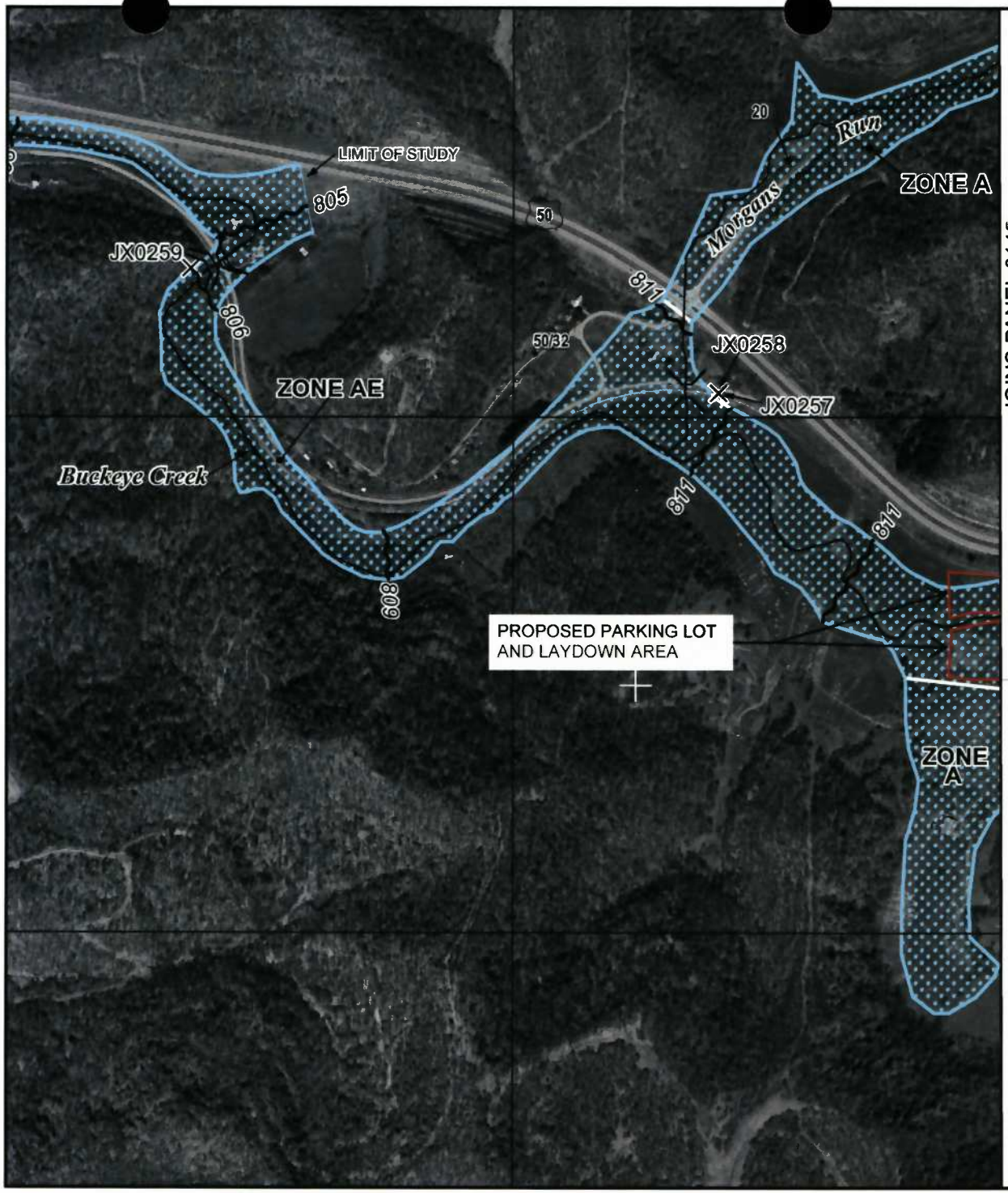
Flood Hazard Area:
Flood Hazard Area:

Flood Hazard Zone:
Stream:
Watershed (HUC8):
Flood Height:
Water Depth:
Elevation: (Source:)
Location (long, lat):
Community&ID: ()

FEMA Flood Map: **EFF:**
Parcel Number:
Address:

Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. **WV Flood Tool (*https://www.MapWV.gov/flood*) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.**



MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 140 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

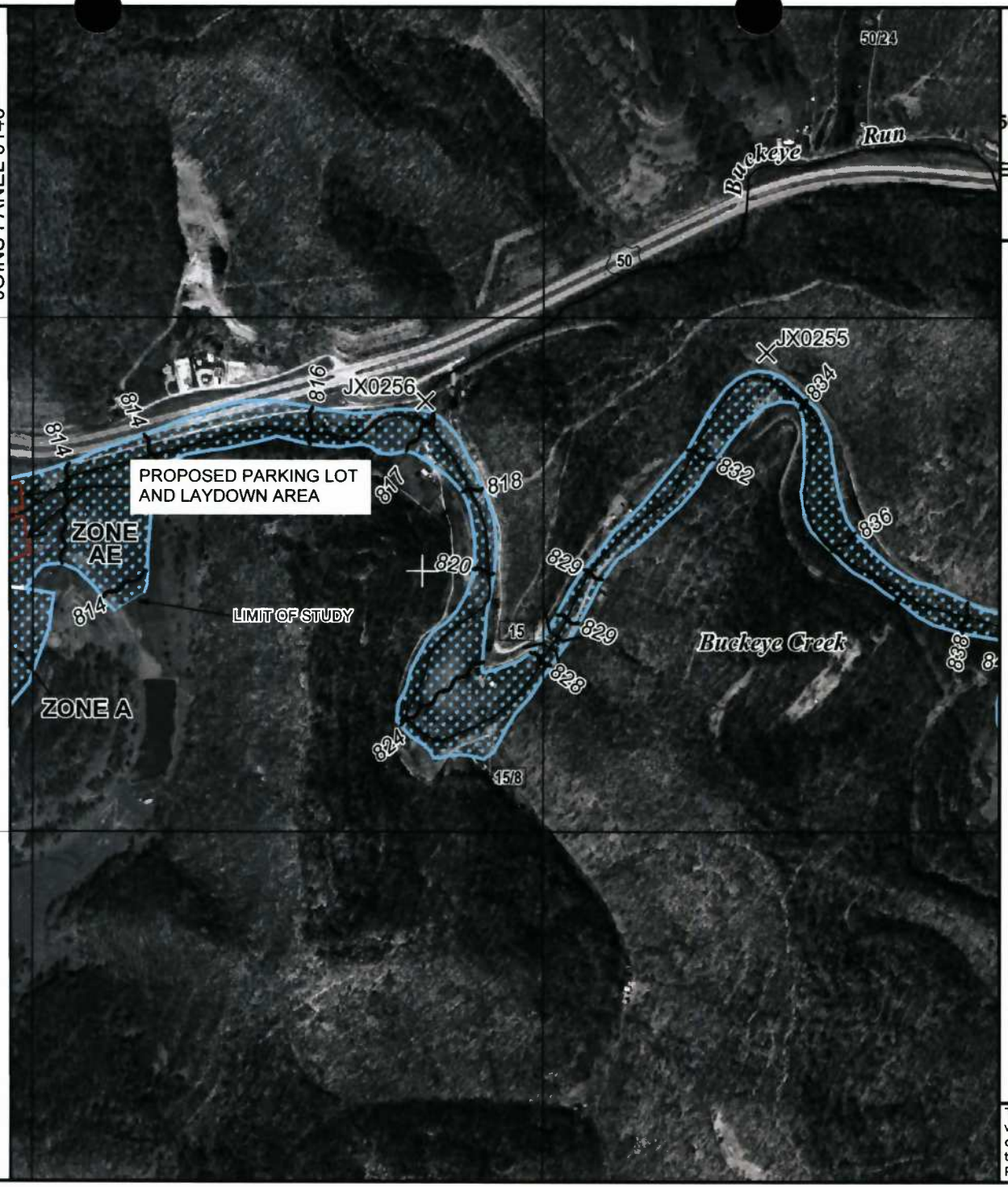
COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0140C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency



MAP SCALE 1" = 1000'

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FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0145C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 145 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0145	C

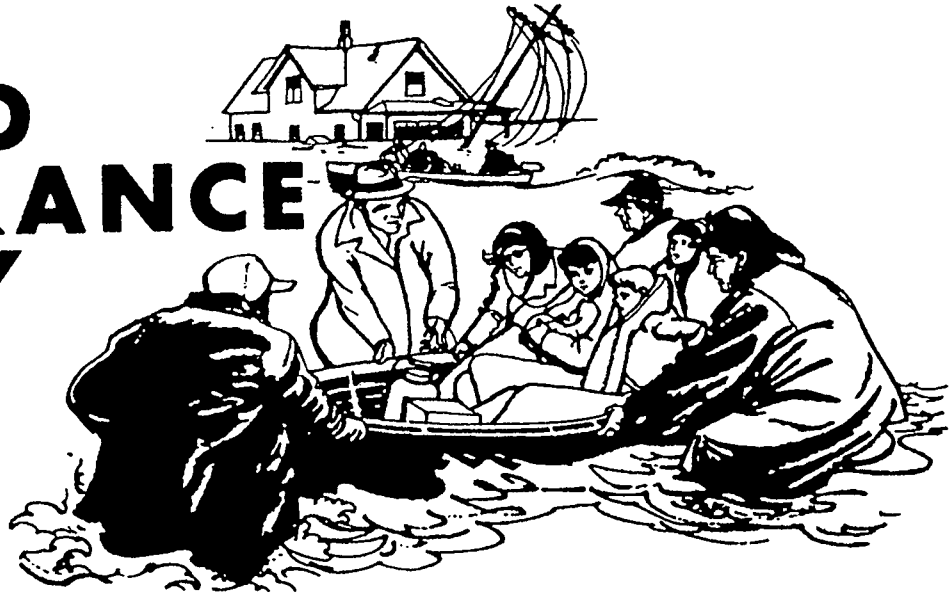
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0145C

MAP REVISED
OCTOBER 4, 2011

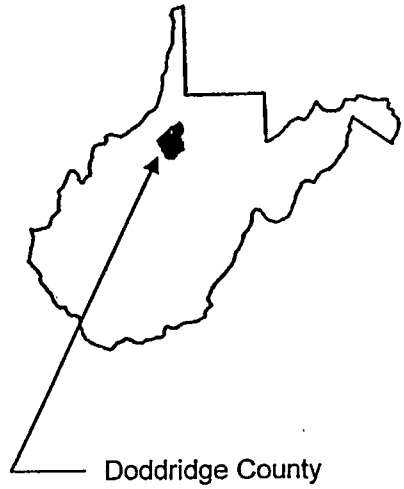
Federal Emergency Management Agency

FLOOD INSURANCE STUDY



DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
WEST UNION, TOWN OF	540025
DODDRIDGE COUNTY (UNINCORPORATED AREAS)	540024



Effective: October 4, 2011

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
54017CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Initial Countywide FIS Effective Date: March 18, 1991

Flood Insurance Study Revised: October 4, 2011

TABLE OF CONTENTS – Volume 1 – *October 4, 2011*

TABLE OF CONTENTS – Volume 1 – *October 4, 2011*

FIGURES

TABLES

EXHIBITS

FLOOD INSURANCE STUDY
DODDRIDGE COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide format Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of Doddridge County, West Virginia, including the Town of West Union and the unincorporated areas of the county (hereinafter referred to collectively as Doddridge County); and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State or other jurisdictional agency will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study were prepared by the U.S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA) under Inter-Agency Agreement No. EMW-87-E- 2512. Within the Town of West Union, the work for this study was completed in May 1988; within the unincorporated areas of the county, the work for this study was completed in June 1988.

This digital conversion was prepared by the USACE, Huntington District, for FEMA, under Inter-Agency Agreement No. HSFE03-06-X-0023.

Base map information shown on the FIRM was provided by West Virginia Statewide Addressing and Mapping Board (SAMB). Imagery was captured at a scale of 1:24,000 in the Spring of 2003 for the purpose of producing natural color digital orthophotos at a two-foot pixel resolution.

The projection used in the preparation of this map is Universal Transverse Mercator (UTM) Zone 17, and the horizontal datum used is North American Datum of 1983 (NAD 83), GRS1980 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to UTM, NAD 1983. Differences in the datum, spheroid, projection, or UTM zones used in the production of FIRMs for adjacent counties may

result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

1.3 Coordination

On January 17, 1985, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the county, and the USGS (the study contractor) to determine the streams to be studied by detailed methods. The Huntington District of the U. S. Army Corps of Engineers (USACE) and the Soil Conservation Service (SCS) were contacted for information pertinent to this study.

On April 18, 1990, a final CCO meeting was held with representatives of FEMA, the county, and the study contractor to review the results of the study. The final CCO meeting for the unincorporated areas of Doddridge County also served as the final CCO meeting for this countywide study, and was open to representatives from all communities within the county that were covered by this countywide study.

For this countywide FIS, the final CCO meeting was held on April 29, 2010, and attended by representatives of the Town of West Union and Doddridge County, West Virginia. All problems raised at that meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Doddridge County, West Virginia, including communities listed in Section 1.1.

Table 1, "Areas Studied by Detailed Methods" lists the streams studied by detailed methods.

Table 1 – Areas Studied by Detailed Methods

Stream	Limits of Detailed Study
Middle Island Creek	From the downstream county boundary to the confluence of Meathouse Fork and Buckeye Creek
Buckeye Creek	From the confluence with Middle Island Creek to a point approximately 240 feet upstream of the confluence of Long Run, and from the confluence of Greenbrier Creek to the confluence of Traugh Fork
Meathouse Fork	From the confluence with Middle Island Creek to County Highway 56, and from a point approximately 1,600 feet downstream of County Highway 25-13 to the confluence of Laurel Run and Big Isaac Creek
McElroy Creek	From the confluence of Flint Run to the confluence of Big Battle Run

Table 1 – Areas Studied by Detailed Methods - continued

Stream	Limits of Detailed Study
Wilhelm Run	From the confluence with Arnold Creek to a point approximately 1.2 miles upstream
Long Run	From the confluence with Buckeye Creek to a point approximately 2.4 miles upstream
Toms Fork	From the confluence with Meathouse Fork to the confluence of Little Toms Fork
Greenbrier Creek	From the confluence with Buckeye Creek to a point approximately 1.9 miles upstream
Big Isaac Creek	From the confluence with Meathouse Fork to the confluence of Little Isaac Creek
Laurel Run	From the confluence with Meathouse Fork to a point approximately 0.9 mile upstream of the confluence with Meathouse Fork

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through January 1990.

All or portions of the following streams were studied by approximate methods: Broad Run, Arnold Creek, Slaughter Run, Flint Run, Riggins Run, Robinson Fork, Big Battle Run, Skelton Run, Talkington Fork, Long Run, Bluestone Creek, Cove Creek, Indian Fork, Nutter Fork, Jockey Camp Run, Morgans Run, Buckeye Creek, Buffalo Calf Creek, Meathouse Fork, Little Toms Fork, Lick Run, Big Isaac Creek, Middle Fork, Dotson Run, Cabin Run, Leason Creek, Right Fork, Left Fork, Elk Lick Run, Pike Fork, Little Battle Run, Piggin Run, Brushy Fork, Rock Run, Wolfpen Run, Englands Run, Jockeycamp Run, Douglascamp Run, Traugh Fork, Bonnet Fork, the South Fork Hughes River, and Sycamore Fork. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Doddridge County.

No Letters of Map Revision (LOMRs) were incorporated for the October 4, 2011, revision.

2.2 Community Description

Doddridge County is located in northern West Virginia. It is bordered by the unincorporated areas of Wetzel and Tyler Counties to the north; the unincorporated areas of Ritchie County to the west; the unincorporated areas of Harrison County to the east; and the unincorporated areas of Gilmer and Lewis Counties to the south. The total land

area contained within the county is approximately 321.6 square miles. In 2000, the population of the county was 7,491 (Reference 1).

The county seat is located in the Town of West Union. The total land area of the town is approximately 0.32 square miles, and the population was 806 in 2000 (Reference 1).

The climate of Doddridge County is temperate with a seasonal variation in temperature. The county is located in a region termed humid continental: humid because of the evenly spaced precipitation, and continental because of the yearly range in temperature. Mean annual precipitation of the county is approximately 45 inches. The average monthly temperatures in degrees Fahrenheit range from the mid-30's in winter to the low 70's in summer (Reference 2).

2.3 Principal Flood Problems

The principal flood problems of Doddridge County are the overflows of Middle Island Creek, Buckeye Creek, and Meathouse Fork. The history of flooding in the county indicates that flooding can occur at any time of the year. Large frontal storms or decaying tropical storms produce the worst flooding on the larger streams, while high intensity thunderstorms produce severe flooding on smaller drainage areas. Major floods have occurred in the county in 1875, 1950, 1963, and 1985.

The mountainous topography of the county is conducive to rapid rises on streams and also to fast runoff best described as flash flooding. This condition has been aggravated by human activities such as timbering in the county.

2.4 Flood Protection Measures

No major structural flood protection measures exist or are planned for the county.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 2-, 1-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 2-, 1-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

Discharge-frequency curves were developed on a regional basis that applies to West Virginia (References 3 and 4). For the streams studied by detailed methods, 1-percent-annual-chance flood elevations were determined through discharge-frequency relations and the Manning equation. Within the Town of West Union, flood elevations were determined through streamflow-station data relationships and the Manning's equation.

Peak discharge-drainage area relationships for each stream studied by detailed methods are presented in Table 2, "Summary of Discharges".

Table 2 – Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ. MILES)	PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL- CHANCE
MIDDLE ISLAND CREEK		
Upstream of Doddridge-Tyler County boundary	134.78	15,200
Approximately 0.1 mile downstream of confluence of Piggin Run	120.06	13,080
BUCKEYE CREEK		
At confluence with Middle Island Creek	38.62	7,350
Downstream of confluence of Long Run	22.62	5,150
Upstream of confluence of Greenbrier Creek	9.41	3,050
Downstream of confluence of Traugh Fork	1.52	1,310
MEATHOUSE FORK		
At confluence with Middle Island Creek	66.84	9,600
Downstream of confluence of Toms Fork	50.47	8,200
Downstream of confluence of Brushy Fork	29.87	6,050
Downstream of confluence of Laurel Run and Big Isaac Creek	3.76	2,230
MCELROY CREEK		
Upstream of confluence of Flint Run	61.95	9,250
Upstream of confluence of Rigging Run	51.23	8,300
Downstream of confluence of Talkington Fork	39.18	7,100
Downstream of confluence of Robinson Fork and Big Battle Run	20.75	4,900

Table 2 – Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ. MILES)	PEAK DISCHARGE (CFS) 1-PERCENT-ANNUAL- CHANCE
WILHELM RUN		
At confluence with Arnold Creek	3.29	2,070
Approximately 1.2 miles upstream of confluence with Arnold Creek	2.07	1,570
LONG RUN		
At confluence with Buckeye Creek	4.44	2,460
Approximately 2.4 miles upstream of confluence with Buckeye Creek	1.85	1,470
TOMS FORK		
At confluence with Meathouse Fork	15.27	4,100
Downstream of confluence of Little Toms Fork	12.58	3,650
GREENBRIER CREEK		
At confluence with Buckeye Creek	2.80	1,880
Approximately 1.9 miles upstream of confluence with Buckeye Creek	1.09	1,080
BIG ISAAC CREEK		
At confluence with Meathouse Fork	1.79	1,450
LAUREL RUN		
At confluence with Meathouse Fork	1.97	1,530
Upstream of confluence of Big Isaac Creek	1.57	1,340

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the FIRM (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals were computed

using the USACE HEC-2 step-backwater computer program, and the results were published in a special flood hazard information report (References 5 and 6). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field surveys of the stream and floodplain areas. For Middle Island Creek, channel "n" values range from 0.040 to 0.045 and overbank "n" values range from 0.050 to 0.070. For Buckeye Creek and Meathouse Fork, channel "n" values range from 0.055 to 0.080.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Qualifying benchmarks within a given jurisdiction that are catalogued by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Benchmarks catalogued by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation (e.g. mounted in bedrock)
- Stability B: Monuments which generally hold their position/elevation (e.g. concrete bridge abutment)
- Stability C: Monuments which may be affected by surface ground movements (e.g. concrete monument below frost line)
- Stability D: Mark of questionable or unknown vertical stability (e.g. concrete monument above frost line, or steel witness post)

In addition to NSRS benchmarks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for benchmarks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

3.3 Vertical Datum

All elevations used in the original Doddridge county FIS reports were referenced to the National Geodetic Vertical Datum of 1929 (NGVD29), formerly referred to as Sea Level Datum of 1929. All flood elevations shown in this FIS report and on the FIRM are referenced to North American Vertical Datum of 1988 (NAVD88). Structure and ground elevations in the community must, therefore, be referenced to NAVD88. Elevation factors used to convert the NGVD29 elevation data of the previous Braxton county FIS reports to NAVD88 are summarized below. Elevation reference marks used in this study are shown on the maps.

The data points used to determine the conversion are listed in Table 3, "Vertical Datum Conversion Values".

Table 3 – Vertical Datum Conversion Values

USGS 7.5-Minute Quadrangle Name	Corner	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Conversion from NGVD29 to NAVD88 (foot)
Shirley	SE	39.375	80.750	-0.522
Center Point	SE	39.375	80.625	-0.515
Folsom	SE	39.375	80.500	-0.525
Pennsboro	SE	39.250	80.875	-0.554
West Union	SE	39.250	80.750	-0.515
Smithburg	SE	39.250	80.625	-0.502
Oxford	SE	39.125	80.750	-0.531
New Milton	SE	39.125	80.625	-0.522
			AVERAGE	**-0.500 foot**

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. A conversion factor of -.500 feet was applied to the NGVD29 elevations in Doddridge County to convert to NAVD88. Structure and ground elevations in the county must, therefore, be referenced to NAVD88. It is important to note that adjacent communities and counties may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the community and county boundaries.

For more information on NAVD88, see the FEMA publication entitled "Converting the National Flood Insurance Program to the North American Vertical Datum of 1988" (FEMA, June 1992), or contact the National Geodetic Survey Information Services, NOAA, N/NGS12, National Geodetic Survey, SSMC-3, #9202, 1315 East-West Highway, Silver Spring, MD 20910-3282 (Internet address http://www.ngs.noaa.gov).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and

delineations of the 1- and 0.2-percent-annual-chance (500-year) floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 1-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 7).

For the streams studied by approximate methods, the boundaries of the 1-percent-annual-chance floodplain were delineated using the Flood Hazard Boundary Map (FHBM) for the Town of West Union and the FIS for the Unincorporated Areas of Doddridge County (References 8 and 9).

The 1-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic".

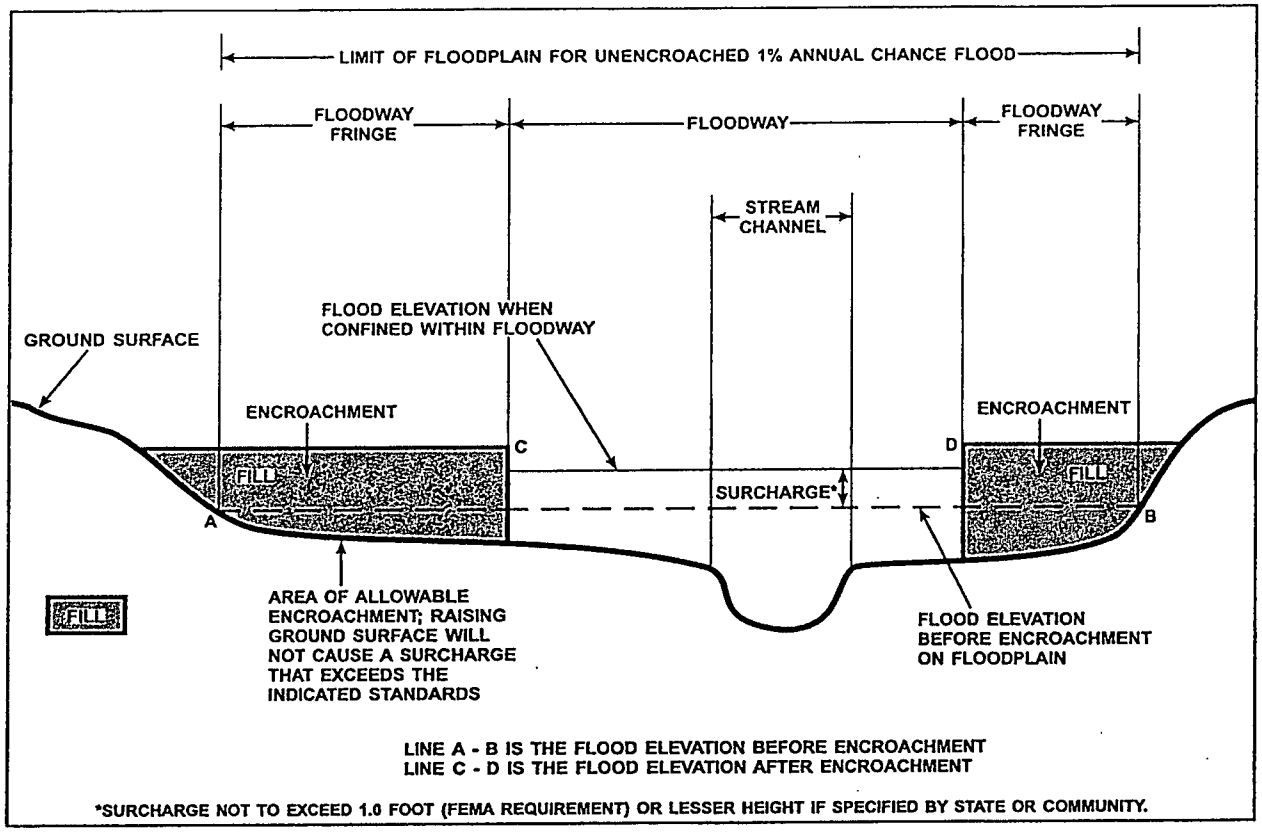


Figure 1 - Floodway Schematic

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no (1-percent-annual-chance) BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot base flood depths derived from the detailed hydraulic analyses are shown within this zone.

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the 1-percent-annual-chance flood event by a flood-control system that was subsequently decertified. Zone AR indicates that the former flood-control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance risk zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

Zone V is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE

Zone VE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1-foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance risk zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Doddridge County. Previously, separate FHBMs and/or FIRMs were prepared for each incorporated community with identified flood hazard areas and the unincorporated areas of the County. Historical map dates relating to pre-countywide maps prepared for each community are presented in Table 4, "Community Map History".

COMMUNITY NAME	INITIAL NFIP MAP DATE	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	INITIAL FIRM DATE	FIRM REVISIONS DATE
West Union, Town of	March 29, 1974	NONE	March 18, 1991	
Doddridge County (Unincorporated Areas)	November 8, 1974	June 3, 1977	March 18, 1991	

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Flood Insurance Studies have been prepared for the unincorporated areas of Tyler, Ritchie and Harrison Counties, and for Lewis County and Incorporated Areas (References 10, 11, 12 and 13). The results of this study are in exact agreement with the results of those studies.

A FIS is currently being prepared for Gilmer County and Incorporated Areas (Reference 14). The results of that study will be in exact agreement with the results of this study.

Because it is based on more up-to-date analyses, this study supersedes the Flood Hazard Boundary Map for the Town of West Union and the FIS for the Unincorporated Areas of Doddridge County (References 8 and 9).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region III, One Independence Mall, Sixth Floor, 615 Chestnut Street, Philadelphia, PA 19106-4404.

9.0 BIBLIOGRAPHY AND REFERENCES

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8. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Town of West Union, Doddridge County, West Virginia, April 2, 1976.

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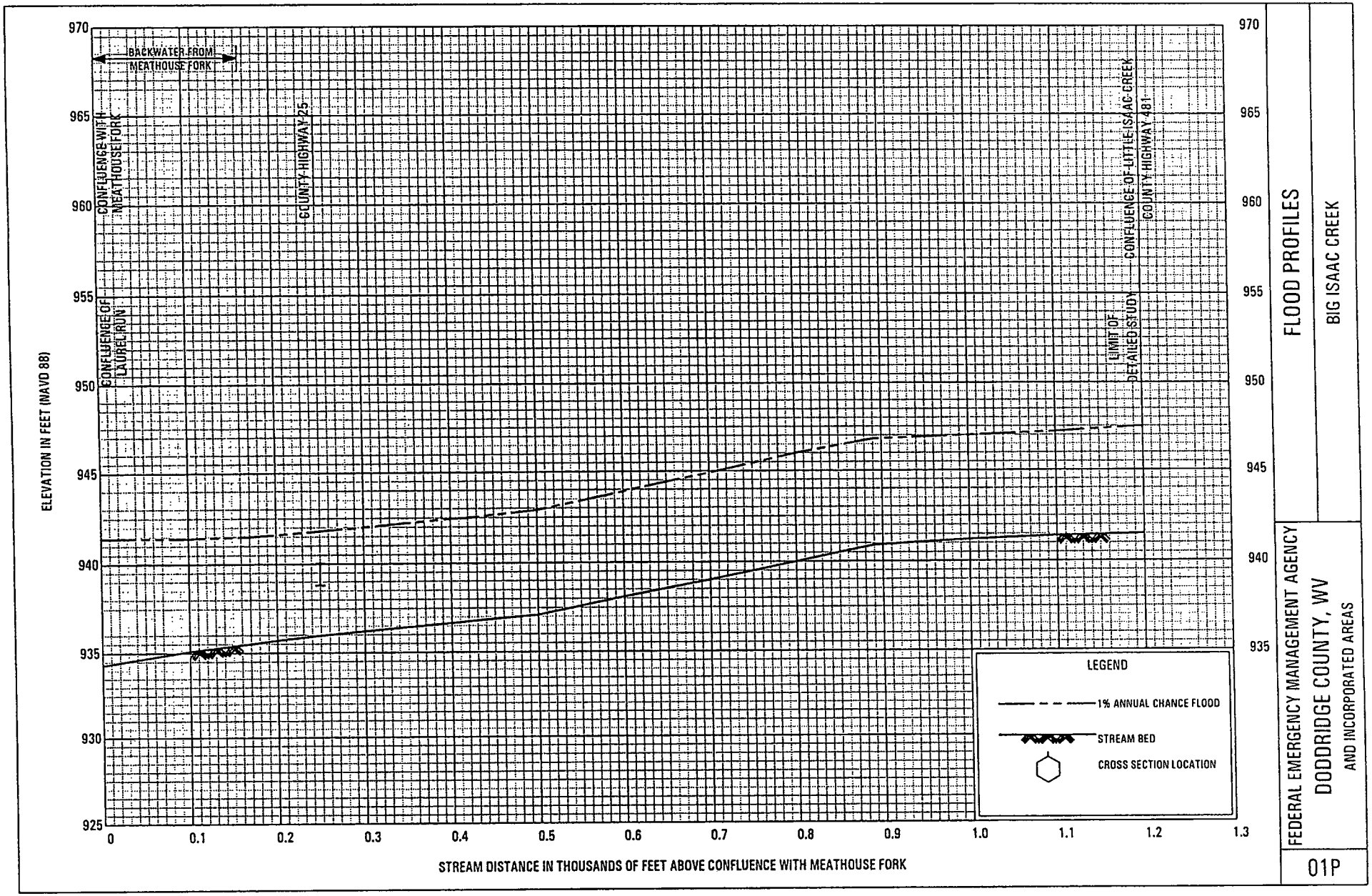
10. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Tyler County, West Virginia, Washington, D. C., November 4, 1988.

11. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Harrison County, West Virginia, Washington, D. C., July 4, 1988.

12. Federal Emergency Management Agency, Flood Insurance Study, Lewis County and Incorporated Areas, West Virginia, Washington, D.C., July 1, 1987.

13. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Ritchie County, West Virginia, Washington, D.C., December 11, 1981.

14. Federal Emergency Management Agency, Flood Insurance Study, Gilmer County and Incorporated Areas, West Virginia (Unpublished).



FLOOD PROFILES

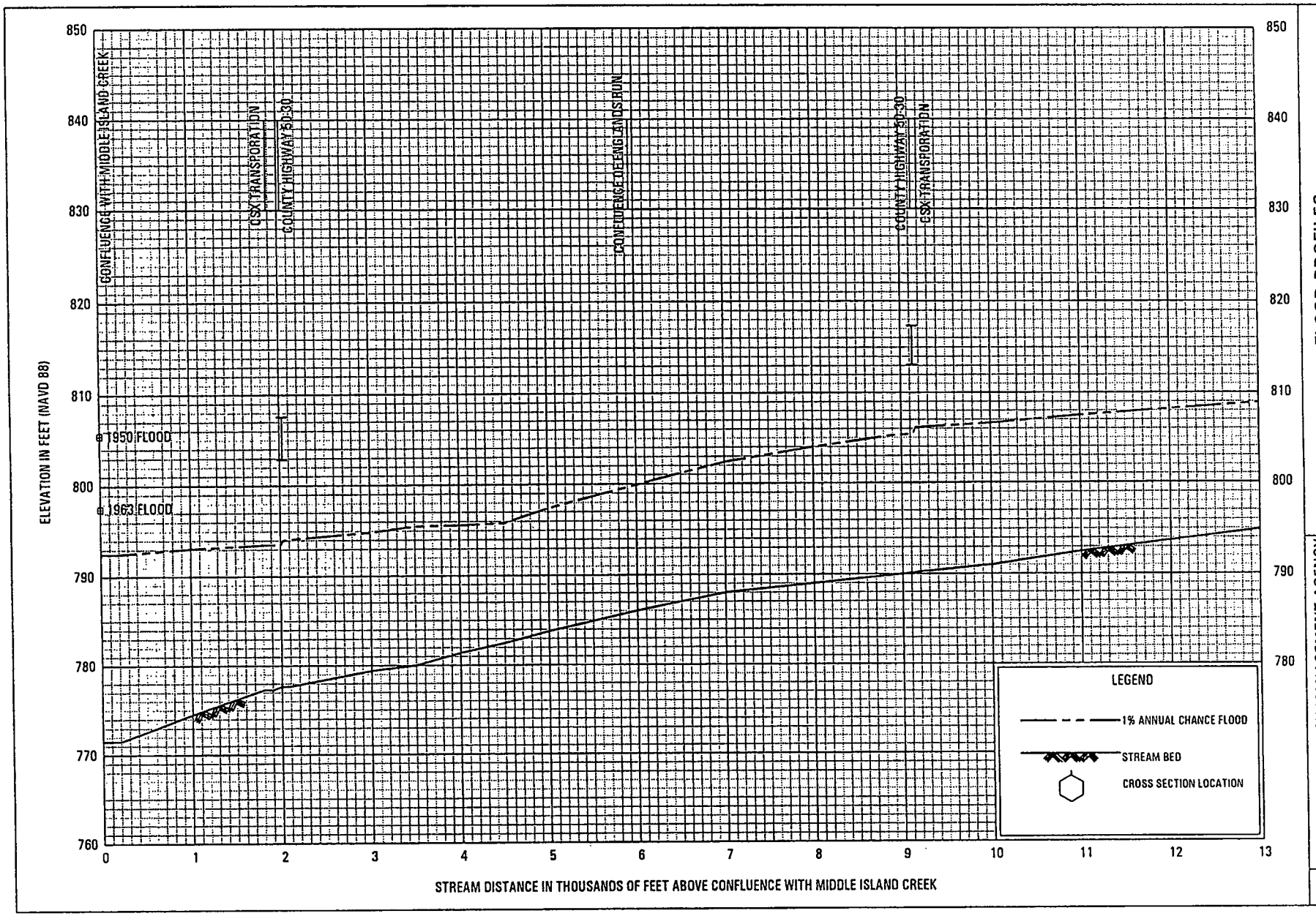
BIG ISAAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

01P



FLOOD PROFILES

BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

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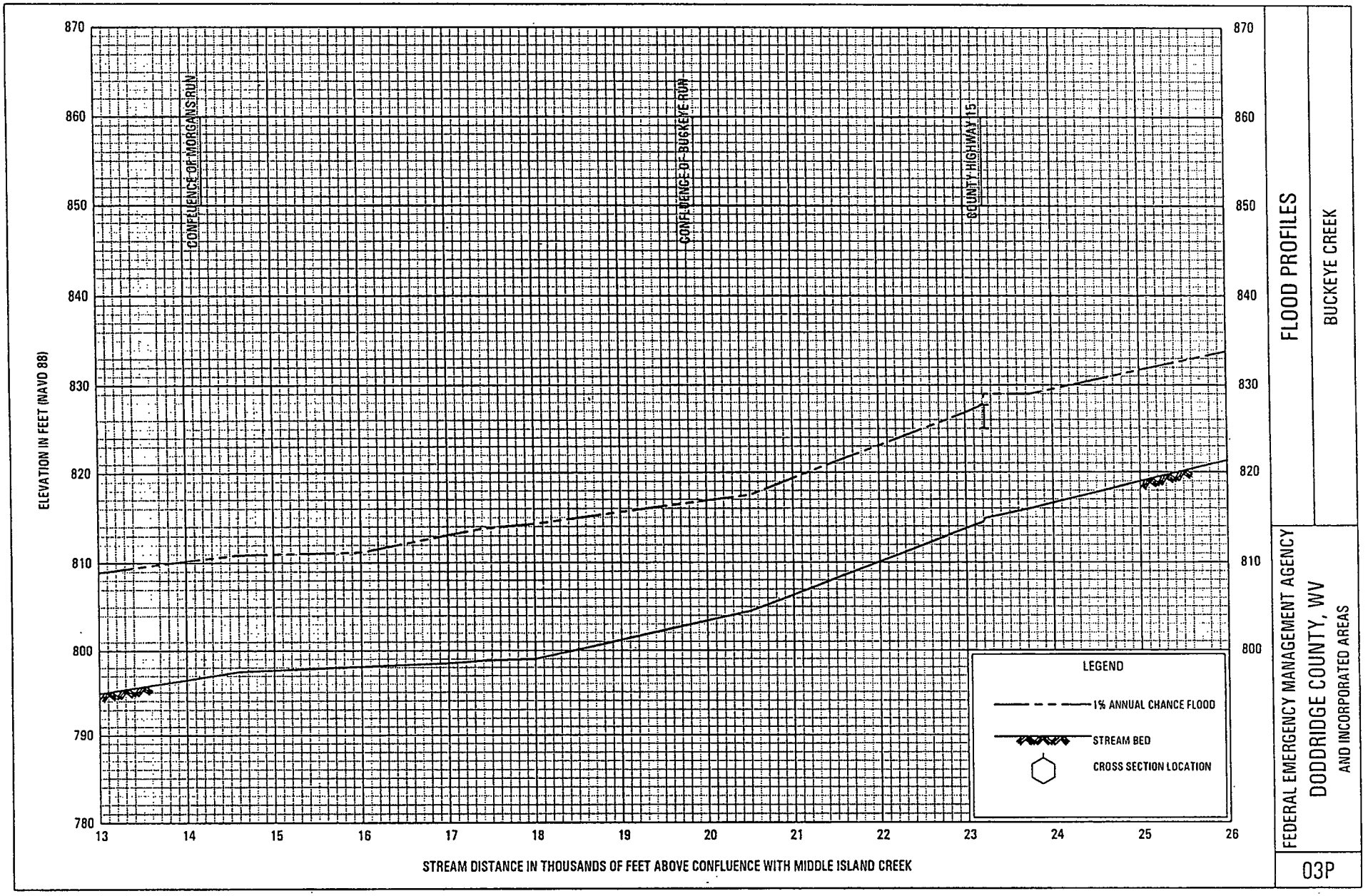
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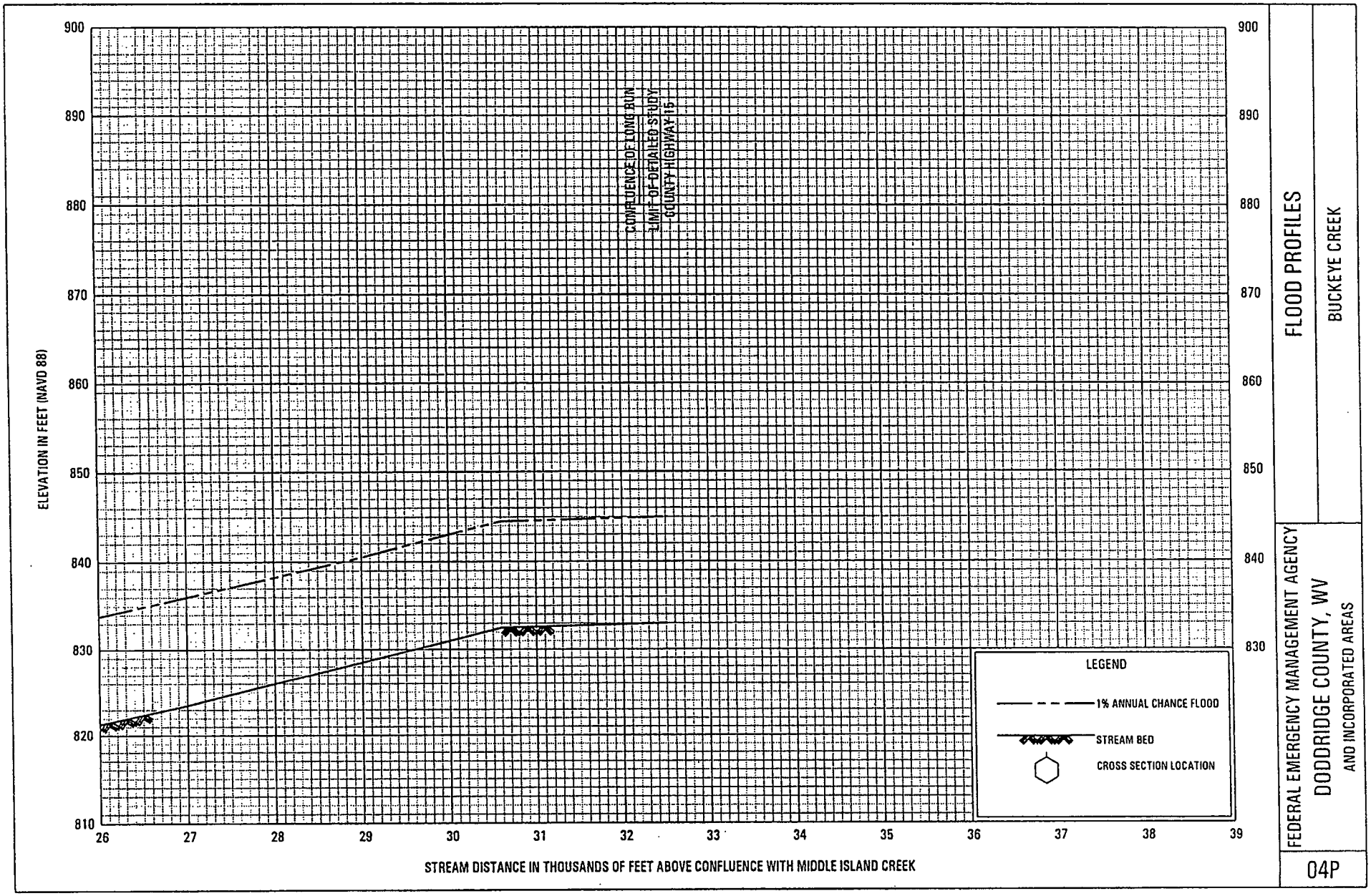
26
ELEVATION IN FEET (NAVD 88)
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH MIDDLE ISLAND CREEK
CONFLUENCE OF MORGANS RUN
CONFLUENCE OF BUCKEYE RUN
COUNTY HIGHWAY 15
LEGEND
1% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
BUCKEYE CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS
03P



FLOOD PROFILES

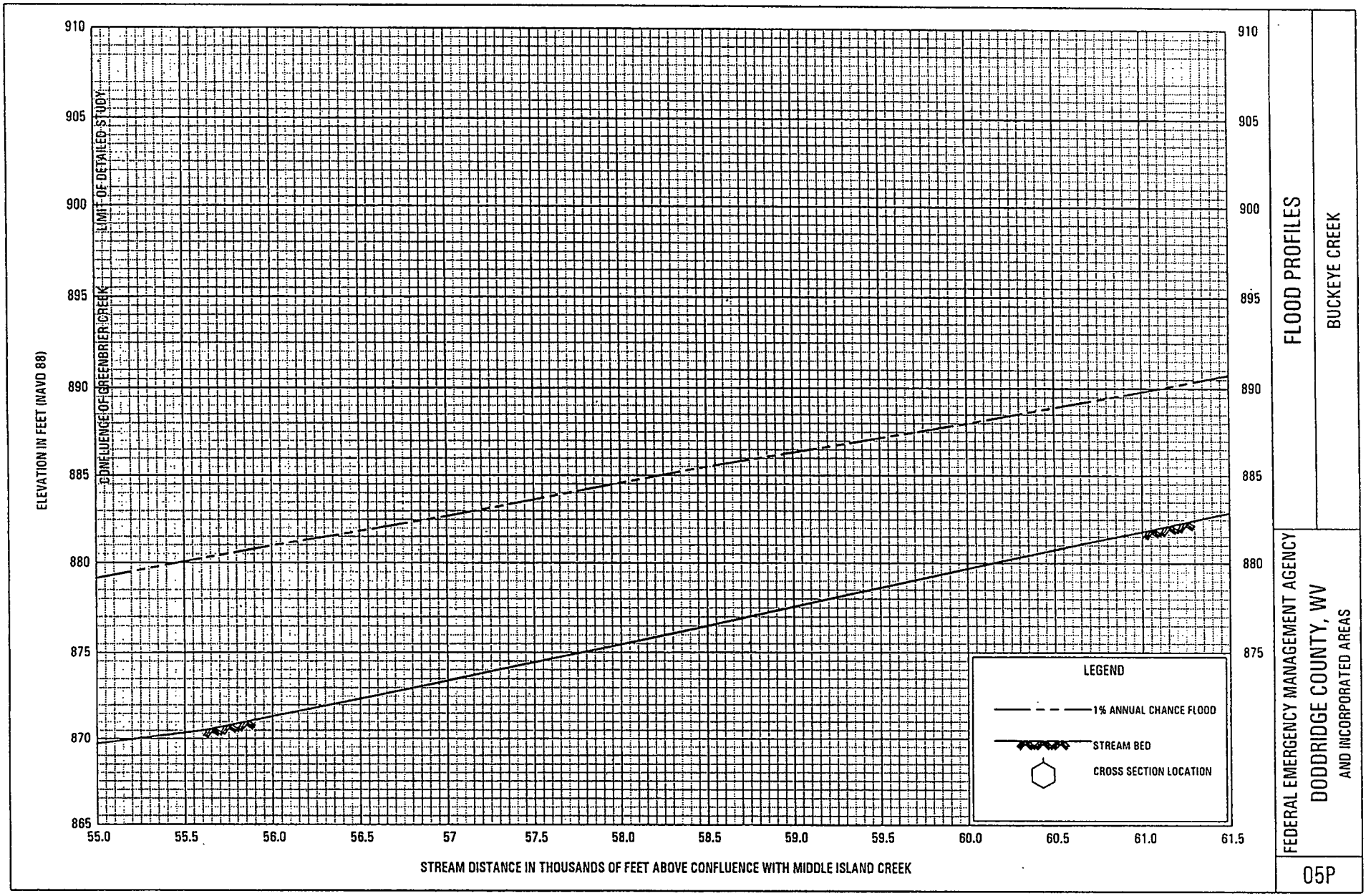
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

04P



FLOOD PROFILES

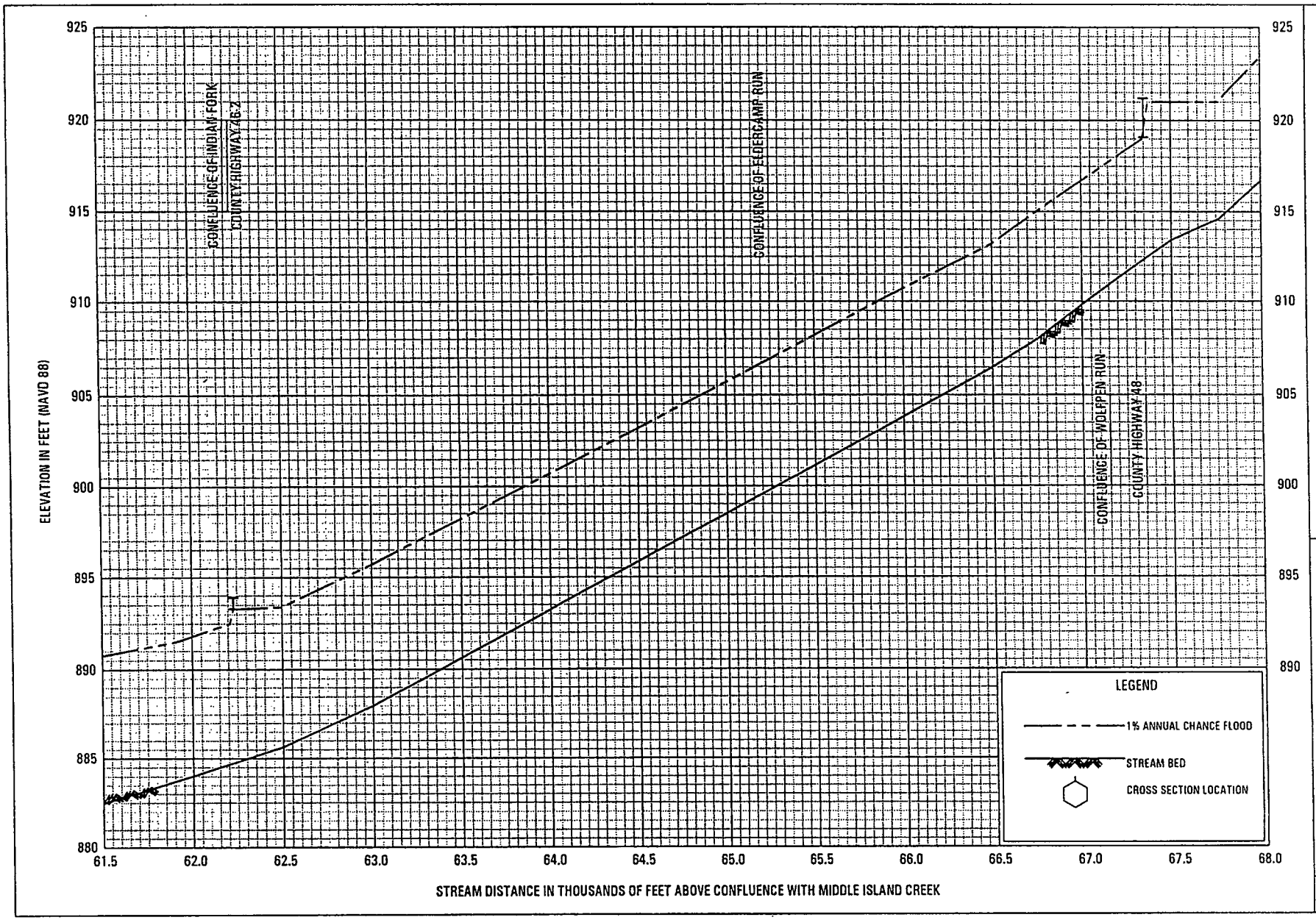
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

05P



FLOOD PROFILES

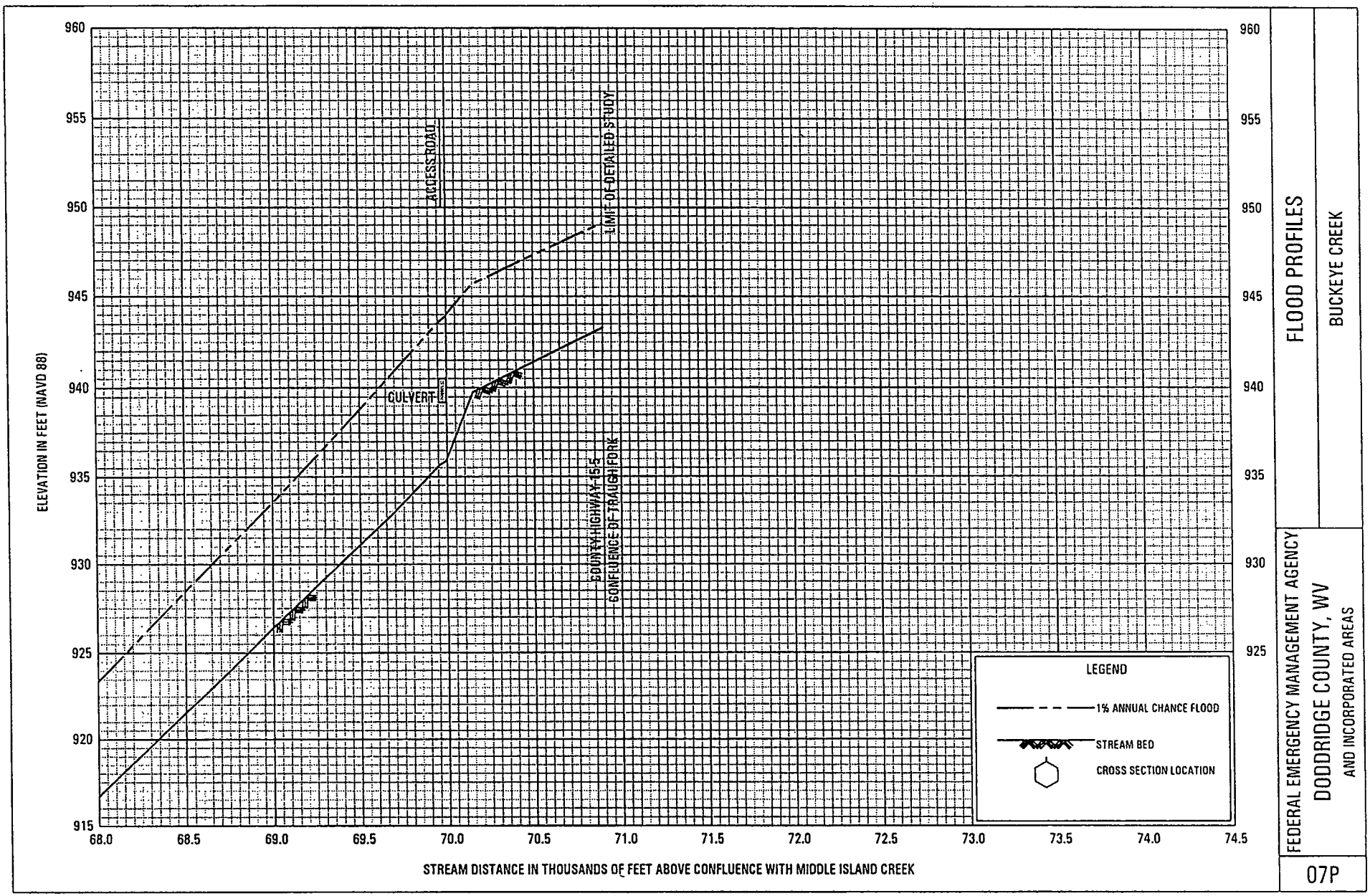
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

06P



FLOOD PROFILES

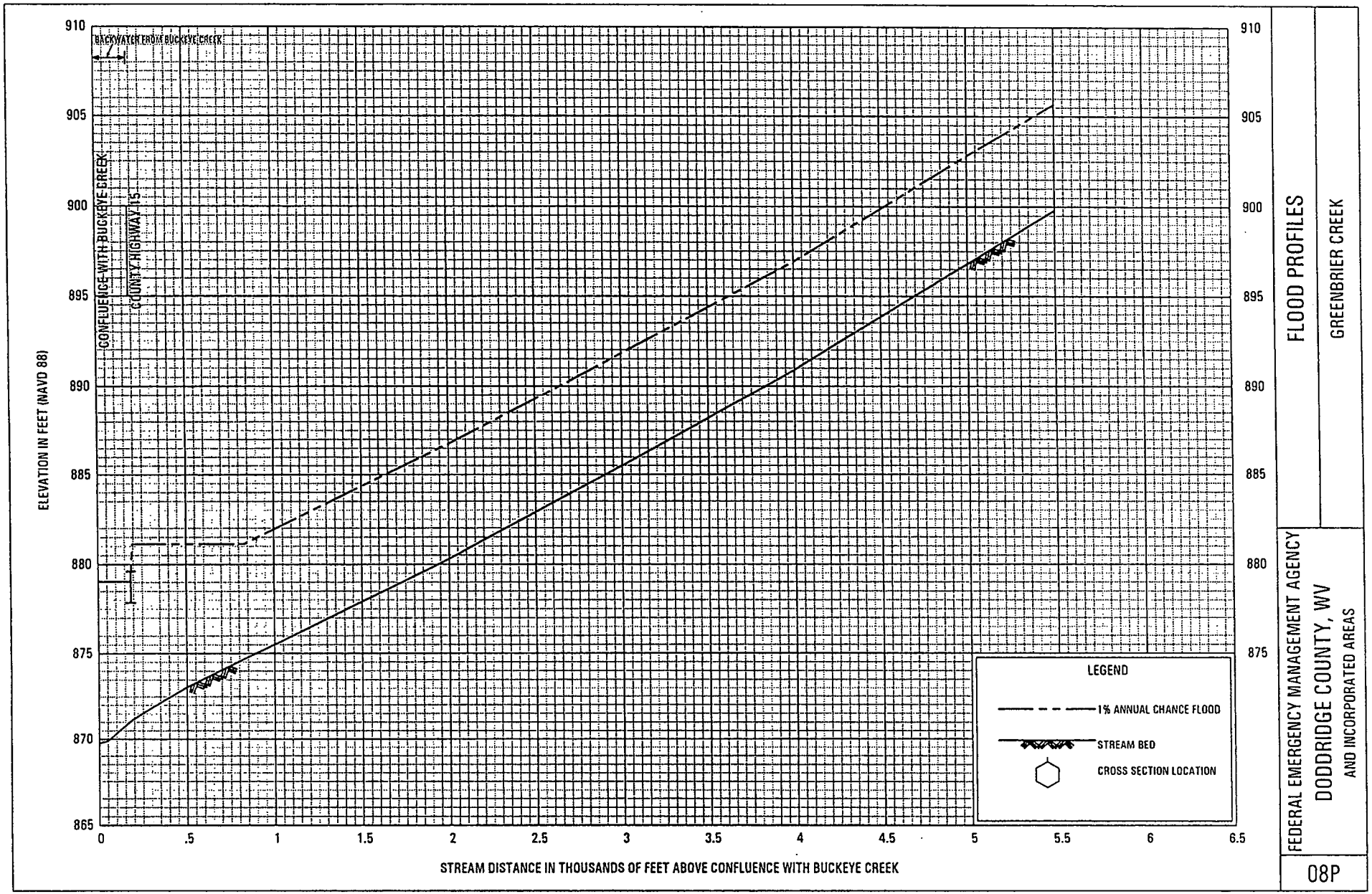
BUCKEYE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

07P



FLOOD PROFILES

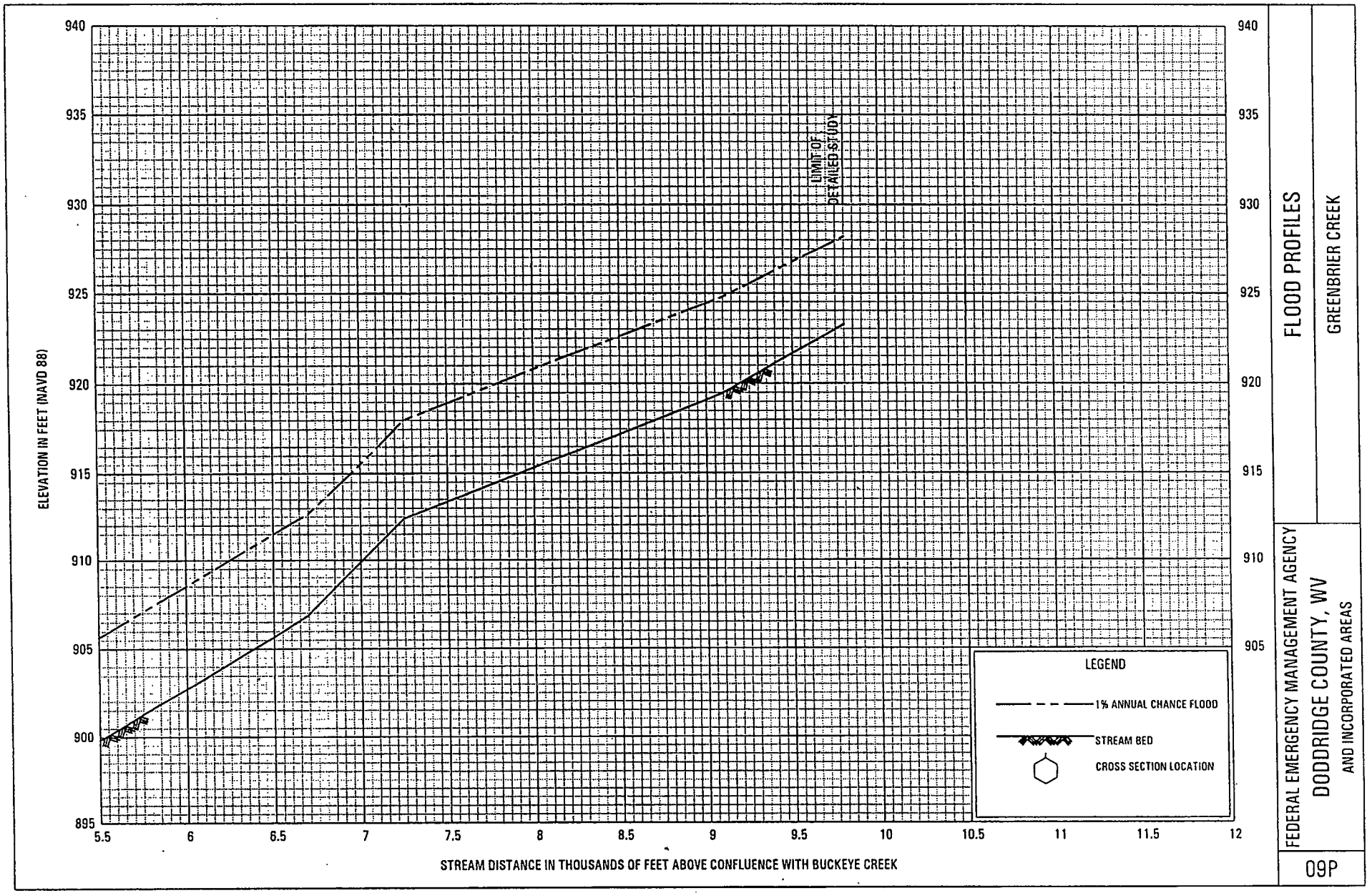
GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

08P



FLOOD PROFILES

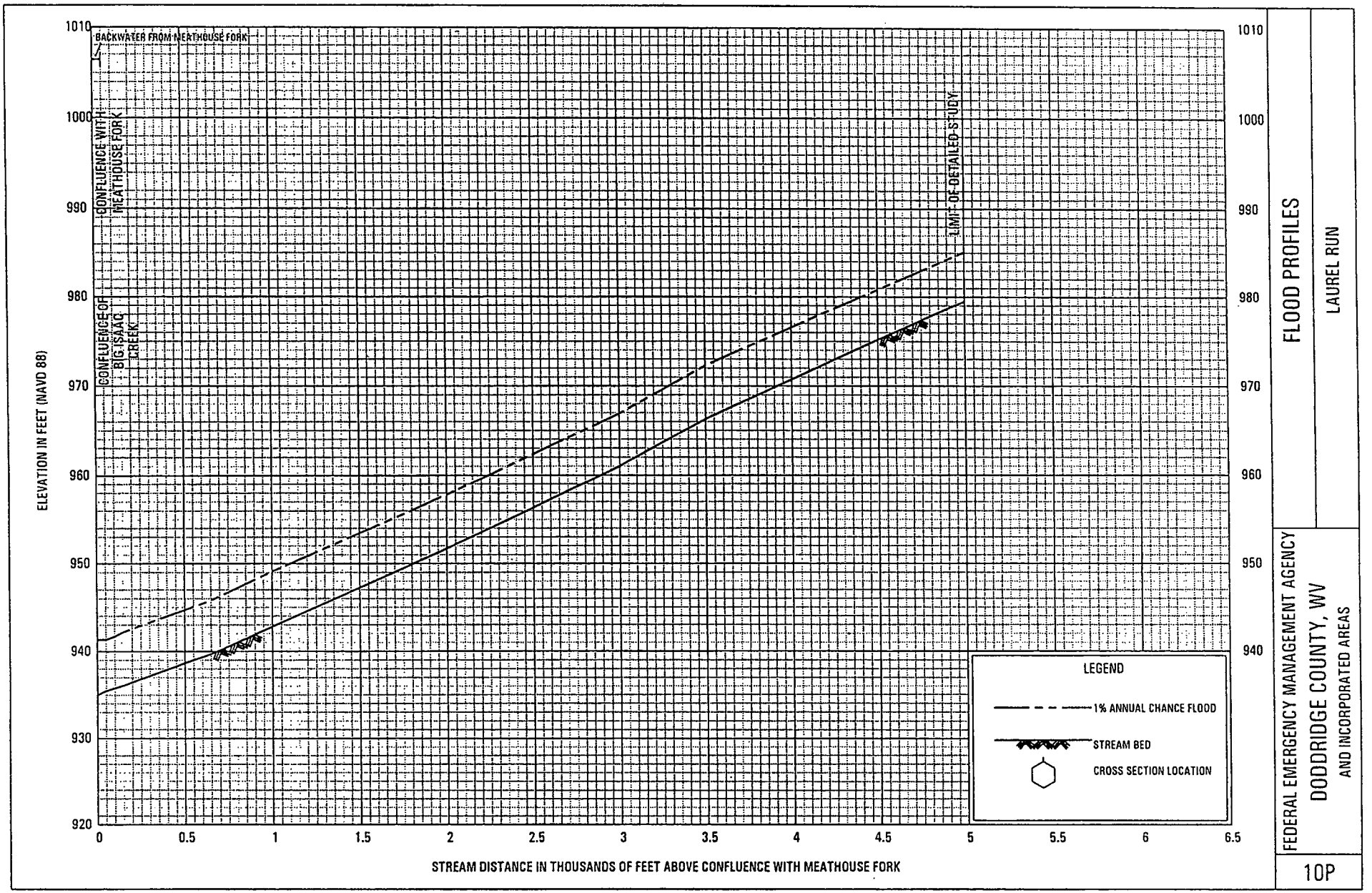
GREENBRIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

09P



FLOOD PROFILES

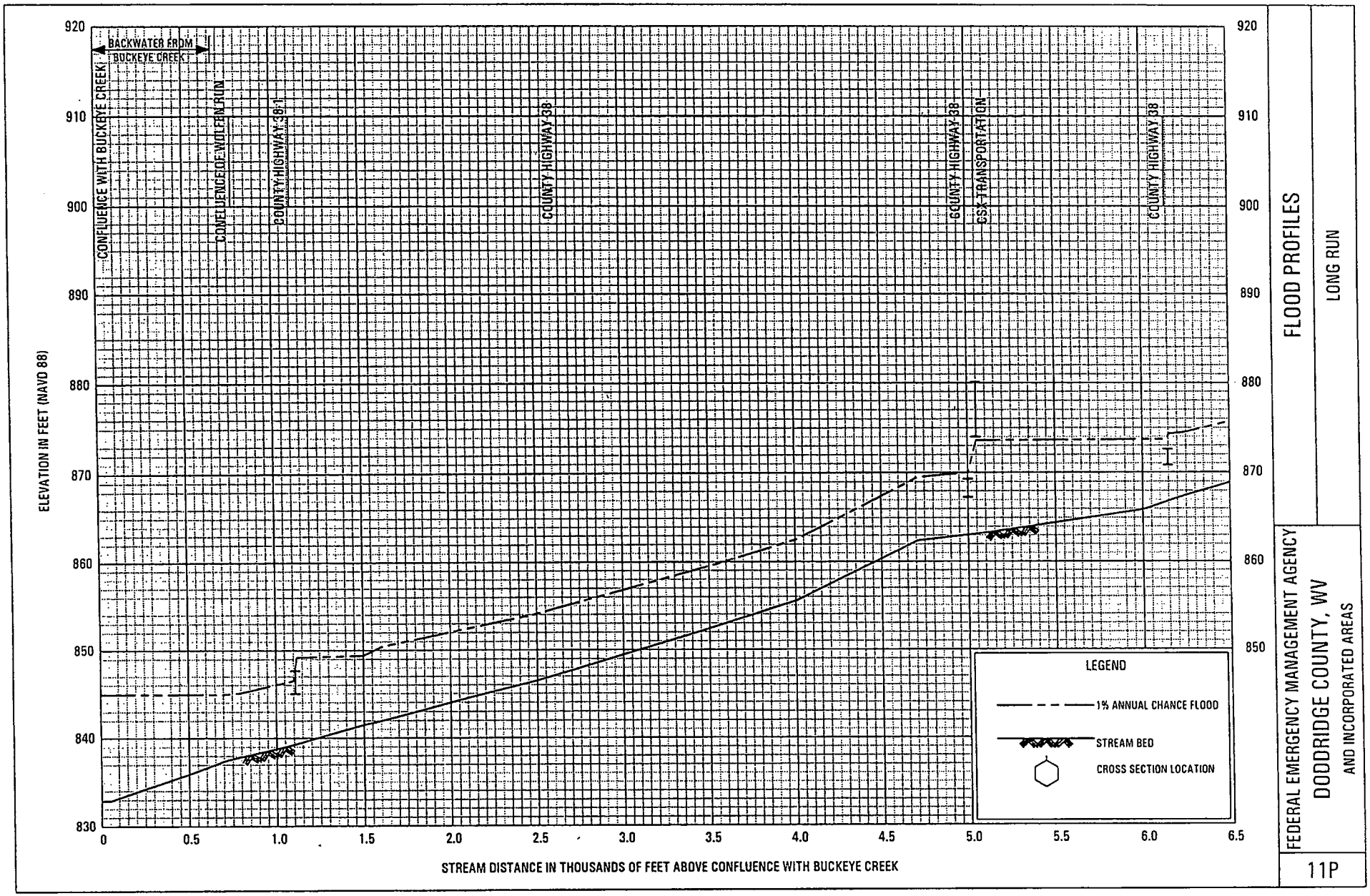
LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

10P



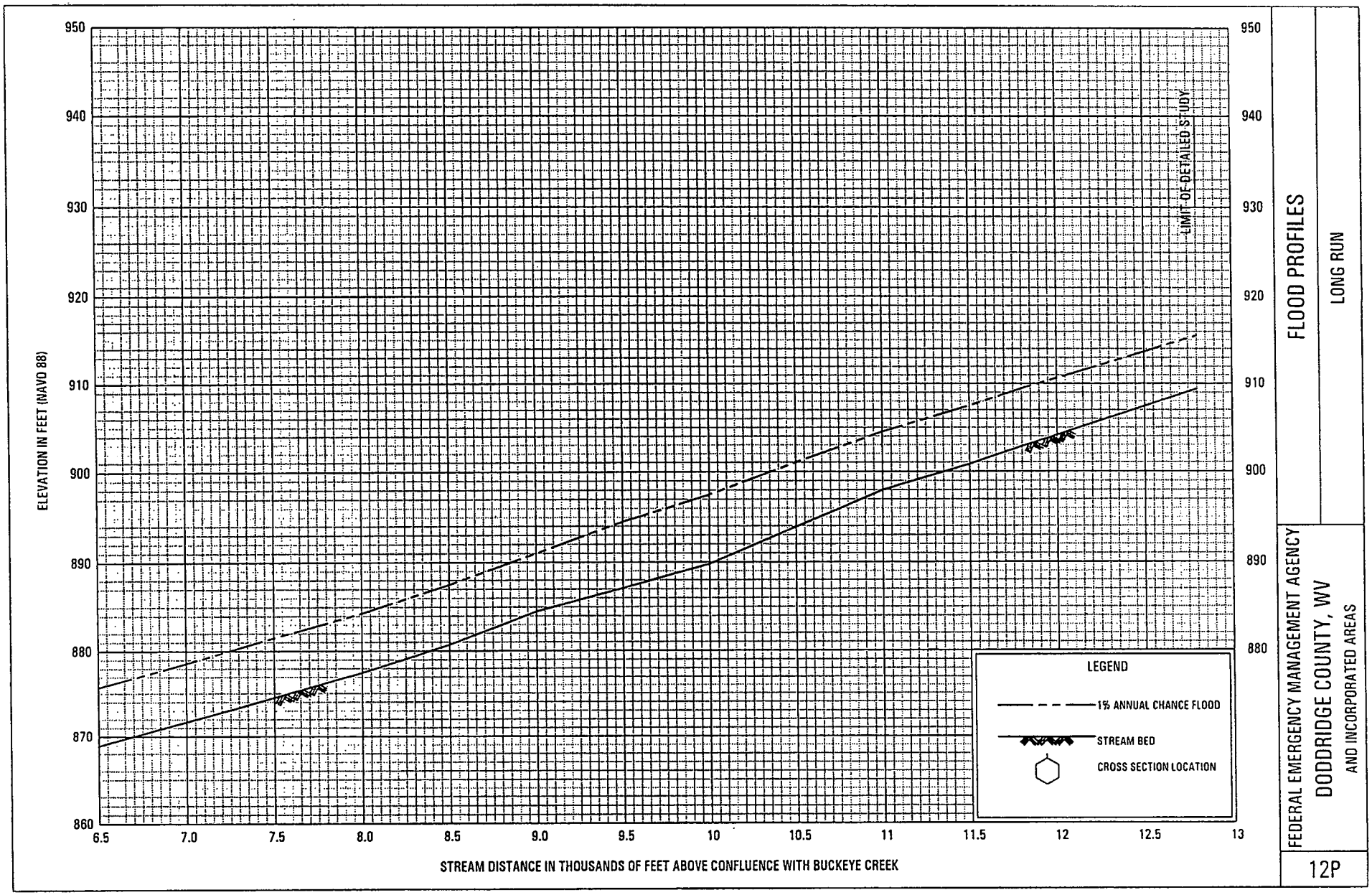
FLOOD PROFILES

LONG RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



FLOOD PROFILES

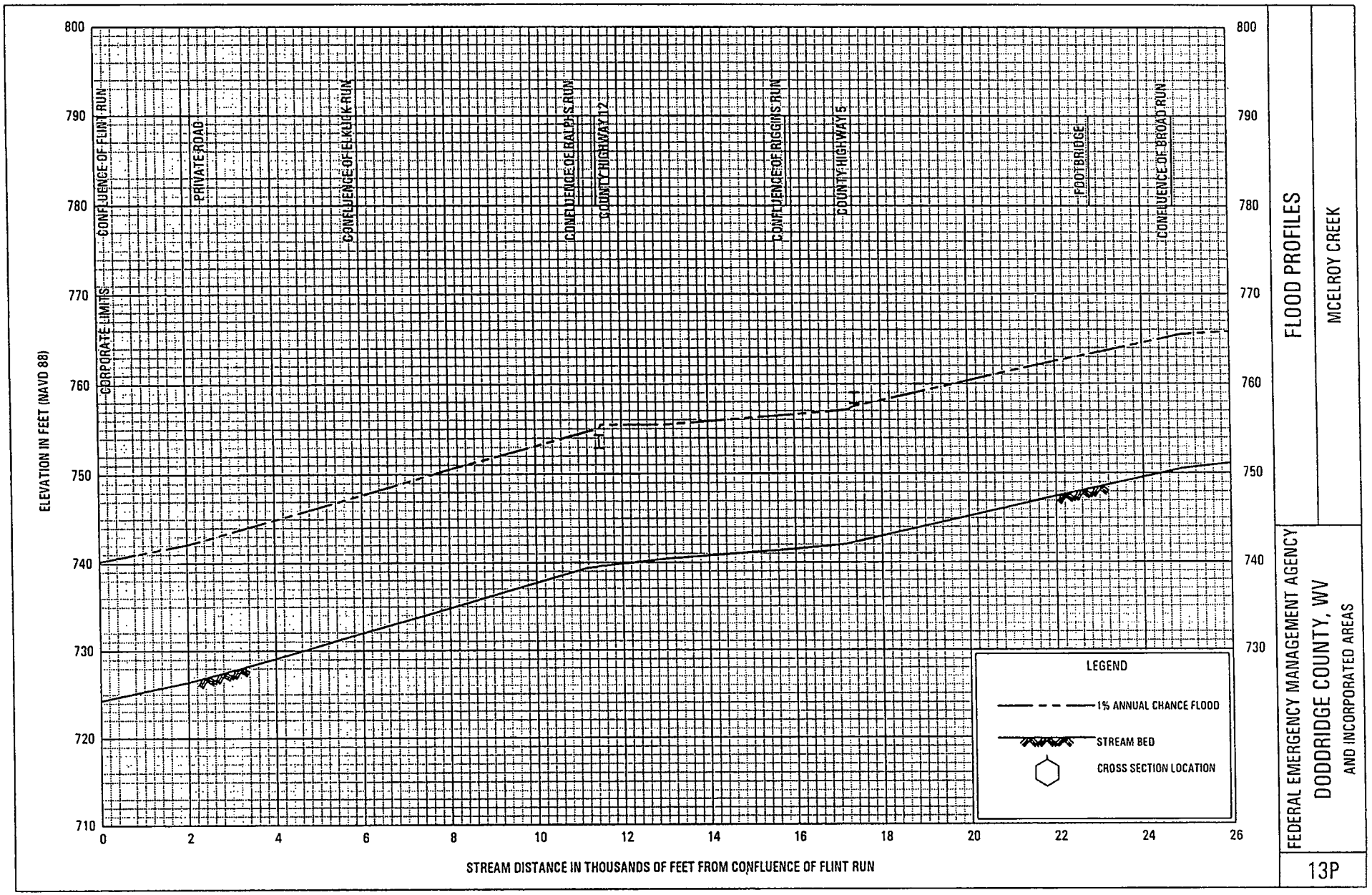
LONG RUN

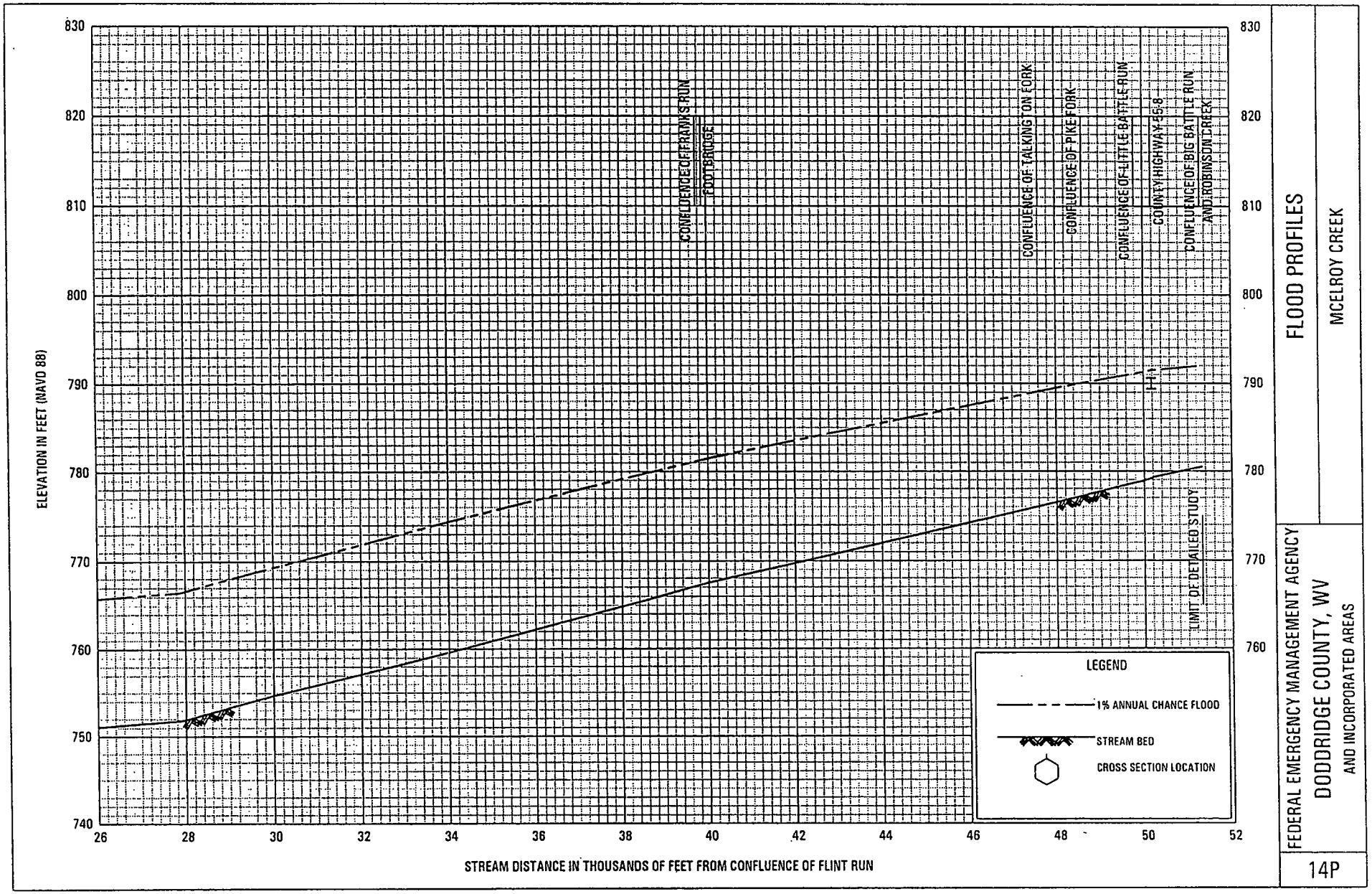
FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

12P


ELEVATION IN FEET (NAVD 88)
800
790
780
770
760
750
740
730
720
710
0
2
4
6
8
10
12
14
16
18
20
22
24
26
STREAM DISTANCE IN THOUSANDS OF FEET FROM CONFLUENCE OF FLINT RUN
CONFLUENCE OF FLINT RUN
CORPORATE LIMITS
PRIVATE ROAD
CONFLUENCE OF ELK LICK RUN
CONFLUENCE OF RALPH'S RUN
COUNTY HIGHWAY 12
CONFLUENCE OF RIGGINS RUN
COUNTY HIGHWAY 5
FOOTBRIDGE
CONFLUENCE OF BROAD RUN
LEGEND
1% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
MCELROY CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS
13P



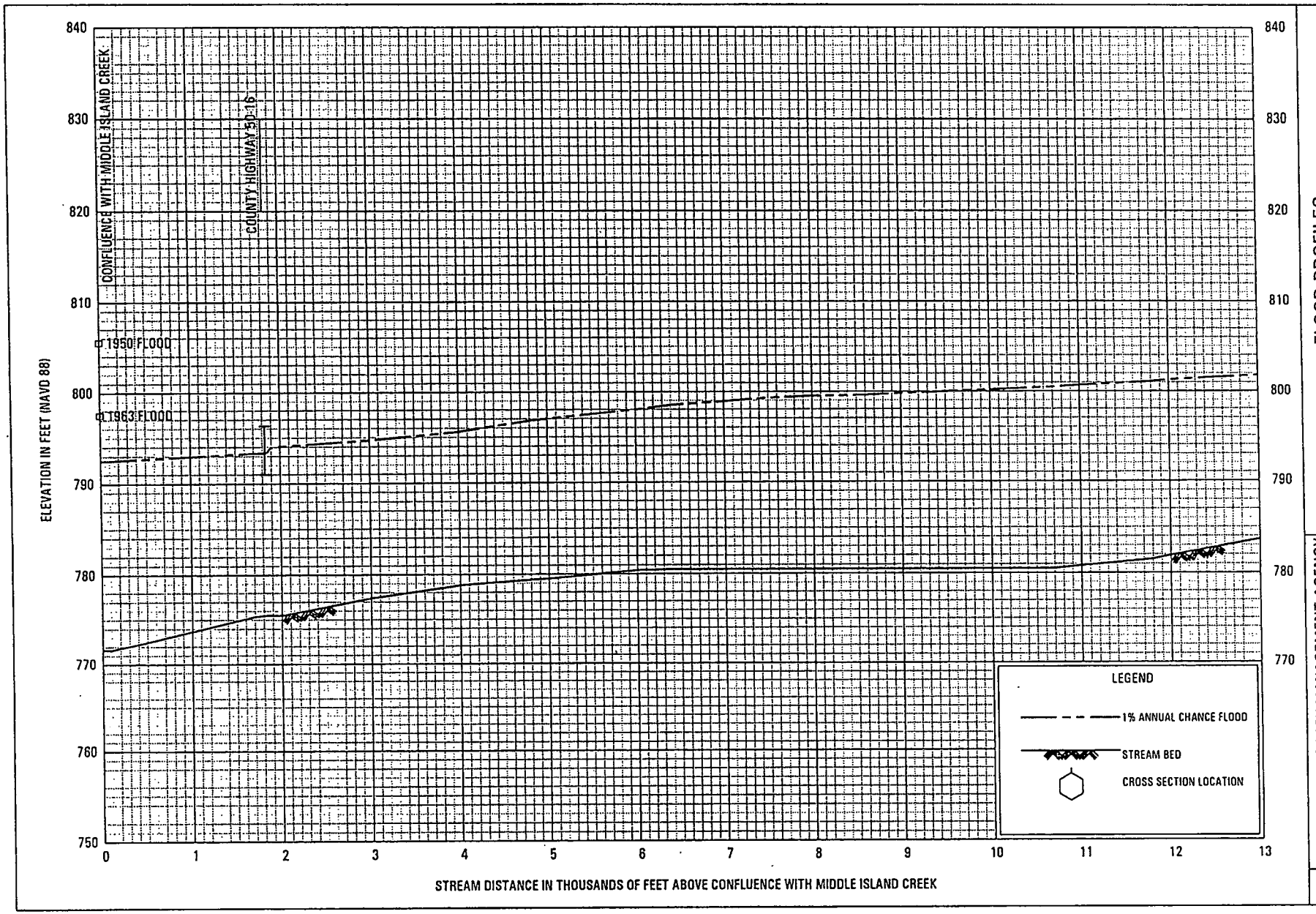
FLOOD PROFILES

MCELROY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS



FLOOD PROFILES

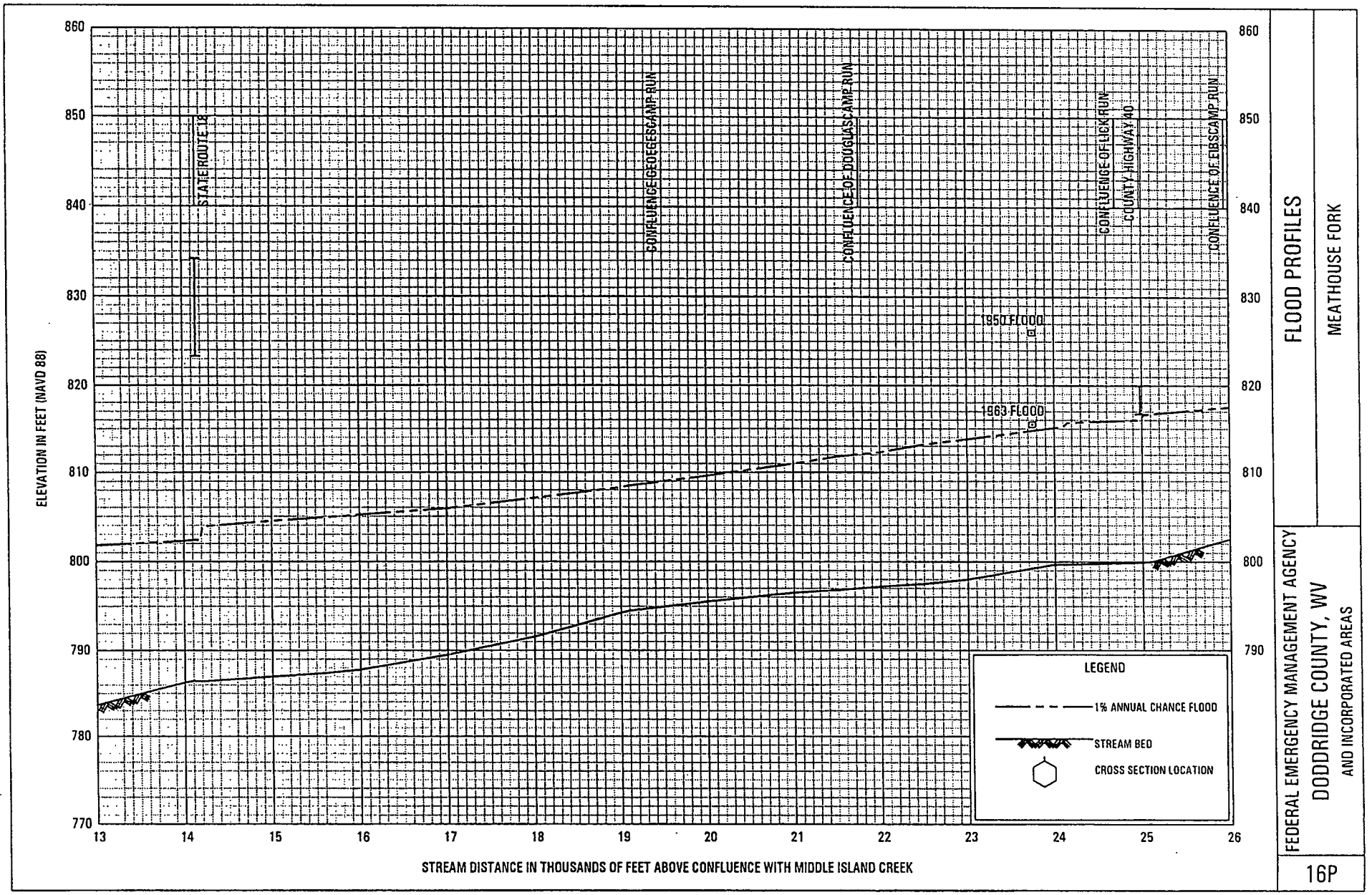
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

15P



FLOOD PROFILES

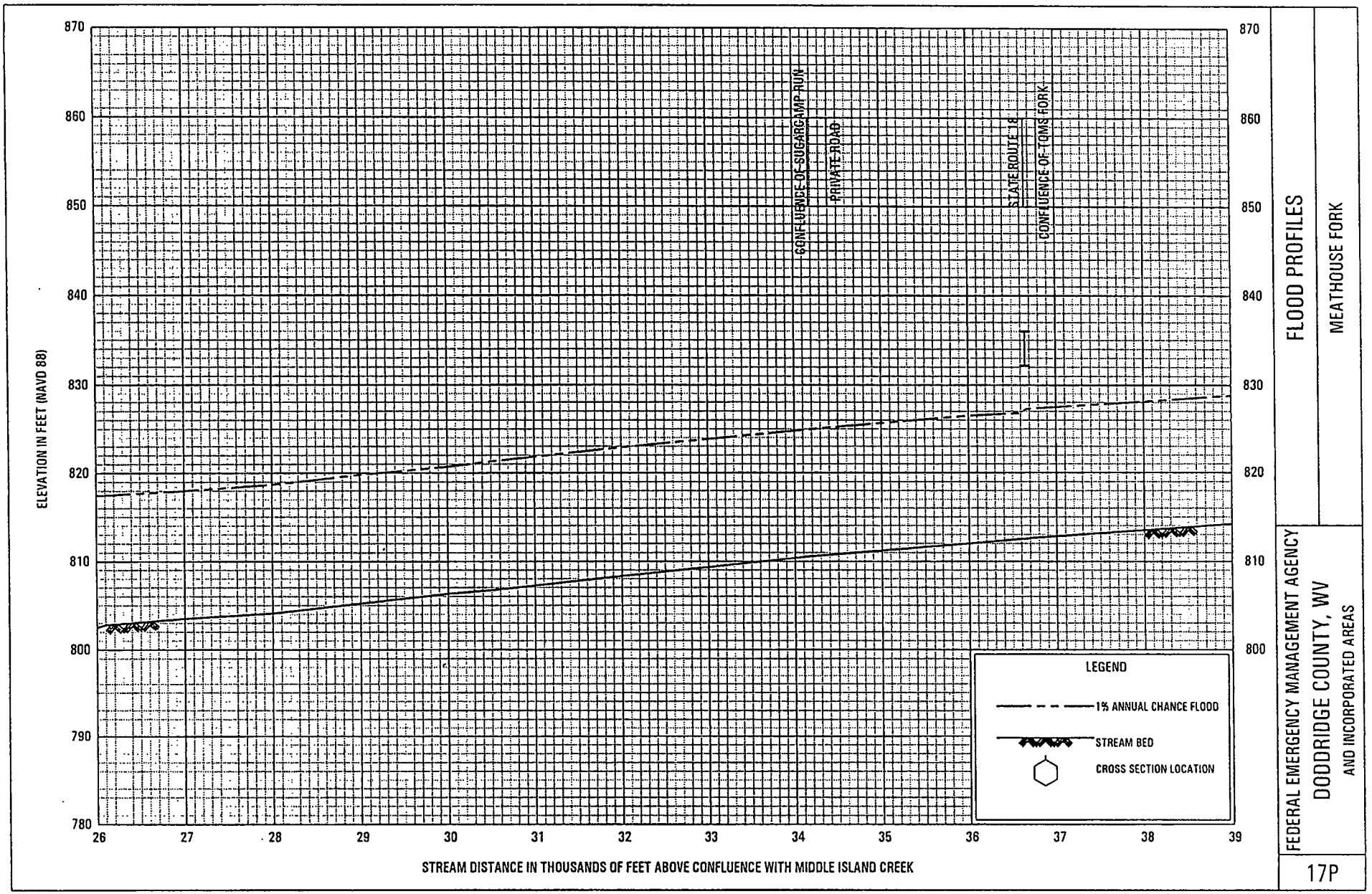
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

16P



FLOOD PROFILES

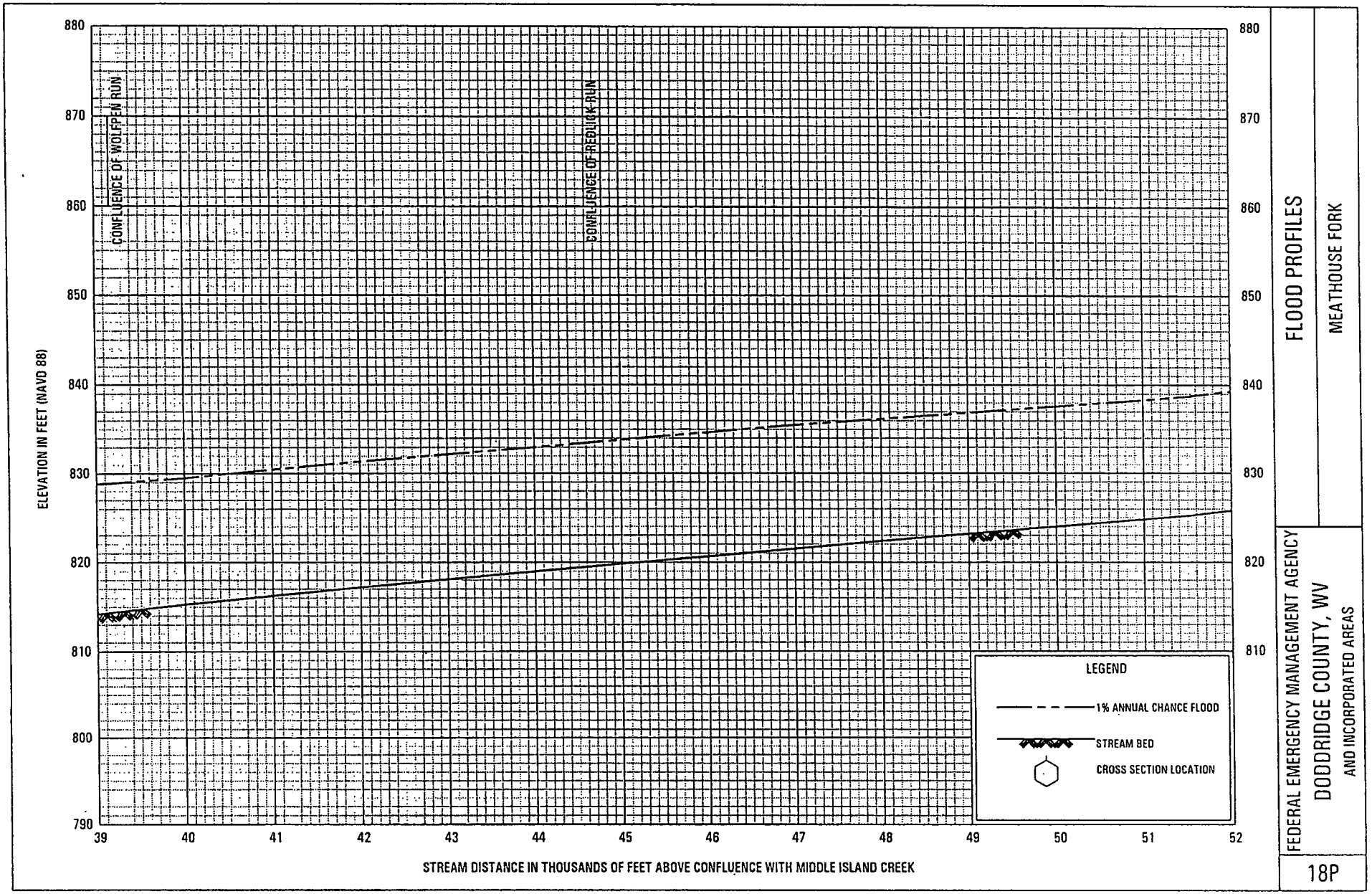
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

17P



FLOOD PROFILES

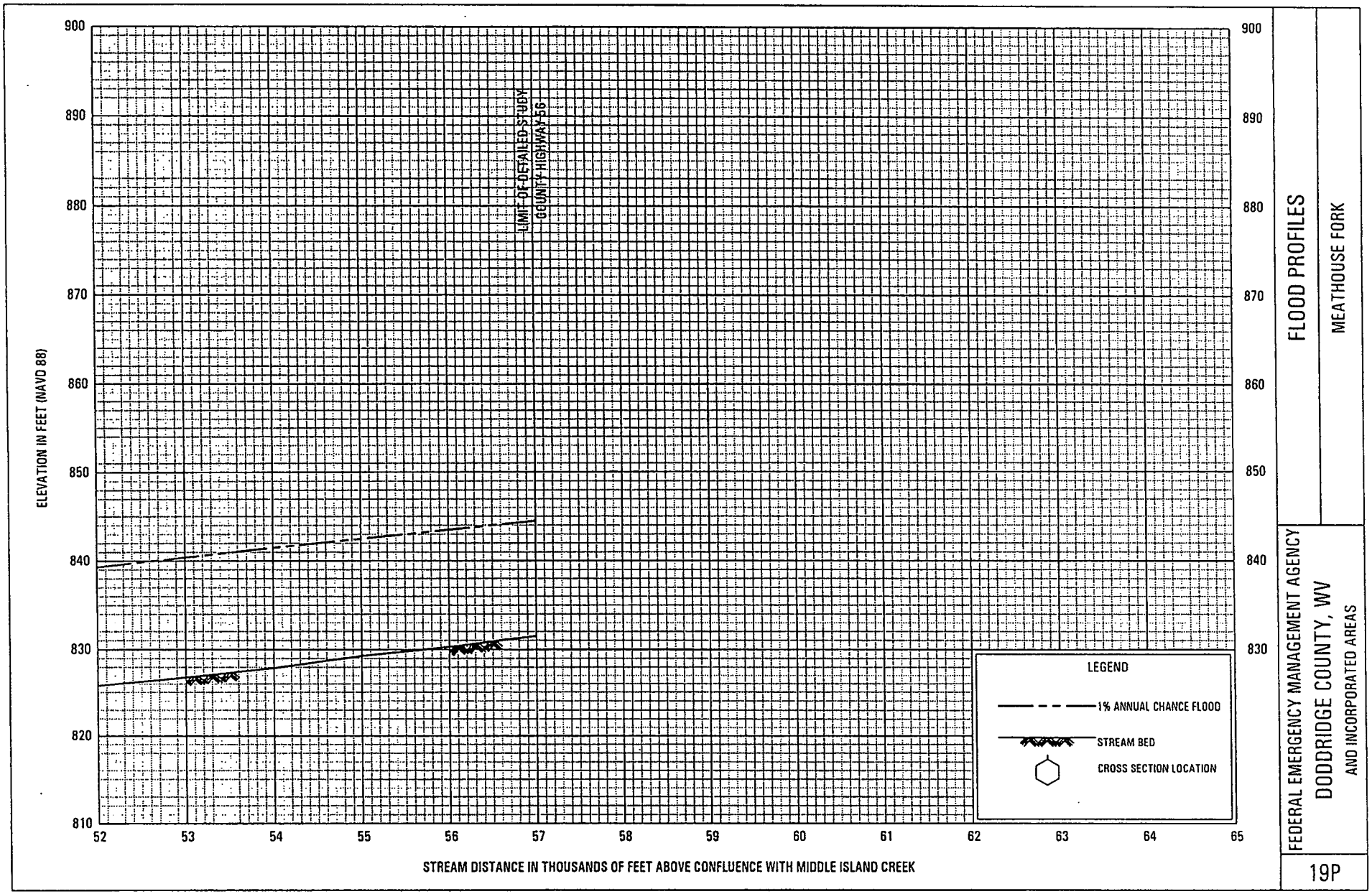
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

18P



FLOOD PROFILES

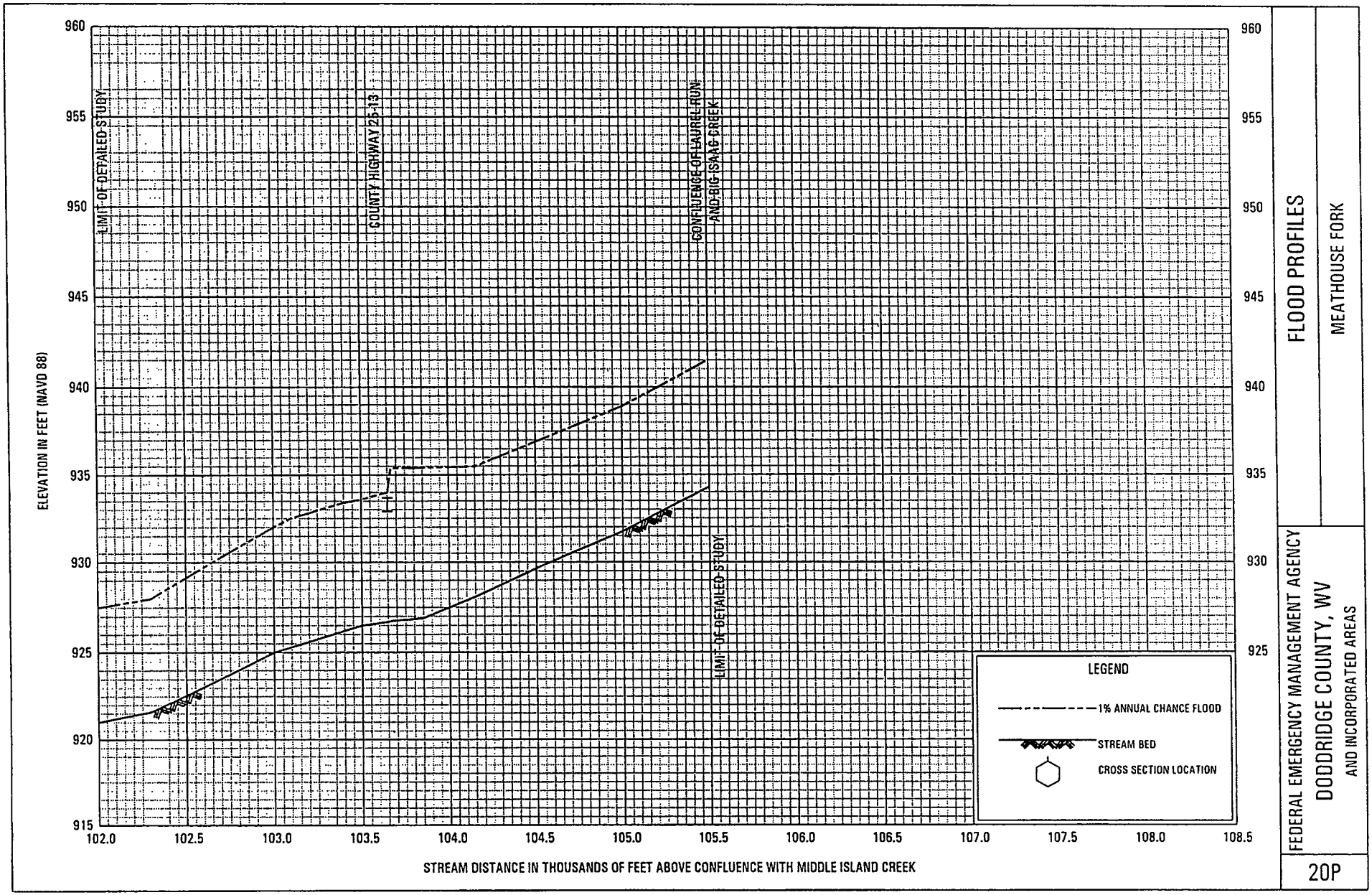
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

19P



FLOOD PROFILES

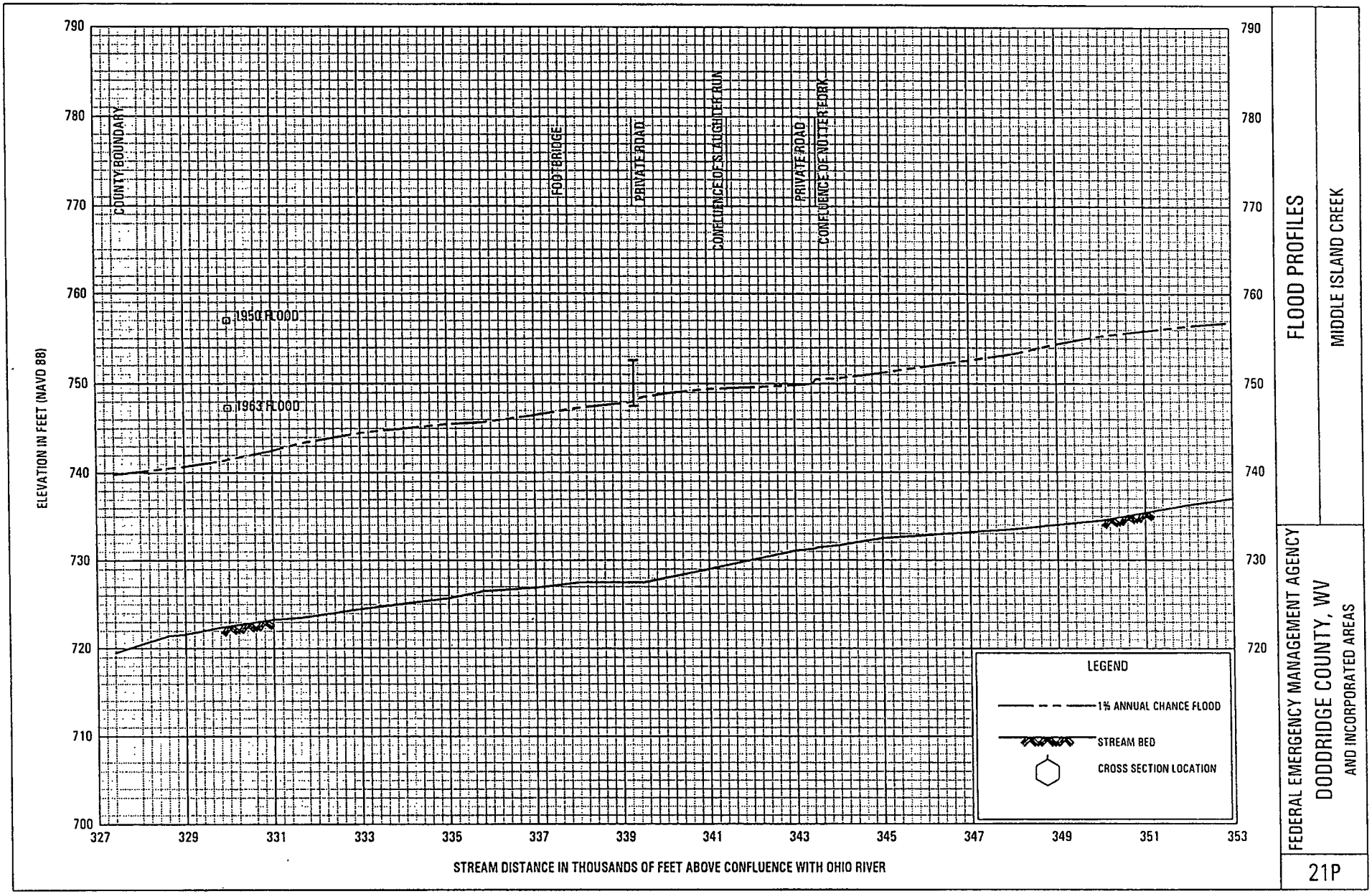
MEATHOUSE FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

20P



FLOOD PROFILES

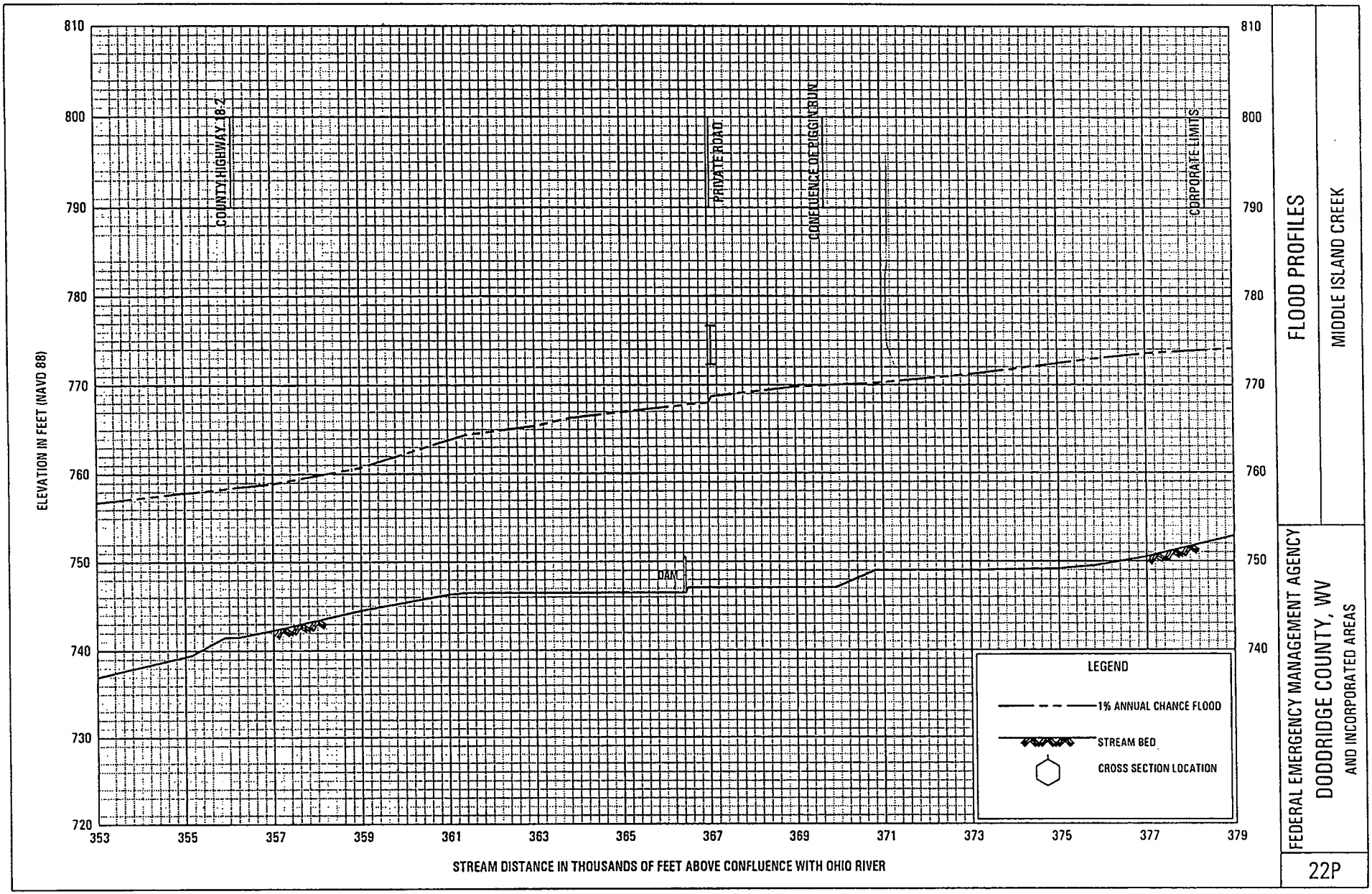
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

21P



FLOOD PROFILES

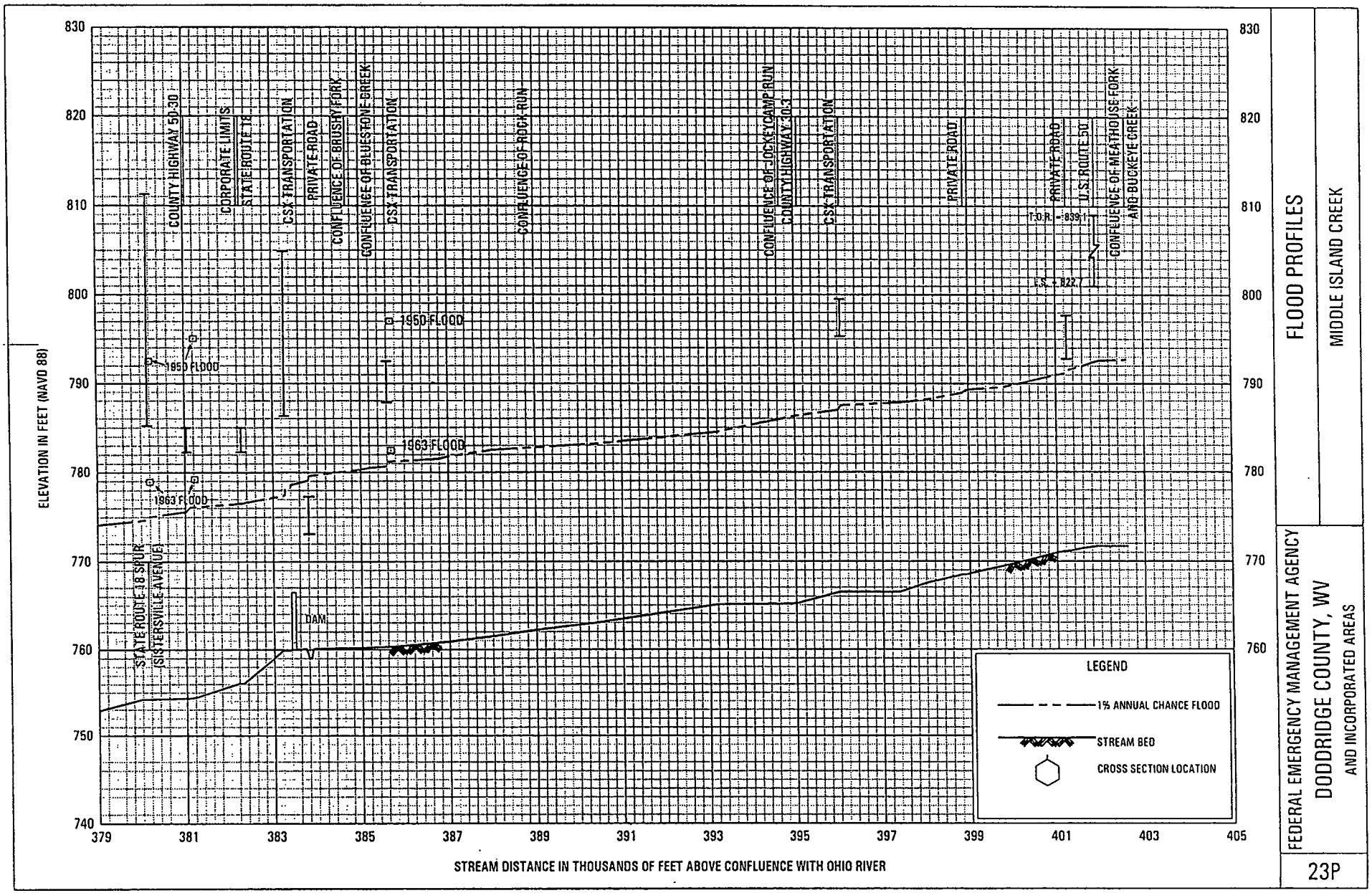
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

22P



FLOOD PROFILES

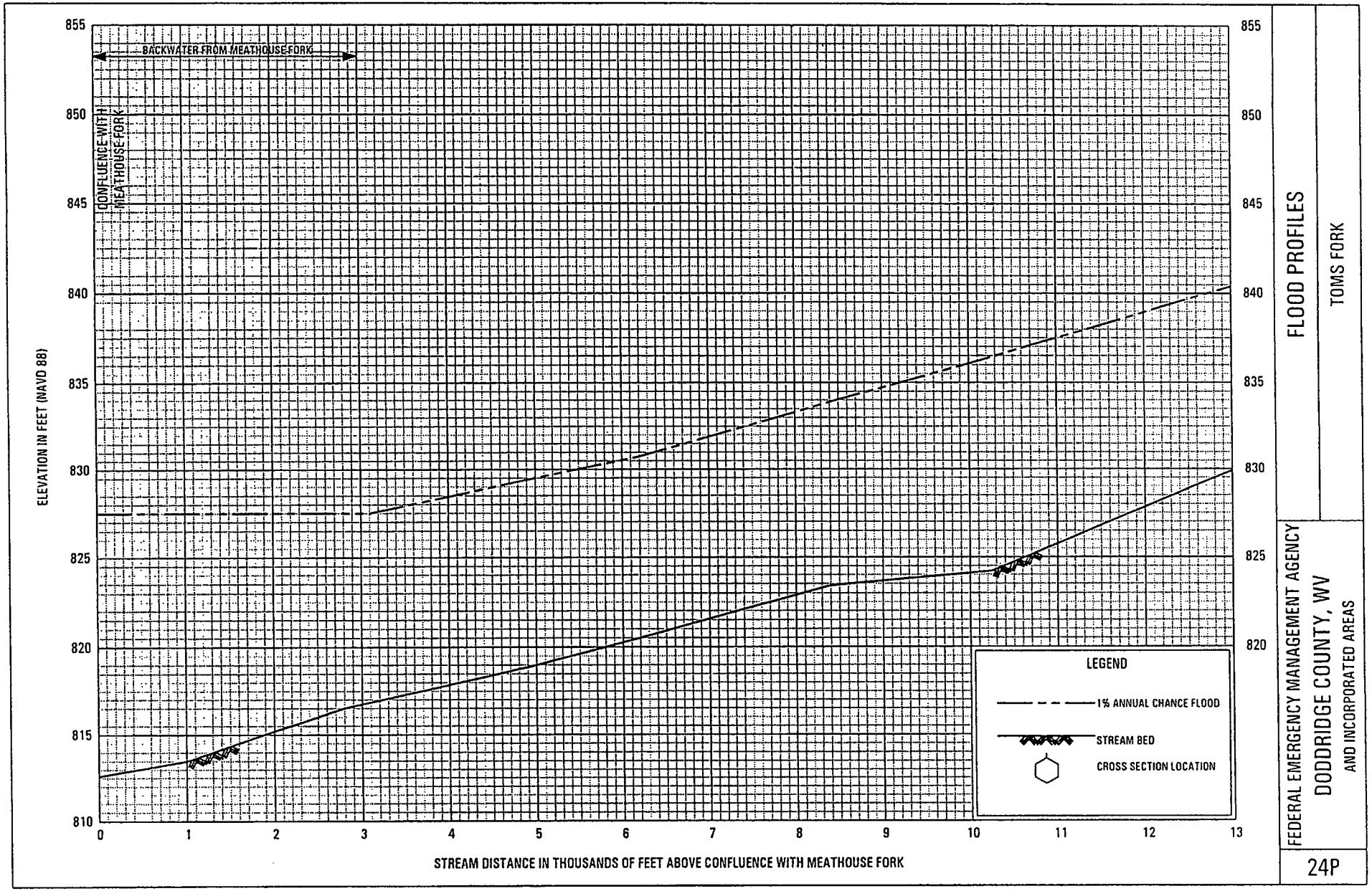
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

23P



FLOOD PROFILES

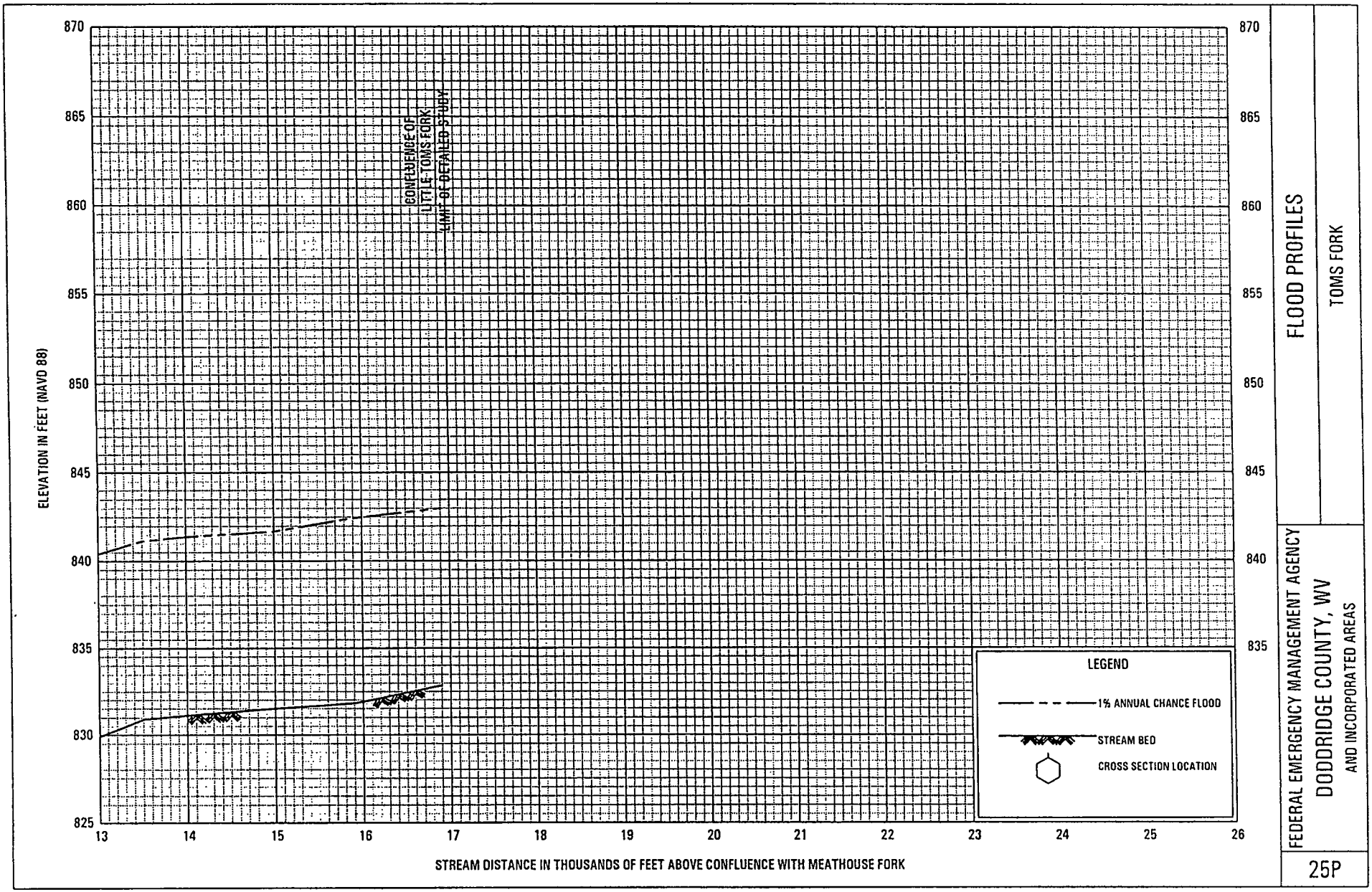
TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

24P



FLOOD PROFILES

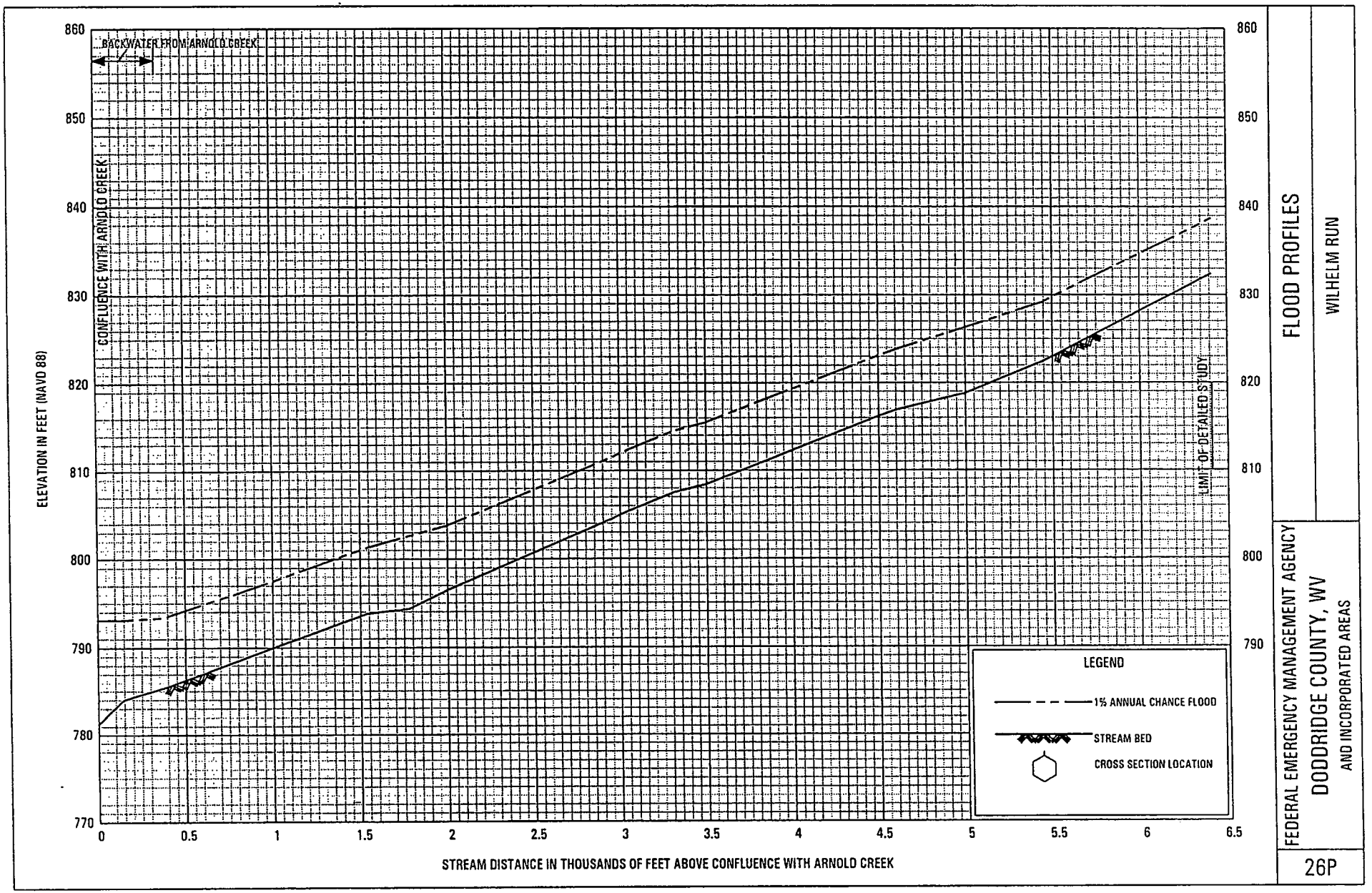
TOMS FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

DODDRIDGE COUNTY, WV

AND INCORPORATED AREAS

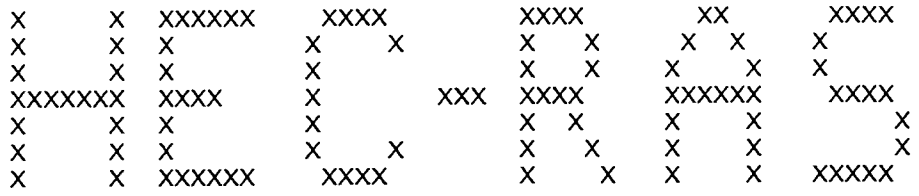
25P


BACKWATER FROM ARNOLD CREEK
CONFLUENCE WITH ARNOLD CREEK
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD 88)
860
850
840
830
820
810
800
790
780
770
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH ARNOLD CREEK
LEGEND
1% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
FLOOD PROFILES
WILHELM RUN
FEDERAL EMERGENCY MANAGEMENT AGENCY
DODDRIDGE COUNTY, WV
AND INCORPORATED AREAS
26P

APPENDIX C

HYDRAULIC CALCULATIONS FOR EXISTING AND PROPOSED CONDITIONS

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



EXISTING
PREPARED BY: TGJ 3/25/2014
CHECKED BY: ARG 26-MAR-2014

PROJECT DATA
Project Title: 110-811_Sherwood FB HH
Project File : 110-811_SherwoFBHH.prj
Run Date and Time: 3/25/2014 10:33:28 AM

Project in English units

Project Description:
MarkWest Liberty Midstream & Resources, LLC
CEC #110-811
4600 J. Barry Ct., Suite 500
Canonsburg, PA 15317

January 2014
(Revised March 25, 2014)

Sherwood Gas
Processing Plant - Full Buildout - Flood Study
Construction in a Floodway
Study for Approval of final grading.

FEMA Zones A, AE, and X from the
Doddridge County Indiana FIS Study shown on FEMA FIRM Panel # 54017C0080 B,
effective October 4, 2011.

CEC Engineering Team:
Principal: Rick Celender,
C.E.T., CPESC, CPSWQ
Project Manager: Andy Gullone, P.E., CPESC
Hydraulic
Modelers: Tim Johnston
Reviewers: Andy Gullone, Rick Celender

Model
Creation:
Existing (Pre-project): CEC Created Model File, "110-811_Sherwood
FB HH," Plan File, "110-811_Existing 01-23-2014."
Proposed (Post-project):
CEC Created Model File, "110-811_Sherwood FB HH," Plan File, "110-811_Proposed
1-23-2014."
Geometry file created in HEC-RAS.
Steady flow file created from
Doddridge County FIS, October 4, 2011.

Data Sources:
Geometry - Surface
created from West Virginia Statewide Addressing and Mapping Board DEM blended with field topo survey of the bridge, existing access road from County Route 50/34, and various locations along the reach.
Flow - Total Buckeye Creek
100-year flow = 5,150 CFS.
Downstream Boundary - Known Water Surface Elevation
= 811. Approximate stream distance of 3,504 feet on profile.

****

PLAN DATA

Plan Title: 110-811_Existing 01-23-2014
Plan File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.p03

Geometry Title: 110-811_Existing_Rev_02-26-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g02

Flow Title : 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Plan Description:
Existing Geometry, 100-year storm, subcritical analysis

Plan Summary Information:

Number of:	Cross Sections	= 38	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information

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

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

****

FLOW DATA

Flow Title: 110-811_100Year
Flow File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.f01

Flow Data (cfs)

River	Reach	RS	100-Year

* Buckeye Creek   Buckeye Creek   3504.54 *   5150 *
****

Boundary Conditions
****

* River   Reach   Profile   *   Upstream
   Downstream   *
****

* Buckeye Creek   Buckeye Creek   100-Year   *
  Known WS = 811 *
****

****

GEOMETRY DATA

Geometry Title: 110-811_Existing_Rev_02-26-2014
Geometry File : p:\2011\110-811\-Calculations\TASK 5001 PLANTS 6 AND 7\Flood Study\110-811_SherwoFBHH.g02

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek   RS: 3504.54

INPUT
Description: A
Station Elevation Data   num=   147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	838.81	-98.96	838.29	-98.75	838.18	-98.4	838	-96.95	837.26
-96.1	836.83	-95.4	836.48	-94.48	836	-93.69	835.59	-92.75	835.1
-91.68	834.54	-90.65	834	-89.58	833.44	-88.38	832.81	-87.57	832.38
-86.84	832	-85.95	831.54	-85.41	831.26	-84.5	830.79	-83.05	830.02
-83.01	830	-81.27	829.11	-79.1	828	-79.08	827.99	-79.07	827.99
-77.37	827.11	-75.99	826.41	-75.64	826.23	-75.18	826	-74.04	825.4
-73.22	824.97	-72.55	824.62	-71.39	824	-70.83	823.7	-70.35	823.45
-69.1	822.78	-67.62	822	-67.26	821.81	-67.01	821.68	-65.6	820.94
-64.29	820.25	-64.09	820.15	-63.81	820	-62.65	819.38	-61.84	818.95
-61.13	818.57	-60.06	818	-60.02	817.91	-59.96	817.79	-59.91	817.69
-59.87	817.59	-59.83	817.5	-59.8	817.43	-59.77	817.35	-59.73	817.28
-59.7	817.21	-59.67	817.15	-59.65	817.09	-59.62	817.04	-59.6	816.99
-59.58	816.94	-59.56	816.89	-59.54	816.85	-59.46	816.69	-59.15	815.06
-47.25	813.56	-46	813.25	-45.85	813.22	-44.79	812.96	-43.56	812.66
-42.3	812.35	-41.93	812.27	-41.36	808.97	-40.43	808	-40.31	808
-40.27	808	-40.22	808	-40.14	808	-38.54	807.48	-34.04	806
-33.41	805.89	-32.05	805.65	-25.82	804.54	-22.76	804.44	-19.68	804.44
-19.3	804.44	-14.73	804.44	-5.05	804.44	0	804.44	.9	804.44
5.75	804.44	15.3	804.44	16.43	804.44	19.72	804.44	21.76	804.67
25.81	806	28.84	806.95	32.2	808	35.74	808.98	39.4	810
43.29	811.02	47.05	812	49.55	812.68	54.41	814	56.85	814.55
63.18	816	63.21	816	63.24	816	63.62	816.01	63.71	816
63.73	816	63.9	816	64.26	816	66.98	816	71.15	816
79.48	816	89.67	816	95.77	816	97.03	816	99.05	816
101.29	816	101.88	816	102.53	816	103.1	816.19	110.92	818
112.97	819.63	113.44	820	115.04	821.27	116.39	822	119.11	823.46
119.51	824	120.78	825.71	121	826	121.65	826.89	122.64	828
123.43	828.89	124.41	830	125.72	831.48	126.18	832	126.52	832.39
127.95	834	129.37	835.19	130.09	835.93	132.25	835.95	133.34	836

134.36 836.19 136.69 836.42

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.05	-41.93	.035	49.55	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-41.93	49.55	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.96	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	6.21	716.90	3.01
E.G. Slope (ft/ft)	0.001962	Area (sq ft)	6.21	716.90	3.01
Q Total (cfs)	5150.00	Flow (cfs)	6.55	5140.58	2.88
Top Width (ft)	104.68	Top Width (ft)	8.49	91.48	4.71
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)	1.05	7.17	0.95
Max Chl Dpth (ft)	9.52	Hydr. Depth (ft)	0.73	7.84	0.64
Conv. Total (cfs)	116272.7	Conv. (cfs)	147.8	116060.0	64.9
Length Wtd. (ft)	50.00	Wetted Per. (ft)	8.67	96.27	4.88
Min Ch El (ft)	804.44	Shear (lb/sq ft)	0.09	0.91	0.08
Alpha	1.02	Stream Power (lb/ft s)	136.69	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	118.78	53.63	65.97
C & E Loss (ft)	0.03	Cum SA (acres)	36.21	5.02	14.49

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3454.54

INPUT
Description: B
Station Elevation Data num= 121

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-106.13	826.76	-105.83	826.61	-105.52	826.46	-104.57	826	-104.45	825.95
-104.42	825.93	-103.35	825.44	-102.97	825.27	-102.28	824.95	-101.55	824.59
-101.24	824.44	-100.37	824	-100.19	823.91	-99.27	823.46	-98.9	823.29
-98.27	822.98	-97.55	822.65	-97.23	822.49	-96.16	822	-96.15	821.99
-96.14	821.99	-94.96	821.48	-94.61	821.32	-93.85	820.99	-93.19	820.71
-92.79	820.53	-91.86	820.13	-91.79	820.1	-91.59	820	-90.51	819.47

-90.04	819.26	-89.22	818.86	-88.25	818.41	-87.98	818.28	-87.37	818
-87.36	818	-87.35	818	-87.19	817.14	-86.99	814.66	-83.41	814.33
-78.27	814.15	-64.45	812.92	-42.91	811.21	-42.79	809.16	-42.41	809.13
-42.01	809.09	-41.6	809.06	-41.18	809.02	-40.66	808.97	-40.11	808.93
-39.53	808.88	-37.2	808.63	-36.6	808.56	-35.97	808.48	-35.28	808.4
-32.94	808.07	-32.49	808	-31.34	807.77	-31	807.7	-29.05	807.31
-28.01	807.09	-26.05	806.67	-25.06	806.46	-22.96	806	-22.17	805.82
-21.82	805.74	-19.4	805.19	-17.82	804.84	-16.67	804.58	-14.08	804.38
-13.68	804.38	-6.61	804.38	0	804.38	17.4	804.38	17.52	804.38
23.35	805.7	24.35	806	28.89	807.47	30.57	808	37.14	809.7
38.3	810	39.73	810.36	46.16	812	52.62	813.62	54.12	814
61.82	815.78	62.8	816	62.86	816	62.93	816	62.98	816
63.03	816	63.08	816	63.12	816	63.16	816	63.2	816
63.43	816	72.23	816	72.53	816	77.56	816	88.82	816
92.29	816	92.47	816	93.12	816	93.64	816	96.03	816
98.64	816	99.53	816	101.36	816	103.41	816	105.44	816
108.77	817.27	110.92	818	112.2	819.74	112.38	820	113.85	822
113.85	822.01	115.45	823.6	115.85	824	116.26	824.42	117.85	826
118.35	826.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-106.13	.05	-42.79	.035	30.57	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-42.79	30.57	52	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.52	Reach Len. (ft)	52.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	33.63	573.48	59.26
E.G. Slope (ft/ft)	0.002677	Area (sq ft)	33.63	573.48	59.26
Q Total (cfs)	5150.00	Flow (cfs)	55.34	4919.94	174.72
Top Width (ft)	123.34	Top Width (ft)	28.35	73.36	21.63
Vel Total (ft/s)	7.73	Avg. Vel. (ft/s)	1.65	8.58	2.95
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	1.19	7.82	2.74
Conv. Total (cfs)	99529.3	Conv. (cfs)	1069.5	95083.1	3376.7
Length Wtd. (ft)	50.02	Wetted Per. (ft)	30.38	74.31	22.32
Min Ch El (ft)	804.38	Shear (lb/sq ft)	0.19	1.29	0.44
Alpha	1.18	Stream Power (lb/ft s)	118.35	0.00	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	118.76	52.89	65.94
C & E Loss (ft)	0.02	Cum SA (acres)	36.19	4.92	14.47

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3404.54

INPUT
Description: C
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.31	819.94	-130.16	819.85	-127.95	818.4	-127.34	818	-124.36	816.46
-123.5	816	-122.92	815.91	-122.44	815.86	-122.09	815.81	-121.89	815.78
-121.74	815.75	-121.45	815.71	-121.31	815.69	-121.19	815.68	-121.09	815.66
-121	815.65	-120.93	815.64	-120.86	815.64	-120.81	815.63	-120.78	815.51
-118.73	815.9	-118.62	815.92	-118.37	815.95	-117.79	815.59	-115.95	814.65
-112.35	813.89	-102.14	815.26	-94.41	813.55	-93.69	813.6	-93.3	813.59
-91.7	813.84	-89.86	814.09	-85.86	814.99	-84.7	814.77	-82.96	814.52
-77.51	814.54	-69.06	813.8	-67.38	813.67	-52.48	812.03	-42.72	810.75
-39.01	809.99	-38.2	809.83	-38.11	809.8	-37.46	809.6	-37.3	809.57
-37.12	809.53	-36.94	809.5	-36.74	809.46	-36.53	809.42	-35.73	809.24
-35.55	809.2	-35.23	809.14	-34.89	809.07	-34.51	809	-34.1	808.92
-33.65	808.83	-33.15	808.73	-32.59	808.62	-31.98	808.5	-31.02	808.31
-30.29	808.16	-29.54	808	-29.5	808	-28.02	807.66	-20.74	806
-15	804.51	-12.96	804.32	-3.54	804.32	0	804.32	4.45	804.32
15.59	804.32	24.88	805.99	24.9	806	29.51	807.42	31.4	808
35.16	808.93	39.43	810	41.01	810.41	47.1	812	50.37	812.89
54.45	814	59.19	815.18	62.48	816	62.51	816	62.55	816
62.56	816	63.15	816	63.19	816	63.22	816	63.23	816
63.24	816	63.25	816	63.26	816	63.27	816	63.28	816
73.18	816	75.76	816	76.08	816	82.98	816	89.81	816
92.74	816	96.15	815.99	98.06	815.99	99.09	815.99	104.95	816
110.42	817.6	111.76	818	112.3	818.75	113.18	820	113.8	820.86
114.59	822	115.75	823.64	116.01	824	117.38	825.93	117.43	826
117.52	826.13	118.81	828	119.32	828.72	120.21	830	120.39	830.24

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.31	.05	-39.01	.035	31.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-39.01	31.4	55	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.11	Reach Len. (ft)	55.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	32.26	520.54	51.49
E.G. Slope (ft/ft)	0.003501	Area (sq ft)	32.26	520.54	51.49
Q Total (cfs)	5150.00	Flow (cfs)	70.07	4912.22	167.71
Top Width (ft)	113.48	Top Width (ft)	23.29	70.41	19.78
Vel Total (ft/s)	8.52	Avg. Vel. (ft/s)	2.17	9.44	

	3.26	*									
*	Max Chl Dpth (ft)	*	8.79	*	Hydr. Depth (ft)	*	1.39	*	7.39	*	
	2.60	*									
*	Conv. Total (cfs)	*	87032.6	*	Conv. (cfs)	*	1184.2	*	83014.2	*	
	2834.3	*									
*	Length Wtd. (ft)	*	50.20	*	Wetted Per. (ft)	*	23.51	*	71.50	*	
	20.43	*									
*	Min Ch El (ft)	*	804.32	*	Shear (lb/sq ft)	*	0.30	*	1.59	*	
	0.55	*									
*	Alpha	*	1.18	*	Stream Power (lb/ft s)	*	120.39	*	0.00	*	
	0.00	*									
*	Frctn Loss (ft)	*	0.15	*	Cum Volume (acre-ft)	*	118.72	*	52.26	*	
	65.88	*									
*	C & E Loss (ft)	*	0.09	*	Cum SA (acres)	*	36.16	*	4.84	*	
	14.45	*									

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3354.54

INPUT
Description: D
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-161.95	820.72	-159	819.1	-154.74	817.2	-151.93	815.9	-147.17	813.71
-145.77	813.06	-126.21	812.54	-124.87	812.51	-123.36	812.51	-123.07	812.53
-122.06	812.55	-122.03	812.53	-115.94	812.57	-115.14	812.59	-114.95	812.57
-103.12	812.35	-88.28	812.14	-82.76	812.08	-54.87	809.98	-52.64	809.81
-41.07	809.2	-39.11	809.06	-36.85	808.62	-36.78	808.61	-36.71	808.61
-36.64	808.6	-36.56	808.59	-36.14	808.54	-35.65	808.48	-35.49	808.45
-35.3	808.43	-35.09	808.4	-34.83	808.36	-34.53	808.32	-34.16	808.27
-33.7	808.2	-33.12	808.12	-32.28	808.01	-32.21	808	-31.45	807.84
-22.89	806	-21.17	805.62	-18.11	804.96	-15.26	804.34	-13.7	804.25
-13.63	804.25	-13.6	804.25	-13.5	804.25	-.57	804.25	0	804.25
4.84	804.25	8.21	804.25	16.71	804.25	17.49	804.25	26.48	806
31.46	807.35	33.9	808	38.76	809.37	40.95	810	46.89	811.73
47.8	812	48.18	812.11	54.65	814	57.78	814.8	62.56	816
62.6	816	62.66	816	62.67	816	62.73	816	62.74	816
62.91	816	63.02	816	63.12	816	63.22	816	63.3	816
63.38	816	63.45	816	63.52	816	63.58	816	63.63	816
63.69	816	63.74	816	63.78	816	63.83	816	64.54	816
66.78	816.01	67.1	816.01	67.7	816.01	68.02	816.01	68.26	816.01
71.84	816.01	73.95	816.01	74.22	816.01	85.96	816	89.03	815.99
91.01	815.98	96.63	815.95	100.33	815.97	106.93	816	112.68	817.78
113.29	818	113.56	818.18	115.15	820	116.54	821.58	116.9	822
118.58	823.91	118.65	824	118.98	824.38	119.3	824.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-161.95	.05	-36.56	.035	33.9	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.56	33.9	35	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	* 814.19	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 1.02	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 813.17	* Reach Len. (ft)	* 35.00	* 50.00	* 50.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 170.79	* 549.92	* 46.67 *
* E.G. Slope (ft/ft)	*0.002626	* Area (sq ft)	* 170.79	* 549.92	* 46.67 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 349.53	* 4669.44	* 131.04 *
* Top Width (ft)	* 197.82	* Top Width (ft)	* 109.45	* 70.46	* 17.91 *
* Vel Total (ft/s)	* 6.71	* Avg. Vel. (ft/s)	* 2.05	* 8.49	* 2.81 *
* Max Chl Dpth (ft)	* 8.92	* Hydr. Depth (ft)	* 1.56	* 7.80	* 2.61 *
* Conv. Total (cfs)	*100493.1	* Conv. (cfs)	* 6820.4	* 91115.7	* 2557.0 *
* Length Wtd. (ft)	* 48.95	* Wetted Per. (ft)	* 109.64	* 71.33	* 18.64 *
* Min Ch El (ft)	* 804.25	* Shear (lb/sq ft)	* 0.26	* 1.26	* 0.41 *
* Alpha	* 1.46	* Stream Power (lb/ft s)	* 119.30	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.13	* Cum Volume (acre-ft)	* 118.59	* 51.64	* 65.82 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 36.08	* 4.76	* 14.43 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3304.54

INPUT
Description: E
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-193.15	818.45	-183.47	814.34	-183.16	814.28	-176.73	813.26	-163.3	813.13
-138.32	812.35	-120.78	812.28	-86.53	811.72	-71.47	811.24	-56.51	810.18
-43	809.27	-36.76	808.75	-36.03	808.62	-36	808.61	-35.97	808.61
-35.94	808.6	-35.9	808.6	-35.86	808.59	-35.82	808.58	-35.77	808.58
-35.72	808.57	-35.67	808.56	-35.62	808.55	-35.57	808.54	-35.45	808.52
-35.38	808.51	-35.31	808.49	-35.22	808.47	-35.13	808.45	-35.02	808.43
-34.88	808.4	-34.73	808.37	-34.53	808.33	-34.3	808.28	-33.99	808.22
-33.59	808.13	-33.11	808.03	-32.95	808	-29.62	807.39	-22.04	806
-15.25	804.68	-11.71	804.25	-11.66	804.25	0	804.25	11.43	804.25
12.59	804.25	14.93	804.25	22.78	805.33	26.75	806	35.39	807.94
35.56	807.97	35.68	808	36.05	808.12	42.24	810	48.06	811.81
48.44	811.93	48.47	811.94	48.67	812	48.97	812.09	55.11	814
58.52	814.76	64.02	816	64.05	816	64.06	816	64.11	816
64.12	816	64.16	816	64.18	816	64.21	816	64.23	816
64.27	816	64.29	816	64.51	816	64.55	816	64.59	816
64.63	816	64.66	816	64.7	816	64.72	816	64.98	816
65.48	816	65.86	816	66.57	816	71.47	816.01	72.7	816.02
72.75	816.02	73.29	816.02	74.51	816.02	75.35	816.02	84.84	816
93.89	815.84	94	815.84	95.83	815.82	98.76	815.86	102.88	815.92

106.57	816	109.76	817.28	111.63	818	113.65	818.64	117.46	820
123.18	821.49	124.76	821.91	125.09	822	125.17	822	125.18	822
125.45	822.01	125.65	822.02	126.04	822.04	126.82	822.08	127.57	822.09
152.93	822.56	166.8	822.78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-193.15	.05	-36.76	.035	35.39	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.76	35.39	55	50	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	814.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.04	Reach Len. (ft)	55.00	50.00	47.00
Crit W.S. (ft)		Flow Area (sq ft)	184.21	546.89	42.81
E.G. Slope (ft/ft)	0.002738	Area (sq ft)	184.21	546.89	42.81
Q Total (cfs)	5150.00	Flow (cfs)	373.41	4655.25	121.33
Top Width (ft)	212.43	Top Width (ft)	123.65	72.15	16.63
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)	2.03	8.51	2.83
Max Chl Dpth (ft)	8.79	Hydr. Depth (ft)	1.49	7.58	2.57
Conv. Total (cfs)	98425.8	Conv. (cfs)	7136.6	88970.3	2318.9
Length Wtd. (ft)	50.47	Wetted Per. (ft)	123.76	72.91	17.40
Min Ch El (ft)	804.25	Shear (lb/sq ft)	0.25	1.28	0.42
Alpha	1.49	Stream Power (lb/ft s)	166.80	0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	118.45	51.02	65.77
C & E Loss (ft)	0.09	Cum SA (acres)	35.98	4.68	14.41

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3254.54

INPUT
Description: F
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240.13	819.89	-227.21	814.66	-216.19	812.98	-198.11	812.16	-175.25	811.94
-165.06	811.8	-160.59	811.79	-152.22	811.82	-122.44	811.41	-109.35	811.26
-104.94	811.11	-102.58	811.05	-67.55	810.05	-42.46	809.03	-36.68	808.81

-36.67	808.63	-36.63	808.62	-36.6	808.62	-36.56	808.61	-36.51	808.6
-36.47	808.59	-36.42	808.58	-36.36	808.57	-36.3	808.56	-36.24	808.55
-36.18	808.54	-36.1	808.52	-35.72	808.43	-35.62	808.41	-35.52	808.39
-35.41	808.37	-35.28	808.34	-35.14	808.31	-34.99	808.27	-34.82	808.23
-34.63	808.18	-34.4	808.13	-34.14	808.06	-33.88	808	-31.55	807.56
-23.17	806	-20.88	805.53	-17.84	804.92	-15.28	804.39	-13.32	804.12
-7.98	804.12	-6.03	804.12	-.01	804.12	0	804.12	4.38	804.12
7.24	804.12	15.16	804.12	15.2	804.12	15.21	804.12	15.81	804.12
16.56	804.21	16.72	804.23	28.47	806	32.29	806.81	35.63	807.52
37.86	808	42.77	809.48	44.49	810	46.47	810.68	50.28	812
53.04	812.93	56.3	814	60.48	814.91	63.23	815.52	63.61	815.59
64.3	815.74	65.6	816	65.65	816	65.74	816	65.87	816
65.99	816	66.12	816	66.23	816	66.36	816	66.47	816
66.61	816	66.72	816	66.85	816	66.96	816	67.1	816
67.21	816	67.34	816	67.45	816	67.55	816	67.63	816
67.97	816	68.02	816	68.06	816	68.1	816	68.14	816
68.72	816	68.76	816	69.87	816.02	70.51	816.02	71.52	816.02
71.91	816.03	77.35	816	78.14	816	85.05	814.92	90.53	814.08
91.07	814	91.75	814	98.34	814	102.59	815.16	106.43	816
110.08	817.66	110.84	818	113.36	819.15	115.21	820	116.17	820.22
116.63	820.29	122.85	821.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-240.13	.05	-36.68	.035	37.86	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.68	37.86	43	50	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.13	Reach Len. (ft)	43.00	50.00	52.00
Crit W.S. (ft)		Flow Area (sq ft)	350.98	581.23	41.57
E.G. Slope (ft/ft)	0.002015	Area (sq ft)	350.98	581.23	41.57
Q Total (cfs)	5150.00	Flow (cfs)	729.27	4318.44	102.30
Top Width (ft)	270.79	Top Width (ft)	180.47	74.54	15.78
Vel Total (ft/s)	5.29	Avg. Vel. (ft/s)	2.08	7.43	2.46
Max Chl Dpth (ft)	9.01	Hydr. Depth (ft)	1.94	7.80	2.63
Conv. Total (cfs)	114733.7	Conv. (cfs)	16246.9	96207.8	2279.0
Length Wtd. (ft)	48.90	Wetted Per. (ft)	180.55	75.50	16.59
Min Ch El (ft)	804.12	Shear (lb/sq ft)	0.24	0.97	0.32
Alpha	1.68	Stream Power (lb/ft s)	122.85	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	118.11	50.37	65.72
C & E Loss (ft)	0.02	Cum SA (acres)	35.79	4.59	14.39

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3204.54

INPUT
Description: G
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-283.58	819.8	-266.29	814.14	-266.24	814.12	-266.23	814.12	-266.09	814.11
-217.5	811.93	-217.38	811.93	-173.11	811.45	-163.78	811.46	-160.93	811.43
-155.76	811.36	-150	811.26	-144.17	811.18	-124.33	810.91	-109.74	810.72
-100.63	810.59	-93.13	810.46	-70.42	809.9	-50.46	809.14	-38.7	808.69
-33.59	808.48	-31.92	807.96	-31.88	807.94	-31.83	807.93	-31.78	807.91
-31.73	807.89	-31.68	807.88	-31.63	807.86	-31.57	807.84	-31.51	807.81
-31.44	807.79	-31.37	807.77	-31.29	807.74	-31.2	807.71	-31.1	807.69
-30.89	807.62	-30.78	807.58	-30.66	807.54	-30.52	807.5	-30.38	807.45
-30.22	807.4	-29.76	807.22	-29.6	807.16	-29.42	807.08	-29.23	807
-28.94	806.91	-28.61	806.8	-28.23	806.67	-27.79	806.53	-27.29	806.36
-26.69	806.17	-26.19	806	-21.56	805.01	-18.47	804.35	-16.86	804.05
-8.24	804.05	-2.99	804.05	0	804.05	3.37	804.05	15.21	804.05
15.24	804.05	16.56	804.21	27.88	806	30.45	806.52	37.81	808
39.9	808.63	44.4	810	47.91	811.09	50.79	812	54.71	813.27
56.99	814	57.54	814.1	57.74	814.13	60.08	814.54	62.07	814.88
63.39	815.06	64.64	815.27	69.51	816	69.65	816	69.72	816
69.9	816	69.98	816	70.07	816	70.16	816	70.17	816
70.18	816	70.19	816	70.2	816	71.28	816	71.34	816
71.39	816	71.44	816	71.49	816	88.72	817.7	91.55	818
96.32	818.82	102.84	820	107.71	820.7	116.72	821.98		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-283.58	.05	-33.59	.035	37.81	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.59	37.81	44	50	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	* 813.74	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.65	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 813.09	* Reach Len. (ft)	* 44.00	* 50.00	* 51.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 451.32	* 571.37	* 42.16 *
* E.G. Slope (ft/ft)	*0.001817	* Area (sq ft)	* 451.32	* 571.37	* 42.16 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 952.68	* 4099.91	* 97.41 *
* Top Width (ft)	* 297.47	* Top Width (ft)	* 209.73	* 71.40	* 16.34 *
* Vel Total (ft/s)	* 4.84	* Avg. Vel. (ft/s)	* 2.11	* 7.18	* 2.31 *
* Max Chl Dpth (ft)	* 9.04	* Hydr. Depth (ft)	* 2.15	* 8.00	*

```
   2.58  *
* Conv. Total (cfs)       *120822.6  * Conv. (cfs)             * 22350.6  * 96186.6  *
 2285.3  *
* Length Wtd. (ft)        *   48.76  * Wetted Per. (ft)        *  209.80  *   72.36  *
  17.11  *
* Min Ch El (ft)          *  804.05  * Shear (lb/sq ft)        *    0.24  *    0.90  *
   0.28  *
* Alpha                   *    1.79  * Stream Power (lb/ft s)  *  116.72  *    0.00  *
   0.00  *
* Frctn Loss (ft)         *    0.08  * Cum Volume (acre-ft)    *  117.72  *   49.71  *
  65.67  *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)          *   35.60  *    4.51  *
  14.37  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek        RS: 3154.54

INPUT
Description: H
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 -344.06  820.17 -341.76  819.33  -335.3  817.11  -317.4  813.56 -307.81   813.2
 -291.22  811.81 -276.12   811.8 -258.35  811.75 -229.19  811.76 -224.11  811.69
 -215.03   811.6 -171.68  811.14 -151.63  811.01 -147.14  810.92 -145.09  810.87
  -117.3  810.47 -103.72  810.29  -98.64  810.21  -79.31  809.67  -63.22  809.32
  -54.02  808.86  -34.08  808.02  -31.16  807.11  -31.09  807.09  -31.01  807.06
  -30.93  807.04  -30.84  807.02  -30.75  806.99  -30.65  806.96  -30.55  806.93
  -30.44   806.9  -30.32  806.86   -30.2  806.83  -30.06  806.79  -29.91  806.74
  -29.75   806.7  -29.57  806.66  -29.38  806.61  -28.95  806.49  -28.71  806.42
  -28.43  806.33  -28.13  806.24  -27.79  806.14   -27.4  806.02  -27.33     806
  -25.54  805.56  -19.16     804  -17.81   803.9  -14.84   803.9  -12.95   803.9
  -11.52   803.9   -10.4   803.9   -9.49   803.9   -8.03   803.9   -7.43   803.9
   -6.92   803.9   -6.49   803.9   -6.11   803.9   -5.77   803.9   -5.54   803.9
   -5.32   803.9       0   803.9    3.09   803.9    3.31   803.9    3.55   803.9
    3.82   803.9    4.15   803.9    4.52   803.9    4.96   803.9    5.47   803.9
    6.08   803.9    6.81   803.9    7.72   803.9    8.87   803.9   10.64   803.9
   13.16   803.9   14.82     804   20.71  805.01   26.47     806   34.72  807.69
   36.26     808   41.95  809.75   42.76     810   43.86  810.36   48.82     812
    51.4  812.8    55.27     814   56.44  814.25   58.83  814.76   62.79   815.6
   64.71     816   64.81     816   65.06     816   65.18     816   65.22     816
   65.34     816   66.33     816   66.69     816      71     816   71.46     816
   71.82     816   76.48  816.77   77.53  816.86   80.56  817.14    83.2  817.46
   87.71  817.86   89.18  817.99   89.27     818   89.46  818.03   100.7     820
  108.63  821.17  115.16     822  115.51     822  115.58     822

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 -344.06     .05  -34.08    .035   34.72     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -34.08   34.72               48      50      52             .1      .3

CROSS SECTION OUTPUT  Profile #100-Year
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* E.G. Elev (ft)          *  813.63  * Element                 *  Left OB *  Channel *
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Right OB					
Vel Head (ft)	0.55	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.08	Reach Len. (ft)	48.00	50.00	52.00
Crit W.S. (ft)		Flow Area (sq ft)	604.09	564.34	49.05
E.G. Slope (ft/ft)	0.001571	Area (sq ft)	604.09	564.34	49.05
Q Total (cfs)	5150.00	Flow (cfs)	1209.94	3828.97	111.09
Top Width (ft)	358.66	Top Width (ft)	272.28	68.80	17.58
Vel Total (ft/s)	4.23	Avg. Vel. (ft/s)	2.00	6.78	2.26
Max Chl Dpth (ft)	9.18	Hydr. Depth (ft)	2.22	8.20	2.79
Conv. Total (cfs)	129951.7	Conv. (cfs)	30530.9	96617.7	2803.1
Length Wtd. (ft)	49.53	Wetted Per. (ft)	272.38	69.69	18.39
Min Ch El (ft)	803.90	Shear (lb/sq ft)	0.22	0.79	0.26
Alpha	1.97	Stream Power (lb/ft s)	115.58	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	117.18	49.05	65.62
C & E Loss (ft)	0.03	Cum SA (acres)	35.36	4.43	14.35

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3104.54

INPUT
Description: I
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-383.34	816.88	-380.41	816.27	-361.18	811.96	-358.34	811.62	-338.46	811.1
-330.45	811.09	-301.63	811.16	-297.15	811.2	-278.53	811.33	-275.53	811.33
-225.16	811.18	-203.03	811.34	-171.74	811.16	-165.14	811.09	-154.69	810.93
-154.09	810.93	-138.76	810.85	-128.69	810.69	-108.79	810.52	-62.36	809.45
-61.73	809.43	-61.33	809.43	-61.1	809.42	-34.68	808.63	-32.1	807.88
-32.06	807.85	-32.01	807.83	-31.95	807.8	-31.9	807.77	-31.84	807.74
-31.78	807.71	-31.72	807.68	-31.65	807.64	-31.58	807.61	-31.5	807.57
-31.37	807.53	-31.23	807.48	-30.68	807.28	-30.54	807.22	-30.4	807.16
-30.24	807.1	-30.08	807.03	-29.9	806.95	-29.7	806.87	-29.49	806.78
-29.26	806.69	-29.02	806.58	-28.7	806.46	-28.35	806.33	-27.96	806.18
-27.52	806.01	-27.48	806	-22.31	804.38	-21.08	804	-11.63	803.47
-11.58	803.47	-11.54	803.47	-11.44	803.47	-7.05	803.47	-4.63	803.47
-2.3	803.47	-.93	803.47	0	803.47	2.92	803.47	3.66	803.47
3.67	803.47	8.94	803.47	13.25	803.47	15.58	804	23.04	805.4
26.21	806	31.87	807.14	36.15	808	38.74	808.76	43	810
46.9	811.41	48.53	812	53.61	813.61	54.83	814	54.97	814.03
55.06	814.05	64.07	816	64.37	816	64.47	816	64.78	816
64.82	816	64.83	816	64.85	816	64.86	816	64.88	816
68.81	816	71.72	816	73.12	816	74.23	816	84.17	817.64
87	818	87.13	818	91.93	818.78	99.35	820	104.37	820.67

104.41	820.68	115.25	822	115.59	822	115.69	822	124.72	822.11
135.24	822.23	144.49	822.33	144.6	822.33	151.56	822.39		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-383.34	.05	-34.68	.035	36.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.68	36.15	22	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.07	Reach Len. (ft)	22.00	50.00	48.00
Crit W.S. (ft)		Flow Area (sq ft)	745.42	587.81	41.19
E.G. Slope (ft/ft)	0.001327	Area (sq ft)	745.42	587.81	41.19
Q Total (cfs)	5150.00	Flow (cfs)	1384.72	3683.45	81.83
Top Width (ft)	418.07	Top Width (ft)	331.47	70.83	15.77
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)	1.86	6.27	1.99
Max Chl Dpth (ft)	9.60	Hydr. Depth (ft)	2.25	8.30	2.61
Conv. Total (cfs)	141367.7	Conv. (cfs)	38010.6	101111.0	2246.1
Length Wtd. (ft)	42.28	Wetted Per. (ft)	331.65	72.08	16.57
Min Ch El (ft)	803.47	Shear (lb/sq ft)	0.19	0.68	0.21
Alpha	2.07	Stream Power (lb/ft s)	151.56	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	116.44	48.39	65.57
C & E Loss (ft)	0.02	Cum SA (acres)	35.02	4.35	14.33

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3054.54

INPUT
Description: J
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-429.24	820.02	-421.03	817.24	-412.97	815.16	-397.1	811.6	-374.14	811.01
-367.57	810.72	-352.22	810.82	-334.91	810.87	-315.95	811.01	-280.2	811.02
-262.38	810.97	-222.98	811.25	-208.79	811.28	-204.94	811.31	-200.98	811.37
-183.88	811.19	-166.39	810.98	-163.8	810.96	-152.84	810.92	-122.32	810.87
-114.52	810.84	-84.08	809.91	-75.91	809.69	-67.79	809.61	-35.1	809.26

-35.07	808.53	-34.81	808.37	-34.74	808.35	-34.67	808.33	-34.6	808.31
-34.52	808.29	-34.44	808.26	-34.36	808.24	-34.27	808.21	-34.17	808.18
-33.73	808	-33.7	808	-33.64	808	-33.6	808	-33.59	808
-33.58	808	-33.56	808	-33.54	808	-31.01	807.15	-27.53	806
-23.61	804.75	-21.27	804	-16.03	803.04	-12.18	803.04	-12.13	803.04
-12.11	803.04	-11.95	803.04	-11.89	803.04	-4.65	803.04	-2.06	803.04
0	803.04	1.54	803.04	2.63	803.04	6.59	803.04	7.86	803.04
9.9	803.04	14.57	803.48	17.29	804	21.31	804.85	26.85	806
28.59	806.34	33.57	807.34	35.91	807.81	36.86	808	38.61	808.46
44.41	810	49.01	811.58	50.23	812	51.33	812.33	57.04	814
66.81	815.06	75.8	816	75.82	816	75.86	816	75.89	816
75.91	816	75.93	816	75.94	816	75.95	816	75.96	816
77.14	816	78.3	816.19	78.68	816.24	79.1	816.3	79.86	816.42
81.74	816.76	83.22	816.97	89.82	818	93.81	818.77	99.8	820
105.59	821.09	110.84	821.97						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-429.24	.05	-35.1	.035	38.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.1	38.61	23	50	53	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.07	Reach Len. (ft)	23.00	50.00	53.00
Crit W.S. (ft)		Flow Area (sq ft)	832.95	622.01	36.20
E.G. Slope (ft/ft)	0.001149	Area (sq ft)	832.95	622.01	36.20
Q Total (cfs)	5150.00	Flow (cfs)	1444.53	3642.42	63.05
Top Width (ft)	457.49	Top Width (ft)	368.54	73.71	15.24
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)	1.73	5.86	1.74
Max Chl Dpth (ft)	10.03	Hydr. Depth (ft)	2.26	8.44	2.38
Conv. Total (cfs)	151934.1	Conv. (cfs)	42616.3	107457.7	1860.0
Length Wtd. (ft)	41.95	Wetted Per. (ft)	368.74	75.78	15.93
Min Ch El (ft)	803.04	Shear (lb/sq ft)	0.16	0.59	0.16
Alpha	2.11	Stream Power (lb/ft s)	110.84	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	116.04	47.70	65.52
C & E Loss (ft)	0.02	Cum SA (acres)	34.85	4.27	14.31

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3004.54

INPUT
Description: K
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-469.9	819.55	-464.82	817.83	-445.16	812.74	-439.76	811.53	-432.36	811.33
-408.99	810.29	-370.93	810.49	-362.09	810.6	-358.19	810.65	-356.83	810.66
-304.24	810.68	-285.06	810.58	-250.46	810.66	-226.31	810.87	-201.92	811.25
-180.38	811.02	-178.06	811.01	-142.44	810.98	-125	810.7	-123.4	810.68
-103.48	810.53	-85.36	810	-63.3	809.72	-38.45	809.01	-35.94	808.19
-35.5	808.15	-35.41	808.15	-35.32	808.14	-35.23	808.13	-35.07	808.12
-34.91	808.11	-34.74	808.1	-34.56	808.09	-34.37	808.07	-34.17	808.06
-33.97	808.05	-33.76	808.03	-33.54	808.02	-33.31	808.01	-33.23	808
-33.22	808	-29.25	806.47	-28.04	806	-24.92	804.84	-22.64	804
-21.26	803.52	-19.32	802.84	-16.91	802.19	-16.85	802.19	-16.82	802.19
-16.69	802.19	-5.82	802.19	-3.39	802.19	-1.15	802.19	.55	802.19
5.22	802.19	7.83	802.19	15.01	804	17.99	804.66	24.08	806
28.83	806.92	34.36	808	39.34	809.23	42.42	810	43.7	810.36
46.48	811.12	48.67	811.73	49.66	812	51.94	812.56	53.3	812.86
55.11	813.29	58.2	813.97	58.24	813.98	58.31	814	58.32	814
58.46	814	58.5	814	58.52	814	58.54	814	58.56	814
58.91	814.04	59.21	814.08	59.5	814.11	59.78	814.15	60.05	814.18
60.31	814.21	60.56	814.25	60.8	814.28	65.04	814.69	65.28	814.71
67.85	814.94	69.06	815.07	71.32	815.3	73.81	815.51	77.92	815.88
78.98	816	81.68	816.58	88.8	818	91.98	818.82	96.72	820
100.95	821.02	104.2	821.84						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-469.9	.05	-38.45	.035	34.36	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.45	34.36	36	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.08	Reach Len. (ft)	36.00	50.00	48.00
Crit W.S. (ft)		Flow Area (sq ft)	998.74	634.20	50.33
E.G. Slope (ft/ft)	0.000931	Area (sq ft)	998.74	634.20	50.33
Q Total (cfs)	5150.00	Flow (cfs)	1644.44	3422.48	83.08
Top Width (ft)	500.68	Top Width (ft)	408.01	72.81	19.86
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)	1.65	5.40	1.65
Max Chl Dpth (ft)	10.89	Hydr. Depth (ft)	2.45	8.71	2.53
Conv. Total (cfs)	168767.0	Conv. (cfs)	53888.8	112155.8	2722.4
Length Wtd. (ft)	44.84	Wetted Per. (ft)	408.25	74.60	20.50

* Min Ch El (ft)	*	802.19	* Shear (lb/sq ft)	*	0.14	*	0.49	*	0.14	*	
* Alpha	*	2.16	* Stream Power (lb/ft s)	*	104.20	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	115.56	*	46.98	*	65.47	*	
* C & E Loss (ft)	*	0.03	* Cum SA (acres)	*	34.64	*	4.18	*	14.29	*	

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2954.54

INPUT
Description: L
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-509.9	819.95	-504.94	818.22	-502.96	817.64	-479.97	811.59	-461.37	810.54
-447.19	809.9	-436.37	809.96	-403.73	810.08	-396.99	810.15	-359.14	810.32
-344.07	810.32	-312.63	810.14	-291.29	810.11	-285.49	810.1	-260.08	810.18
-242.17	810.32	-187.74	811.09	-186.83	811.08	-186.73	811.08	-185.37	811.08
-160.81	810.67	-133.05	810.2	-130.8	810.14	-120.98	809.94	-119.28	809.94
-113.78	809.93	-103.13	809.97	-93.69	809.92	-69.28	809.54	-67.94	809.52
-52.45	809.04	-45.11	808.85	-35.47	808.67	-31.5	808.25	-31.42	808.24
-31.35	808.22	-31.26	808.21	-31.16	808.19	-31.04	808.18	-30.92	808.16
-30.8	808.15	-30.67	808.13	-30.53	808.11	-29.89	808	-29.86	808
-29.83	808	-29.8	808	-29.75	808	-29.74	808	-29.73	808
-29.72	808	-29.7	808	-29.05	807.78	-23.67	806	-21.63	805.31
-17.79	804	-10.69	802.19	-10.66	802.19	-10.4	802.19	0	802.19
9.16	802.19	11.62	802.51	18.63	804	24.79	805.33	27.88	806
35.22	807.49	37.75	808	46.11	809.77	47.2	810	53.42	811.42
56	812	58.23	812.39	59.06	812.53	61.48	812.94	62.86	813.17
63.48	813.27	64.67	813.47	67.71	813.95	68.01	814	68.09	814
68.17	814	74.52	814.69	76.39	814.89	77.77	815.04	78.82	815.15
86.29	816	88.24	816.57	94.41	818	97.98	819.07	101.06	820
106.62	821.6	108.05	822	110.66	822.46	119.91	823.94	120.29	824
120.3	824	125.67	824.01	128.68	824.01	130.18	824.02	131.37	824.02
132.17	824.03	141.52	824.19	144.3	824.23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-509.9	.05	-31.5	.035	35.22	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-31.5	35.22	36	50	48	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

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* E.G. Elev (ft)	*	813.33	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.23	* Wt. n-Val.	*	0.050	*	0.035	*	0.050	*	
* W.S. Elev (ft)	*	813.10	* Reach Len. (ft)	*	36.00	*	50.00	*	48.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	1310.63	*	598.24	*	74.34	*	

* E.G. Slope (ft/ft)	*0.000725	* Area (sq ft)	* 1310.63	* 598.24	* 74.34	*			
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2125.10	* 2910.33	* 114.58	*			
* Top Width (ft)	* 548.18	* Top Width (ft)	* 454.22	* 66.72	* 27.24	*			
* Vel Total (ft/s)	* 2.60	* Avg. Vel. (ft/s)	* 1.62	* 4.86	* 1.54	*			
* Max Chl Dpth (ft)	* 10.91	* Hydr. Depth (ft)	* 2.89	* 8.97	* 2.73	*			
* Conv. Total (cfs)	*191230.1	* Conv. (cfs)	* 78909.2	*108066.4	* 4254.5	*			
* Length Wtd. (ft)	* 44.00	* Wetted Per. (ft)	* 454.52	* 68.16	* 27.82	*			
* Min Ch El (ft)	* 802.19	* Shear (lb/sq ft)	* 0.13	* 0.40	* 0.12	*			
* Alpha	* 2.15	* Stream Power (lb/ft s)	* 144.30	* 0.00	* 0.00	*			
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	* 114.60	* 46.27	* 65.40	*			
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 34.29	* 4.10	* 14.27	*			

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2904.54

INPUT
Description: M
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-555.08	818.17	-551.53	817.23	-533.87	812.12	-525.42	811.56	-494.28	809.71
-465.28	809.62	-444.08	809.58	-434.14	809.66	-422.93	809.74	-392.27	810.04
-348.18	810.06	-339.93	810.08	-336.85	810.04	-323.3	810.05	-294.13	810.01
-287.65	810.03	-244.02	810.11	-235.05	810.23	-208.28	810.47	-187.1	810.73
-185.09	810.59	-179.54	810.57	-153.52	809.97	-147.04	809.8	-143.48	809.78
-131.45	809.67	-109.41	809.57	-105.87	809.47	-105.74	809.47	-73.37	809.04
-65.8	808.97	-57.78	808.78	-50.48	808.91	-36.42	808.86	-35.58	808.5
-32.25	807.93	-29.14	806.3	-25.8	805.38	-22.8	804.42	-20.89	804
-20.73	803.97	-20.58	803.93	-20.41	803.9	-20.24	803.86	-20.06	803.82
-19.87	803.78	-19.67	803.73	-19.45	803.68	-19.23	803.64	-19	803.58
-18.75	803.53	-18.49	803.47	-18.21	803.41	-18.2	803.41	-16.63	802.28
-16.25	802	-8.17	802	-3.39	802	0	802	2.06	802
10.99	802	11.25	802	11.76	802	12.15	802.07	12.83	802.2
18.97	803.35	22.4	804	25.48	804.72	30.97	806	31.31	806.08
31.62	806.15	34.08	806.73	36.43	807.28	36.84	807.37	37.52	807.53
37.56	807.54	37.59	807.55	37.62	807.55	37.65	807.56	37.68	807.56
37.7	807.57	37.94	807.62	37.96	807.63	38.35	807.71	38.38	807.71
38.4	807.72	38.42	807.72	38.87	807.81	38.9	807.82	38.92	807.83
39.41	807.93	39.44	807.93	39.96	808.04	40.52	808.15	41.11	808.27
41.15	808.28	41.79	808.41	41.84	808.42	43.87	808.86	44.37	808.96
44.9	809.07	45.41	809.17	45.95	809.28	46.53	809.39	47.15	809.52
47.83	809.65	49.22	809.95	49.46	810	51.94	810.54	58.66	812
59.36	812.09	59.65	812.13	63.68	812.64	65.81	812.9	68.23	813.21
72.37	813.72	73.02	813.8	74.71	814	79.31	814.6	82.93	815.09
86.03	815.5	89.61	816	89.68	816	93.22	817.02	96.64	818
100.75	819.42	102.44	820	107.15	821.46	108.87	822	113.42	823.17
116.74	824	116.77	824	116.78	824	116.88	824	116.89	824

117.07 824.01

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-555.08	.05	-36.42	.035	41.79	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.42	41.79	42	49.96	51	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.13	Reach Len. (ft)	42.00	49.96	51.00
Crit W.S. (ft)		Flow Area (sq ft)	1588.48	703.40	54.66
E.G. Slope (ft/ft)	0.000495	Area (sq ft)	1588.48	703.40	54.66
Q Total (cfs)	5150.00	Flow (cfs)	2266.53	2824.53	58.94
Top Width (ft)	604.95	Top Width (ft)	500.94	78.21	25.81
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	1.43	4.02	1.08
Max Chl Dpth (ft)	11.13	Hydr. Depth (ft)	3.17	8.99	2.12
Conv. Total (cfs)	231441.3	Conv. (cfs)	101858.2	126934.4	2648.7
Length Wtd. (ft)	46.37	Wetted Per. (ft)	501.18	80.26	26.26
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.10	0.27	0.06
Alpha	2.02	Stream Power (lb/ft s)	117.07	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	113.40	45.52	65.33
C & E Loss (ft)	0.01	Cum SA (acres)	33.89	4.02	14.24

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2854.58

INPUT
Description: N
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-604.74	818.03	-587.39	813.47	-585.09	812.8	-577.61	812.3	-543.57	809.78
-498.5	809.63	-494.24	809.57	-493.32	809.62	-490.35	809.6	-464.42	809.7
-449.62	809.77	-442.77	809.62	-433.61	809.82	-392.69	810.06	-389.49	810.07
-346.11	809.57	-337.27	809.58	-300.9	809.69	-284.47	809.73	-253.74	809.76
-239.62	809.94	-231.28	810.08	-222.63	810.03	-219.09	810.11	-207.99	810.26
-195.77	810.2	-192.67	809.81	-189.75	809.76	-188.94	809.79	-181.12	809.87

-161.13	809.86	-154.94	809.75	-148.17	809.64	-131.76	809.27	-129.32	809.24
-116.92	809.12	-99.47	808.99	-99.27	808.99	-99.21	808.99	-87.45	808.85
-82.36	808.91	-76.54	808.84	-69.24	808.81	-62.26	808.9	-35.56	808.9
-34.29	808.35	-33.72	808.09	-31.28	806.16	-31.27	806.16	-31.24	806.14
-27.8	804.33	-27.74	804.32	-27.67	804.3	-27.61	804.29	-27.54	804.27
-27.46	804.25	-27.39	804.23	-27.3	804.21	-27.21	804.19	-27.11	804.17
-27.01	804.14	-26.89	804.12	-26.77	804.09	-26.64	804.06	-26.49	804.02
-26.4	804	-24.06	802.5	-23.28	802	-4.28	802	0	802
14.53	802	19.83	802.93	25.91	804	26.55	804.15	26.9	804.23
26.94	804.25	26.96	804.25	27.08	804.29	27.12	804.3	27.23	804.33
27.28	804.35	27.38	804.38	27.43	804.4	27.53	804.43	27.59	804.45
28.53	804.72	28.64	804.74	28.75	804.77	28.87	804.79	29	804.82
29.39	804.91	29.49	804.94	29.6	804.97	29.75	805	29.91	805.04
30.09	805.09	30.28	805.13	30.48	805.18	30.7	805.24	30.95	805.3
31.21	805.36	31.5	805.43	31.85	805.52	32.24	805.61	32.68	805.72
33.18	805.84	34.31	806.12	34.94	806.28	35.68	806.46	36.54	806.68
37.56	806.94	38.78	807.25	40.46	807.67	42.6	808.2	45.44	808.91
49.4	809.9	49.81	810	57.71	811.96	57.86	812	66.98	813.82
67.88	814	67.97	814	68.01	814	68.24	814	87.56	815.69
88.39	815.76	90.98	816	94.53	817.23	96.75	818	100.5	819.34
102.36	820	103.49	820.39	108.11	822	109.79	822.45	115.56	824
115.88	824.04								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-604.74	.05	-35.56	.035	45.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.56	45.44	40	50.04	52	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.13	Reach Len. (ft)	40.00	50.04	52.00
Crit W.S. (ft)		Flow Area (sq ft)	1854.07	761.16	36.46
E.G. Slope (ft/ft)	0.000374	Area (sq ft)	1854.07	761.16	36.46
Q Total (cfs)	5150.00	Flow (cfs)	2393.81	2723.35	32.84
Top Width (ft)	649.77	Top Width (ft)	550.67	81.00	18.09
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	1.29	3.58	0.90
Max Chl Dpth (ft)	11.13	Hydr. Depth (ft)	3.37	9.40	2.01
Conv. Total (cfs)	266224.9	Conv. (cfs)	123745.8	140781.4	1697.7
Length Wtd. (ft)	45.03	Wetted Per. (ft)	550.88	83.71	18.59
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.08	0.21	0.05
Alpha	2.00	Stream Power (lb/ft s)	115.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	111.74	44.68	65.28
C & E Loss (ft)	0.01	Cum SA (acres)	33.38	3.93	

14.21 *
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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2804.54

INPUT
Description: O
Station Elevation Data num= 224

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-636.99	817.78	-620.56	813.37	-593.74	811.22	-573.43	809.84	-567.39	809.75
-532.59	809.32	-523.1	809.82	-493.13	809.57	-486.12	809.6	-483.76	809.54
-473.25	809.31	-455.93	809.7	-446.03	809.76	-418.52	809.68	-391.12	809.35
-371.75	809.21	-353.59	809.07	-320.57	809.32	-310.49	809.4	-285.69	809.54
-264.41	809.57	-260.62	809.62	-252.37	809.53	-243.1	809.46	-235.49	809.62
-210.66	809.92	-203.19	809.88	-197.84	809.23	-197.64	809.22	-194.22	809.36
-191.11	809.39	-177.26	809.36	-170.33	809.28	-164.3	809.01	-153.82	808.7
-139.84	808.71	-132.13	808.6	-123.32	808.22	-121.92	808.15	-120.95	808.13
-107.12	808.07	-104.82	808.04	-97.1	807.93	-90.23	807.96	-83.62	808.09
-65.83	808.29	-65.47	808.31	-61.61	808.39	-41.95	809.2	-35.53	809.4
-35.51	809.4	-34.23	808.97	-33.63	808.75	-31.2	806.83	-31.19	806.83
-29.7	805.77	-29.59	805.69	-29.57	805.68	-25.99	803.68	-25.99	803.67
-25.98	803.66	-25.97	803.64	-25.95	803.62	-25.94	803.61	-25.92	803.59
-25.91	803.57	-25.89	803.55	-25.87	803.53	-25.85	803.5	-25.84	803.48
-25.82	803.46	-25.8	803.43	-25.78	803.4	-25.75	803.38	-25.73	803.35
-25.71	803.32	-25.68	803.29	-25.67	803.27	-23.62	802	-12.29	802
-8.16	802	-.98	802	0	802	18.54	802	18.64	802.02
18.75	802.05	18.76	802.05	18.87	802.08	18.97	802.1	19.06	802.12
19.15	802.15	19.24	802.17	19.32	802.19	19.35	802.19	19.44	802.21
19.51	802.23	19.59	802.25	19.66	802.27	19.73	802.28	19.8	802.3
19.86	802.31	19.92	802.33	19.98	802.34	20.04	802.36	20.09	802.37
20.15	802.38	20.21	802.4	20.26	802.41	20.31	802.42	20.36	802.43
20.41	802.45	20.46	802.46	20.5	802.47	20.55	802.48	20.59	802.49
20.63	802.5	20.67	802.51	20.71	802.52	20.75	802.53	20.78	802.53
20.82	802.54	20.85	802.55	20.88	802.56	20.92	802.57	20.95	802.57
20.98	802.58	21.08	802.61	21.11	802.61	21.14	802.62	21.17	802.63
21.2	802.64	21.23	802.64	21.26	802.65	21.29	802.66	21.31	802.66
21.34	802.67	21.36	802.67	21.39	802.68	21.41	802.69	21.44	802.69
21.46	802.7	21.48	802.7	21.5	802.71	21.53	802.71	21.55	802.72
21.57	802.72	21.59	802.73	21.61	802.73	21.63	802.74	21.65	802.74
21.66	802.75	21.68	802.75	21.7	802.75	21.72	802.76	21.74	802.76
21.75	802.77	21.89	802.8	21.91	802.8	23.53	803.12	23.69	803.16
23.71	803.17	23.81	803.19	24.81	805.05	24.86	805.07	25.04	805.13
25.21	805.2	25.38	805.26	25.55	805.32	25.64	805.35	26.14	805.53
37.03	807.89	42.61	809.52	47.89	809.79	48.09	809.82	48.29	809.86
49.56	810.15	49.78	810.2	50.02	810.26	50.26	810.32	50.54	810.38
50.84	810.45	51.15	810.51	51.47	810.58	51.81	810.66	52.17	810.74
52.9	810.9	53.26	810.98	53.64	811.07	54.04	811.17	54.47	811.27
55.97	811.53	56.29	811.59	56.63	811.67	57.01	811.75	57.43	811.84
57.9	811.94	58.18	812	66	813.35	69.49	813.96	69.71	814
75.94	814.59	80	814.97	82.33	815.19	83.84	815.33	85.64	815.5
87.9	815.68	88.33	815.71	90.91	815.91	91.03	815.92	92.13	816
93.67	816.33	94.43	816.53	96.39	816.99	98.88	817.68	99.33	817.79
100.04	818	105.58	819.9	105.87	820	106.47	820.21	111.67	822
117.68	823.92	117.92	824	118.6	824.19	124.8	825.92		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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 -636.99      .05  -35.53     .035   42.61      .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -35.53   42.61                50      50      60             .1        .3

CROSS SECTION OUTPUT  Profile #100-Year
************************************************************************************
***********
* E.G. Elev (ft)         *  813.23  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.09  * Wt. n-Val.             *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  813.14  * Reach Len. (ft)        *   50.00  *   50.00  *
  60.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      * 2166.15  *  725.98  *
  45.01  *
* E.G. Slope (ft/ft)     *0.000319  * Area (sq ft)           * 2166.15  *  725.98  *
  45.01  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)             * 2760.23  * 2351.84  *
  37.93  *
* Top Width (ft)         *  682.42  * Top Width (ft)         *  582.12  *   78.14  *
  22.16  *
* Vel Total (ft/s)       *    1.75  * Avg. Vel. (ft/s)       *    1.27  *    3.24  *
   0.84  *
* Max Chl Dpth (ft)      *   11.14  * Hydr. Depth (ft)       *    3.72  *    9.29  *
   2.03  *
* Conv. Total (cfs)      *288337.5  * Conv. (cfs)            *154539.3  *131674.6  *
 2123.6  *
* Length Wtd. (ft)       *   50.10  * Wetted Per. (ft)       *  582.37  *   82.21  *
  22.50  *
* Min Ch El (ft)         *  802.00  * Shear (lb/sq ft)       *    0.07  *    0.18  *
   0.04  *
* Alpha                  *    1.84  * Stream Power (lb/ft s) *  124.80  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *  109.90  *   43.83  *
  65.23  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   32.86  *    3.84  *
  14.19  *
************************************************************************************
***********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2754.54

INPUT
Description: P
Station Elevation Data    num=     168
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
 -699.01  815.93 -697.79  815.61 -665.41  812.92 -625.31  809.39 -622.52  809.03
 -621.43  808.74 -620.24  808.77 -617.21  808.47  -615.7  809.01 -614.94   809.2
 -612.78   809.4 -602.34  810.16 -597.05  810.51 -583.44  810.88 -579.93  811.01
 -565.86  810.75 -532.33  809.93 -525.05  809.13 -523.29     809 -520.08  809.08
 -508.02  809.38  -501.8  809.78 -500.21  809.87 -489.56   810.2 -459.58  810.12
 -459.49  810.12 -459.48  810.12 -459.41  810.12  -423.2  809.72 -415.83   809.8
 -403.62  809.88 -385.41  809.95 -375.96  810.15 -357.95  810.41 -340.63   810.6
 -319.94  811.16 -304.14  811.19 -294.46  811.26 -270.82  811.15 -265.45  810.91
 -261.08  810.78 -246.74  810.16 -241.79  810.23 -235.18  810.34 -234.12   810.4
 -231.13  810.38 -198.52  809.87 -197.68  809.58  -194.2  808.77 -193.07  808.52
```

-178.48	807.88	-177.88	807.85	-177.82	807.85	-164.45	807.34	-162.67	807.33
-155.89	807.28	-155.32	806.98	-153.6	807.57	-151.86	807.58	-138.74	807.52
-135.54	807.51	-132.75	807.16	-130.02	806.85	-127	806.75	-124.24	806.57
-118.5	806.53	-110.43	805.94	-108.29	805.37	-106.35	805.03	-104.76	805.01
-102.17	805.14	-99.69	805.76	-99.06	805.87	-98.96	805.86	-98.42	805.92
-84.59	807.47	-83.07	807.51	-83.03	807.51	-82.25	807.53	-68.99	807.62
-59.02	807.76	-50.91	807.97	-37.84	808.52	-37.49	808.63	-35.61	808.13
-29.14	805.37	-23.52	803.77	-22.8	802.87	-22.74	802.78	-22.67	802.68
-22.58	802.55	-22.48	802.41	-22.35	802.23	-22.33	802.2	-22.28	802.17
-22.01	802	-18.39	802	-17.92	802	-13.41	802	-12.3	802
-8.44	802	-6.69	802	-3.47	802	-1.09	802	0	802
2.18	802	7.06	802	9.46	802	15.81	802	16.72	802
21.18	802	21.2	802	21.25	802.02	21.31	802.03	21.36	802.04
21.41	802.05	21.46	802.07	21.51	802.08	21.55	802.09	21.6	802.1
21.65	802.11	21.69	802.12	21.73	802.13	21.78	802.14	21.82	802.15
21.86	802.16	21.89	802.17	21.93	802.18	25.86	802.95	25.9	802.96
25.91	802.96	25.93	802.96	28.32	807.37	28.33	807.37	28.38	807.39
28.42	807.41	28.47	807.42	28.51	807.44	28.53	807.45	28.66	807.49
31.44	808.11	45.69	812.31	49.98	813.62	59.57	813.62	60.31	813.64
61.18	813.66	62.21	813.69	63.5	813.72	65.11	813.76	67.15	813.81
69.83	813.88	73.34	813.96	74.76	814	74.91	814	91.42	815.35
99.32	816	102.78	816.84	107.54	818	111.72	819.44	113.34	820
114.82	820.51	119.14	822	124.37	823.8	124.94	824	126.17	824.38
131.32	826	136.21	827.34	138.39	827.91				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-699.01	.05	-37.49	.035	28.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.49	28.66	51	50	58	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	813.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	813.11	Reach Len. (ft)	51.00	50.00	58.00
Crit W.S. (ft)		Flow Area (sq ft)	2218.36	664.85	57.16
E.G. Slope (ft/ft)	0.000334	Area (sq ft)	2218.36	664.85	57.16
Q Total (cfs)	5150.00	Flow (cfs)	2786.10	2302.25	61.65
Top Width (ft)	716.03	Top Width (ft)	630.22	66.15	19.65
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)	1.26	3.46	1.08
Max Chl Dpth (ft)	11.11	Hydr. Depth (ft)	3.52	10.05	2.91
Conv. Total (cfs)	281598.4	Conv. (cfs)	152342.2	125885.2	3371.1
Length Wtd. (ft)	50.56	Wetted Per. (ft)	631.52	70.59	20.45
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.07	0.20	0.06
Alpha	2.03	Stream Power (lb/ft s)	138.39	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	107.38	43.03	

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  65.16  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *   32.17  *    3.75  *
  14.16  *
*******************************************************************************
***********

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2704.54

INPUT
Description: Q
Station Elevation Data    num=     154
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 -748.45  816.02  -700.4  811.68 -692.77  810.93 -683.87  809.81 -680.17  809.65
 -677.45  809.68 -674.56  810.19 -673.33  810.49    -666  811.13 -662.97  811.41
 -637.33  811.61 -634.04  811.63 -631.87  811.61 -583.36  810.81 -582.01  810.82
 -577.31  810.68 -571.55  811.45 -562.03  811.58 -551.48  811.55    -539  811.63
 -517.08  811.43 -503.81  811.42 -480.94  811.33 -472.87  811.32 -443.55  811.19
 -439.45  811.22 -390.14   811.6 -383.12  811.66 -350.21  812.11 -346.85  812.08
 -333.68   812.1 -333.26   812.1 -319.39  812.02 -296.26  811.96 -289.76  811.86
 -274.92  811.73 -266.98  811.52 -260.88  811.65 -254.36  811.35 -248.44  811.18
 -234.05  810.76  -220.2  810.35 -189.97  809.52 -189.63  809.44 -185.63  809.13
 -184.53  808.98 -176.48  808.66 -164.04  808.06 -132.48  807.88 -131.43  807.87
 -131.03  807.87  -128.5  807.82 -127.59   807.8  -97.03  807.18  -93.87  807.15
  -65.52  808.11  -59.38  808.03  -40.14  808.49  -33.94  808.23  -32.14  808.15
  -31.27  808.03  -31.03  807.98  -30.36  807.89  -29.98  807.71  -28.02  805.88
   -27.8  805.81  -27.78   805.8  -27.75  805.79  -27.72  805.78  -27.69  805.77
   -27.6  805.74  -27.39  805.67  -27.27  805.61  -27.07  805.53   -26.7  805.38
  -25.82  805.02  -20.72  802.94  -18.43     802  -17.88     802  -17.79     802
   -12.4     802  -11.38     802    -6.9     802   -6.87     802   -4.92     802
   -1.38     802       0     802    1.76     802    4.54     802    5.55     802
    9.02     802   10.62     802   16.34     802   16.72     802   18.59     802
   19.75  802.24    20.4  802.37   21.76  802.65   22.53   802.8   23.02   802.9
   23.36  802.97   23.61  803.02    23.8  803.06   23.95  803.09   24.07  803.12
   24.17  803.14   24.26  803.16   24.33  803.17   24.39  803.19   24.45   803.2
    24.5  803.21   24.54  803.22   24.58  803.22   24.61  803.23   24.64  803.24
   24.67  803.24    24.7  803.25   24.72  803.25   24.74  803.26   24.76  803.26
   24.78  803.26    24.8  803.27   24.81  803.27   24.83  803.27   24.84  803.28
   24.85  803.28   24.86  803.28   24.88  803.28   25.13  803.34      30  808.07
   30.08  808.22   30.78  808.43    49.1  815.09  102.85  815.17   114.4     816
  114.46     816  114.54     816  114.59     816   114.7     816  115.25  816.16
   116.5  816.52  121.57     818  127.43  819.88  127.81     820  128.27  820.15
  133.84     822   139.7  823.91  139.98     824  140.39  824.13  146.22     826
   150.1  827.24  152.47     828  157.76   829.1  161.88  829.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
 -748.45     .05  -33.94    .035      30     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -33.94      30                51   43.25      43             .1        .3

CROSS SECTION OUTPUT  Profile #100-Year
*******************************************************************************
***********
* E.G. Elev (ft)         *  813.17  * Element                *  Left OB *  Channel *
Right OB *
* Vel Head (ft)          *    0.21  * Wt. n-Val.             *   0.050  *   0.035  *
```

0.050									
* W.S. Elev (ft)	*	812.97	* Reach Len. (ft)	*	51.00	*	43.25	*	
43.00									
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	1625.95	*	626.52	*	
31.94									
* E.G. Slope (ft/ft)	*	0.000629	* Area (sq ft)	*	1625.95	*	626.52	*	
31.94									
* Q Total (cfs)	*	5150.00	* Flow (cfs)	*	2164.32	*	2944.78	*	
40.90									
* Top Width (ft)	*	757.90	* Top Width (ft)	*	680.70	*	63.94	*	
13.26									
* Vel Total (ft/s)	*	2.25	* Avg. Vel. (ft/s)	*	1.33	*	4.70	*	
1.28									
* Max Chl Dpth (ft)	*	10.97	* Hydr. Depth (ft)	*	2.39	*	9.80	*	
2.41									
* Conv. Total (cfs)	*	205359.1	* Conv. (cfs)	*	86303.3	*	117424.8	*	
1631.0									
* Length Wtd. (ft)	*	44.88	* Wetted Per. (ft)	*	681.19	*	67.54	*	
14.18									
* Min Ch El (ft)	*	802.00	* Shear (lb/sq ft)	*	0.09	*	0.36	*	
0.09									
* Alpha	*	2.63	* Stream Power (lb/ft s)	*	161.88	*	0.00	*	
0.00									
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	105.13	*	42.29	*	
65.10									
* C & E Loss (ft)	*	0.14	* Cum SA (acres)	*	31.40	*	3.68	*	
14.14									

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Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2661.29

INPUT
Description: R
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-783.32	816.92	-733.81	811.97	-729.95	811.66	-716.71	810.33	-715.94	810.19
-714.02	810.18	-707.96	809.91	-707.14	810.05	-704.49	810.53	-699.47	810.98
-692.88	811.53	-667.52	811.89	-662.99	811.93	-644.31	811.73	-617.72	811.48
-613.76	811.45	-611.42	811.47	-607.17	810.96	-602.21	811.53	-589.62	811.81
-582.69	811.99	-577.88	811.93	-553	811.55	-533.67	811.35	-517	811.32
-503.59	811.16	-484.32	811.15	-482.21	811.18	-460.37	811.51	-433.39	811.71
-408.66	811.94	-400	812.03	-396.5	812.04	-378.35	811.9	-366.17	811.81
-356.25	811.79	-352.92	811.8	-325.51	811.94	-315.59	811.84	-300.04	811.69
-296.75	811.66	-295.78	811.65	-293.27	811.68	-283.04	811.61	-275.48	811.56
-272.25	811.41	-270.84	811.41	-260.52	811.18	-255.37	811.1	-251.05	811.01
-243.46	810.92	-229.93	810.51	-225.49	810.37	-218.08	810.2	-193.64	809.53
-159.48	808.73	-159.26	808.71	-158.2	808.66	-149.61	808.37	-138.25	808.02
-108.81	808.05	-104.98	807.98	-98.95	808.1	-76.28	808.02	-66.27	807.74
-50.69	807.61	-35.72	807.37	-30.35	806.7	-28.35	806.46	-21.76	804.95
-15.72	804.22	-15.2	803.46	-14.95	803.31	-14.93	803.28	-14.91	803.25
-14.89	803.21	-14.86	803.17	-14.83	803.13	-14.8	803.08	-14.77	803.02

-14.73	802.96	-14.69	802.89	-14.63	802.8	-14.58	802.71	-14.51	802.6
-14.43	802.47	-14.33	802.31	-14.21	802.11	-14.14	802	-10.62	802
-9.76	802	-3.66	802	-1.11	802	0	802	3.28	802
7.57	802	10.21	802	16.23	802	17.12	802	20.6	802
20.72	802.01	20.95	802.03	21.16	802.04	21.36	802.06	21.55	802.07
21.72	802.09	27.88	802.57	31.67	806.67	33.46	808.35	46.36	812.63
47.42	812.95	50.63	813.48	56.04	813.65	57.86	813.75	101.72	813.93
102.64	813.94	103.63	813.96	104.68	813.97	105.74	813.98	106.86	813.99
107.53	814	107.58	814	109.13	814.12	109.42	814.15	113.04	814.43
114.04	814.51	115.48	814.62	117.7	814.79	121.05	815.06	124.84	815.34
126.67	815.49	132.02	815.89	132.34	815.91	133.53	816	136.37	816.61
137.94	816.96	139.77	817.36	142.54	818	143.12	818.18	144.56	818.64
147.7	819.64	148.85	820	152.27	821.08	155.2	822	157.11	822.61
158.68	823.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-783.32	.05	-28.35	.035	31.67	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.35	31.67	134	57.86	63	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-783.32	-26.57	812.2	T
36.35	158.68	812.2	T

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	812.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.		0.035	0.050
W.S. Elev (ft)	811.37	Reach Len. (ft)	7.83	7.83	7.83
Crit W.S. (ft)	809.07	Flow Area (sq ft)		499.45	14.25
E.G. Slope (ft/ft)	0.003540	Area (sq ft)	628.70	508.55	20.66
Q Total (cfs)	5150.00	Flow (cfs)		5102.44	47.56
Top Width (ft)	416.99	Top Width (ft)	346.08	60.02	10.89
Vel Total (ft/s)	10.03	Avg. Vel. (ft/s)		10.22	3.34
Max Chl Dpth (ft)	9.37	Hydr. Depth (ft)		8.58	3.05
Conv. Total (cfs)	86563.4	Conv. (cfs)		85764.1	799.3
Length Wtd. (ft)	7.83	Wetted Per. (ft)		61.40	5.50
Min Ch El (ft)	802.00	Shear (lb/sq ft)		1.80	0.57
Alpha	1.03	Stream Power (lb/ft s)	158.68	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	103.81	41.73	65.07
C & E Loss (ft)		Cum SA (acres)	30.80	3.62	14.12

BRIDGE

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2625.35

INPUT
Description:
Distance from Upstream XS = 7.83
Deck/Roadway Width = 15
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-402.08	811.37	0	-279	812.09	0	-47.53	812.2	0
-31.61	812.2	0	-26.57	812.2	810	0	812.2	810
36.35	812.2	810	39.52	812.2	0	59.65	812.2	0
110	812.2	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 146

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-783.32	816.92	-733.81	811.97	-729.95	811.66	-716.71	810.33	-715.94	810.19
-714.02	810.18	-707.96	809.91	-707.14	810.05	-704.49	810.53	-699.47	810.98
-692.88	811.53	-667.52	811.89	-662.99	811.93	-644.31	811.73	-617.72	811.48
-613.76	811.45	-611.42	811.47	-607.17	810.96	-602.21	811.53	-589.62	811.81
-582.69	811.99	-577.88	811.93	-553	811.55	-533.67	811.35	-517	811.32
-503.59	811.16	-484.32	811.15	-482.21	811.18	-460.37	811.51	-433.39	811.71
-408.66	811.94	-400	812.03	-396.5	812.04	-378.35	811.9	-366.17	811.81
-356.25	811.79	-352.92	811.8	-325.51	811.94	-315.59	811.84	-300.04	811.69
-296.75	811.66	-295.78	811.65	-293.27	811.68	-283.04	811.61	-275.48	811.56
-272.25	811.41	-270.84	811.41	-260.52	811.18	-255.37	811.1	-251.05	811.01
-243.46	810.92	-229.93	810.51	-225.49	810.37	-218.08	810.2	-193.64	809.53
-159.48	808.73	-159.26	808.71	-158.2	808.66	-149.61	808.37	-138.25	808.02
-108.81	808.05	-104.98	807.98	-98.95	808.1	-76.28	808.02	-66.27	807.74
-50.69	807.61	-35.72	807.37	-30.35	806.7	-28.35	806.46	-21.76	804.95
-15.72	804.22	-15.2	803.46	-14.95	803.31	-14.93	803.28	-14.91	803.25
-14.89	803.21	-14.86	803.17	-14.83	803.13	-14.8	803.08	-14.77	803.02
-14.73	802.96	-14.69	802.89	-14.63	802.8	-14.58	802.71	-14.51	802.6
-14.43	802.47	-14.33	802.31	-14.21	802.11	-14.14	802	-10.62	802
-9.76	802	-3.66	802	-1.11	802	0	802	3.28	802
7.57	802	10.21	802	16.23	802	17.12	802	20.6	802
20.72	802.01	20.95	802.03	21.16	802.04	21.36	802.06	21.55	802.07
21.72	802.09	27.88	802.57	31.67	806.67	33.46	808.35	46.36	812.63
47.42	812.95	50.63	813.48	56.04	813.65	57.86	813.75	101.72	813.93
102.64	813.94	103.63	813.96	104.68	813.97	105.74	813.98	106.86	813.99
107.53	814	107.58	814	109.13	814.12	109.42	814.15	113.04	814.43
114.04	814.51	115.48	814.62	117.7	814.79	121.05	815.06	124.84	815.34
126.67	815.49	132.02	815.89	132.34	815.91	133.53	816	136.37	816.61
137.94	816.96	139.77	817.36	142.54	818	143.12	818.18	144.56	818.64
147.7	819.64	148.85	820	152.27	821.08	155.2	822	157.11	822.61
158.68	823.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-783.32	.05	-28.35	.035	31.67	.05

Bank Sta: Left Right Coeff Contr. Expan.
-28.35 31.67 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-783.32	-26.57	812.2	T
36.35	158.68	812.2	T

Downstream Deck/Roadway Coordinates
num= 11

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
-445.44	811.52	0	-304.77	812.2	0	-47.53	812.2	0
-31.61	812.2	0	-26.57	812.2	810	0	812.2	810
36.35	812.2	810	39.52	812.2	0	59.65	812.2	0
109.91	812.2	0	140	812.2	0			

Downstream Bridge Cross Section Data
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-894.09	816.87	-876.52	814.4	-831.94	811.38	-830.85	811.3	-830.72	811.29
-823.48	810.55	-823.34	810.52	-820.05	810.19	-818.82	810.68	-818.75	810.7
-818.67	810.71	-815.87	811.16	-809.43	811	-784.07	810.46	-778.22	810.36
-745.9	810.51	-718.61	810.5	-715.28	810.48	-707.53	810.45	-704.06	810.44
-703.62	810.45	-664.69	810.04	-638.25	809.64	-625.96	809.74	-618.61	809.75
-599.23	809.86	-584.82	810.13	-569.62	810.31	-551.66	810.8	-528.92	811.45
-528.79	811.47	-527.09	811.55	-522.26	811.71	-510.94	811.18	-500.7	811.56
-476.48	811.6	-467.12	811.53	-464.76	811.52	-461.95	811.56	-432.04	811.7
-423.95	811.73	-418.48	811.69	-391.41	811.38	-372.01	811.72	-371.95	811.67
-370.07	811.7	-368.61	811.83	-363.43	811.89	-350.22	811.76	-349.4	811.76
-345.61	811.67	-321.9	811.34	-318.71	811.36	-304.07	810.9	-302.05	810.88
-294.79	810.9	-289.51	810.85	-280.21	810.76	-274.05	810.67	-272.54	810.58
-247.3	810.31	-242.95	810.26	-226.04	809.86	-208.97	809.51	-201.01	809.47
-196.58	809.5	-179.02	809.17	-163.54	808.91	-155.16	808.84	-147.64	808.66
-138.16	808.75	-136.69	808.74	-128.47	808.6	-126.5	808.4	-112.75	808.41
-101.83	808.22	-87.87	808.42	-79.46	808.57	-70.73	808.12	-56.58	807.63
-41.5	806.76	-36.54	806.63	-31.16	806.57	-28.47	806.55	-26.43	806.53
-26.25	806.42	-25.52	805.98	-22.05	802.88	-21.93	802.8	-21.2	802.12
-21.19	802.1	-21.17	802.09	-21.15	802.08	-21.12	802.07	-21.1	802.06
-21.08	802.04	-21.06	802.03	-21.03	802.02	-21.01	802	-3.33	802
0	802	8.49	802	12.86	802	19.91	802	21.64	802.22
23.61	802.46	24.81	802.61	25.62	802.71	26.21	802.79	26.65	802.84
27	802.88	27.27	802.92	27.5	802.95	27.69	802.97	27.71	802.97
27.85	802.99	27.99	803.01	28.11	803.02	28.22	803.04	28.31	803.05
28.39	803.06	28.47	803.07	28.54	803.08	28.6	803.08	28.65	803.09
28.7	803.1	28.75	803.1	28.79	803.11	28.83	803.11	28.87	803.12
28.9	803.12	28.93	803.12	28.96	803.13	28.99	803.13	29.01	803.14
29.04	803.14	29.06	803.14	29.08	803.14	29.1	803.15	29.12	803.15
29.14	803.15	29.16	803.15	29.37	803.21	29.76	803.33	29.88	803.36
35.8	806.62	35.86	806.64	36.09	806.68	36.39	806.71	46.81	807.54
52.56	807.93	59.22	809.23	65.51	809.86	65.97	809.9	73.35	810.89
79.45	811.7	80.35	811.82	80.79	811.87	94.07	812.91	95.32	813.03
98.75	813.24	107.94	813.92	114.81	814.09	117.15	814.33	128.42	814.96
128.96	814.96	139.38	815.3	141.42	815.61				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-894.09	.05	-26.43	.035	35.8	.05

Bank Sta: Left Right Coeff Contr. Expan.
-26.43 35.8 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-894.09	-26.57	811	T
36.35	141.42	811	T

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

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

BRIDGE OUTPUT  Profile #100-Year
*********************************************************************************
*********
* E.G. US. (ft)          *     812.98  * Element                *Inside BR US
*Inside BR DS *
* W.S. US. (ft)          *     811.37  * E.G. Elev (ft)         *     812.98  *
812.55  *
* Q Total (cfs)          *    5150.00  * W.S. Elev (ft)         *     811.37  *
811.37  *
* Q Bridge (cfs)         *    3745.66  * Crit W.S. (ft)         *     809.07  *
808.56  *
* Q Weir (cfs)           *    1404.34  * Max Chl Dpth (ft)      *       9.37  *
 9.37  *
* Weir Sta Lft (ft)      *    -743.89  * Vel Total (ft/s)       *       4.96  *
 3.11  *
* Weir Sta Rgt (ft)      *      47.59  * Flow Area (sq ft)      *    1039.14  *
1658.36  *
* Weir Submerg           *       0.00  * Froude # Chl           *       0.70  *
 0.61  *
* Weir Max Depth (ft)    *       0.78  * Specif Force (cu ft)   *    4101.22  *
4082.60  *
* Min El Weir Flow (ft)  *     812.21  * Hydr Depth (ft)        *             *
 5.36  *
* Min El Prs (ft)        *     810.00  * W.P. Total (ft)        *     129.82  *
444.82  *
* Delta EG (ft)          *       0.43  * Conv. Total (cfs)      *             *
       *
* Delta WS (ft)          *       0.26  * Top Width (ft)         *             *
309.33  *
* BR Open Area (sq ft)   *     427.46  * Frctn Loss (ft)        *             *
       *
* BR Open Vel (ft/s)     *       8.76  * C & E Loss (ft)        *             *
       *
* Coef of Q              *             * Shear Total (lb/sq ft) *             *
       *
```

* Br Sel Method * Press/Weir * Power Total (lb/ft s) * -783.32 * -894.09 *

****

Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

Note: For the cross section inside the bridge at the downstream end, the water surface and energy have been projected from the downstream cross section. The selected bridge modeling method does not compute answers inside the bridge.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2603.43

INPUT
Description: S
Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-894.09	816.87	-876.52	814.4	-831.94	811.38	-830.85	811.3	-830.72	811.29
-823.48	810.55	-823.34	810.52	-820.05	810.19	-818.82	810.68	-818.75	810.7
-818.67	810.71	-815.87	811.16	-809.43	811	-784.07	810.46	-778.22	810.36
-745.9	810.51	-718.61	810.5	-715.28	810.48	-707.53	810.45	-704.06	810.44
-703.62	810.45	-664.69	810.04	-638.25	809.64	-625.96	809.74	-618.61	809.75
-599.23	809.86	-584.82	810.13	-569.62	810.31	-551.66	810.8	-528.92	811.45
-528.79	811.47	-527.09	811.55	-522.26	811.71	-510.94	811.18	-500.7	811.56
-476.48	811.6	-467.12	811.53	-464.76	811.52	-461.95	811.56	-432.04	811.7
-423.95	811.73	-418.48	811.69	-391.41	811.38	-372.01	811.72	-371.95	811.67
-370.07	811.7	-368.61	811.83	-363.43	811.89	-350.22	811.76	-349.4	811.76
-345.61	811.67	-321.9	811.34	-318.71	811.36	-304.07	810.9	-302.05	810.88
-294.79	810.9	-289.51	810.85	-280.21	810.76	-274.05	810.67	-272.54	810.58
-247.3	810.31	-242.95	810.26	-226.04	809.86	-208.97	809.51	-201.01	809.47
-196.58	809.5	-179.02	809.17	-163.54	808.91	-155.16	808.84	-147.64	808.66
-138.16	808.75	-136.69	808.74	-128.47	808.6	-126.5	808.4	-112.75	808.41
-101.83	808.22	-87.87	808.42	-79.46	808.57	-70.73	808.12	-56.58	807.63
-41.5	806.76	-36.54	806.63	-31.16	806.57	-28.47	806.55	-26.43	806.53
-26.25	806.42	-25.52	805.98	-22.05	802.88	-21.93	802.8	-21.2	802.12
-21.19	802.1	-21.17	802.09	-21.15	802.08	-21.12	802.07	-21.1	802.06
-21.08	802.04	-21.06	802.03	-21.03	802.02	-21.01	802	-3.33	802
0	802	8.49	802	12.86	802	19.91	802	21.64	802.22
23.61	802.46	24.81	802.61	25.62	802.71	26.21	802.79	26.65	802.84
27	802.88	27.27	802.92	27.5	802.95	27.69	802.97	27.71	802.97
27.85	802.99	27.99	803.01	28.11	803.02	28.22	803.04	28.31	803.05
28.39	803.06	28.47	803.07	28.54	803.08	28.6	803.08	28.65	803.09
28.7	803.1	28.75	803.1	28.79	803.11	28.83	803.11	28.87	803.12
28.9	803.12	28.93	803.12	28.96	803.13	28.99	803.13	29.01	803.14
29.04	803.14	29.06	803.14	29.08	803.14	29.1	803.15	29.12	803.15
29.14	803.15	29.16	803.15	29.37	803.21	29.76	803.33	29.88	803.36
35.8	806.62	35.86	806.64	36.09	806.68	36.39	806.71	46.81	807.54
52.56	807.93	59.22	809.23	65.51	809.86	65.97	809.9	73.35	810.89

79.45	811.7	80.35	811.82	80.79	811.87	94.07	812.91	95.32	813.03
98.75	813.24	107.94	813.92	114.81	814.09	117.15	814.33	128.42	814.96
128.96	814.96	139.38	815.3	141.42	815.61				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-894.09	.05	-26.43	.035	35.8	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.43	35.8	66 48.89	51	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-894.09	-26.57	811	T
36.35	141.42	811	T

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	812.55	Element	Left OB	Channel	Right OB		
Vel Head (ft)	1.44	Wt. n-Val.	0.050	0.035	0.050		
W.S. Elev (ft)	811.11	Reach Len. (ft)	66.00	48.89	51.00		
Crit W.S. (ft)	808.56	Flow Area (sq ft)	64.38	530.49	6.82		
E.G. Slope (ft/ft)	0.003137	Area (sq ft)	800.22	530.49	96.43		
Q Total (cfs)	5150.00	Flow (cfs)	25.02	5121.47	3.52		
Top Width (ft)	672.15	Top Width (ft)	570.68	62.23	39.24		
Vel Total (ft/s)	8.56	Avg. Vel. (ft/s)	0.39	9.65	0.52		
Max Chl Dpth (ft)	9.11	Hydr. Depth (ft)	0.11	8.52	0.17		
Conv. Total (cfs)	91946.9	Conv. (cfs)	446.7	91437.5	62.8		
Length Wtd. (ft)	49.25	Wetted Per. (ft)	570.97	64.85	39.53		
Min Ch El (ft)	802.00	Shear (lb/sq ft)	0.02	1.60	0.03		
Alpha	1.27	Stream Power (lb/ft s)	141.42	0.00	0.00		
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	103.26	41.09	65.03		
C & E Loss (ft)	0.28	Cum SA (acres)	30.36	3.59	14.11		

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2554.54

INPUT

Description: T

Station Elevation Data num= 139

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-980.71	816.65	-966.99	815.72	-911.36	811.71	-908.48	811.07	-902.49	810.68
-900.98	810.45	-899.91	810.48	-897.13	810.75	-896.07	811.03	-892.29	811.28
-887.6	811.56	-880.22	811.58	-864.67	810.85	-857.47	811.08	-844.2	810.59
-827.89	810.55	-810.53	810.54	-808.89	810.49	-793.01	810.03	-739.04	809.86
-733.68	809.8	-724.34	809.77	-692.73	809.42	-688.21	809.41	-662.05	809.38
-655.02	809.41	-652.17	809.09	-622.65	809.43	-607.5	809.45	-561.09	809.11
-552.41	809.15	-549.56	809.18	-504.79	809.52	-502.65	809.58	-492.03	810.02
-479.47	810.44	-478.93	810.37	-477.23	810.45	-472.11	810.51	-457.61	810.92
-451.18	810.99	-440.74	811.54	-437.51	811.53	-416.3	811.75	-415.69	811.75
-415.3	811.74	-414.24	811.88	-400.27	813.22	-381.79	814.19	-377.69	814.34
-372.13	814.15	-345.57	813.99	-344.8	813.99	-331.37	813.94	-304.29	813.83
-291.47	813.82	-282.04	813.66	-265.95	813.24	-255.64	813.03	-243.09	812.44
-238.48	812.34	-220.12	812.29	-217.37	812.29	-210.91	812.01	-200.05	811.45
-195.07	811.43	-178.84	811.24	-167.69	811.33	-160.54	811.31	-139.86	811.31
-129.03	811.32	-105.31	811.26	-98.54	811.22	-75.44	810.6	-68.79	810.44
-65.81	810.3	-51.67	809.76	-46.88	809.31	-43.87	809.05	-34.16	808.14
-31.74	807.97	-30.75	807.66	-29.78	807.07	-25.71	804.6	-25.19	804.28
-24.27	803.72	-20.91	801.64	-14.53	801.01	-13.49	800.98	-4.76	801.32
-4.06	801.36	-3.06	801.36	-3.03	801.36	-2.99	801.36	-2.95	801.36
-2.9	801.36	-2.84	801.37	-2.78	801.37	-2.17	801.38	0	801.42
13.69	801.68	15.73	802.24	21.21	803.74	26.6	805.12	29.74	806
30.15	806.06	30.83	806.16	30.99	806.18	37.76	807.72	42.93	807.76
45.16	807.86	51.27	808.01	53.64	808.06	72.68	808.47	86.63	808.59
94.2	808.73	118.85	810.47	122.89	810.79	123.74	810.9	152.29	815.32
160.72	815.76	161.08	815.74	161.18	815.74	161.39	815.75	161.98	815.77
171.11	815.96	171.87	815.94	183.22	815.73	183.71	815.73	184.32	815.73
184.46	815.73	188.65	815.68	189.99	815.55	191.72	815.42	192.1	815.42
192.46	815.56	192.97	815.92	193.47	816.19	198.2	817.61		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-980.71	.05	-30.75	.035	37.76	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.75	37.76	293 200.01	191	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-950.83	-400.77	814.31	F

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 812.14	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.87	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.27	* Reach Len. (ft)	* 293.00	* 200.01	* 191.00 *
* Crit W.S. (ft)	* 809.13	* Flow Area (sq ft)	* 85.62	* 562.53	* 213.76 *
* E.G. Slope (ft/ft)	*0.002231	* Area (sq ft)	* 705.30	* 562.53	* 213.76 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 126.92	* 4482.87	* 540.21 *
* Top Width (ft)	* 686.37	* Top Width (ft)	* 529.49	* 68.51	* 88.37 *
* Vel Total (ft/s)	* 5.98	* Avg. Vel. (ft/s)	* 1.48	* 7.97	* 2.53 *

* Max Chl Dpth (ft)	* 10.29	* Hydr. Depth (ft)	* 1.01	* 8.21	* 2.42	*		
* Conv. Total (cfs)	*109034.1	* Conv. (cfs)	* 2687.2	* 94909.8	* 11437.1	*		
* Length Wtd. (ft)	* 216.34	* Wetted Per. (ft)	* 84.95	* 71.01	* 88.49	*		
* Min Ch El (ft)	* 800.98	* Shear (lb/sq ft)	* 0.14	* 1.10	* 0.34	*		
* Alpha	* 1.57	* Stream Power (lb/ft s)	* 198.20	* 0.00	* 0.00	*		
* Frctn Loss (ft)	* 0.26	* Cum Volume (acre-ft)	* 102.12	* 40.48	* 64.85	*		
* C & E Loss (ft)	* 0.18	* Cum SA (acres)	* 29.53	* 3.51	* 14.03	*		

****

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2354.53

INPUT
Description: W
Station Elevation Data num= 273

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-500.98	823.09	-475.76	815.71	-473	814.91	-469.19	814.37	-464.75	813.08
-456.29	811.56	-452.29	810.91	-442.76	810.55	-436.56	810.3	-393.36	808.35
-372.59	807.93	-360.28	807.95	-359.42	807.95	-358.55	807.96	-357.68	807.96
-356.8	807.97	-355.93	807.97	-355.05	807.98	-354.16	807.98	-353.27	807.99
-352.39	807.99	-351.49	808	-350.6	808	-349.7	808.01	-348.79	808.01
-347.89	808.02	-346.98	808.02	-346.07	808.03	-345.15	808.03	-344.24	808.04
-343.31	808.04	-342.39	808.05	-341.46	808.05	-340.53	808.06	-339.59	808.06
-338.66	808.07	-337.71	808.07	-336.77	808.08	-335.82	808.08	-334.87	808.09
-333.91	808.09	-332.96	808.1	-331.99	808.1	-331.03	808.11	-330.06	808.11
-328.11	808.13	-327.13	808.13	-326.15	808.14	-325.16	808.14	-324.17	808.15
-323.17	808.15	-322.18	808.16	-321.18	808.16	-319.16	808.18	-318.15	808.18
-317.13	808.19	-316.11	808.19	-315.09	808.2	-314.06	808.2	-311.99	808.22
-310.95	808.22	-309.91	808.23	-308.86	808.23	-307.81	808.24	-306.75	808.24
-304.63	808.26	-303.56	808.26	-302.49	808.27	-301.41	808.27	-299.25	808.29
-298.16	808.29	-295.97	808.31	-294.87	808.31	-293.77	808.32	-292.66	808.32
-290.42	808.34	-289.3	808.34	-288.17	808.35	-287.04	808.35	-284.76	808.37
-283.62	808.37	-281.32	808.39	-280.16	808.39	-277.83	808.41	-276.65	808.41
-274.29	808.43	-273.11	808.43	-270.72	808.45	-269.52	808.45	-267.1	808.47
-265.89	808.47	-262.33	808.5	-261.12	808.5	-256.41	808.54	-255.17	808.54
-254.04	808.55	-253.97	808.55	-252.85	808.56	-252.78	808.56	-251.67	808.57
-251.59	808.57	-250.48	808.58	-249.3	808.58	-249.21	808.59	-248.02	808.59
-246.93	808.6	-246.82	808.6	-245.75	808.61	-245.63	808.61	-244.57	808.62
-243.51	808.62	-242.47	808.63	-242.34	808.63	-241.3	808.64	-241.16	808.64
-240.14	808.65	-239.98	808.65	-238.97	808.66	-237.62	808.66	-236.64	808.67
-236.45	808.67	-235.47	808.68	-235.27	808.68	-234.3	808.69	-233.14	808.69
-232.91	808.7	-231.73	808.7	-230.81	808.71	-230.56	808.71	-229.65	808.72

-229.38	808.72	-228.49	808.73	-227.33	808.73	-227.02	808.74	-225.84	808.74
-225.01	808.75	-224.67	808.75	-223.85	808.76	-223.49	808.76	-222.69	808.77
-221.54	808.77	-221.13	808.78	-219.96	808.78	-219.23	808.79	-218.78	808.79
-218.08	808.8	-216.93	808.8	-216.42	808.81	-215.78	808.81	-215.24	808.82
-214.07	808.82	-213.5	808.83	-212.89	808.83	-212.36	808.84	-211.22	808.84
-210.53	808.85	-210.09	808.85	-209.35	808.86	-208.18	808.86	-207.84	808.87
-206.72	808.87	-205.82	808.88	-205.62	808.88	-204.64	808.89	-204.51	808.89
-203.46	808.9	-201.16	808.9	-200.9	808.91	-198.19	808.91	-198.07	808.92
-196.33	808.92	-196.11	808.93	-194.44	808.93	-194.08	808.94	-192.3	808.94
-191.74	808.95	-190.43	808.95	-189.66	808.96	-189.04	808.96	-187.97	808.97
-187.81	808.97	-186.47	808.98	-186.13	808.98	-184.95	808.99	-184.44	808.99
-183.41	809	-182.76	809	-181.85	809.01	-181.07	809.01	-180.28	809.02
-179.38	809.02	-178.69	809.03	-177.7	809.03	-177.1	809.04	-176.01	809.04
-175.49	809.05	-174.33	809.05	-173.88	809.06	-172.64	809.07	-172.26	809.07
-170.96	809.08	-170.64	809.08	-169.27	809.09	-169.01	809.09	-167.59	809.1
-167.37	809.1	-165.9	809.11	-165.74	809.11	-164.22	809.12	-164.1	809.12
-162.53	809.13	-162.45	809.13	-159.16	809.15	-158.92	809.15	-158.11	809.16
-157.18	809.16	-156.25	809.17	-155.32	809.17	-153.5	809.19	-152.59	809.19
-151.7	809.2	-150.81	809.2	-149.92	809.21	-143.84	809.14	-140.97	809.14
-139.56	809.13	-131.4	809.13	-130.09	809.12	-122.5	809.12	-121.28	809.11
-113.06	809.11	-111.93	809.1	-103.26	809.1	-102.22	809.09	-94.24	809.09
-93.28	809.08	-72.9	809.08	-53.64	808.83	-53.3	808.83	-42.92	808.79
-36.84	808.13	-23.47	806.92	-19.51	804.16	-12.79	800.05	-10.78	799.14
-7.5	798.07	-3.16	797.95	-.23	798.13	0	798.16	7.77	799.04
12.76	799.53	14.53	799.99	19.12	802.85	22.1	804.84	29.43	805.45
40.13	805.82	47.52	806.56	48.05	806.59	49.68	806.84	53.14	806.92
59.06	807.23	74.02	807.96	88.07	809.49	111.46	811.68	126.83	812.75
130.88	812.86	132.22	812.98	148.01	813.9	183.36	815.24	188.34	815.39
189.8	815.43	195.35	815.57	196.04	814.68				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-500.98	.05	-23.47	.035	22.1	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-23.47	22.1	144	48.15	69	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.43	Reach Len. (ft)	144.00	48.15	69.00
Crit W.S. (ft)		Flow Area (sq ft)	1143.18	501.79	313.90
E.G. Slope (ft/ft)	0.000761	Area (sq ft)	1143.18	501.79	313.90
Q Total (cfs)	5150.00	Flow (cfs)	1792.52	2751.89	605.58
Top Width (ft)	564.25	Top Width (ft)	432.01	45.57	86.67
Vel Total (ft/s)	2.63	Avg. Vel. (ft/s)	1.57	5.48	1.93
Max Chl Dpth (ft)	13.48	Hydr. Depth (ft)	2.65	11.01	3.62
Conv. Total (cfs)	186678.6	Conv. (cfs)	64975.9	99751.3	21951.4
Length Wtd. (ft)	85.74	Wetted Per. (ft)	432.21	49.52	86.96

* Min Ch El (ft)	*	797.95	* Shear (lb/sq ft)	*	0.13	*	0.48	*	0.17 *
* Alpha	*	2.51	* Stream Power (lb/ft s)	*	196.04	*	0.00	*	0.00 *
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	95.90	*	38.04	*	63.69 *
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	26.29	*	3.25	*	13.65 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2306.38

INPUT
Description: X
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-600	815.04	-596.19	813.22	-584.78	812.21	-583.55	812.22	-579.05	812
-578.87	811.96	-558.88	811.42	-541.39	811.12	-534.26	811.07	-528.51	810.88
-490.74	810.6	-487.37	810.58	-487.09	810.57	-483.51	810.51	-442.65	810.06
-413.39	808.76	-404	808.13	-396.13	807.99	-392.09	807.99	-391.95	808
-390.23	808	-390.08	808.01	-388.39	808.01	-388.23	808.02	-386.4	808.02
-386.23	808.03	-384.64	808.03	-384.45	808.04	-382.75	808.04	-382.56	808.05
-380.95	808.05	-380.74	808.06	-379.03	808.06	-378.81	808.07	-376.99	808.07
-376.75	808.08	-375.31	808.08	-375.06	808.09	-373.27	808.09	-373.01	808.1
-371.39	808.1	-371.11	808.11	-369.69	808.11	-369.4	808.12	-270.12	808.39
-269.44	808.39	-268.76	808.4	-268.07	808.4	-267.39	808.41	-266.7	808.41
-266	808.42	-265.31	808.42	-264.61	808.43	-263.21	808.43	-262.51	808.44
-261.8	808.44	-261.09	808.45	-260.38	808.45	-259.66	808.46	-258.94	808.46
-258.22	808.47	-257.5	808.47	-256.77	808.48	-256.04	808.48	-255.31	808.49
-254.57	808.49	-253.84	808.5	-252.35	808.5	-251.61	808.51	-250.86	808.51
-250.1	808.52	-249.35	808.52	-248.59	808.53	-247.83	808.53	-247.07	808.54
-246.3	808.54	-245.53	808.55	-244.76	808.55	-243.98	808.56	-243.2	808.56
-242.42	808.57	-241.63	808.57	-240.85	808.58	-240.05	808.58	-239.26	808.59
-238.46	808.59	-237.66	808.6	-221.08	808.63	-194.05	808.39	-190.81	808.4
-189.5	808.43	-176.68	808.62	-165.82	808.85	-165.44	808.85	-165.05	808.86
-163.92	808.86	-163.54	808.87	-162.06	808.87	-161.7	808.88	-160.61	808.88
-67.79	807.94	-61.68	807.94	-61.46	807.95	-55.48	807.95	-55.3	807.96
-53.7	807.96	-46.53	807.87	-42.07	807.83	-25.4	807	-23.53	805.77
-14.98	799.89	-14.31	799.59	-10.39	798.34	-9.53	798.4	-4.34	798.44
0	798.76	2.37	798.93	3.33	799.04	3.92	799.19	9.66	800.26
13.12	802.38	17.84	805.01	36.45	805.24	44.58	806.39	58.79	806.64
63.08	806.74	90.19	807.54	99.16	807.86	114.68	808.3	122.11	808.58
141.52	810.58	154.18	811.63	158.79	812.07	163.4	812.37	166.83	812.49
196.42	813.78	204.95	814.18	207.15	814.28	209.93	814.36	240.28	815.28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-600	.05	-25.4	.035	17.84	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25.4	17.84	90	51.84	42	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	*	811.61	* Element	*	Left OB	*	Channel	*

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Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.            *   0.050  *   0.035  *
  0.050  *
* W.S. Elev (ft)         *  811.42  * Reach Len. (ft)       *   90.00  *   51.84  *
  42.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     * 1354.51  *  461.50  *
 516.45  *
* E.G. Slope (ft/ft)     *0.000648  * Area (sq ft)          * 1354.51  *  461.50  *
 516.45  *
* Q Total (cfs)          * 5150.00  * Flow (cfs)           * 1906.69  * 2283.32  *
 959.99  *
* Top Width (ft)         *  710.67  * Top Width (ft)       *  533.59  *   43.24  *
 133.84  *
* Vel Total (ft/s)       *    2.21  * Avg. Vel. (ft/s)     *    1.41  *    4.95  *
   1.86  *
* Max Chl Dpth (ft)      *   13.08  * Hydr. Depth (ft)     *    2.54  *   10.67  *
   3.86  *
* Conv. Total (cfs)      *202300.6  * Conv. (cfs)          * 74897.8  * 89692.8  *
37710.1  *
* Length Wtd. (ft)       *   65.18  * Wetted Per. (ft)     *  533.69  *   47.12  *
 134.10  *
* Min Ch El (ft)         *  798.34  * Shear (lb/sq ft)     *    0.10  *    0.40  *
   0.16  *
* Alpha                  *    2.51  * Stream Power (lb/ft s) *  240.28  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft) *   91.77  *   37.50  *
  63.03  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)       *   24.70  *    3.20  *
  13.47  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek        RS: 2254.54

INPUT
Description: Y
Station Elevation Data    num=     228
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
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  -710.8  813.44 -709.97  813.28 -708.61  813.03 -707.74  812.99 -702.01  812.28
    -700  811.99 -699.21  811.96 -699.07  811.96 -686.39   811.6 -681.01  811.55
 -658.05  811.53    -637  811.35 -632.92  811.32 -619.88  810.88 -619.82  810.63
  -610.1  808.98 -609.64  808.98 -609.18  808.97 -607.32  808.97 -606.84  808.96
 -605.42  808.96 -604.93  808.95 -603.67  808.96 -603.19  808.97 -602.19  808.97
 -601.67  808.98 -601.18  808.98 -600.67  808.99 -600.17  808.99 -599.67     809
 -599.16     809 -598.66  809.01 -598.16  809.01 -597.66  809.02 -597.15  809.02
 -595.66  809.05 -595.17  809.05 -593.69  809.08 -593.22  809.08 -592.71  809.09
 -592.25   809.1 -591.73  809.11 -591.28  809.11 -590.76  809.12 -590.31  809.13
 -589.23  809.15 -588.85  809.16 -588.28  809.17  -587.9  809.17 -587.32  809.18
 -586.95  809.19 -586.37   809.2    -586  809.21 -585.41  809.21 -583.55  809.24
 -582.89  809.26 -582.25  809.27  -579.5  809.33 -579.19  809.34 -578.43  809.36
 -578.14  809.37 -577.37   809.4 -577.08   809.4  -576.3  809.43    -576  809.44
 -575.19  809.46 -574.91  809.47 -574.09  809.49 -573.57  809.51 -572.68  809.53
 -572.44  809.54 -571.59  809.57 -571.36  809.57 -570.49   809.6 -570.28   809.6
 -569.39  809.63  -569.2  809.64 -568.29  809.66 -568.11  809.67 -567.18   809.7
 -567.02   809.7 -566.07  809.73 -565.93  809.73 -564.96  809.76 -564.84  809.76
 -563.85  809.79 -563.74   809.8 -562.74  809.83 -562.65  809.83 -561.62  809.86
 -561.55  809.86 -560.51  809.89 -560.45  809.89 -559.39  809.92 -558.26  809.96
 -558.14  809.96 -557.05  809.99 -556.82     810    -556     810 -554.99  810.01
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-553.02	810.01	-552.06	810.02	-551.11	810.02	-543.84	810	-501.31	810
-501.07	809.99	-499.91	809.97	-498.78	809.94	-497.68	809.92	-496.71	809.9
-495.76	809.87	-494.82	809.85	-494.24	809.85	-493.22	809.82	-493.12	809.82
-492.13	809.79	-491.86	809.78	-490.87	809.75	-489.9	809.73	-488.97	809.7
-488.8	809.7	-487.94	809.67	-487.75	809.67	-486.9	809.65	-486.7	809.64
-485.87	809.62	-485.65	809.62	-484.82	809.6	-484.59	809.59	-483.78	809.57
-483.54	809.57	-482.73	809.55	-482.48	809.54	-481.69	809.52	-481.41	809.52
-480.63	809.5	-480.55	809.5	-480.26	809.49	-479.63	809.49	-479.33	809.48
-478.73	809.48	-478.42	809.47	-477.54	809.45	-477.22	809.44	-476.36	809.42
-476.02	809.41	-475.18	809.39	-474.82	809.39	-474	809.36	-473.62	809.36
-472.82	809.33	-472.36	809.33	-470.39	809.28	-469.96	809.28	-469.2	809.26
-468.76	809.25	-468.02	809.23	-467.57	809.23	-446.83	808.86	-445.12	808.82
-443.57	808.78	-442.84	808.76	-442.78	808.76	-423.48	808.33	-423.16	808.32
-422.85	808.32	-422.26	808.3	-421.99	808.3	-411.23	808	-355.26	808
-305.73	808.14	-305.47	808.15	-304.16	808.15	-303.9	808.16	-302.55	808.16
-302.28	808.17	-301.17	808.17	-300.89	808.18	-299.47	808.18	-299.19	808.19
-298.02	808.19	-297.73	808.2	-296.54	808.2	-296.23	808.21	-295.01	808.21
-294.7	808.22	-293.45	808.22	-293.13	808.23	-252.94	808.31	-239.24	808.19
-207.69	808.26	-176.3	808.43	-167.71	808.62	-50.35	807.51	-26.21	806.95
-22.65	804.84	-15.41	799.87	-12.68	798.81	-11.48	798.53	-7.82	799.05
-5.45	799.34	-.27	799.85	0	799.86	1.79	799.91	8.44	800.17
10.39	800.27	12.02	801.53	18.58	804.69	33.45	805.08	33.64	805.09
33.75	805.11	41.59	806.49	61.29	806.74	63.84	806.78	69.72	806.8
99.43	807.45	99.94	807.47	126.43	807.87	140.95	808.4	142.39	808.43
163.62	809.25	175.01	810.36	176.19	810.47	193.42	812.18	221.23	813.76
226.1	814.12	234.24	814.56	253.92	815.17				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-710.8	.05	-26.21	.035	18.58	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-26.21	18.58	90	50	45	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.56	* Element	* Left OB	* Channel	* Right OB	*			
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.050	* 0.035	* 0.050	*			
* W.S. Elev (ft)	* 811.43	* Reach Len. (ft)	* 90.00	* 50.00	* 45.00	*			
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 1721.13	* 463.64	* 639.25	*			
* E.G. Slope (ft/ft)	*0.000476	* Area (sq ft)	* 1721.13	* 463.64	* 639.25	*			
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2201.24	* 1937.17	* 1011.60	*			
* Top Width (ft)	* 832.81	* Top Width (ft)	* 620.69	* 44.79	* 167.33	*			
* Vel Total (ft/s)	* 1.82	* Avg. Vel. (ft/s)	* 1.28	* 4.18	* 1.58	*			
* Max Chl Dpth (ft)	* 12.90	* Hydr. Depth (ft)	* 2.77	* 10.35	* 3.82	*			
* Conv. Total (cfs)	*236093.6	* Conv. (cfs)	*100912.3	* 88806.3	* 46375.1	*			
* Length Wtd. (ft)	* 68.70	* Wetted Per. (ft)	* 621.10	* 48.38	* 167.60	*			
* Min Ch El (ft)	* 798.53	* Shear (lb/sq ft)	* 0.08	* 0.28	* 0.11	*			
* Alpha	* 2.33	* Stream Power (lb/ft s)	* 253.92	* 0.00	*				

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   0.00  *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)   *   88.59  *   36.95  *
  62.48  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)         *   23.51  *    3.15  *
  13.33  *
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CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek       RS: 2204.54

INPUT
Description: Z
Station Elevation Data    num=     165
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -920.1  820.14 -896.19  814.15 -895.12  814.33 -893.31  813.88 -892.86  813.34
 -892.27   813.3 -892.03  813.32 -876.99  813.58 -876.65  813.55 -876.47  813.56
 -876.24  813.54 -872.18  813.51 -870.87  813.28 -869.03  813.08 -868.31  812.86
 -855.14  813.35 -849.65  813.23  -812.3  812.37 -806.56  812.06 -779.56   810.8
 -766.96   810.5 -766.64  810.49 -765.57  810.49  -765.2  810.48 -764.43  810.48
 -764.03  810.47 -763.26  810.47 -762.89  810.46 -761.51  810.46 -758.71  810.45
 -757.65  810.45  -757.1  810.44 -756.54  810.44 -755.96  810.43 -755.35  810.43
 -736.34  810.09 -727.76     810 -724.67     810 -723.11  809.93 -722.72   809.9
 -720.45  809.79 -720.19  809.78 -718.07  809.67 -715.71  809.55 -715.15  809.52
 -713.35  809.43    -711   809.3 -710.14  809.25 -708.66  809.18 -707.65  809.11
 -706.33  809.05 -705.16  808.97 -704.01  808.91 -702.67  808.83  -701.7  808.78
  -700.2  808.68  -699.4  808.64 -695.15  808.37 -694.71  808.35 -692.62  808.21
 -690.13  808.04 -689.45     808  -685.9  807.81 -682.12   807.6 -679.11  807.44
 -677.88  807.38 -671.69  807.04 -669.67  806.94 -668.04  806.85 -665.59  806.72
 -664.32  806.65 -661.42   806.5  -657.4  806.28 -657.06  806.27 -656.63  806.24
 -652.82  806.04 -652.75  806.04 -652.03     806 -593.71     806 -593.13  806.02
 -588.37   806.2  -584.4  806.36 -581.06  806.48 -573.44  806.78 -573.35  806.78
 -572.14  806.82 -570.81  806.86 -569.34   806.9 -567.72  806.95 -565.91     807
 -558.99  807.21 -557.23  807.27 -555.81  807.33 -554.58  807.37 -553.51  807.41
 -552.56  807.45 -551.72  807.48 -550.97  807.51  -550.3  807.53 -550.16  807.53
 -549.52  807.56 -548.94  807.58 -548.41   807.6 -547.93  807.62 -547.49  807.63
 -547.14  807.65 -546.81  807.66 -546.51  807.67 -546.19  807.68 -545.62   807.7
 -545.36  807.71 -536.11     808 -297.24     808  -281.9  808.03 -280.46  808.02
 -277.08  808.03 -262.39  808.11 -202.84  808.29 -173.64   807.9  -170.7  807.89
  -159.9   807.7 -148.14  807.54 -117.32  807.28   -93.7  807.48  -78.23  807.81
  -46.46  808.15  -36.05  807.73  -24.39  806.89  -16.87  802.56  -12.29   799.9
  -10.83  799.57    -3.6  798.81    -.66  799.18       0  799.22    5.47  799.58
    7.65  799.65    9.47  799.75   15.49  800.09   17.16  801.36   19.95  804.35
    25.2   804.7   29.78  804.99   36.45  806.08   39.89  806.63   55.27  806.92
   59.82  806.89   85.88  806.81  100.95  807.11  118.08  807.56  134.44  807.79
  136.61  807.85  149.16  807.76  170.32  807.81  189.32  808.47  190.53  808.49
   191.3  808.57  191.95  808.65  200.96  809.38   215.3  810.83  226.77  812.05
  229.06  812.33  231.06  812.53  233.55  812.84  257.98  814.32  265.36  814.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  -920.1     .05  -24.39    .035   19.95     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -24.39   19.95               74      50      44             .1      .3

CROSS SECTION OUTPUT  Profile #100-Year
*********************************************************************************
```

E.G. Elev (ft)	811.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.46	Reach Len. (ft)	74.00	50.00	44.00
Crit W.S. (ft)		Flow Area (sq ft)	2701.08	472.71	782.92
E.G. Slope (ft/ft)	0.000236	Area (sq ft)	2701.08	472.71	782.92
Q Total (cfs)	5150.00	Flow (cfs)	2850.12	1416.15	883.73
Top Width (ft)	1014.95	Top Width (ft)	769.33	44.34	201.28
Vel Total (ft/s)	1.30	Avg. Vel. (ft/s)	1.06	3.00	1.13
Max Chl Dpth (ft)	12.65	Hydr. Depth (ft)	3.51	10.66	3.89
Conv. Total (cfs)	334996.2	Conv. (cfs)	185394.0	92117.5	57484.7
Length Wtd. (ft)	61.88	Wetted Per. (ft)	769.55	48.07	201.61
Min Ch El (ft)	798.81	Shear (lb/sq ft)	0.05	0.15	0.06
Alpha	1.95	Stream Power (lb/ft s)	265.36	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	84.03	36.42	61.74
C & E Loss (ft)	0.00	Cum SA (acres)	22.07	3.10	13.14

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2154.54

INPUT
Description: AA
Station Elevation Data num= 240

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1050.25	820.63	-1046.01	819.69	-1013.47	813.55	-1012.08	813.09	-1010.95	813.03
-1007.66	812.6	-1006.09	811.8	-1005.58	811.43	-1004.49	811.76	-1001.75	812.04
-989.06	811.69	-985.15	811.91	-983.65	811.94	-979.51	811.82	-936.54	810.46
-928.74	810.18	-887.18	809.85	-877.57	809.89	-877.45	809.89	-874.23	809.92
-873.47	809.93	-872.44	809.95	-870.94	809.97	-868.31	810	-868.11	810
-866.76	809.98	-862.23	809.89	-861.9	809.89	-860.39	809.86	-840.5	809.5
-840.11	809.5	-839.76	809.49	-839.4	809.49	-839.03	809.48	-838.65	809.48
-838.27	809.47	-837.88	809.47	-837.48	809.46	-837.07	809.46	-836.64	809.45
-836.21	809.45	-835.29	809.43	-834.8	809.43	-834.3	809.42	-791.76	808.77
-791.35	808.77	-790.71	808.76	-790.31	808.76	-789.67	808.75	-789.27	808.75
-788.62	808.74	-788.23	808.74	-787.57	808.73	-787.19	808.73	-786.53	808.72
-786.15	808.72	-785.48	808.71	-785.12	808.71	-784.44	808.7	-784.08	808.7
-783.41	808.69	-782.8	808.69	-782.12	808.68	-781.77	808.68	-781.08	808.67
-780.73	808.67	-780.03	808.66	-779.69	808.66	-778.99	808.65	-778.65	808.65
-777.94	808.64	-777.61	808.64	-776.89	808.63	-776.56	808.63	-775.85	808.62
-775.52	808.62	-774.8	808.61	-774.49	808.61	-773.76	808.6	-773.45	808.59
-772.71	808.58	-772.41	808.58	-771.67	808.57	-771.38	808.57	-770.63	808.56
-770.34	808.56	-769.59	808.55	-769.3	808.55	-768.54	808.54	-768.27	808.54

-755.87	808.33	-754.97	808.31	-754.81	808.31	-753.89	808.29	-753.74	808.29
-752.82	808.27	-752.67	808.27	-751.74	808.25	-751.61	808.25	-750.66	808.23
-750.54	808.23	-749.59	808.21	-749.47	808.21	-748.51	808.19	-748.41	808.18
-747.01	808.18	-746.94	808.17	-745.76	808.17	-745.04	808.16	-744.9	808.16
-737.16	808	-722.98	808	-705.02	807.3	-704.02	807.25	-701.59	807.16
-700.41	807.1	-697	806.95	-695.48	806.88	-693.78	806.81	-692.11	806.73
-690.19	806.63	-688.92	806.58	-687.86	806.53	-686.95	806.5	-680.97	806.2
-677.18	806.02	-676.84	806	-628.87	806	-624.75	806.11	-623.33	806.14
-621.96	806.18	-621.8	806.18	-619.64	806.26	-617.64	806.32	-615.79	806.38
-613.24	806.47	-612.44	806.5	-612.16	806.5	-611.37	806.52	-611.08	806.53
-610.3	806.55	-610	806.55	-609.26	806.58	-608.94	806.58	-608.55	806.59
-607.55	806.62	-607.22	806.62	-606.55	806.64	-606.21	806.64	-605.55	806.66
-605.2	806.67	-604.55	806.68	-604.19	806.69	-603.55	806.7	-603.18	806.71
-602.55	806.72	-602.16	806.73	-601.54	806.74	-601.12	806.74	-600.5	806.76
-600.1	806.76	-599.49	806.78	-599.08	806.78	-598.48	806.8	-597.21	806.8
-586.51	807.05	-585.97	807.05	-585.09	807.07	-584.53	807.07	-584.1	807.08
-583.54	807.08	-583.12	807.09	-582.51	807.09	-582.08	807.1	-581.52	807.1
-581.1	807.11	-580.52	807.11	-580.11	807.12	-579.13	807.12	-578.55	807.13
-577.56	807.13	-576.79	807.15	-576.19	807.15	-575.81	807.16	-574.83	807.16
-574.23	807.17	-573.24	807.17	-572.87	807.18	-572.26	807.18	-570.36	807.19
-569.13	807.19	-543.02	808	-182.12	808	-177.95	807.96	-177.84	807.96
-139.2	807.49	-77.02	808.07	-43.93	808.02	-37.15	807.53	-21.68	806.24
-11.01	799.74	-10.69	799.54	-10.59	799.52	-5.56	798.6	-5.29	798.62
3.35	798.83	3.54	798.82	12.36	799.3	12.69	799.28	17.23	800.15
17.56	800.21	18.08	800.51	22.06	801.88	28.84	804.5	30.21	804.68
31.01	804.81	38.21	806.5	53.53	806.9	56.01	806.89	83.27	805.56
90.16	805.89	97.72	805.35	98.09	805.33	98.41	805.31	119.58	805.49
134.35	805.66	139.08	805.15	140.47	805.07	142.84	805.35	145.72	805.7
173.74	807.13	185.9	807.67	200.7	808.17	219.31	808.96	227.19	809.44
230.22	809.96	238.42	810.98	255.45	812.86	266.7	813.74	275.06	814.33

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1050.25	.05	-21.68	.035	38.21	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-21.68	38.21	63	48.8	47	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.50	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.04	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.46	* Reach Len. (ft)	* 63.00	* 48.80	* 47.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 3182.74	* 603.31	* 928.67 *
* E.G. Slope (ft/ft)	*0.000163	* Area (sq ft)	* 3182.74	* 603.31	* 928.67 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 2710.09	* 1474.98	* 964.93 *
* Top Width (ft)	* 1211.03	* Top Width (ft)	* 946.59	* 59.89	* 204.56 *
* Vel Total (ft/s)	* 1.09	* Avg. Vel. (ft/s)	* 0.85	* 2.44	* 1.04 *
* Max Chl Dpth (ft)	* 12.86	* Hydr. Depth (ft)	* 3.36	* 10.07	* 4.54 *
* Conv. Total (cfs)	*403391.3	* Conv. (cfs)	*212277.4	*115532.4	* 75581.5 *
* Length Wtd. (ft)	* 56.27	* Wetted Per. (ft)	* 946.79	* 62.98	*

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 204.91  *
* Min Ch El (ft)         *  798.60  * Shear (lb/sq ft)       *    0.03  *    0.10  *
   0.05  *
* Alpha                  *    1.92  * Stream Power (lb/ft s) *  275.06  *    0.00  *
   0.00  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *   79.03  *   35.80  *
  60.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *   20.61  *    3.04  *
  12.93  *
*********************************************************************************
***********

Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2105.74

INPUT
Description: BB
Station Elevation Data    num=     200
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
-1284.71   828.4-1264.69  825.28-1263.81  824.96-1255.01  824.13-1251.56  823.73
-1212.64  819.73-1195.99   817.6-1171.48  814.52-1154.57  811.39-1154.51  811.39
-1152.14  811.04-1146.22  810.54-1138.02  810.11-1130.04  809.79-1118.28  809.73
-1102.85  809.11 -1094.7  808.94-1092.67  808.85-1081.42  809.01 -1046.4  808.93
-1040.72  808.97-1038.97  808.94-1035.49  808.84 -992.45  809.89 -987.58     810
  -938.5     810 -913.54  809.72 -907.64   809.6 -907.57   809.6 -906.11  809.58
 -904.69  809.55 -898.14  809.45 -895.76  809.41 -894.62   809.4 -891.36  809.34
 -890.32  809.33 -890.09  809.32 -889.08  809.31 -887.57  809.28 -887.02  809.28
 -886.05  809.26 -885.48  809.25 -884.53  809.24 -883.95  809.23 -883.02  809.21
 -882.41   809.2  -881.5  809.19 -880.88  809.18 -867.82  808.94 -866.93  808.93
 -865.98  808.91 -865.12   808.9 -864.15  808.88 -863.32  808.86 -862.31  808.84
 -861.52  808.83 -860.39  808.81 -859.63   808.8 -858.47  808.77 -857.74  808.76
 -856.55  808.74 -855.85  808.73 -854.63   808.7 -853.97  808.69  -852.7  808.66
 -852.56  808.66 -850.64  808.63  -849.3   808.6 -848.72  808.59 -847.34  808.56
 -846.81  808.55 -843.44  808.48 -842.97  808.48 -841.48  808.45 -841.06  808.44
 -840.69  808.43 -840.29  808.42 -839.89  808.42 -839.51  808.41 -839.14  808.41
 -838.43  808.39 -838.09  808.39 -837.76  808.38 -837.69  808.38 -832.66   808.3
 -831.42  808.27 -827.51  808.21 -826.14  808.18 -823.27  808.14 -823.16  808.13
  -821.7  808.11 -821.62  808.11 -820.13  808.08 -820.07  808.08 -818.57  808.06
 -815.34     808 -742.79     808 -655.57  806.72 -655.26  806.72 -654.72  806.74
 -654.43  806.75 -654.15  806.75  -645.4  807.05 -644.35  807.05 -643.86  807.06
 -640.51  807.06 -640.44  807.07 -638.73   807.1 -638.13  807.12 -636.88  807.14
 -636.24  807.16 -635.57  807.17 -634.89  807.19  -634.2   807.2 -632.75  807.24
 -631.09  807.27 -620.02  807.57 -619.11   807.6 -618.17  807.62  -617.2  807.65
  -614.9  807.71 -612.76  807.75 -610.73  807.81 -610.24  807.81 -610.12  807.82
 -609.89  807.82 -602.84     808 -143.09     808 -135.89  807.88 -134.92  807.87
 -134.16  807.85 -134.09  807.85 -127.27  807.75 -115.54  807.75 -111.92  807.81
 -109.05  807.88 -107.52  807.88 -106.87  807.89 -105.45  807.89 -104.68   807.9
 -103.86   807.9 -102.99  807.91 -101.07  807.91  -90.85  807.94   -89.1  807.94
  -77.29  807.99  -69.47  807.99   -68.7     808  -60.94     808  -60.01  807.99
  -57.27  807.99  -55.07  807.82  -38.23  806.81   -35.2  806.61  -34.55   806.6
  -34.29  806.56  -33.82  806.54  -19.98   805.6     -19  805.03  -11.8  800.15
   -7.71   799.5   -5.17  799.19       0  799.12     1.4  799.11   4.01  798.92
   10.22  798.03   12.53  797.84   16.97   798.1   18.46  798.17   19.54   798.4
    23.6   799.5   26.39  801.64   29.68  803.93   34.42   805.9   38.23  806.07
   42.74   806.3   47.09  806.22   62.78  806.13   63.27  806.12   63.62  806.12
   64.44  806.15   83.44  806.15   91.23  806.63   94.72   806.8  100.52  806.83
  132.42  807.25  132.77  807.26  132.86  807.26  133.05  807.27  173.39  808.66
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193.45	809.45	210.92	809.38	236.84	810.04	248.49	810.08	253.06	810.27
259.03	810.45	272.22	811.95	279.37	812.68	292.07	813.79	296.17	814.12

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1284.71	.05	-19.98	.035	34.42	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.98	34.42	190	202.35	215	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.45	Reach Len. (ft)	190.00	202.35	215.00
Crit W.S. (ft)		Flow Area (sq ft)	3589.67	607.54	787.18
E.G. Slope (ft/ft)	0.000161	Area (sq ft)	3589.67	607.54	787.18
Q Total (cfs)	5150.00	Flow (cfs)	2918.29	1563.93	667.78
Top Width (ft)	1422.68	Top Width (ft)	1134.90	54.40	233.38
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	0.81	2.57	0.85
Max Chl Dpth (ft)	13.61	Hydr. Depth (ft)	3.16	11.17	3.37
Conv. Total (cfs)	405600.4	Conv. (cfs)	229836.4	123171.1	52592.9
Length Wtd. (ft)	196.94	Wetted Per. (ft)	1135.13	58.22	233.53
Min Ch El (ft)	797.84	Shear (lb/sq ft)	0.03	0.11	0.03
Alpha	2.32	Stream Power (lb/ft s)	296.17	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	74.13	35.12	59.95
C & E Loss (ft)	0.01	Cum SA (acres)	19.11	2.97	12.70

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1903.41

INPUT
Description: CC
Station Elevation Data num= 299

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1413.08	816.72	-1407.17	816.44	-1397.75	816.01	-1388.84	815.67	-1377.66	815.3
-1366.03	814.77	-1359.93	814.45	-1351.29	814.1	-1335.15	813.35	-1330.71	813.1
-1329.95	813.06	-1327.67	812.99	-1311.67	812.18	-1308.35	812.07	-1306.25	810.9
-1302.09	807.29	-1301.39	807.14	-1295.3	807.3	-1292.12	807.21	-1288.74	807.57
-1286.35	807.86	-1281.48	808.5	-1273.69	809.7	-1271.01	810.13	-1270.85	810.19

-1265.96	810.47	-1263.08	810.63	-1256.33	810.92	-1254.83	810.96	-1254.52	810.97
-1250.44	811.04	-1235.5	811.18	-1232.76	811.29	-1226.9	811.26	-1221.86	811.26
-1192.42	811.42	-1178.27	811.68	-1173.41	811.87	-1164.4	811.94	-1147.89	811.78
-1132.78	811.57	-1120.92	811.3	-1104.29	810.83	-1092.34	809.98	-1084.47	809.39
-1078.79	809.03	-1060.74	808.69	-1034.31	808.1	-1002.08	807.01	-988.32	806.88
-983.24	806.72	-979.96	806.54	-962.01	805.21	-957.69	804.98	-957.01	805.11
-947.73	806.94	-947.71	807.06	-945.84	807.99	-944.47	807.48	-858.15	808
-799.47	808	-736.49	807.13	-689.04	806.61	-688.74	806.61	-628.45	806.52
-628.28	806.53	-628.11	806.53	-627.93	806.54	-627.75	806.54	-627.57	806.55
-627.38	806.55	-627.19	806.56	-627	806.56	-626.8	806.57	-626.6	806.57
-626.4	806.58	-626.19	806.59	-625.97	806.59	-625.76	806.6	-625.53	806.6
-625.31	806.61	-625.07	806.62	-624.83	806.62	-624.59	806.63	-624.07	806.65
-623.81	806.65	-623.55	806.66	-622.7	806.69	-622.41	806.69	-621.8	806.71
-620.81	806.74	-619.38	806.78	-618.6	806.8	-618.2	806.82	-616.86	806.85
-616.41	806.87	-615.45	806.89	-614.95	806.91	-614.43	806.92	-613.34	806.96
-612.77	806.97	-611.56	807.01	-610.92	807.02	-609.58	807.06	-608.87	807.08
-608.13	807.11	-607.36	807.13	-606.49	807.15	-605.65	807.18	-604.78	807.2
-602.91	807.26	-601.92	807.28	-587.74	807.73	-586.05	807.79	-584.26	807.85
-582.34	807.91	-580.28	807.98	-579.52	808	-497.85	808	-489.92	807.75
-488.12	807.69	-484.48	807.58	-483.72	807.56	-482.13	807.51	-481.69	807.5
-480.17	807.45	-479.66	807.44	-478.21	807.4	-477.65	807.38	-476.26	807.34
-475.65	807.32	-474.32	807.28	-473.66	807.27	-472.47	807.23	-471.77	807.21
-468.8	807.13	-468	807.11	-466.97	807.08	-466.13	807.06	-465.15	807.03
-464.11	807.01	-461.88	806.95	-459.38	806.89	-458.02	806.86	-456.71	806.82
-455.33	806.79	-453.87	806.75	-452.92	806.72	-451.38	806.69	-450.52	806.66
-448.13	806.6	-440.76	806.39	-439.42	806.36	-439.1	806.35	-436.3	806.29
-431.15	806.17	-427.32	806.09	-425.27	806.04	-423.45	806	-374	806
-373.56	806.01	-372.23	806.02	-370.93	806.04	-369.65	806.05	-368.39	806.07
-367.15	806.08	-365.72	806.1	-365.57	806.1	-358.39	806.22	-357.27	806.23
-354.06	806.29	-342.7	806.44	-335.04	806.52	-334.69	806.53	-333.81	806.54
-333.44	806.55	-332.57	806.57	-332.19	806.57	-331.34	806.59	-330.94	806.59
-330.1	806.61	-329.69	806.61	-328.43	806.64	-327.61	806.65	-327.35	806.66
-326.9	806.66	-326.02	806.68	-325.56	806.68	-324.69	806.7	-324.22	806.71
-323.37	806.72	-322.88	806.73	-322.04	806.74	-321.54	806.75	-320.71	806.77
-320.2	806.77	-319.39	806.79	-319.27	806.79	-318.73	806.8	-317.94	806.81
-317.39	806.82	-316.6	806.83	-316.04	806.84	-315.27	806.86	-314.69	806.86
-313.94	806.88	-292.28	807.29	-291.62	807.31	-290.98	807.32	-290.48	807.33
-290	807.33	-287.07	807.39	-286.61	807.4	-286.15	807.4	-285.72	807.41
-284.96	807.43	-261.22	807.95	-261.14	807.96	-260.71	807.96	-259.22	807.99
-258.97	808	-191.55	808	-160.29	808.57	-159.61	808.57	-158.94	808.58
-154.42	808.58	-153.85	808.59	-138.43	808.58	-137.74	808.57	-135.64	808.57
-134.94	808.56	-132.25	808.56	-131.6	808.55	-129.06	808.55	-128.42	808.54
-125.81	808.54	-125.15	808.53	-122.41	808.53	-103.56	808	-61.32	808
-61.14	807.99	-60.4	808	-59.58	808	-57.87	807.98	-57.25	807.68
-56.22	807.71	-40.74	807.96	-40.56	807.88	-39.48	807.93	-39.31	807.9
-38.39	807.84	-31.6	806.91	-23.04	804.62	-18.39	802.72	-15.31	799.68
-13.61	799.14	-11.15	798.59	-8.71	798.6	-4.88	798.82	-2.24	798.91
0	799.21	2.77	799.59	5.36	799.74	15.86	800.78	19.21	801.07
25.98	801.39	28.13	801.7	34.86	801.78	40.98	802.22	64.91	803.69
67.69	803.76	85.92	804.31	102.91	804.36	107.15	804.41	109.56	804.63
123.37	806.87	124.99	806.92	138.39	807.04	154.02	807.98	175.38	808.83
193.46	809.77	211.27	810.13	232.8	810.02	248.61	809.84	261.98	809.75
286.4	809.66	312.77	809.79	322.37	809.86	329.27	809.78	332.46	809.82
341.59	809.72	361.96	809.56	373.32	809.63	394.07	809.51	398.94	809.45
403.05	809.94	422.39	812.19	432.81	813.02	439.57	813.46		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1413.08	.05	-18.39	.035	28.13	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-18.39	28.13	512	298.87	86	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.44	Reach Len. (ft)	512.00	298.87	86.00
Crit W.S. (ft)		Flow Area (sq ft)	4455.71	530.61	1318.23
E.G. Slope (ft/ft)	0.000097	Area (sq ft)	4455.71	530.61	1318.23
Q Total (cfs)	5150.00	Flow (cfs)	3175.30	1101.72	872.98
Top Width (ft)	1658.44	Top Width (ft)	1224.15	46.52	387.78
Vel Total (ft/s)	0.82	Avg. Vel. (ft/s)	0.71	2.08	0.66
Max Chl Dpth (ft)	12.85	Hydr. Depth (ft)	3.64	11.41	3.40
Conv. Total (cfs)	522094.5	Conv. (cfs)	321904.3	111689.8	88500.4
Length Wtd. (ft)	376.86	Wetted Per. (ft)	1227.59	48.06	388.23
Min Ch El (ft)	798.59	Shear (lb/sq ft)	0.02	0.07	0.02
Alpha	1.96	Stream Power (lb/ft s)	439.57	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	56.59	32.48	54.75
C & E Loss (ft)	0.00	Cum SA (acres)	13.96	2.74	11.16

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1604.54

INPUT
Description: DD
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-254.5	820.31	-253.81	820	-249.36	818.13	-249.04	818	-248.71	817.86
-244.27	816	-241.75	814.97	-239.41	814	-235.77	812.52	-234.46	812
-232.56	811.25	-229.43	810	-228.2	809.57	-224.74	808.38	-223.94	808.1
-223.65	808	-223.48	808	-221.86	808	-221.07	808	-220.61	808.01
-220.31	808.01	-220.09	808.01	-219.93	808.01	-219.8	808.01	-219.7	808.01
-219.62	808.01	-219.56	808.01	-219.5	808.01	-219.45	808.01	-219.42	808.01
-219.4	808.01	-219.38	808.01	-219.31	808.01	-219.29	808.01	-219.27	808.01
-219.26	808.01	-219.22	808.01	-219.21	808.01	-219.2	808.01	-219.19	808.01
-219.18	808.01	-219.17	808.01	-219.17	808.05	-218.46	808.05	-218.07	808.25
-208.9	807.97	-202.66	807.8	-202.47	807.73	-199.15	806.81	-197.39	806.65
-185.15	805.67	-168.49	805.12	-165.13	805.01	-163.48	805.02	-161.69	805.03
-150.76	805.17	-148.36	804.05	-144.6	801.99	-144.14	801.94	-143.94	801.8
-140.03	799.92	-137.84	799.77	-137.23	799.58	-137.01	799.73	-134.93	801.41

-134.51	801.43	-126.72	801.94	-117.53	801.92	-102.19	801.63	-88	801.53
-78.33	801.45	-66.67	801.3	-53.5	801.47	-51.58	801.47	-36.89	801.33
-18.11	800.66	-15.8	800.56	-15.31	800.44	-11.66	798.9	-2.59	797.82
-2.27	797.8	-1.95	797.77	0	797.54	4.56	797	9.86	796.53
9.89	796.53	14.62	798.12	14.69	798.14	14.81	798.26	20.33	807.16
23.78	807.16	38.24	807.17	53.5	807.14	57.16	807.14	70.39	807.14
74	807.13	112.25	806.72	127.42	806.39	151.27	806.51	160.35	807.08
183.69	807.64	190.99	807.66	210.11	808.16	216.56	808.05	241.85	807.55
242.96	807.5	249.5	807.18	265.56	806.74	289.15	808.84	301.45	809.04
322.56	809.76	342.42	809.63	360.59	809.45	381.97	809.41	400.9	809.43
411.27	809.32	419.05	810.3	430.18	811.75	441.82	812.55	451.46	813.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-254.5	.05	-15.8	.035	20.33	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-15.8	20.33	149 184.82	41	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.35	Reach Len. (ft)	149.00	184.82	41.00
Crit W.S. (ft)		Flow Area (sq ft)	1713.42	459.70	1358.78
E.G. Slope (ft/ft)	0.000177	Area (sq ft)	1713.42	459.70	1358.78
Q Total (cfs)	5150.00	Flow (cfs)	2665.06	1284.07	1200.87
Top Width (ft)	659.94	Top Width (ft)	217.02	36.13	406.80
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)	1.56	2.79	0.88
Max Chl Dpth (ft)	14.82	Hydr. Depth (ft)	7.90	12.72	3.34
Conv. Total (cfs)	386773.2	Conv. (cfs)	200150.6	96435.3	90187.4
Length Wtd. (ft)	128.00	Wetted Per. (ft)	219.87	41.85	407.09
Min Ch El (ft)	796.53	Shear (lb/sq ft)	0.09	0.12	0.04
Alpha	1.59	Stream Power (lb/ft s)	451.46	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	20.33	29.08	52.11
C & E Loss (ft)	0.00	Cum SA (acres)	5.49	2.46	10.38

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1419.72

INPUT

Description: EE
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-133.24	824.56	-130.81	824	-124.37	822.44	-122.58	822	-118.66	821.04
-114.37	820	-112.36	819.49	-106.45	818	-101.64	816.16	-98.65	815.34
-97.21	814.61	-89.43	814.27	-83.42	814	-82.62	813.97	-80.92	813.88
-75.91	810	-75.9	810	-72.82	810.28	-72.74	810.29	-71.16	810.43
-60.51	809.88	-58.71	809.82	-58.63	809.84	-57.68	809.87	-55.63	809.3
-52.04	808.3	-48.95	808.06	-43.9	807.61	-33.31	807.36	-29.68	807.31
-18.8	797.35	-18.51	797.15	-18.37	797.12	-9.34	796.76	-8.3	796.83
-1.89	796.37	-.01	796.51	0	796.51	5.24	797.45	10.42	797.23
15.88	797.82	25.35	798.02	28.91	797.99	35.53	800.94	37.02	801.47
37.8	801.6	46.24	803.46	74.68	805.31	77.76	805.47	79.29	805.55
80.95	805.57	112.25	806.16	129.82	806.8	146.42	807.27	181.61	807.14
183.67	807.12	193.95	807.06	228.2	806.84	237.5	806.83	265.27	806.79
281.86	806.66	304.04	806.21	331.38	805.94	344.68	806.3	350.86	806.46
385.2	806.66	387.18	806.61	399.69	807.42	427.18	809.24	432.84	809.27
465.47	809.54	480.67	809.4	493.5	809.13	509.05	808.96	518.95	808.89
532.2	808.89	549.9	809.02	555.9	809.02	563.05	809.83	577.38	811.63
584.8	812.16	599.7	813.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-133.24	.05	-29.68	.035	46.24	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-29.68	46.24	173	185.67	44	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

* E.G. Elev (ft)	* 811.38	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.09	* Wt. n-Val.	* 0.050	* 0.035	* 0.050	*
* W.S. Elev (ft)	* 811.29	* Reach Len. (ft)	* 173.00	* 185.67	* 44.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 116.41	* 941.47	* 2092.18	*
* E.G. Slope (ft/ft)	*0.000197	* Area (sq ft)	* 116.41	* 941.47	* 2092.18	*
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 86.90	* 2879.95	* 2183.15	*
* Top Width (ft)	* 652.23	* Top Width (ft)	* 47.89	* 75.92	* 528.42	*
* Vel Total (ft/s)	* 1.63	* Avg. Vel. (ft/s)	* 0.75	* 3.06	* 1.04	*
* Max Chl Dpth (ft)	* 14.92	* Hydr. Depth (ft)	* 2.43	* 12.40	* 3.96	*
* Conv. Total (cfs)	*366923.6	* Conv. (cfs)	* 6191.5	*205188.9	*155543.3	*
* Length Wtd. (ft)	* 125.81	* Wetted Per. (ft)	* 48.62	* 80.94	* 528.76	*
* Min Ch El (ft)	* 796.37	* Shear (lb/sq ft)	* 0.03	* 0.14	* 0.05	*
* Alpha	* 2.13	* Stream Power (lb/ft s)	* 599.70	* 0.00	* 0.00	*
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 17.20	* 26.11	* 50.49	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 5.04	* 2.22	* 9.94	*

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1234.05

INPUT
Description: FF
Station Elevation Data num= 125

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-206.29	819.46	-200.65	818	-197.84	817.3	-192.78	816	-189.46	815.12
-185.16	814	-177.52	812.02	-177.45	812	-177.24	811.95	-169.56	810
-163.3	808.42	-161.62	808	-160.3	807.77	-150.98	806	-149.55	805.99
-141.69	805.98	-141.5	805.98	-140.88	805.98	-133.89	805.95	-130.64	805.94
-129.27	805.94	-125.41	805.92	-125.27	805.92	-119.66	805.91	-119.47	805.91
-113.88	805.9	-113.72	805.9	-113.55	805.9	-109.15	805.89	-108.89	805.89
-108.61	805.89	-79.16	805.07	-45.36	804.14	-44.53	804.12	-43.45	804.1
-40.44	804.07	-38.68	804.06	-38.54	804.07	-38.37	804.07	-37.77	804.01
-37.24	804.01	-37.19	804	-30.78	802.5	-29.84	802	-26.29	800.22
-25.87	800	-25.24	799.69	-24.32	799.25	-21.9	798	-21.56	798
-18.9	798	-18.8	798	-18.64	798	-17.59	798	-6.79	798
-.56	798	0	798	12.11	798	12.88	798	16.74	798
19.43	799.16	21.39	800	22.15	800.53	22.62	800.82	24.24	801.82
24.53	802	24.55	802.01	24.8	802.16	25.01	802.28	25.19	802.38
25.35	802.48	25.49	802.56	25.62	802.63	25.72	802.69	25.82	802.75
25.91	802.8	25.99	802.85	26.06	802.9	26.13	802.94	26.19	802.97
26.24	803.01	26.29	803.04	26.34	803.07	26.39	803.09	26.43	803.12
26.47	803.14	26.5	803.16	26.54	803.18	26.57	803.2	26.6	803.22
26.63	803.24	26.66	803.24	54.23	804.14	56.94	804.2	74.1	806.44
77.21	806.52	80.14	806.6	85.51	806.59	126.38	806.77	130.45	806.77
167.98	806.63	179.11	806.59	180.44	806.58	215.96	806.5	220.86	806.45
248.62	806.24	255.71	806.16	256.04	806.17	276.79	805.61	282.15	805.6
287.71	805.65	319.14	806.74	339.94	807.72	355.88	808.41	377.43	808.5
408.02	808.34	427.41	808.18	441.89	808.29	466.55	808.44	473.08	808.48
487.87	810.16	499.3	811.52	507.36	812.1	507.64	812.12	523.13	813.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-206.29	.05	-37.19	.035	26.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.19	26.66	117	131.34	192.99	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	* 811.35	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.06	* Wt. n-Val.	* 0.050	* 0.035	* 0.050 *
* W.S. Elev (ft)	* 811.28	* Reach Len. (ft)	* 117.00	* 131.34	* 192.99 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 748.73	* 770.55	* 2034.00 *
* E.G. Slope (ft/ft)	*0.000169	* Area (sq ft)	* 748.73	* 770.55	* 2034.00 *
* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 891.95	* 2176.63	* 2081.42 *

* Top Width (ft)	*	671.93	* Top Width (ft)	*	137.42	*	63.85	*	470.65	*
* Vel Total (ft/s)	*	1.45	* Avg. Vel. (ft/s)	*	1.19	*	2.82	*	1.02	*
* Max Chl Dpth (ft)	*	13.28	* Hydr. Depth (ft)	*	5.45	*	12.07	*	4.32	*
* Conv. Total (cfs)	*	396595.9	* Conv. (cfs)	*	68688.3	*	167620.0		160287.7	*
* Length Wtd. (ft)	*	151.19	* Wetted Per. (ft)	*	138.05	*	66.44	*	471.05	*
* Min Ch El (ft)	*	798.00	* Shear (lb/sq ft)	*	0.06	*	0.12	*	0.05	*
* Alpha	*	1.92	* Stream Power (lb/ft s)	*	523.13	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	15.48	*	22.46	*	48.40	*
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	4.67	*	1.92	*	9.44	*

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1102.70

INPUT
Description: GG
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-289.51	823.17	-284.72	822.19	-283.86	822	-283.27	821.86	-274.9	820
-267.4	818.33	-265.91	818	-264.06	817.59	-257.15	816	-249.19	814.26
-248.06	814	-239.53	812.19	-238.72	812	-237.74	811.8	-228.6	810
-224.13	809.14	-217.49	808	-212.35	807.38	-210.24	807.28	-205.93	806.82
-205.12	806.75	-199.07	806.63	-196.69	806.46	-195.3	806.37	-195.04	806.35
-193.44	806.27	-192.41	806.23	-183.22	806.24	-178.07	806.21	-172.74	806.18
-171.92	806.16	-171.25	806.15	-161.2	806.03	-158.18	806.03	-156.25	806.02
-151.54	806.03	-151.43	806.03	-146.32	806.01	-146.26	806.01	-142.51	806
-133.64	805.85	-132.12	805.82	-129.94	805.78	-114.43	805.52	-102.78	805.34
-97.86	805.26	-93.46	805.2	-90.78	805.15	-87.77	805.1	-80.07	804.98
-73.86	804.89	-67.18	804.76	-58.77	804.6	-42.37	804.25	-31.66	804.01
-31.15	804.01	-29.92	804.01	-28.29	804	-27.99	804	-27.33	804
-26.85	804	-25.69	803.66	-25.11	803.49	-22.2	802	-19.2	800.47
-18.27	800	-17.41	799.56	-14.62	798	-7.66	798	0	798
1.73	798	17.37	798	17.58	798	18.13	798	18.51	798.19
22.22	800	24.75	801.24	26.32	802	28.22	802.93	31	804
31.94	804	41.11	804.07	45.61	804.3	54.04	804.54	83.33	805.28
91.06	805.49	94.01	805.59	95.91	805.61	132.94	806.3	136.29	806.33
139.49	806.35	164.42	806.54	183.4	806.63	186.37	806.61	231.26	806.05
238.05	806.05	275.37	806.2	280.92	806.2	282.25	806.21	307.77	807.46
324.8	809.33	330.91	809.81	335.5	810.13	336.15	810.18	372.12	812.23
372.24	812.18	373.78	812.33	375.76	812.44	382.54	812.44	392.23	812.55
401.64	812.64	414.95	812.72	417.44	812.75	433.14	812.79	442.12	812.72
464.37	812.83	472.75	812.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-289.51	.05	-25.69	.035	31	.05

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

-25.69 31 138.99 130.59 147.99 .1 .3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.25	Reach Len. (ft)	138.99	130.59	147.99
Crit W.S. (ft)		Flow Area (sq ft)	1123.69	678.76	1543.08
E.G. Slope (ft/ft)	0.000185	Area (sq ft)	1123.69	678.76	1543.08
Q Total (cfs)	5150.00	Flow (cfs)	1392.40	1990.72	1766.88
Top Width (ft)	589.97	Top Width (ft)	209.28	56.69	324.00
Vel Total (ft/s)	1.54	Avg. Vel. (ft/s)	1.24	2.93	1.15
Max Chl Dpth (ft)	13.25	Hydr. Depth (ft)	5.37	11.97	4.76
Conv. Total (cfs)	378186.5	Conv. (cfs)	102249.7	146187.4	129749.4
Length Wtd. (ft)	138.17	Wetted Per. (ft)	209.73	59.40	324.23
Min Ch El (ft)	798.00	Shear (lb/sq ft)	0.06	0.13	0.06
Alpha	1.77	Stream Power (lb/ft s)	472.75	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	12.97	20.27	40.48
C & E Loss (ft)	0.00	Cum SA (acres)	4.21	1.74	7.67

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 972.12

INPUT
Description: HH
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-326.96	813.78	-325.06	813.78	-324.62	813.77	-312.1	813.79	-311.71	813.79
-311.3	813.78	-310.79	813.77	-310.71	813.77	-310.04	813.76	-309.09	813.74
-299.86	813.58	-299.5	813.58	-299.13	813.57	-296.5	813.51	-289.07	813.22
-281.87	812.99	-279.84	812.9	-276.56	812.81	-272.63	812.68	-270.91	812.59
-269.58	812.52	-264.51	812.38	-258.25	812.17	-257.11	812.12	-253.96	812.01
-252.79	812	-247.85	811.77	-247.06	811.74	-246.01	811.7	-235.69	811.04
-234.51	810.98	-230.45	810.9	-224.77	810.76	-217.17	810.53	-213.54	810.36
-203.45	810	-201.81	809.91	-179	808.59	-178.36	808.56	-174.95	808.41
-168.88	808	-168.86	807.99	-167.73	807.99	-167.72	807.99	-166.02	807.98
-162.03	807.97	-158.82	807.97	-157.81	807.96	-156.68	807.96	-153.18	807.93
-152.17	807.93	-147.01	807.71	-124.98	806.82	-98.36	806.05	-98.02	806.03
-96.39	806	-96.31	806	-91.58	805.99	-90.9	805.99	-90.29	805.98
-88.68	805.98	-87.34	805.98	-85.9	805.97	-82.63	805.96	-80.47	805.95
-78.95	805.94	-77.59	805.94	-55.94	805.33	-51.01	805.29	-46.29	805.27

-42.91	805.22	-39.87	805.19	-36.91	805.19	-33.31	804.55	-30.41	804.02
-30.31	804.02	-30.21	804	-28.09	802.54	-27.19	802	-25.5	801.1
-22.96	800	-18.37	797.56	-17.49	797.56	-17.43	797.56	-17.42	797.56
-13.96	797.56	0	797.56	1.22	797.56	14.24	797.56	17.93	797.56
20.45	798	26.11	799.94	26.31	800	32.11	801.03	32.83	802
49.01	803.35	49.44	803.36	55.53	803.3	55.72	803.39	56.74	803.46
60.16	803.53	85.01	805.01	113.83	805.2	119.81	805.24	126.8	805.29
131.99	805.27	139.45	805.25	147.43	805.3	150.86	805.04	162.7	804.62
166.24	804.54	176.45	805.43	177.27	805.48	179.3	805.58	201.26	806.42
208.15	807.25	223.45	808.52	236.82	809.7	252.78	811.09	252.86	811.07
252.99	811.08	255.67	811.11	272.38	811.61	292.88	811.69	300.43	811.78
310.06	811.68	312.5	811.63	314.79	811.65	317.61	811.73	317.72	811.84
317.8	811.83	320.16	811.81	334.73	811.83	341.58	811.8	343.41	811.9
345.47	811.78	346.96	811.81	348.55	811.78	352.07	811.8	367.83	811.79
370.45	811.82	383.76	811.8	383.94	811.82	395.49	811.86	398.25	811.88
398.32	812.08	398.42	811.98	398.86	812.41	408.62	812.42	418.24	812.27
427.48	812.07	437.72	811.84	443.56	811.77	454.65	811.84	466.98	811.99
475.86	812.18	480.39	812.38	482.7	812.57	490.96	812.47	496.51	812.45
496.72	812.45	505.62	812.64	511.92	812.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-326.96	.05	-30.21	.035	32.83	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.21	32.83	168 161.32	108	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.18	Reach Len. (ft)	168.00	161.32	108.00
Crit W.S. (ft)		Flow Area (sq ft)	764.22	793.48	1203.93
E.G. Slope (ft/ft)	0.000228	Area (sq ft)	764.22	793.48	1203.93
Q Total (cfs)	5150.00	Flow (cfs)	817.49	2681.48	1651.03
Top Width (ft)	496.01	Top Width (ft)	207.71	63.04	225.26
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)	1.07	3.38	1.37
Max Chl Dpth (ft)	13.62	Hydr. Depth (ft)	3.68	12.59	5.34
Conv. Total (cfs)	340731.2	Conv. (cfs)	54086.5	177410.4	109234.3
Length Wtd. (ft)	140.95	Wetted Per. (ft)	207.94	65.65	225.68
Min Ch El (ft)	797.56	Shear (lb/sq ft)	0.05	0.17	0.08
Alpha	1.94	Stream Power (lb/ft s)	511.92	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	9.96	18.07	35.81
C & E Loss (ft)	0.00	Cum SA (acres)	3.54	1.56	6.74

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 810.82

INPUT
Description: II
Station Elevation Data num= 159

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-216.91	814	-209.47	814	-201.74	814	-195.8	813.64	-188.84	813.23
-185.45	813.15	-179.25	812.94	-152.13	813.27	-151.81	813.26	-149.47	813.17
-146.37	813.02	-146.36	813.01	-146.32	813.02	-140.6	812.84	-136.23	812.99
-129.02	812.75	-127.18	812.76	-123.2	812.8	-119.29	812.67	-118.82	812.66
-111.87	812.43	-109.55	812.36	-100.54	812.03	-99.84	812	-98.62	811.93
-97.8	811.89	-83.42	811.14	-76.85	810.72	-74.41	810.56	-73.74	810.51
-71.49	810.36	-66.78	810	-61.45	809.65	-58.64	809.44	-52.08	808.96
-50.37	808.85	-41.46	808	-38.34	807.75	-37.59	807.68	-36.09	807.5
-24.8	806	-20.35	804.6	-18.41	804	-18.33	803.94	-15.01	802
-12.97	800.82	-11.05	800	-10.24	799.15	-8.85	797.3	0	797.3
3.17	797.3	10.08	797.3	17.92	797.3	24.85	797.3	27.53	798
27.87	801.86	28.46	802.53	32.36	803.16	42.61	804.76	59.3	804.95
77.03	805.06	103.24	805.26	119.26	805.35	128.03	805.42	149.59	805.57
160.78	805.68	192.07	805.53	197.51	805.48	238.72	804.72	239.38	804.7
240.47	804.67	256.38	804.26	262.57	804.13	266.56	804.18	293.85	808.49
296.89	808.94	300.24	809.22	329.56	811.43	333.28	811.66	333.32	811.67
333.59	811.64	340.57	811.73	344.49	811.76	350.15	811.95	362.33	812.32
365.48	812.39	381.25	812.44	388.26	812.42	396.23	812.36	413.4	812.25
424.49	812.31	455.96	812.46	456.15	812.5	459.79	812.5	467.99	812.4
475.02	812.37	475.36	812.37	475.71	812.37	476.06	812.37	486.93	812.37
487.23	812.37	487.54	812.37	487.85	812.37	488.18	812.37	488.5	812.37
488.83	812.37	489.17	812.37	489.52	812.38	497.79	812.49	497.9	812.49
498.02	812.49	498.14	812.49	498.28	812.49	498.41	812.49	498.56	812.48
498.71	812.48	498.87	812.48	499.04	812.48	499.21	812.48	499.39	812.48
499.57	812.48	499.76	812.48	499.96	812.48	500.17	812.48	500.38	812.49
500.59	812.49	500.81	812.49	501.04	812.49	501.11	812.49	501.27	812.49
501.51	812.49	501.75	812.49	501.99	812.49	502.24	812.49	502.49	812.49
502.74	812.49	503	812.49	503.25	812.49	503.51	812.49	503.76	812.49
504.02	812.49	504.27	812.5	504.52	812.5	504.78	812.5	505.02	812.5
505.27	812.5	505.51	812.5	505.75	812.51	505.98	812.51	506.21	812.51
506.43	812.51	506.65	812.52	506.86	812.52	507.07	812.52	507.27	812.52
507.46	812.53	507.64	812.53	507.82	812.53	524.88	812.93		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-216.91	.05	-20.35	.035	42.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20.35	42.61	200 178.48	258	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.13	Reach Len. (ft)	200.00	178.48	258.00
Crit W.S. (ft)		Flow Area (sq ft)	154.26	725.62	

1505.53	*									
* E.G. Slope (ft/ft)		*0.000312	*	Area (sq ft)		*	154.26	*	725.62	*
1505.53	*									
* Q Total (cfs)		* 5150.00	*	Flow (cfs)		*	146.49	*	2598.76	*
2404.74	*									
* Top Width (ft)		* 408.81	*	Top Width (ft)		*	62.89	*	62.96	*
282.95	*									
* Vel Total (ft/s)		* 2.16	*	Avg. Vel. (ft/s)		*	0.95	*	3.58	*
1.60	*									
* Max Chl Dpth (ft)		* 13.83	*	Hydr. Depth (ft)		*	2.45	*	11.53	*
5.32	*									
* Conv. Total (cfs)		*291710.3	*	Conv. (cfs)		*	8297.8	*	147201.3	
*136211.3	*									
* Length Wtd. (ft)		* 218.44	*	Wetted Per. (ft)		*	63.35	*	69.47	*
283.43	*									
* Min Ch El (ft)		* 797.30	*	Shear (lb/sq ft)		*	0.05	*	0.20	*
0.10	*									
* Alpha		* 1.65	*	Stream Power (lb/ft s)		*	524.88	*	0.00	*
0.00	*									
* Frctn Loss (ft)		* 0.05	*	Cum Volume (acre-ft)		*	8.18	*	15.25	*
32.46	*									
* C & E Loss (ft)		* 0.02	*	Cum SA (acres)		*	3.02	*	1.33	*
6.11	*									

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 632.35

INPUT
Description: JJ
Station Elevation Data num= 135

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.17	814	-232.97	814	-232.29	814	-231.37	814	-229.74	814
-227.54	813.99	-224.26	813.99	-217.08	813.99	-215.69	813.99	-206.84	813.98
-205.84	813.98	-204.78	813.98	-194.69	813.99	-163.17	813.97	-158.17	813.97
-152.63	813.96	-146.75	813.97	-144.86	813.97	-139.53	813.97	-138.59	813.97
-138.16	813.97	-136.9	813.97	-134.88	813.97	-127.78	813.97	-125.89	813.97
-121.27	813.96	-116.23	813.98	-115.18	813.97	-115.16	813.97	-113.57	813.97
-103.05	813.98	-102.55	813.98	-96.44	814	-96.4	814	-96.31	814
-96.25	814	-92.59	813.97	-89.12	813.99	-89.1	813.99	-88.87	813.99
-88.46	813.99	-77.63	814	-76.17	814.02	-76.04	814.02	-75.04	814
-72.8	813.99	-71.53	814	-68.29	814.02	-67.62	814.01	-67.06	814
-63.13	813.78	-62.61	813.72	-62.43	813.69	-57.74	813.21	-57.27	813.17
-52.18	812.77	-48.03	812	-43.2	810.5	-41.72	810	-40.18	809.46
-37.42	808	-35.59	807.07	-33.62	806	-31.7	804.92	-29.9	804
-27.7	802.73	-26.29	802	-22.66	800.11	-22.45	800	-22.1	799.82
-21.65	799.6	-20.99	799.31	-19.21	798.49	-18.32	796.97	-6.82	796.97
-2.66	796.97	0	796.97	.16	796.97	11.62	796.97	15.58	798
15.79	798.01	16.67	798.01	16.75	798.07	16.96	798.08	20.03	798.26
21.03	798.28	27.17	798.57	31.86	800.77	32.51	802.17	32.91	802.6
36.36	804.21	36.53	804.25	37.02	804.34	47.09	805.42	47.49	805.46
49.7	805.63	55.05	805.93	68.74	806.02	86.07	805.93	99.48	805.93
103.38	805.75	123.57	805.98	131.93	806.3	155.1	806.45	176.93	806.19
200.24	806.3	221.51	806.49	244.67	806.72	265.49	806.59	289.74	806.31
312.41	806.09	337.11	806.03	356.2	805.86	381.78	805.86	408.47	805.68
427.73	805.75	446.84	805.64	455	805.63	460.39	805.71	465.48	805.94
478.6	806.16	486.66	806.62	496.58	808.09	504.39	809.32	521.17	811.33
528.01	812.14	528.42	812.31	528.56	812.35	529.4	812.29	529.44	812.28

529.77 812.28 529.97 812.27 537.83 812.44 544.99 812.58 545.64 812.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-233.17	.05	-52.18	.035	37.02	.05

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

-52.18	37.02	239	198.36	80	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	0.050
W.S. Elev (ft)	811.11	Reach Len. (ft)	239.00	198.36	80.00
Crit W.S. (ft)		Flow Area (sq ft)		888.20	2336.33
E.G. Slope (ft/ft)	0.000189	Area (sq ft)		888.20	2336.33
Q Total (cfs)	5150.00	Flow (cfs)		2418.72	2731.28
Top Width (ft)	564.55	Top Width (ft)		82.20	482.35
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		2.72	1.17
Max Chl Dpth (ft)	14.14	Hydr. Depth (ft)		10.81	4.84
Conv. Total (cfs)	374563.3	Conv. (cfs)		175915.6	198647.7
Length Wtd. (ft)	136.17	Wetted Per. (ft)		88.15	482.78
Min Ch El (ft)	796.97	Shear (lb/sq ft)		0.12	0.06
Alpha	1.65	Stream Power (lb/ft s)	545.64	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	7.83	11.95	21.08
C & E Loss (ft)	0.00	Cum SA (acres)	2.87	1.03	3.85

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 433.99

INPUT
Description: KK
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-229.28	815.19	-223.93	814	-216.01	812.28	-214.67	812	-213.65	811.85
-199.66	810	-199.48	810	-199.29	810	-197.88	809.99	-194.25	809.96
-194.23	809.96	-190.38	809.95	-185.59	809.93	-178.39	809.93	-174.76	809.91
-173.86	809.91	-173.11	809.91	-135.76	808.85	-130.79	808.72	-124.61	808.57
-120.21	808.48	-106.09	808.19	-104.62	808.16	-97.07	808.01	-96.21	808
-91.4	808	-90.61	808	-79.64	807.53	-70.25	807.22	-64	807.02

-57.82	806.79	-47.76	806.4	-45.29	806.3	-42.52	806.21	-41.03	806.16
-37.62	806.01	-36.96	806.01	-36.96	806	-33.53	804.27	-32.99	804
-30.1	802.54	-28.88	802	-28.63	801.88	-24.46	800	-22.46	799.07
-20.14	796.7	-12.23	796.7	-4.22	796.7	-1.01	796.7	0	796.7
12.22	796.7	14.57	799.05	16.69	800	17.49	800.3	22.91	802
23.15	802	25.9	802.22	28.38	802.57	34	802.72	35.29	802.76
46.96	803	49.07	803.48	55.32	804.73	65.63	804.46	75.14	804.3
82.19	804.93	83.76	805.01	94.64	805.48	107.93	805.05	115.02	805.14
115.99	805.19	132.95	805.87	140.41	806.12	179.17	805.81	186.1	805.75
218.99	805.95	229.65	806.12	243.46	805.89	273.03	805.79	295.71	805.5
315.95	805.54	342.46	805.87	360.5	806.18	374.77	806.1	406.56	805.76
412.8	805.7	423.66	805.74	441.5	805.56	452.35	805.52	466.16	806.57
471.85	806.85	475.67	807.36	490.39	809.41	494.83	809.91	511.44	811.92
511.84	812.08	511.9	812.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-229.28	.05	-36.96	.035	28.38	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.96	28.38	150.99	144.27	75.99	.1 .3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.10	Reach Len. (ft)	150.99	144.27	75.99
Crit W.S. (ft)		Flow Area (sq ft)	444.32	788.87	2529.67
E.G. Slope (ft/ft)	0.000148	Area (sq ft)	444.32	788.87	2529.67
Q Total (cfs)	5150.00	Flow (cfs)	303.77	2061.26	2784.97
Top Width (ft)	712.65	Top Width (ft)	171.02	65.34	476.29
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)	0.68	2.61	1.10
Max Chl Dpth (ft)	14.40	Hydr. Depth (ft)	2.60	12.07	5.31
Conv. Total (cfs)	422843.5	Conv. (cfs)	24941.4	169240.6	228661.6
Length Wtd. (ft)	108.76	Wetted Per. (ft)	171.16	69.45	476.88
Min Ch El (ft)	796.70	Shear (lb/sq ft)	0.02	0.11	0.05
Alpha	1.82	Stream Power (lb/ft s)	511.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	6.61	8.13	16.61
C & E Loss (ft)	0.00	Cum SA (acres)	2.41	0.69	2.97

CROSS SECTION

RIVER: Buckeye Creek

REACH: Buckeye Creek RS: 289.71

INPUT
Description: LL
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-348.33	816.57	-348.24	816.54	-347.81	816.44	-345.95	816	-342.84	815.36
-339.64	814.72	-336.02	814	-328.13	813.43	-322.18	813.05	-305.65	812
-302.14	811.76	-298.26	811.43	-280.91	810	-279.28	809.93	-246.45	808.55
-235.55	808	-235.47	808	-231.89	808	-230.12	808	-225.75	808
-220.81	808	-220.77	808	-216.44	808	-211.33	808	-195.52	808
-194.47	808	-194.45	808	-184.64	808	-182.43	808	-178.88	808.05
-178.72	808.05	-178.43	808.06	-178.1	808.06	-172.71	808.2	-168.02	808.31
-160.86	808.55	-144.31	808.1	-141.52	808.02	-137.87	808.02	-133.47	808.03
-127.35	808.03	-116.67	808.04	-91.7	808.03	-68.94	808.02	-63.03	808.02
-59.01	808.02	-55.88	808.02	-55.76	808.02	-55.73	808.02	-53.31	808.01
-52.54	808.01	-49.34	808.01	-47.14	808.01	-46.11	808.01	-43.69	808.01
-42.03	808.01	-41.16	808	-36.46	808	-36.18	807.96	-34.84	807.82
-34.01	807.45	-33.88	807.41	-30.5	806	-28.59	805.2	-25.72	804
-24.06	803.13	-22.27	802	-20.72	801.07	-18.75	800	-17.18	799.08
-15.4	796.46	-1.4	796.46	0	796.46	1.93	796.46	6.13	796.46
16.91	796.46	18.38	798	18.87	798	19.47	798	19.95	798.46
21.23	799.6	21.7	799.87	24.37	800.38	35.61	802.38	50.22	802.63
53.88	802.69	63.02	802.91	78.8	802.53	78.99	802.53	82.81	802.65
94.02	803.02	100.69	804.05	109.95	805.3	112.56	805.37	144.08	805.37
153.1	805.31	186.57	805.2	205.42	805.47	226.33	805.61	253.41	805.45
264.38	805.23	289.6	805.11	294.8	805.28	315.35	805.29	333.93	805.43
339.25	805.41	361.21	806.06	367.63	805.99	382.77	805.65	385.82	805.7
412.49	806.66	414.12	806.72	415.41	806.89	435.44	809.42	453.47	811.42
458.91	812.07	459.37	812.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-348.33	.05	-34.84	.035	35.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.84	35.61	142 180.45	179	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.09	Reach Len. (ft)	142.00	180.45	179.00
Crit W.S. (ft)		Flow Area (sq ft)	707.26	825.10	2378.05
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	707.26	825.10	2378.05
Q Total (cfs)	5150.00	Flow (cfs)	480.47	2020.46	2649.07
Top Width (ft)	744.61	Top Width (ft)	259.28	70.45	414.88
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)	0.68	2.45	1.11
Max Chl Dpth (ft)	14.63	Hydr. Depth (ft)	2.73	11.71	5.73
Conv. Total (cfs)	439699.1	Conv. (cfs)	41021.7	172504.1	226173.4

* Length Wtd. (ft)	*	174.95	* Wetted Per. (ft)	*	259.40	*	75.50	*	415.36	*	
* Min Ch El (ft)	*	796.46	* Shear (lb/sq ft)	*	0.02	*	0.09	*	0.05	*	
* Alpha	*	1.75	* Stream Power (lb/ft s)	*	459.37	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	4.62	*	5.46	*	12.33	*	
* C & E Loss (ft)	*	0.00	* Cum SA (acres)	*	1.66	*	0.47	*	2.19	*	

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 109.26

INPUT
Description: MM
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-420.57	814.39	-419.2	814	-407.77	813.42	-407.7	813.42	-379.04	812
-378.22	811.99	-334.8	811.11	-302.12	810.46	-279.5	810	-278.77	810
-199.19	808.01	-198.67	808	-196.73	808	-196.71	808	-160.16	807.18
-150.67	806.97	-143.98	806.83	-123.71	806.44	-101.58	806	-100.78	806
-92.21	805.99	-80.49	805.97	-77.36	805.97	-69.5	805.98	-53.95	806
-46.87	806	-41.13	806	-38.95	806	-35.79	806	-33.95	804.99
-32.14	804	-29.75	802.69	-28.49	802	-26.52	800.92	-25.03	800
-24.55	799.7	-20.63	798	-13.87	796.17	-7.1	796.17	-6.45	796.17
-5.34	796.17	-3.06	796.17	0	796.17	9.83	796.17	10.32	798
11.65	798	12.28	798	15.39	799.59	16.21	800	18.42	801.13
20.26	802	23.7	803.6	24.16	803.84	24.46	804	25.31	804.27
25.55	804.34	26.05	804.45	33.05	806	33.29	806	34.24	806
36.49	805.83	40.87	805.6	49.87	805.76	78.79	805.59	114.93	804.96
121.77	804.87	141.12	804.61	165.89	804.29	192.3	804.3	201.03	804.39
211.75	804.67	229.66	805	247.1	805.46	263.63	805.77	272.64	805.95
279.01	806.31	286.81	806.72	289.32	807.18	307.42	809.78	309.29	809.95
325.74	811.48	328.02	811.69	328.25	811.72	328.26	811.72	328.83	811.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-420.57	.05	-35.79	.035	33.05	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.79	33.05	105.99	109.26	120	.1	.3

CROSS SECTION OUTPUT Profile #100-Year
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* E.G. Elev (ft)	*	811.10	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.07	* Wt. n-Val.	*	0.050	*	0.035	*	0.050	*	
* W.S. Elev (ft)	*	811.03	* Reach Len. (ft)	*	105.99	*	109.26	*	120.00	*	
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	914.88	*	791.16	*	1564.78	*	
* E.G. Slope (ft/ft)	*	0.000200	* Area (sq ft)	*	914.88	*	791.16	*	1564.78	*	

* Q Total (cfs)	* 5150.00	* Flow (cfs)	* 817.04	* 2302.15	* 2030.81 *
* Top Width (ft)	* 651.91	* Top Width (ft)	* 295.18	* 68.84	* 287.89 *
* Vel Total (ft/s)	* 1.57	* Avg. Vel. (ft/s)	* 0.89	* 2.91	* 1.30 *
* Max Chl Dpth (ft)	* 14.86	* Hydr. Depth (ft)	* 3.10	* 11.49	* 5.44 *
* Conv. Total (cfs)	*364262.0	* Conv. (cfs)	* 57789.4	*162832.3	*143640.3 *
* Length Wtd. (ft)	* 113.08	* Wetted Per. (ft)	* 295.24	* 74.12	* 288.24 *
* Min Ch El (ft)	* 796.17	* Shear (lb/sq ft)	* 0.04	* 0.13	* 0.07 *
* Alpha	* 1.85	* Stream Power (lb/ft s)	* 328.83	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 1.97	* 2.11	* 4.23 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.76	* 0.18	* 0.74 *

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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 0

INPUT
Description: NN
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-417.03	813.82	-412.45	812.94	-406.81	812	-406.1	812	-405.22	812
-395.28	811.74	-380.91	811.39	-371.41	811.15	-364.68	810.99	-359.42	810.86
-355.34	810.77	-345.4	810.64	-340.02	810.54	-336.02	810.47	-325.13	810.34
-312.35	810.19	-297.14	810.01	-296.43	810	-296.02	810	-295.59	810
-285.2	809.91	-274.56	809.84	-274.54	809.84	-273.77	809.83	-272.94	809.82
-262.55	809.73	-253.03	809.67	-251.8	809.66	-250.49	809.65	-241.36	809.57
-232.98	809.51	-230.33	809.49	-227.4	809.46	-224.11	809.42	-220.35	809.37
-208.38	809.22	-174.4	808.34	-171.28	808.24	-167.82	808.24	-159.55	808.19
-158.48	808.19	-156.58	808.18	-145.99	808.1	-143.06	808.1	-141.48	808.1
-141.47	808.1	-141.45	808.1	-141.41	808.1	-139.97	808.09	-136.44	808.09
-134.24	808.08	-131.11	808.06	-127.77	808.05	-120.4	808.02	-118.91	808.01
-118.39	808.01	-117.91	808.01	-117.81	808.01	-115.67	808	-113.81	807.99
-106.61	807.86	-105.72	807.84	-104.61	807.82	-104.57	807.82	-102.61	807.78
-99.96	807.71	-94.79	807.56	-82.5	807.22	-39.63	806	-38.69	806
-32.64	804.46	-31.48	804	-29.07	802.86	-27.45	802	-25.43	800.91
-24.71	800.57	-23.51	800	-21.41	799	-19.3	798	-10.6	796
-.12	796	-.06	796	0	796	11.36	796	20.55	798
22.64	798.89	25.23	800	25.29	800.03	25.3	800.03	29.05	802
30.21	802.61	33.02	804	35.92	804.98	37.94	804.98	38.95	804.98
39.77	804.98	55.66	804.9	86.81	804.9	121.46	804.49	134.69	804.4
178.19	803.99	181.7	803.96	182	803.96	184.59	803.99	228.44	804.47
248.69	805.15	255.51	805.29	257.89	805.39	258.14	805.47	259.94	805.87
277.19	809.69	294.63	811.77	300.3	812.2	300.82	812.43	300.99	812.54

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-417.03	.05	-38.69	.035	35.92	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.69	35.92	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-Year

E.G. Elev (ft)	811.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.050	0.035	0.050
W.S. Elev (ft)	811.00	Reach Len. (ft)			
Crit W.S. (ft)	803.91	Flow Area (sq ft)	705.56	889.77	1504.49
E.G. Slope (ft/ft)	0.000191	Area (sq ft)	705.56	889.77	1504.49
Q Total (cfs)	5150.00	Flow (cfs)	484.14	2637.88	2027.98
Top Width (ft)	653.27	Top Width (ft)	326.41	74.61	252.25
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)	0.69	2.96	1.35
Max Chl Dpth (ft)	15.00	Hydr. Depth (ft)	2.16	11.93	5.96
Conv. Total (cfs)	372848.1	Conv. (cfs)	35050.7	190976.4	146821.0
Length Wtd. (ft)		Wetted Per. (ft)	326.46	78.27	252.83
Min Ch El (ft)	796.00	Shear (lb/sq ft)	0.03	0.14	0.07
Alpha	1.91	Stream Power (lb/ft s)	300.99	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Buckeye Creek

Reach	River Sta.	n1	n2	n3
Buckeye Creek	3504.54	.05	.035	.05
Buckeye Creek	3454.54	.05	.035	.05
Buckeye Creek	3404.54	.05	.035	.05
Buckeye Creek	3354.54	.05	.035	.05
Buckeye Creek	3304.54	.05	.035	.05
Buckeye Creek	3254.54	.05	.035	.05
Buckeye Creek	3204.54	.05	.035	.05
Buckeye Creek	3154.54	.05	.035	.05
Buckeye Creek	3104.54	.05	.035	.05
Buckeye Creek	3054.54	.05	.035	.05
Buckeye Creek	3004.54	.05	.035	.05
Buckeye Creek	2954.54	.05	.035	.05
Buckeye Creek	2904.54	.05	.035	.05
Buckeye Creek	2854.58	.05	.035	.05
Buckeye Creek	2804.54	.05	.035	.05
Buckeye Creek	2754.54	.05	.035	.05

Reach	River Sta.	Left	Channel	Right
*Buckeye Creek	2704.54	.05	.035	.05
*Buckeye Creek	2661.29	.05	.035	.05
*Buckeye Creek	2625.35	Bridge		
*Buckeye Creek	2603.43	.05	.035	.05
*Buckeye Creek	2554.54	.05	.035	.05
*Buckeye Creek	2354.53	.05	.035	.05
*Buckeye Creek	2306.38	.05	.035	.05
*Buckeye Creek	2254.54	.05	.035	.05
*Buckeye Creek	2204.54	.05	.035	.05
*Buckeye Creek	2154.54	.05	.035	.05
*Buckeye Creek	2105.74	.05	.035	.05
*Buckeye Creek	1903.41	.05	.035	.05
*Buckeye Creek	1604.54	.05	.035	.05
*Buckeye Creek	1419.72	.05	.035	.05
*Buckeye Creek	1234.05	.05	.035	.05
*Buckeye Creek	1102.70	.05	.035	.05
*Buckeye Creek	972.12	.05	.035	.05
*Buckeye Creek	810.82	.05	.035	.05
*Buckeye Creek	632.35	.05	.035	.05
*Buckeye Creek	433.99	.05	.035	.05
*Buckeye Creek	289.71	.05	.035	.05
*Buckeye Creek	109.26	.05	.035	.05
*Buckeye Creek	0	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
*Buckeye Creek	3504.54	50	50	50
*Buckeye Creek	3454.54	52	50	50
*Buckeye Creek	3404.54	55	50	50
*Buckeye Creek	3354.54	35	50	50
*Buckeye Creek	3304.54	55	50	47
*Buckeye Creek	3254.54	43	50	52
*Buckeye Creek	3204.54	44	50	51
*Buckeye Creek	3154.54	48	50	52
*Buckeye Creek	3104.54	22	50	48
*Buckeye Creek	3054.54	23	50	53
*Buckeye Creek	3004.54	36	50	48
*Buckeye Creek	2954.54	36	50	48
*Buckeye Creek	2904.54	42	49.96	51
*Buckeye Creek	2854.58	40	50.04	52
*Buckeye Creek	2804.54	50	50	60
*Buckeye Creek	2754.54	51	50	58
*Buckeye Creek	2704.54	51	43.25	43
*Buckeye Creek	2661.29	134	57.86	63
*Buckeye Creek	2625.35	Bridge		
*Buckeye Creek	2603.43	66	48.89	51
*Buckeye Creek	2554.54	293	200.01	191
*Buckeye Creek	2354.53	144	48.15	69
*Buckeye Creek	2306.38	90	51.84	42
*Buckeye Creek	2254.54	90	50	45
*Buckeye Creek	2204.54	74	50	44
*Buckeye Creek	2154.54	63	48.8	47
*Buckeye Creek	2105.74	190	202.35	215
*Buckeye Creek	1903.41	512	298.87	86
*Buckeye Creek	1604.54	149	184.82	41
*Buckeye Creek	1419.72	173	185.67	44

*Buckeye Creek	*	1234.05	* 117*	131.34*	192.99*
*Buckeye Creek	*	1102.70	* 138.99*	130.59*	147.99*
*Buckeye Creek	*	972.12	* 168*	161.32*	108*
*Buckeye Creek	*	810.82	* 200*	178.48*	258*
*Buckeye Creek	*	632.35	* 239*	198.36*	80*
*Buckeye Creek	*	433.99	* 150.99*	144.27*	75.99*
*Buckeye Creek	*	289.71	* 142*	180.45*	179*
*Buckeye Creek	*	109.26	* 105.99*	109.26*	120*
*Buckeye Creek	*	0	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Buckeye Creek

Reach	River Sta.	Contr.	Expan.
*Buckeye Creek	3504.54	.1	.3
*Buckeye Creek	3454.54	.1	.3
*Buckeye Creek	3404.54	.1	.3
*Buckeye Creek	3354.54	.1	.3
*Buckeye Creek	3304.54	.1	.3
*Buckeye Creek	3254.54	.1	.3
*Buckeye Creek	3204.54	.1	.3
*Buckeye Creek	3154.54	.1	.3
*Buckeye Creek	3104.54	.1	.3
*Buckeye Creek	3054.54	.1	.3
*Buckeye Creek	3004.54	.1	.3
*Buckeye Creek	2954.54	.1	.3
*Buckeye Creek	2904.54	.1	.3
*Buckeye Creek	2854.58	.1	.3
*Buckeye Creek	2804.54	.1	.3
*Buckeye Creek	2754.54	.1	.3
*Buckeye Creek	2704.54	.1	.3
*Buckeye Creek	2661.29	.3	.5
*Buckeye Creek	2625.35	*Bridge	*
*Buckeye Creek	2603.43	.3	.5
*Buckeye Creek	2554.54	.1	.3
*Buckeye Creek	2354.53	.1	.3
*Buckeye Creek	2306.38	.1	.3
*Buckeye Creek	2254.54	.1	.3
*Buckeye Creek	2204.54	.1	.3
*Buckeye Creek	2154.54	.1	.3
*Buckeye Creek	2105.74	.1	.3
*Buckeye Creek	1903.41	.1	.3
*Buckeye Creek	1604.54	.1	.3
*Buckeye Creek	1419.72	.1	.3
*Buckeye Creek	1234.05	.1	.3
*Buckeye Creek	1102.70	.1	.3
*Buckeye Creek	972.12	.1	.3
*Buckeye Creek	810.82	.1	.3
*Buckeye Creek	632.35	.1	.3
*Buckeye Creek	433.99	.1	.3
*Buckeye Creek	289.71	.1	.3
*Buckeye Creek	109.26	.1	.3
*Buckeye Creek	0	.1	.3

HEC-RAS HEC-RAS 5.0.0 February 2016
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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

PREPARED BY: PJH 12/4/2018 CHECKED BY: ARC 12/4/2018

PROPOSED
PROJECT DATA
Project Title: 110-811_Sherwood FB HH
Project File : 110-811_SherwoFBHH.prj
Run Date and Time: 12/4/2018 12:27:42 PM

Project in English units

Project Description:
Markwest Liberty Midstream & Resources, LLC
CEC #110-811
4600 J. Barry Ct., Suite 500
Canonsburg, PA 15317

Existing - March 2014
Proposed - November 2018

Sherwood GasProcessing Plant - Full Buildout - Flood Study -
Updated for Buckeye Run Breaker Station and proposed temporary parking lot and laydown area.
Construction in a Floodway Study for Approval of final grading.

FEMA
Zones A, AE, and X from the Doddridge County West Virginia FIS Study shown on FEMA FIRM Panel # 54017C0080 B, effective October 4, 2011.

CEC Engineering
Team:
Principal: Rick Celender, C.E.T., CPESC, CPSWQ

Project Manager: Andy Celender
Hydraulic Modelers: Pat Hessenius
Reviewers: Andy Celender, George Haberman, P.E.

Model Creation:
Existing (Pre-project): CEC Created Model File, "110-811_Sherwood FB HH," Plan File, "110-811_Existing 01-23-2014."
Proposed (Post-project): CEC Created Model File, "110-811_Sherwood FB HH," Plan File, "110-811_Proposed 11-28-2018-Parking_Lots."
Geometry file created in HEC-RAS.
Steady flow file created from Doddridge County FIS, October 4, 2011.

Data Sources:
Geometry - Surface created from West Virginia Statewide Addressing and Mapping Board DEM blended with field topo survey of the bridge, existing access road from County Route 50/34, various locations along the reach, existing topography provided by ECI, and proposed grading provided by ECI & CEC
Flow - Total Buckeye Creek 100-year flow = 5,150 CFS.
Downstream Boundary
- Known Water Surface Elevation = 811. Approximate stream distance of 3,504 feet on profile.

PLAN DATA

Plan Title: 185-068_Proposed_11-28-2018-Parking_Lots
Plan File : p:\2018\185-068\-Calculations\Flood Study\110-811_SherwoFBHH.p09

Geometry Title: 110-811_Proposed 11-28-2018-Parking_Lots
Geometry File : p:\2018\185-068\-Calculations\Flood Study\110-811_SherwoFBHH.g05

Flow Title : 110-811_100Year
Flow File : p:\2018\185-068\-Calculations\Flood Study\110-811_SherwoFBHH.f01

Plan Summary Information:

Number of:	Cross Sections	= 41	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information
Water surface calculation tolerance = 0.01

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

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

FLOW DATA

Flow Title: 110-811_100Year
Flow File : p:\2018\185-068\-Calculations\Flood Study\110-811_SherwoFBHH.f01

Flow Data (cfs)

River	Reach	RS	100-Year
Buckeye Creek	Buckeye Creek	3504.54	5150

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Buckeye Creek	Buckeye Creek	100-Year	Known WS = 811	

GEOMETRY DATA

Geometry Title: 110-811_Proposed 11-28-2018-Parking_Lots
Geometry File : p:\2018\185-068\-Calculations\Flood Study\110-811_SherwoFBHH.g05

CROSS SECTION

RIVER: Buckeye Creek

REACH: Buckeye Creek RS: 3504.54

INPUT
Description: A
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	838.81	-98.96	838.29	-98.75	838.18	-98.4	838	-96.95	837.26
-96.1	836.83	-95.4	836.48	-94.48	836	-93.69	835.59	-92.75	835.1
-91.68	834.54	-90.65	834	-89.58	833.44	-88.38	832.81	-87.57	832.38
-86.84	832	-85.95	831.54	-85.41	831.26	-84.5	830.79	-83.05	830.02
-83.01	830	-81.27	829.11	-79.1	828	-79.08	827.99	-79.07	827.99
-77.37	827.11	-75.99	826.41	-75.64	826.23	-75.18	826	-74.04	825.4
-73.22	824.97	-72.55	824.62	-71.39	824	-70.83	823.7	-70.35	823.45
-69.1	822.78	-67.62	822	-67.26	821.81	-67.01	821.68	-65.6	820.94
-64.29	820.25	-64.09	820.15	-63.81	820	-62.65	819.38	-61.84	818.95
-61.13	818.57	-60.06	818	-60.02	817.91	-59.96	817.79	-59.91	817.69
-59.87	817.59	-59.83	817.5	-59.8	817.43	-59.77	817.35	-59.73	817.28
-59.7	817.21	-59.67	817.15	-59.65	817.09	-59.62	817.04	-59.6	816.99
-59.58	816.94	-59.56	816.89	-59.54	816.85	-59.46	816.69	-59.15	815.06
-47.25	813.56	-46	813.25	-45.85	813.22	-44.79	812.96	-43.56	812.66
-42.3	812.35	-41.93	812.27	-41.36	808.97	-40.43	808	-40.14	808
-38.54	807.48	-34.04	806	-33.41	805.89	-32.05	805.65	-25.82	804.54
-22.76	804.44	19.72	804.44	21.76	804.67	25.81	806	28.84	806.95
32.2	808	35.74	808.98	39.4	810	43.29	811.02	47.05	812
49.55	812.68	54.41	814	56.85	814.55	63.18	816	63.24	816
63.62	816.01	63.71	816	102.53	816	103.1	816.19	110.92	818
112.97	819.63	113.44	820	115.04	821.27	116.39	822	119.11	823.46
119.51	824	120.78	825.71	121	826	121.65	826.89	122.64	828
123.43	828.89	124.41	830	125.72	831.48	126.18	832	126.52	832.39
127.95	834	129.37	835.19	130.09	835.93	132.25	835.95	133.34	836
134.36	836.19	136.69	836.42						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-100	.05	-41.93	.035	49.55	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-41.93	49.55	50	50	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3454.54

INPUT
Description: B
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-106.13	826.76	-105.83	826.61	-105.52	826.46	-104.57	826	-104.45	825.95
-104.42	825.93	-103.35	825.44	-102.97	825.27	-102.28	824.95	-101.55	824.59
-101.24	824.44	-100.37	824	-100.19	823.91	-99.27	823.46	-98.9	823.29
-98.27	822.98	-97.55	822.65	-97.23	822.49	-96.16	822	-96.15	821.99
-96.14	821.99	-94.96	821.48	-94.61	821.32	-93.85	820.99	-93.19	820.71
-92.79	820.53	-91.86	820.13	-91.79	820.1	-91.59	820	-90.51	819.47
-90.04	819.26	-89.22	818.86	-88.25	818.41	-87.98	818.28	-87.37	818
-87.35	818	-87.19	817.14	-86.99	814.66	-83.41	814.33	-78.27	814.15
-64.45	812.92	-42.91	811.21	-42.79	809.16	-42.41	809.13	-42.01	809.09
-41.6	809.06	-41.18	809.02	-40.66	808.97	-40.11	808.93	-39.53	808.88
-37.2	808.63	-36.6	808.56	-35.97	808.48	-35.28	808.4	-32.94	808.07
-32.49	808	-31.34	807.77	-31	807.7	-29.05	807.31	-28.01	807.09
-26.05	806.67	-25.06	806.46	-22.96	806	-22.17	805.82	-21.82	805.74
-19.4	805.19	-17.82	804.84	-16.67	804.58	-14.08	804.38	17.52	804.38
23.35	805.7	24.35	806	28.89	807.47	30.57	808	37.14	809.7
38.3	810	39.73	810.36	46.16	812	52.62	813.62	54.12	814
61.82	815.78	62.8	816	105.44	816	108.77	817.27	110.92	818
112.2	819.74	112.38	820	113.85	822.01	115.45	823.6	115.85	824
116.26	824.42	117.85	826	118.35	826.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-106.13	.05	-42.79	.035	30.57	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-42.79	30.57	52	50	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3404.54

INPUT
Description: C
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-130.31	819.94	-130.16	819.85	-127.95	818.4	-127.34	818	-124.36	816.46
-123.5	816	-122.92	815.91	-122.44	815.86	-122.09	815.81	-121.89	815.78
-121.74	815.75	-121.45	815.71	-121.31	815.69	-121.19	815.68	-121.09	815.66
-121	815.65	-120.93	815.64	-120.86	815.64	-120.81	815.63	-120.78	815.51
-118.73	815.9	-118.62	815.92	-118.37	815.95	-117.79	815.59	-115.95	814.65
-112.35	813.89	-102.14	815.26	-94.41	813.55	-93.69	813.6	-93.3	813.59
-91.7	813.84	-89.86	814.09	-85.86	814.99	-84.7	814.77	-82.96	814.52
-77.51	814.54	-69.06	813.8	-67.38	813.67	-52.48	812.03	-42.72	810.75
-39.01	809.99	-38.2	809.83	-38.11	809.8	-37.46	809.6	-37.3	809.57
-37.12	809.53	-36.94	809.5	-36.74	809.46	-36.53	809.42	-35.73	809.24

-35.55	809.2	-35.23	809.14	-34.89	809.07	-34.51	809	-34.1	808.92
-33.65	808.83	-33.15	808.73	-32.59	808.62	-31.98	808.5	-31.02	808.31
-30.29	808.16	-29.54	808	-29.5	808	-28.02	807.66	-20.74	806
-15	804.51	-12.96	804.32	15.59	804.32	24.88	805.99	24.9	806
29.51	807.42	31.4	808	35.16	808.93	39.43	810	41.01	810.41
47.1	812	50.37	812.89	54.45	814	59.19	815.18	62.48	816
92.74	816	96.15	815.99	99.09	815.99	104.95	816	110.42	817.6
111.76	818	112.3	818.75	113.18	820	113.8	820.86	114.59	822
115.75	823.64	116.01	824	117.38	825.93	117.43	826	117.52	826.13
118.81	828	119.32	828.72	120.21	830	120.39	830.24		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-130.31	.05	-39.01	.035	31.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-39.01	31.4	55	50	50	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3354.54

INPUT
Description: D
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-161.95	820.72	-159	819.1	-154.74	817.2	-151.93	815.9	-147.17	813.71
-145.77	813.06	-126.21	812.54	-124.87	812.51	-123.36	812.51	-123.07	812.53
-122.06	812.55	-122.03	812.53	-115.94	812.57	-115.14	812.59	-114.95	812.57
-103.12	812.35	-88.28	812.14	-82.76	812.08	-54.87	809.98	-52.64	809.81
-41.07	809.2	-39.11	809.06	-36.85	808.62	-36.78	808.61	-36.71	808.61
-36.64	808.6	-36.56	808.59	-36.14	808.54	-35.65	808.48	-35.49	808.45
-35.3	808.43	-35.09	808.4	-34.83	808.36	-34.53	808.32	-34.16	808.27
-33.7	808.2	-33.12	808.12	-32.28	808.01	-32.21	808	-31.45	807.84
-22.89	806	-21.17	805.62	-18.11	804.96	-15.26	804.34	-13.7	804.25
17.49	804.25	26.48	806	31.46	807.35	33.9	808	38.76	809.37
40.95	810	46.89	811.73	47.8	812	48.18	812.11	54.65	814
57.78	814.8	62.56	816	64.54	816	66.78	816.01	74.22	816.01
85.96	816	89.03	815.99	91.01	815.98	96.63	815.95	100.33	815.97
106.93	816	112.68	817.78	113.29	818	113.56	818.18	115.15	820
116.54	821.58	116.9	822	118.58	823.91	118.65	824	118.98	824.38
119.3	824.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-161.95	.05	-36.56	.035	33.9	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.56	33.9	35	50	50	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3304.54

INPUT
Description: E
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-193.15	818.45	-183.47	814.34	-183.16	814.28	-176.73	813.26	-163.3	813.13
-138.32	812.35	-120.78	812.28	-86.53	811.72	-71.47	811.24	-56.51	810.18
-43	809.27	-36.76	808.75	-36.03	808.62	-36	808.61	-35.97	808.61
-35.94	808.6	-35.9	808.6	-35.86	808.59	-35.82	808.58	-35.77	808.58
-35.72	808.57	-35.67	808.56	-35.57	808.54	-35.45	808.52	-35.38	808.51
-35.31	808.49	-35.22	808.47	-35.13	808.45	-35.02	808.43	-34.88	808.4
-34.73	808.37	-34.53	808.33	-34.3	808.28	-33.99	808.22	-33.59	808.13
-33.11	808.03	-32.95	808	-29.62	807.39	-22.04	806	-15.25	804.68
-11.71	804.25	14.93	804.25	22.78	805.33	26.75	806	35.39	807.94
35.56	807.97	35.68	808	36.05	808.12	42.24	810	48.06	811.81
48.44	811.93	48.47	811.94	48.67	812	48.97	812.09	55.11	814
58.52	814.76	64.02	816	66.57	816	71.47	816.01	72.7	816.02
75.35	816.02	84.84	816	93.89	815.84	94	815.84	95.83	815.82
98.76	815.86	102.88	815.92	106.57	816	109.76	817.28	111.63	818
113.65	818.64	117.46	820	123.18	821.49	124.76	821.91	125.09	822
125.18	822	125.45	822.01	125.65	822.02	126.04	822.04	126.82	822.08
127.57	822.09	152.93	822.56	166.8	822.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-193.15	.05	-36.76	.035	35.39	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.76	35.39	55	50	47	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3254.54

INPUT
Description: F
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240.13	819.89	-227.21	814.66	-216.19	812.98	-198.11	812.16	-175.25	811.94
-165.06	811.8	-160.59	811.79	-152.22	811.82	-122.44	811.41	-109.35	811.26
-104.94	811.11	-102.58	811.05	-67.55	810.05	-42.46	809.03	-36.68	808.81
-36.67	808.63	-36.63	808.62	-36.6	808.62	-36.56	808.61	-36.51	808.6
-36.47	808.59	-36.42	808.58	-36.36	808.57	-36.3	808.56	-36.24	808.55
-36.18	808.54	-36.1	808.52	-35.72	808.43	-35.62	808.41	-35.52	808.39
-35.41	808.37	-35.28	808.34	-35.14	808.31	-34.99	808.27	-34.82	808.23
-34.63	808.18	-34.4	808.13	-34.14	808.06	-33.88	808	-31.55	807.56
-23.17	806	-20.88	805.53	-17.84	804.92	-15.28	804.39	-13.32	804.12
15.81	804.12	16.56	804.21	16.72	804.23	28.47	806	32.29	806.81
35.63	807.52	37.86	808	42.77	809.48	44.49	810	46.47	810.68
50.28	812	53.04	812.93	56.3	814	60.48	814.91	63.23	815.52
63.61	815.59	64.3	815.74	65.6	816	68.76	816	69.87	816.02
71.52	816.02	71.91	816.03	77.35	816	78.14	816	85.05	814.92
90.53	814.08	91.07	814	98.34	814	102.59	815.16	106.43	816
110.08	817.66	110.84	818	113.36	819.15	115.21	820	116.17	820.22
116.63	820.29	122.85	821.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-240.13	.05	-36.68	.035	37.86	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.68	37.86	43	50	52	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3204.54

INPUT
Description: G
Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-283.58	819.8	-266.29	814.14	-266.24	814.12	-266.23	814.12	-266.09	814.11
-217.5	811.93	-217.38	811.93	-173.11	811.45	-163.78	811.46	-160.93	811.43
-155.76	811.36	-150	811.26	-144.17	811.18	-124.33	810.91	-109.74	810.72
-100.63	810.59	-93.13	810.46	-70.42	809.9	-50.46	809.14	-38.7	808.69
-33.59	808.48	-31.92	807.96	-31.88	807.94	-31.83	807.93	-31.78	807.91
-31.73	807.89	-31.68	807.88	-31.63	807.86	-31.57	807.84	-31.51	807.81
-31.44	807.79	-31.37	807.77	-31.29	807.74	-31.2	807.71	-31.1	807.69
-30.89	807.62	-30.78	807.58	-30.66	807.54	-30.52	807.5	-30.38	807.45
-30.22	807.4	-29.76	807.22	-29.6	807.16	-29.42	807.08	-29.23	807
-28.94	806.91	-28.61	806.8	-28.23	806.67	-27.79	806.53	-27.29	806.36
-26.69	806.17	-26.19	806	-21.56	805.01	-18.47	804.35	-16.86	804.05
15.24	804.05	16.56	804.21	27.88	806	30.45	806.52	37.81	808

39.9	808.63	44.4	810	47.91	811.09	50.79	812	54.71	813.27
56.99	814	57.54	814.1	57.74	814.13	60.08	814.54	62.07	814.88
63.39	815.06	64.64	815.27	69.51	816	71.49	816	88.72	817.7
91.55	818	96.32	818.82	102.84	820	107.71	820.7	116.72	821.98

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-283.58	.05	-33.59	.035	37.81	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.59	37.81	44	50	51	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3154.54

INPUT
Description: H
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-344.06	819.81	-341.76	819.08	-341.5	819	-341.22	818.91	-340.84	818.79
-337.9	818	-334.17	817.44	-331	817	-327.91	816.57	-323.41	816
-320.76	815.66	-315.56	815	-310.98	814.42	-307.71	814	-302.24	813.3
-299.86	813	-293.88	812.24	-292.01	812	-286.93	812	-277.22	812.32
-258.35	812.99	-258.09	813	-253.72	813.61	-245.48	813	-236.46	812.34
-231.87	812	-229.17	812	-223.28	812.4	-219.22	813	-216.77	813.02
-216.11	813	-204.16	812.31	-202.3	812.31	-190.03	812.33	-162.2	812.1
-160.46	812.1	-156.63	812.01	-153.48	812	-147.14	811.85	-136.56	811.51
-124.69	811	-103.71	810.26	-98.64	810.21	-79.31	809.67	-63.22	809.32
-54.02	808.86	-34.08	808.02	-31.24	807.13	-30.93	807.04	-30.84	807.02
-30.75	806.99	-30.65	806.96	-30.55	806.93	-30.44	806.9	-30.32	806.86
-30.2	806.83	-30.06	806.79	-29.91	806.74	-27.38	806	-27.33	806
-18.87	803.96	-18.57	803.89	0	803.89	14.2	803.9	17.29	804.43
26.47	806	26.52	806	26.53	806	35.37	807.81	36.26	808
41.95	809.75	42.76	810	43.86	810.36	48.82	812	51.4	812.8
55.27	814	56.44	814.25	58.83	814.76	62.79	815.6	64.71	816
71.82	816	76.48	816.77	77.53	816.86	80.56	817.14	83.2	817.46
87.71	817.86	89.18	817.99	89.27	818	89.46	818.03	100.7	820
108.63	821.17	115.16	822	115.58	822				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-344.06	.05	-34.08	.035	35.37	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.08	35.37	48	50	52	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-200.123	-207.623	820	-135.22	-142.527	820

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3104.54

INPUT
Description: I
Station Elevation Data num= 163

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-402.442	824	-399.553	823.1484	-399.05	823	-396.848	822.3507	-395.658	822
-394.447	821.6429	-392.883	821.1818	-392.371	821.0185	-392.313	821	-389.531	820.1121
-389.18	820	-387.197	819.3673	-386.047	819	-384.918	818.7803	-381.099	818.2408
-379.394	818	-373.856	817.2178	-372.314	817	-366.529	816.1829	-365.234	816
-359.029	815.1235	-358.155	815	-354.378	814.7171	-351.075	814	-345.373	813.1666
-343.634	813	-343.298	812.9944	-340.935	812.9838	-338.812	812.9906	-338.049	812.9904
-336.922	813	-327.457	813.7289	-327.431	813.7307	-325.729	813.8358	-324.283	814.003
-324.263	814.0029	-324.24	814.0029	-324.193	814.0028	-324.078	814.0024	-324.004	814.0022
-323.279	814.0001	-323.24	814	-320.717	814.8338	-320.49	814.909	-320.204	815
-319.013	815.3795	-318.906	815.412	-318.542	815.5235	-318.414	815.5614	-318.17	815.6337
-317.994	815.6839	-317.868	815.7202	-317.743	815.7541	-317.615	815.7893	-317.528	815.812
-317.48	815.8454	-317.348	815.8602	-317.291	815.8716	-317.175	815.9006	-317.141	815.9078
-317.026	815.9347	-316.905	815.9615	-316.777	815.9909	-316.774	815.9916	-316.736	816
-316.73	816	-316.71	816	-316.621	816	-316.06	816	-311.437	816
-309.861	816	-293.835	816	-293.628	816	-289.955	816	-289.113	816
-275.755	816	-274.127	816	-255.308	816	-255.302	816	-254.083	816
-243.12	816	-239.09	815.1681	-226.057	815.1395	-225.815	815.1273	-215.667	815.1069
-210.616	815.0038	-197.397	815.0028	-197.214	815.0026	-195.769	815.0037	-186.684	815.0027
-186.467	815.0025	-175.766	815.0014	-175.629	815.0012	-163.244	815.0001	-163.236	815.0001
-163.226	815.0001	-162.543	815	-161.886	814.7824	-159.526	814	-158.107	813.5294
-156.51	813	-156.046	812.8464	-154.118	812.3355	-152.852	812	-147.612	811.9193
-143.665	811.9388	-137.071	811.4428	-131.195	811	-131	810.9961	-129.732	810.9955
-128.69	810.69	-108.79	810.52	-62.35	809.45	-61.73	809.43	-61.33	809.43
-61.1	809.42	-34.67	808.63	-31.5	807.57	-29.01	806.58	-27.66	806
-27.48	806	-20.05	804.21	-16.97	803.47	12.55	803.47	19.85	804.82
26.22	806	26.33	806	26.34	806	26.41	806	34.26	807.67
34.55	807.72	34.86	807.78	35.19	807.83	35.54	807.89	36.08	808
36.12	808	36.15	808	38.74	808.76	43	810	46.91	811.41
48.53	812	53.61	813.61	54.83	814	54.97	814.03	55.06	814.05
64.07	816	64.83	816	64.86	816	74.23	816	84.17	817.64
87	818	87.13	818	91.93	818.78	99.35	820	104.37	820.67
104.41	820.68	115.26	822	115.69	822	124.72	822.11	135.24	822.23
144.5	822.33	144.6	822.33	151.57	822.39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-402.442	.05	-34.67	.035	36.12	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.67	36.12	22	50	48	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3054.54

INPUT
Description: J
Station Elevation Data num= 174

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-441.587	828	-439.001	827.1344	-438.6	827	-436.318	826.2358	-435.614	826
-433.568	825.3151	-432.627	825	-430.772	824.3788	-429.64	824	-427.941	823.4311
-426.654	823	-425.085	822.4748	-423.667	822	-422.209	821.5118	-420.681	821
-418.004	820.1037	-417.49	820	-413.614	819.5593	-408.696	819	-405.341	818.6185
-399.901	818	-397.421	817.718	-391.106	817	-390.501	816.9315	-384.505	816
-384.434	815.9768	-381.439	815	-379.723	814.4401	-378.374	814	-372.691	814
-370.401	814	-369.485	813.9987	-367.924	814	-358.903	814.4972	-358.034	814.5691
-355.084	814.6954	-351.579	814.7867	-349.622	814.8299	-349.129	815	-348.57	815.1867
-346.13	816	-344.754	816	-341.528	816	-332.155	816	-329.864	816
-301.386	816	-296.839	816	-291.799	816	-291.174	816	-283.778	816
-282.967	816	-282.557	816	-278.812	816	-277.453	815.7166	-273.13	815.7105
-271.93	815.6494	-267.99	815.6443	-237.448	815.0238	-226.907	815.0233	-225.361	815.0216
-212.944	815.0321	-208.381	815.0318	-205.813	815.029	-200.462	815.0286	-197.56	815.0254
-191.399	815.0251	-188.196	815.0216	-184.423	815.0245	-180.458	815.0242	-176.539	815.02
-170.878	815.0238	-170.775	815.0238	-165.27	815.0179	-165.015	815.0181	-155.845	815.0023
-154.528	815.0011	-154.434	815	-154.108	814.86	-146.855	814.3811	-145.013	814.1338
-143.636	814	-141.968	813.5953	-139.516	813	-137.885	812.6039	-135.397	812
-135.334	812	-135.259	812	-134.311	811.9619	-134.288	811.961	-133.687	811.9369
-133.541	811.931	-133.478	811.9285	-133.446	811.9272	-133.193	811.917	-133.022	811.9089
-132.996	811.9106	-132.775	811.917	-132.772	811.917	-132.767	811.9169	-129.457	811.8443
-128.526	811.8238	-128.511	811.823	-122.323	811.5648	-109.225	811	-84.09	809.91
-75.91	809.69	-67.79	809.61	-35.1	809.26	-35.08	808.53	-34.81	808.37
-34.75	808.35	-34.68	808.33	-34.6	808.31	-34.53	808.29	-34.45	808.26
-34.36	808.24	-34.27	808.21	-34.17	808.18	-33.73	808	-33.6	808
-33.59	808	-33.55	808	-33.28	807.92	-32.95	807.81	-32.66	807.71
-32.4	807.62	-32.22	807.55	-27.71	806	-27.59	806	-27.57	806
-27.55	806	-27.54	806	-27.53	806	-20.47	804.38	-14.6	803.03
-6.69	803.04	0	803.04	11.6	803.05	19.99	804.68	26.81	806
26.83	806	27	806	27.03	806	27.17	806	33.89	807.43
34.15	807.48	34.43	807.53	34.73	807.58	35.05	807.64	35.73	807.77
36.09	807.85	36.49	807.92	36.86	808	38.6	808.46	44.4	810

49.01	811.58	50.22	812	51.33	812.33	57.04	814	66.81	815.06
75.79	816	75.95	816	77.14	816	78.3	816.19	78.68	816.24
79.1	816.3	79.86	816.42	81.74	816.76	83.22	816.97	89.82	818
93.81	818.77	99.8	820	105.59	821.09	110.84	821.97		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-441.587	.05	-35.1	.035	38.6	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.1	38.6	23	50	53	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 3004.54

INPUT
Description: K
Station Elevation Data num= 130

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.698	827.4542	-477.239	827.3028	-476.322	827	-473.901	826.2005	-473.294	826
-470.642	825.1245	-470.265	825	-467.436	824.0657	-467.237	824	-464.266	823.0189
-464.209	823	-462.785	822.5298	-461.331	822.033	-461.234	822	-458.564	821.0879
-458.307	821	-457.778	820.8166	-455.38	820	-449.794	819.1817	-448.993	819.087
-448.259	819	-442.068	818.2674	-439.79	818	-439.619	817.9799	-431.27	817
-430.693	816.9323	-422.75	816	-421.992	815.9396	-421.731	815.909	-421.585	815.8958
-421.496	815.8667	-421.431	815.8452	-419.097	815.0751	-418.942	815.024	-418.87	815
-418.771	814.9673	-415.839	814	-411.731	814	-408.213	814	-398.637	813.9858
-397.265	813.9868	-386.981	814	-386.058	814.0767	-383.28	815	-381.597	815.5611
-380.28	816	-373.75	816	-372.683	816	-328.216	816	-321.515	816
-321.454	816	-319.205	816	-317.519	815.9798	-317.289	815.9795	-316.67	815.976
-315.748	815.9694	-315.625	815.9683	-312.313	815.9119	-267.392	815.0586	-261.472	815.0603
-257.358	815.0573	-242.722	815.074	-215.791	815.0157	-214.267	815.0138	-212.667	815.0118
-211.037	815.0098	-206.313	815	-202.877	814.9329	-197.993	814.8522	-172.572	814
-157.496	813.0981	-155.857	813	-153.952	812.7929	-149.373	812.3031	-147.914	812
-145.119	811.2193	-143.68	811	-142.748	810.9905	-127.174	810.9258	-126.324	810.9299
-121.613	810.9578	-121.139	810.9524	-119.77	810	-119.28	809.99	-113.78	809.93
-103.13	809.97	-93.69	809.92	-67.95	809.52	-52.45	809.04	-45.11	808.85
-35.47	808.67	-31.5	808.25	-31.27	808.21	-30.54	808.11	-29.89	808
-29.7	808	-29.38	807.86	-25.92	806	-23.67	806	-9.97	802.18
9.69	802.2	28.6	806	35.49	807.51	37.75	808	47.2	810
53.42	811.42	56	812	58.23	812.39	59.06	812.53	61.47	812.95
63.47	813.27	64.67	813.47	68	814	68.17	814	74.52	814.69
78.81	815.15	86.28	816	88.24	816.57	94.41	818	101.05	820
106.62	821.6	108.04	822	110.65	822.46	119.91	823.94	120.28	824
128.68	824.01	131.37	824.02	132.16	824.03	141.52	824.19	144.29	824.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.698	.05	-35.47	.035	35.49	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.47	35.49	36	50	48	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-286.26	-299.23	817	-209.22	-265.06	817	-152.87	-161.37	820

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2954.54

INPUT
Description: L
Station Elevation Data num= 130

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-534.874	830	-534.718	829.9349	-532.749	829.1159	-532.4	829	-532.382	828.9669
-529.383	828	-528.588	827.7362	-526.367	827	-525.079	826.5731	-523.351	826
-521.697	825.4517	-520.335	825	-518.398	824.3578	-517.319	824	-515.156	823.2831
-514.302	823	-511.956	822.2222	-511.286	822	-508.787	821.1715	-508.27	821
-505.642	820.1288	-505.254	820	-501.023	819.3241	-498.874	819	-496.106	818.6736
-490.396	818	-488.075	817.7263	-481.917	817	-479.786	816.7486	-473.439	816
-472.835	815.9517	-470.779	815.7086	-469.614	815.6035	-469.559	815.5854	-469.357	815.5186
-467.787	815	-465.287	814.1738	-464.761	814	-457.604	814	-457.296	814
-456.521	813.9982	-445.1	813.9794	-443.388	813.9823	-442.093	813.9847	-433.141	814
-430.858	814.7611	-430.141	815	-429.767	815.1246	-427.142	816	-425.639	816
-425.395	816	-415.64	816	-383.111	816	-374.846	816	-371.326	816
-362.337	815.8809	-360.747	815.8743	-355.854	815.8378	-346.284	815.7542	-344.728	815.7389
-301.119	815.0845	-294.622	815.0734	-272.644	815.0093	-268.504	815	-222.036	814.2244
-219.168	814.1764	-213.91	814	-210.836	813.8157	-197.231	813	-196.693	812.9414
-195.933	812.9185	-194.604	812.8682	-188.337	812.5832	-187.308	812.5364	-176.289	812
-168.817	811.6311	-168.656	811.611	-168.281	811.5643	-166.219	811.0918	-165.926	811.0135
-153.83	811	-138.198	810.4121	-119.772	810	-119.284	809.9909	-113.78	809.93
-103.13	809.97	-93.69	809.92	-67.95	809.52	-52.45	809.04	-45.11	808.85
-35.47	808.67	-31.5	808.25	-31.27	808.21	-30.54	808.11	-29.89	808
-29.7	808	-29.38	807.86	-25.92	806	-23.67	806	-9.97	802.18
9.69	802.2	28.6	806	35.49	807.51	37.75	808	47.2	810
53.42	811.42	56	812	58.23	812.39	59.06	812.53	61.47	812.95
63.47	813.27	64.67	813.47	68	814	68.17	814	74.52	814.69
78.81	815.15	86.28	816	88.24	816.57	94.41	818	101.05	820
106.62	821.6	108.04	822	110.65	822.46	119.91	823.94	120.28	824
128.68	824.01	131.37	824.02	132.16	824.03	141.52	824.19	144.29	824.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-534.874	.05	-31.5	.035	35.49	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-31.5	35.49	36	50	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-250.06	-378.2	817

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2904.54

INPUT
Description: M
Station Elevation Data num= 127

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-576.184	826	-575.96	825.9	236-573.252	825	-572.645	824.7932	-570.32	824
-569.408	823.6889	-567.388	823	-566.226	822.6037	-564.456	822	-563.086	821.5327
-561.524	821	-559.978	820.4727	-558.592	820	-554.508	819.3287	-552.342	819
-545.402	818.0856	-544.752	818	-542.88	817.7533	-538.579	817.228	-536.713	817
-531.583	816.3735	-528.525	816	-528.242	815.9765	-522.54	815.2777	-520.566	815.0917
-520.338	815.0924	-519.569	815.095	-519.279	814.9984	-519.039	814.9185	-518.92	814.8791
-518.673	814.7969	-516.279	814	-512.373	814	-509.213	814	-507.192	813.9954
-495.446	813.9671	-494.431	813.9649	-491.761	813.9692	-479.89	814	-477.77	814.7044
-476.88	815	-475.658	815.4061	-473.871	816	-465.13	816	-430.716	816
-430.646	816	-404.805	815.6536	-399.899	815.6305	-384.104	815.5065	-349.783	815.197
-343.723	815.1368	-335.121	815.014	-333.994	815.012	-329.944	815	-326.02	814.914
-320.016	814.8078	-296.338	814.2529	-287.835	814.1418	-280.898	814.1744	-274.722	814.1483
-257.205	814	-243.437	813.3784	-236.719	813	-216.898	812.0332	-216.208	812
-215.268	811.9531	-215.188	811.9496	-215.086	811.9453	-215.052	811.9439	-192.264	811.0094
-192.035	811	-175.377	810.3522	-163.095	810	-163.089	809.9999	-163.085	809.9999
-65.8	808.97	-57.77	808.78	-50.48	808.91	-36.42	808.86	-35.58	808.5
-32.25	807.93	-29.13	806.3	-28.06	806	-18.33	803.44	-18.19	803.41
-16.24	802	11.77	802	22.41	804	37.52	807.53	37.63	807.55
39.94	808.03	42.23	808.53	42.4	808.57	42.61	808.61	42.76	808.65
42.95	808.69	43.08	808.72	43.25	808.76	43.36	808.78	43.52	808.82
43.62	808.84	43.87	808.86	47.83	809.65	49.22	809.95	49.46	810
58.67	812	59.36	812.09	59.65	812.13	63.68	812.64	65.81	812.91
68.23	813.21	72.37	813.72	73.02	813.8	74.71	814	79.32	814.6
82.93	815.09	86.03	815.5	89.61	816	89.68	816	93.22	817.02
96.65	818	102.45	820	108.88	822	113.42	823.17	116.74	824
116.89	824	117.07	824.01						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-576.184	.05	-36.42	.035	42.23	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.42	42.23	42	49.96	51	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-576.184	-407	815	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-365.89	-438.713	817	-269.5	-299.8	817

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2854.58

INPUT
Description: N
Station Elevation Data num= 124

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-624.362	825	-623.918	824.8131	-621.986	824	-621.67	823.867	-619.61	823
-619.521	822.9626	-619.005	822.7454	-617.412	822	-617.355	821.9734	-615.275	821
-614.662	820.7128	-613.138	820	-609.509	819.5097	-606.236	819	-602.962	818.5652
-598.707	818	-593.344	817.2877	-591.178	817	-585.197	816.2055	-583.65	816
-582.313	815.8224	-573.579	815	-572.171	814.8728	-571.561	814.7814	-567.756	814.4696
-567.331	814.328	-566.347	814	-566.324	814	-559.956	814	-549.375	813.9649
-543.759	813.9469	-540.775	813.9378	-531.563	813.9643	-520.806	814	-519.195	814.5366
-517.805	815	-515.994	815.6033	-514.803	816	-512.617	816	-506.05	816
-486.79	816	-486.436	816	-441.774	815.4033	-433.503	815.3659	-407.312	815.1639
-390.625	815.0149	-385.392	815	-369.204	814.3769	-351.328	814.0809	-350.859	814.0683
-348.189	814.0064	-346.389	814.0109	-332.747	814.069	-322.426	814.0232	-319.235	814.0197
-314.822	814.0199	-305.749	814.0196	-303.068	814.0103	-299.6	814.0114	-298.449	814
-291.441	813.3758	-282.844	813.072	-281.129	813.0815	-278.942	813.0657	-273.956	813
-259.628	812.4166	-252.546	812.0493	-249.311	812	-238.39	811.5605	-225.889	811.0573
-224.493	811	-196.129	810.2378	-191.978	810.1261	-190.577	810.0806	-186.906	810
-181.11	809.87	-161.13	809.86	-148.16	809.64	-131.76	809.27	-129.32	809.24
-116.92	809.12	-99.47	808.99	-99.21	808.99	-87.44	808.85	-82.36	808.91
-76.54	808.84	-69.24	808.81	-62.25	808.9	-35.55	808.9	-34.28	808.35
-33.72	808.09	-31.27	806.16	-27.8	804.33	-27.67	804.3	-26.4	804
-23.28	802	14.53	802	25.91	804	26.91	804.23	27.08	804.29
27.6	804.45	28.53	804.72	29	804.82	29.39	804.91	29.6	804.97
31.5	805.43	33.19	805.84	34.31	806.12	38.79	807.25	45.44	808.91
57.71	811.96	57.86	812	67.88	814	68.25	814	87.56	815.69
88.4	815.76	90.99	816	94.53	817.23	96.75	818	102.36	820
108.12	822	109.79	822.45	115.56	824	115.89	824.04		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-624.362	.05	-35.55	.035	45.44	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.55	45.44	40	50.04	52	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-624.362	-400	815	T

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
-541.618	-549.618	820	-430.83	-486.528	817	-329.487	-341.341	815

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2804.54

INPUT
Description: O
Station Elevation Data num= 157

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-636.99	817.78	-636.95	817.77	-634.08	817	-630.98	816.17	-630.35	816
-626.97	815.09	-626.62	815	-626.25	814.9	-622.89	814	-622.35	813.93
-616.17	813.67	-609.26	813.83	-606.82	814.08	-602.15	814.59	-593.08	815.07
-590.11	815.23	-583.93	815.46	-581.75	815.34	-575.63	815	-571.54	814.52
-565.54	814	-563.07	813.65	-560.88	813.47	-559.96	813.39	-559.17	813.34
-558.87	813.32	-553.59	813	-551.92	812.9	-549.63	812.76	-539.3	812.27
-533.53	812	-530.18	811.84	-529.43	811.81	-524.3	811.39	-519.46	811
-508.33	810.1	-507.11	810	-424.82	810	-416.88	810.16	-414.07	810.21
-411.1	810.23	-394.19	810.31	-378.96	810.43	-367.39	810.51	-355.79	810.57
-349.84	810.6	-344.93	810.61	-312.68	810.67	-302.9	810.67	-299.88	810.7
-291.35	810.67	-282.84	810.79	-274.96	810.27	-272.64	810.31	-266.75	810.35
-254.54	810.87	-252.37	810.91	-247.19	811	-235.23	810.68	-226.27	810.48
-225.8	810.06	-223.75	810.05	-200.27	810	-200.18	810	-197.84	809.23
-197.64	809.22	-194.22	809.36	-191.11	809.39	-177.26	809.36	-170.32	809.28
-164.3	809.01	-153.82	808.7	-139.84	808.71	-132.12	808.6	-123.32	808.22
-121.92	808.15	-120.94	808.13	-107.12	808.07	-104.81	808.04	-97.09	807.93
-90.23	807.96	-83.61	808.09	-65.83	808.29	-65.47	808.31	-61.61	808.39
-41.95	809.2	-35.53	809.4	-34.23	808.97	-33.63	808.75	-31.2	806.83
-29.59	805.69	-25.99	803.67	-25.93	803.61	-25.85	803.5	-25.79	803.43
-25.75	803.38	-25.7	803.32	-23.62	802	18.54	802	18.75	802.05
19.33	802.19	19.59	802.25	20.21	802.4	20.37	802.43	20.55	802.48
20.63	802.5	20.75	802.53	20.89	802.56	20.95	802.57	21.08	802.61
21.15	802.62	21.23	802.64	21.29	802.66	21.34	802.67	21.42	802.69
21.48	802.7	21.59	802.73	21.65	802.74	21.7	802.75	21.76	802.77
21.91	802.8	23.53	803.12	23.7	803.16	23.82	803.19	24.81	805.05

25.55	805.32	26.14	805.53	37.03	807.89	42.61	809.52	47.89	809.79
48.29	809.86	49.56	810.15	50.26	810.32	52.18	810.74	52.9	810.9
54.47	811.27	55.97	811.53	58.18	812	66	813.35	69.71	814
85.64	815.5	87.9	815.68	88.33	815.71	90.91	815.91	91.03	815.92
92.13	816	93.67	816.33	94.43	816.53	96.39	816.99	98.88	817.68
99.33	817.79	100.04	818	105.58	819.9	111.67	822	117.68	823.92
117.92	824	124.8	825.92						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-636.99	.05	-35.53	.035	42.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.53	42.61	87	50	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-636.99	-400	815	T

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2754.54

INPUT
Description: P
Station Elevation Data num= 241

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-698.23	841.94	-697.8	841.94	-697.04	841.95	-696.78	841.95	-696.02	841.96
-694.73	841.96	-693.98	841.97	-693.7	841.97	-692.96	841.98	-691.66	841.98
-690.91	841.99	-690.63	841.99	-689.89	842	-688.59	842	-687.85	842.01
-687.56	842.01	-686.83	842.02	-685.52	842.02	-684.79	842.03	-683.77	842.03
-683.47	842.04	-682.45	842.04	-681.72	842.05	-680.4	842.05	-679.68	842.06
-679.37	842.06	-678.66	842.07	-677.64	842.07	-631.16	842.29	-629.22	842.29
-627.51	842.3	-622.02	842.3	-621.1	842.31	-617.57	842.31	-612.62	844.35
-610.15	844.36	-605.2	842.38	-604.27	841.98	-602.59	841.26	-602.52	841.23
-600.9	840.54	-600.8	840.5	-599.22	839.82	-599.08	839.76	-597.53	839.1
-597.35	839.02	-595.85	838.38	-595.63	838.28	-594.17	837.66	-593.91	837.54
-592.49	836.93	-592.18	836.8	-590.8	836.21	-590.46	836.06	-589.12	835.49
-588.74	835.32	-587.44	834.76	-587.02	834.58	-585.76	834.04	-585.29	833.84
-584.07	833.32	-583.57	833.1	-582.39	832.59	-581.85	832.35	-580.71	831.86
-580.13	831.61	-579.03	831.14	-578.41	830.87	-577.34	830.41	-576.68	830.12
-575.66	829.68	-574.96	829.38	-573.98	828.95	-573.24	828.63	-572.3	828.23
-571.52	827.88	-570.62	827.5	-569.79	827.14	-568.93	826.77	-568.07	826.39
-567.25	826.04	-566.35	825.64	-565.57	825.31	-564.63	824.89	-563.89	824.57
-562.91	824.14	-562.21	823.84	-561.19	823.4	-560.53	823.11	-559.46	822.64
-558.84	822.38	-557.74	821.89	-557.16	821.64	-556.02	821.14	-555.48	820.91
-554.3	820.39	-553.8	820.18	-552.58	819.64	-552.12	819.44	-550.86	818.89

-550.44	818.7	-549.14	818.13	-548.76	817.97	-547.42	817.38	-547.08	817.23
-545.7	816.62	-545.4	816.49	-543.97	815.87	-543.72	815.76	-542.25	815.11
-542.03	815.02	-540.53	814.36	-540.35	814.28	-538.81	813.6	-538.67	813.54
-537.09	812.84	-536.99	812.8	-535.37	812.09	-535.31	812.06	-532.91	811
-472.29	810.18	-471.39	810.17	-471.33	810.17	-470.43	810.15	-469.46	810.13
-468.5	810.12	-467.53	810.1	-466.57	810.09	-464.63	810.05	-463.67	810.03
-462.74	810.02	-461.37	810	-461.32	810.13	-459.29	810.31	-458.73	810.35
-458.45	811.05	-456.78	811.38	-455.5	811.55	-455.11	811.51	-454.8	811.55
-454.43	811.52	-454.09	811.56	-453.74	811.54	-453.38	811.58	-453.05	811.57
-452.68	811.61	-446.41	813.33	-393.3	821.98	-392.25	822.16	-392.17	822.17
-372.32	822	-342.8	810	-342.53	810.1	-341.61	810.1	-340.67	810.09
-339.61	810.09	-338.8	810.08	-336.7	810.08	-335.97	810.07	-331.86	810.07
-331.24	810.06	-326.08	810.06	-325.55	810.05	-317.43	810.05	-317	810.04
-316.47	810.05	-316.04	810.04	-300.52	810.04	-294.75	810.03	-294.46	810.03
-249.98	810	-231.53	810.1	-231.27	810.1	-207.6	810	-203.84	809.83
-200.1	809.7	-196.86	809.6	-195.32	809.56	-178.49	807.88	-177.88	807.85
-177.82	807.85	-164.45	807.34	-162.67	807.33	-155.89	807.28	-155.32	806.98
-153.6	807.57	-151.86	807.58	-135.54	807.51	-132.75	807.16	-130.02	806.85
-127	806.75	-124.24	806.57	-118.5	806.53	-110.43	805.94	-108.29	805.37
-106.35	805.03	-104.76	805.01	-102.17	805.14	-99.69	805.76	-99.06	805.87
-98.96	805.86	-98.42	805.92	-84.59	807.47	-83.07	807.51	-82.26	807.53
-69	807.62	-59.03	807.76	-50.91	807.97	-37.84	808.52	-37.5	808.63
-35.61	808.13	-29.14	805.37	-23.52	803.77	-22.81	802.87	-22.74	802.78
-22.35	802.23	-22.29	802.17	-22.01	802	21.18	802	21.41	802.05
21.55	802.09	21.78	802.14	21.89	802.17	25.86	802.95	25.93	802.96
28.32	807.37	28.46	807.42	28.53	807.45	28.66	807.49	31.44	808.11
45.69	812.31	49.98	813.62	59.57	813.62	74.91	814	99.32	816
102.78	816.84	107.54	818	124.94	824	131.32	826	136.21	827.34
138.38	827.91								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-698.23	.05	-37.5	.035	28.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.5	28.66	109	50	58	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-698.23	-475	815	T

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2704.54

INPUT
Description: Q

Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-789.49	842.74	-788.7	842.74	-787.7	842.75	-787.52	842.76	-786.5	842.76
-786.33	842.77	-785.31	842.77	-785.15	842.78	-784.12	842.78	-783.96	842.79
-782.93	842.79	-782.78	842.8	-781.74	842.81	-781.59	842.81	-780.54	842.82
-780.41	842.82	-779.35	842.83	-779.22	842.83	-778.16	842.84	-778.04	842.84
-776.97	842.85	-776.85	842.85	-775.78	842.86	-775.67	842.86	-774.59	842.87
-774.49	842.87	-773.39	842.88	-773.3	842.88	-772.2	842.89	-771.01	842.89
-770.93	842.9	-769.82	842.9	-769.75	842.91	-768.56	842.91	-767.43	842.92
-767.38	842.92	-766.24	842.93	-766.19	842.93	-765.05	842.94	-762.67	842.96
-761.48	842.97	-760.28	842.98	-757.9	843	-756.73	843	-754.43	843.01
-753.28	843.02	-752.13	843.03	-750.97	843.03	-749.82	843.04	-745.22	843.06
-745.15	843.06	-595.41	843.79	-569.52	843.72	-568.9	843.72	-564.74	845.78
-562.67	845.78	-558.51	843.75	-558.34	843.66	-516.25	823.5	-515.93	823.5
-514.33	823.48	-359.7	822	-334.66	810	-334.45	810.06	-334.34	810.1
-332.68	810.1	-234.26	810	-216.12	810.1	-192.08	810	-187.27	809.67
-186.59	809.62	-185.47	809.54	-184.52	809.47	-183.67	809.41	-182.45	809.32
-181.87	809.28	-180.38	809.17	-180.08	809.15	-178.31	809.01	-178.16	809
-177.38	809	-170.27	808.22	-165.51	808	-152.11	807.93	-132.87	807.69
-126.24	807.69	-97.98	807.11	-95.16	807.09	-80.48	807.66	-65.02	808.17
-61.54	808.11	-40.15	808.52	-33.94	808.23	-32.14	808.15	-31.28	808.03
-31.03	807.98	-30.36	807.89	-29.98	807.72	-28.02	805.88	-27.8	805.81
-27.69	805.77	-27.39	805.67	-18.43	802	18.59	802	24.54	803.22
24.61	803.23	24.69	803.25	24.76	803.26	24.81	803.27	24.86	803.28
25.12	803.34	29.99	808.07	30.08	808.22	30.78	808.43	49.1	815.09
58.94	814.78	66.34	814.57	78.5	814.24	86.32	814	114.4	816
114.7	816	115.25	816.16	121.57	818	127.81	820	133.84	822
139.98	824	152.46	828	161.88	829.95				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-789.49	.05	-33.94	.035	29.99	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-33.94	29.99	52	43.25	43	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2661.29

INPUT
Description: R
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-845.31	843.49	-754.83	843.94	-754.77	843.94	-751.36	843.96	-749.04	843.97
-745.57	843.99	-744.41	843.99	-743.25	844	-742.09	844	-740.95	844.01

-739.79	844.02	-738.65	844.02	-737.5	844.03	-730.6	844.06	-651.71	844.46
-558.32	844.22	-557.61	844.22	-556.84	844.21	-556.21	844.21	-552.09	846.28
-550.03	846.28	-545.91	844.23	-503.01	823.5	-502.07	823.49	-347.88	822
-323.07	810	-322.7	810.1	-212.04	810	-209.54	810	-194.54	810.1
-173.38	810	-172.47	809.93	-172.29	809.92	-170.23	809.76	-169.59	809.72
-167.99	809.6	-166.91	809.52	-165.74	809.43	-164.23	809.33	-163.49	809.27
-161.56	809.14	-161.24	809.12	-159.55	809	-152.1	809	-136.76	808.08
-110.75	808.1	-105.69	808	-98.01	808.15	-77.01	808.06	-66.06	807.74
-50.99	807.61	-35.7	807.37	-28.35	806.46	-26	808.01	-21.76	804.95
-15.72	804.22	-15.2	803.46	-14.95	803.31	-14.91	803.25	-14.86	803.17
-14.73	802.96	-14.58	802.71	-14.51	802.6	-14.43	802.47	-14.14	802
20.6	802	27.87	802.57	31.67	806.67	33.46	808.35	46.35	812.63
47.42	812.95	50.62	813.48	56.04	813.65	57.86	813.75	101.72	813.93
107.53	814	109.42	814.15	113.04	814.43	117.7	814.79	121.05	815.06
124.84	815.34	126.67	815.49	132.02	815.89	132.34	815.91	133.53	816
136.36	816.61	137.94	816.96	139.77	817.36	142.54	818	147.7	819.64
155.2	822	158.67	823.11						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-845.31	.05	-28.35	.035	31.67	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-28.35	31.67	53	58	63	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-100.15	-109.65	820

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2603.43

INPUT
Description: S
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-903.57	844.18	-745.6	844.93	-745.52	844.93	-733.11	844.98	-731.97	844.99
-730.84	845	-729.7	845	-728.57	845.01	-727.44	845.01	-726.31	845.02
-724.05	845.03	-720.66	845.04	-715.19	845.07	-679.35	845	-678.34	845
-677.32	844.99	-673.25	844.99	-672.23	844.98	-667.15	844.98	-665.11	844.97
-663.08	844.97	-660.03	844.96	-647.82	844.94	-644.77	844.93	-643.68	844.93
-638.66	844.92	-128.48	808.6	-126.5	808.4	-112.75	808.41	-101.83	808.22
-87.87	808.42	-79.46	808.57	-70.73	808.12	-56.58	807.63	-41.5	806.76
-35.36	806.51	-33	806.38	-27.24	806.67	-26.43	806.53	-25.52	805.98
-22.06	802.88	-21.93	802.8	-21.21	802.12	-21.13	802.07	-21.06	802.03
-21.01	802	19.91	802	27.69	802.97	28.47	803.07	28.53	803.08

28.7	803.1	28.83	803.11	28.93	803.12	28.99	803.13	29.04	803.14
29.12	803.15	29.37	803.21	29.76	803.33	29.88	803.36	35.8	806.62
35.86	806.64	36.08	806.68	46.81	807.54	52.56	807.93	59.22	809.23
65.96	809.9	80.35	811.82	80.79	811.87	94.07	812.91	95.31	813.03
98.75	813.24	107.94	813.92	114.81	814.09	117.15	814.33	128.41	814.96
128.95	814.96	139.38	815.3	141.41	815.61	145.31	815.54	148.6	815.53
151.33	815.55	160.12	815.57	160.95	815.58	165.75	815.04	166.67	814.95
167.29	815.16	171.81	816.59						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-903.57	.05	-26.43	.035	35.8	.05

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
-26.43	35.8		68	48.89	51	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2554.54

INPUT
Description: T
Station Elevation Data num= 301

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-980.71	845.06	-808.9	845.9	-710.3	845.76	-624.26	845.28	-623.85	845.28
-622.68	845.27	-621.87	845.27	-620.67	845.5	-613.51	845.5	-612.69	845.49
-609.55	845.49	-603.5	845.48	-596.4	845.48	-595.56	845.47	-592.43	845.47
-534.04	845.34	-532.68	845.33	-530.35	845.33	-528.94	845.32	-527.45	845.32
-526.7	845.31	-525.32	845.31	-521.22	847.4	-519.18	847.41	-515.08	845.33
-470.18	823.5	-316.69	822.01	-315.94	822	-291.26	810	-290.73	810.1
-278.43	810.1	-277.46	810.09	-277.36	810.09	-276.48	810.08	-275.25	810.08
-274.52	810.07	-274.2	810.07	-273.53	810.06	-272.1	810.06	-271.55	810.05
-270.01	810.05	-269.57	810.04	-267.93	810.04	-267.58	810.03	-265.59	810.03
-264.82	810.02	-262.75	810.02	-262.59	810.01	-259.59	810.01	-258.62	810
-256.57	810	-255.56	810.01	-254.54	810.01	-253.53	810.02	-252.51	810.02
-251.5	810.03	-249.47	810.04	-248.45	810.04	-247.43	810.05	-246.37	810.05
-245.4	810.06	-244.32	810.06	-243.38	810.07	-242.28	810.07	-241.34	810.08
-240.24	810.08	-239.31	810.09	-238.3	810.09	-238.2	810.1	-237.18	810.1
-236.27	810.11	-235.14	810.11	-234.24	810.12	-233.1	810.12	-232.21	810.13
-231.05	810.13	-230.17	810.14	-229.01	810.14	-228.14	810.15	-227.13	810.15
-226.97	810.16	-225.95	810.16	-225.1	810.17	-223.9	810.17	-223.06	810.18
-221.86	810.18	-221.03	810.19	-220.84	810.19	-220.02	810.2	-218.79	810.2
-217.99	810.21	-216.75	810.21	-215.95	810.22	-215.73	810.22	-214.94	810.23
-213.68	810.23	-212.9	810.24	-211.89	810.24	-211.64	810.25	-210.62	810.25
-209.86	810.26	-208.57	810.26	-207.82	810.27	-207.55	810.27	-206.81	810.28
-205.5	810.28	-204.77	810.29	-203.76	810.29	-203.46	810.3	-202.43	810.3

-201.73	810.31	-200.71	810.31	-200.38	810.32	-199.36	810.32	-198.68	810.33
-197.66	810.33	-197.31	810.34	-196.29	810.34	-195.62	810.35	-195.27	810.35
-194.61	810.36	-193.59	810.36	-193.22	810.37	-192.2	810.37	-191.56	810.38
-190.54	810.38	-190.15	810.39	-189.12	810.39	-188.51	810.4	-188.1	810.4
-187.49	810.41	-186.47	810.41	-186.05	810.42	-184.87	810.42	-184.44	810.43
-183.86	810.43	-183.42	810.44	-182.4	810.44	-181.84	810.45	-180.83	810.45
-180.37	810.46	-179.82	810.46	-179.35	810.47	-178.33	810.47	-177.8	810.48
-176.79	810.48	-176.3	810.49	-175.78	810.49	-175.28	810.5	-174.77	810.5
-174.26	810.51	-173.25	810.51	-172.75	810.52	-171.74	810.52	-171.21	810.53
-170.74	810.53	-170.19	810.54	-169.73	810.54	-169.17	810.55	-168.16	810.55
-167.71	810.56	-167.14	810.56	-166.7	810.57	-165.69	810.57	-165.1	810.58
-164.68	810.58	-164.08	810.59	-163.67	810.59	-163.07	810.6	-162.66	810.6
-162.05	810.61	-161.65	810.61	-161.03	810.62	-160.01	810.62	-159.63	810.63
-158.99	810.63	-158.62	810.64	-157.61	810.64	-156.96	810.65	-156.6	810.65
-155.94	810.66	-155.59	810.66	-154.92	810.67	-154.58	810.67	-153.9	810.68
-153.57	810.68	-152.88	810.69	-152.57	810.69	-151.86	810.7	-151.56	810.7
-150.84	810.71	-150.55	810.71	-149.82	810.72	-149.54	810.72	-148.8	810.73
-148.53	810.73	-147.78	810.74	-147.52	810.74	-146.76	810.75	-146.51	810.75
-145.75	810.76	-145.5	810.76	-144.73	810.77	-144.49	810.77	-143.71	810.78
-143.48	810.78	-142.69	810.79	-142.47	810.79	-141.67	810.8	-141.46	810.8
-140.65	810.81	-140.45	810.81	-139.63	810.82	-139.44	810.82	-138.61	810.83
-138.43	810.83	-137.59	810.84	-137.43	810.84	-136.57	810.85	-136.42	810.85
-135.55	810.86	-135.41	810.86	-134.53	810.87	-134.4	810.87	-133.51	810.88
-133.39	810.88	-132.49	810.89	-132.38	810.9	-131.47	810.91	-131.37	810.91
-130.45	810.92	-130.36	810.92	-129.43	810.93	-129.35	810.93	-128.4	810.94
-128.35	810.94	-127.38	810.95	-126.36	810.96	-125.34	810.98	-123.3	811
-122.3	811	-120.29	811.02	-119.29	811.02	-118.28	811.03	-117.28	811.03
-116.28	811.04	-114.27	811.04	-109.53	811.07	-105.31	811.26	-98.54	811.22
-75.45	810.6	-68.79	810.44	-65.82	810.3	-51.68	809.76	-46.89	809.31
-43.87	809.05	-34.16	808.14	-31.75	807.97	-30.76	807.66	-24.28	803.72
-20.91	801.64	-14.53	801.01	-13.49	800.98	-4.76	801.32	-4.06	801.36
-3	801.36	-2.78	801.37	13.68	801.68	21.2	803.74	26.6	805.12
29.73	806	30.98	806.18	37.75	807.72	41.97	808.69	42.92	807.76
45.15	807.86	51.27	808.01	72.68	808.47	86.62	808.59	94.2	808.73
118.84	810.47	122.89	810.79	123.74	810.9	152.29	815.32	160.72	815.76
161.08	815.74	161.18	815.74	161.39	815.75	161.98	815.77	171.1	815.96
171.86	815.94	183.22	815.73	184.46	815.73	188.65	815.68	189.98	815.55
191.72	815.42	192.1	815.42	192.45	815.56	192.97	815.92	193.46	816.19
198.19	817.61								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-980.71	.05	-30.76	.035	37.75	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.76	37.75	83	59.92	60	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2494.62

INPUT
Description: U
Station Elevation Data num= 300

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-901.35	847.44	-836.62	847.05	-831.46	846.94	-831.13	846.94	-830.77	846.93
-830.61	846.93	-830.44	846.92	-823.05	846.77	-821.4	846.73	-820.78	846.71
-819.23	846.67	-818.49	846.66	-817.06	846.62	-816.2	846.6	-814.87	846.57
-813.91	846.55	-811.57	846.49	-810.48	846.47	-809.47	846.44	-808.27	846.42
-807.35	846.4	-806.06	846.37	-805.23	846.35	-803.83	846.33	-803.1	846.31
-801.6	846.28	-800.96	846.27	-799.36	846.24	-798.81	846.23	-797.11	846.2
-796.65	846.19	-794.85	846.16	-794.48	846.16	-792.59	846.12	-792.3	846.12
-790.32	846.09	-790.12	846.08	-788.05	846.05	-787.94	846.05	-785.77	846.01
-785.33	846	-770.93	845.43	-769.41	845.37	-747.43	844.59	-744.94	844.48
-740.91	844.3	-736.89	844.12	-728.85	843.72	-724.83	843.51	-720.81	843.29
-716.79	843.06	-712.77	842.83	-708.74	842.59	-704.72	842.34	-700.7	842.08
-696.68	841.82	-692.66	841.55	-688.64	841.27	-684.62	840.98	-680.59	840.69
-676.57	840.38	-534.07	829.3	-483.76	825.38	-481.77	825.22	-479.79	825.07
-439.06	821.9	-425.53	820.84	-421.51	820.54	-417.49	820.25	-413.48	819.96
-409.97	819.72	-405.45	819.41	-401.43	819.15	-397.41	818.9	-393.4	818.65
-389.38	818.42	-385.36	818.19	-381.35	817.97	-377.33	817.76	-373.32	817.56
-369.3	817.36	-365.28	817.17	-363.27	817.08	-359.26	816.91	-355.24	816.75
-351.23	816.59	-347.21	816.44	-343.19	816.3	-339.18	816.17	-331.14	815.93
-327.13	815.82	-325.12	815.77	-323.11	815.73	-319.06	815.64	-316.25	815.58
-298.91	814	-298.79	814	-297.81	813.97	-296.83	813.95	-296.78	813.95
-295.86	813.93	-295.78	813.93	-294.88	813.9	-294.78	813.9	-293.89	813.88
-293.77	813.88	-292.91	813.86	-292.77	813.86	-291.93	813.84	-291.77	813.84
-290.95	813.82	-290.77	813.82	-289.96	813.8	-289.76	813.8	-288.98	813.78
-288.76	813.78	-287.99	813.76	-287.76	813.76	-287.01	813.74	-286.75	813.74
-286.02	813.73	-285.75	813.72	-285.04	813.71	-284.74	813.71	-284.05	813.69
-283.74	813.69	-283.06	813.67	-282.73	813.67	-282.07	813.66	-281.73	813.65
-281.08	813.64	-280.72	813.64	-280.1	813.63	-279.72	813.62	-279.11	813.61
-278.71	813.61	-278.12	813.59	-277.71	813.59	-277.12	813.58	-276.7	813.58
-276.13	813.57	-275.7	813.56	-275.14	813.55	-274.69	813.55	-274.15	813.54
-273.68	813.53	-273.16	813.52	-272.68	813.52	-272.17	813.51	-271.67	813.51
-270.67	813.49	-270.18	813.48	-269.66	813.48	-269.18	813.47	-268.65	813.47
-268.19	813.46	-267.65	813.46	-267.2	813.45	-266.64	813.44	-266.2	813.44
-265.63	813.43	-265.21	813.42	-264.63	813.42	-264.21	813.41	-263.62	813.41
-263.22	813.4	-262.61	813.4	-262.22	813.39	-261.61	813.39	-261.22	813.38
-260.6	813.37	-260.23	813.37	-259.59	813.36	-259.23	813.36	-258.58	813.35
-258.23	813.35	-257.58	813.34	-257.24	813.34	-256.57	813.33	-256.24	813.33
-209.92	813	-209.17	813	-208.17	812.99	-207.18	812.98	-206.18	812.98
-205.19	812.97	-204.2	812.97	-203.2	812.96	-202.21	812.96	-201.21	812.95
-200.17	812.95	-199.23	812.94	-198.17	812.94	-197.24	812.93	-196.17	812.93

-195.25	812.92	-194.17	812.92	-193.26	812.91	-192.17	812.91	-191.27	812.9
-190.17	812.9	-189.28	812.89	-188.17	812.89	-187.29	812.88	-185.18	812.88
-184.3	812.87	-183.18	812.87	-182.32	812.86	-181.18	812.86	-180.32	812.85
-178.18	812.85	-177.34	812.84	-176.18	812.84	-175.35	812.83	-173.18	812.83
-172.36	812.82	-171.19	812.82	-170.37	812.81	-168.19	812.81	-167.39	812.8
-165.19	812.8	-164.4	812.79	-162.2	812.79	-161.41	812.78	-159.2	812.78
-158.43	812.77	-156.2	812.77	-155.44	812.76	-153.21	812.76	-152.45	812.75
-150.21	812.75	-149.47	812.74	-136.92	812.74	-129.63	812.5	-109.68	812.37
-95.7	812.25	-91.86	812.22	-69.56	811.87	-68.96	811.86	-66.88	811.84
-64.43	811.75	-59.97	811.56	-52.47	811.16	-37.57	810.15	-35.22	809.68
-24.96	807.08	-20.94	804.26	-14.73	800.23	-13.47	800	-6.97	799.17
-.36	799.4	0	799.4	2.39	799.36	7.85	799.97	11.93	800.16
12.41	800.45	18.41	802.84	21.85	805.15	24.59	805.52	32.01	807.83
33.12	808.4	33.79	808.65	34.78	808.68	36.69	808.9	48.53	811.75
50.46	811.83	59.92	810.53	61.66	810.47	75.36	808.35	91.32	808.48
107.37	808.47	128.28	808.4	135.2	808.44	140.98	808.4	144.46	808.56
161	809.23	164.1	809.39	164.55	809.45	190.55	814.5	192.97	815
193.65	815.27	197.21	815.43	197.36	815.43	204.13	815.64	209.81	815.78
210.74	815.79	211.11	815.9	217.12	815.69	223.47	815.53	226.68	815.16
226.89	815.14	226.94	815.19	227	815.15	228.76	816.23	228.83	816.26
229.7	816.54	229.79	816.57	229.86	816.6	229.94	816.63	233.03	817.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.35	.05	-35.22	.035	32.01	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.22	32.01	170	76.77	86	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.35	-25.4	812	T
21.09	233.03	812	T

BRIDGE

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2460.04

INPUT
Description:
Distance from Upstream XS = 19.58
Deck/Roadway Width = 30
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
-167.99	812	0	-50.53	812	0	-21.32	812	0

-21.32	812	809.83	17.88	812	809.83	17.88	812	0
99.43	812	0						

Upstream Bridge Cross Section Data

Station Elevation Data num= 213

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-901.346	860.086	-834.88	860.631	-834.483	860.636	-833.635	860.639	-801.532	860.807
-801.242	860.812	-800.092	860.821	-799.803	860.826	-799.229	860.83	-798.939	860.835
-798.366	860.84	-798.074	860.844	-797.503	860.849	-797.21	860.854	-796.64	860.858
-796.345	860.863	-795.778	860.868	-795.481	860.873	-794.915	860.877	-794.616	860.882
-794.052	860.887	-793.752	860.892	-793.189	860.896	-792.887	860.901	-792.326	860.905
-792.023	860.911	-791.463	860.915	-791.158	860.92	-790.601	860.925	-790.293	860.93
-789.738	860.934	-789.429	860.94	-788.875	860.944	-788.564	860.949	-788.012	860.954
-787.699	860.959	-787.149	860.963	-786.834	860.969	-786.287	860.973	-785.97	860.979
-785.424	860.983	-785.105	860.988	-784.561	860.993	-784.24	860.998	-783.699	861.003
-783.375	861.008	-782.836	861.012	-782.51	861.018	-781.973	861.022	-781.645	861.028
-781.111	861.032	-780.78	861.039	-780.248	861.043	-779.915	861.049	-779.386	861.053
-779.05	861.059	-778.523	861.063	-778.185	861.069	-777.66	861.073	-777.32	861.079
-776.798	861.083	-776.455	861.09	-775.935	861.094	-775.589	861.1	-775.073	861.104
-774.724	861.111	-774.211	861.115	-773.859	861.121	-773.348	861.125	-772.993	861.132
-772.486	861.136	-772.128	861.143	-763.748	861.256	-728.288	862	-712.595	862.156
-711.745	862.165	-711.222	862.064	-710.205	861.868	-709.189	861.672	-598.823	840.399
-568.981	834.339	-559.738	832.462	-558.711	832.254	-557.685	832.045	-551.526	830.795
-549.473	830.378	-548.447	830.169	-546.395	829.753	-545.369	829.544	-544.342	829.336
-543.316	829.128	-542.29	828.919	-541.747	828.809	-541.276	828.751	-540.273	828.627
-539.271	828.503	-538.269	828.379	-536.265	828.132	-535.262	828.008	-534.26	827.885
-532.256	827.637	-531.254	827.513	-531.199	827.507	-527.246	827.019	-527.169	827.01
-525.241	826.772	-525.155	826.761	-523.237	826.524	-523.14	826.513	-514.22	825.413
-514.075	825.395	-510.213	824.919	-510.046	824.898	-502.198	823.931	-439.328	816.195
-438.688	816.118	-401.4	815.76	-386.25	815.51	-373.26	815.48	-338.72	815.07
-334.28	815	-307.86	814.49	-304.35	814.41	-304.01	814.45	-292.77	814.29
-291.75	814.28	-289.24	814.25	-239.27	813.37	-229.33	813.16	-224.65	813.15
-224.32	813.11	-219.31	812.98	-213.16	812.98	-212.61	812.99	-211.09	813.02
-185.27	813.13	-169.91	812.83	-165.7	812.79	-151.41	812.7	-129.64	812.5
-109.68	812.37	-109.31	812.37	-108.95	812.36	-108.22	812.36	-107.85	812.35
-106.76	812.35	-106.4	812.34	-105.67	812.34	-105.31	812.33	-104.59	812.33
-104.23	812.32	-103.15	812.32	-102.79	812.31	-102.08	812.31	-101.72	812.3
-101	812.3	-100.65	812.29	-99.58	812.29	-99.23	812.28	-98.52	812.28
-98.16	812.27	-97.11	812.27	-96.75	812.26	-96.05	812.26	-95.7	812.25
-95	812.25	-94.65	812.24	-93.6	812.24	-93.25	812.23	-92.56	812.23
-92.21	812.22	-91.87	812.22	-68.96	811.86	-68.67	811.86	-68.37	811.85
-67.77	811.85	-67.48	811.84	-66.88	811.84	-64.43	811.75	-59.97	811.56
-52.47	811.16	-40.27	810.34	-37.57	810.15	-35.22	809.68	-24.96	807.08
-20.95	804.26	-14.73	800.24	-13.47	800	-6.97	799.17	-.36	799.4
0	799.4	2.38	799.36	7.84	799.97	11.93	800.16	12.41	800.45
18.41	802.84	21.85	805.15	24.59	805.51	32	807.83	33.12	808.4
33.79	808.65	34.78	808.68	36.69	808.9	48.53	811.75	50.46	811.83
176.11	811.85	190.55	814.5	192.96	815	193.65	815.27	197.2	815.43

197.36	815.43	204.13	815.64	209.81	815.78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-901.346	.035	-35.22	.035	32	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
-35.22	32	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-901.346	-25.4	812	T
21.09	209.81	812	T

Downstream Deck/Roadway Coordinates num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-420	816	0	-276	814	0	-23.04	812	0
-23.04	812	809.83	16.16	812	809.83	16.16	812	0
99.43	812	0	164.68	812	0			

Downstream Bridge Cross Section Data

Station Elevation Data num= 168

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.653	831.341	-476.723	830.863	-437.449	830.649	-437.043	830.647	-426.887	827.59
-426.68	827.634	-426.599	827.651	-417.714	829.554	-417.213	829.526	-415.765	829.444
-415.696	829.44	-383.534	827.586	-382.957	827.552	-382.427	827.36	-328.369	807.782
-327.199	807.358	-326.17	807.36	-325.5	807.37	-323.36	807.43	-320.98	807.49
-319.25	807.53	-318.33	807.56	-317.38	807.58	-316.39	807.61	-315.36	807.63
-312	807.72	-309.5	807.78	-308.17	807.82	-306.77	807.85	-303.76	807.93
-300.44	808.01	-296.75	808.11	-294.75	808.16	-294.61	808.16	-291.67	808.2
-291.57	808.2	-288.52	808.25	-288.31	808.25	-285.37	808.29	-285.05	808.29
-282.23	808.33	-281.79	808.34	-279.09	808.37	-278.53	808.38	-275.96	808.41
-275.27	808.42	-269.71	808.49	-268.76	808.5	-266.59	808.53	-263.48	808.56
-262.25	808.57	-260.37	808.6	-257	808.64	-254.17	808.7	-251.68	808.76
-250.54	808.79	-248.46	808.83	-247.5	808.86	-246.15	808.86	-245.27	808.88
-243.84	808.89	-243.04	808.91	-241.53	808.92	-240.81	808.93	-239.21	808.94
-238.58	808.95	-236.88	808.96	-236.35	808.97	-234.55	808.98	-234.11	808.99
-232.22	808.99	-231.87	809	-229.88	809	-229.63	809.01	-224.18	809.01
-222.72	809	-220.7	808.98	-217.89	808.96	-216.87	808.95	-216.02	808.94
-215.31	808.94	-214.7	808.93	-214.17	808.93	-213.71	808.92	-212.62	808.92
-212.33	808.91	-211.41	808.91	-211.22	808.9	-209.11	808.9	-208.41	808.91
-206.39	808.91	-205.65	808.92	-125.39	811.11	-124.94	811.11	-124.48	811.13
-124.02	811.12	-123.56	811.14	-123.11	811.13	-122.65	811.15	-122.19	811.16
-121.73	811.16	-121.27	811.17	-119.9	811.17	-119.43	811.16	-117.53	811.16
-117.06	811.15	-113.73	811.15	-113.26	811.14	-109.94	811.14	-109.46	811.13
-106.14	811.13	-105.65	811.12	-102.34	811.12	-101.85	811.11	-99.49	811.11
-99	811.1	-95.69	811.1	-95.2	811.09	-92.84	811.09	-92.34	811.08
-89.04	811.08	-88.54	811.07	-86.19	811.07	-85.69	811.06	-83.35	811.06

-82.83	811.05	-80.5	811.05	-79.98	811.04	-76.7	811.04	-76.17	811.03
-73.85	811.03	-73.32	811.02	-72.37	811.02	-72.05	810.91	-53.17	810.86
-48.44	810.69	-37.84	809.07	-30	808.33	-25.59	807.53	-22.23	806.22
-16.85	802.25	-15.05	800.91	-13.8	799.95	-13.33	799.82	-8.16	798.5
-6.82	798.57	-.39	798.8	0	798.79	1.29	798.75	6.69	799.12
8.2	799.53	13.28	800.39	15.02	801.97	21.15	805.17	21.66	805.28
26.21	805.85	26.67	805.91	30.12	807.2	37.5	809.93	37.87	810.04
38.14	810.11	39	810.16	69.62	812.05	85.89	812.92	93.96	813.4
98.67	813.65	100.06	813.69	126.28	814.65				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-477.653	.035	-22.23	.035	21.15	.05

Bank Sta: Left Right Coeff Contr. Expan.

-22.23	21.15	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-50	-27	811.25	T
25	50	811.25	T

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

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: Buckeye Creek
REACH: Buckeye Creek RS: 2417.85

INPUT
Description: V
Station Elevation Data num= 264

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-477.653	854.654	-468.251	854.563	-429.095	854.17	05 -428.913	854.168	8 -423.485	4.1075
-414.191	854.007	2 -413.556	854.000	1 -413.548	854	-413.526	854	-408.775	852.5274
-407.17	852	-405.566	851.379	2 -403.227	850.39	71 -402.276	850	-401.016	849.4129
-397.929	848	-395.693	846.928	7 -393.734	846	-391.338	44.8418	-389.591	844
-388.159	843.327	8 -386.323	842.487	4 -385.275	842	-383.577	841.2164	-381.049	840
-380.886	839.930	7 -380.625	839.821	6 -377.938	838.71	34 -376.26	838	-375.098	37.4696
-373.091	836.562	2 -372.304	836.208	9 -371.838	836	-369.538	34.9454	-367.411	834
-366.711	833.693	8 -365.557	833.231	1 -363.711	832.49	01 -362.43	832	-361.152	831.473
-358.368	30.4341	-357.552	830.125	1 -357.177	830	-354.624	828.9023	-352.566	828
-351.798	27.6547	-350.489	826.972	1 -349.262	826.32	57 -348.636	826	-346.563	825.0422
-344.408	824	-343.852	823.761	8 -342.955	823.35	05 -341.071	822.5002	-339.997	822
-338.113	821.285	5 -335.421	820.258	-335.004	820.11	07 -334.734	820	-331.874	818.9416
-329.358	818	-328.544	817.825	6 -328.064	817.72	33 -324.739	817.0049	-320.353	816.0726
-320.28	16.0407	-319.991	816	-314.481	5.5803	-312.819	815.4236	-308.665	815.1028
-307.189	814.938	3 -305.046	814.697	4 -299.571	814	-299.152	813.9944	-289.51	813.5579
-289.017	813.535	6 -271.924	812.846	4 -265.267	812.59	8 -263.898	812.5378	-262.74	812.5033
-260.216	812.406	7 -256.973	812.345	6 -254.493	812.24	66 -253.091	812.1955	-252.127	812.1711
-251.373	812.152	9 -236.882	812.075	7 -229.799	812.01	44 -227.879	812.0118	-223.001	812
-222.161	811.990	4 -219.879	811.960	7 -218.216	811.94	51 -217.323	811.9474	-215.717	811.9382
-214.311	811.942	7 -213.255	811.948	2 -207.504	811.57	5 -207.306	811.545	-207.228	811.5394
-206.976	811.521	2 -206.646	811.497	5 -206.486	811.47	14 -206.439	811.4639	-206.018	811.3953
-205.727	811.345	7 -205.685	811.338	6 -204.719	811.17	39 -204.198	811.0751	-202.45	810.8107
-202.449	810.811	2 -202.449	810.811	3 -202.447	810.81	21 -202.223	810.9233	-201.912	811.0771
-201.524	811.269	4 -201.307	811.377	4 -200.814	811.62	17 -200.692	811.6821	-200.593	811.7311
-199.546	812.25	-156.377	812.25	-148.067	812.25	-66.7668	812.25	-53.306	812.25
-38.5978	812.25	-37.1372	811.520	2 -36.9851	811.44	42 -36.1263	811.015	-34.7925	810.3486
-33.0909	809.498	3 -32.7897	809.347	8 -32.5359	809.22	1 -32.3266	809.1164	-32.3055	809.1058
-31.7712	809.045	2 -28.0357	808.631	4 -27.3158	808.55	04 -26.5411	808.4845	-25.708	808.4609
-23.8841	808	-22.23	806.22	-16.85	802.25	-15.05	800.91	-13.81	799.95
-13.33	799.82	-8.16	798.5	-6.82	798.57	-.39	798.8	0	798.79
1.28	798.75	6.68	799.12	8.19	799.53	13.27	800.39	15.02	801.97
21.15	805.17	21.66	805.28	21.67	805.28	22.4468	05.8549	22.8143	806
24.5111	806.555	29.0414	808	33.4908	809.4499	35.201	810	35.3185	810.0031
35.745	810.022	35.7502	810.022	1 36.4062	810.0766	38.8081	810.2766	38.8087	810.2769
38.8327	810.288	9 38.8331	810.289	1 38.8965	810.32	07 38.8977	810.3213	38.9088	810.3269
40.7885	811.264	3 41.4326	811.585	5 41.5627	811.65	04 42.765	812.25	54.0456	812.325
54.1871	812.310	9 54.496	812.280	2 55.0284	812.22	72 56.1357	812.117	57.2673	812.0044
57.3063	812.000	5 57.331	811.998	1 57.3361	811.99	84 57.3511	811.9996	57.3567	812

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 57.3772812.0015 57.3987812.0032 57.5148812.0068 57.5358812.0075 57.5533812.0081
 57.6051812.0097 57.6896812.0122 57.7818812.0149 57.8735812.0153 57.9023 812.018
 58.0152812.0207 59.3691812.1427 59.4605812.1509 59.5416812.1553 62.7553812.3521
 62.7726812.3531 62.8757812.3594 62.8767812.3595 62.9121812.3613 65.3963812.4943
 65.5089   812.5 65.5144812.5003 65.5634812.5029 65.5635812.5029 65.5647 812.503
 65.5649812.5031  65.565812.5031 65.5652812.5031 65.5653 812.503 65.5663812.5032
 66.2235812.5336 66.2574812.5354 66.5928 812.551 66.6076812.5517 66.6077812.5517
 66.6152812.5522 66.6156812.5522 66.6341812.5533 66.6883812.5558  66.689812.5558
  67.912812.6232 68.0088812.6285 68.0779812.6323 68.0785812.6323 68.0857812.6326
 68.0873812.6327 68.1201812.6345 68.1475 812.636   68.15812.6361 68.2176812.6395
 68.2232812.6398 68.2282812.6423 72.7986812.8533 92.2068813.9077 95.1702     814
100.4555814.1646100.9527814.1801101.4035814.1898101.4041814.1896101.4042814.1895
101.4083814.1879101.4142814.1857101.4313814.1791101.4353814.1776 111.288815.0188
113.5761 815.242117.1595815.5447118.1769815.6446118.8218815.7091 119.361815.7581
121.7689815.8206 124.406 815.911126.0525     816126.4369816.0002

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-477.653     .05  -22.23    .035   21.15     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        -22.23   21.15                91   63.32      62             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     -50     -27  811.25       T
      25      50  811.25       T

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2354.53

INPUT
Description: W
Station Elevation Data    num=     205
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-505.762856.0038-504.498856.0034-501.914856.0007-501.263     856-501.168855.9997
-501.066855.9982-500.798855.9957-499.598855.9905-496.129855.9824-495.873855.9821
 -495.69 855.982-494.026855.9718-492.401855.9607-491.514855.9593-485.839855.9374
-478.841855.9475 -446.88855.4849-426.756855.1515-359.559854.0029-359.455     854
-359.385     854-358.522     854-357.651     854-356.931     854-356.728     854
-356.221     854-355.532     854-353.365     854-352.774     854-351.927     854
-347.542     854-341.885     854-340.159     854-338.491     854 -337.53     854
-337.139     854-335.448     854-335.236     854-334.973     854-334.253     854
-334.105     854-331.546     854-323.289     854 -323.22     854-320.675     854
 -320.32     854-318.068     854-318.005853.9787-312.271     852-312.086851.9243
-307.629     850-303.972848.1503-303.679     848-300.153846.1855-299.796     846
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-296.126844.2225-295.655     844-292.012842.2603-291.459     842 -287.88840.2983
 -287.27     840-286.654839.6904-283.119     838-282.437837.6516-279.243     836
  -278.5835.6154-275.321     834-274.476833.5784-271.218     832-270.324831.5402
-267.362     830-266.413829.5042-263.588     828-262.654827.4697-260.146     826
-259.141825.4374-256.584     824-255.524823.4041-252.981     822-251.751821.3694
-249.014     820-247.486819.3302-244.289     818-242.288817.2824-238.804     816
-237.044815.2341-234.301     814-232.149813.1891-229.122     812-221.655810.9074
-214.955     810-214.477809.9998-214.296809.9997-207.153809.9966-205.132 809.996
-203.515809.9948-203.436809.9947-203.229809.9945-199.606809.9952-198.854809.9952
-198.342809.9953-188.262809.9924-182.436809.9907-182.228810.0941-181.861810.2774
-181.731810.3423-181.717810.3492-177.904  812.25-84.1112  812.25  -38.91  812.25
-36.7109  812.25-36.0117811.9004 -35.873811.8311-35.8543811.8217-35.7308  811.76
-35.5684811.6788-35.1107811.4499-34.0608810.9251-30.5655809.1776-29.6408808.7153
-28.5083 808.149-28.4987808.1485-28.4801808.1433-28.4793808.1431-28.4761808.1435
-28.4747808.1444-28.4724808.1439-28.4655808.1426-28.4654808.1425 -28.465808.1425
-28.4646808.1424-28.4644808.1423-28.4382808.1371-28.4381808.1371-28.4189808.1379
-28.4081808.1384-27.9831808.1206-25.6282     808  -23.47     806  -19.51  804.16
  -12.79  800.05  -10.78  799.14    -7.5  798.07   -3.16  797.95    -.23  798.13
    4.66  798.69    7.77  799.04   12.76  799.53   14.53  799.99   19.12  802.85
    22.1  804.84 25.8491805.7352 26.6654     806  26.862 806.013 26.8672806.0132
 27.0379806.0216 27.4197806.0395 34.2089 806.425 34.2164806.4288 35.7393807.1902
 36.8585807.7498 37.2334807.9372 38.5555808.5983 39.3579808.9995 45.8592  812.25
 70.3574812.8749  83.624813.0059149.4647813.6556149.6142813.7154149.6497813.7296
149.7074813.7526149.7718813.7784149.7723813.7786149.8934 813.827149.8949813.8276
150.0859813.9039150.1378813.9247150.2043813.9513150.2201813.9576150.2287 813.961
150.3959813.9642152.3822813.9903152.6977813.9952153.0241     814153.6466814.0036
157.8045814.1555 162.395814.2963162.4242 814.297 166.112814.3109169.8164814.2893
170.7635814.3122171.9287 814.356172.5275814.3587 173.304814.3964175.9968814.4776
 176.058814.4781179.2306814.6725180.2753814.7331181.2322814.7841 182.336814.7667
183.4031814.7581188.3632814.8616 195.279 815.057200.0318815.2309202.0624815.2934

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-505.762     .05  -23.47    .035    22.1     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -23.47    22.1              144   48.15      69             .1       .3
Left Levee      Station=  -177.9      Elevation=  812.25

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2306.38

INPUT
Description: X
Station Elevation Data    num=     227
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     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-545.545856.7486-538.144856.6655-524.125856.5214-479.011856.0416-478.156856.0421
-475.829856.0312-471.444856.0121-469.867 856.015-469.713856.0142-469.608856.0132
-469.025856.0139-467.203856.0161-466.627 856.016-465.482856.0148 -464.27856.0161
-463.908856.0168 -460.69 856.007-458.483856.0006-458.348     856-458.076855.9996
-457.279855.9993-456.517855.9982 -456.21855.9981 -455.92855.9975-455.545855.9975
-455.441855.9975-452.396855.9969-451.989855.9966-424.172855.5603 -400.98855.2114
-398.648855.1672-397.517855.1493-376.402854.7458-340.206854.0085-338.688 854.008
-338.153854.0045-338.014 854.003-337.685854.0012-337.167     854-336.428     854
-336.331     854 -333.51     854-332.941     854-325.905     854-318.494     854
-317.212     854 -316.53     854 -315.03     854-312.931     854-309.704     854
-308.308     854-306.128     854-303.817     854-302.673853.5448-299.106     852
-295.511850.3036-294.832     850-291.522848.2192-291.116     848-287.192846.1276
-286.938     846 -286.56845.8101-282.913     844-279.224842.0411 -279.15     842
-279.072841.9557-275.477     840-275.253839.8749-272.019     838-271.659837.7988
-268.543     836-267.974835.7208-264.542     834-261.357832.4192-260.443     832
-257.293830.5052-256.288     830-253.746828.5803-252.756     828-251.579827.3738
-249.017     826-246.393824.7359-244.826     824-242.287822.8228 -240.51     822
-237.979 820.914-235.859     820 -233.35 819.012-230.692     818-228.633817.1118
-226.064     816-223.353814.7764-221.355     814-217.605812.6548-215.812     812
-208.651810.4653-206.334     810-205.662809.9989-205.373809.9989 -205.04809.9978
 -204.92809.9975-204.733 809.997-204.208 809.997-204.028809.9969-199.297809.8988
-198.045809.8728-188.963809.6899-185.204809.6142-184.672809.6097-184.126 809.605
 -183.65809.6008-183.163809.5965-173.824809.4921-173.779809.4915 -173.75 809.506
-170.355811.1922-170.258811.2404-170.167811.2855-170.067811.3349-169.975811.3808
-169.374811.6794-169.099811.8156 -169.05811.8404-168.968811.8811-168.901811.9144
-168.846811.9413-168.799811.9647-168.778811.9751-168.225  812.25-158.666  812.25
-38.5776  812.25-34.3185810.1297-34.3173810.1291-34.2833810.1122-34.1875810.0644
-33.1208809.5334-30.0108807.9851-29.9824 807.971-29.9439807.9518-29.9265807.9432
 -29.826807.8931-29.7538807.8572 -29.624807.7926-29.5813807.7713-29.5014807.7315
-29.4833807.7225-29.4634807.7126-27.9862807.4127   -25.4     807  -23.53  805.77
  -14.98  799.89  -14.31  799.59  -10.39  798.34   -9.53   798.4   -4.34  798.44
    2.37  798.93    3.33  799.04    3.92  799.19    9.66  800.26   13.12  802.38
   17.84  805.01 19.3794805.3537 20.7444     806 28.2632806.2652 33.5439806.4482
 33.7495806.5508 34.6665807.0087 35.3939 807.372 35.6197807.4847 35.8443807.5969
 36.5582807.9534 36.7274808.0379 38.8996809.1226 40.0018 809.673 40.0544809.6993
 40.2739809.8089 40.5078809.9257 45.1624  812.25 138.244813.3718146.5719813.4005
153.7892 813.397160.2025813.3806160.2384813.3642160.6849813.1611160.7606813.1266
160.7828813.1165160.8786813.0729161.0235 813.007161.1132812.9662 161.115812.9654
161.1627812.9437161.2487812.9045161.3432812.8616 173.423813.7111175.2897813.8379
175.7159813.8671177.5235     814   178.1814.0025180.1976 814.015180.4679 814.016
180.6092 814.016182.0624814.0209182.4055814.0206183.4482814.0187189.7302814.2628
190.3226814.2966190.6994 814.314191.1704814.3319199.8434814.6723205.7645814.8611
206.2813814.8645208.8787814.9525212.1478 815.088213.6753 815.138215.8193815.2367
220.4931 815.505227.9895815.9836228.2087     816232.1878816.0272233.5244816.0334
234.7351816.0245236.6536816.0129239.1727     816240.1796815.9964240.8886815.9944
242.1827815.9886242.2865815.9888
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-545.545	.05	-25.4	.035	17.84	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25.4	17.84	90	51.84	.1	.3

Left Levee Station= -168.23 Elevation= 812.25

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2254.54

INPUT
Description: Y
Station Elevation Data num= 229

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-695.15	858.5996	-683.075	858.4662	-676.166	858.4012	-668.642	858.3298	-667.387	858.3161
-635.489	858.002	-635.27	858.002	-634.523	858.0018	-634.313	858.0017	-630.321	858.002
-630.159	858.002	-629.401	858.0016	-626.625	858.0003	-625.861	858.0003	-625.843	858.0003
-625.756	858	-625.076	857.9994	-624.488	857.9981	-623.768	857.9977	-622.302	857.9976
-622.167	857.9972	-620.782	857.9957	-620.157	857.9957	-612.421	857.9126	-608.58	857.8701
-596.324	857.7212	-548.813	857.1936	-523.479	856.9178	-522.625	856.9069	-448.317	856.036
-447.582	856.0367	-446.247	856.0307	-442.743	856.0163	-441.729	856.0166	-441.216	856.0167
-437.315	856.0176	-437.276	856.0174	-437.264	856.0174	-437.23	856.0173	-433.804	856.0066
-432.648	856.0059	-432.214	856.0057	-431.667	856.0039	-431.33	856.0023	-430.922	856.0021
-429.224	856	-428.893	855.9998	-428.687	855.9996	-413.655	855.6985	-399.891	855.4255
-383.969	855.1185	-373.654	854.9234	-324.245	854.0209	-323.319	854.0001	-317.853	854.0001
-311.413	854.0001	-305.966	854	-305.068	854	-303.229	854	-302.518	854
-299.786	854	-299.512	854	-298.949	854	-297.861	854	-295.504	852.982
-293.386	852	-290.749	850.7792	-289.096	850	-286.305	848.5895	-285.196	848
-284.23	847.499	-281.235	846	-280.509	845.6578	-277.117	844	-273.248	842.0321
-273.172	842	-272.489	841.6356	-269.425	840	-269.153	839.8577	-265.71	838
-265.111	837.6852	-261.952	836	-260.954	835.5078	-257.937	834	-255.872	832.9367
-254.037	832	-252.673	831.268	-250.306	830	-248.229	828.9649	-246.288	828
-243.825	826.7769	-242.338	826	-240.971	825.3448	-238.053	824	-236.878	823.5195
-233.225	822	-232.537	821.7047	-228.535	820	-228.256	819.8874	-225.617	818.8028
-223.674	818	-223.451	817.9076	-219.172	816	-214.876	814.4583	-213.499	814
-208.829	812.7163	-206.469	812	-202.808	811.0268	-198.856	810	-198.628	809.9973
-194.021	809.766	-189.281	809.5418	-181.666	809.478	-179.283	809.424	-178.443	809.414
-172.578	809.3439	-171.262	809.3282	-170.962	809.3201	-170.54	809.3086	-166.992	809.2125
-166.675	809.2039	-165.492	809.173	-165.478	809.18	-165.45	809.194	-165.392	809.223
-165.328	809.255	-165.106	809.3657	-159.336	812.25	-108.167	812.25	-54.7917	812.25
-38.1469	812.25	-36.8883	811.6211	-36.8879	811.6209	-36.8784	811.6162	-36.7587	811.5563
-36.6773	811.5157	-36.6075	811.4808	-36.4853	811.4197	-36.3489	811.3516	-36.1118	811.2331
-35.7196	811.0372	-33.9908	810.1734	-33.0671	809.7118	-31.5481	808.9529	-29.2704	807.8148
-26.6957	806.5283	-26.6084	806.4847	-26.5954	806.4782	-26.21	806.95	-22.65	804.84

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  -15.41  799.87  -12.68  798.81  -11.48  798.53   -7.82  799.05   -5.45  799.34
    -.27  799.85    1.79  799.91    8.44  800.17   10.39  800.27   12.02  801.53
   18.58  804.69 30.1905 805.658 33.1453     806 33.5168806.0008 33.5269805.9996
33.5478805.9951 33.7476805.9524 33.7588 805.958 33.7847 805.971 33.7898805.9735
33.8024805.9798 33.8338805.9955 33.8346805.9959 33.8378805.9975 33.8384805.9978
33.8391805.9981 33.8477806.0024  33.938806.0476 34.2973806.2271 35.4572806.8067
35.5603806.8582 35.6332806.8947 35.6341806.8951 36.5245  807.34 36.7392807.4473
36.7591807.4572 37.2225807.6888 46.3507  812.25 85.2656812.7193122.6796812.8534
154.5923 812.843182.5594812.7762 182.576812.7686184.0332812.1012184.4085811.9293
184.431811.9189184.5339811.8718184.5378  811.87184.5596  811.86184.5632811.8584
184.5665811.8569184.5765811.8523184.6468811.8201184.7244 811.835185.6032     812
186.0216812.0129198.2529812.9678203.3456813.3161205.0079813.4107207.5493813.6249
208.3236813.6875209.8155813.7834210.2238813.8189213.0102813.9549 213.785813.9971
214.0313     814  215.82814.0014216.4493814.0012217.1977814.0018218.1956814.0008
218.6885     814219.3808813.9955221.6467813.9817222.4856813.9759224.8952813.9911
 226.111     814226.5394814.0021228.4963814.0914259.5656815.2621

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -695.15     .05  -26.21    .035   18.58     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -26.21   18.58               90      50      45             .1       .3
Left Levee      Station= -159.34      Elevation=  812.25

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 2204.54

INPUT
Description: Z
Station Elevation Data    num=     257
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
-849.813860.3134-834.564860.1296-823.767860.0005-823.268860.0006-823.163860.0006
-822.985     860-822.966859.9998-819.893859.9992-819.167 859.999-818.756859.9991
-817.665859.9994 -816.36     860-816.099860.0001-816.085860.0001-815.671860.0001
-814.222860.0004-814.169860.0004-812.031860.0004-810.238860.0005-809.154860.0005
-808.682860.0004-804.656     860-804.591     860-804.585     860-804.574     860
-803.924859.9994-803.116859.9994-798.306859.9963-795.612859.9944-795.197859.9945
-794.533 859.994-794.521 859.994-792.952859.9781-698.065859.0269-695.555859.0046
-642.302858.4677-596.143858.0009-596.048858.0009 -594.13858.0009-593.317858.0009
-591.279858.0002-590.388858.0001-590.074858.0001-589.681     858-589.057     858
-588.783857.9997-587.903 857.999-584.572857.9959-583.934857.9958-583.196857.9959
-582.604 857.995-582.407857.9949-540.861857.4799-460.915856.4917 -457.92 856.456
-456.649856.4396-422.117856.0016 -421.42 856.001-421.328856.0009 -420.22856.0012
-419.634856.0013-419.287856.0012-418.959 856.001-418.793 856.001-417.745856.0012
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-417.27856.0013-414.822856.0004-414.593856.0003-413.597 856-364.564855.0217
-340.166854.5339-331.526854.3618-324.372854.2201-321.233854.1587-312.382 854
-311.665 854-311.128 854-310.264 854 -308.84 854-297.373 854
-293.886 854 -289.39 854-285.063854.0003 -284.4854.0004-282.834854.0003
-279.219 854-278.587853.7843 -276.03852.9472-273.085 852-271.041851.2349
-267.749 850-263.604 848.131-263.305 848-263.153847.9406-262.409847.6346
-259.356846.3843-258.476 846-254.331844.0184-254.294 844-254.271843.9859
-251.115 842-248.866840.7614-247.477 840-246.474839.4464-243.827 838
-242.35837.1462-240.295 836-238.233834.8465-236.677 834-234.667832.8825
-233.032 832-229.905830.2402-229.481 830-226.605828.5049-225.631 828
-225.461827.9167-221.546 826-220.723825.5718-217.641 824-216.066823.2327
-213.553 822-211.311820.8866-209.556 820-206.524818.5381-205.406 818
-201.592816.3701-200.731 816-198.282 814.528 -197.4 814-197.043813.8479
-192.765 812-190.793811.3929-186.316 810 -171.66808.1256-170.655 808
-170.443 808-170.342 808-167.353 808-166.327 808-166.267 808
-165.251 808-164.528 808-162.418 808-162.281 808-162.154 808
-159.337 808-159.321 808-159.277 808-157.305808.0094-156.519808.0108
-156.167808.0088-155.228 808-154.489 808-154.458 808-153.262808.5869
-152.003809.2047 -151.46809.4713-149.486810.4402-148.666810.8427-148.456810.9455
-147.764811.2855-145.798 812.25-136.872 812.25-85.6832 812.25-36.9255 812.25
-30.5504809.0625-26.9566807.2656-26.8022807.1884-26.6095 807.092-26.4239806.9993
-26.0081806.7914-25.9793 806.777-25.9463806.7605-25.8855 806.73 -25.879806.7268
-25.878806.7263-25.8693806.7219-25.8461806.7104 -25.846806.7103-25.8447806.7096
-25.8431806.7088-25.8103806.7034-25.8088806.7031-25.4952806.6507-25.3463806.6258
-24.39 806.89 -16.86 802.56 -12.29 799.9 -10.83 799.57 -3.6 798.81
-.66 799.18 5.47 799.58 7.65 799.65 9.48 799.75 15.49 800.09
17.16 801.36 19.95 804.35 20.4247 804 31.0677805.4408 34.9307 806
35.0839806.0034 35.2656806.0038 35.2658806.0039 35.2664806.0042 35.2737806.0078
38.0854807.4103 38.1234807.4293 38.1627807.4489 38.7761807.7549 38.8374807.7855
41.4305 809.079 41.6894809.2081 43.2949 810.009 44.1267810.4239 47.7875 812.25
55.8265812.2733 72.9987812.3058105.0919812.4606155.0043812.5204193.4704812.4876
193.4775812.4842194.1046812.1825194.3475812.0656194.3515812.0637194.3962812.0422
194.4074812.0368194.5464811.9699194.6895811.9011195.9924811.2742196.0969 811.224
196.11811.2177196.1239 811.211196.1393811.2036196.1411811.2027 196.213811.1681
199.074811.5251202.8607 812204.3723812.0283205.3727812.0563206.0774812.0708
208.1898812.2697215.8732812.9015216.7252812.9551219.5769813.1913221.2619813.3518
225.0221813.5706227.1647813.6849229.6632813.8315 230.056813.8672230.3427813.8905
231.6884813.9891231.9187813.9912232.1162813.9946232.6935 814234.0719814.0032
234.1763814.0032256.4436815.0915

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-849.813	.05	-24.39	.035	19.95	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-24.39	19.95	74	50	44	.1 .3

Left Levee Station= -145.8 Elevation= 812.25
Right Levee Station= 193.47 Elevation= 812.25

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2154.54

INPUT
Description: AA
Station Elevation Data num= 380

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1104.74	861.0006	-1083.04	861.2411	-1078.98	861.2796	-1075.31	861.3142	-1073.56	861.3305
-1071.89	861.3459	-1069.88	861.3651	-1067.82	861.383	-1065.76	861.4016	-1061.37	861.4474
-1057.68	861.4862	-1054.91	861.5126	-1052.48	861.536	-1050.18	861.5578	-1048.09	861.5773
-1043.42	861.6214	-1037.51	861.6744	-1031.28	861.7322	-1029.45	861.7488	-1027.91	861.763
-1021.97	861.8166	-1015.66	861.8747	-1008.08	861.9478	-1002.76	861.9998	-1002.49	862
-1001.84	862	-998.899	862	-998.033	862	-997.712	862	-997.254	862
-993.982	861.9999	-991.981	861.9999	-988.121	862	-987.347	862	-987.135	862
-986.411	862	-983.757	862	-983.744	862	-982.319	861.9999	-982.232	861.9999
-979.725	861.9999	-977.336	861.9999	-977.316	861.9999	-976.865	861.9998	-976.742	861.9998
-974.149	861.9998	-973.986	861.9998	-973.52	861.9997	-973.499	861.9997	-973.179	861.9997
-825.29	860.2122	-816.402	860.105	-807.414	860.0015	-807.267	860.0015	-805.507	860.0016
-801.57	860.002	-800.97	860.0017	-799.642	860.001	-798.338	860.0002	-797.771	860
-794.724	859.9997	-793.762	859.9997	-790.673	859.9994	-789.769	859.9994	-788.117	859.9995
-784.717	859.9998	-783.429	860	-783.024	860.0001	-781.931	860.0002	-781.626	860.0002
-781.328	860.0002	-779.419	860.0001	-778.782	860.0001	-778.174	860.0001	-777.276	860
-776.72	859.9999	-776.662	859.9999	-776.59	859.9999	-776.584	859.9999	-775.763	859.9918
-771.139	859.9512	-768.732	859.9271	-761.582	859.8552	-742.106	859.6547	-726.346	859.4931
-700.126	859.228	-616.04	858.3743	-579.451	858.0003	-579.421	858.0003	-579.265	858.0003
-578.875	858.0003	-578.698	858	-578.368	857.9994	-577.31	857.9979	-577.272	857.9977
-577.045	857.9974	-576.791	857.997	-576.299	857.9952	-574.909	857.9919	-573.898	857.9877
-573.43	857.9865	-573.132	857.9862	-571.953	857.9809	-568.275	857.9817	-567.826	857.9818
-567.533	857.9799	-566.927	857.9778	-562.946	857.9776	-448.91	856.51	-423.704	856.1911
-421.032	856.1579	-408.405	856.0002	-408.159	856	-407.44	855.9984	-407.12	855.9982
-406.815	855.9969	-406.083	855.9949	-404.576	855.9895	-404.36	855.9896	-404.036	855.9884
-403.876	855.9884	-403.77	855.9878	-403.337	855.9879	-402.62	855.9851	-399.52	855.9845
-398.411	855.9808	-397.819	855.9792	-397.36	855.9786	-348.466	854.9891	-316.523	854.353
-315.138	854.3284	-313.166	854.295	-311.553	854.2685	-300.488	854.0072	-300.042	854.0071
-298.654	854.0061	-298.244	854.0054	-296.269	854.0053	-295.156	854.0054	-293.508	854.0032
-292.67	854.0019	-291.254	854	-289.93	854	-288.216	854	-287.411	854
-286.876	854	-286.748	854	-286.595	854	-285.287	854.0001	-284.187	854.0001
-283.801	854	-283.11	854	-279.76	854	-277.877	854	-276.62	854
-276.079	854	-275.389	854	-270.783	854.0013	-268.977	854.0018	-267.469	854.0014
-264.524	854.0006	-262.67	854	-258.293	852.2225	-257.728	852	-254.529	850.4964
-253.461	850	-253.314	849.9282	-249.553	848	-248.698	847.6549	-244.458	846
-243.158	845.3274	-240.393	844	-238.626	843.06	-236.618	842	-234.018	840.7871
-232.361	840	-229.299	838.5087	-228.261	838	-224.889	836.248	-224.412	836
-220.748	834.0032	-220.742	834	-220.694	833.9742	-217.036	832	-216.525	831.7536

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-213.019     830-212.042829.4886-209.202     828-207.859827.2413-205.494     826
-203.573 824.988 -201.61     824-198.973822.7161-197.574     822-194.482820.4506
-193.626     820-190.165818.1955-189.807     818-186.859816.4749-185.943     816
-185.831815.9392-182.321     814-181.734813.6971-178.565     812-177.149 811.426
-173.597     810-166.935809.1777-157.116     808-156.401     808-155.816     808
-152.853807.9999-151.569807.9998-148.717807.9998-148.301807.9998-148.062807.9998
-147.396807.9997-146.936807.9998-146.798807.9998-145.901807.9998-145.545807.9998
-144.729807.9998-143.778807.9998-142.721807.9998-142.051807.9999-141.641807.9999
-141.603807.9999-140.545807.9999-136.382807.9999 -135.33807.9999-134.956808.1829
 -131.64809.8033-126.634  812.25 -91.178  812.25-67.7913  812.25 -35.605  812.25
-32.5775810.7364-32.5273810.7114-31.5903810.2429-29.2484809.0721-28.5662808.7311
-27.9641  808.43-27.2616808.0788-27.0531807.9746-26.1814807.5388 -25.092806.9942
-23.8985806.3975-23.8312806.3639  -21.68  806.24  -11.01  799.74  -10.69  799.54
  -10.59  799.52   -5.56   798.6   -5.29  798.62    3.36  798.83    3.54  798.82
   12.37   799.3   12.69  799.28   17.23  800.15   17.57  800.21   18.08  800.51
   22.06  801.88   28.84   804.5   30.21  804.68   31.01  804.81   38.21   806.5
 43.0967806.0028 45.4193806.0032 47.9066806.0039 49.1508806.0042 50.7573806.0045
   50.86806.0045 51.1228806.0046 52.8858 806.005 54.5535806.0045 55.6834806.0042
 56.3786 806.004 57.2421806.0037 57.9717806.0036  58.414806.0036 59.1763806.0034
 60.2939806.0032 60.5985806.0031 61.7829806.0028 62.1478806.0027 63.5911806.0026
 64.5878806.0025  67.024806.0021 68.0976806.0019 70.6659806.0015  75.736806.0008
 76.4599806.0007 77.1015806.0006 77.5932806.0005 77.9537806.0004 78.2467806.0004
 78.4694806.0003 80.8582806.0003 80.9785806.0003 82.8147806.0001 82.8272806.0001
 82.8298     806 84.5892     806 88.1745     806 89.1568806.0024  89.344806.0035
 92.2143806.0169 94.7514806.0067 95.6732806.0022 96.6334     806 98.2018     806
101.1232     806101.3853     806101.5389     806104.6565     806105.0305     806
105.1615     806105.6053     806106.1822     806114.8069     806116.9545     806
118.0344     806120.0309     806121.1675     806123.1009     806124.4274     806
125.9788     806130.8196     806 132.293     806133.7892     806137.1242     806
138.2559     806139.7285     806141.2642     806142.6982     806148.1674     806
148.4529     806148.9989     806151.4405806.1983 152.065806.2319152.5643806.2591
153.2001806.2953158.2254806.7087161.2448806.9456163.3437807.1024163.8246807.1354
166.5741807.2505167.8501807.3625177.1345807.9851177.3685807.9854 179.499807.9858
179.8785807.9868180.8896 807.987187.2182807.9808189.7271807.9879192.8733807.9986
193.0845807.9995193.2369807.9997193.2849     808193.5093808.0118198.7414808.2524
 202.891808.4231203.7508808.4556206.0255808.5546208.4797808.6803212.5057808.9098
215.9049809.1409226.6827 809.967227.0434 809.972227.7623809.9887228.3071809.9952
228.8309     810235.7008810.8677246.0653     812246.3443812.0718  247.73812.4161
252.5851813.6498254.1173     814258.9527814.1984269.4976814.5634275.0654814.7434

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-1104.74     .05  -21.68    .035   38.21     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -21.68   38.21               63    48.8      47             .1       .3
Left Levee      Station= -126.63      Elevation=  812.25
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CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 2105.74

INPUT
Description: BB
Station Elevation Data num= 280

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-402.24	856.07	52 -401.725	856.06	86 -396.695	856.00	25 -396.168	856.00	24 -395.823	856.00	22
-394.989	856.00	13 -393.974	856.00	07 -393.514	856.00	03 -392.765	856	-391.286	855.99	53
-390.962	855.99	39 -389.863	855.99	04 -386.65	855.97	82 -384.483	855.98	15 -383.41	855.98	24
-353.055	855.40	73 -348.581	855.33	47 -341.899	855.23	32 -336.146	855.14	92 -321.836	854.81	95
-288.426	854.01	36 -288.335	854.01	18 -288.265	854.01	05 -288.255	854.01	03 -287.825	854	
-286.456	854	-285.695	854	-285.159	854	-283.837	854	-283.152	854	
-281.881	854	-280.197	854	-278.627	854	-271.415	854	-267.474	854	
-266.06	854.00	09 -265.313	854.00	13 -263.177	854.00	27 -261.511	854.00	38 -260.235	854.003	
-255.878	854	-253.324	853.06	35 -250.353	852	-248.134	850.94	11 -246.145	850	
-243.995	848.84	35 -242.396	848	-240.629	847.10	17 -238.395	846	-235.132	844.63	46
-233.678	844	-230.859	842.46	45 -230.015	842	-229.735	841.86	05 -228.726	841.39	08
-226.691	840.43	55 -225.751	840	-222.036	838.32	58 -221.322	838	-217.501	836.21	88
-217.046	836	-213.243	834.11	84 -213.01	834	-209.012	832.01	87 -208.975	832	
-208.221	831.64	01 -204.797	830	-204.628	829.91	51 -200.773	828	-200.398	827.81	55
-196.864	826	-196.318	825.71	92 -193.019	824	-192.215	823.62	26 -188.798	822	
-187.862	821.52	-184.944	820	-182.016	818.61	79 -180.699	818	-177.889	816.71	52
-176.284	816	-174.097	814.80	46 -172.621	814	-170.208	812.89	63 -168.185	812	
-165.356	811.01	07 -162.665	810	-159.563	809.65	81 -155.343	809.212	-144.288	808.07	38
-143.004	808.06	89 -142.128	808.06	23 -139.862	808.049	-139.072	808.04	73 -137.536	808.05	29
-136.582	808.05	25 -134.892	808.06	85 -133.45	808.05	75 -130.577	808.05	54 -129.724	808.05	51
-128.651	808.05	24 -125.106	808.06	26 -114.11	808.00	68 -112.991	808.00	22 -112.405	808	
-107.979	808	-106.449	807.99	99 -104.285	808	-103.265	808	-101.689	808	
-100.212	808	-99.9706	808	-98.8692	808	-98.3172	808	-97.8075	808	
-97.0161	808	-96.7381	808	-95.5847	808	-89.5908	808	-87.5836	808	
-85.5679	808	-84.2239	807.997	-82.6738	807.99	45 -82.1806	807.99	35 -80.5385	807.99	46
-80.1299	807.99	44 -79.4979	807.99	51 -78.8568	807.99	53 -76.4916	807.99	95 -76.4369	807.99	96
-76.3777	807.99	96 -76.3356	807.99	97 -76.2563	807.99	98 -76.1685	808	-73.0579	808	
-72.5601	808	-71.5236	808	-66.701	808	-65.7255	808	-62.514	808	
-59.8451	808	-59.2481	808	-58.6269	808	-57.9418	807.99	52 -57.5004	807.98	79
-57.1563	807.98	-53.8633	807.79	81 -52.6539	807.74	24 -52.2996	807.72	06 -51.5757	807.67	22
-48.0659	807.47	74 -47.7389	807.46	06 -46.178	807.36	95 -44.7949	807.26	54 -38.4393	806.92	65
-23.084	806.00	64 -22.8115	806.002	-22.6822	806	-21.2845	805.59	21 -19.98	805.6	
-19	805.03	-11.8	800.15	-7.71	799.5	-5.17	799.19	1.4	799.11	
4.01	798.92	10.22	798.03	12.53	797.84	16.97	798.1	18.46	798.17	
19.54	798.4	23.6	799.5	26.39	801.64	29.68	803.93	34.42	805.9	
35.1146	806.00	22 35.2574	806.00	24 36.5543	806.00	31 37.3901	806.00	36 38.7127	806.00	57
38.7557	806.00	57 38.9779	806.00	59 47.389	806.00	76 48.2759	806.00	81 49.6477	806.00	84
50.1222	806.00	88 50.7696	806.009	53.9196	806.01	13 54.5705	806.01	22 55.125	806.01	25

61.0425806.0181 62.9081806.0224 64.5547806.0188 65.7237806.0194 66.4209806.0192
67.5465806.0203 68.6891806.0223 69.2221806.0227 74.1779806.0278 75.0458806.0289
75.8533806.0282 76.7442806.0273 77.895806.0286 78.3993806.0287 98.3766806.6357
103.8504806.8466114.9785807.2924116.5278807.3305117.9214807.3635118.8874807.3872
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138.1775 807.955139.1523807.9596140.2901807.9635141.1726807.9617141.7103807.9612
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175.5986808.9171177.5345809.0822 182.257809.4546188.3826809.9891188.7006 810
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206.3743810.0107212.8746810.0049215.8579810.0023216.1425810.0023219.5053 810
219.9843 809.999220.0959809.9991220.5225 810224.1125 810.006224.1318810.0061
224.7575810.0076224.9701810.0086264.5542811.7128271.4044 812 271.743812.0418
275.5276812.4723 277.374812.5913280.5208812.8944282.9291813.0854283.0696813.0918
284.6547813.2275287.1968813.2873290.0879813.3961 292.411813.4843296.1686813.6439

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-402.24	.05	-19.98	.035	34.42	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.98	34.42	190	202.35	215	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
-142.722	-151.722	820

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1903.41

INPUT
Description: CC
Station Elevation Data num= 476

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-706.53	860.005	4-706.515	860.005	4-706.033	860.005	4-705.926	860.005	3-694.105	860.007
-694.01	860.007	-692.679	860.006	4-692.556	860.006	4-691.307	860.005	8-691.127	860.0057
-689.958	860.005	1-689.616	860.0051	-688.11	860.0048	-687.915	860.0048	-686.462	860.0044
-686.331	860.004	4-686.186	860.0044	-683.383	860.0035	-682.331	860.0035	-682.238	860.0035
-680.886	0.0031	-679.712	860.003	-677.523	860.0022	-674.647	860.0021	-673.551	860.0022
-673.354	860.002	1-673.224	860.0021	-671.89	860.0018	-671.241	860.002	-668.117	860.0006
-667.521	860	-666.996	859.9999	-665.072	859.9998	-664.623	859.9998	-663.006	859.9996
-662.979	859.9996	-662.918	59.9996	-661.698	59.9996	-661.223	859.9996	-660.009	859.9994
-658.527	859.9993	-658.521	859.9993	-658.483	859.9993	-657.213	859.9992	-657.039	859.9992

-655.898859.9993-654.472859.9991-654.187859.9991-653.966 859.999-653.946 859.999
-653.926 859.999-652.832859.9989-652.176 859.999-651.098859.9989-650.275859.9987
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-647.226859.9986-645.895859.9958-644.993859.9963-635.338859.9959-634.449859.9957
-633.583859.9954 -632.69859.9952-631.745859.9947-629.769859.9939-628.747859.9937
-627.758859.9934-626.761859.9932-599.998859.8056-554.628859.5059 -551.55859.5142
-548.434 859.524-543.651859.4304-536.387859.2772-534.664859.2823-533.212859.2423
-531.586 859.196-529.781859.1952-528.041859.1963-526.255 859.196-524.835859.1637
-523.217859.1517-514.375858.5699-511.873858.3184-507.435858.3302-505.979858.3088
-504.619858.3009-503.303858.2938-502.008858.2871-500.653858.2798-499.273858.2722
-497.89858.2647-497.027858.2602-496.502 858.256-496.418 858.256-487.505858.1369
-486.572858.1308-485.172858.1255-482.904 858.097-480.406858.0696-479.865858.0689
-479.316858.0681-478.765858.0674-478.196858.0666 -476.58858.0536-476.146858.0491
-475.707858.0485-475.258858.0478-474.808858.0472-474.364858.0472-471.127858.0214
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-433.789857.9929-433.329857.9934-432.612857.9928-430.953 857.996-428.657857.9961
-428.385857.9962-427.999857.9966-426.965857.9959-426.746857.9959-425.391857.9961
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-423.416857.9969-420.246857.9987-417.845 858-412.029858.0052-410.053858.0069
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-252.182855.9976-250.254855.9998-250.165855.9999-250.105 856 -246.9856.0329
-246.717856.0348-243.933856.0061-243.372 856 -241.5855.2993-238.054 854
-237.237853.6874 -232.69 852-230.593851.1283-227.887 850-225.084 848.796
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-178.903 828-177.322827.2929-174.433 826-171.548824.7811 -169.7 824
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-156.346     818-154.952817.3829-151.889     816-150.846815.3511-148.617     814
-146.496813.0321 -144.21     812 -140.35810.5813 -138.75     810-132.424809.2319
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-64.9647 807.997-58.0105807.9999-57.9309807.9999-57.7618     808-54.5431     808
 -42.424     808-41.1021     808-39.7145     808-39.2344     808-37.5501     808
-37.3843     808-36.2642     808-35.8546     808 -33.066807.2873 -28.413     806
-27.4187805.7015-23.3491804.4775-22.0678 804.094 -21.751     804  -18.38  802.72
  -15.31  799.68   -13.6  799.14  -11.14  798.59    -8.7   798.6   -4.87  798.82
   -2.24  798.91    2.77  799.59    5.37  799.74   15.86  800.78   19.21  801.07
   25.98  801.39   28.13   801.7 28.6217802.5437 31.6966802.7093 32.4197802.7391
 33.9788802.8193 35.3546802.8874 37.4417802.9414 41.3855803.0721 46.6968803.2678
 49.8781803.4199 51.9862803.5148 52.6483803.5405 53.2447803.5629 56.1496803.6636
 64.1943803.9808 64.4651803.9823 64.8951803.9852  65.432803.9916 66.3822803.9962
 66.5175803.9975 66.6466803.9976 66.9654     804 67.2547804.0008 69.5617804.0528
 73.9947  804.15 74.4701804.1686 75.8082804.2235 78.4871804.3376  81.055804.4528
 89.0753   804.8102.7592805.3862116.9393805.9992116.9655805.9995117.0964     806
150.6937807.4074165.1323807.9998165.1406807.9998165.1462     808170.0367808.3976
 174.601808.7506174.6401 808.753177.7755808.9966179.9132809.1498183.2705809.2898
184.7338809.3807 190.598 809.613 199.073809.9954199.1062 809.997199.1231809.9976
199.1267809.9977199.1829     810199.9298     810 201.236810.0001202.3653810.0001
204.0847810.0001205.1719810.0001206.2155810.0001206.8337     810207.7029     810
214.8049 809.959 217.247809.9471 223.418809.9673229.7899809.9984230.1335809.9991
230.3818     810233.2203810.0001234.4612810.0001234.7588810.0001235.3228810.0001
236.2537     810236.5224809.9992242.7828809.7906248.3228809.6215251.6575809.5443
254.6983809.4786255.3311809.4845256.9678809.4522257.0503809.4534258.4842809.4713
259.8325 809.486260.5036809.4918260.9613809.4969308.9506809.3742350.7657809.3044
353.1149809.3332353.6707809.3391360.2013809.4128367.5087809.4985367.8993809.5018
372.4656809.5579377.3907809.6198383.8451809.7055385.6994809.7226387.3518809.7375
391.5343809.7914392.2134809.7974396.6373809.8524401.3437809.9122407.3403809.9985
407.7934809.9994407.8536809.9996407.9271809.9996407.9325809.9997 408.031809.9996
408.9455     810408.9922810.0035408.9956810.0036409.1038810.0126412.0334810.2506
412.7466810.3731417.0394810.8126417.4447810.8771419.9307811.2393420.8378811.3643
424.4513811.8301424.8225811.8942425.5541811.9927425.9097     812426.4215812.0027
426.5359812.0027427.4799812.0474428.0294 812.075430.6159812.2233431.5487812.2817
439.5713812.7211

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
-706.538     .05  -18.38    .035   28.13     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        -18.38   28.13              233   99.41      34             .1       .3

CROSS SECTION
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RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1804

INPUT
Description: DD
Station Elevation Data num= 478

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-1396.08	849.12	-1383.75	849.04	-1383.69	849.04	-1370.49	848.96	-1370.44	848.96
-1234.66	848.07	-1234.57	848.07	-1230.66	848.04	-1230.61	848.04	-1224.16	848
-1216.18	847.98	-1212.74	847.98	-1211.7	847.97	-1210.21	847.97	-1205.76	847.96
-1204.5	847.96	-1203.49	847.95	-1203.36	847.95	-1153.12	847.81	-1152.24	847.81
-1049.68	848.09	-1048.98	848.1	-1048.59	848.1	-1047.88	848.11	-1011.12	848.23
-1010.19	848.23	-1009.53	848.24	-1007.04	848.24	-1006.33	848.25	-1006.26	848.25
-1003.2	848.26	-1000.46	849.82	-1000.17	849.98	-997.98	851.23	-997.43	851.54
-995.51	852.64	-994.69	853.1	-993.03	854.05	-991.95	854.66	-990.55	855.46
-989.21	856.23	-978.93	862.09	-977.58	862.87	-977.22	862.82	-977.17	862.81
-888.53	852.6	-886.83	852.48	-883.74	852.37	-880.57	852.36	-877.43	852.44
-874.43	852.62	-817.9	860.3	-817.78	860.31	-815.04	860.59	-813.74	860
-813.61	859.94	-813.32	859.81	-791.73	849.66	-789.16	848.46	-787.68	847.77
-786.95	847.44	-786.87	847.4	-786.28	847.13	-785.25	846.66	-785.09	846.58
-782.97	845.62	-781	844.74	-779.14	843.91	-774.23	841.6	-772.61	840.87
-771.02	840.11	-767.18	838.26	-763.79	836.63	-760.76	835.19	-758.03	833.9
-755.57	832.73	-753.33	831.68	-751.28	830.73	-749.4	829.86	-747.66	829.06
-746.06	828.32	-744.57	827.64	-743.17	827.01	-741.87	826.43	-740.65	825.88
-739.5	825.37	-738.42	824.9	-737.4	824.45	-736.43	824.03	-735.51	823.63
-734.64	823.26	-733.81	822.91	-733.02	822.58	-732.26	822.26	-731.53	821.96
-730.84	821.68	-730.17	821.41	-729.53	821.15	-728.91	820.9	-728.31	820.67
-727.74	820.45	-727.18	820.23	-726.65	820.03	-726.13	819.83	-725.62	819.64
-725.14	819.46	-724.66	819.29	-724.2	819.12	-723.76	818.96	-723.32	818.81
-722.9	818.66	-722.48	818.52	-722.08	818.38	-721.69	818.25	-721.3	818.13
-720.93	818	-720.56	817.88	-720.2	817.77	-720.02	817.71	-719.67	817.61
-719.33	817.5	-718.99	817.4	-718.66	817.3	-718.34	817.21	-718.02	817.12
-717.71	817.03	-717.4	816.94	-717.09	816.86	-716.79	816.78	-716.5	816.71
-716.21	816.63	-715.92	816.56	-715.64	816.49	-715.5	816.46	-715.22	816.39
-714.95	816.33	-714.67	816.26	-714.4	816.21	-714.14	816.15	-713.87	816.09
-713.61	816.04	-713.35	815.99	-713.09	815.94	-712.59	815.84	-712.33	815.8
-712.08	815.75	-711.83	815.71	-711.59	815.67	-711.34	815.64	-711.09	815.6
-710.85	815.56	-710.61	815.53	-710.36	815.5	-710.12	815.47	-709.88	815.44
-709.64	815.41	-709.39	815.39	-709.15	815.37	-708.91	815.34	-708.67	815.32
-708.42	815.3	-708.16	815.28	-707.89	815.27	-707.6	815.25	-707.31	815.23
-707	815.22	-706.85	815.22	-706.69	815.21	-706.53	815.21	-706.37	815.2
-705.96	815.2	-705.23	815.18	-705.02	815.18	-704.29	815.17	-704.08	815.16
-703.35	815.15	-703.14	815.15	-702.41	815.13	-702.2	815.13	-701.38	815.11
-700.96	815.11	-700.23	815.09	-700.02	815.09	-699.28	815.08	-699.08	815.07
-698.34	815.06	-698.13	815.05	-697.4	815.04	-697.19	815.04	-696.46	815.02
-696.25	815.02	-695.52	815.01	-695.31	815	-694.57	814.99	-694.36	814.98

-691.24	814.93	-691.03	814.93	-690.06	814.91	-689.85	814.91	-689.16	814.9
-688.95	814.9	-687.97	814.88	-687.76	814.88	-687.2	814.87	-686.99	814.87
-686.3	814.86	-686.09	814.85	-685.11	814.84	-684.9	814.84	-684.03	814.82
-683.82	814.82	-683.28	814.81	-683.08	814.81	-682.2	814.79	-681.99	814.79
-681.38	814.78	-681.17	814.78	-680.29	814.76	-680.08	814.76	-679.47	814.75
-679.26	814.75	-678.17	814.73	-677.97	814.73	-677.34	814.72	-677.13	814.72
-676.61	814.71	-676.41	814.71	-675.29	814.69	-675.09	814.68	-673.83	814.65
-673.12	814.63	-672.91	814.63	-672.21	814.61	-672.08	814.6	-671.37	814.58
-671.24	814.58	-670.16	814.54	-669.33	814.5	-668.89	814.48	-668.07	814.44
-667.85	814.43	-666.84	814.37	-664.72	814.24	-663.19	814.14	-661.88	814.04
-661.43	814	-660.86	813.95	-660.48	813.92	-659.76	813.86	-659.5	813.83
-658.78	813.77	-657.98	813.69	-656.82	813.58	-655.84	813.48	-654.93	813.38
-654.35	813.31	-654.24	813.3	-653.65	813.23	-653.54	813.22	-652.88	813.14
-651.53	812.98	-651.11	812.93	-649.57	812.73	-649.43	812.71	-649.25	812.68
-647.97	812.51	-647.88	812.5	-646.99	812.38	-646.91	812.37	-646.85	812.35
-646.08	812.25	-645.38	812.14	-644.79	812.06	-644.64	812.03	-644.05	811.94
-643.48	811.85	-642.9	811.76	-642.76	811.73	-642.2	811.64	-641.63	811.56
-641.49	811.53	-641.33	811.5	-640.76	811.41	-640.19	811.32	-638.04	810.95
-637.91	810.92	-637.09	810.77	-636.97	810.75	-635.3	810.45	-635.19	810.43
-634.35	810.28	-634.24	810.25	-633.39	810.1	-633.29	810.08	-631.58	809.77
-631.48	809.75	-630.62	809.58	-630.53	809.56	-629.66	809.4	-629.58	809.38
-628.7	809.22	-626.81	808.84	-626.74	808.83	-625.73	808.62	-625.67	808.61
-624.65	808.4	-624.59	808.39	-623.56	808.18	-623.51	808.16	-614.53	806.32
-607.2	806	-605.8	806	-564.39	806.32	-561.52	806.36	-546.23	806.28
-530.19	806	-513.95	806	-510.97	805.92	-510.05	805.89	-510	805.89
-509.14	805.87	-509.08	805.87	-508.23	805.84	-508.14	805.84	-507.3	805.82
-507.21	805.82	-506.38	805.8	-506.28	805.8	-504.65	805.76	-504.53	805.76
-503.73	805.74	-503.6	805.74	-502.73	805.71	-502.59	805.71	-501.73	805.69
-501.57	805.69	-500.72	805.67	-500.56	805.67	-499.72	805.65	-499.54	805.65
-498.72	805.63	-498.53	805.63	-497.71	805.61	-497.51	805.61	-496.71	805.59
-496.49	805.59	-495.78	805.57	-495.55	805.57	-494.84	805.55	-494.61	805.55
-493.91	805.54	-493.67	805.54	-492.97	805.52	-491.94	805.53	-489.21	805.43
-412.51	804	-304.14	804	-300.51	804.06	-298.35	804.09	-298.11	804.1
-298.05	804.1	-297.62	804.12	-297.52	804.12	-297.1	804.13	-295.82	804.18
-295.67	804.19	-293.01	804.28	-283.45	804.57	-283.08	804.59	-281.52	804.62
-281.12	804.64	-280.36	804.65	-279.51	804.69	-276.38	804.77	-275.9	804.78
-275.2	804.8	-274.7	804.82	-274.02	804.84	-273.5	804.85	-272.84	804.87
-272.3	804.89	-271.65	804.9	-271.09	804.92	-270.47	804.94	-269.88	804.96
-269.28	804.97	-268.67	804.99	-268.09	805.01	-267.46	805.03	-266.89	805.04
-266.24	805.07	-265.7	805.08	-265.03	805.1	-264.56	805.11	-263.87	805.14
-263.42	805.15	-258.67	805.33	-258.29	805.34	-257.41	805.38	-257.06	805.39
-256.15	805.43	-255.82	805.44	-253.87	805.53	-245.18	806	-244.51	806
-241.38	806.28	-239.56	806.43	-233.05	807	-226.36	807.56	-224.49	807.72
-221.05	808	-204.34	810	-166.05	810	-165.66	809.96	-144.89	808
-136.39	807.52	-126.97	807.01	-124.93	806.9	-114.75	806.57	-114.5	806.58
-105.39	807.14	-105.11	807.15	-104.87	807.59	-102.72	807.59	-99.84	807.51
-96.18	807.6	-83.79	807.59	-82.74	807.43	-81.14	807.02	-74.18	807.03
-58.27	806.73	-58.03	806.72	-55.94	806.72	-39.68	806.59	-32.02	806.65

-22.12	806.46	-19.59	802.08	-16.74	798.47	-15.6	798.33	-11.62	797.78
-6.78	798.22	-4.67	798.39	2.11	799.13	4.72	799.37	6.94	799.64
17.02	800.44	27.02	801.33	28.15	801.42	29.64	801.42	42.74	801.61
46.83	801.9	63.07	802.8	64.68	803.5	88.23	808.27	88.31	808.29
91.21	808.32	108.15	808.3	130.34	808.04	140.71	807.65	154.48	807.21
177.89	807.24	180.59	807.24	189.3	807.66	204.44	808.24	220.81	808.62
241.73	808.87	253.45	808.76	272.31	809.06	295.99	809.55	339.66	809.54
343.47	809.51	348.73	809.54	406.75	809.55	410.08	809.51	417.06	810.39
430.92	812.06	444.91	813.02	449.49	813.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-1396.08	.05	-19.59	.035	28.15	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-19.59	28.15	279 199.46	52	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
-1396.08	-240	812	F

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1604.54

INPUT
Description: EE
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-254.5	820.31	-253.81	820	-249.36	818.13	-249.04	818	-248.71	817.86
-244.27	816	-241.75	814.97	-239.41	814	-235.77	812.52	-234.46	812
-232.56	811.25	-229.43	810	-228.2	809.57	-224.74	808.38	-223.94	808.1
-223.65	808	-221.07	808	-220.61	808.01	-219.17	808.01	-219.17	808.05
-218.46	808.05	-218.07	808.25	-208.9	807.97	-202.66	807.8	-202.47	807.73
-199.15	806.81	-197.39	806.65	-185.15	805.67	-168.49	805.12	-165.13	805.01
-163.48	805.02	-161.69	805.03	-150.76	805.17	-148.36	804.05	-144.6	801.99
-144.14	801.94	-143.94	801.8	-140.03	799.92	-137.84	799.77	-137.23	799.58
-137.01	799.73	-134.93	801.41	-134.51	801.43	-126.72	801.94	-117.53	801.92
-102.19	801.63	-88	801.53	-78.33	801.45	-66.67	801.3	-53.5	801.47
-51.58	801.47	-36.89	801.33	-18.11	800.66	-15.8	800.56	-15.31	800.44
-11.66	798.9	-2.59	797.82	-2.27	797.8	-1.95	797.77	0	797.54
4.56	797	9.86	796.53	9.89	796.53	14.62	798.12	14.69	798.14
14.81	798.26	20.33	807.16	23.78	807.16	38.24	807.17	53.5	807.14
70.39	807.14	74	807.13	112.25	806.72	127.42	806.39	151.27	806.51
160.35	807.08	183.69	807.64	190.99	807.66	210.11	808.16	216.56	808.05
241.85	807.55	242.96	807.5	249.5	807.18	265.56	806.74	289.15	808.84
301.45	809.04	322.56	809.76	342.42	809.63	360.59	809.45	381.97	809.41

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   400.9  809.43  411.27  809.32  419.05   810.3  430.18  811.75  441.82  812.55
  451.46  813.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  -254.5     .05   -15.8    .035   20.33     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -15.8   20.33              149  184.82      41             .1       .3

CROSS SECTION


RIVER: Buckeye Creek
REACH: Buckeye Creek      RS: 1419.72

INPUT
Description: FF
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 -133.24  824.56 -130.81     824 -124.37  822.44 -122.58     822 -118.66  821.04
 -114.37     820 -112.36  819.49 -106.45     818 -101.64  816.16  -98.65  815.34
  -97.21  814.61  -89.43  814.27  -83.42     814  -82.62  813.97  -80.92  813.88
  -75.91     810   -75.9     810  -72.82  810.28  -72.74  810.29  -71.16  810.43
  -60.51  809.88  -58.71  809.82  -58.63  809.84  -57.68  809.87  -55.63   809.3
  -52.04   808.3  -48.95  808.06   -43.9  807.61  -33.31  807.36  -29.68  807.31
   -18.8  797.35  -18.51  797.15  -18.37  797.12   -9.34  796.76    -8.3  796.83
   -1.89  796.37    -.01  796.51       0  796.51    5.24  797.45   10.42  797.23
   15.88  797.82   25.35  798.02   28.91  797.99   35.53  800.94   37.02  801.47
    37.8   801.6   46.24  803.46   74.68  805.31   77.76  805.47   79.29  805.55
   80.95  805.57  112.25  806.16  129.82   806.8  146.42  807.27  181.61  807.14
  183.67  807.12  193.95  807.06   228.2  806.84   237.5  806.83  265.27  806.79
  281.86  806.66  304.04  806.21  331.38  805.94  344.68   806.3  350.86  806.46
   385.2  806.66  387.18  806.61  399.69  807.42  427.18  809.24  432.84  809.27
  465.47  809.54  480.67   809.4   493.5  809.13  509.05  808.96  518.95  808.89
   532.2  808.89   549.9  809.02   555.9  809.02  563.05  809.83  577.38  811.63
   584.8  812.16   599.7  813.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 -133.24     .05  -29.68    .035   46.24     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -29.68  46.24              173  185.67      44             .1       .3

CROSS SECTION
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RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1234.05

INPUT
Description: GG
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-206.29	819.46	-200.65	818	-197.84	817.3	-192.78	816	-189.46	815.12
-185.16	814	-177.52	812.02	-177.45	812	-177.24	811.95	-169.56	810
-163.3	808.42	-161.62	808	-160.3	807.77	-150.98	806	-149.55	805.99
-141.69	805.98	-140.88	805.98	-133.89	805.95	-130.64	805.94	-129.27	805.94
-125.41	805.92	-125.27	805.92	-119.66	805.91	-119.47	805.91	-113.88	805.9
-113.55	805.9	-109.15	805.89	-108.61	805.89	-79.16	805.07	-45.36	804.14
-44.53	804.12	-43.45	804.1	-40.44	804.07	-38.68	804.06	-38.54	804.07
-38.37	804.07	-37.77	804.01	-37.24	804.01	-37.19	804	-30.78	802.5
-29.84	802	-26.29	800.22	-25.87	800	-25.24	799.69	-24.32	799.25
-21.9	798	16.74	798	19.43	799.16	21.39	800	22.15	800.53
22.62	800.82	24.24	801.82	24.53	802	24.55	802.01	24.8	802.16
25.01	802.28	25.19	802.38	25.35	802.48	25.49	802.56	25.62	802.63
25.72	802.69	25.82	802.75	25.91	802.8	25.99	802.85	26.06	802.9
26.13	802.94	26.19	802.97	26.24	803.01	26.29	803.04	26.34	803.07
26.39	803.09	26.43	803.12	26.47	803.14	26.5	803.16	26.54	803.18
26.57	803.2	26.6	803.22	26.63	803.24	26.66	803.24	54.23	804.14
56.94	804.2	74.1	806.44	77.21	806.52	80.14	806.6	85.51	806.59
126.38	806.77	130.45	806.77	167.98	806.63	179.11	806.59	180.44	806.58
215.96	806.5	220.86	806.45	248.62	806.24	255.71	806.16	256.04	806.17
276.79	805.61	282.15	805.6	287.71	805.65	319.14	806.74	339.94	807.72
355.88	808.41	377.43	808.5	408.02	808.34	427.41	808.18	441.89	808.29
466.55	808.44	473.08	808.48	487.87	810.16	499.3	811.52	507.36	812.1
507.64	812.12	523.13	813.21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-206.29	.05	-37.19	.035	26.66	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-37.19	26.66	117	131.34	192.99	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 1102.70

INPUT
Description: HH
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

-289.51	823.17	-284.72	822.19	-283.86	822	-283.27	821.86	-274.9	820
-267.4	818.33	-265.91	818	-264.06	817.59	-257.15	816	-249.19	814.26
-248.06	814	-239.53	812.19	-238.72	812	-237.74	811.8	-228.6	810
-224.13	809.14	-217.49	808	-212.35	807.38	-210.24	807.28	-205.93	806.82
-205.12	806.75	-199.07	806.63	-196.69	806.46	-195.3	806.37	-195.04	806.35
-193.44	806.27	-192.41	806.23	-183.22	806.24	-178.07	806.21	-172.74	806.18
-171.92	806.16	-171.25	806.15	-161.2	806.03	-158.18	806.03	-156.25	806.02
-151.54	806.03	-151.43	806.03	-146.32	806.01	-146.26	806.01	-142.51	806
-133.64	805.85	-132.12	805.82	-129.94	805.78	-114.43	805.52	-102.78	805.34
-97.86	805.26	-93.46	805.2	-90.78	805.15	-87.77	805.1	-80.07	804.98
-73.86	804.89	-67.18	804.76	-58.77	804.6	-42.37	804.25	-31.66	804.01
-29.92	804.01	-28.29	804	-26.85	804	-25.69	803.66	-25.11	803.49
-22.2	802	-19.2	800.47	-18.27	800	-17.41	799.56	-14.62	798
18.13	798	18.51	798.19	22.22	800	24.75	801.24	26.32	802
28.22	802.93	31	804	31.94	804	41.11	804.07	45.61	804.3
54.04	804.54	83.33	805.28	91.06	805.49	94.01	805.59	95.91	805.61
132.94	806.3	136.29	806.33	139.49	806.35	164.42	806.54	183.4	806.63
186.37	806.61	231.26	806.05	238.05	806.05	275.37	806.2	280.92	806.2
282.25	806.21	307.77	807.46	324.8	809.33	330.91	809.81	335.5	810.13
336.15	810.18	372.12	812.23	372.24	812.18	373.78	812.33	375.76	812.44
382.54	812.44	392.23	812.55	401.64	812.64	414.95	812.72	417.44	812.75
433.14	812.79	442.12	812.72	464.37	812.83	472.75	812.9		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-289.51	.05	-25.69	.035	31	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-25.69	31	138.99	130.59	147.99	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 972.12

INPUT
Description: II
Station Elevation Data num= 154

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-326.96	813.78	-325.06	813.78	-324.62	813.77	-312.1	813.79	-311.71	813.79
-311.3	813.78	-310.79	813.77	-310.71	813.77	-310.04	813.76	-309.09	813.74
-299.86	813.58	-299.5	813.58	-299.13	813.57	-296.5	813.51	-289.07	813.22
-281.87	812.99	-279.84	812.9	-276.56	812.81	-272.63	812.68	-270.91	812.59
-269.58	812.52	-264.51	812.38	-258.25	812.17	-257.11	812.12	-253.96	812.01
-252.79	812	-247.85	811.77	-247.06	811.74	-246.01	811.7	-235.69	811.04
-234.51	810.98	-230.45	810.9	-224.77	810.76	-217.17	810.53	-213.54	810.36
-203.45	810	-201.81	809.91	-179	808.59	-178.36	808.56	-174.95	808.41

-168.88	808	-168.86	807.99	-167.72	807.99	-166.02	807.98	-162.03	807.97
-158.82	807.97	-157.81	807.96	-156.68	807.96	-153.18	807.93	-152.17	807.93
-147.01	807.71	-124.98	806.82	-98.36	806.05	-98.02	806.03	-96.39	806
-96.31	806	-91.58	805.99	-90.9	805.99	-90.29	805.98	-87.34	805.98
-85.9	805.97	-82.63	805.96	-80.47	805.95	-78.95	805.94	-77.59	805.94
-55.94	805.33	-51.01	805.29	-46.29	805.27	-42.91	805.22	-39.87	805.19
-36.91	805.19	-33.31	804.55	-30.41	804.02	-30.31	804.02	-30.21	804
-28.09	802.54	-27.19	802	-25.5	801.1	-22.96	800	-18.37	797.56
17.93	797.56	20.45	798	26.11	799.94	26.31	800	32.11	801.03
32.83	802	49.01	803.35	49.44	803.36	55.53	803.3	55.72	803.39
56.74	803.46	60.16	803.53	85.01	805.01	113.83	805.2	119.81	805.24
126.8	805.29	131.99	805.27	139.45	805.25	147.43	805.3	150.86	805.04
162.7	804.62	166.24	804.54	176.45	805.43	177.27	805.48	179.3	805.58
201.26	806.42	208.15	807.25	223.45	808.52	236.82	809.7	252.78	811.09
252.86	811.07	252.99	811.08	255.67	811.11	272.38	811.61	292.88	811.69
300.43	811.78	310.06	811.68	312.5	811.63	314.79	811.65	317.61	811.73
317.72	811.84	317.8	811.83	320.16	811.81	334.73	811.83	341.58	811.8
343.41	811.9	345.47	811.78	346.96	811.81	348.55	811.78	352.07	811.8
367.83	811.79	370.45	811.82	383.76	811.8	383.94	811.82	395.49	811.86
398.25	811.88	398.32	812.08	398.42	811.98	398.86	812.41	408.62	812.42
418.24	812.27	427.48	812.07	437.72	811.84	443.56	811.77	454.65	811.84
466.98	811.99	475.86	812.18	480.39	812.38	482.7	812.57	490.96	812.47
496.51	812.45	496.72	812.45	505.62	812.64	511.92	812.78		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-326.96	.05	-30.21	.035	32.83	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-30.21	32.83	168	161.32	108	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 810.82

INPUT
Description: JJ
Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-216.91	814	-201.74	814	-195.8	813.64	-188.84	813.23	-185.45	813.15
-179.25	812.94	-152.13	813.27	-151.81	813.26	-149.47	813.17	-146.37	813.02
-146.36	813.01	-146.32	813.02	-140.6	812.84	-136.23	812.99	-129.02	812.75
-127.18	812.76	-123.2	812.8	-119.29	812.67	-118.82	812.66	-111.87	812.43
-109.55	812.36	-100.54	812.03	-99.84	812	-98.62	811.93	-97.8	811.89
-83.42	811.14	-76.85	810.72	-74.41	810.56	-73.74	810.51	-71.49	810.36
-66.78	810	-61.45	809.65	-58.64	809.44	-52.08	808.96	-50.37	808.85

-41.46	808	-38.34	807.75	-37.59	807.68	-36.09	807.5	-24.8	806
-20.35	804.6	-18.41	804	-18.33	803.94	-15.01	802	-12.97	800.82
-11.05	800	-10.24	799.15	-8.85	797.3	24.85	797.3	27.53	798
27.87	801.86	28.46	802.53	32.36	803.16	42.61	804.76	59.3	804.95
77.03	805.06	103.24	805.26	119.26	805.35	128.03	805.42	149.59	805.57
160.78	805.68	192.07	805.53	197.51	805.48	238.72	804.72	239.38	804.7
240.47	804.67	256.38	804.26	262.57	804.13	266.56	804.18	293.85	808.49
296.89	808.94	300.24	809.22	329.56	811.43	333.28	811.66	333.32	811.67
333.59	811.64	340.57	811.73	344.49	811.76	350.15	811.95	362.33	812.32
365.48	812.39	381.25	812.44	388.26	812.42	396.23	812.36	413.4	812.25
424.49	812.31	455.96	812.46	456.15	812.5	459.79	812.5	467.99	812.4
475.02	812.37	489.17	812.37	489.52	812.38	497.79	812.49	498.41	812.49
498.56	812.48	500.17	812.48	500.38	812.49	504.02	812.49	504.27	812.5
505.51	812.5	505.75	812.51	506.43	812.51	506.65	812.52	507.27	812.52
507.46	812.53	507.82	812.53	524.88	812.93				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-216.91	.05	-20.35	.035	42.61	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-20.35	42.61	200	178.48	258	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
256	524.88	812	T

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 604.54

INPUT
Description: KK
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-233.17	814	-229.74	814	-227.55	813.99	-215.7	813.99	-206.84	813.98
-204.79	813.98	-194.7	813.99	-163.17	813.97	-158.18	813.97	-152.63	813.96
-146.76	813.97	-125.89	813.97	-121.27	813.96	-116.24	813.98	-115.18	813.97
-113.58	813.97	-103.05	813.98	-102.55	813.98	-96.44	814	-96.25	814
-92.59	813.97	-89.12	813.99	-88.46	813.99	-77.63	814	-76.17	814.02
-76.04	814.02	-75.05	814	-72.8	813.99	-71.53	814	-68.29	814.02
-67.62	814.01	-67.07	814	-63.14	813.78	-62.62	813.72	-62.43	813.69
-57.74	813.21	-57.28	813.17	-52.18	812.77	-48.03	812	-43.21	810.5
-41.73	810	-40.19	809.46	-37.43	808	-35.6	807.07	-33.63	806
-31.7	804.92	-29.91	804	-27.7	802.73	-26.3	802	-22.66	800.11
-22.46	800	-22.11	799.82	-21.66	799.6	-20.99	799.31	-19.22	798.49
-18.32	798	-17.81	797.64	-17.52	797.32	-17.41	797.2	-17.2	797.09

-17.13	797.06	-17.04	796.98	-14.15	796.98	-9.7	796.97	4.23	796.97
12.96	796.96	14.52	797.58	15.57	798	16.4	798.23	37.02	804.34
47.48	805.46	49.7	805.63	55.05	805.93	68.73	806.02	86.07	805.93
99.47	805.93	103.38	805.75	123.56	805.98	131.93	806.3	155.1	806.45
176.92	806.19	200.24	806.3	221.5	806.49	244.67	806.72	248.53	807.85
258.28	812.73	258.42	812.8	261.53	812.52	261.56	812.52	261.73	812.5
262.12	812.47	262.92	812.41	263.01	812.36	263.92	812.82	267.39	812.93
287.84	812.5	287.88	812.72	287.94	813	388	813	391.44	812.93
394.5	812.87	394.55	812.63	394.6	812.37	411.03	812.06	414.52	812
425.73	811.97	453.54	811.61	515.74	812.44	529.7	812.7	529.77	812.28
529.97	812.27	537.83	812.44	544.99	812.58	545.63	812.59		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-233.17	.05	-52.18	.035	37.02	.05	258.28	.01

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-52.18	37.02	239	198.36	80	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 433.99

INPUT
Description: LL
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-229.28	815.19	-223.93	814	-216.01	812.28	-214.67	812	-213.64	811.85
-199.65	810	-199.28	810	-197.88	809.99	-194.24	809.96	-194.22	809.96
-190.38	809.95	-185.59	809.93	-178.39	809.93	-174.76	809.91	-173.1	809.91
-135.76	808.85	-130.78	808.72	-124.61	808.57	-120.21	808.48	-106.08	808.19
-104.62	808.16	-97.07	808.01	-96.21	808	-90.61	808	-79.64	807.53
-70.25	807.22	-64	807.02	-57.82	806.79	-47.76	806.4	-45.29	806.3
-42.52	806.21	-41.03	806.16	-37.62	806.01	-36.96	806.01	-36.96	806
-33.53	804.27	-32.99	804	-30.1	802.54	-28.88	802	-28.63	801.88
-24.46	800	-22.46	799.07	-20.14	798	-17.33	797.01	-16.81	796.87
-16.16	796.69	0	796.69	9.79	796.7	11.95	797.86	12.22	798
15.13	799.3	16.69	800	17.37	800.24	22.52	802	22.94	802
25.48	802.9	25.81	802.98	28.19	803.48	28.29	803.55	28.37	802.29
28.38	802.57	28.38	802.29	28.4	802.28	28.41	802.28	35.29	802.76
46.97	803	49.07	803.48	55.32	804.73	65.63	804.46	75.14	804.3
82.19	804.93	83.76	805.01	94.64	805.48	107.93	805.05	115.02	805.14
115.99	805.19	132.96	805.87	140.42	806.12	179.17	805.81	186.1	805.75
219	805.95	229.2	806.56	235.54	809.71	239.7	811.78	242.02	811.91
242.66	811.95	243.11	811.97	243.34	811.99	244.23	811.99	245.16	811.53
245.24	811.57	248.82	811.61	308.7	812.28	323.8	812.29	339.72	812.3

342.29	812.26	414.31	811.66	424.55	811.53	436.11	811.44	504.49	812.68
512.71	812.76	512.77	811.98	513.14	811.94	513.84	811.86	522.29	812.04
528.92	812.18	531.68	812.24						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-229.28	.05	-36.96	.035	28.38	.05	244.23	.01

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-36.96	28.38	150.99	144.27	75.99	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 289.71

INPUT
Description: MM
Station Elevation Data num= 122

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-348.33	816.57	-348.23	816.54	-347.81	816.44	-345.95	816	-342.84	815.36
-339.64	814.72	-336.02	814	-328.13	813.43	-322.18	813.05	-305.65	812
-302.14	811.76	-298.26	811.43	-280.91	810	-279.28	809.93	-246.45	808.55
-235.55	808	-182.43	808	-178.88	808.05	-178.72	808.05	-178.43	808.06
-178.1	808.06	-172.71	808.2	-168.02	808.31	-160.86	808.55	-144.31	808.1
-141.52	808.02	-137.87	808.02	-133.47	808.03	-127.35	808.03	-116.67	808.04
-91.7	808.03	-68.94	808.02	-55.73	808.02	-53.31	808.01	-42.03	808.01
-41.16	808	-36.46	808	-36.18	807.96	-34.84	807.82	-34.01	807.45
-33.88	807.41	-30.5	806	-28.59	805.2	-25.72	804	-24.06	803.13
-22.27	802	-20.72	801.07	-18.75	800	-17.18	799.08	-15.4	798
-13.05	797.13	-12.75	797.03	-12.38	796.91	-11.91	796.75	-11.27	796.55
-11	796.46	7.88	796.46	9.3	796.47	14.72	796.47	17.91	797.5
19.47	798	19.95	798.46	20.46	798.93	20.71	799.16	20.87	799.3
20.97	799.4	21.05	799.46	21.11	799.51	21.16	799.55	21.19	799.58
21.23	799.6	21.69	799.87	21.7	799.87	24.37	800.38	35.61	802.38
50.22	802.63	53.88	802.69	63.02	802.91	78.8	802.53	78.99	802.53
82.81	802.65	94.02	803.02	100.69	804.05	109.95	805.3	112.56	805.37
144.09	805.37	153.09	805.31	168.39	806.39	175.66	809.92	181.67	812.84
183.2	812.87	183.59	812.88	183.66	812.88	185.12	812.9	185.38	812.91
185.64	812.91	185.69	812.92	185.74	812.92	186.28	812.94	186.34	812.91
187.31	812.43	194.78	812.5	226.14	812.5	226.18	812.66	226.25	813
308.22	813	308.84	812.99	314.89	812.83	314.99	812.37	319.45	812.29
335.38	812	359.91	811.87	380.54	811.73	413.84	811.94	460.55	812.15
460.69	811.73	461.27	811.49	461.46	811.41	463.36	811.45	466.38	811.51
476.79	811.74	490.56	812.04						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-348.33	.05	-34.84	.035	35.61	.05	181.67	.01

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-34.84	35.61	142	180.45	179	.1	.3

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 109.26

INPUT
Description: NN
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-420.57	814.39	-419.2	814	-407.77	813.42	-407.7	813.42	-379.04	812
-378.22	811.99	-334.8	811.11	-302.12	810.46	-279.5	810	-278.77	810
-199.19	808.01	-198.67	808	-196.71	808	-160.16	807.18	-150.67	806.97
-143.98	806.83	-123.71	806.44	-101.58	806	-100.78	806	-92.21	805.99
-80.49	805.97	-77.36	805.97	-69.5	805.98	-53.95	806	-35.79	806
-33.95	804.99	-32.14	804	-29.75	802.69	-28.49	802	-26.52	800.92
-25.03	800	-24.55	799.7	-20.63	798	-13.87	796.17	9.83	796.17
10.32	798	12.28	798	15.39	799.59	16.21	800	18.42	801.13
20.26	802	23.7	803.6	24.16	803.84	24.46	804	25.31	804.27
25.55	804.34	26.05	804.45	33.05	806	34.24	806	36.49	805.83
40.87	805.6	49.87	805.76	78.79	805.59	114.93	804.96	121.77	804.87
141.12	804.61	165.89	804.29	192.3	804.3	201.03	804.39	211.75	804.67
229.66	805	247.1	805.46	263.63	805.77	272.64	805.95	279.01	806.31
286.81	806.72	289.32	807.18	307.42	809.78	309.29	809.95	325.74	811.48
328.02	811.69	328.25	811.72	328.26	811.72	328.83	811.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-420.57	.05	-35.79	.035	33.05	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-35.79	33.05	105.99	109.26	120	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
92	328.83	812	T

CROSS SECTION

RIVER: Buckeye Creek
REACH: Buckeye Creek RS: 0

INPUT
Description: OO
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-417.03	813.82	-412.45	812.94	-406.81	812	-405.22	812	-395.28	811.74
-380.91	811.39	-371.41	811.15	-364.68	810.99	-359.42	810.86	-355.34	810.77
-345.4	810.64	-340.02	810.54	-336.02	810.47	-325.13	810.34	-312.35	810.19
-297.14	810.01	-296.43	810	-295.59	810	-285.2	809.91	-274.56	809.84
-274.54	809.84	-273.77	809.83	-272.94	809.82	-262.55	809.73	-253.03	809.67
-251.8	809.66	-250.49	809.65	-241.36	809.57	-232.98	809.51	-230.33	809.49
-227.4	809.46	-224.11	809.42	-220.35	809.37	-208.38	809.22	-174.4	808.34
-171.28	808.24	-167.82	808.24	-159.55	808.19	-158.48	808.19	-156.58	808.18
-145.99	808.1	-141.41	808.1	-139.97	808.09	-136.44	808.09	-134.24	808.08
-131.11	808.06	-127.77	808.05	-120.4	808.02	-118.91	808.01	-117.81	808.01
-115.67	808	-113.81	807.99	-106.61	807.86	-105.72	807.84	-104.61	807.82
-104.57	807.82	-102.61	807.78	-99.96	807.71	-94.79	807.56	-82.5	807.22
-39.63	806	-38.69	806	-32.64	804.46	-31.48	804	-29.07	802.86
-27.45	802	-25.43	800.91	-24.71	800.57	-23.51	800	-21.41	799
-19.3	798	-10.6	796	11.36	796	20.55	798	22.64	798.89
25.23	800	25.29	800.03	25.3	800.03	29.05	802	30.21	802.61
33.02	804	35.92	804.98	39.77	804.98	55.66	804.9	86.81	804.9
121.46	804.49	134.69	804.4	178.19	803.99	181.7	803.96	182	803.96
184.59	803.99	228.44	804.47	248.69	805.15	255.51	805.29	257.89	805.39
258.14	805.47	259.94	805.87	277.19	809.69	294.63	811.77	300.3	812.2
300.82	812.43	300.99	812.54						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-417.03	.05	-38.69	.035	35.92	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-38.69	35.92	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Buckeye Creek

Reach	River Sta.	n1	n2	n3	n4
Buckeye Creek	3504.54	.05	.035	.05	
Buckeye Creek	3454.54	.05	.035	.05	
Buckeye Creek	3404.54	.05	.035	.05	
Buckeye Creek	3354.54	.05	.035	.05	
Buckeye Creek	3304.54	.05	.035	.05	
Buckeye Creek	3254.54	.05	.035	.05	
Buckeye Creek	3204.54	.05	.035	.05	

Buckeye Creek	3154.54		.05	.035	.05
Buckeye Creek	3104.54		.05	.035	.05
Buckeye Creek	3054.54		.05	.035	.05
Buckeye Creek	3004.54		.05	.035	.05
Buckeye Creek	2954.54		.05	.035	.05
Buckeye Creek	2904.54		.05	.035	.05
Buckeye Creek	2854.58		.05	.035	.05
Buckeye Creek	2804.54		.05	.035	.05
Buckeye Creek	2754.54		.05	.035	.05
Buckeye Creek	2704.54		.05	.035	.05
Buckeye Creek	2661.29		.05	.035	.05
Buckeye Creek	2603.43		.05	.035	.05
Buckeye Creek	2554.54		.05	.035	.05
Buckeye Creek	2494.62		.05	.035	.05
Buckeye Creek	2460.04	Bridge			
Buckeye Creek	2417.85		.05	.035	.05
Buckeye Creek	2354.53		.05	.035	.05
Buckeye Creek	2306.38		.05	.035	.05
Buckeye Creek	2254.54		.05	.035	.05
Buckeye Creek	2204.54		.05	.035	.05
Buckeye Creek	2154.54		.05	.035	.05
Buckeye Creek	2105.74		.05	.035	.05
Buckeye Creek	1903.41		.05	.035	.05
Buckeye Creek	1804		.05	.035	.05
Buckeye Creek	1604.54		.05	.035	.05
Buckeye Creek	1419.72		.05	.035	.05
Buckeye Creek	1234.05		.05	.035	.05
Buckeye Creek	1102.70		.05	.035	.05
Buckeye Creek	972.12		.05	.035	.05
Buckeye Creek	810.82		.05	.035	.05
Buckeye Creek	604.54		.05	.035	.05 .01
Buckeye Creek	433.99		.05	.035	.05 .01
Buckeye Creek	289.71		.05	.035	.05 .01
Buckeye Creek	109.26		.05	.035	.05
Buckeye Creek	0		.05	.035	.05

SUMMARY OF REACH LENGTHS

River: Buckeye Creek

Reach	River Sta.	Left	Channel	Right
Buckeye Creek	3504.54	50	50	50
Buckeye Creek	3454.54	52	50	50
Buckeye Creek	3404.54	55	50	50

Buckeye Creek	3354.54	35	50	50
Buckeye Creek	3304.54	55	50	47
Buckeye Creek	3254.54	43	50	52
Buckeye Creek	3204.54	44	50	51
Buckeye Creek	3154.54	48	50	52
Buckeye Creek	3104.54	22	50	48
Buckeye Creek	3054.54	23	50	53
Buckeye Creek	3004.54	36	50	48
Buckeye Creek	2954.54	36	50	48
Buckeye Creek	2904.54	42	49.96	51
Buckeye Creek	2854.58	40	50.04	52
Buckeye Creek	2804.54	87	50	60
Buckeye Creek	2754.54	109	50	58
Buckeye Creek	2704.54	52	43.25	43
Buckeye Creek	2661.29	53	58	63
Buckeye Creek	2603.43	68	48.89	51
Buckeye Creek	2554.54	83	59.92	60
Buckeye Creek	2494.62	170	76.77	86
Buckeye Creek	2460.04	Bridge		
Buckeye Creek	2417.85	91	63.32	62
Buckeye Creek	2354.53	144	48.15	69
Buckeye Creek	2306.38	90	51.84	42
Buckeye Creek	2254.54	90	50	45
Buckeye Creek	2204.54	74	50	44
Buckeye Creek	2154.54	63	48.8	47
Buckeye Creek	2105.74	190	202.35	215
Buckeye Creek	1903.41	233	99.41	34
Buckeye Creek	1804	279	199.46	52
Buckeye Creek	1604.54	149	184.82	41
Buckeye Creek	1419.72	173	185.67	44
Buckeye Creek	1234.05	117	131.34	192.99
Buckeye Creek	1102.70	138.99	130.59	147.99
Buckeye Creek	972.12	168	161.32	108
Buckeye Creek	810.82	200	178.48	258
Buckeye Creek	604.54	239	198.36	80
Buckeye Creek	433.99	150.99	144.27	75.99
Buckeye Creek	289.71	142	180.45	179
Buckeye Creek	109.26	105.99	109.26	120
Buckeye Creek	0	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Buckeye Creek

Reach	River Sta.	Contr.	Expan.

Buckeye Creek	3504.54		.1	.3
Buckeye Creek	3454.54		.1	.3
Buckeye Creek	3404.54		.1	.3
Buckeye Creek	3354.54		.1	.3
Buckeye Creek	3304.54		.1	.3
Buckeye Creek	3254.54		.1	.3
Buckeye Creek	3204.54		.1	.3
Buckeye Creek	3154.54		.1	.3
Buckeye Creek	3104.54		.1	.3
Buckeye Creek	3054.54		.1	.3
Buckeye Creek	3004.54		.1	.3
Buckeye Creek	2954.54		.1	.3
Buckeye Creek	2904.54		.1	.3
Buckeye Creek	2854.58		.1	.3
Buckeye Creek	2804.54		.1	.3
Buckeye Creek	2754.54		.1	.3
Buckeye Creek	2704.54		.1	.3
Buckeye Creek	2661.29		.1	.3
Buckeye Creek	2603.43		.1	.3
Buckeye Creek	2554.54		.1	.3
Buckeye Creek	2494.62		.3	.5
Buckeye Creek	2460.04	Bridge		
Buckeye Creek	2417.85		.3	.5
Buckeye Creek	2354.53		.1	.3
Buckeye Creek	2306.38		.1	.3
Buckeye Creek	2254.54		.1	.3
Buckeye Creek	2204.54		.1	.3
Buckeye Creek	2154.54		.1	.3
Buckeye Creek	2105.74		.1	.3
Buckeye Creek	1903.41		.1	.3
Buckeye Creek	1804		.1	.3
Buckeye Creek	1604.54		.1	.3
Buckeye Creek	1419.72		.1	.3
Buckeye Creek	1234.05		.1	.3
Buckeye Creek	1102.70		.1	.3
Buckeye Creek	972.12		.1	.3
Buckeye Creek	810.82		.1	.3
Buckeye Creek	604.54		.1	.3
Buckeye Creek	433.99		.1	.3
Buckeye Creek	289.71		.1	.3
Buckeye Creek	109.26		.1	.3
Buckeye Creek	0		.1	.3

Profile Output Table - Standard Table 1

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/s)	(sq ft)	(ft)	
Buckeye Creek	3504.54	100-Year	5150.00	804.44	814.46							
						815.16	0.001592	6.73	779.77	110.81		0.41
Buckeye Creek	3454.54	100-Year	5150.00	804.38	814.14							
						815.05	0.002017	7.84	746.74	132.92		0.48
Buckeye Creek	3404.54	100-Year	5150.00	804.32	813.89							
						814.92	0.002433	8.41	697.11	128.65		0.52
Buckeye Creek	3354.54	100-Year	5150.00	804.25	814.01							
						814.73	0.001677	7.26	935.62	202.52		0.44
Buckeye Creek	3304.54	100-Year	5150.00	804.25	813.95							
						814.64	0.001658	7.14	982.96	236.04		0.43
Buckeye Creek	3254.54	100-Year	5150.00	804.12	814.03							
						814.50	0.001190	6.14	1222.90	287.12		0.37
Buckeye Creek	3204.54	100-Year	5150.00	804.05	814.02							
						814.43	0.001060	5.90	1352.03	321.11		0.35
Buckeye Creek	3154.54	100-Year	5150.00	803.89	813.94							
						814.37	0.001095	6.05	1369.74	362.33		0.35
Buckeye Creek	3104.54	100-Year	5150.00	803.47	813.81							
						814.31	0.001192	6.28	1138.45	236.94		0.37
Buckeye Creek	3054.54	100-Year	5150.00	803.03	813.71							
						814.25	0.001256	6.40	1060.33	198.49		0.38
Buckeye Creek	3004.54	100-Year	5150.00	802.18	813.71							
						814.17	0.001071	6.07	1194.12	233.97		0.35
Buckeye Creek	2954.54	100-Year	5150.00	802.18	813.69							
						814.12	0.001015	5.99	1291.76	274.68		0.34
Buckeye Creek	2904.54	100-Year	5150.00	802.00	813.74							
						814.04	0.000697	4.97	1559.97	324.08		0.28
Buckeye Creek	2854.58	100-Year	5150.00	802.00	813.75							
						813.99	0.000544	4.50	1764.50	362.33		0.25
Buckeye Creek	2804.54	100-Year	5150.00	802.00	813.81							
						813.94	0.000374	3.68	2345.81	641.82		0.21
Buckeye Creek	2754.54	100-Year	5150.00	802.00	813.79							
						813.91	0.000321	3.55	2457.00	514.41		0.19
Buckeye Creek	2704.54	100-Year	5150.00	802.00	813.73							
						813.88	0.000407	3.97	2162.43	387.79		0.22
Buckeye Creek	2661.29	100-Year	5150.00	802.00	813.69							
						813.85	0.000466	4.23	2058.82	387.37		0.23
Buckeye Creek	2603.43	100-Year	5150.00	802.00	813.55							
						813.82	0.000582	4.92	1657.19	301.01		0.26
Buckeye Creek	2554.54	100-Year	5150.00	800.98	813.57							
						813.77	0.000497	4.43	2005.67	439.55		0.24
Buckeye Creek	2494.62	100-Year	5150.00	799.17	811.96							
						808.33	813.56	0.002598	10.16	506.78	252.96	0.54

Buckeye Creek	2460.04			Bridge			
Buckeye Creek	2417.85		100-Year	5150.00	798.50	811.41	
	813.21	0.003044	10.83	512.03	82.90	0.58	
Buckeye Creek	2354.53		100-Year	5150.00	797.95	811.51	
807.93	812.78	0.002157	9.36	632.31	79.62		0.49
Buckeye Creek	2306.38		100-Year	5150.00	798.34	811.04	
808.59	812.62	0.003079	10.52	569.86	78.87		0.58
Buckeye Creek	2254.54		100-Year	5150.00	798.53	810.88	
808.57	812.45	0.003256	10.53	567.94	79.00		0.59
Buckeye Creek	2204.54		100-Year	5150.00	798.81	810.73	
808.30	812.28	0.003166	10.46	572.96	78.64		0.59
Buckeye Creek	2154.54		100-Year	5150.00	798.60	811.56	
807.89	811.84	0.000720	5.17	1550.45	276.23		0.29
Buckeye Creek	2105.74		100-Year	5150.00	797.84	811.55	
	811.80	0.000591	4.96	1895.66	427.73	0.26	
Buckeye Creek	1903.41		100-Year	5150.00	798.59	811.49	
	811.67	0.000482	4.63	2329.97	564.62	0.24	
Buckeye Creek	1804		100-Year	5150.00	797.78	811.48	
805.90	811.61	0.000356	4.08	2751.96	1067.33		0.21
Buckeye Creek	1604.54		100-Year	5150.00	796.53	811.49	
	811.54	0.000165	2.72	3626.18	661.40	0.13	
Buckeye Creek	1419.72		100-Year	5150.00	796.37	811.44	
	811.52	0.000183	2.97	3246.65	653.60	0.15	
Buckeye Creek	1234.05		100-Year	5150.00	798.00	811.43	
	811.49	0.000156	2.74	3653.16	673.76	0.14	
Buckeye Creek	1102.70		100-Year	5150.00	798.00	811.40	
	811.47	0.000173	2.85	3434.30	593.36	0.14	
Buckeye Creek	972.12		100-Year	5150.00	797.56	811.34	
	811.44	0.000215	3.30	2838.34	503.54	0.16	
Buckeye Creek	810.82		100-Year	5150.00	797.30	811.26	
	811.39	0.000323	3.68	2188.45	413.11	0.19	
Buckeye Creek	604.54		100-Year	5150.00	796.96	811.15	
	811.32	0.000392	3.88	1929.77	300.42	0.21	
Buckeye Creek	433.99		100-Year	5150.00	796.69	811.13	
	811.25	0.000285	3.57	2437.90	446.57	0.18	
Buckeye Creek	289.71		100-Year	5150.00	796.46	811.10	
	811.22	0.000270	3.46	2481.28	472.31	0.18	
Buckeye Creek	109.26		100-Year	5150.00	796.17	810.95	
	811.15	0.000443	4.31	1986.74	646.59	0.23	
Buckeye Creek	0		100-Year	5150.00	796.00	811.00	
803.91	811.08	0.000191	2.96	3099.82	653.27		0.15

ERRORS WARNINGS AND NOTES

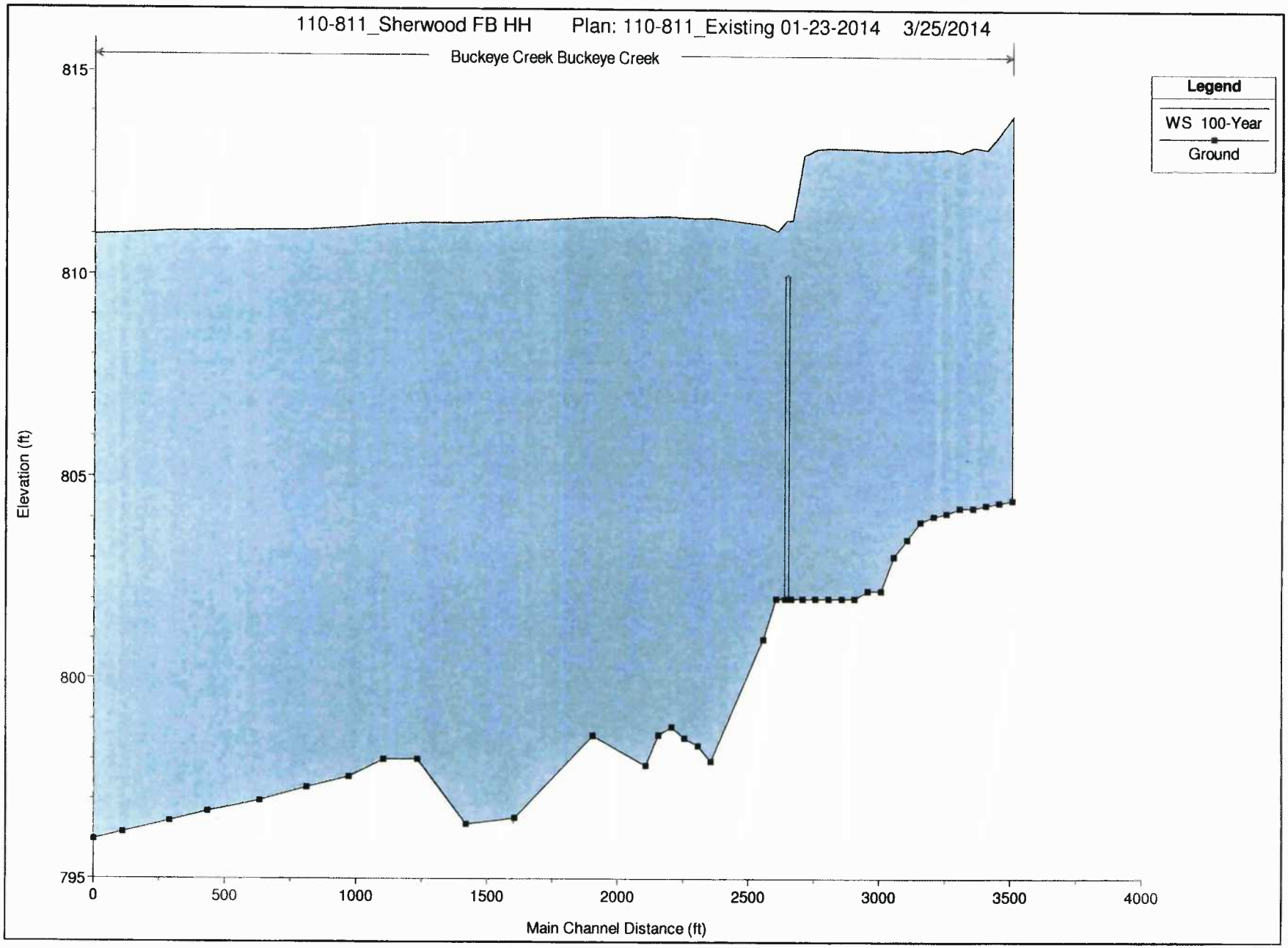
Errors Warnings and Notes for Plan : Proposed-18-PL

River: Buckeye Creek Reach: Buckeye Creek RS: 3404.54 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
River: Buckeye Creek Reach: Buckeye Creek RS: 3254.54 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
River: Buckeye Creek Reach: Buckeye Creek RS: 3104.54 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
River: Buckeye Creek Reach: Buckeye Creek RS: 2804.54 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
River: Buckeye Creek Reach: Buckeye Creek RS: 2754.54 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
River: Buckeye Creek Reach: Buckeye Creek RS: 2554.54 Profile: 100-Year
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Buckeye Creek Reach: Buckeye Creek RS: 2460.04 Profile: 100-Year
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was
used for pressure flow.
River: Buckeye Creek Reach: Buckeye Creek RS: 2460.04 Profile: 100-Year Upstream
Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from
the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
River: Buckeye Creek Reach: Buckeye Creek RS: 2460.04 Profile: 100-Year Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: For the cross section inside the bridge at the downstream end, the water surface and energy have been projected from
the downstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
River: Buckeye Creek Reach: Buckeye Creek RS: 2417.85 Profile: 100-Year
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Buckeye Creek Reach: Buckeye Creek RS: 2354.53 Profile: 100-Year
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 2306.38 Profile: 100-Year
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 2254.54 Profile: 100-Year

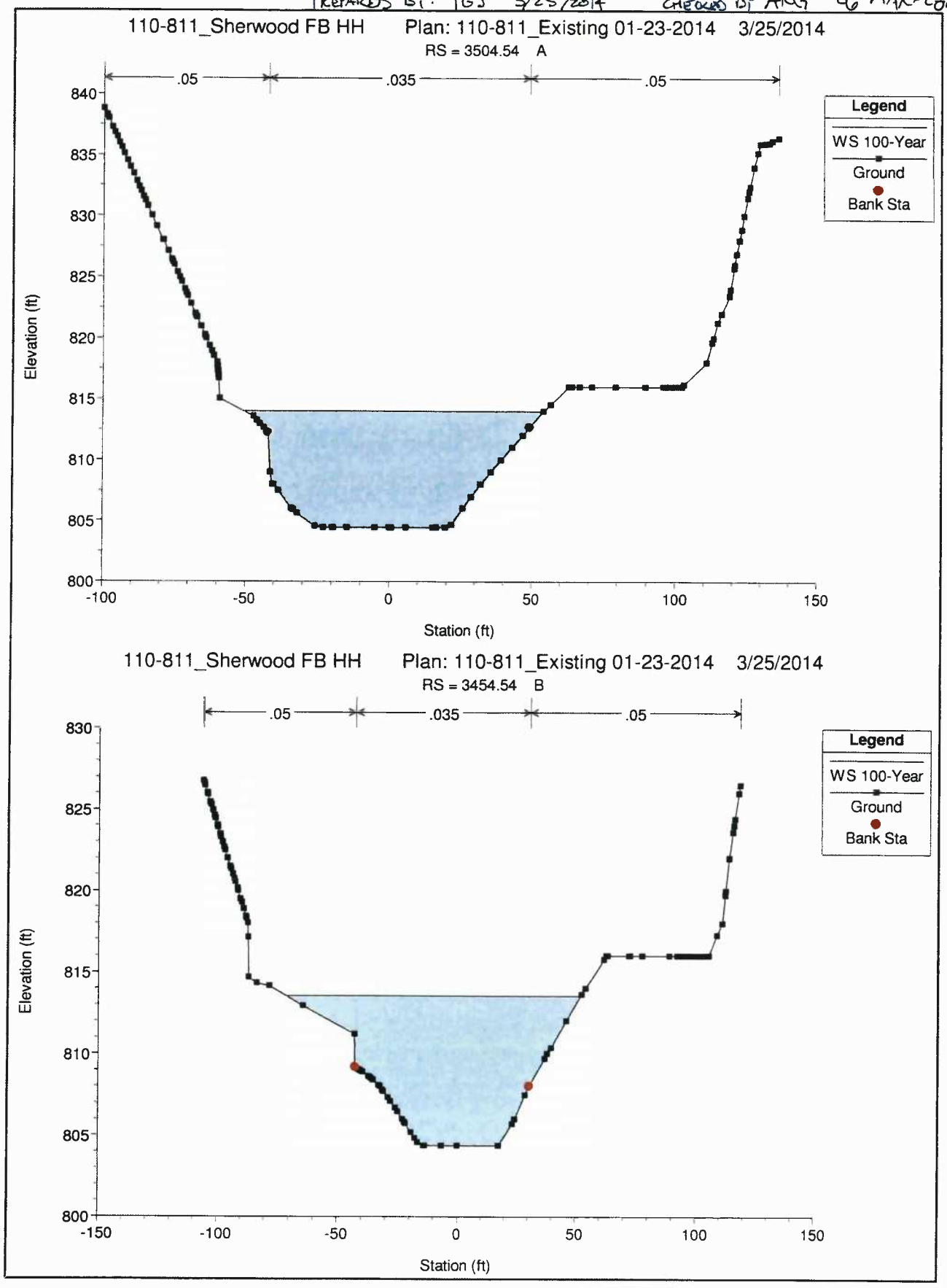
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 2204.54 Profile: 100-Year
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 2154.54 Profile: 100-Year
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 1804 Profile: 100-Year
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buckeye Creek Reach: Buckeye Creek RS: 109.26 Profile: 100-Year
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

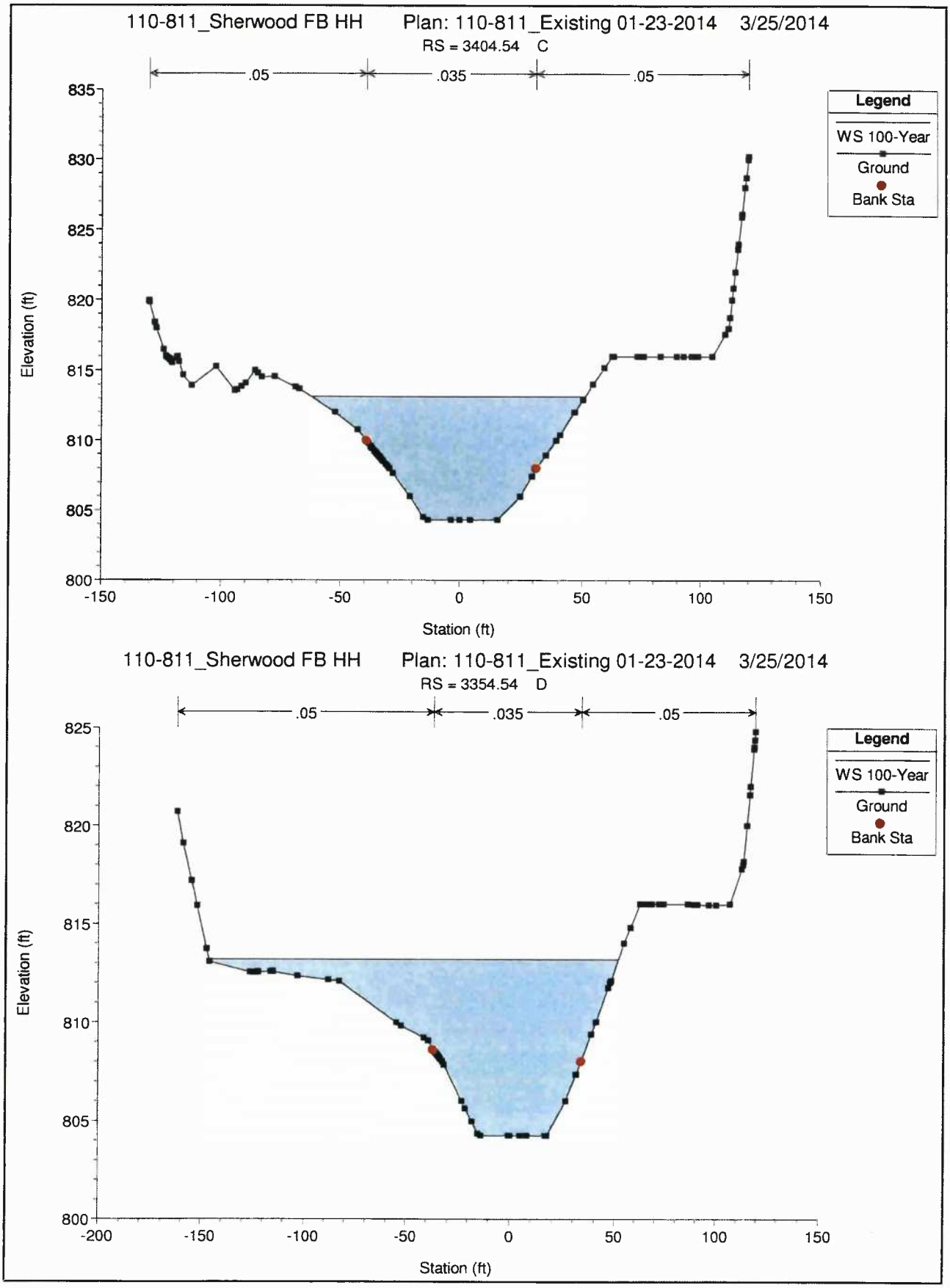
APPENDIX D

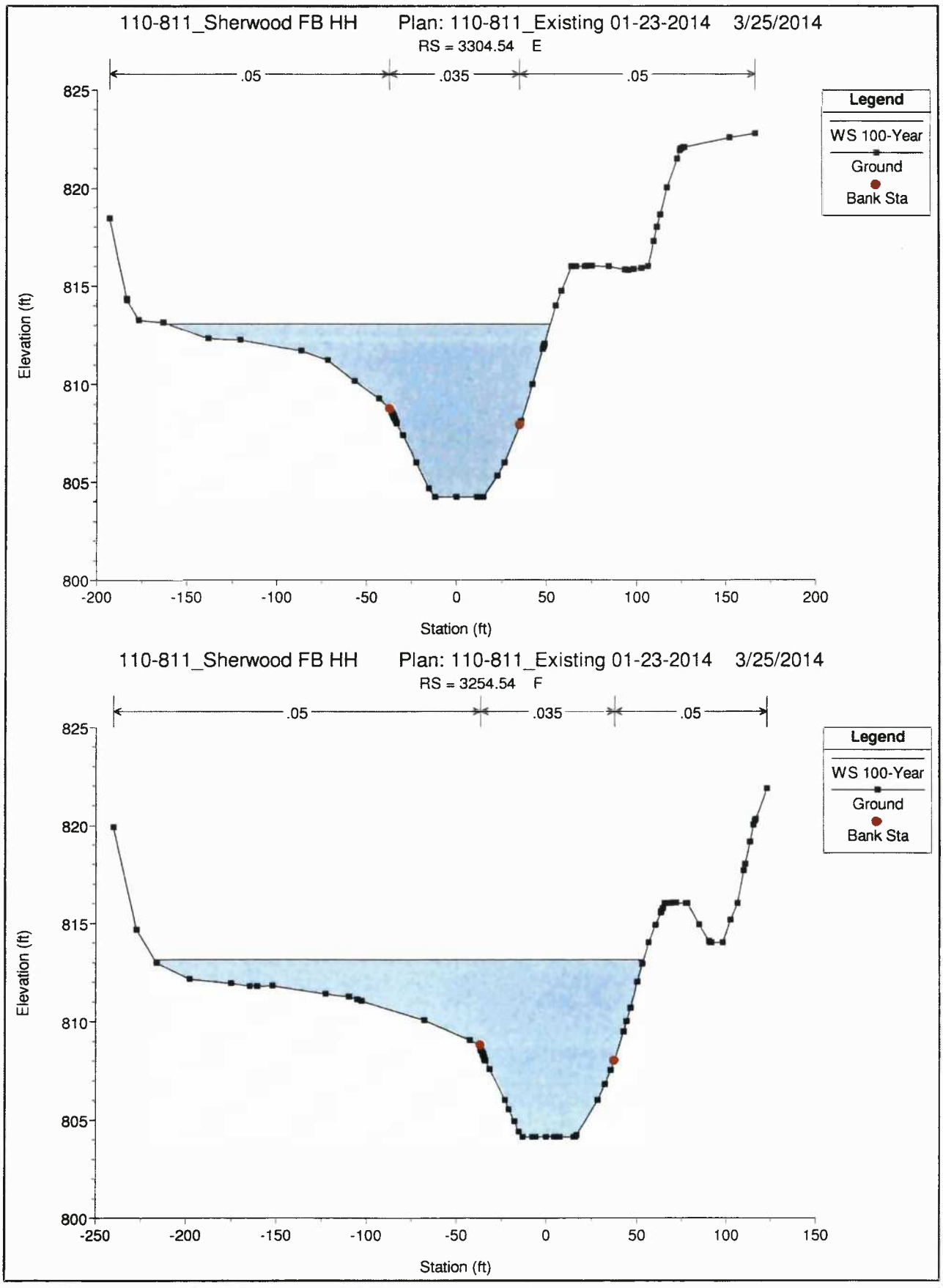
EXISTING AND PROPOSED FLOODWAY MAPS, WATER SURFACE PROFILES, AND CROSS SECTION OUTPUT

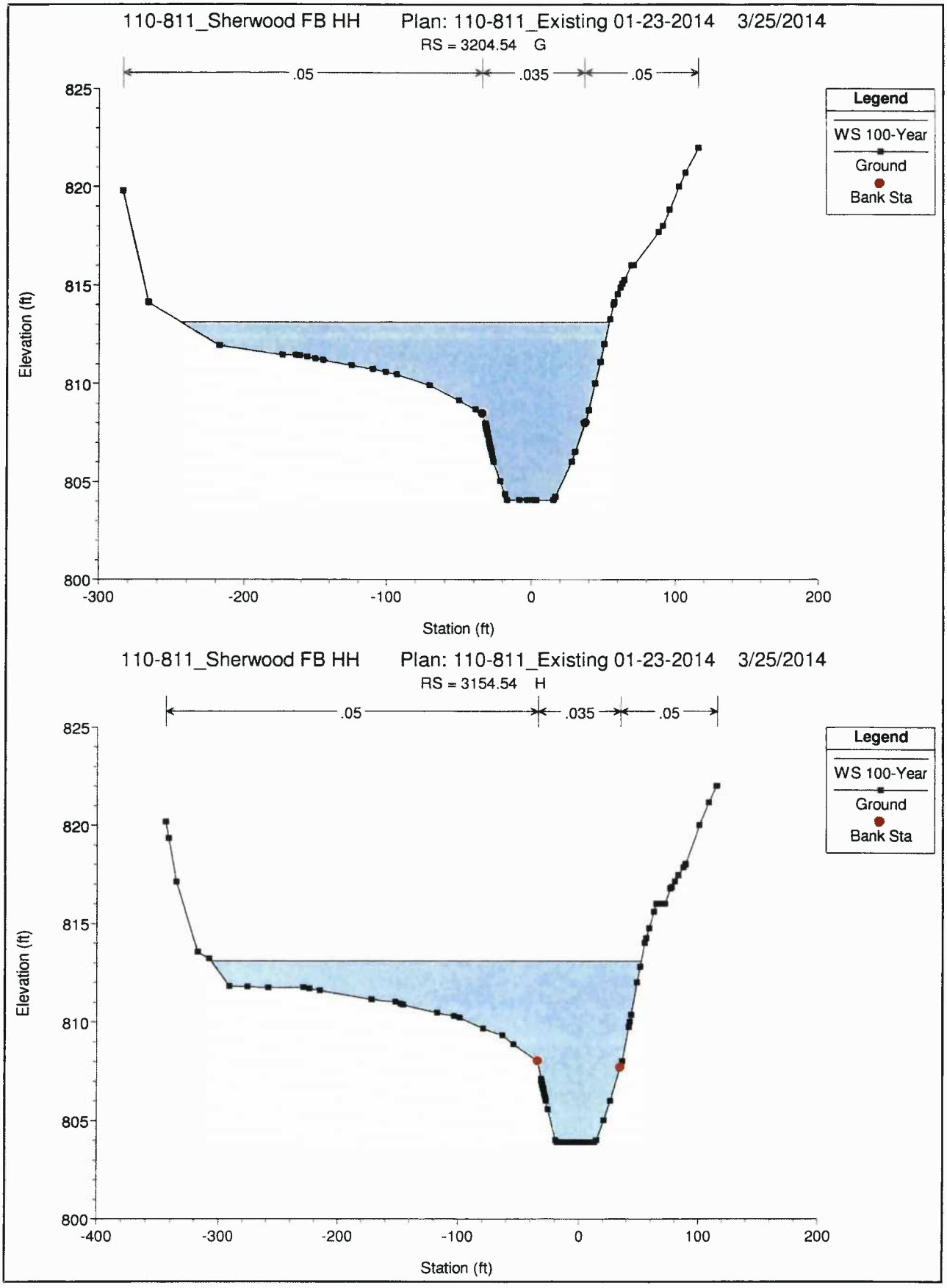

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
Buckeye Creek Buckeye Creek
Legend
WS 100-Year
Ground
Elevation (ft)
815
810
805
800
795
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)

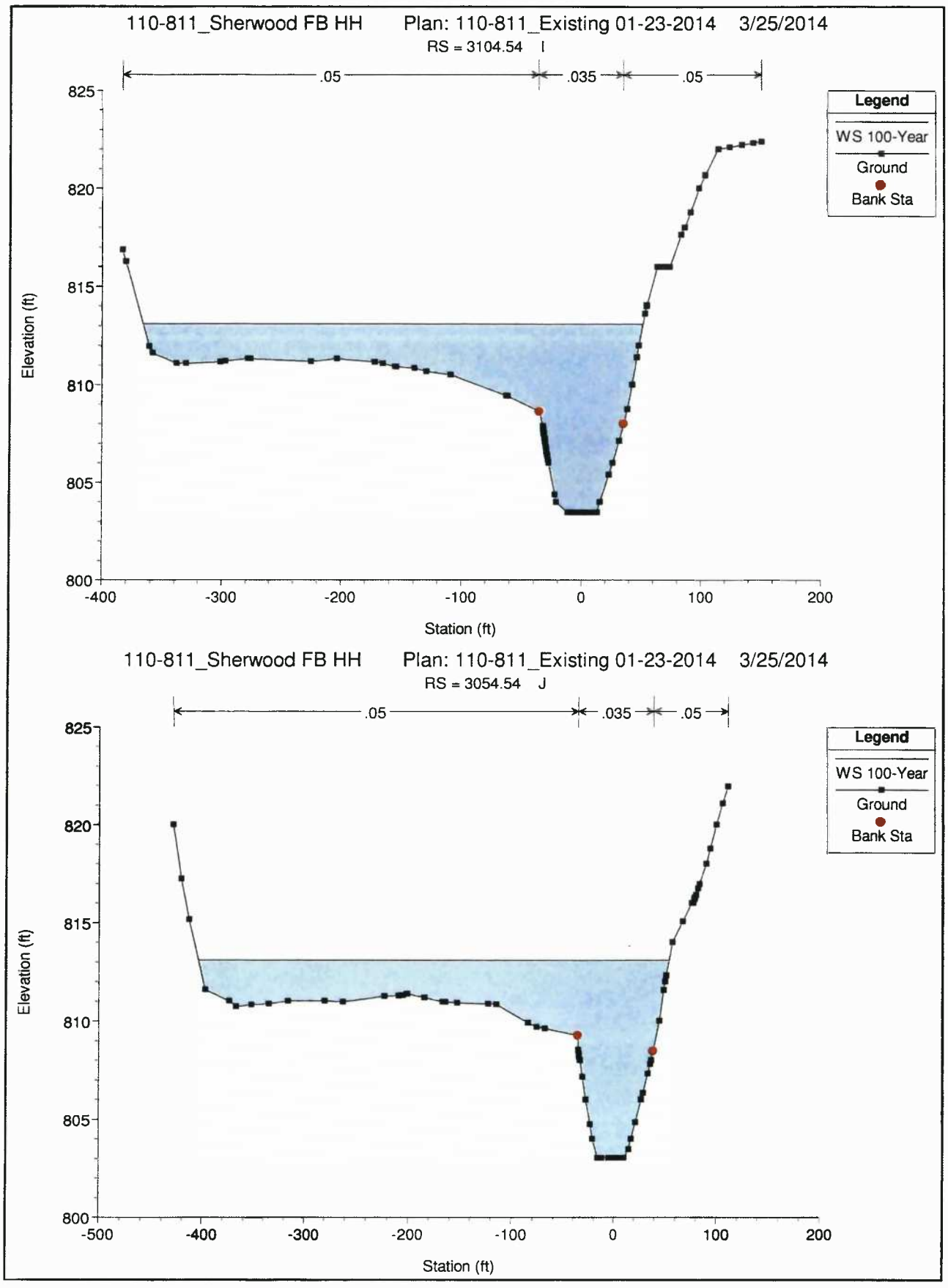
PREPARED BY: TGJ 3/25/2014 CHECKED BY: ARG 26-MAR-2014

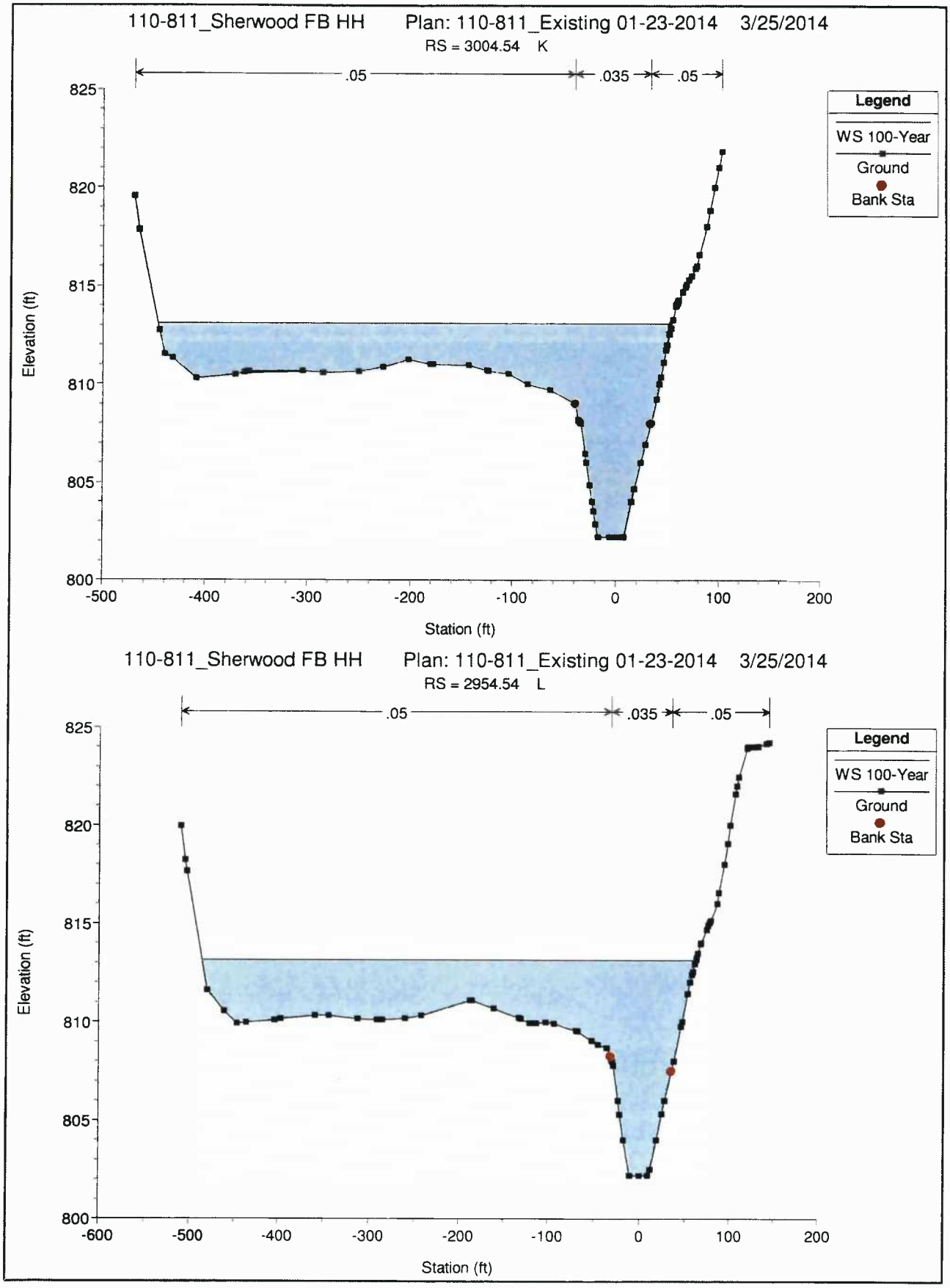


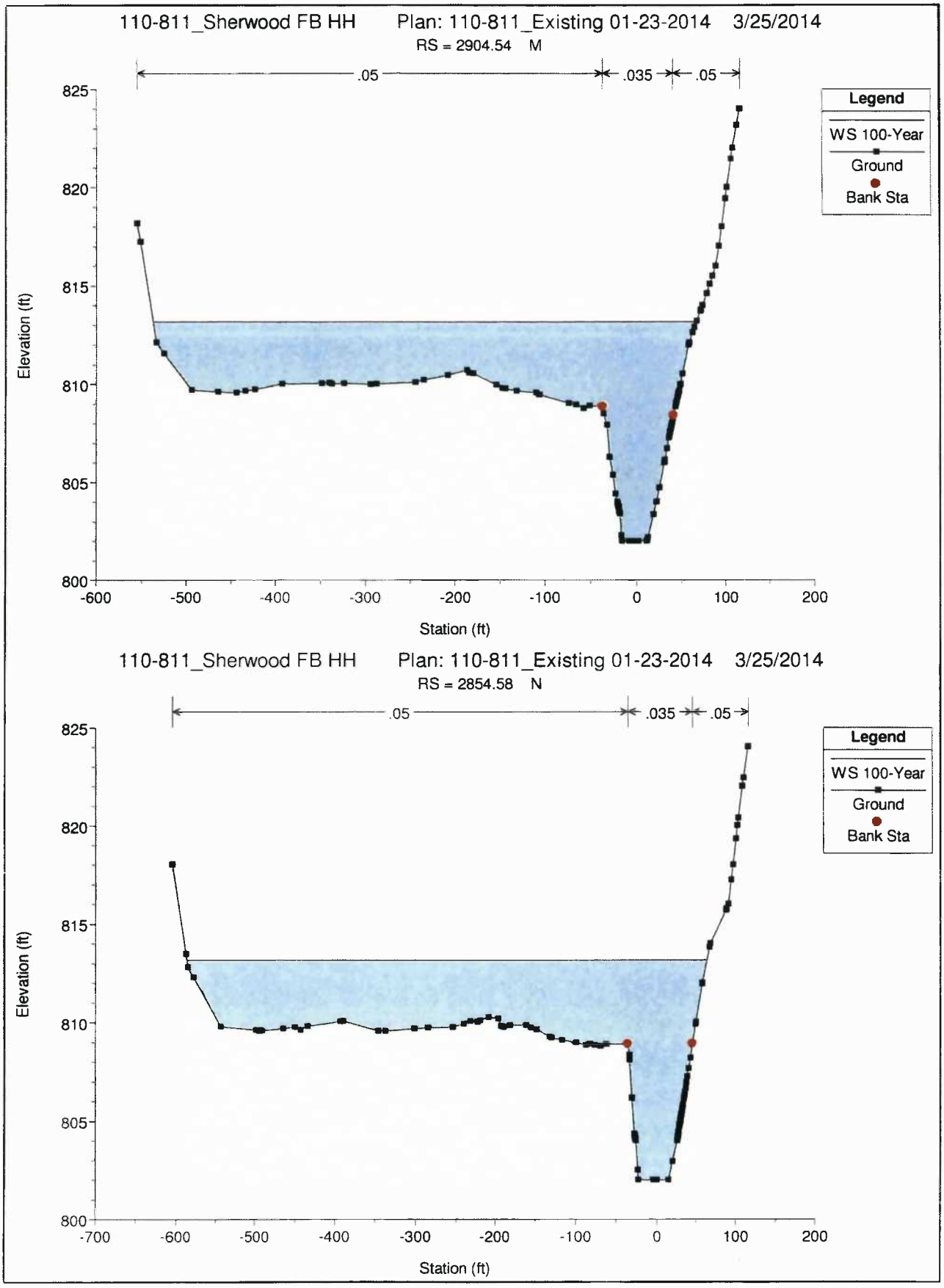

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 3404.54 C
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
835
830
825
820
815
810
805
800
-150
-100
-50
0
50
100
150
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 3354.54 D
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
Station (ft)

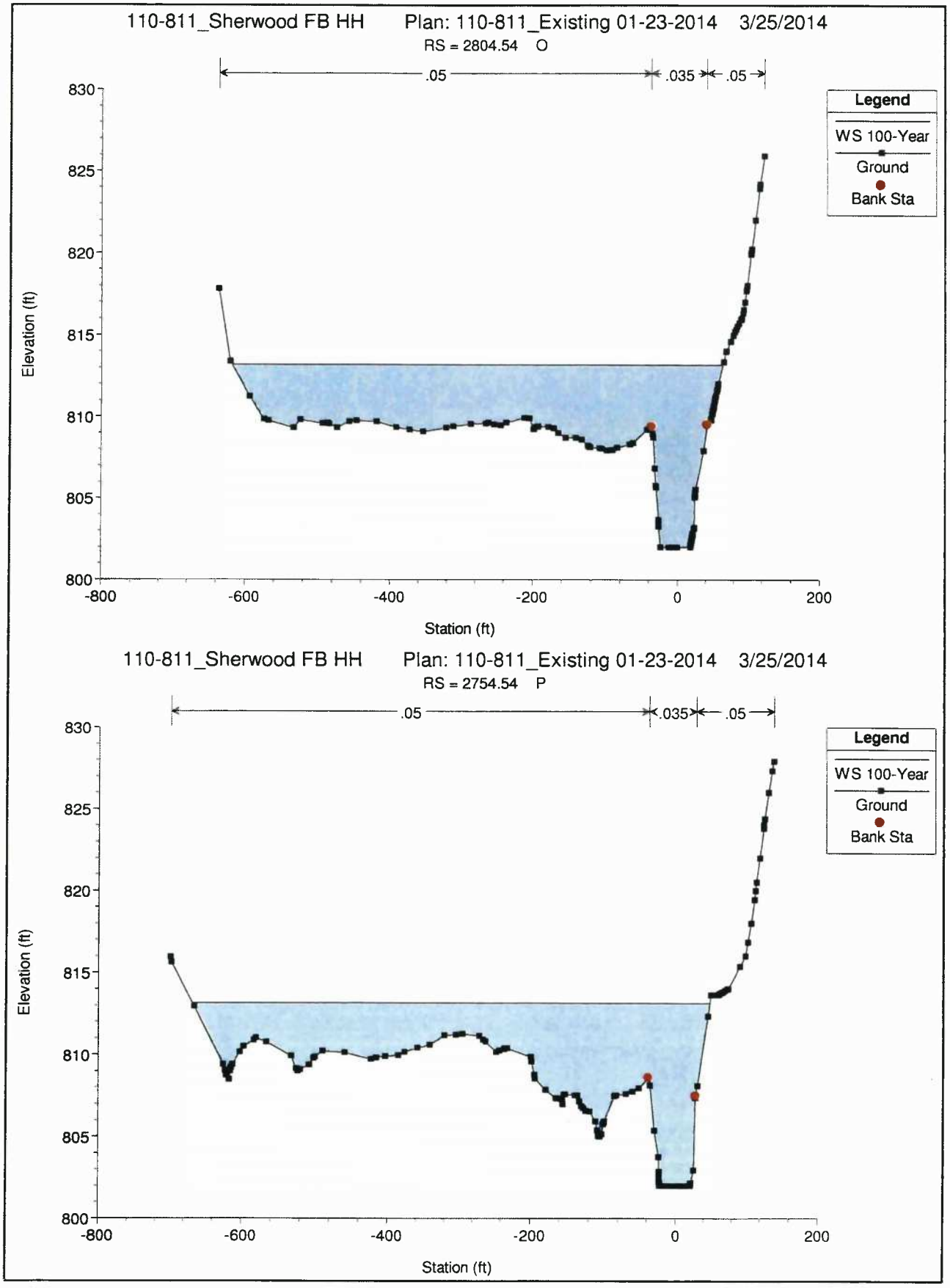

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 3304.54 E
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-200
-150
-100
-50
0
50
100
150
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 3254.54 F
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-250
-200
-150
-100
-50
0
50
100
150
Station (ft)

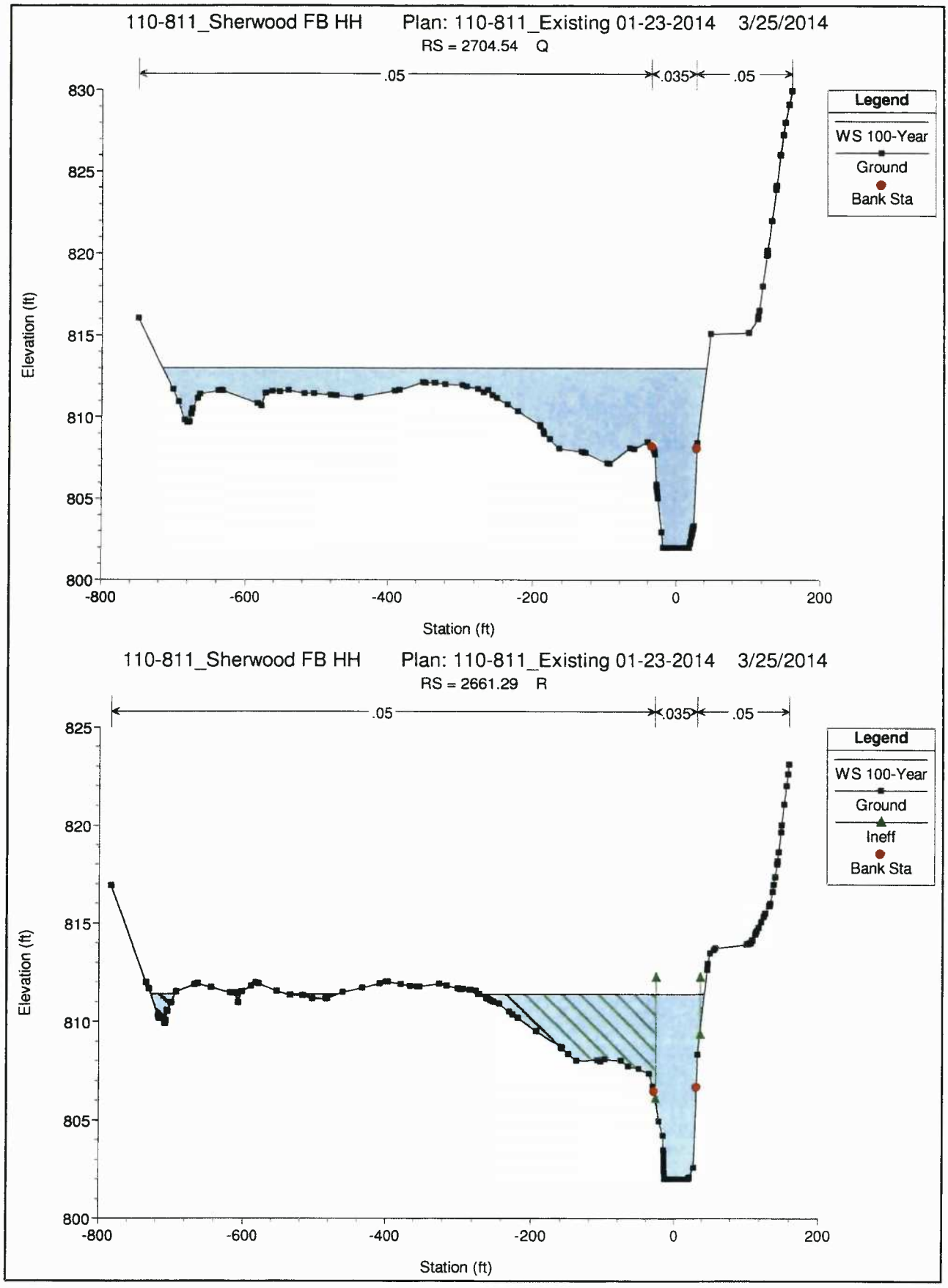

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 3204.54 G
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 3154.54 H
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-400
-300
-200
-100
0
100
200
Station (ft)

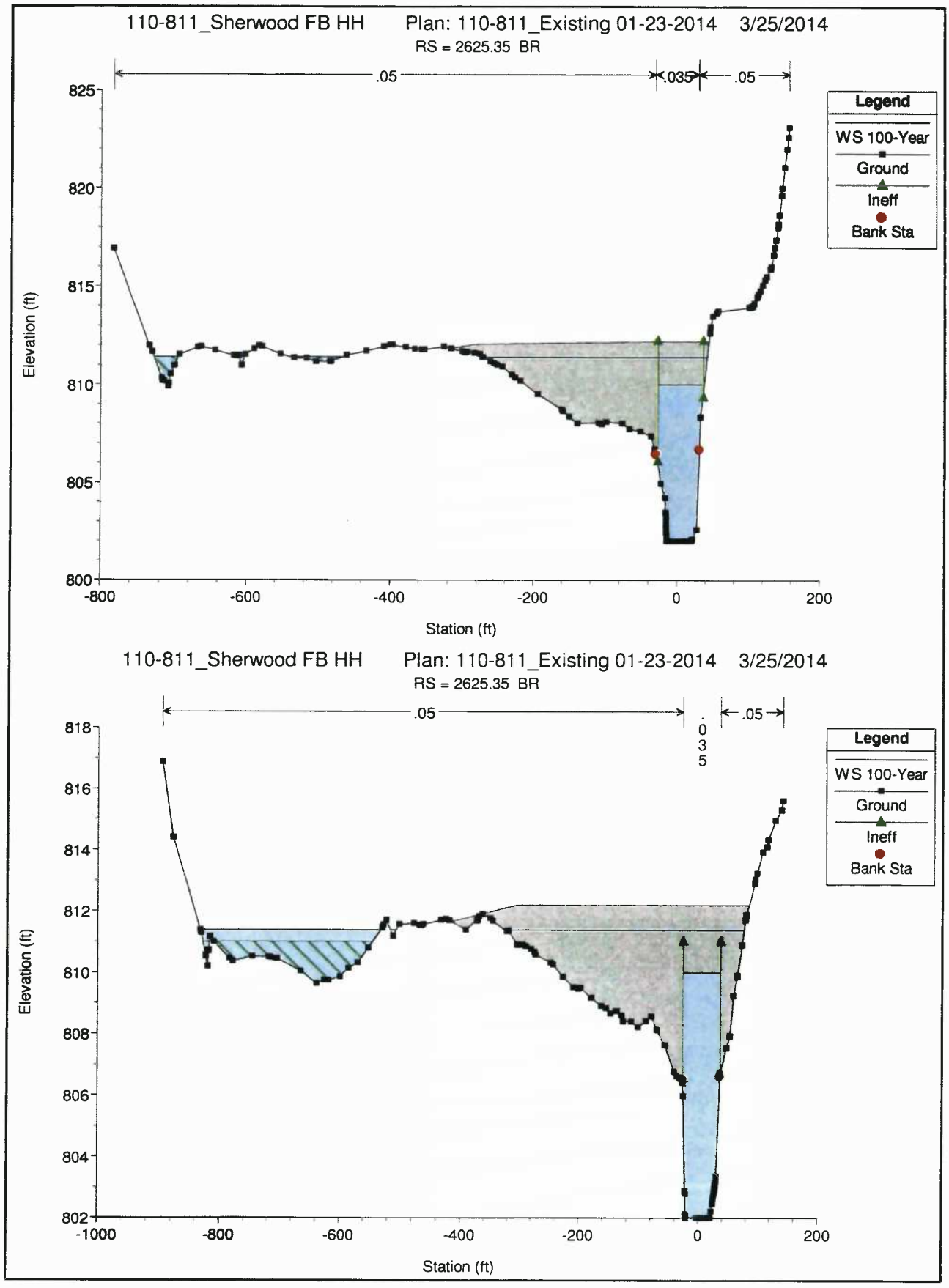

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 3104.54
I
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 3054.54
J
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-500
-400
-300
-200
-100
0
100
200
Station (ft)

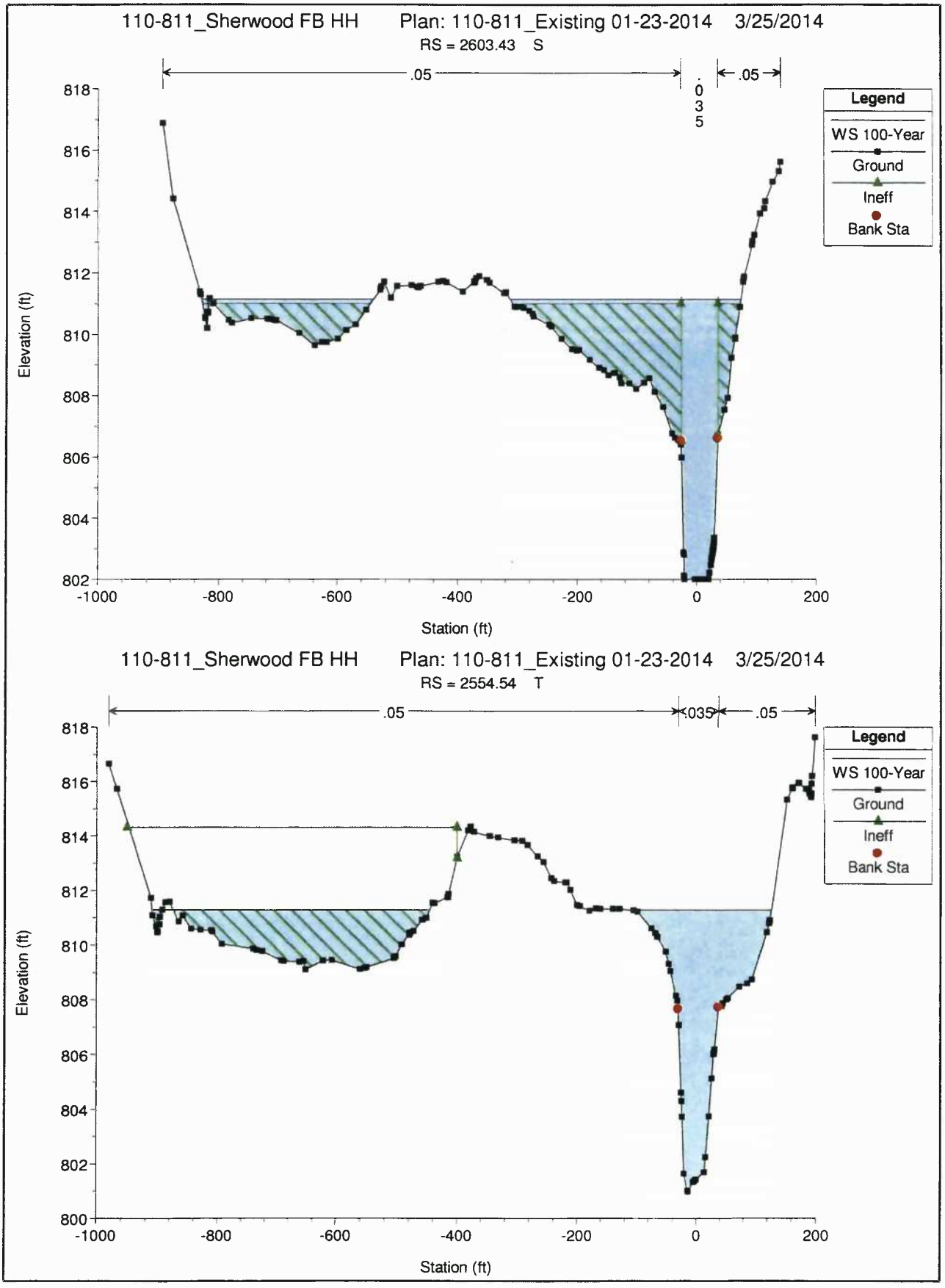

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 3004.54 K
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 2954.54 L
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)

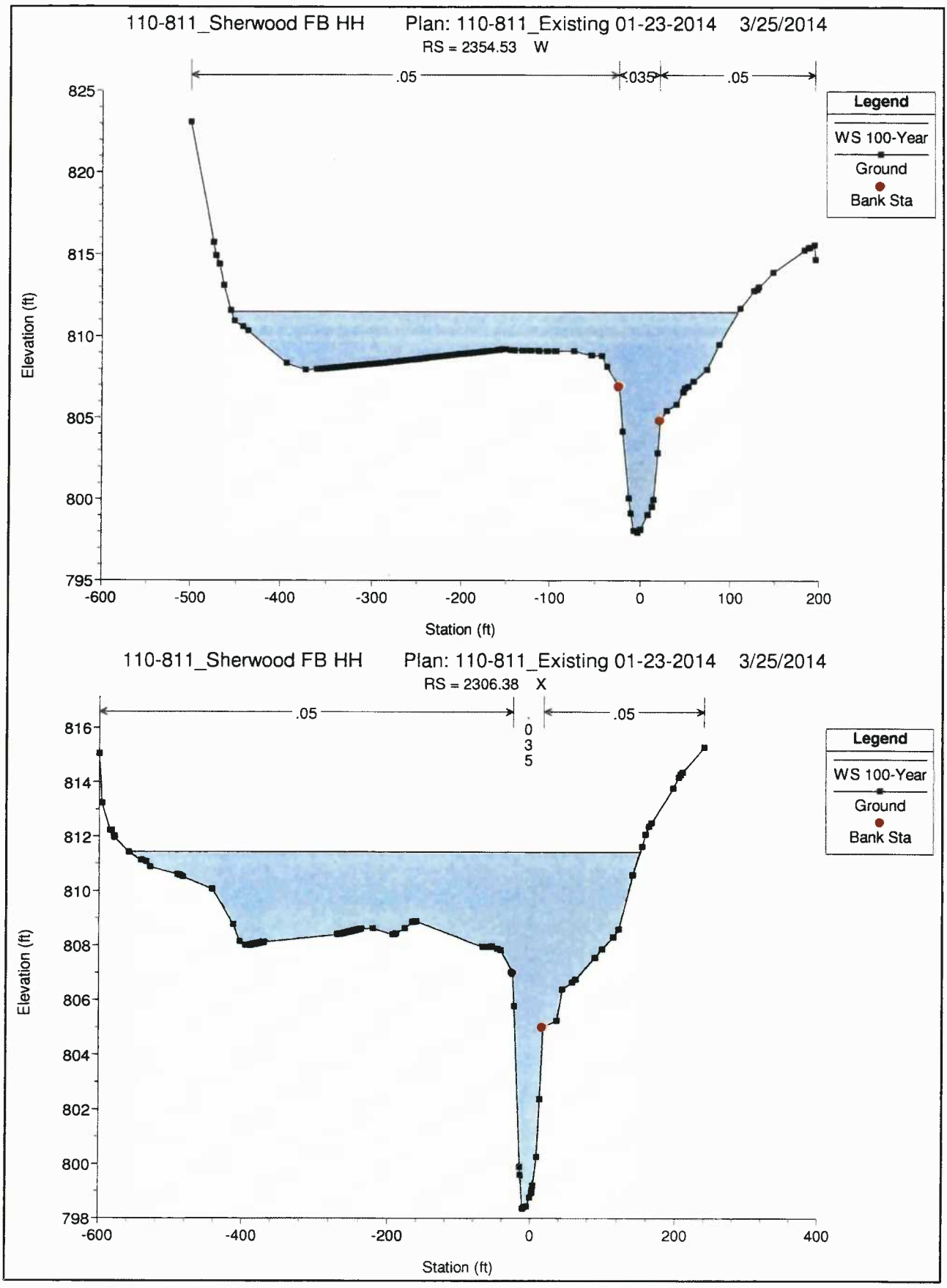

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2904.54 M
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2854.58 N
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-700
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)

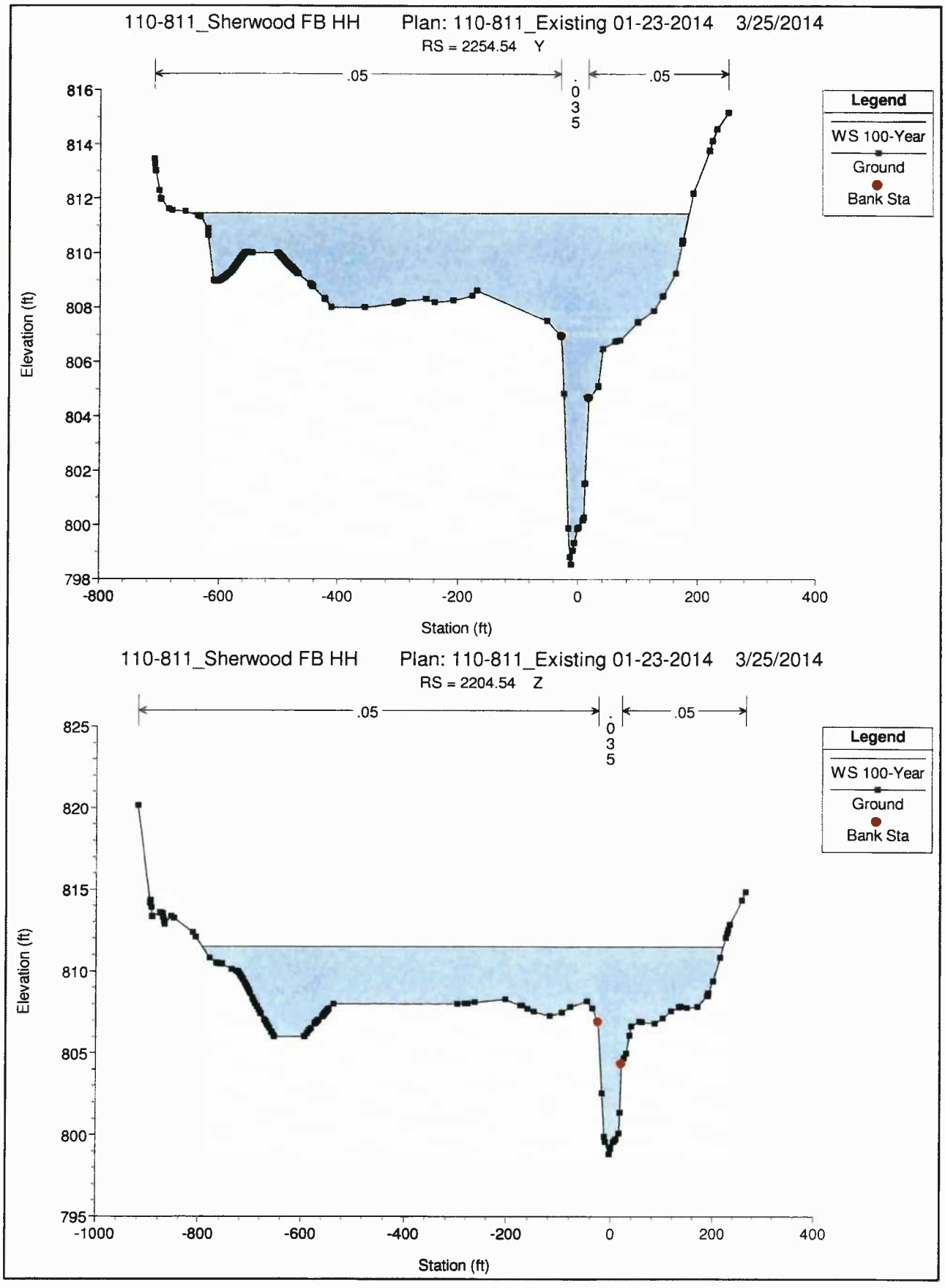

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2804.54 O
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2754.54 P
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

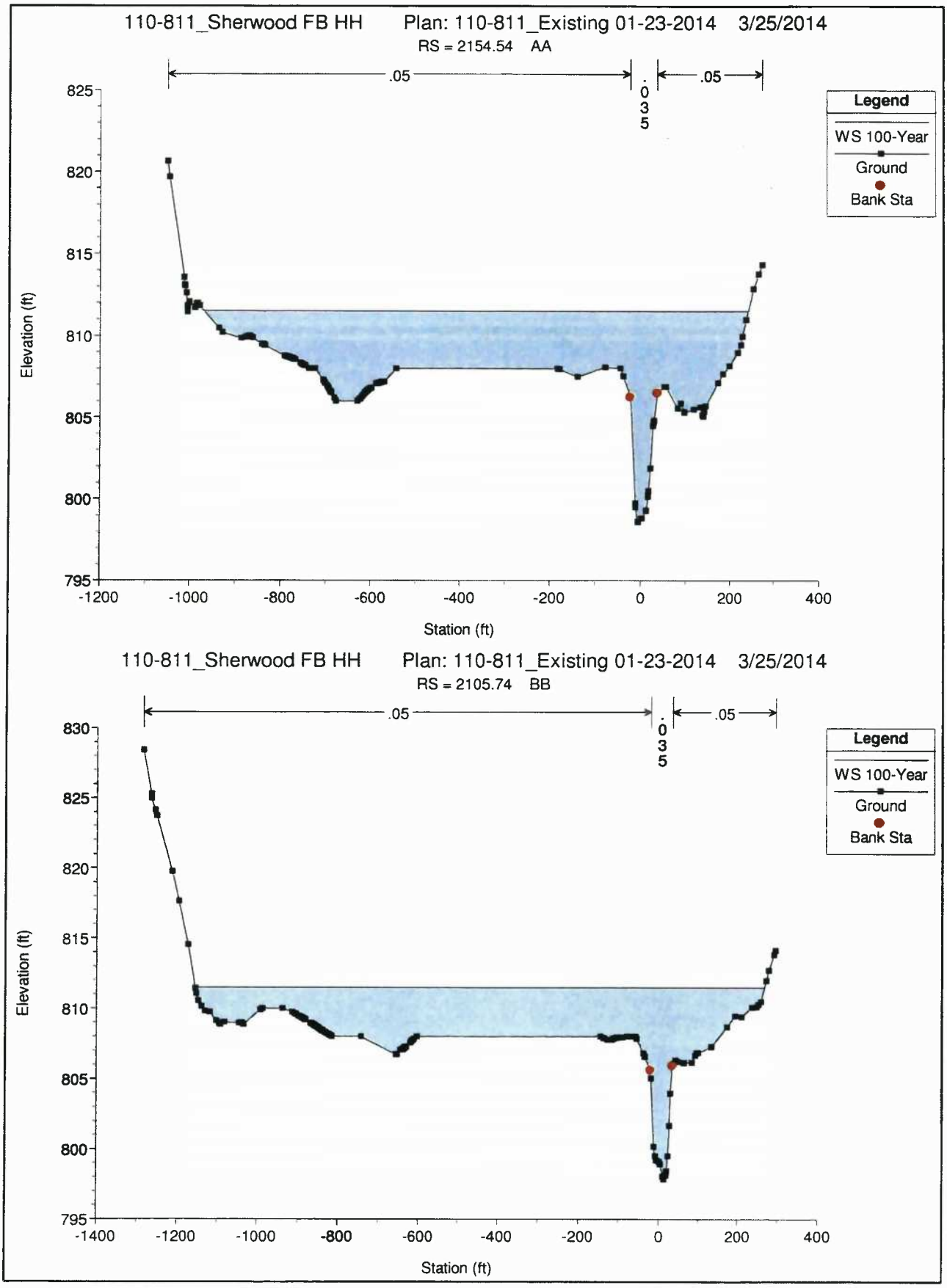

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2704.54 Q
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2661.29 R
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)

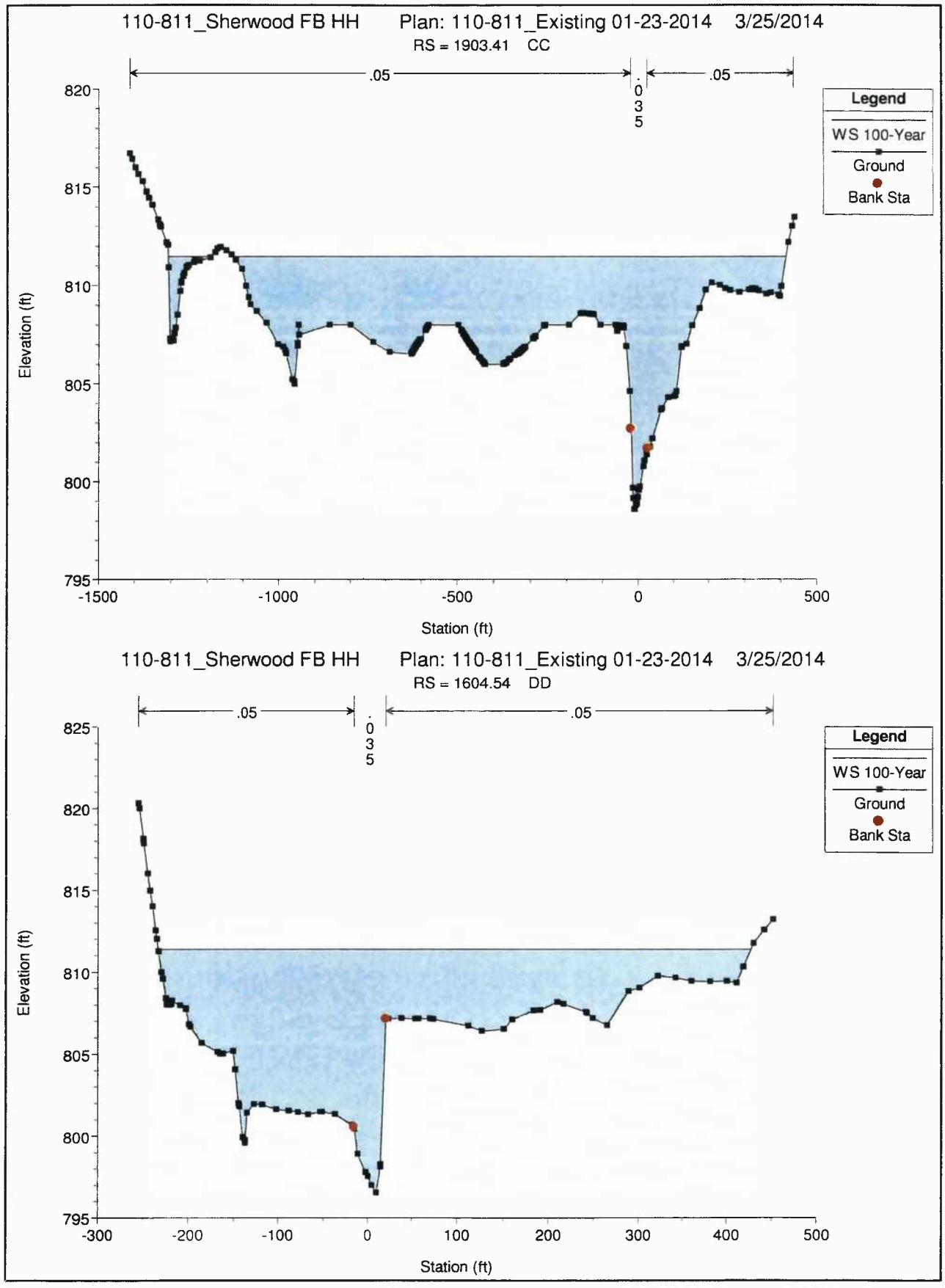

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 2625.35 BR
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
825
820
815
810
805
800
-800
-600
-400
-200
0
200
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 2625.35 BR
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
818
816
814
812
810
808
806
804
802
-1000
-800
-600
-400
-200
0
200
Station (ft)

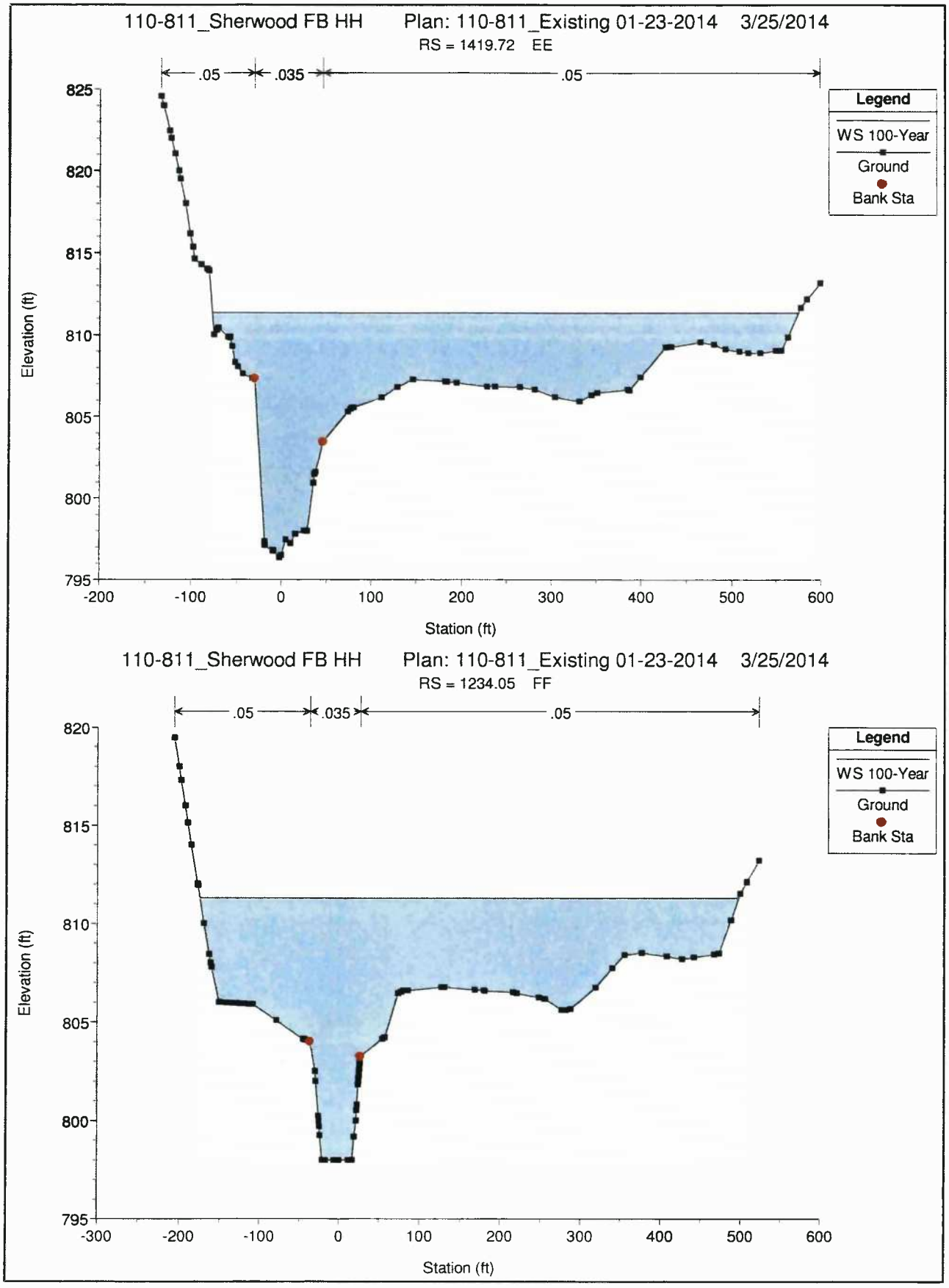

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2603.43 S
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2554.54 T
.05
.035
.05
Legend
WS 100-Year
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

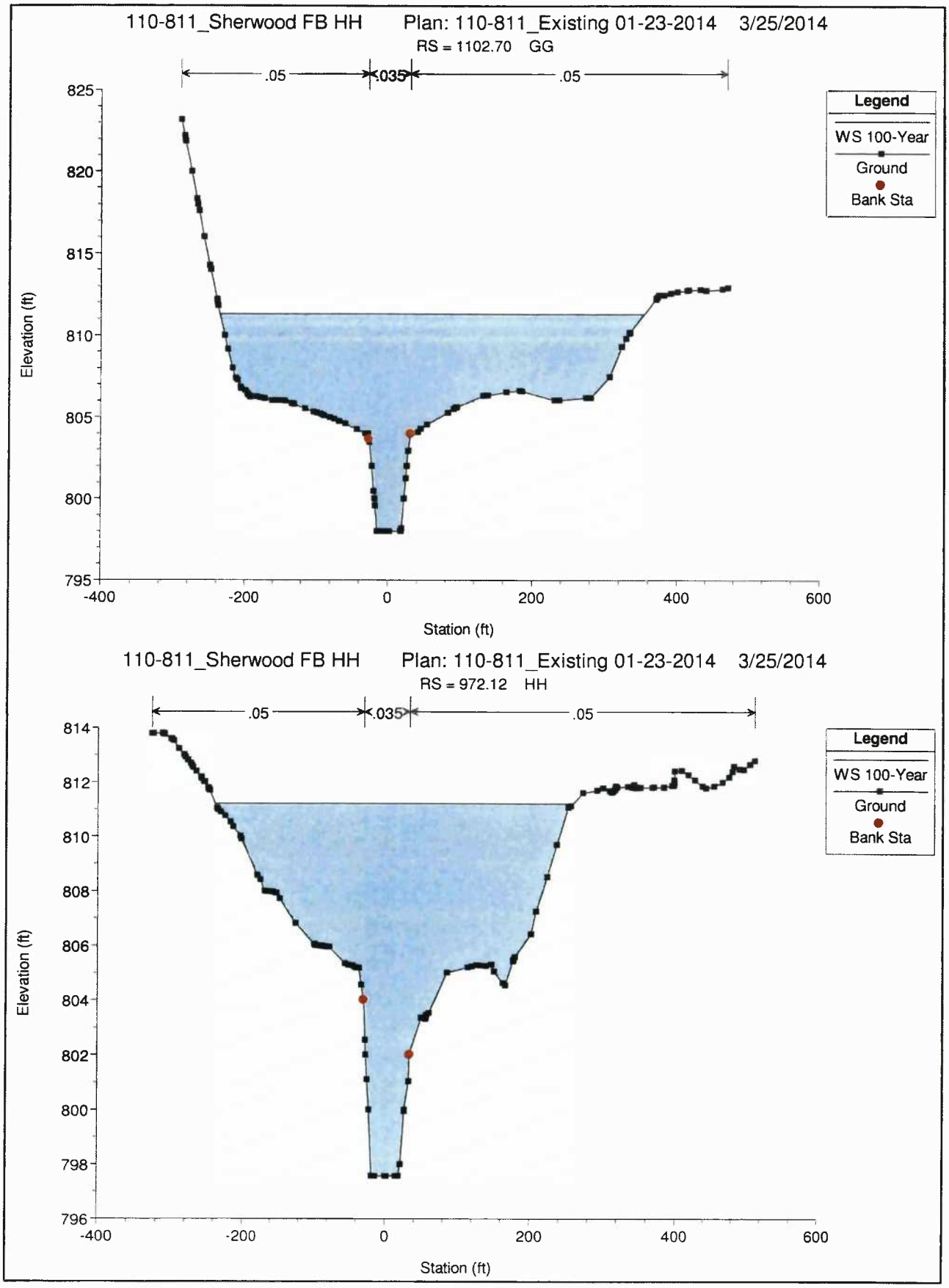

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2354.53 W
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-600
-500
-400
-300
-200
-100
0
100
200
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2306.38 X
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
816
814
812
810
808
806
804
802
800
798
-600
-400
-200
0
200
400
Station (ft)

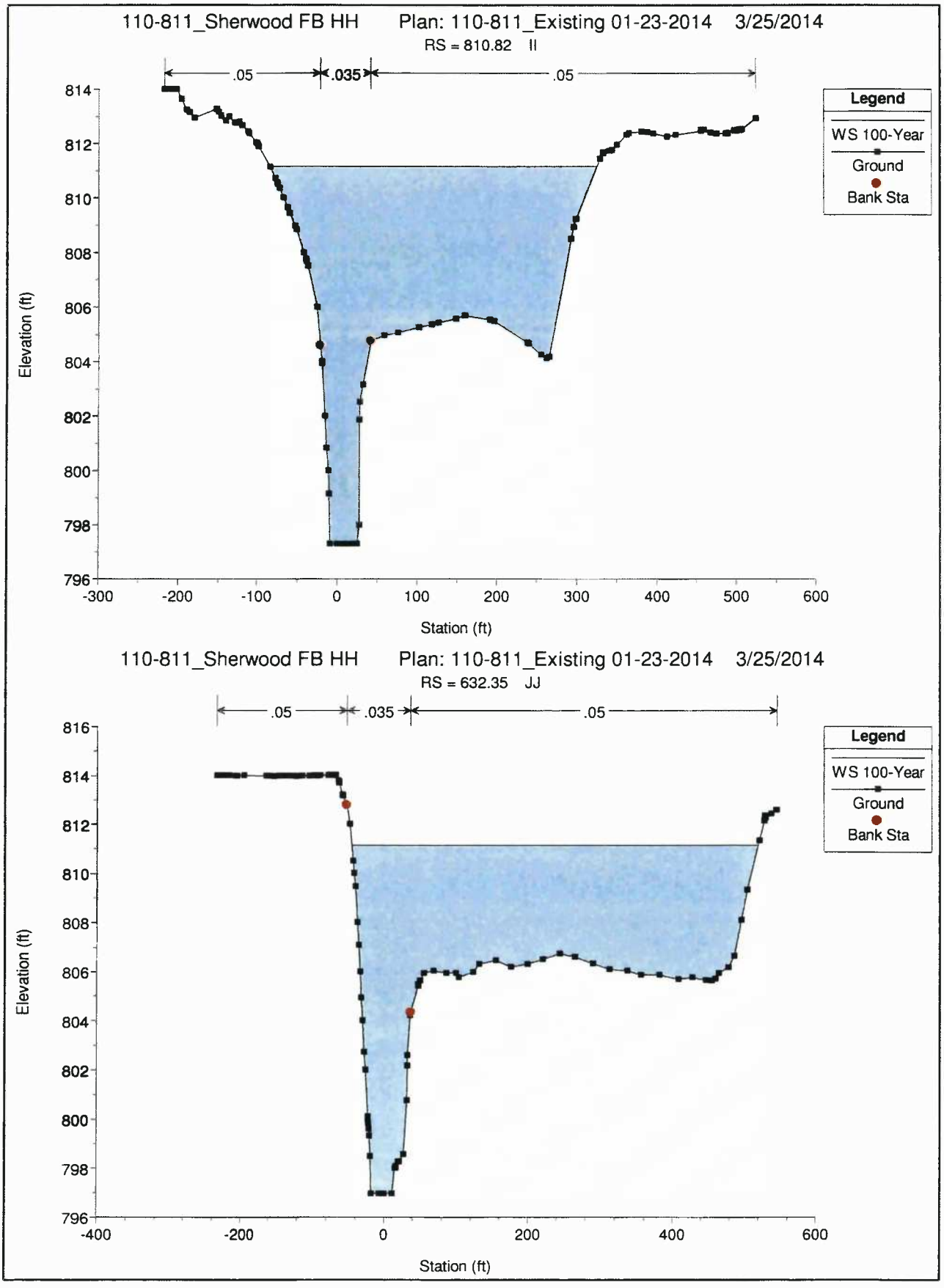

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 2254.54 Y
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
816
814
812
810
808
806
804
802
800
798
-800
-600
-400
-200
0
200
400
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 2204.54 Z
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1000
-800
-600
-400
-200
0
200
400
Station (ft)

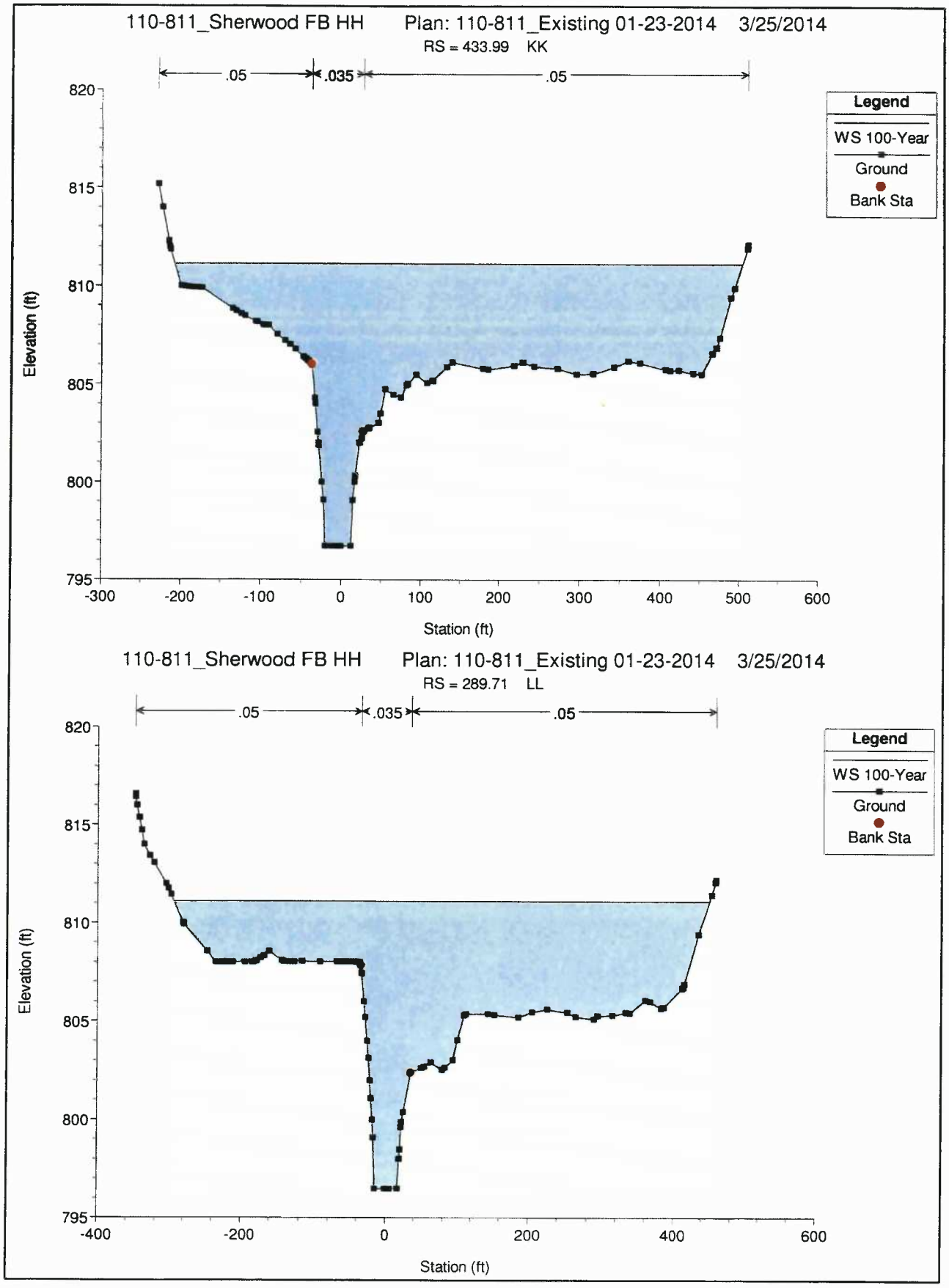

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2154.54 AA
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-1200
-1000
-800
-600
-400
-200
0
200
400
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 2105.74 BB
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
830
825
820
815
810
805
800
795
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Station (ft)

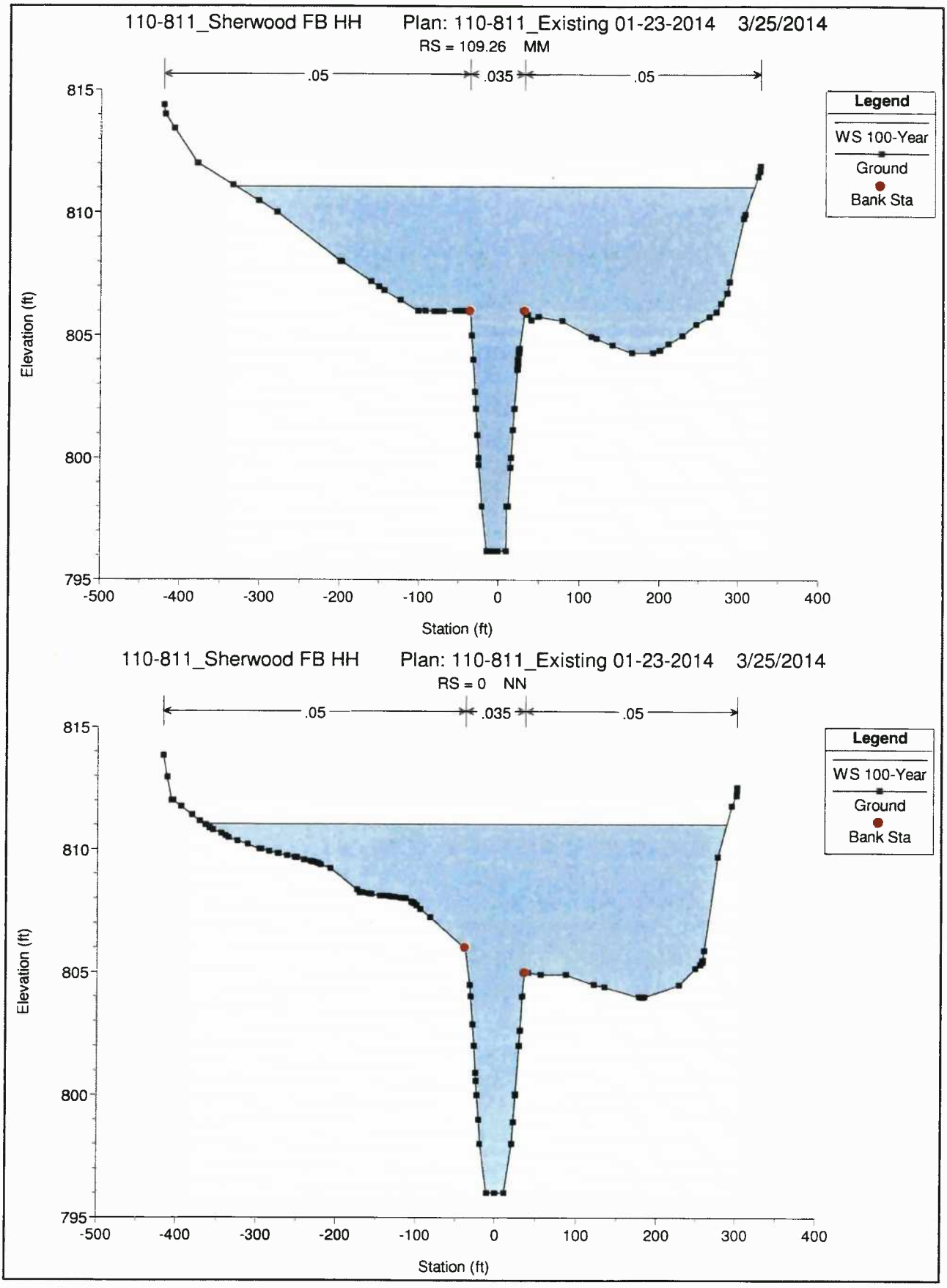

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 1903.41 CC
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
820
815
810
805
800
795
Elevation (ft)
-1500
-1000
-500
0
500
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 1604.54 DD
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
825
820
815
810
805
800
795
Elevation (ft)
-300
-200
-100
0
100
200
300
400
500
Station (ft)

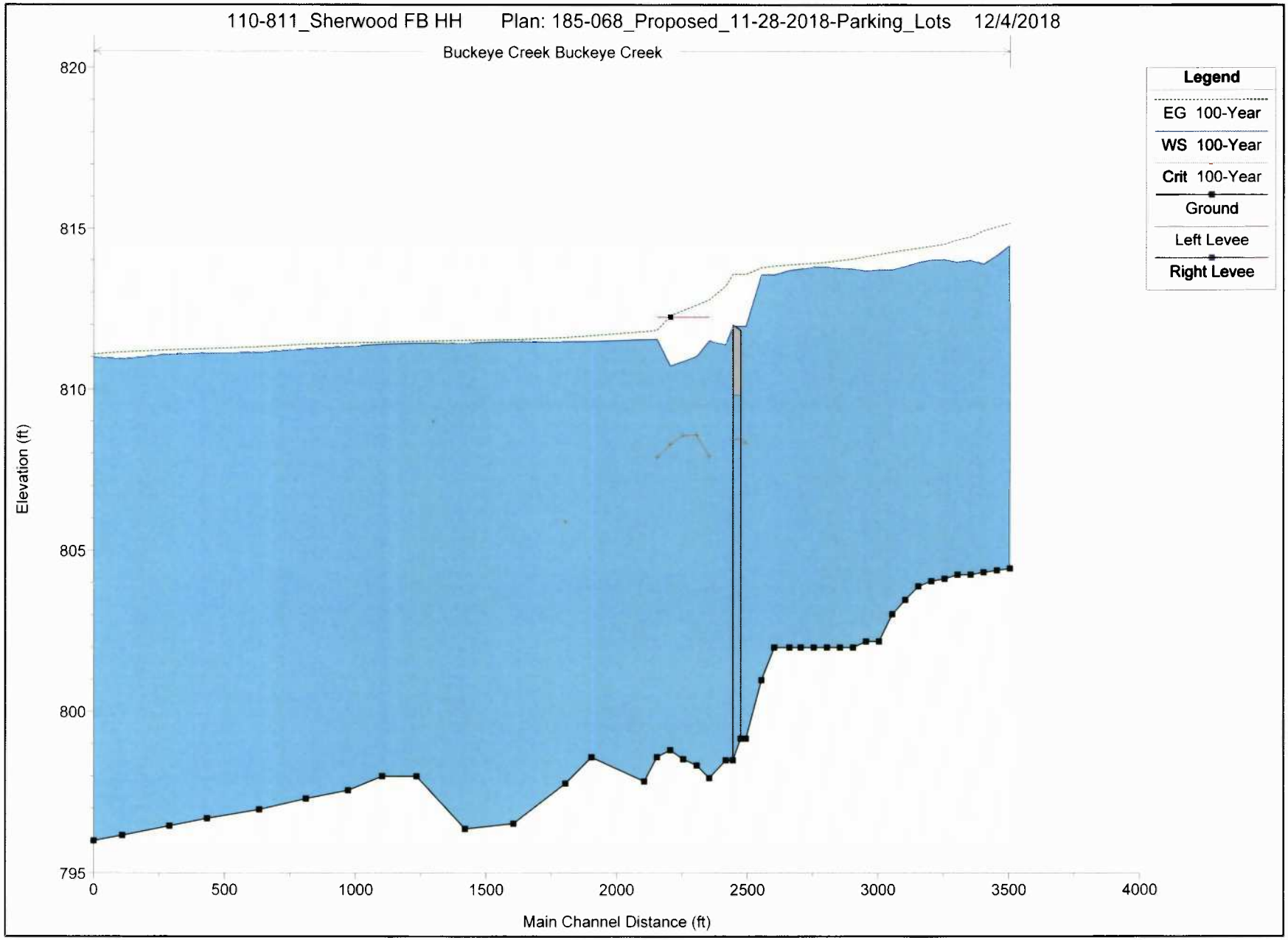

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 1419.72 EE
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-200
-100
0
100
200
300
400
500
600
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 1234.05 FF
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-300
-200
-100
0
100
200
300
400
500
600
Station (ft)


110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 1102.70 GG
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
825
820
815
810
805
800
795
-400
-200
0
200
400
600
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 972.12 HH
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
814
812
810
808
806
804
802
800
798
796
-400
-200
0
200
400
600
Station (ft)

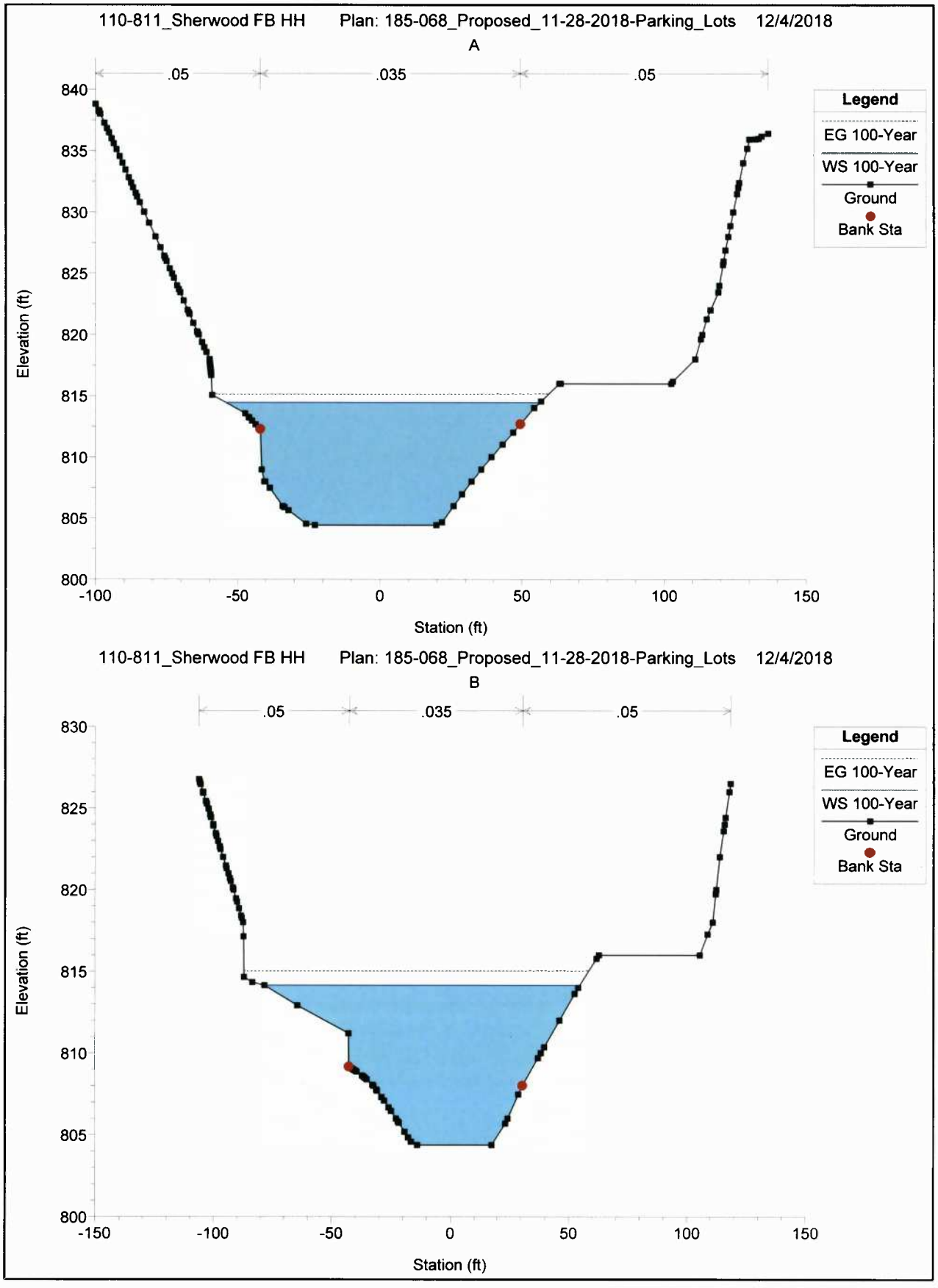

110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 810.82 II
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)
110-811_Sherwood FB HH Plan: 110-811_Existing 01-23-2014 3/25/2014
RS = 632.35 JJ
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
Station (ft)

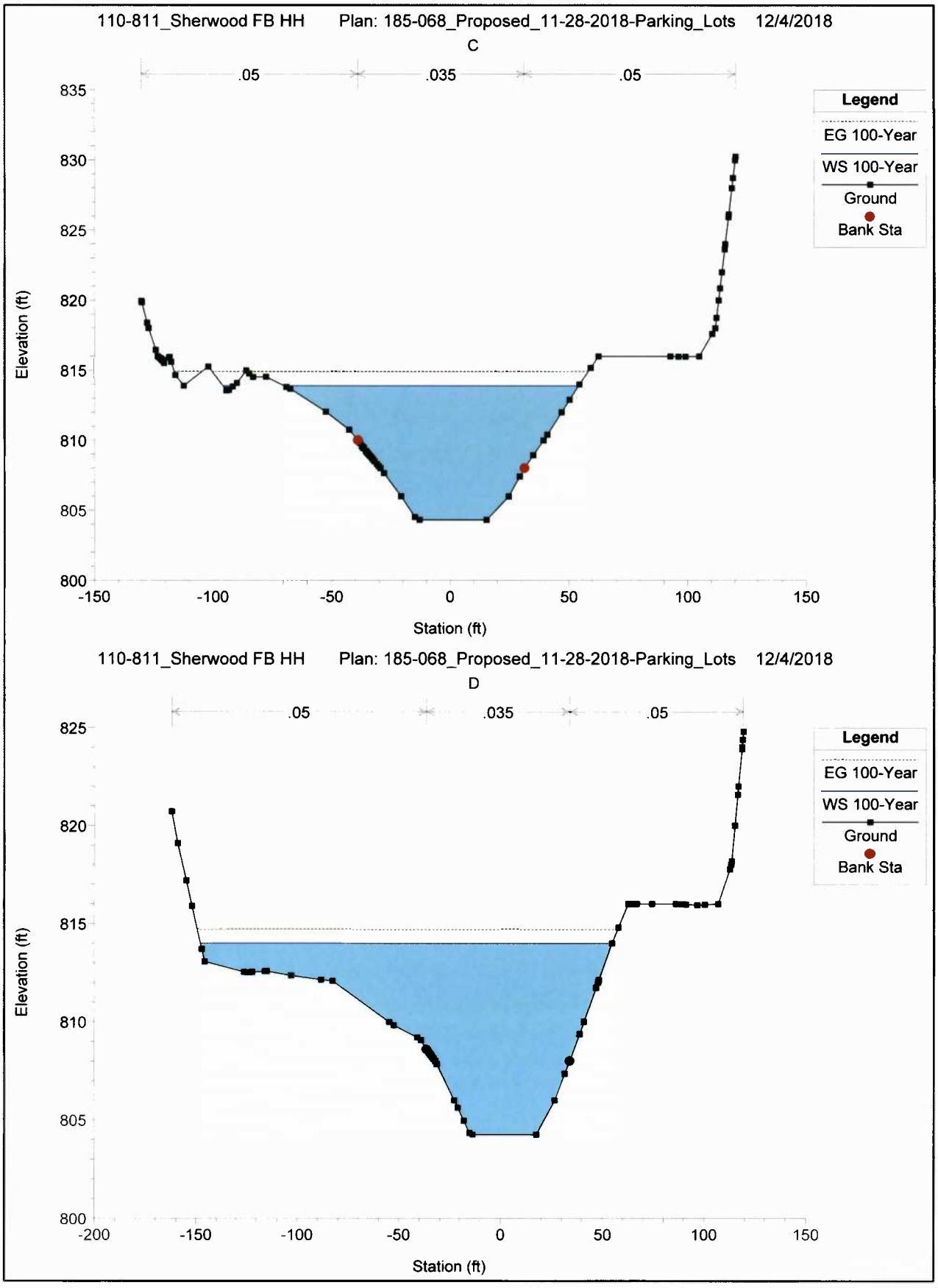

110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 433.99 KK
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-300
-200
-100
0
100
200
300
400
500
600
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 289.71 LL
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
820
815
810
805
800
795
-400
-200
0
200
400
600
Station (ft)


110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 109.26 MM
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
300
400
Station (ft)
110-811_Sherwood FB HH
Plan: 110-811_Existing 01-23-2014
3/25/2014
RS = 0 NN
.05
.035
.05
Legend
WS 100-Year
Ground
Bank Sta
Elevation (ft)
815
810
805
800
795
-500
-400
-300
-200
-100
0
100
200
300
400
Station (ft)


110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
Buckeye Creek Buckeye Creek
Legend
EG 100-Year
WS 100-Year
Crit 100-Year
Ground
Left Levee
Right Levee
820
815
810
805
800
795
Elevation (ft)
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)

PREPARED BY: PJH 12/4/2018 CHECKED BY:




110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
C
.05
.035
.05
Legend
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110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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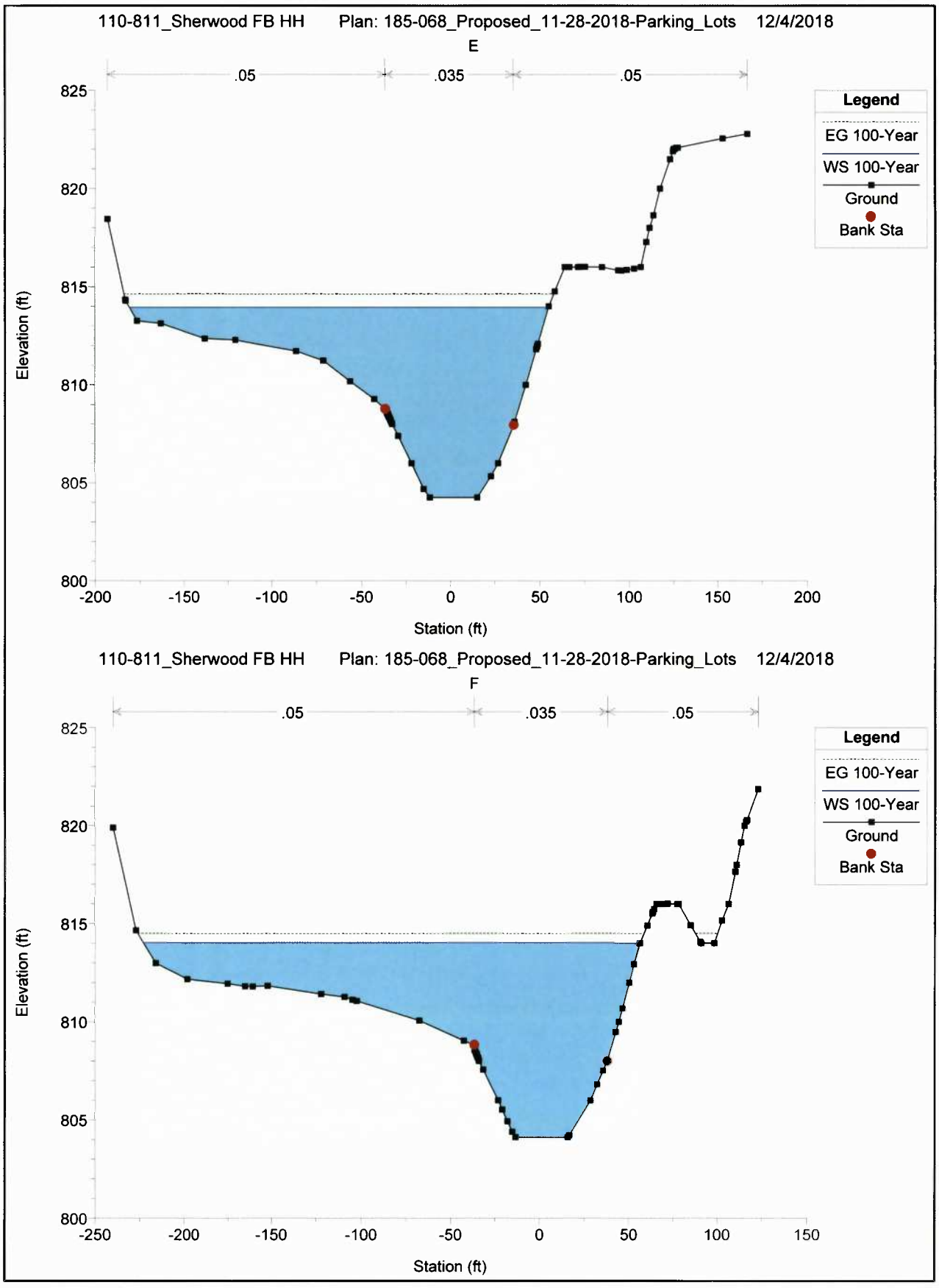
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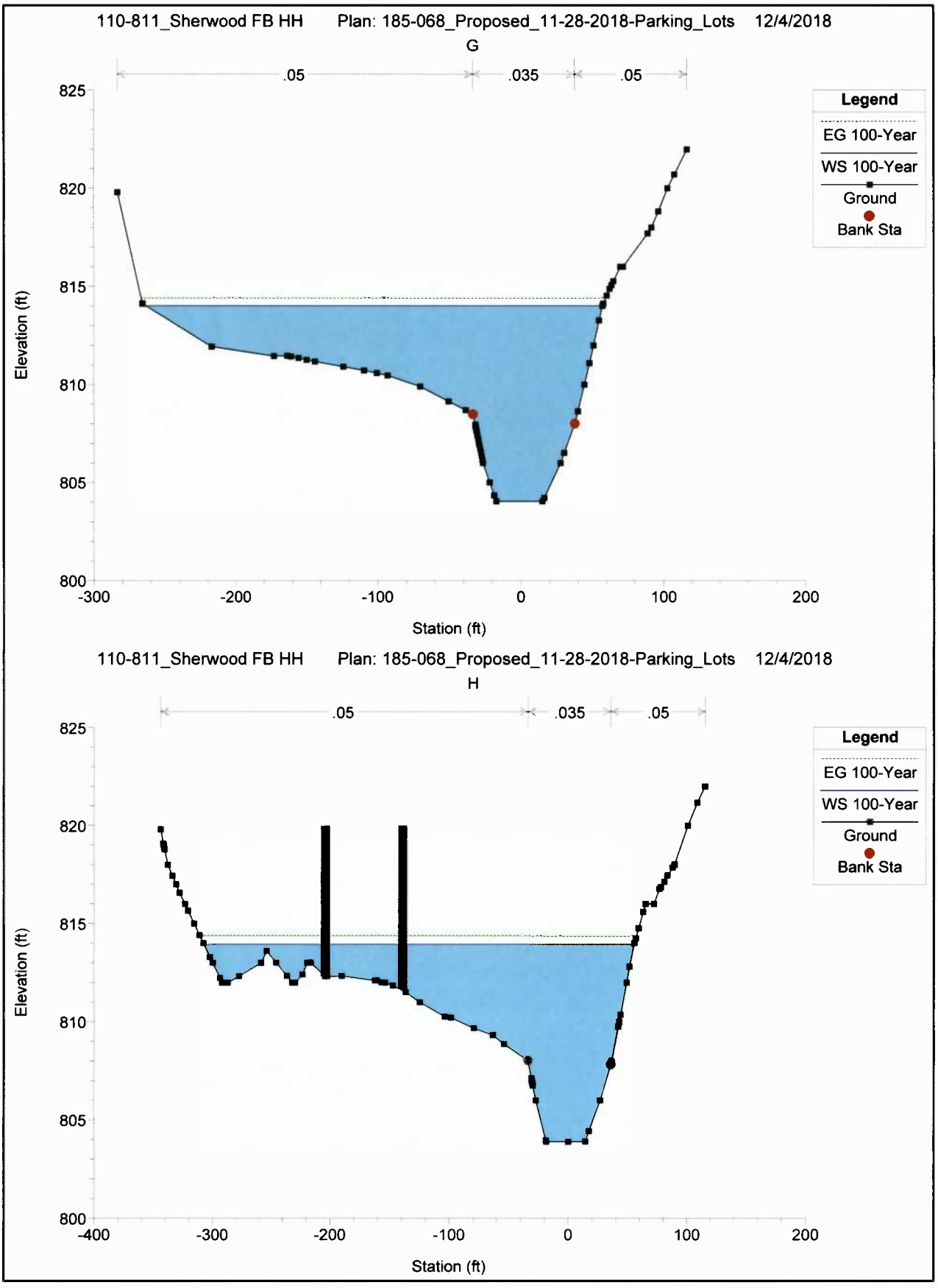
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110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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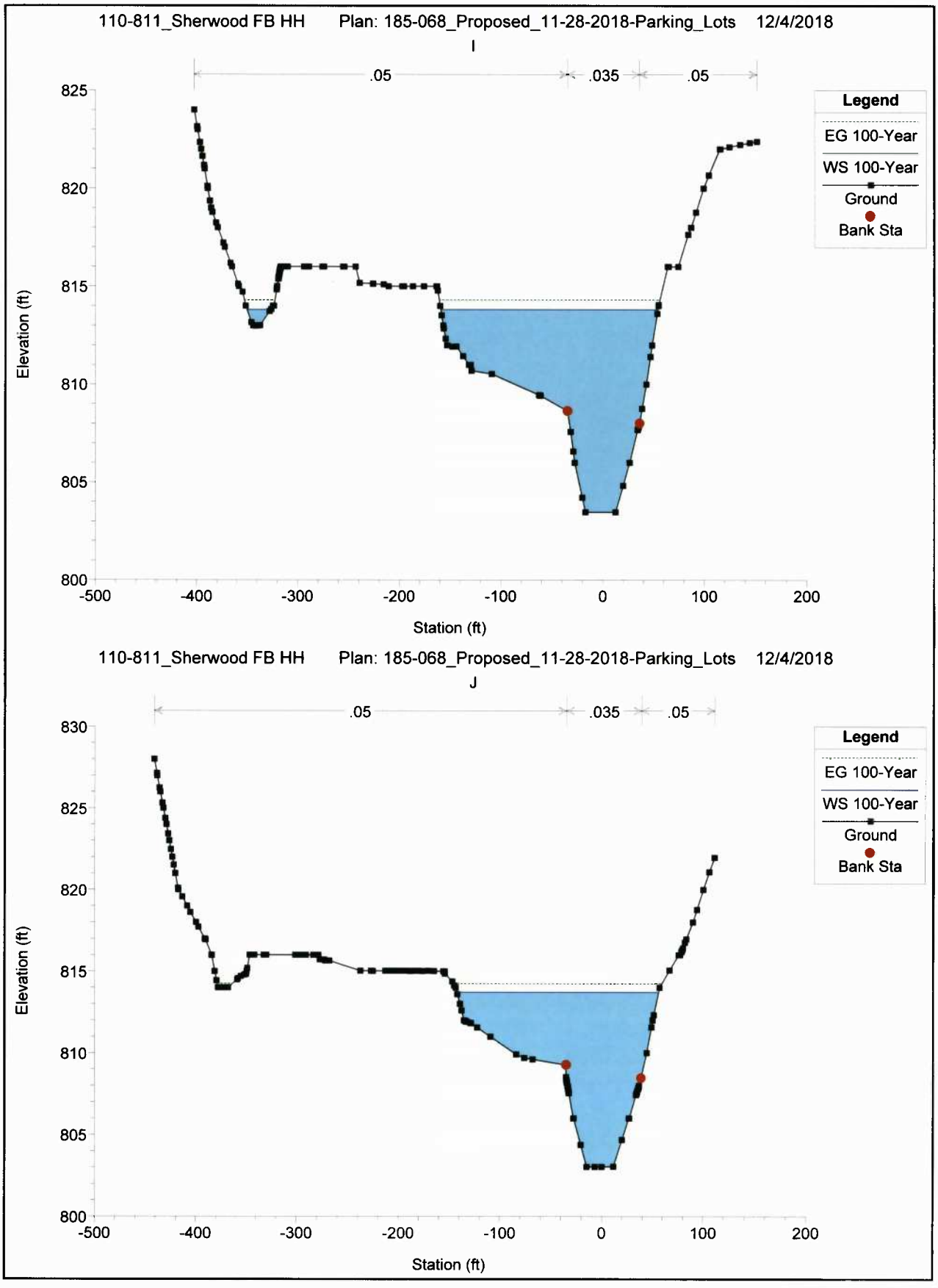
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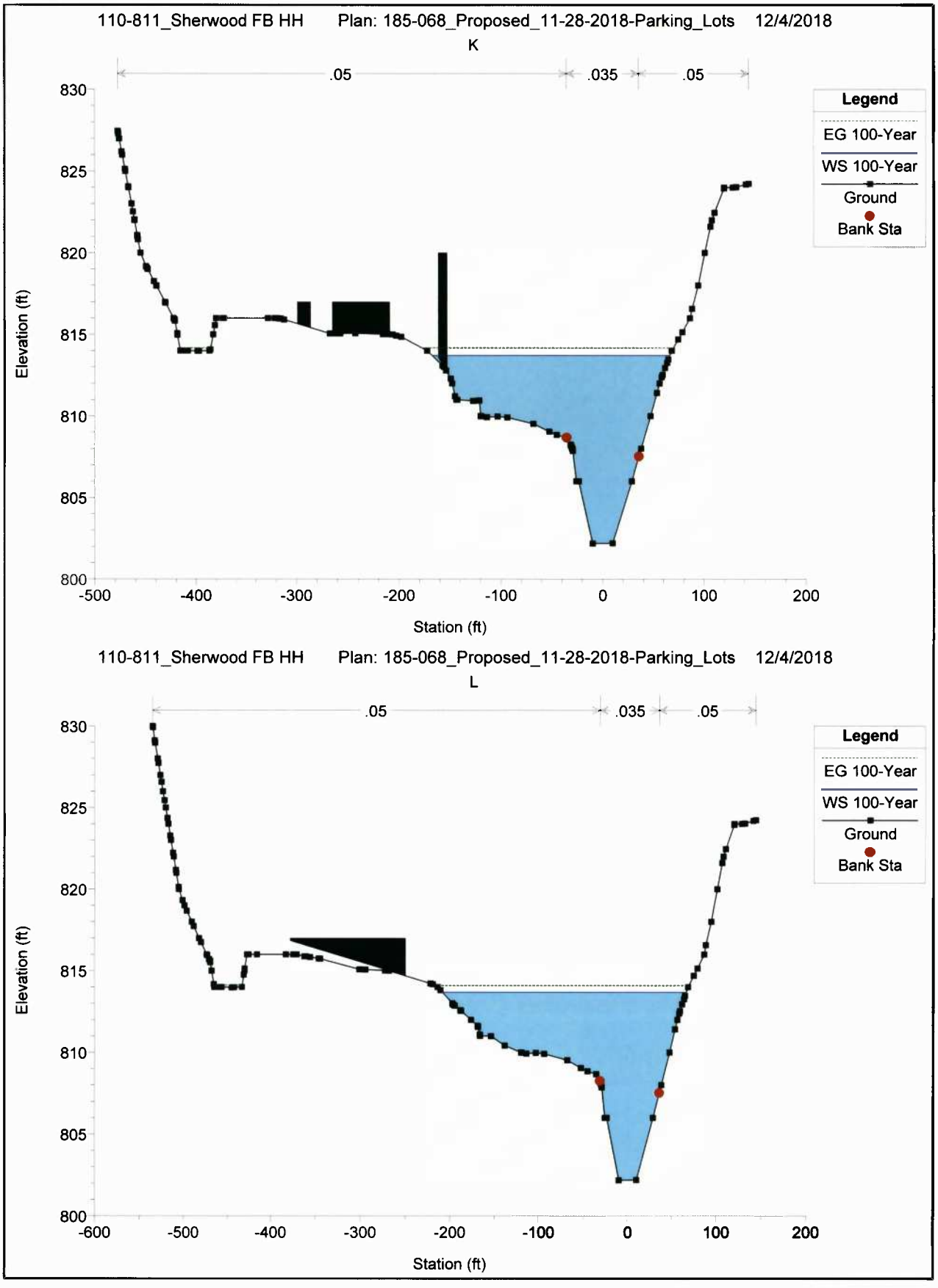
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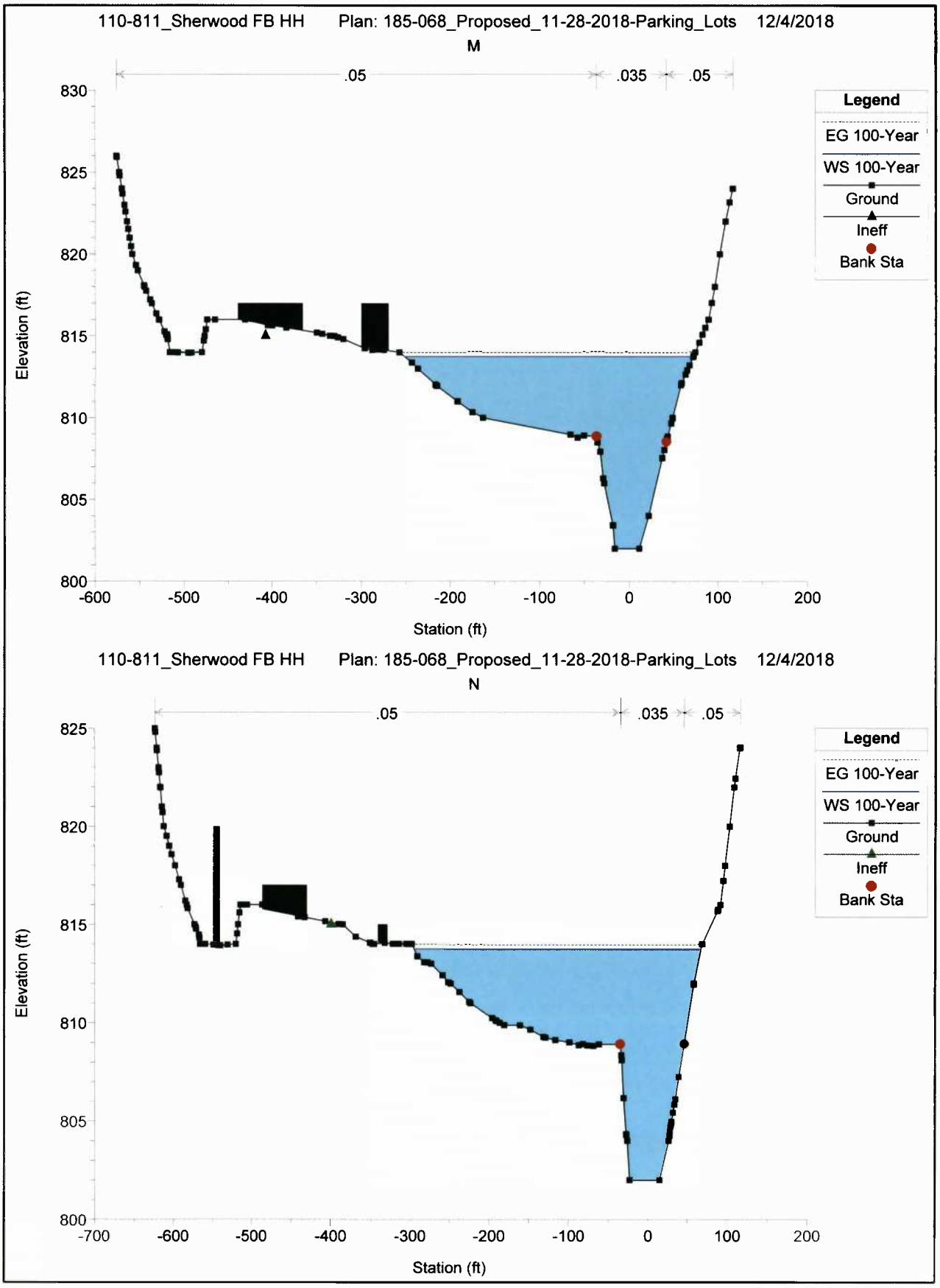
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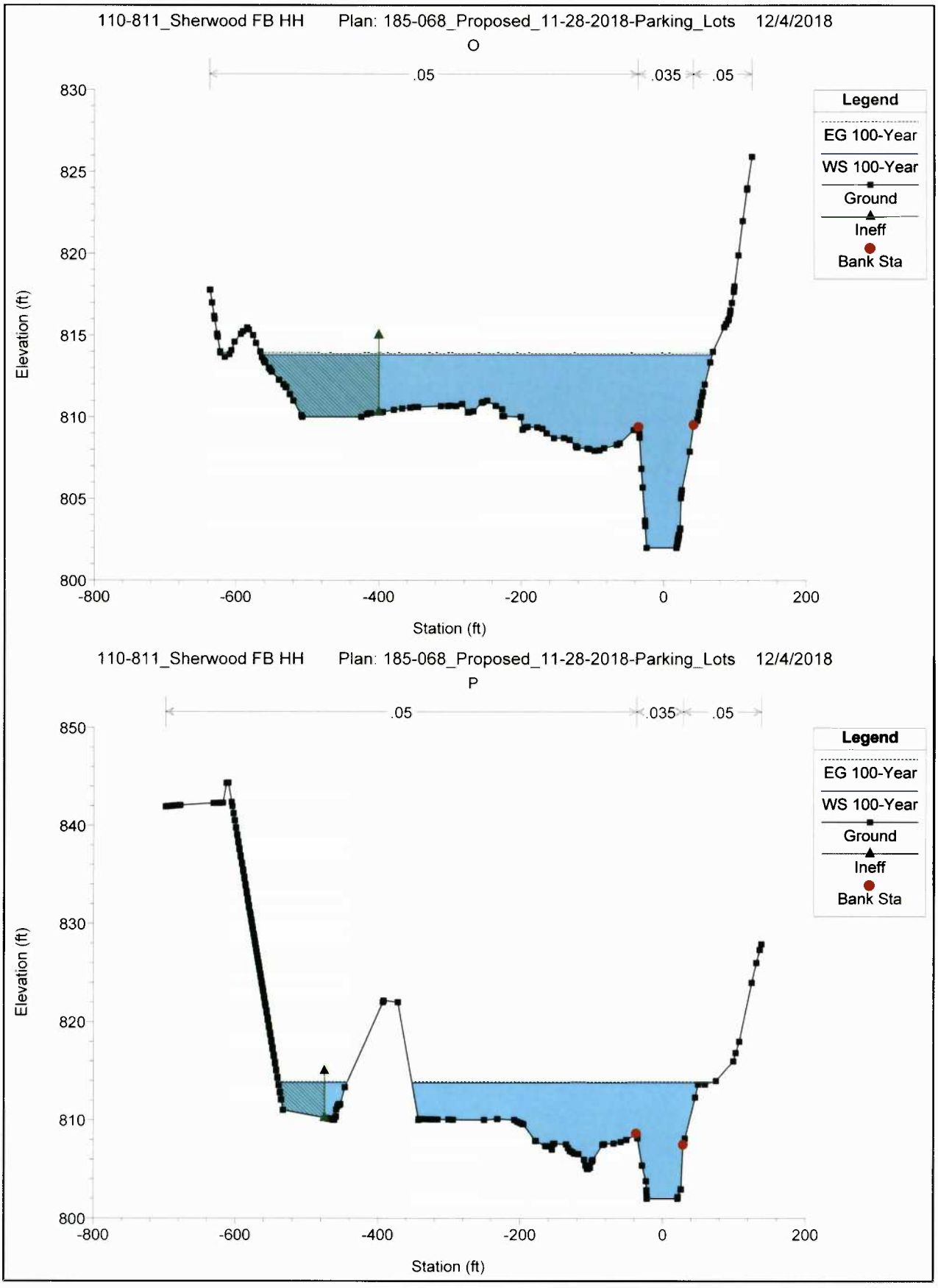
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Elevation (ft)
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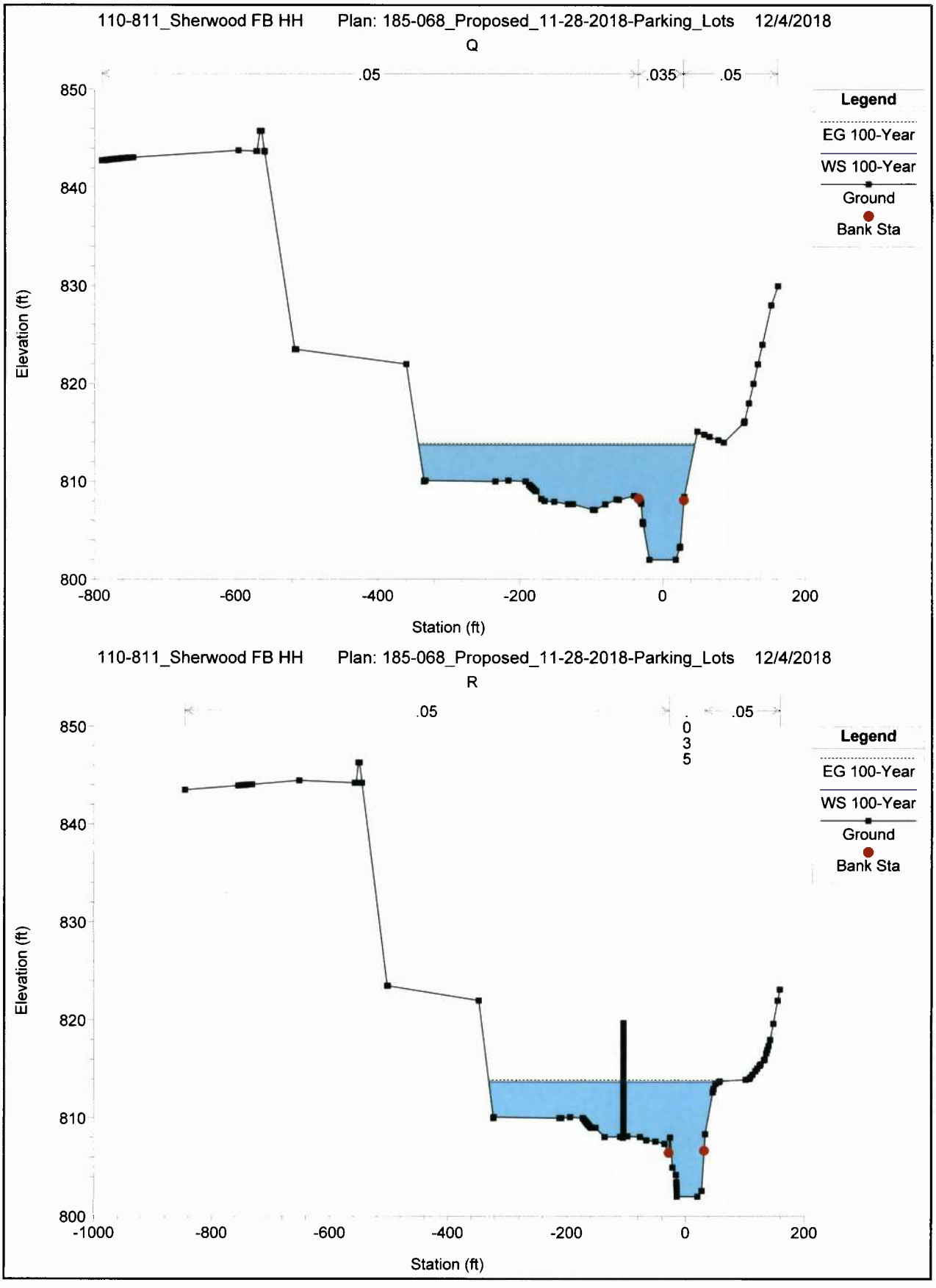
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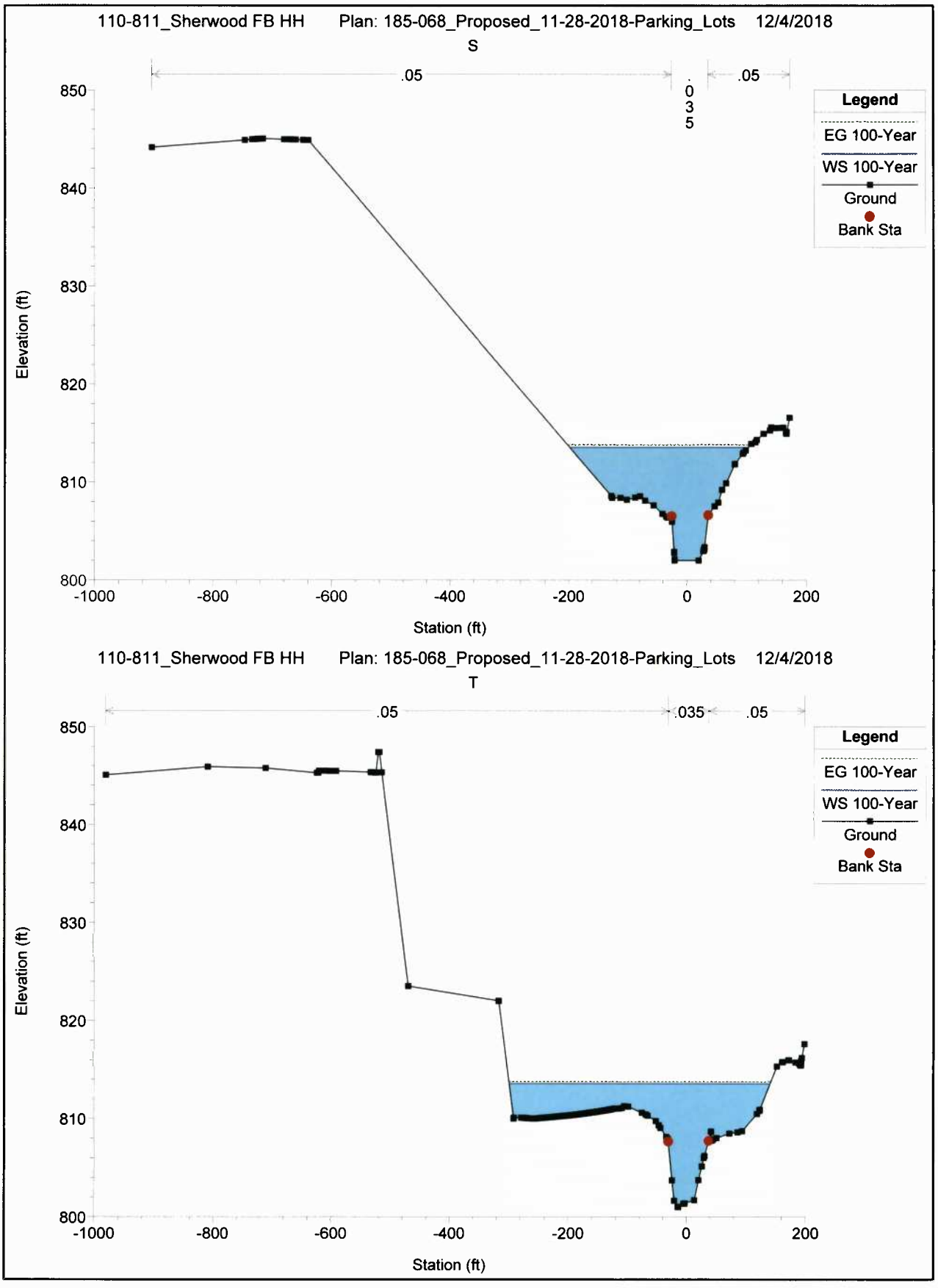
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110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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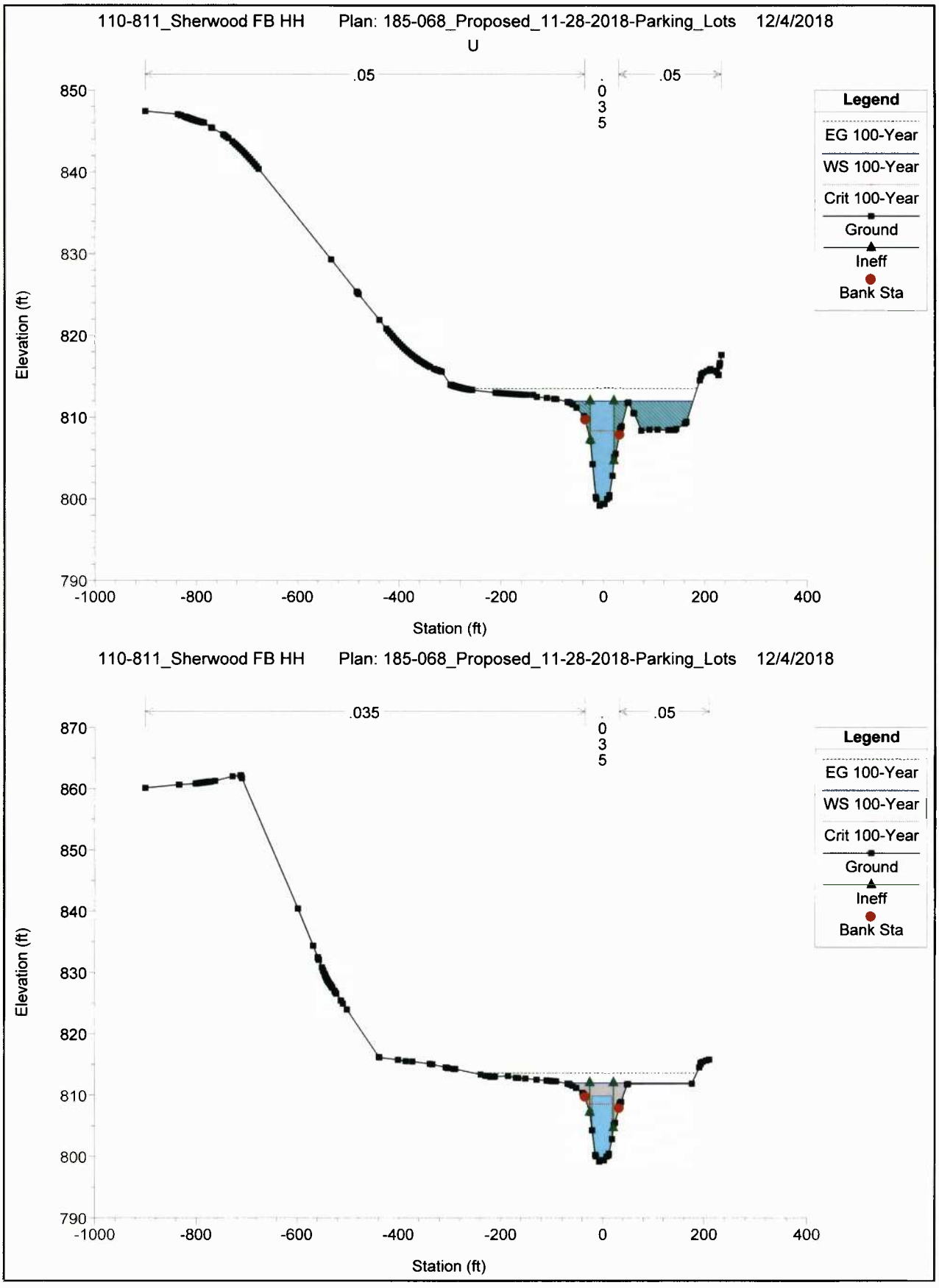
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Ground
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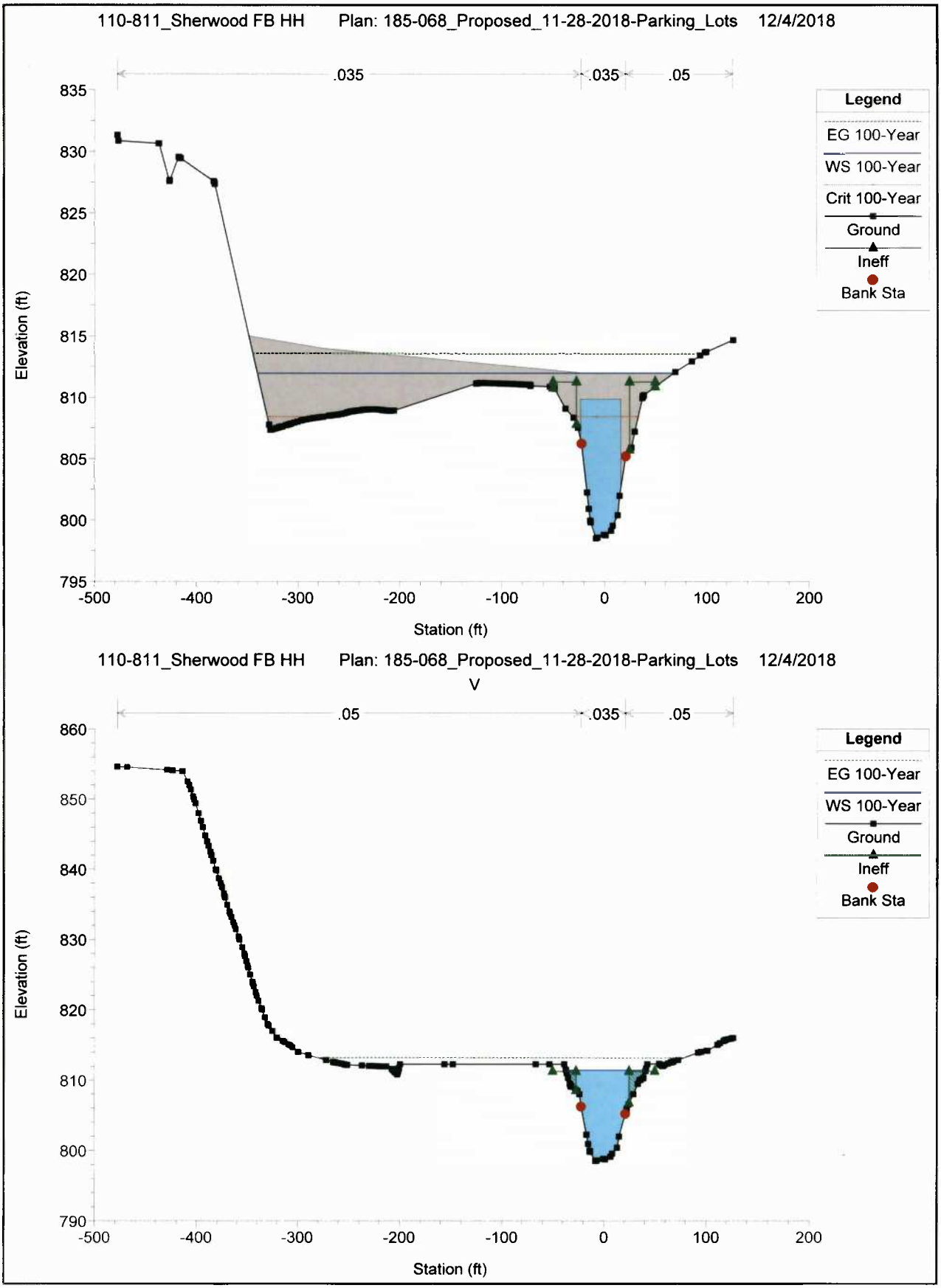
Station (ft)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Station (ft)
110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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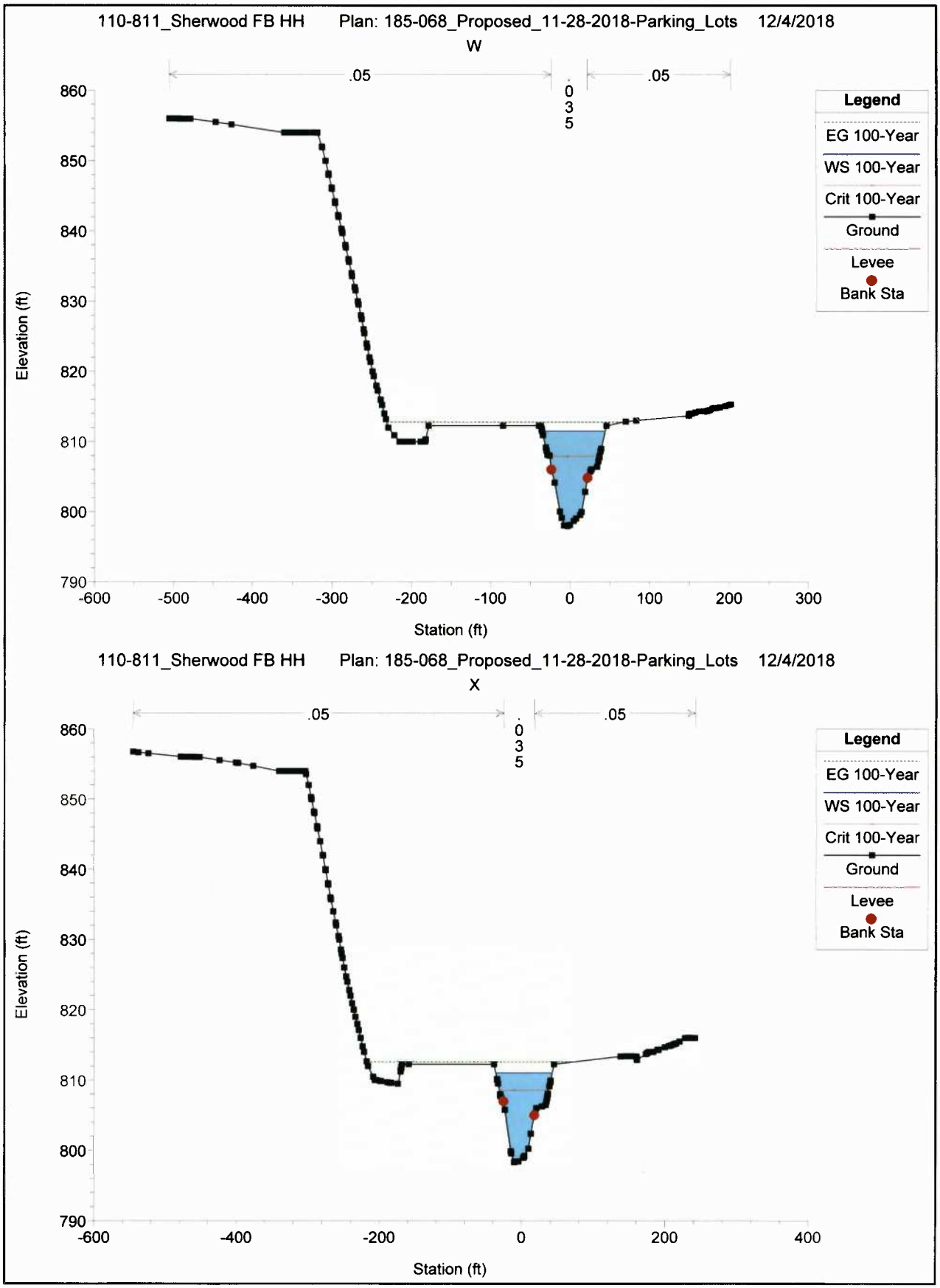
Station (ft)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Crit 100-Year
Ground
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Elevation (ft)
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Station (ft)
110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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Legend
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WS 100-Year
Crit 100-Year
Ground
Levee
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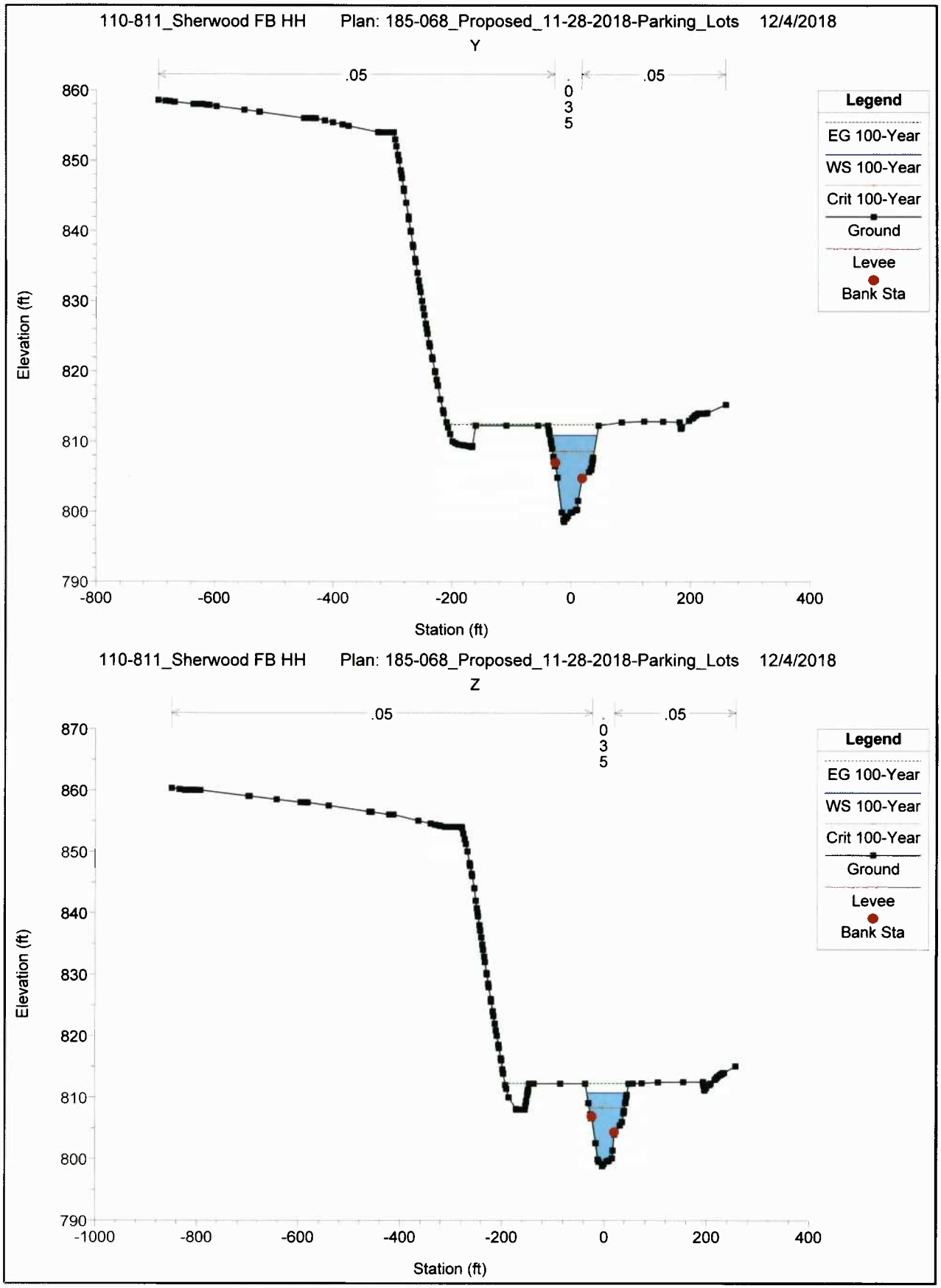
Station (ft)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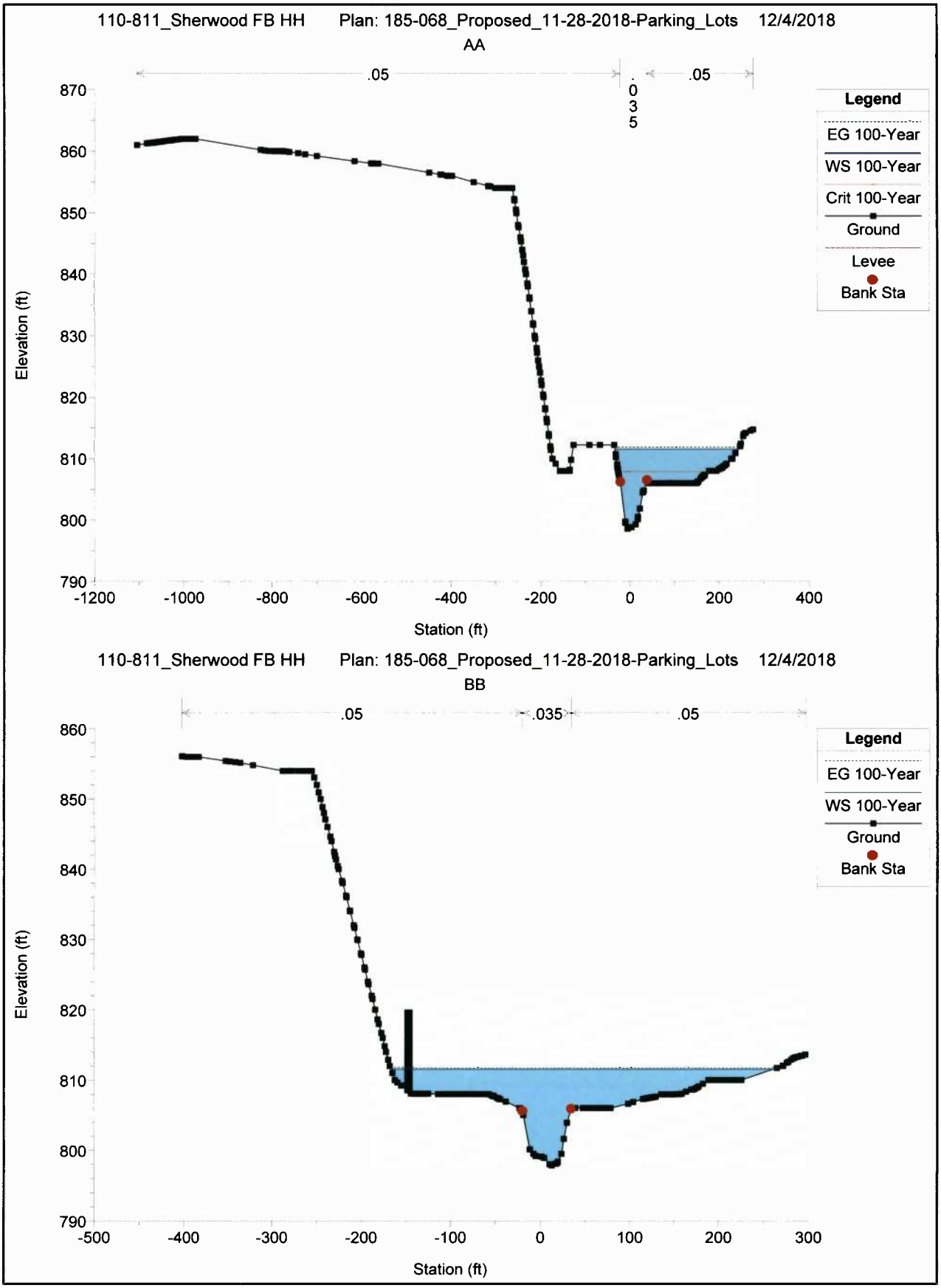
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Elevation (ft)
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Station (ft)
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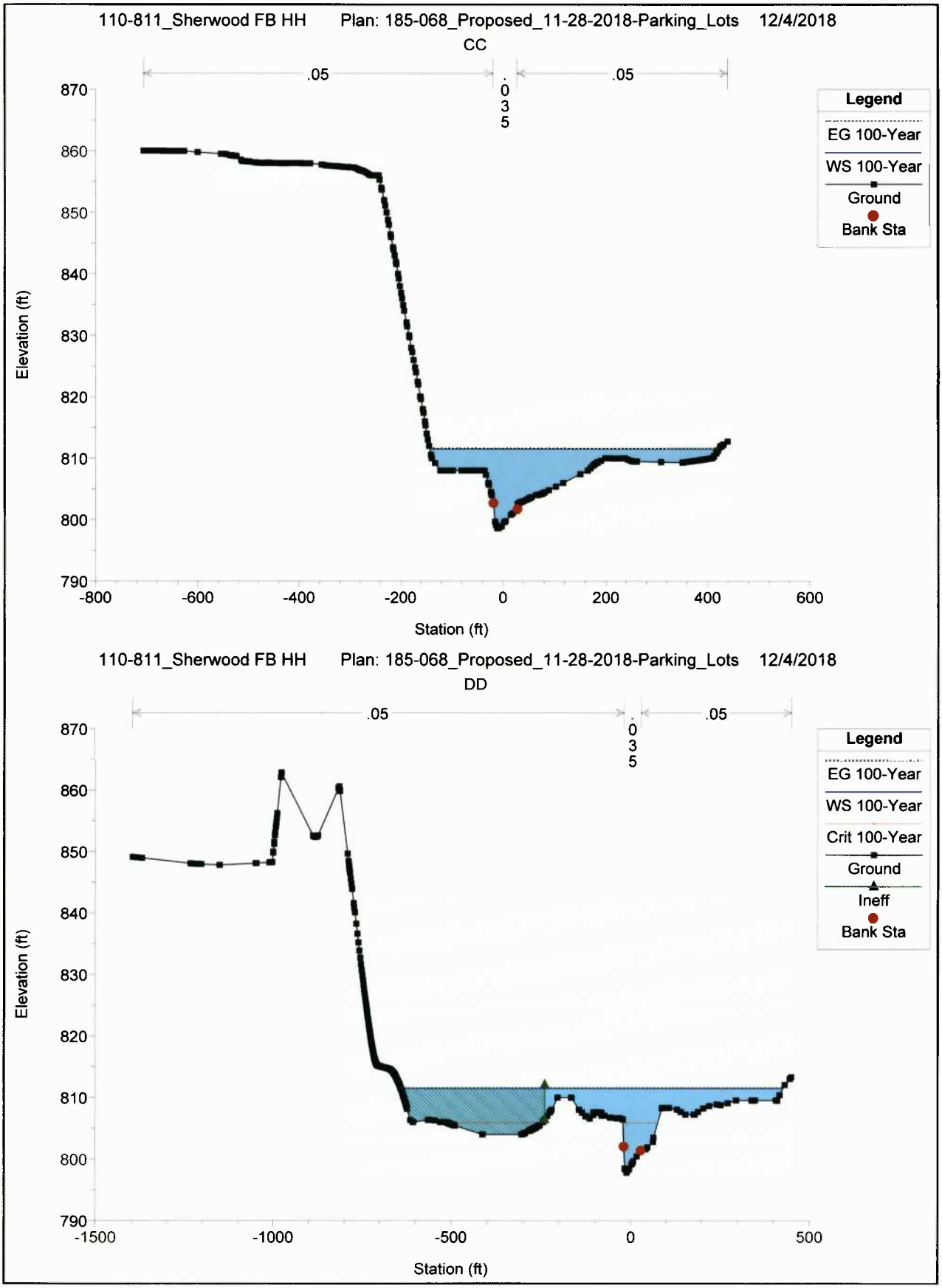
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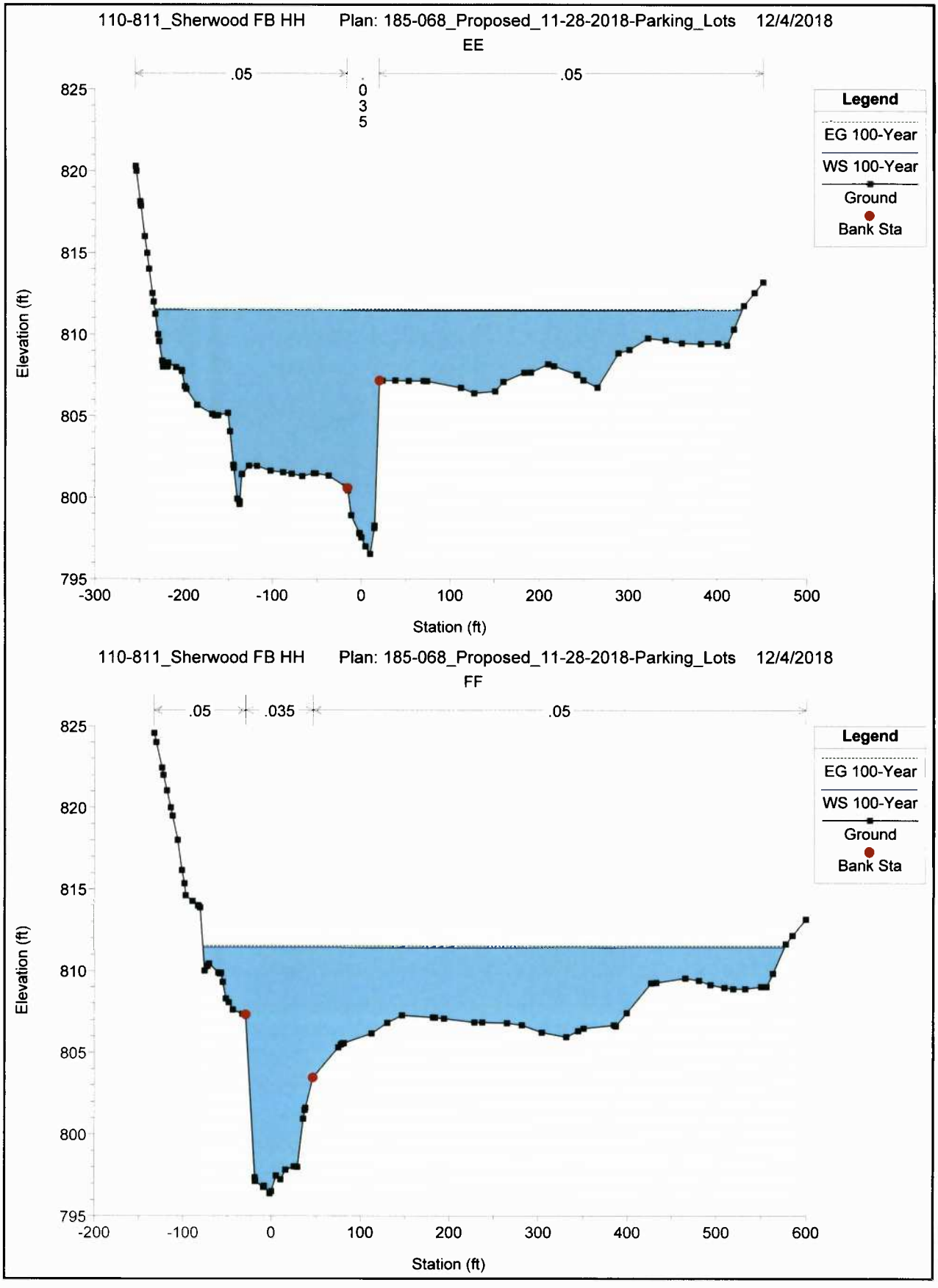
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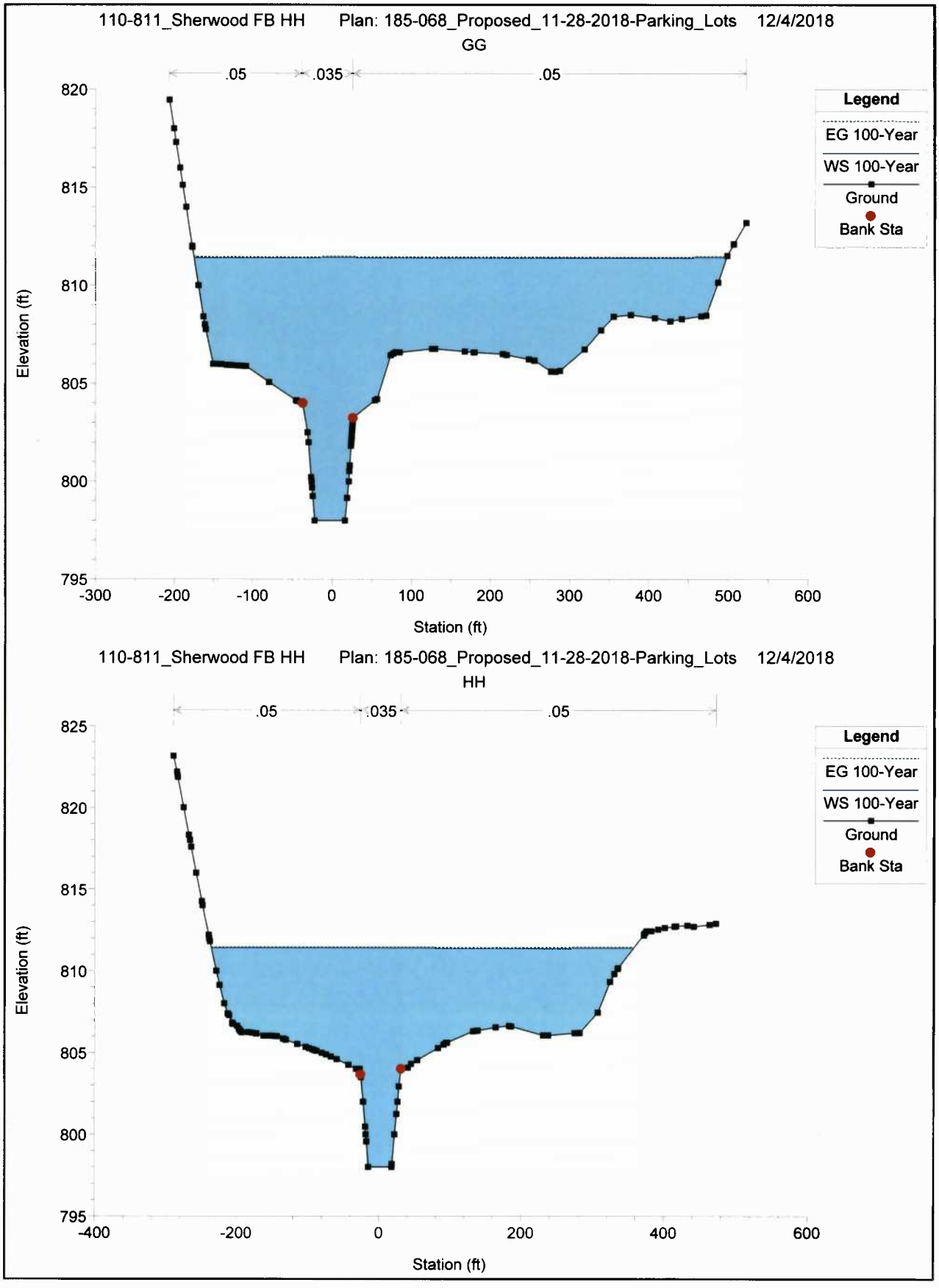
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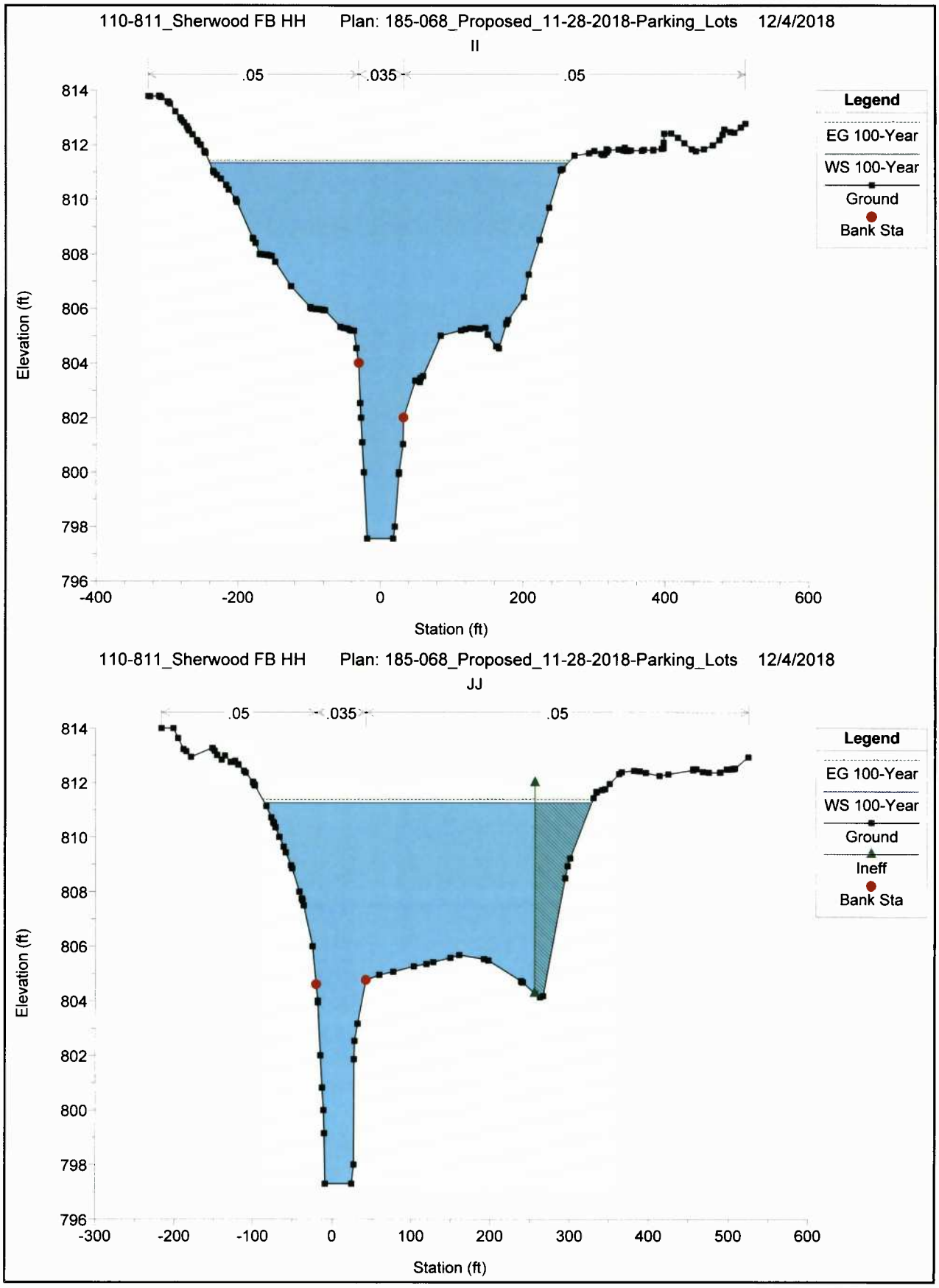
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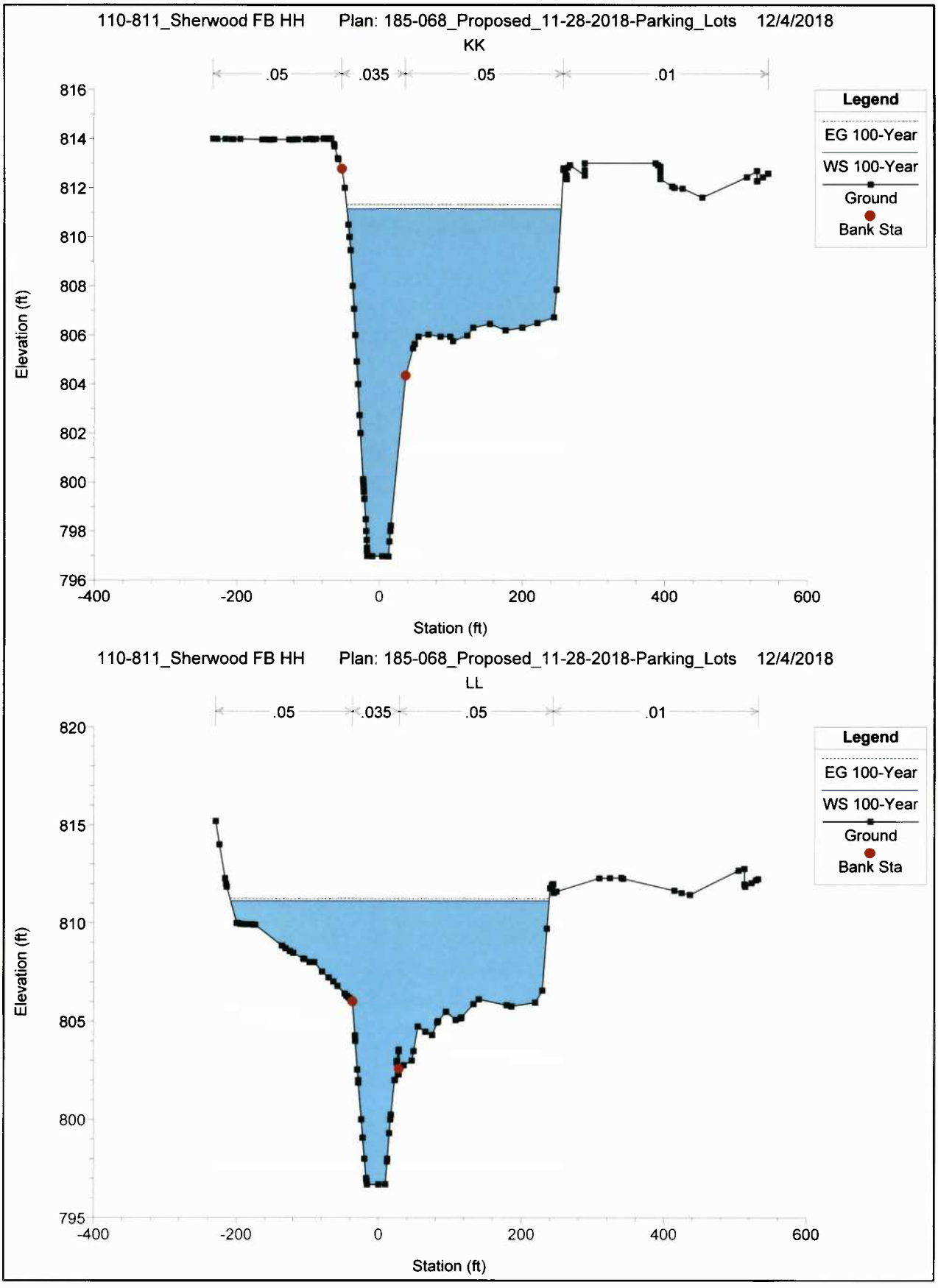
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110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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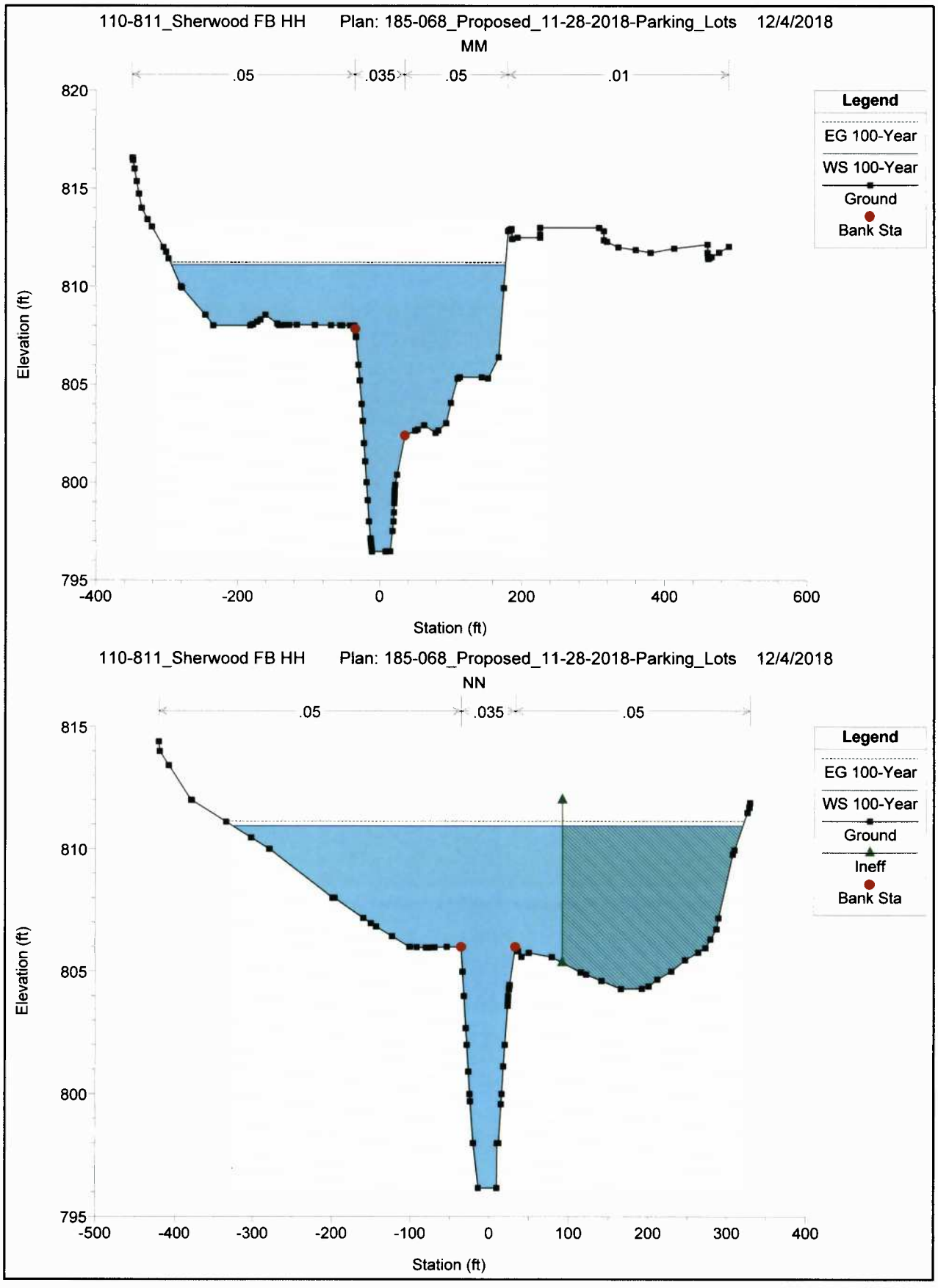
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110-811_Sherwood FB HH Plan: 185-068_Proposed_11-28-2018-Parking_Lots 12/4/2018
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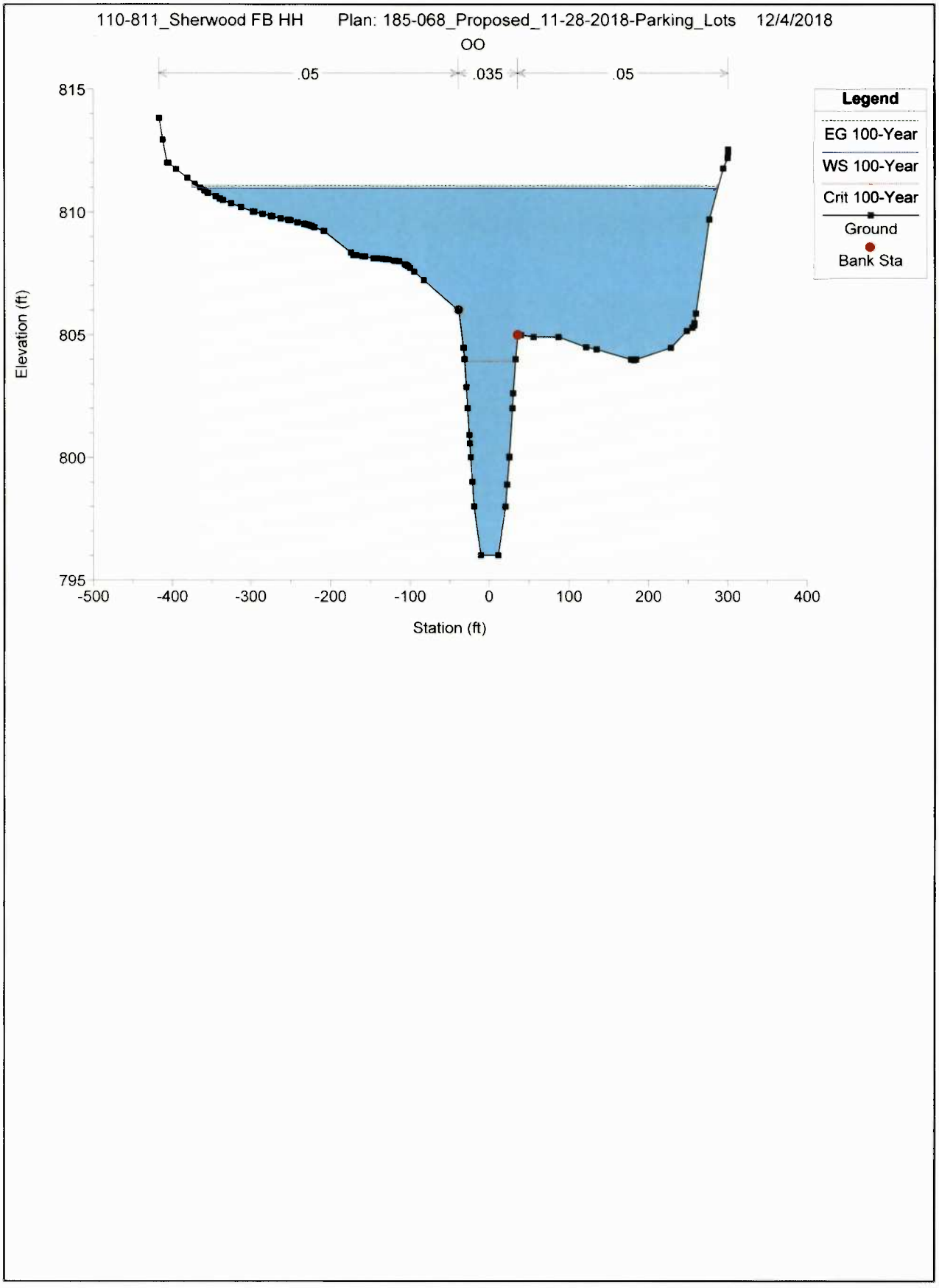
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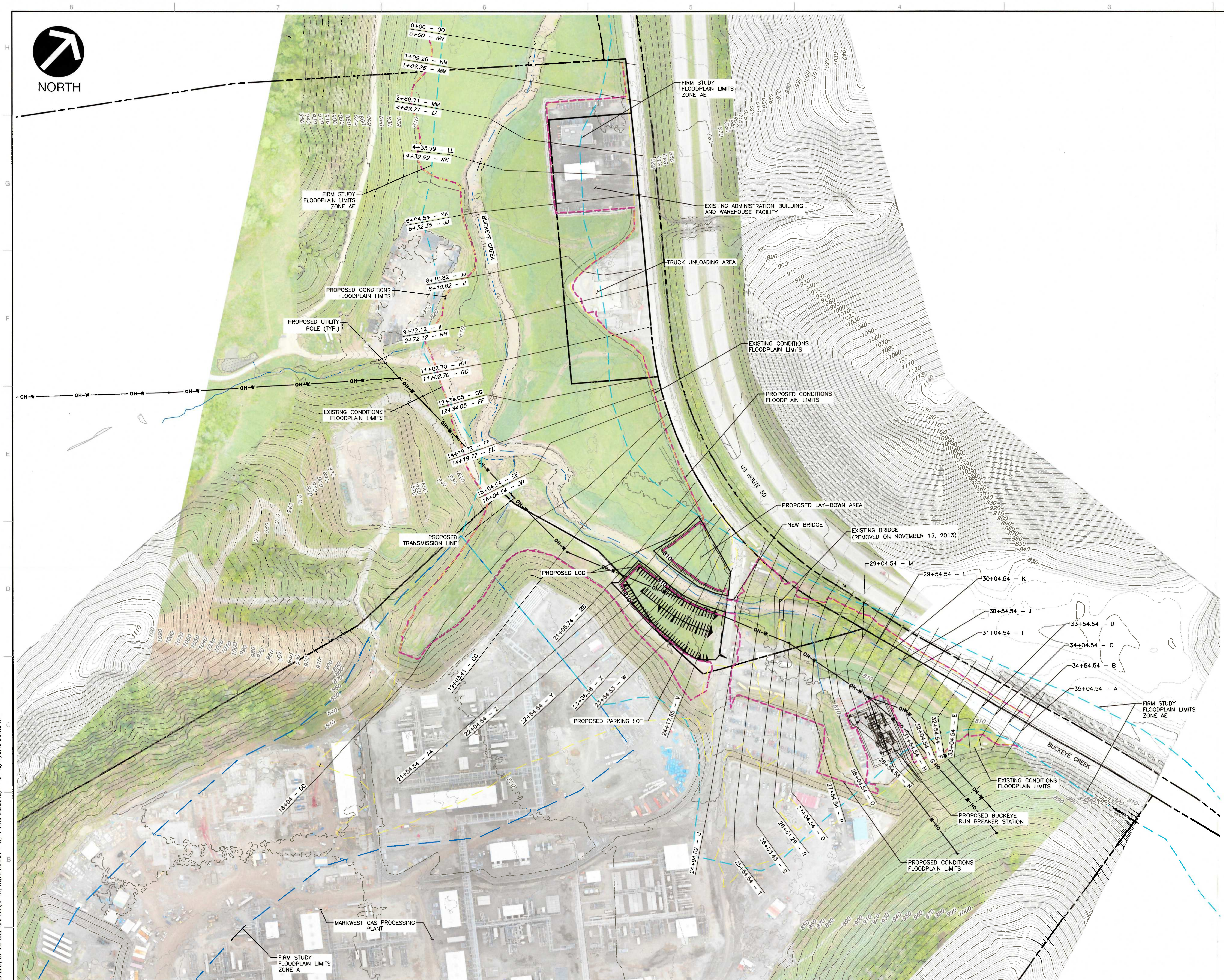


LEGEND

303+04.54 – K	PROPOSED CONDITIONS HEC-RAS CROSS SECTION
303+04.54 – K / 303+04.54 – K	EXISTING AND PROPOSED CONDITIONS HEC-RAS CROSS SECTION
	100-YEAR FLOODPLAIN LIMITS, CURRENT CONDITIONS
	100-YEAR FLOODPLAIN LIMITS, PROPOSED CONDITIONS
	FIRM STUDY FLOODPLAIN LIMITS ZONE AE
	FIRM STUDY FLOODPLAIN LIMITS ZONE A
	PROPERTY LINE
870	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
870	AS-BUILT INDEX CONTOUR
	AS-BUILT INTERMEDIATE CONTOUR
870	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR
	PROPOSED LOD
O/U	PROPOSED TRANSMISSION LINE / UTILITY POLE

REFERENCE

1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING CEC SURVEY DATA AND DIGITAL ELEVATION MODELS (USGS 3-METER), 2003 OF THE u.s. GEOLOGICAL SURVEY (USGS) AND WEST VIRGINIA STATEWISE ADDRSSING & MAPPING BOARD (WVSAMB). ADDITIONAL EXISTING TOPOGRAPHY NEAR PROPOSED SUBSTATION PROVIDED BY ELECTRICAL CONSULTANTS, INC.
2. STREAM LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3. AERIAL IMAGERY GENERATED FROM UNMANNED AERIAL SYSTEM (UAS) RECORDED DATA COLLECTED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) ON MAY 16, 2018.
4. PROPOSED SUBSTATION GRADING, EQUIPMENT LAYOUT, AND UTILITY POLE LOCATIONS PROVIDED BY ELECTRICAL CONSULTANTS, INC.

* HAND SIGNATURE ON FILE

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road · Cincinnati, OH 45242
513-985-0226 · 800-759-5614
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD FACILITY PARKING LOT EXPANSION
DODDRIDGE COUNTY, WV

EXISTING AND FINAL PROPOSED GRADING 100-YEAR FLOODPLAIN MAP

DATE:	12/4/2018	DRAWN BY:	PJH
DWG SCALE:	1"=150'	CHECKED BY:	TGJ
PROJECT NO:	110-811	APPROVED BY:	*RPC

DRAWING NO.: SP01

APPENDIX E

HEC-RAS SUMMARY OF EXISTING AND PROPOSED HYDRAULIC CALCULATIONS

HEC-RAS Plan: Existing River: Buckeye Creek Reach: Buckeye Creek Profile: 100-Year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Buckeye Creek	3504.54	100-Year	5150.00	804.44	813.96		814.76	0.001962	7.17	726.12	104.68	0.45
Buckeye Creek	3454.54	100-Year	5150.00	804.38	813.52		814.61	0.002677	8.58	666.37	123.34	0.54
Buckeye Creek	3404.54	100-Year	5150.00	804.32	813.11		814.44	0.003501	9.44	604.30	113.48	0.61
Buckeye Creek	3354.54	100-Year	5150.00	804.25	813.17		814.19	0.002626	8.49	767.38	197.82	0.54
Buckeye Creek	3304.54	100-Year	5150.00	804.25	813.04		814.06	0.002738	8.51	773.91	212.43	0.54
Buckeye Creek	3254.54	100-Year	5150.00	804.12	813.13		813.86	0.002015	7.43	973.78	270.79	0.47
Buckeye Creek	3204.54	100-Year	5150.00	804.05	813.09		813.74	0.001817	7.18	1064.85	297.47	0.45
Buckeye Creek	3154.54	100-Year	5150.00	803.90	813.08		813.63	0.001571	6.78	1217.48	358.65	0.42
Buckeye Creek	3104.54	100-Year	5150.00	803.47	813.07		813.53	0.001327	6.27	1374.43	418.07	0.38
Buckeye Creek	3054.54	100-Year	5150.00	803.04	813.07		813.46	0.001149	5.86	1491.17	457.49	0.36
Buckeye Creek	3004.54	100-Year	5150.00	802.19	813.08		813.39	0.000931	5.40	1683.27	500.68	0.32
Buckeye Creek	2954.54	100-Year	5150.00	802.19	813.10		813.33	0.000725	4.86	1983.21	548.18	0.29
Buckeye Creek	2904.54	100-Year	5150.00	802.00	813.13		813.28	0.000495	4.02	2346.54	604.95	0.24
Buckeye Creek	2854.58	100-Year	5150.00	802.00	813.13		813.25	0.000374	3.58	2651.69	649.77	0.21
Buckeye Creek	2804.54	100-Year	5150.00	802.00	813.14		813.23	0.000319	3.24	2937.14	682.42	0.19
Buckeye Creek	2754.54	100-Year	5150.00	802.00	813.11		813.21	0.000334	3.46	2940.37	716.03	0.19
Buckeye Creek	2704.54	100-Year	5150.00	802.00	812.97		813.17	0.000629	4.70	2284.41	757.90	0.26
Buckeye Creek	2661.29	100-Year	5150.00	802.00	811.37	809.07	812.98	0.003540	10.22	513.70	416.99	0.61
Buckeye Creek	2625.45		Bridge									
Buckeye Creek	2604.43	100-Year	5150.00	802.00	811.11	808.56	812.55	0.003137	9.65	601.68	672.15	0.58
Buckeye Creek	2554.54	100-Year	5150.00	800.98	811.27	809.13	812.14	0.002231	7.97	861.91	686.37	0.49
Buckeye Creek	2354.53	100-Year	5150.00	797.95	811.43		811.70	0.000761	5.48	1958.87	564.25	0.29
Buckeye Creek	2306.38	100-Year	5150.00	798.34	811.42		811.61	0.000648	4.95	2332.46	710.67	0.27
Buckeye Creek	2254.54	100-Year	5150.00	798.53	811.43		811.56	0.000476	4.18	2824.02	832.81	0.23
Buckeye Creek	2204.54	100-Year	5150.00	798.81	811.46		811.51	0.000236	3.00	3956.71	1014.95	0.16
Buckeye Creek	2154.54	100-Year	5150.00	798.60	811.46		811.50	0.000163	2.44	4714.72	1211.03	0.14
Buckeye Creek	2104.54	100-Year	5150.00	797.84	811.45		811.49	0.000161	2.57	4984.39	1422.68	0.14
Buckeye Creek	1903.41	100-Year	5150.00	798.59	811.44		811.46	0.000097	2.08	6304.55	1658.44	0.11
Buckeye Creek	1604.54	100-Year	5150.00	796.53	811.35		811.40	0.000177	2.79	3531.91	659.94	0.14
Buckeye Creek	1554.72	100-Year	5150.00	796.37	811.29		811.38	0.000197	3.06	3150.05	652.23	0.15
Buckeye Creek	1504.54	100-Year	5150.00	798.00	811.28		811.35	0.000169	2.82	3553.28	671.93	0.14
Buckeye Creek	1454.54	100-Year	5150.00	798.00	811.25		811.32	0.000185	2.93	3345.53	589.97	0.15
Buckeye Creek	1404.54	100-Year	5150.00	797.56	811.18		811.29	0.000228	3.38	2761.62	496.01	0.17
Buckeye Creek	1354.54	100-Year	5150.00	797.30	811.13		811.25	0.000312	3.58	2385.42	408.81	0.19
Buckeye Creek	1304.54	100-Year	5150.00	796.97	811.11		811.18	0.000189	2.72	3224.53	564.55	0.15
Buckeye Creek	1254.54	100-Year	5150.00	796.70	811.10		811.15	0.000148	2.61	3762.86	712.65	0.13
Buckeye Creek	1204.54	100-Year	5150.00	796.46	811.09		811.14	0.000137	2.45	3910.40	744.61	0.13
Buckeye Creek	1154.54	100-Year	5150.00	796.17	811.03		811.10	0.000200	2.91	3270.82	651.91	0.15
Buckeye Creek	1104.54	100-Year	5150.00	796.00	811.00	803.91	811.08	0.000191	2.96	3099.82	653.27	0.15

PREPARED BY: 3/25/2014 TGJ

CHECKED BY: APG 26-MAR-2014

PREPARED BY: PJH 12/4/2018 CHECKED BY: ARC 12/4/2018

HEC-RAS Plan: Proposed-18-PL River: Buckeye Creek Reach: Buckeye Creek Profile: 100-Year

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Buckeye Creek	3504.54	100-Year	5150.00	804.44	814.46		815.16	0.001592	6.73	779.77	110.81	0.41
Buckeye Creek	3454.54	100-Year	5150.00	804.38	814.14		815.05	0.002017	7.84	746.74	132.92	0.48
Buckeye Creek	3404.54	100-Year	5150.00	804.32	813.89		814.92	0.002433	8.41	697.11	128.65	0.52
Buckeye Creek	3354.54	100-Year	5150.00	804.25	814.01		814.73	0.001677	7.26	935.62	202.52	0.44
Buckeye Creek	3304.54	100-Year	5150.00	804.25	813.95		814.64	0.001658	7.14	982.96	236.04	0.43
Buckeye Creek	3254.54	100-Year	5150.00	804.12	814.03		814.50	0.001190	6.14	1222.90	287.12	0.37
Buckeye Creek	3204.54	100-Year	5150.00	804.05	814.02		814.43	0.001060	5.90	1352.03	321.11	0.35
Buckeye Creek	3154.54	100-Year	5150.00	803.89	813.94		814.37	0.001095	6.05	1369.74	362.33	0.35
Buckeye Creek	3104.54	100-Year	5150.00	803.47	813.81		814.31	0.001192	6.28	1138.45	236.94	0.37
Buckeye Creek	3054.54	100-Year	5150.00	803.03	813.71		814.25	0.001256	6.40	1060.33	198.49	0.38
Buckeye Creek	3004.54	100-Year	5150.00	802.18	813.71		814.17	0.001071	6.07	1194.12	233.97	0.35
Buckeye Creek	2954.54	100-Year	5150.00	802.18	813.69		814.12	0.001015	5.99	1291.76	274.68	0.34
Buckeye Creek	2904.54	100-Year	5150.00	802.00	813.74		814.04	0.000697	4.97	1559.97	324.08	0.28
Buckeye Creek	2854.58	100-Year	5150.00	802.00	813.75		813.99	0.000544	4.50	1764.50	362.33	0.25
Buckeye Creek	2804.54	100-Year	5150.00	802.00	813.81		813.94	0.000374	3.68	2345.81	641.82	0.21
Buckeye Creek	2754.54	100-Year	5150.00	802.00	813.79		813.91	0.000321	3.55	2457.00	514.41	0.19
Buckeye Creek	2704.54	100-Year	5150.00	802.00	813.73		813.88	0.000407	3.97	2162.43	387.79	0.22
Buckeye Creek	2661.29	100-Year	5150.00	802.00	813.69		813.85	0.000466	4.23	2058.82	387.37	0.23
Buckeye Creek	2603.43	100-Year	5150.00	802.00	813.55		813.82	0.000582	4.92	1657.19	301.01	0.26
Buckeye Creek	2554.54	100-Year	5150.00	800.98	813.57		813.77	0.000497	4.43	2005.67	439.55	0.24
Buckeye Creek	2494.62	100-Year	5150.00	799.17	811.96	808.33	813.56	0.002598	10.16	506.78	252.96	0.54
Buckeye Creek	2460.04		Bridge									
Buckeye Creek	2417.85	100-Year	5150.00	798.50	811.41		813.21	0.003044	10.83	512.03	82.90	0.58
Buckeye Creek	2354.53	100-Year	5150.00	797.95	811.51	807.93	812.78	0.002157	9.36	632.31	79.62	0.49
Buckeye Creek	2306.38	100-Year	5150.00	798.34	811.04	808.59	812.62	0.003079	10.52	569.86	78.87	0.58
Buckeye Creek	2254.54	100-Year	5150.00	798.53	810.88	808.57	812.45	0.003256	10.53	567.94	79.00	0.59
Buckeye Creek	2204.54	100-Year	5150.00	798.81	810.73	808.30	812.28	0.003166	10.46	572.96	78.64	0.59
Buckeye Creek	2154.54	100-Year	5150.00	798.60	811.56	807.89	811.84	0.000720	5.17	1550.45	276.23	0.29
Buckeye Creek	2105.74	100-Year	5150.00	797.84	811.55		811.80	0.000591	4.96	1895.66	427.73	0.26
Buckeye Creek	1903.41	100-Year	5150.00	798.59	811.49		811.67	0.000482	4.63	2329.97	564.62	0.24
Buckeye Creek	1804	100-Year	5150.00	797.78	811.48	805.90	811.61	0.000356	4.08	2751.96	1067.33	0.21
Buckeye Creek	1604.54	100-Year	5150.00	796.53	811.49		811.54	0.000165	2.72	3626.18	661.40	0.13
Buckeye Creek	1419.72	100-Year	5150.00	796.37	811.44		811.52	0.000183	2.97	3246.65	653.60	0.15
Buckeye Creek	1234.05	100-Year	5150.00	798.00	811.43		811.49	0.000156	2.74	3653.16	673.76	0.14
Buckeye Creek	1102.70	100-Year	5150.00	798.00	811.40		811.47	0.000173	2.85	3434.30	593.36	0.14
Buckeye Creek	972.12	100-Year	5150.00	797.56	811.34		811.44	0.000215	3.30	2838.34	503.54	0.16
Buckeye Creek	810.82	100-Year	5150.00	797.30	811.26		811.39	0.000323	3.68	2188.45	413.11	0.19
Buckeye Creek	604.54	100-Year	5150.00	796.96	811.15		811.32	0.000392	3.88	1929.77	300.42	0.21
Buckeye Creek	433.99	100-Year	5150.00	796.69	811.13		811.25	0.000285	3.57	2437.90	446.57	0.18
Buckeye Creek	289.71	100-Year	5150.00	796.46	811.10		811.22	0.000270	3.46	2481.28	472.31	0.18
Buckeye Creek	109.26	100-Year	5150.00	796.17	810.95		811.15	0.000443	4.31	1986.74	646.59	0.23
Buckeye Creek	0	100-Year	5150.00	796.00	811.00	803.91	811.08	0.000191	2.96	3099.82	653.27	0.15

Buckeye Creek
Existing vs. Proposed HEC-RAS Models
100-Year Water Surface Elevations Summary
Parking Lot and Laydown Area Expansion Project - Doddridge County, WV
Project: 185-068

PREPARED BY: PJH
DATE: 12/4/2018
CHECKED: ARC
DATE: 12/4/2018

ID	River Station	100-Year Peak Flow (cfs)	Water Surface Elevations Existing	Water Surface Elevations Proposed	Water Surface Elevations Existing vs. Proposed
A	35+04.54	5150	813.96	814.46	0.50
B	34+54.54	5150	813.52	814.14	0.62
C	34+04.54	5150	813.11	813.89	0.78
D	33+54.54	5150	813.17	814.01	0.84
E	33+04.54	5150	813.04	813.95	0.91
F	32+54.54	5150	813.13	814.03	0.90
G	32+04.54	5150	813.09	814.02	0.93
H	31+54.54	5150	813.08	813.94	0.86
I	31+04.54	5150	813.07	813.81	0.74
J	30+54.54	5150	813.07	813.71	0.64
K	30+04.54	5150	813.08	813.71	0.63
L	29+54.54	5150	813.10	813.69	0.59
M	29+04.54	5150	813.13	813.74	0.61
N	28+54.58	5150	813.13	813.75	0.62
O	28+04.54	5150	813.14	813.81	0.67
P	27+54.54	5150	813.11	813.79	0.68
Q	27+04.54	5150	812.97	813.73	0.76
R	26+61.29	5150	811.37	813.69	2.32
		Existing Bridge			
S	26+03.43	5150	811.11	813.55	2.44
T	25+54.54	5150	811.27	813.57	2.30
U	24+94.62	5150	-	811.96	N/A
		New Bridge			
V	24+17.85	5150	-	811.41	N/A
W	23+54.53	5150	811.43	811.51	0.08
X	23+06.38	5150	811.42	811.04	-0.38
Y	22+54.54	5150	811.43	810.88	-0.55
Z	22+04.54	5150	811.46	810.73	-0.73
AA	21+54.54	5150	811.46	811.56	0.10
BB	21+05.74	5150	811.45	811.55	0.10
CC	19+03.41	5150	811.44	811.49	0.05
DD	18+04.00	5150	-	811.48	N/A
EE	16+04.54	5150	811.35	811.49	0.14
FF	14+19.72	5150	811.29	811.44	0.15
GG	12+34.05	5150	811.28	811.43	0.15
HH	11+02.70	5150	811.25	811.40	0.15
II	9+72.12	5150	811.18	811.34	0.16
JJ	8+10.82	5150	811.13	811.26	0.13
KK	6+04.54	5150	811.11	811.15	0.04
LL	433.99	5150	811.10	811.13	0.03
MM	289.71	5150	811.09	811.10	0.01
NN	109.26	5150	811.03	810.95	-0.08
OO	0	5150	811.00	811.00	0.00

APPENDIX F

DODDRIDGE COUNTY FLOODPLAIN PERMITS

May 16, 2018

Mr. George Eidel
Doddridge County Floodplain Manager
108 Court Street, Suite 1
West Union, WV 26456

Dear Mr. Eidel:

Subject: Floodplain Permit Request
Commercial/Industrial Floodplain Development Permit #15-391
Sherwood Facility Permit Application
Doddridge County, West Virginia
CEC Project 110-811

DEC 26 18 9:00AM

On behalf of MarkWest Liberty Midstream & Resources, LLC, Civil & Environmental Consultants, Inc. (CEC) is submitting an updated Commercial/Industrial Floodplain Development Permit associated with the Sherwood Facility, located in Doddridge County, West Virginia. Per our phone conversation on May 09, 2018, please find enclosed the following information:

- Permit Application Fee in the amount of $13,060 (139757); and
- A copy of the Doddridge County Floodplain Development Permit Application (Sherwood).

CEC understands that this enclosed Floodplain Permit Application and Application Fee are required to cover the renewal of the Sherwood permit for one (1) year, upon approval.

Should you have any questions or require additional information, do not hesitate to contact us at 412-429-2324.

Very truly yours,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Brian R. Tomiczek, E.I.T.
Staff Consultant

George Haberman, P.E., R.L.S.
Senior Project Manager

Enclosures

cc: Richard Lowry, MarkWest Liberty Midstream & Resources, LLC

110-811-L-Floodplain Permit-5-16-18/P

Permit# 18-539

Project Name: Teporary Parking Lot

Permittees Name: Mark West

DEC26 18 9:30AM

Doddridge County, WV

Floodplain Development Permit Application

This document is to be used for projects that impact/potentially impact the FEMA---designated floodplain and/or floodway of Doddridge County, WV pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance.

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. The permit will expire if no work is commenced within six months of issuance.
5. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
6. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
7. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE _____

DATE 5/15/18

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: MarkWest Liberty Midstream & Resources, LLC		
Corporate Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State: PA**	**Zip: 15317**
Corporate Point of Contact (POC): Richard Lowry		
Corporate POC Title: Environmental Manager – New Construction		
Corporate POC Primary Phone: (724) 416-0520		
Corporate POC Primary Email: Richard.Lowry@markwest.com		
Corporate FEIN: 30-0528059	**Corporate DUNS:**	
Corporate Website:		
Local Mailing Address: 320 South View Drive, Suite 200		
City: Bridgeport	**State: WV**	**Zip: 26330**
Local Project Manager (PM): Reno Jackson		
Local PM Primary Phone: (304) 942-8766		
Local PM Secondary Phone:		
Local PM Primary Email: reno.jackson@markwest.com		
Person Filing Application: Richard Lowry		
Applicant Title: Environmental Manager – New Construction		
Applicant Primary Phone: (724) 416-0520		
Applicant Secondary Phone: (412) 925-8165		
Applicant Primary Email: Richard.Lowry@markwest.com		

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Project Narrative:

Describe in detail the proposed development including project name/title, type of development, estimated start and completion timeline, and its potential impact on the floodplain. Use additional copies of this page as needed.

Project Narrative:
MarkWest is continuing to construct additional plants on the existing pad of the Sherwood Gas Processing Facility. All work is outside of the Buckeye Creek floodplain.

Proposed Development:

Please check all elements of the proposed project thatapply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

	ACTIVITY		STRUCTURAL TYPE
[X]	New Structure	[]	Residential (1 – 4 Family)
[]	Addition	[]	Residential (more than 4 Family)
[]	Alteration	[X]	Non-residential (floodproofing)
[]	Relocation	[]	Combined Use (res. & com.)
[]	Demolition	[]	Replacement
[]	Manufactured/Mobil Home		

B. OTHER DEVELOPLMENT ACTIVITIES:

[X] Fill [] Mining [] Drilling [] Pipelining
[X] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[] Watercourse Alteration (including dredging and channel modification)
[] Drainage Improvements (including culvert work)
[] Road, Street, or Bridge Construction
[] Subdivision (including new expansion)
[] Individual Water or Sewer System
[] Other (please specify)

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 1 of 3

Site/Property Information:		
Legal Description: See Attachment		
Physical Address/911 Address: Swisher Lane		
Decimal Latitude/Longitude: N 39.27744508°/E -80.69008442°		
DMS Latitude/Longitude: N 39° 16' 38.80"/E -80° 41' 24.30"		
District: Grant	**Map: 19**	**Parcel: 31.6**
Land Book Description:		
Deed Book Reference: DBV 346, PG. 457		
Tax Map Reference: Tax Map 19		
Existing Buildings/Use of Property: Existing gas processing facility, meadow, stream		

Floodplain Location Data: *(to be completed by Floodplain Manager or designee)*			
Community:	**Number:**	**Panel:** 5401 7C 0140C	**Suffix:** 5401 7C 0145C
Location (Lat/Long): See Above		**Approximate Elevation:** **Estimated BFE:** 814'	
Is the development in the floodway? ☐ Yes ☒ No		**Is the development in the floodplain?** ☒ Yes ☐ No **Zone:** AE	
Notes:			

PROPERTY DESCRIPTION
5.758 ACRES
GRANT DISTRICT, COUNTY OF DODDRIDGE,
STATE OF WEST VIRGINIA

All that certain 5.758 acres of land situate in the Grant District, County of Doddridge, State of West Virginia, on the waters of Buckeye Creek, being part of land now or formerly of Dennis H. Powell (second tract), as recorded in Deed Book Volume 200, Page 532, more particularly bounded and described as follows:

BEGINNING FOR REFERENCE at an iron pipe set at the northwest corner of property of now or formerly Billy D. Carroll, as recorded in Deed Book Volume 140, Page 190, said point also being at the northeast corner of property of now or formerly Dennis H. Powell, as recorded in Deed Book Volume 200, Page 532, said point also being on the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, as recorded in Deed book Volume 216, Page 166, variable width; thence along the northerly line of property of now or formerly Dennis H. Powell and along the southerly right of way line of the The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width, the following eighteen (18) courses and distances, viz: thence South 77°19'37" West, 743.13' to an iron pipe set; thence South 55°33'48" West, 40.27' to an iron pipe set; thence South 59°34'48" West, 111.00' to an iron pipe set; thence South 65°43'48" West, 111.00' to an iron pipe set; thence South 67°29'54" West, 34.97' to an iron pipe set; thence North 20°36'12" West, 77.00' to an iron pipe set; thence South 72°53'48" West, 52.00' to an iron pipe set; thence South 77°41'48" West, 103.00' to an iron pipe set; thence South 81°59'48" West, 103.00' to an iron pipe set; thence South 86°58'48" West, 103.00' to an iron pipe set; thence North 84°41'12" West, 103.00' to an iron pipe set; thence North 81°03'12" West, 103.00' to an iron pipe set; thence North 74°31'12" West, 103.00' to an iron pipe set; thence North 69°06'12" West,103.00' to an iron pipe set; thence North 62°17'12" West,103.00' to an iron pipe set; thence North 57°06'12" West, 103.00' to an iron pipe set; thence North 52°46'12" West, 103.00' to an iron pipe set; thence North 48°29'12" West, 2.54' to an iron pipe set on the northerly line of property of now or formerly Dennis H. Powell, being the **TRUE PLACE OF BEGINNING**; thence through the property of now or formerly Dennis H. Powell the following three (3) courses and distances, viz: South 41°30'48" West, 285.00' to an iron pipe set; thence North 48°29'12" West, 880.00' to an iron pipe set (iron pipe set at 440.00') ; thence North 41°30'48" East, 285.00' to an iron pipe set on the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width; thence along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, variable width, South 48°29'12" East, 880.00' to an iron pipe set at the true place of beginning.

Contains: 250,800.00 Sq. Ft. or 5.758 Acres.

EXCEPTING AND RESERVING a Permanent Channel Change Easement located in Deed Book 156, Page 206, and a Telephone Utility Easement located in Deed Book 130, Page 410.

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 2 of 3

Site/Property Information:		
Legal Description: See Attachment – A portion of the D&M Powell LLC Property was recently purchased by MarkWest Liberty Midstream & Resources, LLC as part of Parcel 32. The Tax Map has not been updated.		
Physical Address/911 Address: Swisher Lane		
Decimal Latitude/Longitude: N 39.27744508°/E -80.69008442°		
DMS Latitude/Longitude: N 39° 16' 38.80"/E -80° 41' 24.30"		
District: Grant	**Map: 19**	**Parcel: 31**
Land Book Description:		
Deed Book Reference: DBV 304, PG. 355		
Tax Map Reference: Tax Map 19		
Existing Buildings/Use of Property: Existing gas processing facility, meadow, stream		

Floodplain Location Data: *(to be completed by Floodplain Manager or designee)*			
Community:	**Number:**	**Panel:**	**Suffix:**
Location (Lat/Long):		**Approximate Elevation:** **Estimated BFE:**	
Is the development in the floodway? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **No** **Zone:** _____	
Notes:			

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 3 of 3

Site/Property Information:		
Legal Description: See Attachment – A portion of the D&M Powell LLC Property was recently purchased by MarkWest Liberty Midstream & Resources, LLC as part of Parcel 32. The Tax Map has not been updated.		
Physical Address/911 Address: Swisher Lane		
Decimal Latitude/Longitude: N 39.27744508°/E -80.69008442°		
DMS Latitude/Longitude: N 39° 16' 38.80"/E -80° 41' 24.30"		
District: Grant	**Map: 19**	**Parcel: 32**
Land Book Description:		
Deed Book Reference: DBV 346, PG. 457		
Tax Map Reference: Tax Map 19		
Existing Buildings/Use of Property: Existing gas processing facility, meadow, stream		

Floodplain Location Data: *(to be completed by Floodplain Manager or designee)*			
Community:	**Number:**	**Panel:**	**Suffix:**
Location (Lat/Long):		**Approximate Elevation:** **Estimated BFE:**	
Is the development in the floodway? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **No** **Zone:** _____	
Notes:			

PROPERTY DESCRIPTION
257.495 ACRES
PARCEL A OF THE
SHERWOOD PLANT CONSOLIDATION PLAN
GRANT DISTRICT, COUNTY OF DODDRIDGE,
STATE OF WEST VIRGINIA

All that certain 257.495 acres, being Parcel A of the Sherwood Plant Consolidation Plan (to be recorded), situate in Grant District, County of Doddridge, State of West Virginia, on the waters of Buckeye Creek, being part of land now or formerly Dennis H. Powell (second & fourth tracts) as recorded in Deed Book Volume 200, Page 532, being more particularly bounded and described as follows:

BEGINNING AT A POINT on an existing stone at the westerly corner of property of now or formerly Dennis H. Powell (fourth tract), recorded in Deed Book Volume 200, Page 532, said stone also being on the easterly line of property of now or formerly Howard J. Rivers, recorded in Deed Book Volume 249, Page 356; thence along the northerly line of property of now or formerly Howard J. Rivers the following four (4) courses and distances, viz: North 33°17'31" East, 264.13' to a capped rebar set; thence North 57°54'19" West, 102.11' to a capped rebar set; thence North 52°54'19" West, 145.20' to a capped rebar set; thence North 73°24'19" West, 225.37' to a capped rebar set on the southerly line of property of now or formerly Dennis H. Powell; thence through the property of now or formerly Dennis H. Powell the following eight (8) courses and distances, viz: North 15°49'45" East, 2304.02' to a capped rebar set; thence North 02°42'33" West, 647.27' to a capped rebar set; thence North 88°57'32" East, 57.52' to a capped rebar set; thence North 76°26'19" East, 311.96' to a capped rebar set; thence South 88°02'36" East, 122.42' to a capped rebar set; thence South 75°10'25" East, 224.21' to a capped rebar set; thence North 89°02'55" East, 192.57' to a capped rebar set; thence North 25°07'41" East, 537.92' to a capped rebar set on the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, as recorded in Deed Book Volume 216, Page 166; thence along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority the following six (6) courses and distances, viz: South 20°36'12" East, 77.00' to a capped rebar set; thence North 67°29'54" East, 34.97' to a capped rebar set; thence North 65°43'48" East, 111.00' to a capped rebar set; thence North 59°34'48" East,111.00' to a capped rebar set; thence North 55°33'48" East, 40.27' to a capped rebar set; thence North 77°19'37" East, 743.13' to a capped rebar set at the northwest corner of property of now or formerly Billy D. Carroll, as recorded in Deed Book Volume 140, Page 190; thence along the Westerly line of property of now or formerly Billy D. Carroll the following eleven (11) courses and distances, viz: South 14°30'56" East, 715.45' to a point; thence South 34°26'09" East, 107.25' to a point; thence South 24°26'09" East, 396.00' to a point; thence South 16°26'09" East, 198.00' to a point; thence South 05°33'51" West, 226.88' to a point; thence South 06°56'09" East, 247.50' to a point; thence South 11°33'51" West, 276.37' to a point; thence South 05°03'51" West, 478.50' to a point; thence South 04°26'09" East, 330.00' to a point; thence South 03°33'51" West, 222.75' to a point; thence South 09°26'09" East, 330.00' to a point on the northerly line of property of

now or formerly Glenn R. Long, as recorded in Deed Volume 230, Page 493; thence along the northerly line of property of now or formerly Glenn R. Long South 89°33'51" West, 148.50' to a capped rebar set at the northeast corner of property of now or formerly Jeremy M. Sutton, as recorded in Deed Book Volume 266, Page 374; thence along the northerly line of property of now or formerly Jeremy M. Sutton the following eleven (11) courses and distances, viz: South 65°24'18" West, 141.35' to a capped rebar set; thence South 35°50'50" West, 189.75' to a capped rebar set; thence South 31°05'50" West, 165.00' to a capped rebar set; thence South 18°20'50" West, 181.50' to a capped rebar set; thence South 17°50'50" West, 148.50' to a capped rebar set; thence South 25°20'50" West, 148.50' to a capped rebar set; thence South 41°50'50" West, 107.25' to a capped rebar set; thence South 41°50'50" West, 152.63' to a capped rebar set; thence South 33°50'50" West, 297.00' to a capped rebar set; thence South 55°50'50" West, 202.13' to a capped rebar set; thence South 21°39'10" East, 123.75' to a capped rebar set at a northeasterly corner of property of now or formerly Howard J. Rivers; thence along the northerly line of property of now or formerly Howard J. Rivers the following two (2) courses and distances, viz: South 49°50'50" West, 621.33' to a capped rebar set; thence North 45°57'17" West, 1837.63' to an existing stone at the place of beginning.

Contains: 11,216,484.16 Sq. Ft. or 257.495 Acres.

Bearing basis is the West Virginia State Plane North Zone Grid, NAD 1983.

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 1 of 2

Property Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 304 Stuart Street		
City: West Union	**State: WV**	**Zip: 26456**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO): MarkWest Liberty Midstream & Resources, LLC		
PO Address: 304 Stuart Street		
City: West Union	**State: WV**	**Zip: 26456**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: *(As Applicable)*		
Name of Primary Owner (PO): N/A		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Property Owner Data:

Please provide data on current site/property landowner(s), both surface and mineral rights (as applicable). Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 2 of 2

Property Owner Data:		
Name of Primary Owner (PO): D&M Powell LLC		
PO Address: 304 Stuart Street		
City: West Union	**State: WV**	**Zip: 26456**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Surface Rights Owner Data:		
Name of Primary Owner (PO): D&M Powell LLC		
PO Address: 304 Stuart Street		
City: West Union	**State: WV**	**Zip: 26456**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Mineral Rights Owner Data: *(As Applicable)*		
Name of Primary Owner (PO): N/A		
PO Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Contractor Data:

Please provide all pertinent data for contractors and sub---contractors that may be participating in this project. Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: 1 of 1

Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name: TO BE DETERMINED		
C/SC WV License Number:		
C/SC FEIN:	**C/SC DUNS:**	
Local C/SC Point of Contact (POC):		
Local C/SC POC Title:		
C/SC Mailing Address:		
City:	**State:**	**Zip-Code:**
Local C/SC Office Phone:		
Local C/SC POC Phone:		
Local C/SC POC E-Mail:		

Engineer Firm Information:		
Engineer Firm Name: Civil & Environmental Consultants, Inc.		
Engineer WV License Number: 17441		
Engineer Firm FEIN: 25-1599565	**Engineer Firm DUNS: 36-160-9878**	
Engineer Firm Primary Point of Contact (POC): George J. Haberman, P.E.		
Engineer Firm Primary POC Title: Senior Project Manager		
Engineer Firm Mailing Address: 333 Baldwin Road		
City: Pittsburgh	**State: PA**	**Zip-Code: 15205**
Engineer Firm Office Phone: (412) 429-2324		
Engineer Firm Primary POC Phone: (412) 249-3189		
Engineer Firm Primary POC E-Mail: ghaberman@cecinc.com		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): N/A		
Physical Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): N/A		
Physical Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): N/A		
Physical Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): N/A		
Physical Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

A Site Plan is an accurate and detailed map of the proposed development for this project. It shows the size, shape, location and special features of the project property, and the size and location of any development planned to the property, especially as that development will impact the floodplain and/or floodway. Site plans show what currently exists on the project property, and any changes or improvements you are proposing to make. **A certified and licensed engineering firm should complete site plans.**

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

1. Legal description of the parcel, north arrow and scale
2. All property lines and their dimensions
3. Names of adjacent roads, location of driveways
4. Location of sloughs, tributaries, streams, rivers, wetlands, ponds, and lakes, with setbacks indicated, and including FEMA floodplain data based on most updated FIRM.
5. Location, size, shape of all buildings, existing and proposed, with elevation of lowest floor indicated.
6. Location and dimensions of existing or proposed on-site sewage systems.
7. Location of all propane tanks, fuel tanks or other liquid storage tanks whether above ground or below ground level.
8. Location and dimensions of any proposed pipeline placement(s) into floodplain/floodway.
9. Location and dimensions of any roadway development into floodplain/floodway. *(Includes initial development access roads)*
10. Location and dimensions of any bridge and/or culvert development into floodplain/floodway.
11. Location and dimensions of any storage yard or facility into the floodplain/floodway.
12. Location of any existing utilities and/or proposed utility placement and/or displacement.
13. Location, dimensions and depth of any existing or proposed fill on site.
14. A survey showing the **existing ground elevations** of at least location on the building site. **ELEVATION NOTE**: All vertical datum will reference either NGVD 29 or NAVD 88. Assumed datum will not be acceptable unless the property is located in an area where vertical datum has not been published. For those areas where vertical datum has not been established, a site plan with contours, elevations using assumed datum, high water marks and existing water levels of sloughs, rivers, lakes or streams and proposed lowest floor elevation.

Applicant

Please read print name, sign and date below:

- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have will be properly attained, are current and valid, and must be presented prior to a Doddridge County Floodplain Permit being issued.
- I understand that if in the course of the development project additional permits become required that were not needed during the initial proposal, the primary developer must notify the Doddridge County Floodplain Manager within 48 hours of such need, and that a "Stop Work" order may be issued for all project work directly impacting the floodplain or floodway, until such time the required additional permits are acquired.
- I understand that once the floodplain permit is submitted, the application will be entered into official public record at the next regularly scheduled Doddridge County Commission meeting after the date of submittal.
- I understand that from the date of submittal of the fully completed permit application, the Doddridge County Floodplain Manager has ninety (90) days to make a determination to either grant or deny said permit application. During this approval period, the Doddridge County Floodplain Manager may, at his or her discretion, conduct a review and/or additional study of provided documentation by means of an independent engineering firm. All costs associated with said review and/or study must be reimbursed to the County before issuance of approved permit.
- I understand that during the approval period, the Doddridge County Floodplain Manager of designee may at his or her discretion conduct site visits and document conditions of proposed development pursuant to the permit application.
- I understand that once the Floodplain Permit is granted, the permit will be entered into official public record. Appeals to the permit may be made no later than twenty (20) days after said issuance. If a valid appeal is submitted, as determined by the Doddridge County Floodplain Manager, a "Stop Work" order will be issued for all project development directly involving the floodplain or floodway. A public hearing by the Doddridge County Appeals Board will be scheduled no less than ten (10) days after the next regularly scheduled Doddridge County Commission meeting.
- I understand that all decisions of the Doddridge County Appeals Board shall be final.
- **I understand issuance of a Floodplain Permit authorizes me to proceed with construction as proposed.**
- In signing this application, the primary developer hereby grants the Doddridge County Floodplain Manager or designee the right to enter onto the above---described location to inspect the development work proposed, in progress, and/or completed.
- I understand that if I do not follow exactly the site---plan submitted and approved by this permit that a "Stop Work" order may be issued by the Doddridge County Floodplain Manager and that I must stop all construction immediately until discrepancies of actual work vs. proposed work is resolved.

Applicant Signature: _____ Date: 5/15/18

Applicant Printed Name: Rick Lowry

For MarkWest Liberty Midstream + Resources, LLC.

31.6
TAX MAP HAS NOT
BEEN OFFICIALLY
UPDATED

For Tax Purposes Only

Kimball

N

Legend

- Property
- Hydrology
- Road and Railroad R/W
- Road Easement
- Road Right of Way
- Parcel Number
- Lot Number
- Parcel Number
- Parcel Split
- District

Revisions

1	[illegible]	7	
2	2012	8	
3		9	
4		10	
5		11	
6		12	

16	17
19	20
23	

STATE OF WEST VIRGINIA
DODDRIDGE COUNTY
Office of Assessor

District
GRANT

SHEET NO: 19

Date Aerial Photography _____
Photo No. _____

Date Map _____
Scale 1" = 400'

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0145C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 145 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0145	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0145C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

MAP SCALE 1" = 1000'

500 0 1000 2000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 140 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0140	C

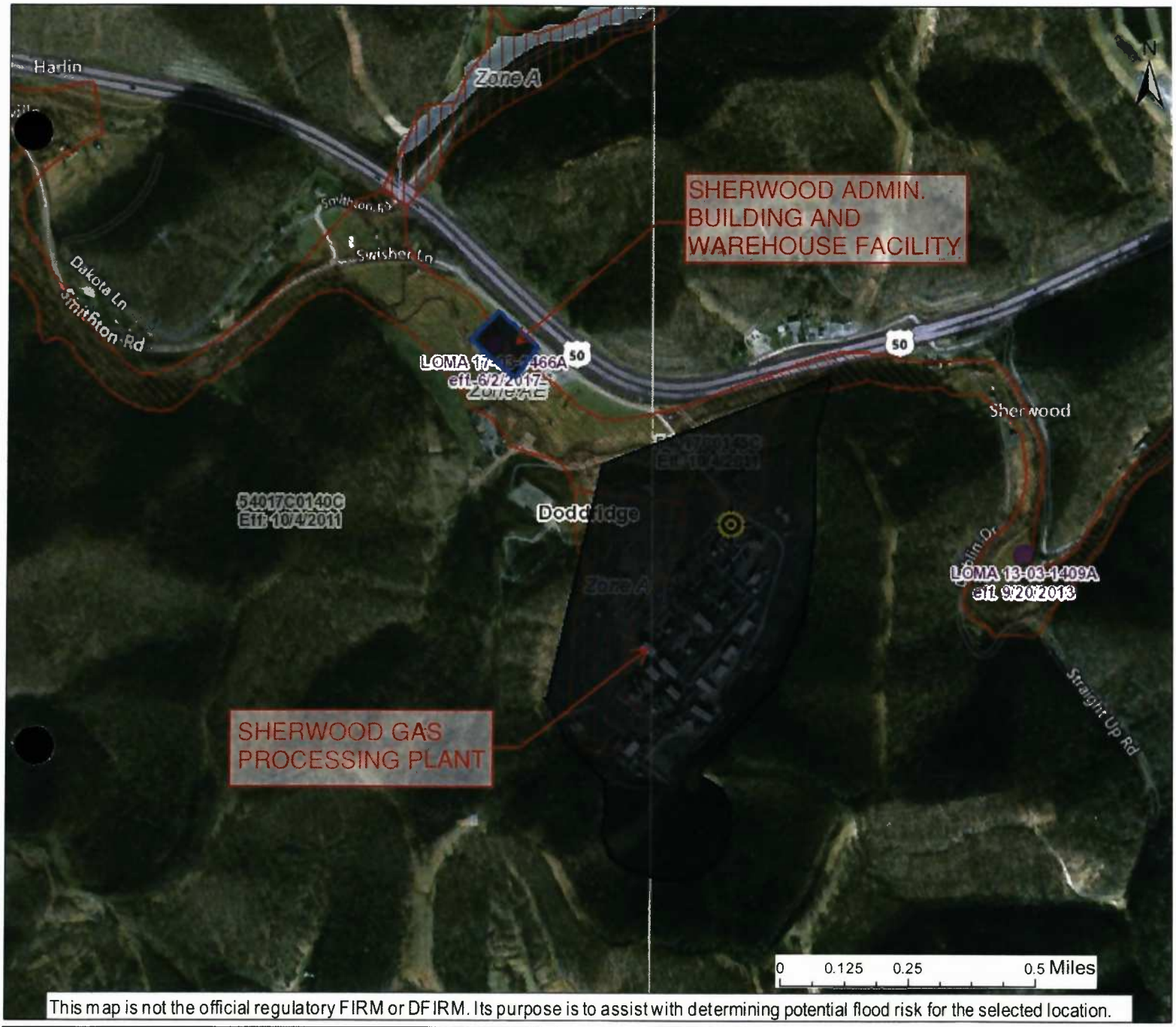
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0140C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

Sherwood Master Plan



This map is not the official regulatory FIRM or DFIRM. Its purpose is to assist with determining potential flood risk for the selected location.

LOMAs

- Incorporated
- Superseded
- Not incorporated
- No Revalidation Status
- Reevaluated

Contact Community for Revalidation Status

FEMA Effective Floodplains

- Zone AE FLOODWAY
- Zone AE (AH, AO)
- Zone A

Zone X (Shaded)

DFIRM Panel Index

Flood Depth (Ft)

- High : 623.366
- Low : 0

LOMRs

- Effective

Flood Info Location

Map created on 5/9/2018

User Notes:

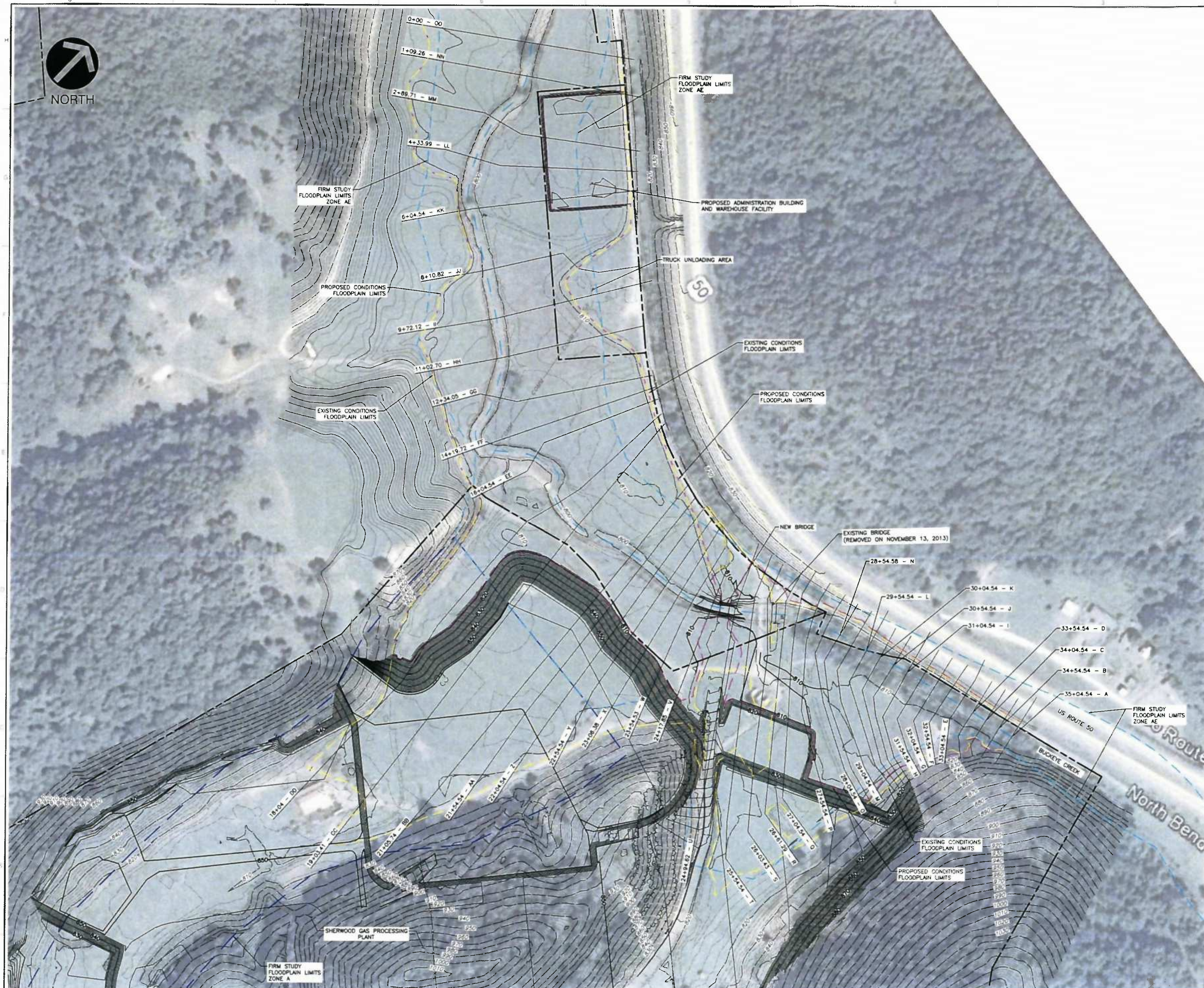
Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. Refer to the official Flood Insurance Study (FIS) for detailed flood elevation data in flood profiles and data tables. **WV Flood Tool (*https://www.MapWV.gov/flood*) is**

Flood Hazard Area:
Location is **NOT WITHIN** identified flood hazard area, but within 75 feet of an identified flood hazard area.

Flood Hazard Zone: Near Flood Zone
Stream: N/A
Watershed (HUC8): Little Musringum-Middle Island (503C
Flood Height: N/A
Water Depth: N/A
Elevation: About 865 ft (Source: SAMS 2003)
Location (long, lat): (-80.685247, 39.275656)
Community&ID: Doddridge County (540024)

FEMA Flood Map: 54017C0145C **EFF:** 10/4/2011
Parcel Number: 09-03-0019-0032-0000
Address: multiple addresses



LEGEND

— — — — —	APPROXIMATE STREAM CENTERLINE
303+04.54 - K	HEC-RAS CROSS SECTION
yellow dashed	100-YEAR FLOODPLAIN LIMITS, CURRENT CONDITIONS
red dashed	100-YEAR FLOODPLAIN LIMITS, PROPOSED CONDITIONS
blue dashed	FIRM STUDY FLOODPLAIN LIMITS ZONE AE
black dashed	FIRM STUDY FLOODPLAIN LIMITS ZONE A
— - —	PROPERTY LINE
900	EXISTING INDEX CONTOUR
	EXISTING INTERMEDIATE CONTOUR
900	PROPOSED INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOUR

REFERENCE

1. EXISTING TOPOGRAPHY DEVELOPED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC. (CEC) USING CEC SURVEY DATA AND DIGITAL ELEVATION MODELS (USGS 3-METER), 2003 OF THE U.S. GEOLOGICAL SURVEY (USGS) AND WEST VIRGINIA STATEWISE ADDRSSING & MAPPING BOARD (WVSAMB).
2. STREAM LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3. IMAGE PROVIDED BY GOOGLE EARTH © 2012.

SCALE IN FEET
0 150 300

* HAND SIGNATURE ON FILE

REVISION RECORD

NO	DATE	DESCRIPTION
		REVISED PER DODDRIDGE COUNTY REVIEW
		REVISED PER US ARMY CORPS OF ENGINEERS REVIEW
		REVISED FOR PLANT ADMINISTRATION BUILDING AND WAREHOUSE GRADING CHANGES

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road · Cincinnati, OH 45242
513-985-0226 · 800-759-5614
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC.
SHERWOOD GAS PROCESSING PLANT
DODDRIDGE COUNTY, WEST VIRGINIA

EXISTING AND FINAL PROPOSED GRADING
100-YEAR FLOODPLAIN MAP

DATE	1/29/2013	DRAWN BY	TGJ
DWG SCALE	1"=150'	CHECKED BY	ARG
PROJECT NO	110-811.5001		
APPROVED BY	*RPC		

DRAWING NO
SP01

NORTH

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR

ADMINISTRATION BUILDING

PLANT 8

PLANT 9

FUTURE DEETHANIZER 2

FUTURE PLANT LAYOUTS

DEETHANIZER 1

PLANT 5

PLANT 7

PLANT 3

PLANT 4

PLANT 6

PLANT 2

PLANT 1

SUBSTATION

SLUG CATCHERS

FLARE

REFERENCE

1. EXISTING CONTOURS DERIVED FROM BARE-EARTH DIGITAL ELEVATION MODEL CONSTRUCTED FROM UNMANNED AERIAL SYSTEM (UAS) RECORDED ELEVATION POINTS. TOPOGRAPHIC CONTOURS MAPPED AT AN INTERVAL OF 2 FEET, DATED MARCH 16, 2016.
2. STREAM AND WETLAND LOCATIONS DELINEATED BY CIVIL & ENVIRONMENTAL CONSULTANTS, INC.
3. PLANT EQUIPMENT PROVIDED TO CEC ELECTRONICALLY BY EXTERRAN, TITLED: US-107366-201.01-BA-06-001_REVIEW.DWG, RECEIVED 10/14/2015.
4. EXISTING UTILITIES LOCATED BY CEC AND CHAPMAN CORPORATION.

SCALE IN FEET
0 200 400

REVISION RECORD

NO	DATE	DESCRIPTION

Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205
412-429-2324 · 800-365-2324
www.cecinc.com

MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC
SHERWOOD GAS PROCESSING PLANT FACILITY
DODDRIDGE COUNTY, WEST VIRGINIA

OVERALL SHERWOOD EXHIBIT

DATE:	2/8/17
DRAWN BY:	ARG
CHECKED BY:	RPC
PROJECT NO:	110-811.5001
APPROVED BY:	RPC
DWG SCALE:	1" = 200'

DRAWING NO:
SP-41

Permit# _____

Project Name: _____

Permittees Name: _____

Doddridge County, WV

Floodplain Development Permit Application

This document is to be used for projects that impact/potentially impact the FEMA---designated floodplain and/or floodway of Doddridge County, WV pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance.

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. The permit will expire if no work is commenced within six months of issuance.
5. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
6. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
7. I THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE _____

DATE 12/20/18

Doddridge County Commercial/Industrial
Floodplain Development Permit Application

Applicant Information:

Please provide all pertinent data.

Applicant Information		
Responsible Company Name: MarkWest Liberty Midstream & Resources, LLC		
Corporate Mailing Address: 4600 J. Barry Court, Suite 500		
City: Canonsburg	**State:** PA	**Zip:** 15317
Corporate Point of Contact (POC): Richard Lowry		
Corporate POC Title: Environmental Manager - New Construction		
Corporate POC Primary Phone: (724) 416-0520		
Corporate POC Primary Email: Richard.Lowry@markwest.com		
Corporate FEIN: 30-0528059	**Corporate DUNS:**	
Corporate Website:		
Local Mailing Address: 320 South View Drive, Suite 200		
City: Bridgeport	**State:** WV	**Zip:** 26330
Local Project Manager (PM): Reno Jackson		
Local PM Primary Phone: (304) 942-8766		
Local PM Secondary Phone:		
Local PM Primary Email: reno.jackson@markwest.com		
Person Filing Application: Richard Lowry		
Applicant Title: Environmental Manager - New Construction		
Applicant Primary Phone: (724) 416-0520		
Applicant Secondary Phone: (412) 925-8165		
Applicant Primary Email: Richard.Lowry@markwest.com		

Project Narrative:

Describe in detail the proposed development including project name/title, type of development, estimated start and completion timeline, and its potential impact on the floodplain. Use additional copies of this page as needed.

Project Narrative:

Markwest Liberty Services, LLC (Markwest) has contracted Civil & Environmental Consultants, Inc. (CEC) to perform a flood study as part of the construction of the proposed parking lot expansion and laydown area. The proposed parking lot and laydown area currently consist of meadow areas located within the previously calculated floodplain. After construction at the Sherwood Plant has been completed, the proposed parking lot and laydown area will be restored to original contour with a cover type of meadow in good condition. The Sherwood Natural Gas Processing Plant is located approximately one-half-mile east of the intersection of U.S. Route 50 and County Route 20 along County Route 50/34 in Doddridge County, West Virginia.

The work proposes placing fill in the floodplain in order to construct the proposed parking lot and laydown area. Construction is anticipated to begin in April of 2019 and be completed by August of 2019. The proposed improvements are not anticipated to have a major impact on the floodplain.

Proposed Development:

Please check all elements of the proposed project thatapply.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

	ACTIVITY		STRUCTURAL TYPE
[X]	New Structure	[]	Residential (1 – 4 Family)
[]	Addition	[]	Residential (more than 4 Family)
[]	Alteration	[X]	Non-residential (floodproofing)
[]	Relocation	[]	Combined Use (res. & com.)
[]	Demolition	[]	Replacement
[]	Manufactured/Mobil Home		

B. OTHER DEVELOPLMENT ACTIVITIES:

[X] Fill [] Mining [] Drilling [] Pipelining
[] Grading
[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)
[] Watercourse Alteration (including dredging and channel modification)
[] Drainage Improvements (including culvert work)
[] Road, Street, or Bridge Construction
[] Subdivision (including new expansion)
[] Individual Water or Sewer System
[] Other (please specify)

Development Site/Property Information:

Please provide physical description of the site/property, along with pertinent ownership (surface and mineral rights) data as applicable. Attach appropriate maps from the WV Flood Tool showing location of proposed development. Use additional copies of this page if development spans multiple property boundaries. Designate each property by number (i.e. Property 1 of 1, Property 2 of 7, etc.)

Property Designation: 1 of 1

Site/Property Information:		
Legal Description: See Property Description Attachment & Tax Map (Sheet No. 19)		
Physical Address/911 Address: 218 Swisher Lane		
Decimal Latitude/Longitude: 39.277208 , -80.687432		
DMS Latitude/Longitude: W80° 41' 14.75" , N39° 16' 37.95"		
District: Grant	**Map:** 19	**Parcel:** 32
Land Book Description:		
Deed Book Reference: DBV 406, PG. 133		
Tax Map Reference: Tax Map 19		
Existing Buildings/Use of Property:		
Meadow areas within calculated 100-year floodplain		

Floodplain Location Data: ***(to be completed by Floodplain Manager or designee)***			
Community:	**Number:**	**Panel:**	**Suffix:**
Location (Lat/Long):		**Approximate Elevation:** **Estimated BFE:**	
Is the development in the floodway? ☐ **Yes** ☐ **No**		**Is the development in the floodplain?** ☐ **Yes** ☐ **No** **Zone:** _____	
Notes:			

QUITCLAIM DEED

KNOW ALL MEN BY THESE PRESENTS:

THAT, MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C., a Delaware limited liability company ("Grantor"), whose address is 1515 Arapahoe Street, Tower 1, Suite 1600, Denver, Colorado 80202, for valuable consideration paid, the receipt and sufficiency of which is hereby acknowledged, does hereby remise, release, and forever quitclaim unto **SHERWOOD MIDSTREAM HOLDINGS LLC**, a Delaware limited liability company ("Grantee"), whose address is 1515 Arapahoe Street, Tower 1, Suite 1600, Denver, Colorado 80202, the following described real property (the "Property") as further shown on Exhibit "A" and Exhibit "B" attached hereto and incorporated herein by reference, together with all of Grantor's right, title and interest in and to all rights, benefits, privileges, easements, tenements, hereditaments and appurtenances thereon or in any way appertaining thereto:

DESCRIPTION OF 211.525 ACRES

GRANT DISTRICT, COUNTY OF DODDRIDGE, STATE OF WEST VIRGINIA

All that certain 211.525 acres, being Lot E of the Revised Sherwood Plant Facilities Plan (to be recorded) located within the property of now or formerly MarkWest Liberty Midstream & Resources, L.L.C., recorded in Deed Book Volume 378, Page 516, located on Tax Parcel Sheet 19, Lot 32, situate in the Grant District, County of Doddridge, State of West Virginia, more particularly bounded and described as follows:

BEGINNING FOR REFERENCE at a point on an existing stone on a northerly corner of property now or formerly Howard J. Rivers, recorded in Deed Book Volume 249, Page 356, said stone also being at a south corner of Lot E of the Revised Sherwood Plant Facilities Plan (to be recorded), said Revised Sherwood Plant Facilities Plan being property now or formerly MarkWest Liberty Midstream & Resources, L.L.C., recorded in Deed Book Volume 378, Page 516; thence along the dividing line of property of now or formerly Howard J. Rivers and property herein described, the following four (4) courses and distances, viz: North 33°17'31" East, 264.13' to a capped rebar set; thence North 57°54'19" West, 102.11' to a capped rebar set; thence North 52°54'19" West, 145.20' to a capped rebar set; thence North 73°24'19" West, 225.37' to a capped rebar set at the southeast corner of property now or formerly Dennis H. Powell; thence along the dividing line of property of now or formerly Dennis H. Powell and property herein described, the following six (6) courses and distances, viz: North 15°49'45" East, 2304.02' to a capped rebar set; thence North 02°42'33" West, 647.27' to a capped rebar set; thence North 88°57'32" East, 57.52' to a capped rebar set; thence North 76°26'19" East, 311.96' to a capped rebar set; thence South 88°02'36" East, 122.42' to a capped rebar set; thence South 75°10'25" East, 131.40' to a capped steel pipe set at a north corner of Lot D of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot D of the Revised Sherwood Plant Facilities Plan and property herein described, the following three (3) courses and distances, viz: South 40°00'30" West, 289.34' to a capped steel pipe set; thence South 04°59'30" East, 53.74' to a capped steel pipe set; thence South 49°59'30" East, 112.00' to a capped steel pipe set at a northwest corner of Lot C of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot C of the Revised Sherwood Plant Facilities Plan and property herein described, the following three (3) courses and distances, viz: South 40°00'30" West, 551.11' to a capped steel pipe set; thence South 49°48'52" East, 232.76' to a capped steel pipe set; thence South 40°48'51" West, 519.56' to a capped steel pipe set at an

west corner of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B of the Revised Sherwood Plant Facilities Plan and property herein described, the following twelve (12) courses and distances, viz: South 39°47'23" West, 254.29' to a capped steel pipe set; thence South 49°38'56" East, 1356.83' to a capped steel pipe set; thence North 39°43'10" East, 502.99' to a capped steel pipe set; thence North 50°16'50" West, 302.85' to a capped steel pipe set; thence North 39°43'10" East, 894.00' to a capped steel pipe set; thence North 50°16'50" West, 218.55' to a capped steel pipe set; thence North 39°43'10" East, 457.75' to a capped steel pipe set;

thence North 49°51'12" West, 391.08' to a capped steel pipe set; thence South 40°56'23" West, 356.29' to a capped steel pipe set; thence South 46°50'52" East, 26.12' to a capped steel pipe set; thence South 39°43'10" West, 102.89' to a capped steel pipe set; thence South 50°16'50" East, 41.70' to a capped steel pipe set at a north corner of Lot A of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot A of the Revised Sherwood Plant Facilities Plan and property herein described, South 39°43'10" West, 452.34' to a capped steel pipe set at a northwest corner of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B of the Revised Sherwood Plant Facilities Plan and property herein described, South 40°42'41" West, 163.87' to a capped steel pipe set at a southeast corner of Lot C of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot C of the Revised Sherwood Plant Facilities Plan and property herein described, the following four (4) courses and distances, viz: North 49°56'03" West, 237.73' to a capped steel pipe set; thence North 40°00'30" East, 1014.01' to a capped steel pipe set; thence North 49°59'30" West, 298.16' to a capped steel pipe set; thence South 40°00'30" West, 112.00' to a capped steel pipe set at a east corner of Lot D of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot D of the Revised Sherwood Plant Facilities Plan and property herein described, North 49°59'30" West, 300.74' to a capped steel pipe set on the line of property now or formerly Dennis H. Powell; thence along the dividing line of property of now or formerly Dennis H. Powell and property herein described, the following three (3) courses and distances, viz: South 75°10'25" East, 51.30' to a capped rebar set; thence North 89°02'55" East, 192.57' to a capped rebar set; thence North 25°07'41" East, 537.92' to a capped rebar set on the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority, as recorded in Deed Book Volume 216, Page 166; thence along the southerly right of way line of The State of West Virginia, West Virginia Railroad Maintenance Authority the following six (6) courses and distances, viz: South 20°36'12" East, 77.00' to a capped rebar set; thence North 67°29'54" East, 34.97' to a capped rebar set; thence North 65°43'48" East, 111.00' to a capped rebar set; thence North 59°34'48" East, 111.00' to a capped rebar set; thence North 55°33'48" East, 40.27' to a capped rebar set; thence North 77°19'37" East, 743.13' to a capped rebar set at the northwest corner of property of now or formerly Michael E. Bonnell, as recorded in Deed Book Volume 140, Page 190; thence along the dividing line of property of now or formerly Michael E. Bonnell and property herein described, the following eleven (11) courses and distances, viz: South 14°30'56" East, 715.45' to a capped rebar set; thence South 34°26'09" East, 107.25' to a capped rebar set; thence South 24°26'09" East, 396.00' to a capped rebar set; thence South 16°26'09" East, 198.00' to a capped rebar set; thence South 05°33'51" West, 226.88' to a capped rebar set; thence South 06°56'09" East, 247.50' to a capped rebar set; thence South 11°33'51" West, 276.37' to a capped rebar set; thence South 05°03'51" West, 478.50' to a capped rebar set; thence South 04°26'09" East, 330.00' to a capped rebar set; thence South 03°33'51" West, 222.75' to a capped rebar set; thence South 09°26'09" East, 330.00' to a capped rebar set on the northerly line of property of now or formerly Mule Tracts, LLC; thence along the dividing line of property of now or formerly Mule Tracts, LLC and property herein described, the following twelve (12) courses and distances, viz: South 89°33'51" West, 148.50' to a capped rebar set; thence South 65°24'18" West, 141.35' to a capped rebar set; thence South 35°50'50" West, 189.75' to a capped rebar set; thence South 31°05'50" West, 165.00' to a capped rebar set; thence South 18°20'50" West, 181.50' to a capped rebar set; thence South 17°50'50" West, 148.50' to a capped rebar set; thence South 25°20'50" West, 148.50' to a capped rebar set; thence South 41°50'50" West, 107.25' to a capped rebar set; thence South 41°50'50" West, 152.63' to a capped rebar set; thence

South 33°50'50" West, 297.00' to a capped rebar set; thence South 55°50'50" West, 202.13' to a capped rebar set; thence South 21°39'10" East, 123.75' to a capped rebar set at a northeast corner of property of now or formerly Howard J. Rivers; thence along the dividing line of property of now or formerly Howard J. Rivers and property herein described, the following two (2) courses and distances, viz: South 49°50'50" West, 621.33' to a capped rebar set; thence North 45°57'17" West, 1837.63' to an existing stone at the **PLACE OF BEGINNING.**

Contains 9,214,015.33 Sq. Ft. or 211.525 Acres

DESCRIPTION OF ACCESS EASEMENT (Exhibit "B" attached)

GRANT DISTRICT, COUNTY OF DODDRIDGE, STATE OF WEST VIRGINIA

All that certain Access Easement within the Revised Sherwood Plant Facilities Plan (to be recorded), said Access Easement is located within the property of now or formerly MarkWest Liberty Midstream & Resources, L.L.C., recorded in Deed Book Volume 378, Page 516, located on Tax Parcel Sheet 19, Lot 32, situate in the Grant District, County of Doddridge, State of West Virginia, more particularly bounded and described as follows:

BEGINNING FOR REFERENCE at a capped rebar set on the southerly right of way line of U.S. Route 50, said rebar being on the dividing line of Lot E of the Revised Sherwood Plant Facilities Plan (to be recorded) and property now or formerly Dennis H. Powell, recorded in Deed Book Volume 200, Page 532; thence along the dividing line of Lot E of the Revised Sherwood Plant Facilities Plan and property now or formerly Dennis H. Powell, South 25°07'41" West, 357.07' to a point on the line of the Access Easement, being the **TRUE PLACE OF BEGINNING;** thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following ten (10) courses and distances, viz: South 39°33'11" East, 454.78' to a point; thence by an arc of a circle deflecting to the left in a southeastwardly direction, having a radius of 975.00', an arc distance of 175.28' (chord bearing and distance, South 44°42'11" East, 175.04') to a point; thence South 49°51'12" East, 399.02' to a point; thence by an arc of a circle deflecting to the right in a southeastwardly direction, having a radius of 135.00', an arc distance of 154.93' (chord bearing and distance, South 16°58'35" East, 146.57') to a point; thence South 15°54'02" West, 613.15' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 425.00', an arc distance of 132.47' (chord bearing and distance, South 24°49'47" West, 131.93') to a point; thence South 33°45'32" West, 464.47' to a point; thence by an arc of a circle deflecting to the left in a southwestwardly direction, having a radius of 175.00', an arc distance of 71.95' (chord bearing and distance, South 21°58'51" West, 71.44') to a point; thence South 10°12'10" West, 112.18' to a point; thence North 79°47'50" West, 10.57' to a capped steel pipe set at a southeast corner of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, North 50°16'50" West, 45.32' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following two (2) courses and distances, viz: North 10°12'10" East, 71.37' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 145.00', an arc distance of 89.25' (chord bearing and distance, South 84°43'51" West, 87.85') to a point on an easterly line of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following two (2) courses and distances, viz: North 50°16'50" West, 160.24' to a point; thence North 39°43'10" East, 23.01' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following six (6) courses and distances, viz: South 56°32'29" East, 108.14' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 95.00', an arc distance of 145.18' (chord bearing and distance, North 77°32'16" East, 131.46') to a point; thence North 33°45'32" East, 411.69' to a

point; thence North 56°14'28" West, 36.00' to a point; thence by an arc of a circle deflecting to the left in a northwestwardly direction, having a radius of 125.00', an arc distance of 44.56' (chord bearing and distance, North 66°27'11" West, 44.32') to a point; thence North 76°39'54" West, 74.77' to a point on an easterly line of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, North 39°43'10" East, 55.81' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following eight (8) courses and distances, viz: South 76°39'54" East, 49.97' to a point; thence by an arc of a circle deflecting to the right in a southeastwardly direction, having a radius of 175.00', an arc distance of 62.38' (chord bearing and distance, South 66°27'11" East, 62.05') to a point; thence South 56°14'28" East, 36.00' to a point; thence North 33°45'32" East, 29.96' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 375.00', an arc distance of 116.88' (chord bearing and distance, North 24°49'47" East, 116.41') to a point; thence North 15°54'02" East, 613.15' to a point; thence by an arc of a circle deflecting to the left in a northwestwardly direction, having a radius of 85.00', an arc distance of 97.55' (chord bearing and distance, North 16°58'35" West, 92.28') to a point; thence North 49°51'12" West, 0.94' to a point to a capped steel pipe set at a northeast corner of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following four (4) courses and distances, viz: North 49°51'12" West, 391.08' to a PK nail set; thence South 40°56'23" West, 356.29' to a capped steel pipe set; thence South 46°50'52" East, 26.12' to a capped steel pipe set; thence South 39°43'10" West, 62.05' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following ten (10) courses and distances, viz: North 15°57'34" East, 67.04' to a point; thence by an arc of a circle deflecting to the right in a northeastwardly direction, having a radius of 525.00', an arc distance of 136.83' (chord bearing and distance, North 23°25'33" East, 136.44') to a point; thence South 40°09'15" West, 78.35' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 525.00', an arc distance of 85.75' (chord bearing and distance, South 44°50'00" West, 85.66') to a point; thence South 49°30'46" West, 98.45' to a point; thence by an arc of a circle deflecting to the left in a southwestwardly direction, having a radius of 475.00', an arc distance of 64.53' (chord bearing and distance, South 45°37'15" West, 64.48') to a point; thence South 41°43'44" West, 64.17' to a point; thence by an arc of a circle deflecting to the left in a southwestwardly direction, having a radius of 275.00', an arc distance of 105.18' (chord bearing and distance, South 30°46'17" West, 104.54') to a point; thence South 19°48'50" West, 7.83' to a point; thence South 50°16'50" East, 121.92' to a point on the northwesterly line of Lot A of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot A and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, South 39°43'10" West, 50.00' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following four (4) courses and distances, viz: North 50°16'50" West, 105.09' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 125.00', an arc distance of 51.39' (chord bearing and distance, South 39°32'34" West, 51.03') to a point; thence South 08°55'31" West, 162.59' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 225.00', an arc distance of 47.97' (chord bearing and distance, South 15°01'56" West, 47.87') to a point on the westerly line of Lot B of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot B and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following two (2) courses and distances, viz: South 40°42'41" West, 65.59' to a capped steel pipe set; thence North 49°56'03" West, 37.25' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following three (3) courses and distances, viz: by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 175.00', an arc distance of 87.71' (chord bearing and distance, North 23°17'03" East, 86.80') to a point; thence North 08°55'31" East, 127.56' to a point; thence South 70°17'34" West, 217.42' to a point on the easterly line of Lot C of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot C and

Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, North 40°00'30" East, 99.15' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following eight (8) courses and distances, viz: North 70°17'34" East, 151.83' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 75.00', an arc distance of 66.08' (chord bearing and distance, North 45°03'12" East, 63.96') to a point; thence North 19°48'50" East, 43.28' to a point; thence by an arc of a circle deflecting to the right in a northeastwardly direction, having a radius of 325.00', an arc distance of 124.31' (chord bearing and distance, North 30°46'17" East, 123.55') to a point; thence North 41°43'44" East, 64.17' to a point; thence by an arc of a circle deflecting to the right in a northeastwardly direction, having a radius of 525.00', an arc distance of 71.32' (chord bearing and distance, North 45°37'15" East, 71.27') to a point; thence North 49°30'46" East, 31.78' to a point; thence North 49°59'30" West, 61.56' to a point on the easterly line of Lot C of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot C and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, North 40°00'30" East, 50.00' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following nine (9) courses and distances, viz: South 49°59'30" East, 69.94' to a point; thence North 49°30'46" East, 15.97' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 475.00', an arc distance of 77.58' (chord bearing and distance, North 44°50'00" East, 77.50') to a point; thence North 40°09'15" East, 117.59' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 225.00', an arc distance of 313.01' (chord bearing and distance, North 00°18'02" East, 288.37') to a point; thence North 39°33'11" West, 229.45' to a point; thence South 25°07'41" West, 31.44' to a point; thence by an arc of a circle deflecting to the right in a southwestwardly direction, having a radius of 175.00', an arc distance of 195.23' (chord bearing and distance, South 57°05'18" West, 185.27') to a point; thence South 89°02'55" West, 63.87' to a point on the northeasterly line of Lot D of the Revised Sherwood Plant Facilities Plan; thence along the dividing line of Lot D and Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, North 49°59'30" West, 76.27' to a point; thence through Lot E of the Revised Sherwood Plant Facilities Plan and along the Access Easement, the following four (4) courses and distances, viz: North 89°02'55" East, 121.47' to a point; thence by an arc of a circle deflecting to the left in a northeastwardly direction, having a radius of 125.00', an arc distance of 139.45' (chord bearing and distance, North 57°05'18" East, 132.33') to a point; thence North 25°07'41" East, 55.09' to a point; thence North 39°33'11" West, 55.31' to a point

on the dividing line of Lot E of the Revised Sherwood Plant Facilities Plan and property now or formerly Dennis H. Powell; thence along the dividing line of Lot E of the Revised Sherwood Plant Facilities Plan and property now or formerly Dennis H. Powell and along the Access Easement, North 25°07'41" East, 55.31' to a point at the **TRUE PLACE OF BEGINNING.**

Contains 253,923.67 Sq. Ft. or 5.829 Acres

Bearing basis is the West Virginia State Plane North Zone Grid, NAD 1983.

To have and to hold the above granted and bargained premises with the appurtenances thereunto belonging, unto the said **GRANTEE,** its successors and assigns forever.

PURSUANT to the requirement of W. Va. Code §11-22-6, the total consideration paid for this transaction is One Dollar and 00/100 ($1.00).

[*Signature Page Follows*]

GRANTOR:

MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C.

By: _____
Name: Greg S Floerke
Title: EVP, Gathering & Processing

STATE OF Colorado)
) ss.
COUNTY OF Denver)

On this, the 2 day of April, 2018, before me personally appeared Greg S. Floerke, who acknowledged himself to be the EVP of MarkWest Liberty Midstream & Resources, L.L.C., and who represented that in such capacity he was authorized to execute the foregoing instrument on behalf of said limited liability company.

(SEAL)

LISA R. CRUM
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID # 20054031684
MY COMMISSION EXPIRES 07-01-2019

_____
Notary Public

My commission expires: 07/01/2019

GRANTEE:

SHERWOOD MIDSTREAM HOLDINGS LLC

By: _____
Name: Greg S. Fiverke
Title: EVP, Gathering & Processing

STATE OF Colorado)
) ss.
COUNTY OF Denver)

On this, the 2 day of April, 2018, before me personally appeared Greg S. Fiverke, who acknowledged himself to be the EVP of Sherwood Midstream Holdings LLC, and who represented that in such capacity he was authorized to execute the foregoing instrument on behalf of said limited liability company.

(SEAL)

LISA R. CRUM
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID # 20054031684
MY COMMISSION EXPIRES 07-01-2019

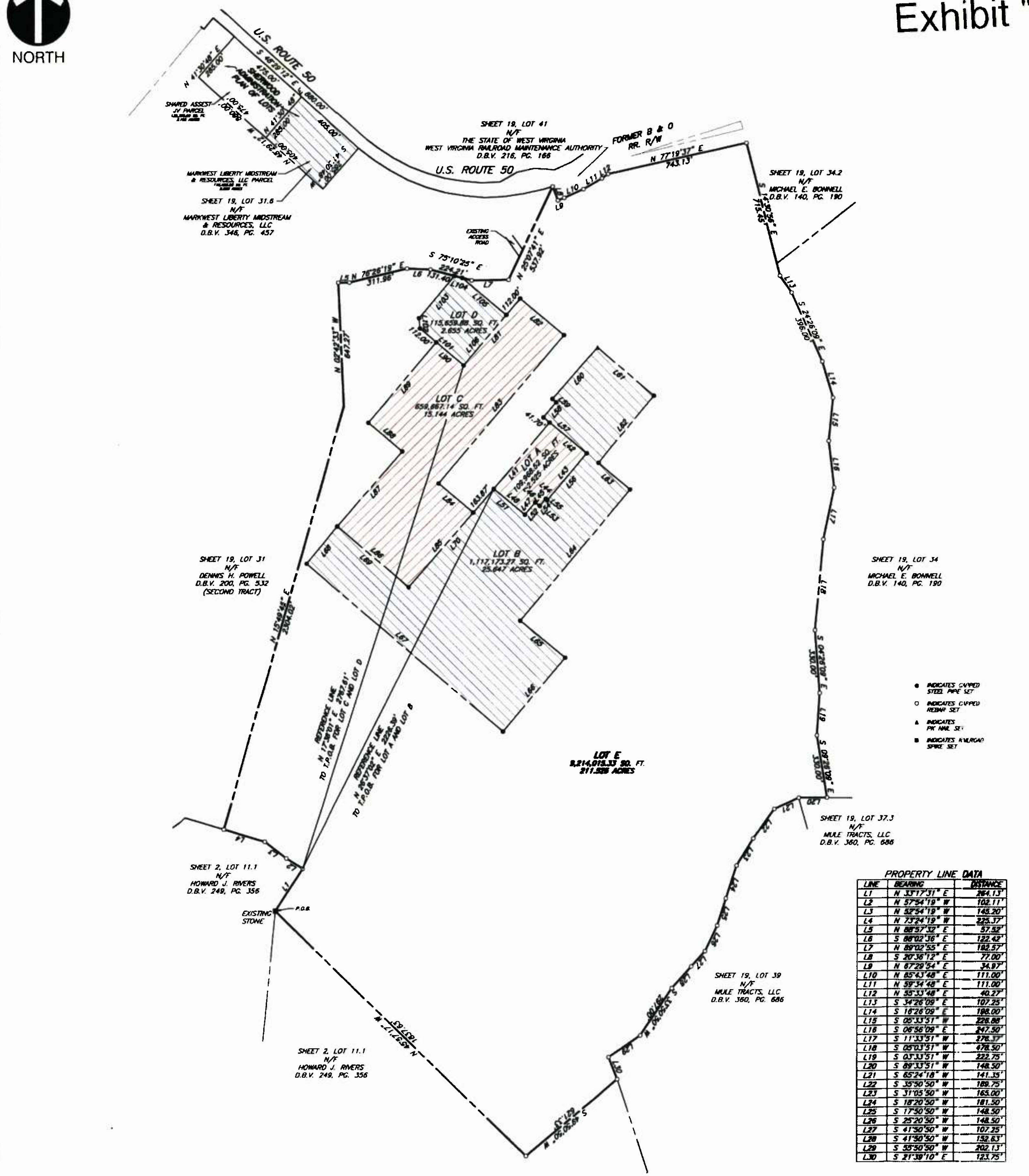
_____
Notary Public

My commission expires: 07/01/2019

This instrument prepared by, and after recording, please return to:
Sherwood Midstream Holdings LLC
1515 Arapahoe Street
Tower 1, Suite 1600
Denver, Colorado 80202

Exhibit "A"

REVISION RECORD		
NO	DATE	DESCRIPTION
△		
△		
△		
△		



● INDICATES CAPPED STEEL PIPE SET

○ INDICATES CAPPED REBAR SET

▲ INDICATES PK NAIL SET

■ INDICATES RAILROAD SPIKE SET

LOT A

LINE	BEARING	DISTANCE
L41	N 39°43'10" E	452.34'
L42	S 50°16'50" E	251.88'
L43	S 39°43'10" W	319.00'
L44	N 50°16'50" W	11.00'
L45	S 39°43'10" W	48.60'
L46	N 50°16'50" W	29.50'
L47	S 39°43'10" W	84.74'
L48	N 50°16'50" W	211.38'

LOT B

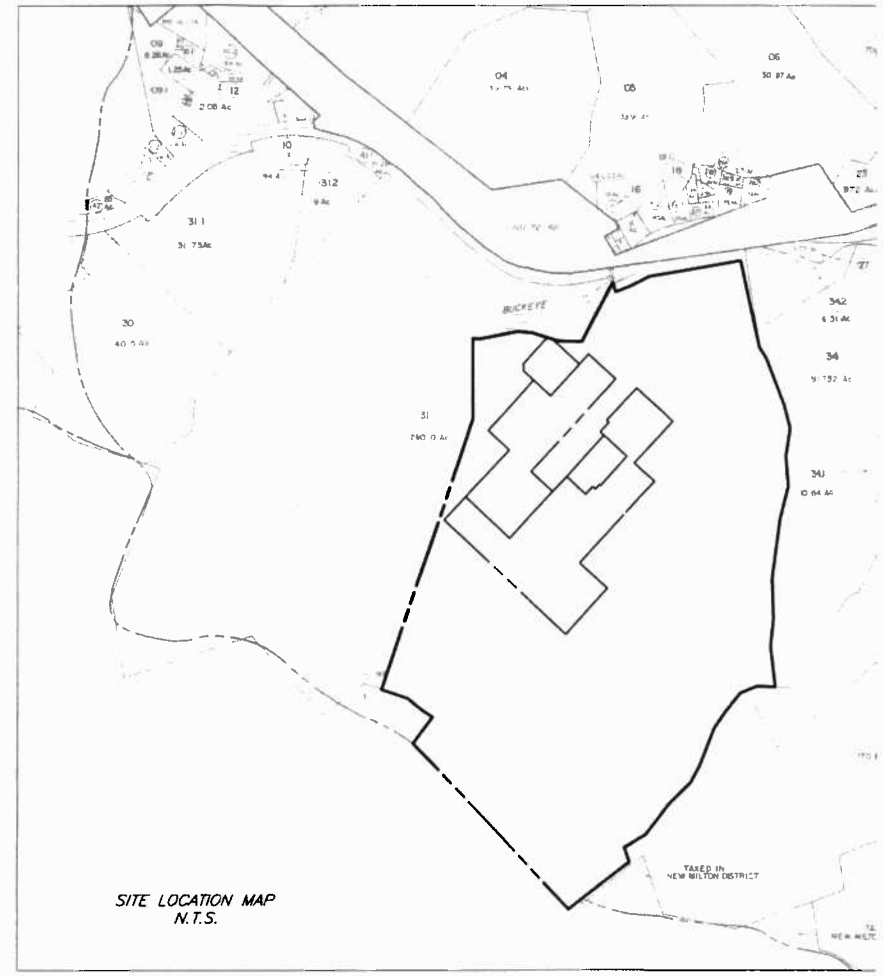
LINE	BEARING	DISTANCE
L51	S 50°16'50" E	211.38'
L52	N 39°43'10" E	84.74'
L53	S 50°16'50" E	29.50'
L54	N 39°43'10" E	48.60'
L55	S 50°16'50" E	11.00'
L56	N 39°43'10" E	319.00'
L57	N 50°16'50" W	293.58'
L58	N 39°43'10" E	102.89'
L59	N 46°50'52" W	26.12'
L60	N 40°56'23" E	356.29'
L61	S 49°51'12" E	391.08'
L62	S 39°43'10" W	457.75'
L63	S 50°16'50" E	218.55'
L64	S 39°43'10" W	894.00'
L65	S 50°16'50" E	302.85'
L66	S 39°43'10" W	502.99'
L67	N 49°38'56" W	1356.83'
L68	N 39°47'23" E	254.29'
L69	S 49°38'42" E	492.40'
L70	N 40°42'41" E	880.97'

LOT C

LINE	BEARING	DISTANCE
L81	N 40°00'30" E	457.00'
L82	S 49°59'30" E	298.16'
L83	S 40°00'30" W	1014.01'
L84	S 49°56'03" E	237.73'
L85	S 40°42'41" W	517.10'
L86	N 49°38'42" W	492.40'
L87	N 40°48'51" E	519.56'
L88	N 49°48'52" W	232.78'
L89	N 40°00'30" E	551.11'
L90	S 49°59'30" E	188.30'

LOT D

LINE	BEARING	DISTANCE
L101	N 49°59'30" W	300.30'
L102	N 04°59'30" W	53.74'
L103	N 40°00'30" E	289.34'
L104	S 75°10'25" E	41.51'
L105	S 49°59'30" E	300.74'
L106	S 40°00'30" W	345.00'



PROPERTY LINE DATA

LINE	BEARING	DISTANCE
L1	N 33°17'31" E	264.13'
L2	N 57°54'19" W	102.11'
L3	N 52°54'19" W	145.20'
L4	N 73°24'19" W	225.37'
L5	N 88°57'32" E	57.52'
L6	S 88°02'36" E	122.42'
L7	N 89°02'55" E	192.57'
L8	S 20°36'12" E	77.00'
L9	N 67°29'54" E	34.97'
L10	N 85°43'48" E	111.00'
L11	N 59°34'48" E	111.00'
L12	N 55°33'48" E	40.27'
L13	S 34°26'09" E	107.25'
L14	S 16°26'09" E	198.00'
L15	S 05°33'51" W	226.88'
L16	S 06°56'09" E	247.50'
L17	S 11°33'51" W	276.37'
L18	S 05°03'51" W	478.50'
L19	S 03°33'51" W	222.75'
L20	S 89°33'51" W	148.50'
L21	S 65°24'18" W	141.35'
L22	S 35°50'50" W	189.75'
L23	S 31°05'50" W	165.00'
L24	S 18°20'50" W	181.50'
L25	S 17°50'50" W	148.50'
L26	S 25°20'50" W	148.50'
L27	S 41°50'50" W	107.25'
L28	S 41°50'50" W	152.63'
L29	S 55°50'50" W	202.13'
L30	S 21°39'10" E	123.75'

LEGEND

MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C.

SHERWOOD MIDSTREAM LLC

SHERWOOD MIDSTREAM HOLDINGS LLC

AREA TABULATIONS

	SQ. FT.	ACRES
LOT A	109,988.52	2.525
LOT B	1,117,173.27	25.647
LOT C	859,887.14	15.144
LOT D	115,659.88	2.655
LOT E	9,214,015.33	211.525
TOTAL LOT AREAS	11,216,484.17	257.495

NOTES:

1. THE BEARINGS SHOWN ON THIS DRAWING ARE BASED ON WEST VIRGINIA STATE PLANE NORTH GRID, NAD 1983.
2. THERE ARE NO GAS PIPELINE FACILITIES OR PLANT EQUIPMENT IMPROVEMENTS SHOWN ON THIS PLAN.
3. PROPERTY IS TAX PARCEL SHEET 19, LOT 32.
4. THIS PLAN IS A REVISION OF THE SHERWOOD PLANT FACILITIES PLAN RECORDED BY QUITCLAIM DEED, MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C. TO MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C., DATED 1/18/2017 IN D.B.V. 378, PAGE 516.

JAMES R. BRUGGEMAN
No. 2104
STATE OF WEST VIRGINIA
PROFESSIONAL SURVEYOR

JAMES R. BRUGGEMAN
LICENSED PROFESSIONAL SURVEYOR
NO. 2104

TOTAL PLAN AREA
11,216,484.17 SQ. FT.
257.495 ACRES

SCALE IN FEET
0 300 600

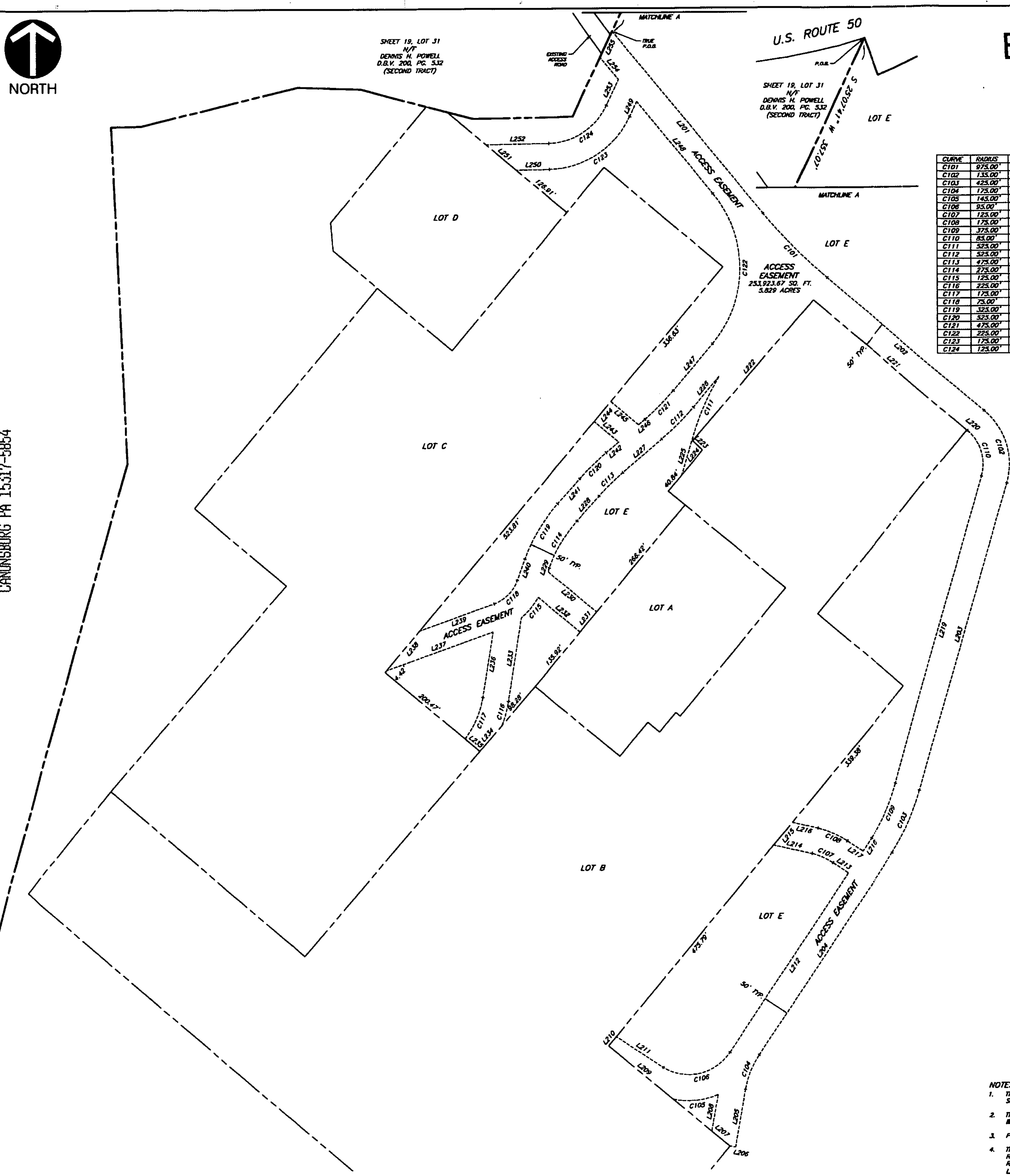
CEC
Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205
Ph: 412.429.2324 · 800.365.2324 · Fax: 412.429.2114
www.cecinc.com

REVISED SHERWOOD PLANT
FACILITIES PLAN
Situate In
GRANT DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA
Made For
MARKWEST LIBERTY MIDSTREAM
& RESOURCES, LLC.

DATE 3/15/2018	SCALE 1"=300'	DRAWING NO		
DRAWN BY CMM	CHECKED BY DGG	SUB-1		
PROJECT NO 110-811	APPROVED BY JRB	SHEET 1 OF 2		

MARKWEST ENERGY PARTNERS, LLC
ATTN: SHANNON SCHMIDT
4600 J BARRY COURT SUITE 500
CANONSBURG PA 15317-5854

Exhibit "B"

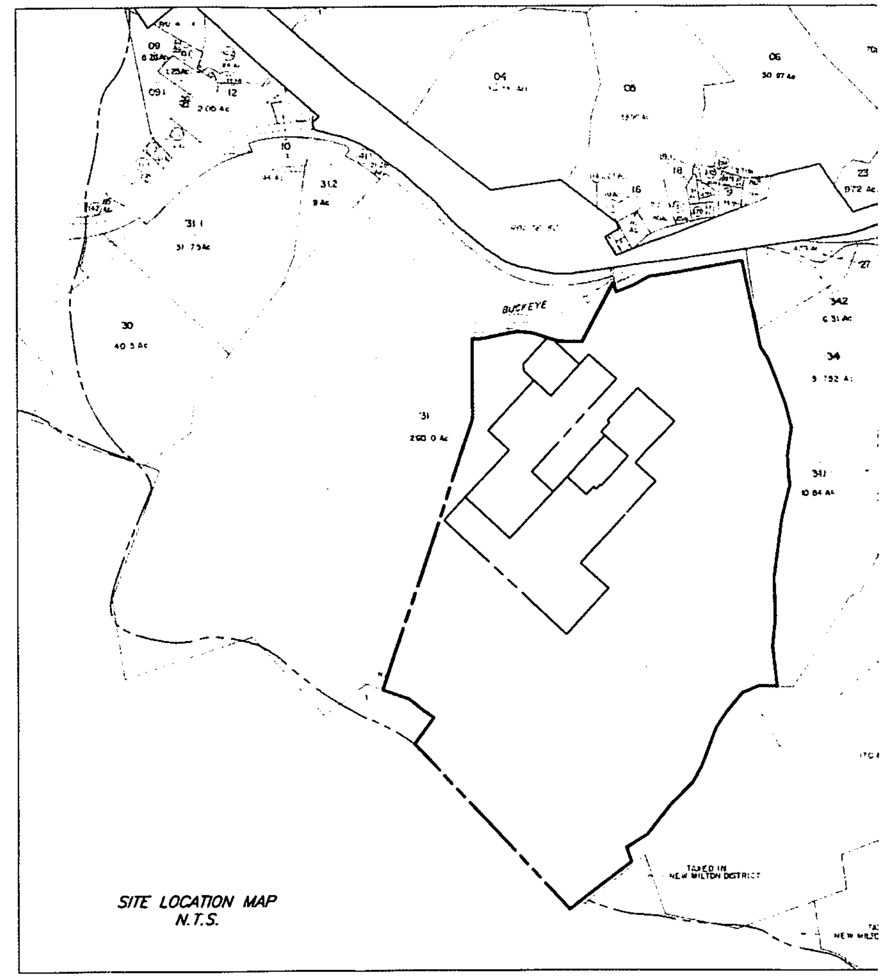


ACCESS EASEMENT DATA

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C101	975.00'	175.28'	175.04'	S 44°42'11" E	10°18'01"
C102	135.00'	154.93'	146.57'	S 16°58'35" E	65°45'14"
C103	425.00'	132.47'	131.93'	S 24°49'47" W	17°51'30"
C104	175.00'	71.95'	71.44'	S 21°58'51" W	23°33'22"
C105	145.00'	89.25'	87.85'	S 84°43'51" W	35°15'56"
C106	95.00'	145.18'	131.46'	N 77°32'16" E	87°33'27"
C107	125.00'	44.58'	44.32'	N 66°27'11" W	20°25'26"
C108	175.00'	62.38'	62.05'	S 66°27'11" E	20°25'26"
C109	375.00'	116.88'	116.41'	N 24°49'47" E	17°51'30"
C110	85.00'	97.55'	92.28'	N 16°58'35" W	65°45'14"
C111	525.00'	136.83'	136.44'	N 23°25'33" E	14°55'57"
C112	525.00'	85.75'	85.66'	S 44°50'00" W	9°21'31"
C113	475.00'	64.53'	64.48'	S 45°37'15" W	7°47'02"
C114	275.00'	105.18'	104.54'	S 30°46'17" W	21°54'54"
C115	125.00'	51.39'	51.03'	S 39°32'34" W	23°33'13"
C116	225.00'	47.97'	47.87'	S 15°01'56" W	12°12'51"
C117	175.00'	87.71'	86.80'	N 23°17'03" E	28°43'04"
C118	75.00'	66.08'	63.96'	N 45°03'12" E	50°28'43"
C119	325.00'	124.31'	123.55'	N 30°46'17" E	21°54'54"
C120	525.00'	71.32'	71.27'	N 45°37'15" E	7°47'02"
C121	475.00'	77.58'	77.50'	N 44°50'00" E	9°21'31"
C122	225.00'	313.01'	288.37'	N 00°18'02" E	79°42'26"
C123	175.00'	195.23'	185.27'	S 57°05'18" W	63°55'15"
C124	125.00'	139.45'	132.33'	N 57°05'18" E	63°55'15"

ACCESS EASEMENT DATA

LINE	BEARING	DISTANCE
L201	S 39°33'11" E	454.78'
L202	S 49°51'12" E	399.02'
L203	S 15°54'02" W	613.15'
L204	S 33°45'32" W	464.47'
L205	S 10°12'10" W	112.18'
L206	N 79°47'50" W	10.57'
L207	N 50°16'50" W	45.32'
L208	N 10°12'10" E	71.37'
L209	N 50°16'50" W	160.24'
L210	N 39°43'10" E	23.01'
L211	S 56°32'29" E	108.14'
L212	N 33°45'32" E	411.69'
L213	N 56°14'28" W	36.00'
L214	N 76°39'54" W	74.77'
L215	N 39°43'10" E	55.81'
L216	S 76°39'54" E	49.97'
L217	S 56°14'28" E	36.00'
L218	N 33°45'32" E	29.96'
L219	N 15°54'02" E	613.15'
L220	N 49°51'12" W	0.94'
L221	N 49°51'12" W	391.08'
L222	S 40°56'23" W	356.29'
L223	S 46°50'52" E	26.12'
L224	S 39°43'10" W	62.05'
L225	N 15°57'34" E	67.04'
L226	S 40°09'15" W	78.35'
L227	S 49°30'46" W	98.45'
L228	S 41°43'44" W	64.17'
L229	S 19°48'50" W	7.83'
L230	S 50°16'50" E	121.92'
L231	S 39°43'10" W	50.00'
L232	N 50°16'50" W	105.09'
L233	S 08°55'31" W	162.59'
L234	S 40°42'41" W	65.59'
L235	N 49°56'03" W	37.25'
L236	N 08°55'31" E	127.56'
L237	S 70°17'34" W	217.42'
L238	N 40°00'30" E	99.15'
L239	N 70°17'34" E	151.83'
L240	N 19°48'50" E	43.28'
L241	N 41°43'44" E	64.17'
L242	N 49°30'46" E	31.78'
L243	N 49°59'30" W	61.56'
L244	N 40°00'30" E	50.00'
L245	S 49°59'30" E	69.94'
L246	N 49°30'46" E	15.97'
L247	N 40°09'15" E	117.59'
L248	N 39°33'11" W	229.45'
L249	S 25°07'41" W	31.44'
L250	S 89°02'55" W	63.87'
L251	N 49°59'30" W	76.27'
L252	N 89°02'55" E	121.47'
L253	N 25°07'41" E	55.09'
L254	N 39°33'11" W	55.31'
L255	N 25°07'41" E	55.31'



SITE LOCATION MAP
N.T.S.

REVISION RECORD		
NO	DATE	DESCRIPTION

Doddridge County
Beth A Rogers, Clerk
Instrument 291623
04/24/2018 @ 12:08:52 PM
QUIT CLAIM DEED
Book 406 @ Page 133
Pages Recorded 9
Recording Cost $ 30.00

NOTES:

1. THE BEARINGS SHOWN ON THIS DRAWING ARE BASED ON WEST VIRGINIA STATE PLANE NORTH GRID, NAD 1983.
2. THERE ARE NO GAS PIPELINE FACILITIES OR PLANT EQUIPMENT IMPROVEMENTS SHOWN ON THIS PLAN.
3. PROPERTY IS TAX PARCEL SHEET 19, LOT 32.
4. THIS PLAN IS A REVISION OF THE SHERWOOD PLANT FACILITIES PLAN RECORDED BY QUITCLAIM DEED, MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C. TO MARKWEST LIBERTY MIDSTREAM & RESOURCES, L.L.C., DATED 1/18/2017 IN D.B.V. 378, PAGE 516.

JAMES R. BRUGGEMAN
LICENSED No. 2104
STATE OF WEST VIRGINIA
PROFESSIONAL SURVEYOR

JAMES R. BRUGGEMAN
LICENSED PROFESSIONAL SURVEYOR
NO. 2104

SCALE IN FEET
0 100 200

CEC
Civil & Environmental Consultants, Inc.
333 Baldwin Road · Pittsburgh, PA 15205
Ph: 412.429.2324 · 800.365.2324 · Fax: 412.429.2114
www.cecinc.com

REVISED SHERWOOD PLANT FACILITIES PLAN
Situate In
GRANT DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA
Made For
MARKWEST LIBERTY MIDSTREAM & RESOURCES, LLC.

DATE: 3/15/2018	SCALE: 1"=100'	DRAWING NO.
DRAWN BY: CMM	CHECKED BY: DGG	SUB-2
PROJECT NO: 110-811	APPROVED BY: JRB	SHEET 2 OF 2

Contractor Data:

Please provide all pertinent data for contractors and sub---contractors that may be participating in this project. Use additional copies of this page as needed. Designate each page in relation to each property listed above.

Property Designation: ____ of ____

Contractor/Sub-Contractor (C/SC) Information:		
C/SC Company Name:		
C/SC WV License Number:		
C/SC FEIN:	**C/SC DUNS:**	
Local C/SC Point of Contact (POC):		
Local C/SC POC Title:		
C/SC Mailing Address:		
City:	**State:**	**Zip-Code:**
Local C/SC Office Phone:		
Local C/SC POC Phone:		
Local C/SC POC E-Mail:		

Engineer Firm Information:		
Engineer Firm Name: Civil & Environmental Consultants, Inc.		
Engineer WV License Number: 17441		
Engineer Firm FEIN: 25-1599565	**Engineer Firm DUNS:** 36-160-9878	
Engineer Firm Primary Point of Contact (POC): George Haberman		
Engineer Firm Primary POC Title: George Haberman		
Engineer Firm Mailing Address: Senior Consultant		
City: Pittsburgh	**State:** PA	**Zip-Code:** 15205
Engineer Firm Office Phone: (412)-429-2324		
Engineer Firm Primary POC Phone: (412)-512-8804		
Engineer Firm Primary POC E-Mail: ghaberman@cecinc.com		

Adjacent and/or Affected Landowners Data

Please provide data for all adjacent and/or affected surface owners (both up and down stream) whose property may be impacted by proposed development as demonstrated by a floodplain study or survey. Use additional copies of this page as needed.

Adjacent Property Owner Data: Upstream		
Name of Primary Owner (PO): Michael Bonnell		
Physical Address: 3825 WV Route 18 S		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): Markwest Liberty Midstream & Resources, LLC		
Physical Address: 1515 Arapahoe St Tower, Suite 1		
City: Denver	**State:** CO	**Zip:** 80202
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO): D&M Powell, LLC		
Physical Address: 304 Stuart Street		
City: West Union	**State:** WV	**Zip:** 26456
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Adjacent Property Owner Data: Downstream		
Name of Primary Owner (PO):		
Physical Address:		
City:	**State:**	**Zip:**
PO Primary Phone:		
PO Secondary Phone:		
PO Primary Email:		

Site Plan

A Site Plan is an accurate and detailed map of the proposed development for this project. It shows the size, shape, location and special features of the project property, and the size and location of any development planned to the property, especially as that development will impact the floodplain and/or floodway. Site plans show what currently exists on the project property, and any changes or improvements you are proposing to make. **A certified and licensed engineering firm should complete site plans.**

A SITE PLAN MUST CONTAIN THE FOLLOWING INFORMATION:

1. Legal description of the parcel, north arrow and scale
2. All property lines and their dimensions
3. Names of adjacent roads, location of driveways
4. Location of sloughs, tributaries, streams, rivers, wetlands, ponds, and lakes, with setbacks indicated, and including FEMA floodplain data based on most updated FIRM.
5. Location, size, shape of all buildings, existing and proposed, with elevation of lowest floor indicated.
6. Location and dimensions of existing or proposed on-site sewage systems.
7. Location of all propane tanks, fuel tanks or other liquid storage tanks whether above ground or below ground level.
8. Location and dimensions of any proposed pipeline placement(s) into floodplain/floodway.
9. Location and dimensions of any roadway development into floodplain/floodway. *(Includes initial development access roads)*
10. Location and dimensions of any bridge and/or culvert development into floodplain/floodway.
11. Location and dimensions of any storage yard or facility into the floodplain/floodway.
12. Location of any existing utilities and/or proposed utility placement and/or displacement.
13. Location, dimensions and depth of any existing or proposed fill on site.
14. A survey showing the **existing ground elevations** of at least location on the building site. **ELEVATION NOTE**: All vertical datum will reference either NGVD 29 or NAVD 88. Assumed datum will not be acceptable unless the property is located in an area where vertical datum has not been published. For those areas where vertical datum has not been established, a site plan with contours, elevations using assumed datum, high water marks and existing water levels of sloughs, rivers, lakes or streams and proposed lowest floor elevation.

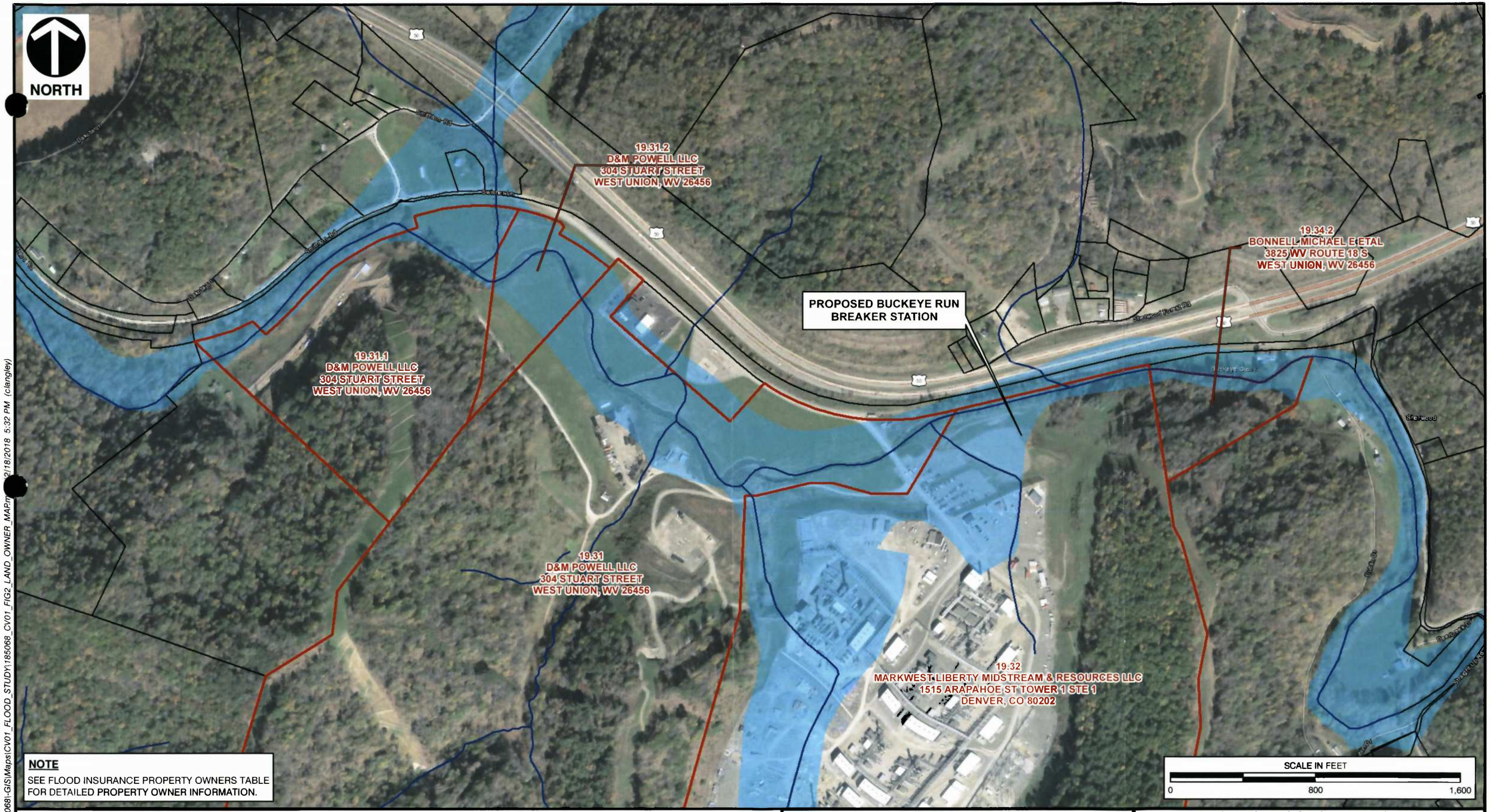
Applicant

Please read print name, sign and date below:

- I certify that I am authorized to submit this application for the primary project developer.
- I certify that the information included in this application is to the best of my knowledge true and complete.
- I certify that all required Federal, State, and local permits required by law and/or ordinance for the above described development of this project have will be properly attained, are current and valid, and must be presented prior to a Doddridge County Floodplain Permit being issued.
- I understand that if in the course of the development project additional permits become required that were not needed during the initial proposal, the primary developer must notify the Doddridge County Floodplain Manager within 48 hours of such need, and that a "Stop Work" order may be issued for all project work directly impacting the floodplain or floodway, until such time the required additional permits are acquired.
- I understand that once the floodplain permit is submitted, the application will be entered into official public record at the next regularly scheduled Doddridge County Commission meeting after the date of submittal.
- I understand that from the date of submittal of the fully completed permit application, the Doddridge County Floodplain Manager has ninety (90) days to make a determination to either grant or deny said permit application. During this approval period, the Doddridge County Floodplain Manager may, at his or her discretion, conduct a review and/or additional study of provided documentation by means of an independent engineering firm. All costs associated with said review and/or study must be reimbursed to the County before issuance of approved permit.
- I understand that during the approval period, the Doddridge County Floodplain Manager of designee may at his or her discretion conduct site visits and document conditions of proposed development pursuant to the permit application.
- I understand that once the Floodplain Permit is granted, the permit will be entered into official public record. Appeals to the permit may be made no later than twenty (20) days after said issuance. If a valid appeal is submitted, as determined by the Doddridge County Floodplain Manager, a "Stop Work" order will be issued for all project development directly involving the floodplain or floodway. A public hearing by the Doddridge County Appeals Board will be scheduled no less than ten (10) days after the next regularly scheduled Doddridge County Commission meeting.
- I understand that all decisions of the Doddridge County Appeals Board shall be final.
- **I understand issuance of a Floodplain Permit authorizes me to proceed with construction as proposed.**
- In signing this application, the primary developer hereby grants the Doddridge County Floodplain Manager or designee the right to enter onto the above---described location to inspect the development work proposed, in progress, and/or completed.
- I understand that if I do not follow exactly the site---plan submitted and approved by this permit that a "Stop Work" order may be issued by the Doddridge County Floodplain Manager and that I must stop all construction immediately until discrepancies of actual work vs. proposed work is resolved.

Applicant Signature: Rick Lowry MJP Date: 12/21/2018

Applicant Printed Name: RICK LOWRY



LEGEND

- STREAM
- PARCEL BOUNDARY -LANDOWNER CONTACT NEEDED
- PARCEL BOUNDARY
- FEMA 100 YEAR FLOODZONE

REFERENCE

WVSAMB LiDAR-DERIVED STREAMS LAYER, 2003

FEDERAL EMERGENCY MANAGEMENT AGENCY DIGITAL FLOOD INSURANCE RATE MAP DATABASE, DODDRIDGE COUNTY, WEST VIRGINIA, 2010.

ESRI WORLD IMAGERY / ARCGIS MAP SERVICE: HTTP://GOTO.ARCGISONLINE.COM/MAPS/WORLD_IMAGERY, ACCESSED 12/18/2018, IMAGERY DATE: 2017.

Civil & Environmental Consultants, Inc.
333 Baldwin Road - Pittsburgh, PA 15205-9072
412-429-2324 · 800-365-2324
www.cecinc.com

ELECTRICAL CONSULTANTS, INC.
BUCKEYE RUN BREAKER
FLOOD STUDY & FLOODPLAIN PERMIT
DODDRIDGE COUNTY, WEST VIRGINIA

BUCKEYE CREEK LAND OWNER MAP

DRAWN BY:	CBL	CHECKED BY:	PJH	APPROVED BY:	* Hand signature on file DRAFT	FIGURE NO:	2
DATE:	12/18/2018	SCALE:	1 " = 500 '	PROJECT NO:	185-068		

Gmail George Eidel <doddridgecountyfpm@gmail.com>

MarkWest Sherwood Floodplain Permit - Modification Approval for WVR310068-6, Sherwood Plant Parking, Doddridge County, Acres (96.64)

1 message

Celender, Rick <rcelender@cecinc.com> Thu, Feb 14, 2019 at 8:37 AM
To: George Eidel <doddridgecountyfpm@gmail.com>
Cc: "Weis, Kristen" <kweis@cecinc.com>, "Johnston, Tim" <tjohnston@cecinc.com>

George,

See below for the MarkWest Sherwood Parking/Laydown WVDEP permit approval. This is the only permit that is required for this work. Please let me know if us need anything else related to the issuance of the floodplain permit for this project.

Regards,

Rick

Richard P. Celender, RLA*, C.E.T., CPESC, CPSWQ / Vice President

ASLA/FAA Remote Pilot

Civil & Environmental Consultants, Inc.

333 Baldwin Road · Pittsburgh, PA 15205-1751

Direct: 412-249-2309 · Fax: 412-429-2114

Mobile: 412-760-0136 · http://www.cecinc.com

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From: DEP NPDESEP <DEP.NPDESEP@wv.gov>
Date: February 13, 2019 at 5:53:33 PM EST
To: "richard.lowry@markwest.com" <richard.lowry@markwest.com>
Cc: "Hendley, John H" <John.H.Hendley@wv.gov>, "McGee, James L" <James.L.McGee@wv.gov>, DEP NPDESEP <DEP.NPDESEP@wv.gov>, "Devereux, Ashton B" <Ashton.B.Devereux@wv.gov>, "Cochran, Joseph W" <Joseph.W.Cochran@wv.gov>
Subject: [EXTERNAL] Modification Approval for WVR310068-6, Sherwood Plant Parking, Doddridge County, Acres (96.64)

Richard Lowry

Markwest Liberty Midstream & Resources, L.L.C.

4600 J Barry CT

STE 500

Canonsburg, PA 15317

Physical Site Location: County Route 50, Smithburg

Please be advised that this e-mail constitutes approval and serves as Modification No. 6 of your existing General Permit Registration No. WVR310068, dated the 31st day of October, 2013.

After review of your existing General Permit Registration and Permit Modification Application No. WVR310068-6, the subject general permit registration is hereby modified to remove 2 acres of stabilized area from the project and add 2 acres of additional disturbance for a gravel parking lot and laydown area. The disturbed acreage remains 96.64 acres. The annual permit fee remains $1,500.00.

All other terms and conditions of the subject registration shall remain in effect and unchanged.

If you have any questions relative to this approval, please do not hesitate to contact **Joseph Cochran** at (304) 926-0499 Ext. **1069** or by email at **joseph.w.cochran@wv.gov**.

Harold D. Ward, Acting Director
WV DEP-Division of Water & Waste Mgt.
601 57th St SE
Charleston, WV 25304-2345
Phone: (304) 926-0495
Fax: (304) 926-0463

The Doddridge Independent

The Doddridge Independent

PUBLISHER'S CERTIFICATE

I, Michael D. Zorn, Publisher of The Doddridge Independent, A newspaper of general circulation published in the town of West Union, Doddridge County, West Virginia, do hereby certify that:

Please take notice that on the (26th) of (December), 2018, (Mark West Liberty Midstream) filed an application for a Floodplain Permit (#18-539) to develop land located at or about (218 Swisher lane); Coordinates: 39.277695 N, -80.687849 W. The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29~ Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by (January 23,

was published in The Doddridge Independent
2 times commencing on Friday, January 4, 2019 and
Ending on Friday, January 11, 2019 at the request of:

George Eidel, Doddridge County Floodplain Manager& Doddridge County Commission

Given under my hand this Friday, January 11, 2019

The publisher's fee for said publication is:

$ 29.93 1st Run/$ 22.44 Subsequent Runs

This Legal Ad Total: $ 52.37

Michael D. Zorn
Publisher of The Doddridge Independent

Subscribed to and sworn to before me on
this date: 1/14/2019

Notary Public in and for Doddridge County
My Commission expires on
The 16 day of MAY 20 19

Floodplain Public Notice • Legal Notice

Please take notice that on the (26th) of (December), 2018, (Mark West Liberty Midstream) filed an application for a Floodplain Permit (#lg-539) to develop land located at or about (218 Swisher lane); Coordinates: 39.277695 N, -80.687849 W. The Application is on file with the Floodplain Manager of the County and may be inspected or copied during regular business hours in accordance to WV Code Chapter 29~ Freedom of Information, Article 1 Public Records and county policy and procedures. Any interested persons who desire to comment shall present the same in writing by (January 23, 2019) (20 calendar days after the announcement at the regularly scheduled Doddridge County Commission Meeting) delivered to the Floodplain Manager of the County at 105 Court Street, Suite #3, West Union, WV 26456. This project is for a Temporary Parking Lot 1/4 - 1/11