SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to: 13-082

Alvadore, Jr. &
Frances J. McCloy
Rt. 1, Box 310
Greenwood, WV 26415

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Frances J McCloy ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* FRANCES J McCloy

C. Date of Delivery 10/24/13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number
(Transfer from service label) 7011 0470 0000 8523 2648

UNITED STATES POSTAL SERVICE

CHARLESTON WV 250

24 OCT 2013 PM 2 L

First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4 in this box •

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2013 OCT 25 AM 8:41
BETH A. ROGER
DODDRIDGE COUNTY CLERK
DODDRIDGE COUNTY, WV

BETH A. ROGER
DODDRIDGE CO. CLERK
118 EAST COURT ST.
ROOM 102
WEST UNION, WV 26456

Doddridge County Sheriff
Flood Plain Ordinance Fund

1066
69-217/515

DATE November 5, 2013

PAY TO THE ORDER OF THE HERALD RECORD $ 108.70

One Hundred Eight dollars and 70/100---------- DOLLARS

Security features included. Details on back.

CORNERSTONE BANK
West Union, WV 26456

Ralph Sandy
Beth A. Rogers
Sheriff

MEMO Inv #: 2841-2842-2856-2857-2858

⑈001066⑈ ⑆051502175⑆ ⑆⑈9649⑈9⑈

BLUE TRADITIONAL

#13-078
#13-077
#13-083
#13-079
#13-082

7011 0470 0000 8523 2648

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Postage	$ .46
Certified Fee	3.10
Return Receipt Fee (Endorsement Required)	2.55
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$ 6.11

OCT 22 2013
WEST UNION, WV
Postmark Here

#13-082

Sent To Alvadore, Jr. & Frances J. McCloy
Street, Apt. No.; or PO Box No. Rt. 1, Box 310
City, State, ZIP+4 Greenwood, WV 26415

PS Form 3800, August 2006 See Reverse for Instructions

ANTERO RESOURCES CORPORATION
1625 17th STREET, SUITE 300
DENVER, COLORADO 80202

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Oct-17-2013	40642	$1,100.41

VOUCHER	VENDOR INV #	INV DATE	TOTAL AMOUNT	PRIOR PMTS & DISCOUNTS	NET AMOUNT
10-AP-10348	SONHOLLANDFP	10/17/13	1,100.41	0.00	1,100.41
FLOOD PLAIN PERMIT - DOTSON HOLLAND PAD					
TOTAL INVOICES PAID					1,100.41

13-082
Antero/Dotson Holland Pad.

DETACH AND RETAIN FOR TAX PURPOSES

By: BH - MEH - AML
Asst. Chief Tax Deputy

W. C .Underwood Jr.
Sheriff of Doddridge County

The Person paying Money into the Treasury shall forthwith file one of these Receipts with the County Clerk

Doddridge County, West Virginia

No. 729

Date: October 21, 2013
Customer copy

Received: #13-082 ANTERO - DOTSON HOLLAN PAD $1,100.41

In Payment For: 318 Building Permits (LP)

For: 12-Flood Plain Ordinance #20 Fund

By: BH - MEH - AML
Asst. Chief Tax Deputy

W. C .Underwood Jr.
Sheriff of Doddridge County

Doddridge County Flood Plain Application Fee Calculator (if in Flood Plain)	
Dotson Holland Pad	
Estimated Construction Costs	$120,082.91
Amount over $100,000	$20,082.91
Drilling Oil and Gas Well Fee	$1,000.00
$5 per $1,000 over $100,000	$100.41
Amount Due with application	$1,100.41

Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 21st day of October, 2013

ANTERO RESOURCES APPALACHIAN CORPORATION –

DOTSON HOLLAND PAD # 13-082

filed an

application for a Floodplain Permit to develop land located at or about: **SURFACE OWNERS: ALVADORE, JR. & FRANCES J. MCCLOY**

DEED BOOK: 173/634, TAX MAP: 17-42, 8-26.1, 17-43

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours.

Any interested persons who desire to comment shall present the same in writing by **November 9th, 2013.**

Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

P. 01

TRANSACTION REPORT

OCT-21-2013 MON 01:22 PM

FOR: DODDRIDGE CO. CLERK 304 873 1840

SEND

DATE	START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
OCT-21	01:21 PM	93048731600	38″	2	FAX TX	OK	673	

TOTAL : 38S PAGES: 2

Legal Advertisement:

Doddridge County

Floodplain Permit Application

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ANTERO RESOURCES APPALACHIAN CORPORATION –

DOTSON HOLLAND PAD # 13-082

filed an

application for a Floodplain Permit to develop land located at or

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Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

PERMIT NO. 13-082

DODDRIDGE COUNTY

FLOODPLAIN DEVELOPMENT

PERMIT

PURPOSE FOR PERMIT: WELL ACCESS ROAD
Dotson-Holland Well Site

ISSUED TO ANTERO RESOURCES

ADDRESS: Denver, Co

PROJECT ADDRESS: U.S. Rt. 50 & Greenwood

ISSUED BY: Dan Wellings

DATE: 11/13/2013

CONSTRUCTION MUST START WITHIN 180 DAYS FROM ISSUED DATE. PERMIT EXPIRES IN 12 MONTHS FROM ISSUED DATE. IF EXTENTION IS NEEDED A REQUEST MUST BE MADE IN WRITING STATING A REASON FOR THE EXTENTION.

THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.

FILED

2013 OCT 18 PM 3:19

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

ANTERO RESOURCES

Antero Resources
1625 17th Street
Denver, Colorado 80202
Office 303.357.7310
Fax 303.357.7315

October 17, 2013

Doddridge County Commission
Attn: Dan Wellings, Doddridge County Floodplain Manager
118 East Court Street, Room 102
West Union, WV 26456

Mr. Wellings:

Antero Resources Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our Dotson Holland Drill Pad. Our project is located in Doddridge County, Central District. Per HEC-RAS study prepared by Navitus Engineering, on October 16, 2013, and FEMA Map 54017C0115C and 54017C0100C, there will be minimal changes in the 100 year base flood elevation and no impacts to upstream and downstream properties along Dotson Run.

Attached you will find the following:

- Doddridge County Floodplain Permit Application and Permit Fee
- HEC-RAS Floodplain Study
- A detailed set of plans signed by a WV licensed professional engineer
- Adjacent Surface Owner Data

If you have any questions please feel free to contact me at (303) 357-6820. Thank you in advance for your consideration.

Sincerely,

Shauna Redican
Permit Representative
Antero Resources Corporation

Enclosures

Dotson Holland Pad

13-082

DODDRIDGE COUNTY
FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
7. Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
8. **I, THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.**

FILED
2013 OCT 18 PM 3:20
BETTY A. ROGERS
DODDRIDGE COUNTY CLERK
COUNTY, WV

APPLICANT'S SIGNATURE W. McNeilly

DATE October 17, 2013

SECTION 2: PROPOSE DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: Antero Resources Corporation - Ward McNeilly, Vice President of Engineering

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: Contact Shauna Redican: 303-357-6820

BUILDER'S NAME: Antero Resources Corporation

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: (303) 357-7310

ENGINEER'S NAME: Navitus Engineering Inc - Cyrus Kump

ADDRESS: 151 Windy Hill Lane, Winchester, Virginia 22602

TELEHONE NUMBER: 888-662-4185

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Please see attached Firm Map with Landowner Tabulation

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT). Please see attached Firm Map with Landowner Tabulation

DISTRICT: Central

DATE/FROM WHOM PROPERTY PURCHASED: N/A

LAND BOOK DESCRIPTION:

DEED BOOK REFERENCE: Please see attached Firm Map with Landowner Tabulation

TAX MAP REFERENCE:

EXISTING BUILDINGS/USES OF PROPERTY: None

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY

To avoid delay in processing the application, please provide enough information to easily identify the project location.

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	[]	Non-residential (floodproofing)
[]	Relocation	[]	Combined Use (res. & com.)
[]	Demolition	[]	Replacement
[]	Manufactured/Mobil Home		

B. OTHER DEVEOPLMENT ACTIVITIES:

[] Fill [] Mining X Drilling [] Pipelining

X Grading

[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)

[] Watercourse Altercation (including dredging and channel modification)

[] Drainage Improvements (including culvert work)

X Road, Street, or Bridge Construction *Access Road Construction as shown on page 10-13 attached Dotson Holland Pad Design

[] Subdivision (including new expansion)

[] Individual Water or Sewer System

[] Other (please specify)

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED.**
2. **IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED:**
   SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION OF THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY.
3. **SIGN AND DATE THE SKETCH.**

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN $ 120,082.91

*See attached Floodplain Calculation Fee

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. **NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED).**

NAME: Please see attached Firm Map with
ADDRESS: Landowner Tabulation

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

1. **NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.**

NAME: N/A
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

NAME:
ADDRESS:

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

(A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.

(B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.

(C) PUBLICATION.

(D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.

(E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Antero Resources Corporation - Ward McNeilly, Vice President of Engineering

SIGNATURE: W. McNeilly **DATE:** October 17, 2013

After completing SECTION 2, APPLICANT should submit form to Floodplain Administrator/Manager or his/her representative for review.

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 160 & 165

Dated: 10/04/2011

[] Is **NOT** located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and **NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED**).

[X] Is located in Special Flood Hazard Area.

FIRM zone designation A

100-Year flood elevation is: 847.2 NGVD ~~(MSL)~~

[] Unavailable

[] The proposed development is located in a floodway.

FBFM Panel No._____ Dated_____

[] See section 4 for additional instructions.

SIGNED Dan Wellman DATE 11/13/2013

SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by Floodplain Administrator/Manager or his/her representative)

The applicant must submit the documents checked below before the application can be processed.

[] A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

[] Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also_____

_____

[] Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

[] Plans showing the extent of watercourse relocation and/or landform alterations.

[] Top of new fill elevation_____Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.

[] Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

[] Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

[] Other:

_____

_____

_____

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity **(type is or is not)** in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED_____DATE_____

If the Floodplain Administrator/Manager found that the above was not in conformance with the provisions of the Doddridge County Floodplain Ordinance and/or denied that application, the applicant may complete an appealing process below.

APPEALS: Appealed to the County Commission of Doddridge County? [] Yes {} No
Hearing Date:_____
County Commission Decision - Approved [] Yes [] No

CONDITIONS:_____

_____

_____

_____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued).

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application).

COMPLETE 1 OR 2 BELOW:

1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is_____FT. NGVD (MSL)

2 Actual (As Built) elevation of floodproofing is_____FT. NGVD (MSL)

Note: Any work performed prior to submittal of the above information is at risk of the applicant.

SECTION 7: COMPLIANCE ACTION (To be completed by the Floodplain Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.

INSPECTIONS:

DATE:_____ **BY:**_____

DEFICIENCIES ? **Y/N**

COMMENTS_____

_____

_____

_____

_____

_____

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain Administrator/Manager or his/her representative).

Certificate of Compliance issued: DATE:_____ BY:_____

CERTIFICATE OF COMPLIANCE
FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA
(OWNER MUST RETAIN)

PERMIT NUMBER:_____

PERMIT DATE:_____

PURPOSE –

CONSTRUCTION LOCATION:_____

OWNER'S ADDRESS:_____

_____

_____

THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF DODDRIDGE COUNTY ON MAY 21, 2013.

SIGNED_____DATE_____

NAVITUS
ENERGY ENGINEERING
151 Windy Hill Lane, Winchester, VA 22602

13-082

February 10, 2014

Doddridge County Commission
118 East Court Street
West Union, WV 26456

Attn: Dan Wellings, Doddridge County Floodplain Administrator

Re: Dotson Holland Stream Crossing - Floodplain Analysis

Dear Mr. Wellings:

Navitus Engineering has completed a revised floodplain analysis of the proposed Dotson Holland site stream crossing over Dotson Run, previously submitted on October 16, 2013. The site is located just south of Greenwood, along County Route 50/30 in Doddridge County, West Virginia. This site is located within a FEMA Flood Zone A, as shown on the Flood Insurance Rate Maps (FIRM) from the National Flood Insurance Program (NFIP), Map Numbers 54017C0100C, dated October 4, 2011. Being that the site is located in a Flood Zone A, base flood elevations for this area have not been established and no detailed study information was found in the Flood Insurance Study for Doddridge County, dated October 4, 2011.

In order to establish base flood elevations for this site, a hydrologic and hydraulic analysis was preformed as outlined in the current Doddridge County Floodplain Ordinance, enacted May 21st, 2013. Using field shot data, 10-foot interval topography converted from 3 meter West Virginia GIS Technical Center DEM data, and information taken from USGS 7.5 Minute Series Topographic Maps, a drainage analysis was performed for the Dotson Run drainage shed. Upon establishing the peak flow drainage calculations for the 100-year storm event, a HEC-RAS river analysis was conducted for a section of Dotson Run adjacent to the development area and Base Flood Elevations (BFE) were established. The resulting BFEs were used to establish adjusted floodplain boundaries for the segment of Dotson Run being studied. These boundaries are shown on the attached Floodplain Exhibit of this development site.

In addition to establishing BFEs, a proposed conditions analysis was performed to determine revised the impacts of the proposed entrance road and stream crossing over Dotson Run. **The plan was revised to incorporate dual 96" CMP culverts instead of dual 8'x6' concrete box culverts per the clients request**. The proposed grading and culverts were added into the cross sections and the manning's "n" values were adjusted. The model was run with these changes to determine the impacts of the proposed access road and culverts. The results of this analysis indicate that the proposed improvement will cause a maximum increase of 0.9' in the BFEs in this area and no upstream or downstream properties will be adversely impacted. The maximum increase in the BFE occurs at River Stations 20+19.079 through river stations 21+93.833. The cross section at River Station 20+19.079 has an existing BFE of 846.3 and a proposed BFE of 847.2 and the cross section at River Station 21+93.833 has an existing BFE of 846.3 and a proposed BFE of 847.2. The revised stream crossing plan has been attached, which details all revisions made to the plan.

Attached are the following documents associated with this submission:

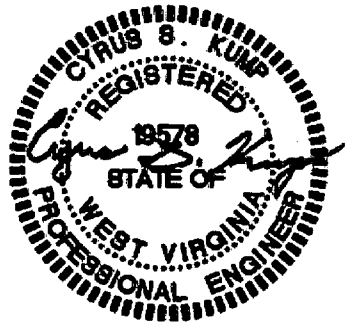
- A Floodplain Analysis of Dotson Run documenting the methods used for the analysis, drainage computations, cross sections, and a narrative to describe the analysis. Included with this analysis are exhibits that identify the existing and proposed 100-year floodplain.
- The Dotson Holland Well Pad Stream Crossing plan, prepared by Navitus Engineering, Inc. which includes additional site design and construction specifications.

Should any questions or comments arise during the review, please let us know and we will work to address them. Please let me know if you should need additional information. You can reach me by phone (540) 336-9486 or email: dmurphy@navituseng.com.

Sincerely,
Navitus Engineering, Inc.

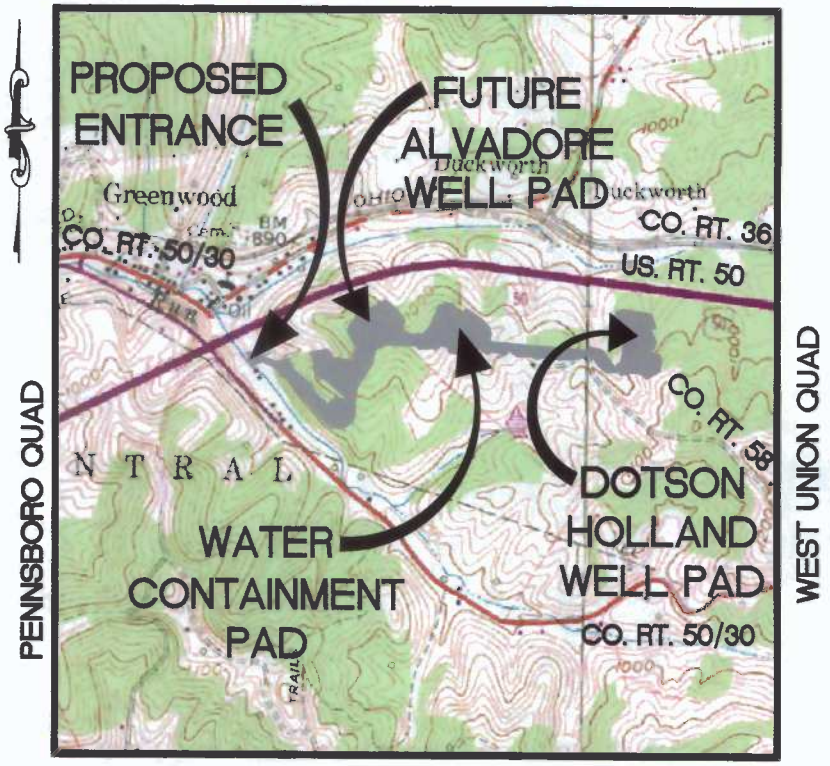
Daniel E. Murphy, CFM

Daniel E. Murphy, CFM
#US-13-07064
Certified Floodplain Manager (CFM®)



FLOODPLAIN ANALYSIS OF DOTSON RUN

DOTSON HOLLAND - WELL SITE



VICINITY MAP
1" = 2,000'

NAVITUS
ENERGY ENGINEERING
Telephone: (888) 662-4185 | www.NavitusEng.com

Prepared For:

Antero Resources

535 White Oaks Blvd.
Bridgeport, WV 26330
(304) 842-4100

Contacts:
Aaron Kunzler, Construction Supervisor
(405) 227-8344
Anthony Smith, Field Engineer
(304) 673-6196
Mark Hutson, Land Agent
(304) 669-8315

CYRUS S. KUMP
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

Revised: February 10, 2014
Date: October 16, 2013

Designed By:
Navitus Engineering, Inc.

Project Manager:
Cyrus Kump, PE
ckump@navituseng.com

Surface Owner(s):
Robert Holland Heirs, Jr. & Frances McCloy Alvadore, Allen Dotson

Tax Parcel:
Map 9 Parcel 22, 23 & 24

Location:
Central District, Doddridge County, West Virginia

FN# ANT024

1. Objective

The objective of this floodplain analysis was to establish revised boundaries for the existing and proposed conditions of the 100 year base flood elevations of the previously submitted Floodplain Analysis of Dotson Run on October 16th, 2013. The revised condition includes the installation of two (2) 96" CMP culverts instead of (2) 8'x6' concrete box culverts and an access road to provide access to a well pad site, where the proposed access road and stream crossing is within FEMA Flood Zone "A".

2. Existing Conditions

2.1. Property Description

This site is located in Doddridge County, West Virginia along Dotson Run and County Route 50/31 south of Greenwood. The proposed access road entrance is located along County Route 50/31. The proposed culverts are located upstream of (2) 6.7'x5.1' elliptical steel culverts under an existing an access road, and upstream of (2) 5'x6' concrete box culverts under US. Rt. 50. The proposed culverts are larger than both sets of existing culverts along Dotson Run.

2.2. Floodplain Delineation

The approximate limit of the 100-year floodplain (a flood event that has a 1% chance of being equaled or exceeded in any given year) is shown on FEMA Flood Insurance Rate Map (FIRM) for Doddridge County on panels 54017C0100C effective October 4, 2011. This floodplain is located in flood zone designation "A" and no base flood elevations have been established.

2.3. Floodplain Ordinance

This site is administered under the Doddridge County Floodplain Ordinance, enacted May 31st, 2013.

Per Section 4.4.A of the ordinance, when a site is located in FEMA Flood Zone designation "A" the Floodplain Administrator shall use elevation and floodway information from Federal, State, or other acceptable sources when available to determine the elevation above which development will reasonably safe from flooding.

Per Section 4.4.B. of the ordinance, when data from an acceptable source is not available, the Floodplain Administrator shall review, or shall cause to be reviewed; all proposed development to determine (1) the amount being invested and (2) the specific flood risk at the site. The Floodplain Administrator shall then require the applicant to determine the elevation above which the development and adjacent properties including but not limited to existing buildings will be reasonably safe from flooding using hydrologic and hydraulic analyses or other techniques. When hydrologic and hydraulic analyses are required, they shall only be prepared by a registered professional engineer who shall certify that the methods used

correctly reflect currently accepted technical concepts. The resulting study shall include a cover letter, signed by the responsible professional, providing a statement of findings in basic terms. In addition, studies, analyses, computations, etc. shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.
Per Section 4.4.C. of the ordinance, any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, Ordinances and Regulations.

Per Section 4.4.D. of the ordinance, within any apportioned Floodplain Zone (Zone A) without Floodway Area, no new construction or development shall be allowed unless it is demonstrated that the cumulative impact of the proposed development, when combined with all other existing and anticipated development, will not increase the elevation of the 100-year flood more than one (1) foot at any point.

Per Section 4.5.A of the ordinance, any developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, and adjacent communities and any adjacent property owners of all such intended activities prior to the alteration of the stream. Copies of all required notifications must be submitted to the Federal Insurance Administration. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those government agencies from which Federal or State Law requires approval.

Per Section 4.5.B a stream crossing analysis for the proposed permanent crossing of Dotson Run has been provided under separate cover and includes a cover letter signed by the responsible professional, a detailed report, hydraulic and hydrologic computations and a sitemap detailing the planned construction.

Per Section 4.5.C of this ordinance the crossing site has been designed with "best practice" techniques in mind. Dual 96" CMP culverts were selected to pass the 10 year and 100 year storm events. The culverts will be embedded 24 inches to allow for aquatic passage. The culverts were designed to specifically pass the 10 year storm event in order to remain as a permanent crossing. All fill slopes will be armored with 4-6" large angular durable rock to minimize erosion during storm events. Gabion basket wing walls will be utilized to minimize scour around the culverts. Sandbag cofferdams and a pump around system will be utilized during construction to minimize erosion. The proposed culverts are located approximately 15' upstream from a set of existing 6.7'x5.1' elliptical steel culverts and 80' upstream of existing dual 5'x6' concrete box culverts under Route 50.

Per Section 4.5.E of this ordinance the Developer shall provide Doddridge County with all required legal agreements detailing inspections and maintenance.

Per Section 5.1 of this ordinance Permits are required for the construction of the permanent stream crossing. The format of the permit will coincide with the requirements set forth in Section 5.2 of the ordinance.

Per Section 6.1E of this ordinance the fill associated with this plan has been designed to not adversely affect adjacent properties. The access road and culverts were located to minimize floodway constriction and the height above the existing grade was minimized to allow as much flow as possible to be unimpeded. Impacts to the 100 year are demonstrated later in this report, however, increases to the 100 year base flood elevations were limited to approximately 290' upstream of the proposed culvert and returned to 0.0' of impact approximately 355' upstream of the proposed culvert. The nearest upstream structure is a garage located 70' from the culvert and had 0.9' of impact to the 100 year base flood elevation at that location. Impacts downstream of the proposed culvert were limited to immediately past the culvert and returned to 0.0' of impact immediately. The nearest downstream structure is an existing house located approximately 600' downstream from the culvert. All fill slopes will located within the 100 year flood limits will be armored with 4-6" large angular durable rock, fill around the culverts shall consist of 1-2" clean rock aggregate, all other fill will be suitable fill armored with the 4-6" large angular rock. No less than 2:1 slopes will be utilized in the construction of the proposed crossing.

Per Section 6.1F the structure has been placed with the longitudinal axis parallel to the direction of flood flow and to maintain the same flood-flow lines of the adjoining structures.

Per Section 6.1G the culverts will be securely anchored to prevent flotation, collapse, and lateral movement.

Per Section 6.1.I of this ordinance, no material or equipment storage shall be allowed within the vicinity of the entrance. The storage of all material and equipment shall be onsite and away from the entrance.

Per Section 6.1.K of this ordinance, a flow line is proposed along the entrance to allow adequate drainage across the proposed entrance.

All other specific requirements covered in Section 6.1 of this ordinance are not applicable to this design. (Sections 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.1.H, and 6.1.L)

The developer shall conform with all administrative procedures as outline in Article 7 of this ordinance.

2.4. Dotson Run Characteristics

Dotson Run is located in the New Milton District of Doddridge County and flows in a northwesterly direction. The drainage area flowing to Dotson Run at the stream crossing is approximately 691 acres of forested and agricultural land with an average basin slope of 28.6%.

3. Analysis Information

3.1. HEC-RAS

A HEC-RAS hydraulic analysis was performed for the portion of the Dotson Run that has an impact on the BFE's across the property. HEC-RAS is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels. The steady flow system is designed for applications in floodplain management and flood insurance studies.

3.2. Analysis Limits

The analysis information is based upon two foot interval aerial shot topography by Blue Mountain Aerial Mapping. The upstream analysis limit for Dotson Run is located approximately 1,165 feet upstream from the proposed stream crossing and represents the 31+83.868 section. The downstream analysis limit for Dotson Run is located approximately 1,020 feet downstream of the proposed stream crossing and represents the 10+00.000 section. These limits were selected so that the HEC-RAS model would accurately determine the base flood elevations on site and off site.

3.3. Flow Data

The hydrologic analysis utilized USDA soil surveys for computation of drainage shed curve numbers, aerial topography and 3 meter West Virginia GIS Technical Center DEM to determine the drainage area(s) and time of concentration path(s). The peak 100-year discharge within the inundation area was determined through TR-55 SCS methodology. Time of concentration paths were calculated utilizing the SCS lag method. The hydrologic calculations for the drainage area were performed using HEC-HMS. See the table below for a summary of the flow conditions, and see Supplement 1 for the complete Drainage Computations.

Stream	**Drainage Area**	**Flow (cfs)**	**Note**
Dotson Run	691.11 Ac.	505.7	Upper Reach
Dotson Run	556.83 Ac.	783.6	Lower Reach

3.4. Cross Section Data

The cross sections were employed at significant changes in site features. This includes major bends in the stream channel, areas of major contraction and expansion of the floodplain area, upstream and downstream of existing culverts, and at building obstructions (cross sections were compiled using Aerial Mapping by Blue Mountain Aerial Mapping).

3.5. Manning's n-value

The channel and overbank areas were assigned manning's n-values based on photographs and close inspection of existing aerial photography. The chart below describes the manning's n values used in this study.

Manning's n value	Description	Portion Used
.1	Heavy stand of timber, few down trees, little undergrowth, flow below branches	Floodplains
.03	Clean, straight, full, no rifts or deep pools	Main Channel
.035	High grass	Floodplains
.06	Light Brush and trees, in summer	Floodplains

4. Results

4.1. Existing Conditions

Since the site is in Zone "A" floodplain area as shown on the FIRM, the existing condition model was based on existing topography and drainage computations. This information was processed in HEC-RAS to determine the existing conditions of the Base Flood Elevations.

4.2. Proposed Conditions

The proposed conditions model was based on the proposed topography for the site access road and proposed culverts in the stream. This information was added into the existing conditions cross sections, and then was processed in HEC-RAS to determine the proposed conditions of the Base Flood Elevations. A summary of elevation changes showing the existing and proposed BFEs at the various cross sections has been provided in the appendix below. As shown in the table, the proposed development will not increase the existing BFEs more than 0.9' throughout the project area and return to 0.0' approximately 355' upstream of the proposed culverts at Station 23+33.304. BFE's return to 0.0' of impact immediately downstream of the proposed culverts.

5. Conclusion

The results of this floodplain analysis indicate that there will be minimal changes in the 100 year base flood elevation on the subject property and no impacts to upstream and downstream properties along Dotson Run. The largest increase in base flood elevation is 0.9' on the subject property and is located on site directly upstream of the stream crossing.

APPENDIX

Exhibit A	FIRM Panel 54017C0100C
Exhibit B	Overall Plan
Exhibit C	Existing Conditions Plan
Exhibit D	Proposed Conditions Plan
Supplement 1	Drainage Computations
Supplement 2	Summary of Computed Elevations
Supplement 3	HEC-RAS Analysis –Existing Conditions Summary
Supplement 4	HEC-RAS Analysis –Proposed Conditions Summary w/ Cross Sections

Exhibit A

FIRM Panel 54017C0100C

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

0 600 1200 METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0100C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 100 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0100	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
54017C0100C

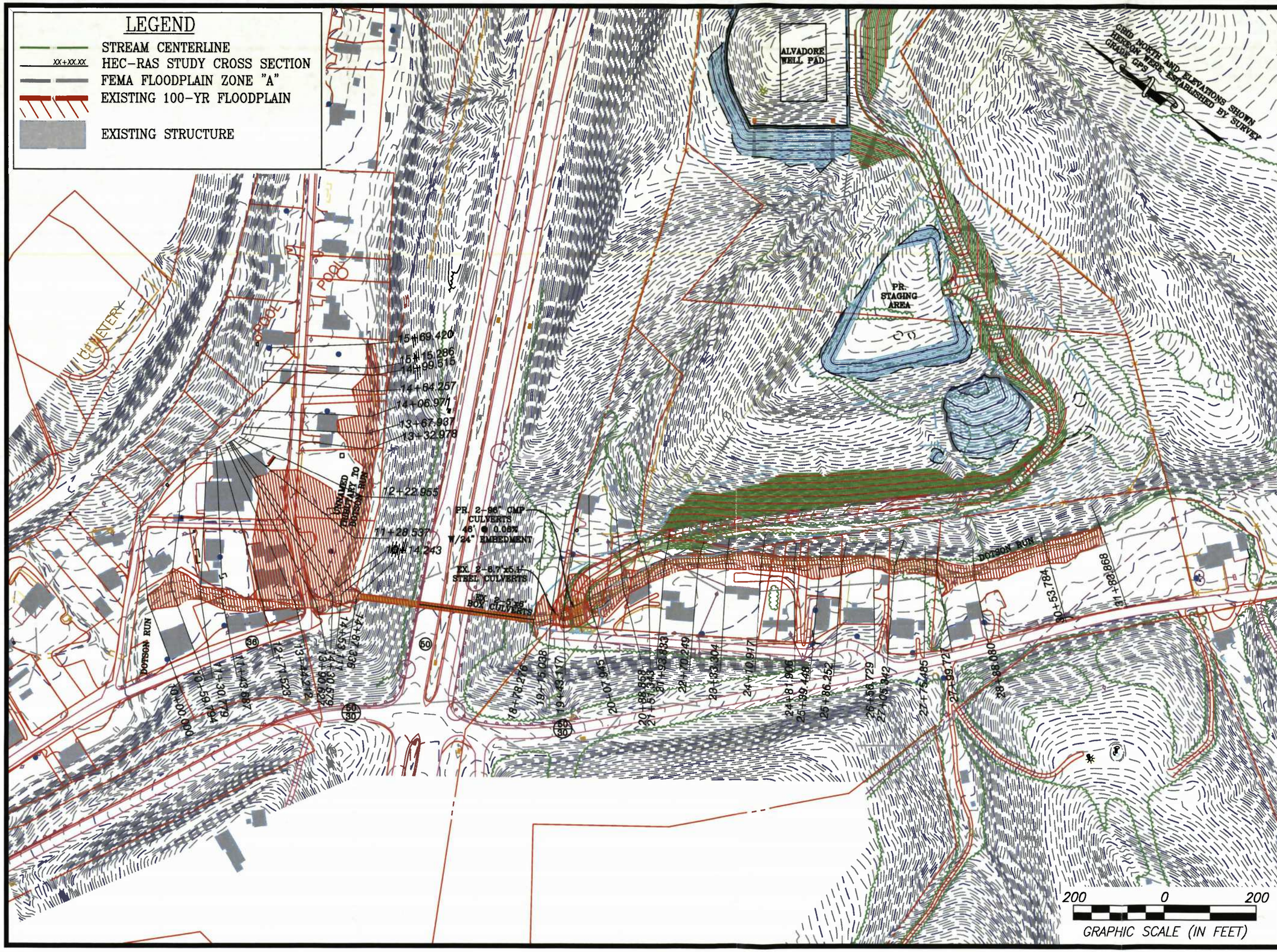
MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

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

Exhibit B

Overall Plan



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CYRUS S. KUMP
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

2/10/2014

Antero Resources

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

OVERALL PLAN

DOTSON HOLLAND FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 200'

DOTSON HOLLAND
JOB NO. ANT024

DATE: 2/10/2014

Exhibit C

Existing Conditions Plan

LEGEND

- STREAM CENTERLINE
- XX+XX.XX HEC-RAS STUDY CROSS SECTION
- FEMA FLOODPLAIN ZONE "A"
- EXISTING 100-YR FLOODPLAIN
- FLOOD PROTECTION SETBACK

EX. DWELLING
EX. 15" CMP CULVERT
EX. GARAGE
GRID NORTH AND ELEVATIONS SHOWN HEREON WERE ESTABLISHED BY SURVEY GRADE GPS
FLOOD PROTECTION SETBACK
DOTSON RUN
EX. DRIVEWAY
EX. 2-5'x6' BOX CULVERTS
TOP OF BANK
EX. 2-6.7'x5.1' STEEL CULVERTS
EX. GARAGE
EX. GARAGE
EX. DWELLING
EX. GARAGE
EX. DWELLING
EX. DWELLING
860
870
880
890
900
18+78.276, EX.=844.1
19+15.038, EX.=844.1
19+43.117, EX.=846.1
20+07.945, EX.=846.3
20+88.858, EX.=846.3
21+67.343, EX.=846.3
21+93.833, EX.=846.3
22+70.249, EX.=846.3
23+33.304, EX.=847.5
24+10.917, EX.=848.6
24+81.906, EX.=848.8
25+39.448, EX.=849.0
50 0 50
GRAPHIC SCALE (IN FEET)

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2/10/2014

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EXISTING CONDITIONS PLAN

DOTSON HOLLAND FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 50'

DOTSON HOLLAND
JOB NO. ANT024

DATE: 2/10/2014

Exhibit D

Proposed Conditions Plan

LEGEND

- STREAM CENTERLINE
- XX+XX.XX HEC-RAS STUDY CROSS SECTION
- FEMA FLOODPLAIN ZONE "A"
- EXISTING 100-YR FLOODPLAIN
- PROPOSED 100-YR WSE

EX. DWELLING
EX. 15" CMP CULVERT
EX. GARAGE
EX. DRIVEWAY
EX. 2-6.7'x5.1' STEEL CULVERTS
EX. 2-5'x6' BOX CULVERTS
ROCK CONSTRUCTION ENTRANCE
2-96" CMP CULVERTS 46' @ 0.06% W/24" EMBEDMENT
PROPOSED 20' ACCESS ROAD W/4% IN SLOPE
GRID NORTH AND ELEVATIONS SHOWN HEREON ARE BASED ON GPS OBSERVATIONS ESTABLISHED BY SURVEY GRADE
DOTSON RUN
TOP OF BANK
EX. 100 YR FLOODPLAIN
PR. 100 YR FLOODPLAIN
EX. GARAGE
EX. DWELLING
EX. DWELLING
EX. GARAGE
EX. GARAGE
EX. DWELLING

18+78.276, EX. = 844.1, PR. = 844.1, DIFF. = 0.0'
19+15.038, EX. = 844.1, PR. = 844.1, DIFF. = 0.0'
19+43.117, EX. = 846.1, PR. = 846.1, DIFF. = 0.0'
20+19.079, EX. = 846.3, PR. = 847.2, DIFF. = +0.9'
20+88.858, EX. = 846.3, PR. = 847.2, DIFF. = +0.9'
21+51.343, EX. = 846.3, PR. = 847.2, DIFF. = +0.9'
21+93.833, EX. = 846.3, PR. = 847.2, DIFF. = +0.9'
22+70.249, EX. = 846.3, PR. = 847.2, DIFF. = +0.9'
23+33.304, EX. = 847.5, PR. = 847.5, DIFF. = 0.0'
24+10.917, EX. = 848.6, PR. = 848.6, DIFF. = 0.0'
24+81.906, EX. = 848.8, PR. = 848.8, DIFF. = 0.0'
25+39.448, EX. = 849.0, PR. = 849.0, DIFF. = 0.0'

50 0 50
GRAPHIC SCALE (IN FEET)

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2/10/2014

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PROPOSED CONDITIONS PLAN

DOTSON HOLLAND FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

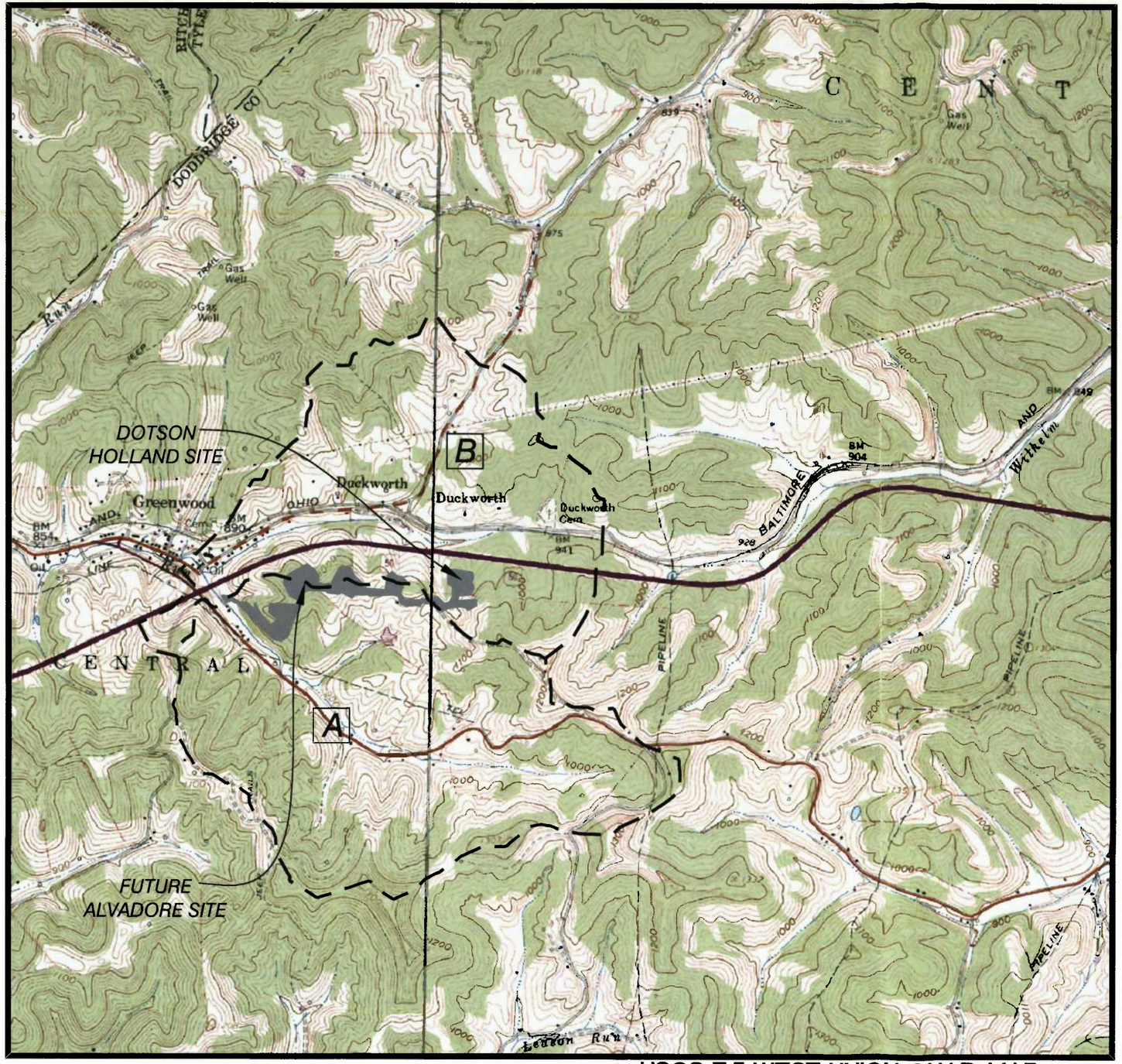
SCALE: 1" = 50'
DOTSON HOLLAND
JOB NO. ANT024
DATE: 2/10/2014

Supplement 1

Drainage Computations

DRAINAGE MAP

USGS 7.5 PENNSBORO QUAD MAP



USGS 7.5 WEST UNION QUAD MAP

WEST VIRGINIA STATE PLANE
COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS
& OPUS POST-PROCESSING

KEY	HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)
A	UPPER DOTSON RUN	1.080
B	LOWER DOTSON RUN	0.869
	TOTAL	1.949

2000 0 2000
GRAPHIC SCALE (IN FEET)

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2/10/2014

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WAS PREPARED FOR:
ANTERO RESOURCES
CORPORATION

DRAINAGE MAP

DOTSON HOLLAND
FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 2000'

DOTSON HOLLAND
JOB NO. ANT024

DATE: 2/10/2014

Project: Dotson Holland Simulation Run: Existing

Start of Run:	19Dec2013, 00:00	Basin Model:	Existing
End of Run:	20Dec2013, 00:05	Meteorologic Model:	100 YR
Compute Time:	21Feb2013, 16:06:14	Control Specifications:	Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC FT)
Dotson Run	1.08	505.7	19Dec2012, 13:10	125.5
Unnamed Trib to Dotsc	0.87	313.8	19Dec2012, 13:45	99.7
Downstream	1.95	783.6	19Dec2012, 13:20	225.2

Supplement 2

Summary of Computed Elevations

E13-082

DOTSON HOLLAND WELL PAD & WATER CONTAINMENT PAD
FLOODPLAIN STUDY
SUMMARY OF COMPUTED ELEVATIONS

CROSS SECTION STATION	RIVER NAME	100 YEAR BASE FLOOD ELEVATION		
		EXISTING CONDITIONS MODEL	PROPOSED CONDITIONS MODEL	PROPOSED DIFFERENCE
3183.868	Dotson Run Upper	856.5	856.5	0.0
3053.784	Dotson Run Upper	855.5	855.5	0.0
2888.08	Dotson Run Upper	853.2	853.2	0.0
2799.743	Dotson Run Upper	852	852	0.0
2775.485	Dotson Run Upper	851.7	851.7	0.0
2705.342	Dotson Run Upper	850.8	850.8	0.0
2656.729	Dotson Run Upper	850.1	850.1	0.0
2586.252	Dotson Run Upper	849.3	849.3	0.0
2539.448	Dotson Run Upper	849	849	0.0
2481.906	Dotson Run Upper	848.8	848.8	0.0
2410.917	Dotson Run Upper	848.6	848.6	0.0
2333.304	Dotson Run Upper	847.5	847.5	0.0
2270.249	Dotson Run Upper	846.3	847.2	+ 0.9
2193.833	Dotson Run Upper	846.3	847.2	+ 0.9
2151.343	Dotson Run Upper	846.3	847.2	+ 0.9
2088.858	Dotson Run Upper	846.3	847.2	+ 0.9
2007.945	Dotson Run Upper	846.3	847.2	+ 0.9
1976.738	Dotson Run Upper	Culvert		
1943.117	Dotson Run Upper	846.1	846.1	0.0
1929.28	Dotson Run Upper	Culvert		
1915.038	Dotson Run Upper	844.1	844.1	0.0
1878.276	Dotson Run Upper	844.1	844.1	0.0
1683.45	Dotson Run Upper	Culvert		
1487.336	Dotson Run Upper	840.9	840.9	0.0
1453.111	Dotson Run Upper	841	841	0.0

DOTSON HOLLAND WELL PAD & WATER CONTAINMENT PAD
FLOODPLAIN STUDY
SUMMARY OF COMPUTED ELEVATIONS

CROSS SECTION STATION	RIVER NAME	100 YEAR BASE FLOOD ELEVATION		
		EXISTING CONDITIONS MODEL	PROPOSED CONDITIONS MODEL	PROPOSED DIFFERENCE
1430.579	Dotson Run Lower	841.4	841.4	0.0
1390.627	Dotson Run Lower	841	841	0.0
1370.77	Dotson Run Lower	Bridge		
1344.212	Dotson Run Lower	840.2	840.2	0.0
1271.523	Dotson Run Lower	839.6	839.6	0.0
1182.267	Dotson Run Lower	839.1	839.1	0.0
1130.779	Dotson Run Lower	838	838	0.0
1059.794	Dotson Run Lower	838.4	838.4	0.0
1000	Dotson Run Lower	837.2	837.2	0.0
1569.42	Unnamed Trib. To Dotson Run	843.6	843.6	0.0
1515.286	Unnamed Trib. To Dotson Run	843.3	843.3	0.0
1499.515	Unnamed Trib. To Dotson Run	843.2	843.2	0.0
1464.257	Unnamed Trib. To Dotson Run	842.9	842.9	0.0
1406.971	Unnamed Trib. To Dotson Run	842.6	842.6	0.0
1367.937	Unnamed Trib. To Dotson Run	842.8	842.8	0.0
1332.978	Unnamed Trib. To Dotson Run	842.7	842.7	0.0
1222.955	Unnamed Trib. To Dotson Run	841.4	841.4	0.0
1128.537	Unnamed Trib. To Dotson Run	841.4	841.4	0.0
1014.243	Unnamed Trib. To Dotson Run	841.4	841.4	0.0

Supplement 3

HEC-RAS Analysis –Existing Conditions Summary

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

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

****

PROJECT DATA
Project Title: Dotson Revised
Project File : DotsonRevised.prj
Run Date and Time: 2/10/2014 3:07:53 PM

Project in English units

****

PLAN DATA

Plan Title: Existing Revised
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.p01

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.g01

Flow Title : Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.f01

Plan Summary Information:

Number of:	Cross Sections	= 40	Multiple Openings	=	0
	Culverts	= 2	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: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Dotson Run	Dotson Run	3183.868	505.7
Dotson Run	Lower	1430.579	783.6
Dotson Run	Lower	1390.627	783.6
Unt to Dotson	Unt to Dotson	1569.420	313.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Dotson Run	Lower	PF 1		Normal S = 0.008

****

GEOMETRY DATA

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Dotson Run	Dotson Run		1
Dotson Run	Lower	1	
Unt to Dotson	Unt to Dotson		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
Dotson Run	Dotson Run	to Dotson Run	Lower	22.53	
Unt to Dotson	Unt to Dotson	to Dotson Run	Lower	24.28	

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 3183.868

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.94	3.39	870.03	3.5	870	4.02	869.82	5.08	869.43
7.69	868.48	8.28	868.26	8.94	868	9.35	867.83	13.36	866
14.07	865.7	17.82	864	22.76	862.47	23.91	862	29.87	861.65
43.53	860.85	49.77	860.52	59.69	860	78.51	858.78	90.5	858
104.73	857.6	125.59	857.11	135.27	856.92	139.09	856.86	141.91	856.83
147.03	856.66	150.64	856.61	157.64	856.32	165.53	856	165.63	856
166.21	855.78	166.86	855.55	169.9	854.49	171.29	854	171.33	853.99
174.63	853.28	181.68	853.16	184.76	853.07	185.09	853.33	185.54	853.69
185.95	854	186.28	854.28	188.75	856	190.49	857.32	191.42	858
193.73	859.79	194.01	860	194.2	860.16	196.56	862	198.3	863.11
199.67	864	201.55	865.07	203.22	866	205.41	867.25	206.23	867.72
206.72	868	208.54	868.82	211.17	870	212.81	870.53	217.49	872
220.61	873	223.77	874	226.98	875.14	229.42	876	232.77	877.45
234.07	878	238.84	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	165.53	.03	188.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
165.53	188.75	137.71	129.12	122.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	857.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	856.48	Reach Len. (ft)	137.71	129.12	122.82
Crit W.S. (ft)	856.48	Flow Area (sq ft)	2.88	58.96	0.15
E.G. Slope (ft/ft)	0.009180	Area (sq ft)	2.88	58.96	0.15
Q Total (cfs)	505.70	Flow (cfs)	4.55	501.08	0.07
Top Width (ft)	35.69	Top Width (ft)	11.84	23.22	0.64

Vel Total (ft/s)	8.16	Avg. Vel. (ft/s)	1.58	8.50	0.47		
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)	0.24	2.54	0.24		
Conv. Total (cfs)	5278.1	Conv. (cfs)	47.5	5229.8	0.8		
Length Wtd. (ft)	129.58	Wetted Per. (ft)	11.85	24.61	0.80		
Min Ch El (ft)	853.07	Shear (lb/sq ft)	0.14	1.37	0.11		
Alpha	1.08	Stream Power (lb/ft s)	238.84	0.00	0.00		
Frctn Loss (ft)	1.04	Cum Volume (acre-ft)	0.20	2.65	0.23		
C & E Loss (ft)	0.05	Cum SA (acres)	0.34	0.98	0.14		

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 3053.784

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.91	11.74	864.13	11.92	864	12.19	863.79	14.39	862
16.8	860.6	17.83	860	30.38	858.46	38.03	858	38.99	857.98
56.06	857.78	63.03	857.74	66.8	857.7	73.25	857.58	78.67	857.44
84.53	857.3	117.17	856	123.08	856	130.84	855.62	141.38	855.1
146.8	854.77	159.88	854	165.16	852.16	165.64	852.01	165.78	852.21
171.69	851.89	174.3	851.73	174.43	851.97	174.97	852.23	178.57	854
181.54	855.73	182.03	856	183.37	856.85	184.59	857.66	185.06	858
186.95	859.26	187.96	860	188.72	860.57	190.81	862	192.67	863.24
192.9	863.39	193.73	864	194.65	864.68	196.65	866	199.02	867.56
199.73	868	201.84	869.23	203.15	870	205.65	871.48	206.52	872
207.3	872.29	211.65	874	211.87	874.07	217.76	876	220.06	876.8
223.57	878	225.42	878.64	229.37	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	159.88	.03	178.57	.1

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

159.88 178.57 175.37 163.58 152.04 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	856.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	855.45	Reach Len. (ft)	175.37	163.58	152.04
Crit W.S. (ft)	855.45	Flow Area (sq ft)	18.03	54.92	1.81
E.G. Slope (ft/ft)	0.007099	Area (sq ft)	18.03	54.92	1.81
Q Total (cfs)	505.70	Flow (cfs)	50.92	453.12	1.66
Top Width (ft)	46.83	Top Width (ft)	25.64	18.69	2.49
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)	2.82	8.25	0.92
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	0.70	2.94	0.73
Conv. Total (cfs)	6002.1	Conv. (cfs)	604.4	5378.0	19.7
Length Wtd. (ft)	164.27	Wetted Per. (ft)	25.69	19.76	2.89
Min Ch El (ft)	851.73	Shear (lb/sq ft)	0.31	1.23	0.28
Alpha	1.35	Stream Power (lb/ft s)	229.37	0.00	0.00
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	0.16	2.48	0.22
C & E Loss (ft)	0.02	Cum SA (acres)	0.29	0.92	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2888.080

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.88	6.02	866.79	6.1	866.79	7.29	866.67	7.42	866.65
8.14	866.54	11.84	866	12.27	866	13.57	865.81	16.86	865.46
19.28	865.2	24.25	864.66	28.51	864.3	32.27	864	33.44	863.87
36.41	863.6	39.16	863.44	41.98	863.32	47.64	862.57	49.07	862.49
51.26	862.22	51.76	862.19	53.3	862	53.4	861.99	53.43	861.98
55.04	861.67	56.18	861.53	57.63	861.54	58.23	861.36	58.86	861.33
61.67	860.59	63.7	860	67.31	858	69.41	856	70.92	855.59
91.84	855.33	111.12	855.09	120.56	854.68	124.92	854.6	126	854.56

126.58	854.54	136.38	854	136.65	853.96	146.77	852.53	149.08	852.2
150.3	852	150.7	851.73	153.26	850	153.35	849.91	154.42	849.01
159.34	849.33	160.42	849.43	161.56	849.81	161.93	850	163.58	850.48
168.7	852	172.6	852.84	177.23	854	179.35	854.32	182.36	854.77
189.85	856	191.95	857.34	193.05	858	194.81	858.99	196.49	860
197.2	860.46	199.93	862	202.41	863.86	202.6	864	202.94	864.26
205.09	865.9	205.22	866	205.29	866.05	205.56	866.26	207.84	868
208.09	868.1	213.52	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	150.3	.03	168.7	.1

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
150.3	168.7	81.7	84.14	75.97	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
22.2	94.176	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	854.39	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.21	Wt. n-Val.	0.035	0.030	0.100	
W.S. Elev (ft)	853.19	Reach Len. (ft)	81.70	84.14	75.97	
Crit W.S. (ft)	853.19	Flow Area (sq ft)	4.75	54.73	3.23	
E.G. Slope (ft/ft)	0.008412	Area (sq ft)	4.75	54.73	3.23	
Q Total (cfs)	505.70	Flow (cfs)	12.77	489.81	3.12	
Top Width (ft)	31.86	Top Width (ft)	8.17	18.40	5.28	
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	2.69	8.95	0.97	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	0.58	2.97	0.61	
Conv. Total (cfs)	5513.6	Conv. (cfs)	139.3	5340.3	34.0	
Length Wtd. (ft)	83.98	Wetted Per. (ft)	8.26	19.79	5.41	
Min Ch El (ft)	849.01	Shear (lb/sq ft)	0.30	1.45	0.31	
Alpha	1.20	Stream Power (lb/ft s)	213.52	0.00	0.00	
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.12	2.27	0.21	
C & E Loss (ft)	0.16	Cum SA (acres)	0.22	0.85	0.12	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2799.743

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.92	1.71	866.54	3.7	866.08	4.04	866	4.89	865.82
7.32	865.51	15.26	864.33	20.48	864	21.81	863.91	22.44	863.85
26.79	863.44	30.46	863.02	38.41	862	53.51	860	55.88	859.58
58.71	859.06	65.42	858	67.07	857.54	69.92	856.69	73.2	856.15
74.3	856	76.92	854.7	77.79	853.95	77.81	853.94	77.85	853.95
77.89	854	78.33	854	80.18	854.17	80.84	854.24	84.42	854.52
87.66	854.68	88.78	854.69	91.66	854.66	94.89	854.46	95.9	854.3
99.55	854.08	100.69	854	102.96	853.74	109.23	853	109.29	853.01
109.32	853.01	109.33	853	119.33	852.55	119.49	852.54	119.85	852.49
119.87	852.49	124.29	852.62	124.74	852.62	125.38	852.57	127.1	852.88
128.36	852.85	129.49	853.03	133.16	853.18	134.16	853.32	134.99	853.45
135.7	853.57	137.02	853.49	138.36	853.6	139.62	853.61	141.06	853.49
141.7	853.48	142.35	853.46	143.09	853.43	143.99	853.38	144.93	853.32
145.74	853.27	147.72	853.12	149.67	852.97	151.88	852.82	153.4	852.67
157.34	852.45	162.4	852.18	165.34	852	166.48	852	166.53	851.99
168.01	851.75	168.66	851.66	170.44	851.33	171.53	851.17	172.89	850.85
175.23	850.48	177.82	850	179.06	849.68	180.54	849.2	181.17	848.9
182.41	848.36	194.25	848.85	195.56	848.93	196.47	849.07	196.92	849.16
200.17	850	200.73	850.17	206.47	852	208.38	852.59	210.52	853.57
211.43	854	211.86	854.16	213.44	854.71	217.1	856	218.71	857.46
219.35	858	221.34	859.82	221.55	860	223.65	861.93	223.73	862
223.85	862.08	224.13	862.35	225.46	863.58	225.89	864	227.14	864.93
228.69	866	230.61	867.32	231.59	868	234.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	177.82	.03	200.73	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
177.82 200.73 62.16 24.26 28.56 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
26.211	98.77	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 852.68	* Element	* Left OB	* Channel	* Right OB *

* Vel Head (ft)	*	0.66	* Wt. n-Val.	*	0.035	*	0.030	*	0.100	*
* W.S. Elev (ft)	*	852.03	* Reach Len. (ft)	*	62.16	*	24.26	*	28.56	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	11.45	*	70.31	*	5.40	*
* E.G. Slope (ft/ft)	*	0.004229	* Area (sq ft)	*	11.45	*	70.31	*	5.40	*
* Q Total (cfs)	*	505.70	* Flow (cfs)	*	28.93	*	471.97	*	4.80	*
* Top Width (ft)	*	41.62	* Top Width (ft)	*	12.89	*	22.91	*	5.82	*
* Vel Total (ft/s)	*	5.80	* Avg. Vel. (ft/s)	*	2.53	*	6.71	*	0.89	*
* Max Chl Dpth (ft)	*	3.66	* Hydr. Depth (ft)	*	0.89	*	3.07	*	0.93	*
* Conv. Total (cfs)	*	7776.7	* Conv. (cfs)	*	444.9	*	7258.0	*	73.8	*
* Length Wtd. (ft)	*	25.36	* Wetted Per. (ft)	*	13.07	*	23.37	*	6.11	*
* Min Ch El (ft)	*	848.36	* Shear (lb/sq ft)	*	0.23	*	0.79	*	0.23	*
* Alpha	*	1.26	* Stream Power (lb/ft s)	*	234.54	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.15	* Cum Volume (acre-ft)	*	0.10	*	2.15	*	0.21	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.20	*	0.81	*	0.11	*

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: Dotson Run
REACH: Dotson Run RS: 2775.485

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.1	.3	867.06	.56	867.02	1.24	866.94	3.89	866.68
5.58	866.45	7.65	866.21	8.24	866.14	9.41	866	9.96	866
17.45	864.41	19.81	864	20.63	864	23.9	863.56	24.45	863.48
27.08	863.08	29.82	862.76	33.42	862	36.03	862	36.44	861.97
44.32	860.46	46.67	860	48.74	860	50.15	859.89	50.47	859.89
53.7	859.68	54.15	859.68	59.39	859.46	82.23	858	93.95	857.07
107.25	856	109.01	855.88	123.01	854.91	136.3	854	144.49	853.66
152	853.34	168.93	852.64	174.31	852.42	176.91	852.32	177.31	852.3
182.92	852	184.97	851.57	194.73	850	196.29	849	197.6	848.36
201.08	848.62	207.34	848.72	214.15	849.75	215.1	850	215.96	850
216.7	850.25	217.36	850.55	220.42	852	223.09	853.46	224.1	854
225.7	854.87	226.56	855.36	227.66	856	228.78	857.01	229.9	858
232.45	859.96	232.5	860	232.52	860.02	232.69	860.15	234.98	862
236.14	862.98	237.35	864	239.68	865.95	239.75	866	241.46	867.38
242.24	868	246.26	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	182.92	.03	220.42	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
182.92	220.42	82.66	67.68	48.19	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
42.1	80.895	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.52	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.78	Wt. n-Val.		0.030		
W.S. Elev (ft)	851.74	Reach Len. (ft)	82.66	67.68	48.19	
Crit W.S. (ft)	851.54	Flow Area (sq ft)		71.16		
E.G. Slope (ft/ft)	0.008530	Area (sq ft)		71.16		
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	35.68	Top Width (ft)		35.68		
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11		
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.99		
Conv. Total (cfs)	5475.4	Conv. (cfs)		5475.4		
Length Wtd. (ft)	67.68	Wetted Per. (ft)		36.76		
Min Ch El (ft)	848.36	Shear (lb/sq ft)		1.03		
Alpha	1.00	Stream Power (lb/ft s)	246.26	0.00	0.00	
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.09	2.11	0.20	
C & E Loss (ft)	0.03	Cum SA (acres)	0.19	0.80	0.11	

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2705.342

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.8	3.16	869.54	14.31	868.41	15.21	868.39	16.74	868.28
20.63	868	22.62	867.21	25.65	866	27.2	865.28	29.71	864.12
29.87	864.05	29.98	864	30.45	863.82	35.8	862	42.28	862
54.7	860.2	57.24	860	76.85	860	95.81	858.47	98.48	858.41
99.1	858.39	99.63	858.35	101.48	858.15	104.98	858.1	106	858
107.86	857.84	112.43	857.42	117.75	856.62	119.6	856.39	120.92	856.27
122.8	856	129.81	855.46	134.78	855.15	142.68	854	145.41	854
146.4	853.92	153.02	853.7	158.99	853.54	185.73	852.35	187.06	852.33
188.4	852.31	191.41	852	191.43	852	194.49	852	199.97	851.01
205.99	850	210.22	848.14	210.53	848	210.63	847.95	211.34	847.62
211.57	847.52	217.01	847.3	222.24	847.42	223.03	847.9	223.21	848
224.35	848.43	225.37	848.98	227.41	850	229.53	850.47	235.93	852
236.43	852.09	239.9	852.67	242.9	853.25	246.76	854	250.47	855.73
251.17	856	252.52	856.74	254.39	858	256.28	859.28	257.78	860
259.64	860.82	262.28	862	263.1	862.47	264.12	863.12	265.36	864

266.71	864.69	268.38	865.34	269.97	866	271.85	866.78	274.52	868
277.75	869.36	279.2	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	194.49	.03	235.93	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
194.49	235.93	27.35	47.59	60.55	.1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
69.324	100.13	865	177.199	198.178	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	850.79	Reach Len. (ft)	27.35	47.59	60.55
Crit W.S. (ft)	850.79	Flow Area (sq ft)		61.42	
E.G. Slope (ft/ft)	*0.011030	Area (sq ft)		61.42	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	29.54	Top Width (ft)		29.54	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		2.08	
Conv. Total (cfs)	4815.0	Conv. (cfs)		4815.0	
Length Wtd. (ft)	47.59	Wetted Per. (ft)		30.85	
Min Ch El (ft)	847.30	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	279.20	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.09	2.01	0.20
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	0.75	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2656.729

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.23	7.65	869.96	7.97	869.94	8.3	869.92	11.84	869.92
12.14	869.91	12.46	869.89	23.56	869.07	32.05	869.78	32.41	870
32.91	870	34.89	869.85	40.03	869.49	40.94	869.32	50.35	868
50.44	868	59.03	866.24	60.14	866	62.05	865.54	68.88	864
74.5	862.68	76.78	862.15	77.46	862	85.23	860	87.89	859.3
90.43	858.69	93.28	858	104.91	856	116.45	855.08	122.11	854.67
123.09	854.62	128.58	854.1	128.7	854.09	129.52	854	133.88	853.6
153.28	853.19	155.19	853.04	155.25	853.04	156.16	853.07	156.19	853.08
156.31	853.07	157.61	853.02	169.34	852.58	169.58	852.58	169.86	852.56
170.88	852.36	171.71	852.34	178.23	852	206.08	850.73	208.01	850.64
214.45	850.4	219.38	850	224.2	848.07	224.36	848	225.47	847.42
232.25	847.25	235.27	847.15	237.09	847.13	239.3	847.05	239.85	847.3
240.37	847.42	241.43	847.72	242.31	848	243.49	848.6	244.76	849.28
246.02	850	248.24	851.63	248.78	852	251.47	852.87	255.14	854
257.21	854.91	259.59	856	260.79	857.1	261.03	857.31	261.81	858
262.86	858.94	264.03	860	265.56	861.35	266.29	862	268.21	863.69
268.55	864	270.44	865.6	270.84	866	271.23	866.41	272.71	868
274.77	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.38	.03	246.02	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.38	246.02	92	68.22	65.11	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.665	124.429	870	178.349	204.346	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	850.09	Reach Len. (ft)	92.00	68.22	65.11
Crit W.S. (ft)	850.09	Flow Area (sq ft)	0.05	59.37	0.01
E.G. Slope (ft/ft)	*0.010767	Area (sq ft)	0.05	59.37	0.01
Q Total (cfs)	505.70	Flow (cfs)	0.03	505.67	0.00
Top Width (ft)	27.93	Top Width (ft)	1.16	26.64	0.13
Vel Total (ft/s)	8.51	Avg. Vel. (ft/s)	0.57	8.52	0.17
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.05	2.23	0.05
Conv. Total (cfs)	4873.6	Conv. (cfs)	0.3	4873.3	0.0
Length Wtd. (ft)	68.39	Wetted Per. (ft)	1.17	27.83	0.16
Min Ch El (ft)	847.05	Shear (lb/sq ft)	0.03	1.43	0.03
Alpha	1.00	Stream Power (lb/ft s)	274.77	0.00	0.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.09	1.95	0.20
C & E Loss (ft)	0.08	Cum SA (acres)	0.19	0.72	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2586.252

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	875.18	.94	875.01	7.34	874	14.24	872.22	15.06	872
17.23	871.05	19.61	870	20.6	868.85	21.11	868.23	21.35	868
21.76	867.55	22.5	866.7	23.01	866	23.85	865.55	27.32	864
27.82	863.79	29.24	863.18	32.07	862	33.49	862	34.84	862.14
49.65	863.14	49.87	863.11	50.91	863.49	51.61	864	54.7	864
56.07	864.04	61.14	864.06	64.87	864.03	68.62	864.03	72.78	864.02
74.16	864	74.52	863.94	74.98	863.84	78.55	863.07	79.73	862.8
83.32	862	83.5	861.94	86.72	860.85	89.57	860	89.85	859.9
94.09	858.36	95.01	858.03	95.08	858	95.86	857.85	105.95	856
108.17	855.88	109.56	855.8	124.79	854.98	133.75	854.34	136.12	854.21
136.61	854.19	137.63	854.09	137.68	854.09	138.12	854.06	139	854
143.53	854	148.16	853.7	150.83	853.51	152.1	853.42	154.24	853.27
159.09	852.9	170.6	852	172.4	851.88	174.75	851.76	176.41	851.67
188.77	850.96	192.92	850.72	195.03	850.59	209.29	850	220.54	849.46
227.17	849.14	234.28	848.57	241.49	848	242.28	847.64	246.2	846.3
251.61	845.94	254.62	845.84	254.79	845.83	262.62	848	263.33	848.63
264.86	850	266.95	851.96	267.23	852.2	269.32	854	270.15	854.53
272.43	856	273.7	856.72	276.03	858	276.96	858.59	278.96	860
279.36	860.29	280.01	860.76	281.75	862	284.35	863.77	284.66	864
285.7	864.69	287.8	866	289.16	866.9	290.93	868	294.06	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	234.28	.03	263.33	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
234.28	263.33	52.67	46.71	56.22	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
97.61	170.13	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.34	Reach Len. (ft)	52.67	46.71	56.22
Crit W.S. (ft)	849.21	Flow Area (sq ft)	3.82	66.11	0.28
E.G. Slope (ft/ft)	0.008051	Area (sq ft)	3.82	66.11	0.28
Q Total (cfs)	505.70	Flow (cfs)	7.11	498.44	0.15
Top Width (ft)	41.02	Top Width (ft)	11.18	29.05	0.79
Vel Total (ft/s)	7.20	Avg. Vel. (ft/s)	1.86	7.54	0.55
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)	0.34	2.28	0.35
Conv. Total (cfs)	5635.9	Conv. (cfs)	79.2	5554.9	1.7
Length Wtd. (ft)	46.91	Wetted Per. (ft)	11.21	29.92	1.06
Min Ch El (ft)	845.83	Shear (lb/sq ft)	0.17	1.11	0.13
Alpha	1.08	Stream Power (lb/ft s)	294.06	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.09	1.85	0.20
C & E Loss (ft)	0.00	Cum SA (acres)	0.18	0.67	0.11

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2539.448

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.37	3.52	878.5	5.19	878	9.98	876.6	12.01	876
24.51	876	24.59	875.96	27.56	874	30.58	872.05	30.65	872
30.71	871.94	30.75	871.9	30.82	871.82	32.09	870	32.17	869.89
34.35	866.49	34.59	866	35.65	864.08	35.69	864	35.98	863.83
39.35	862	39.76	861.86	44.59	860	48.68	860	49.15	859.99
58.98	859.72	69.03	859.64	69.29	859.76	72.88	860.29	74.14	860.08
80.84	859.71	81.74	859.84	81.88	859.79	82.46	859.97	82.52	860
83.73	859.89	84.23	859.84	88.15	858.14	90.33	858	93.99	858
100.28	857.14	101.04	856.72	102.49	856.04	102.59	856	108.52	856
124.3	855.08	129.93	854.86	130.38	854.85	130.59	854.84	140.5	854.38
156.27	854.39	164.55	854.44	165.61	854.45	168.69	854.36	180.46	854.18
180.5	854.18	180.59	854.14	180.9	854	183.76	852.7	185.33	852
194.57	850.2	195.84	850	199.04	850	232.19	848.66	243.29	848.22
248.45	848	250.73	847.38	255.51	846	255.59	846.04	256.05	845.9
260.5	845.66	266.68	845.18	267.41	845.75	267.64	846	268.31	846.43
271.32	848	272.72	849.09	273.94	850	276.12	851.69	277.1	852.47
279.16	854	280.54	854.81	282.68	856	283.61	856.53	285.76	857.7
285.92	857.8	286.2	858	286.53	858.25	289.06	860	289.48	860.31

291.92	862	292.5	862.51	293.66	863.53	294.25	864	295.46	865
296.62	866	298.44	867.48	299.05	868	301.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.45	.03	271.32	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.45	271.32	37.06	57.38	52.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
111.785	193.476	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.00	Reach Len. (ft)	37.06	57.38	52.68
Crit W.S. (ft)	848.89	Flow Area (sq ft)	12.18	62.60	0.64
E.G. Slope (ft/ft)	*0.006651	Area (sq ft)	12.18	62.60	0.64
Q Total (cfs)	505.70	Flow (cfs)	26.38	478.90	0.42
Top Width (ft)	48.77	Top Width (ft)	24.62	22.87	1.28
Vel Total (ft/s)	6.70	Avg. Vel. (ft/s)	2.17	7.65	0.65
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	0.49	2.74	0.50
Conv. Total (cfs)	6200.9	Conv. (cfs)	323.5	5872.3	5.1
Length Wtd. (ft)	56.74	Wetted Per. (ft)	24.64	24.02	1.62
Min Ch El (ft)	845.18	Shear (lb/sq ft)	0.21	1.08	0.16
Alpha	1.24	Stream Power (lb/ft s)	301.54	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.08	1.78	0.20
C & E Loss (ft)	0.04	Cum SA (acres)	0.15	0.64	0.11

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2481.906

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.33	879.3	4.2	878	5.73	877.27	8.32	876
10.69	874.82	11.95	874.18	12.26	874	12.39	873.83	12.83	873.18
13.5	872	14.19	870.99	14.79	870	15.73	868.65	16.13	868
17.3	866.36	17.53	866	18.89	864.11	18.95	864	19.02	863.93
20.69	862	22.08	861.53	26.18	860	30.36	859.38	33.21	859.39
42.26	859.15	59.7	859.16	61.85	858.9	61.89	858.9	62.04	858.87
62.99	858.7	66.59	858	67.28	857.85	67.7	857.79	74.72	856.57

76.33	856.36	77.68	856.24	79.05	856	84.18	854.7	85.22	854.42
87.93	854	88.41	853.98	94.1	853.78	103.56	853.15	105.57	853.06
118.81	852.75	118.97	852.74	119.5	852.75	134.17	852.4	136.62	852.42
137.67	852.42	139.77	852.4	141.64	852.36	152.25	852.1	154.87	852.03
155.51	852	155.77	852	160.72	851.87	165.32	851.68	166.09	851.65
174.44	851.13	178.35	850.93	182.87	850.8	184.71	850.71	186.94	850.66
190.85	850.51	193.06	850.3	195.33	850.15	196.55	850	203.31	849.66
204.16	849.6	210.26	849.28	212.68	849.16	214.18	849.07	226.98	848
231.68	846.23	232.28	846	233.74	845.44	234.45	845.16	243.88	844.82
244.85	844.8	245	844.87	245.36	845.02	247.78	846	248.87	846.56
251.6	848	253.15	848.93	254.92	850	256.79	851.18	258.15	852
259.9	853.08	261.42	854	264.44	855.72	264.91	856	267.09	857.16
267.28	857.27	268.5	858	269.12	858.43	271.49	860	272.21	860.51
274.42	862	274.93	862.45	277.59	864.66	279.12	865.9	279.23	866
279.37	866.11	281.68	868	282.01	868.27	284.14	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	226.98	.03	251.6	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
226.98	251.6	87.12	70.98	70.07	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.453	119.546	870	127.365	138.768	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.76	Reach Len. (ft)	87.12	70.98	70.07
Crit W.S. (ft)		Flow Area (sq ft)	3.46	72.19	0.48
E.G. Slope (ft/ft)	*0.004979	Area (sq ft)	3.46	72.19	0.48
Q Total (cfs)	505.70	Flow (cfs)	5.44	500.02	0.24
Top Width (ft)	34.99	Top Width (ft)	9.10	24.62	1.27
Vel Total (ft/s)	6.64	Avg. Vel. (ft/s)	1.57	6.93	0.50
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)	0.38	2.93	0.38
Conv. Total (cfs)	7166.6	Conv. (cfs)	77.0	7086.2	3.4
Length Wtd. (ft)	71.10	Wetted Per. (ft)	9.14	25.88	1.48
Min Ch El (ft)	844.80	Shear (lb/sq ft)	0.12	0.87	0.10
Alpha	1.08	Stream Power (lb/ft s)	284.14	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.07	1.69	0.20
C & E Loss (ft)	0.07	Cum SA (acres)	0.14	0.61	0.10

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2410.917

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.1	878.15	3.35	878	4.35	877.45	5.72	876
6.51	874.96	7.35	874	8.26	872.79	8.84	872	10.09	870.42
10.4	870	11.83	868.18	11.97	868	12.6	867.32	13.33	866.64
13.75	866.25	14.08	866	14.55	865.72	17.87	864	18.99	863.44
21.6	862	24	860.71	25.4	860	26.99	857.6	27.58	856.59
28.74	857.79	29.02	858	30.31	857.71	36.91	856.17	39.64	857.82
39.88	858	40.04	857.97	40.44	857.06	41.27	857.85	51.38	857.97
51.83	857.97	53.07	858	59.64	857.52	59.73	857.51	59.83	857.5
59.89	857.48	65.64	856	67.34	855.34	70.04	854	72.23	852.94
74.91	852	76.06	852	84.43	851.7	94.56	851.39	100.04	851.21
110.69	850.88	116.53	850.71	123.51	850.49	128.22	850.39	133.32	850.26
133.96	850.24	142.62	850.07	142.68	850.07	149.53	850.01	153.5	850
158.66	850	160.71	849.99	174.5	849.99	180.98	850	187.1	850
187.38	850	196.83	850	211.27	849.57	212.67	849.52	212.98	849.51
213.12	849.51	213.23	849.51	213.44	849.51	214.55	849.4	215.86	849.28
218.41	849.06	230.78	848	231.59	847.7	236.04	846	237.27	845.27
237.65	845.07	238.09	844.87	249.94	844.41	254.41	845.66	255.52	846
256.84	846.59	259.68	848	261.32	849.05	264.18	851.05	265.36	852
268.21	853.94	268.3	854	268.51	854.14	269.83	855.04	271.09	856
272.7	856.83	274.93	857.97	274.97	858	274.99	858.01	275.05	858.04
279.21	860	280.63	861.26	281.45	862	281.96	862.53	283.43	864
283.6	864.17	284.58	865.2	285.37	866	286.62	867.28	287.33	868
288.63	869.33	289.29	870	289.9	870.69	291.17	872	292.03	873
292.98	874	293.51	874.44	294.25	874.93	295.97	876	298.74	877.84
298.98	878	299.42	878.29	302.19	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.78	.035	259.68	.1

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
230.78	259.68	77.37	77.23	80.15	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.2	113.31	870	160.79	183.695	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.035	0.035	0.100
W.S. Elev (ft)	848.58	Reach Len. (ft)	77.37	77.23	80.15
Crit W.S. (ft)		Flow Area (sq ft)	1.93	86.91	0.26
E.G. Slope (ft/ft)	0.004554	Area (sq ft)	1.93	86.91	0.26
Q Total (cfs)	505.70	Flow (cfs)	2.40	503.20	0.10

Top Width (ft)	36.51	Top Width (ft)	6.71	28.90	0.90
Vel Total (ft/s)	5.68	Avg. Vel. (ft/s)	1.24	5.79	0.39
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)	0.29	3.01	0.29
Conv. Total (cfs)	7493.7	Conv. (cfs)	35.6	7456.6	1.5
Length Wtd. (ft)	77.23	Wetted Per. (ft)	6.73	30.25	1.07
Min Ch El (ft)	844.41	Shear (lb/sq ft)	0.08	0.82	0.07
Alpha	1.04	Stream Power (lb/ft s)	302.19	0.00	0.00
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.07	1.56	0.20
C & E Loss (ft)	0.05	Cum SA (acres)	0.12	0.57	0.10

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: Dotson Run
REACH: Dotson Run RS: 2333.304

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.3	879.1	3.46	877.71	6.28	876	8.95	874.28
9.39	874	9.5	873.92	11.97	872	13.71	870.56	15.5	868.84
16.28	868	16.59	867.66	18.24	866	19.08	865.31	20.75	864
22.68	862.83	24	862	25.9	860.84	27.23	860	30.16	858.37
30.8	858	31.84	856.45	32.19	855.96	33.11	854.69	33.37	854.32
33.81	854.63	34.58	856	35.96	854.55	37.39	853.28	37.95	854.09
38.19	854.08	41.13	854.16	41.94	854.09	43.96	855.16	44.74	856
45.25	855.29	45.97	855.23	51.44	855.59	53.34	856	57.94	855.55
66.09	854.16	66.95	854	72.95	852.08	73.07	852.04	73.2	852
73.45	851.97	91.51	850	98.4	849.81	99.1	849.8	107.15	849.6
114.56	849.44	121.67	849.3	185.19	848.95	187.32	848.96	188.56	848.97
202.93	848.82	206.38	848.69	206.87	848.7	212.37	848.48	218.94	848.17
219.92	848.12	222.06	848	237.89	846	239.79	845.54	245.29	844
245.74	843.89	246.08	843.78	250.45	843.8	252.11	843.76	252.36	843.9
252.55	844	254.15	845.19	255.37	846	257.98	847.95	258.06	848
258.42	848.29	260.48	849.89	260.62	850	260.89	850.12	263.35	852
267.76	853.58	269.22	854	271.07	854.76	274.47	856	274.52	856.04
277.24	858	278.01	858.59	278.57	859	280.51	860.44	282.66	862
284.98	863.75	285.32	864	287.54	865.73	287.9	866	289.04	866.86
290.13	867.67	290.56	868	290.96	868.31	293.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	222.06	.03	257.98	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
222.06 257.98 67.01 62.63 55.78 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
156.144	188.341	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	848.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	847.50	Reach Len. (ft)	67.01	62.63	55.78
Crit W.S. (ft)	847.50	Flow Area (sq ft)		62.55	
E.G. Slope (ft/ft)	*0.011340	Area (sq ft)		62.55	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	31.37	Top Width (ft)		31.37	
Vel Total (ft/s)	8.08	Avg. Vel. (ft/s)		8.08	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	4748.9	Conv. (cfs)		4748.9	
Length Wtd. (ft)	62.63	Wetted Per. (ft)		32.96	
Min Ch El (ft)	843.76	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	293.23	0.00	0.00
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	0.07	1.43	0.20
C & E Loss (ft)	0.02	Cum SA (acres)	0.12	0.52	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2270.249

INPUT
Description:
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.42	878.24	3.9	878	4	877.94	7.49	876
9.48	874.36	12.39	872.26	12.8	872	15.95	870	18.64	868.18
18.9	868	20.26	867.1	21.98	866	23.01	865.34	25.21	864

26.46	863.29	28.39	862	31.62	860.1	31.78	860	31.93	859.91
35.23	858	37.03	856.79	38.35	856	39.5	853.58	40.24	852.43
40.95	853.34	41.65	854	45.4	853.12	48.03	852.49	48.33	852.67
49.12	853.16	49.75	854	51.55	853.86	51.6	853.56	51.71	853.85
57	853.82	58.71	853.81	58.87	853.59	59.86	853.81	63.24	853.86
69.44	854	76.99	852.09	77.39	852	81.16	850.11	81.4	850
83.81	849.92	86.87	849.82	117.51	848.78	130.16	848.39	136.37	848.2
136.66	848.19	142.63	848.02	142.7	848.01	143.25	848	207.42	848
216.93	847.28	233.71	846	236.61	844.94	239.08	844	239.47	843.82
240.27	843.41	250.07	842.67	250.72	842.62	250.91	842.69	256.2	844
259.59	845.69	260.14	846	262.74	847.46	263.45	848	263.9	848.31
267.69	850	270.8	851.02	273.88	852	274.78	852.33	278.49	853.69
279.94	854	280.85	854.6	281.79	855.18	283.19	856	285.11	857.24
285.84	857.7	286.28	858	286.53	858.18	289.24	860		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	233.71	.03	259.59	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
233.71	259.59	73.07 75.65	77.19	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
107.731	172.984	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	846.27	Reach Len. (ft)	73.07	75.65	77.19
Crit W.S. (ft)	846.05	Flow Area (sq ft)	0.49	64.87	0.30
E.G. Slope (ft/ft)	*0.007670	Area (sq ft)	0.49	64.87	0.30
Q Total (cfs)	505.70	Flow (cfs)	0.48	505.07	0.16
Top Width (ft)	30.48	Top Width (ft)	3.57	25.88	1.03
Vel Total (ft/s)	7.70	Avg. Vel. (ft/s)	0.98	7.79	0.52
Max Chl Dpth (ft)	3.65	Hydr. Depth (ft)	0.14	2.51	0.29
Conv. Total (cfs)	5774.1	Conv. (cfs)	5.4	5766.8	1.8
Length Wtd. (ft)	75.65	Wetted Per. (ft)	3.58	26.98	1.19
Min Ch El (ft)	842.62	Shear (lb/sq ft)	0.07	1.15	0.12
Alpha	1.02	Stream Power (lb/ft s)	289.24	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.07	1.34	0.20
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	0.47	0.10

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: Dotson Run
REACH: Dotson Run RS: 2193.833

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	.96	879.31	2.65	878	3.79	877.2	5.33	876
7.74	874.21	8.01	874	8.26	873.79	9.32	872.99	10.73	872
11.24	871.41	12.53	870	13.6	868.79	14.28	868	15.46	866.67
16.73	865.18	17.84	864	18.18	863.7	19.69	862	21.8	860.19
22.12	860	23.89	858.49	24.52	858	26.52	856.29	26.88	856
27.95	855.36	29.84	854	32.97	852.76	34.8	852	37.45	850.93
38.14	850.56	38.73	850.39	39.48	850.16	39.73	850.07	39.8	850.03
39.84	849.98	39.84	850	39.85	849.93	40.89	849.74	41.96	850
42.06	850	42.77	850.16	45.14	850.63	48.25	851.89	48.53	852
48.6	851.99	56.94	851.7	66.68	852.06	68.61	852	69.86	851.54
74.83	850	105.59	848.9	125.04	848.24	132.09	848	133.25	847.98
133.64	847.98	136.93	847.94	138.55	847.92	139.52	847.91	140.5	847.92
148.4	847.99	149.64	847.96	166.22	847.95	167.27	847.96	168.89	847.91
169.97	847.91	171.62	847.86	196.87	846.67	199.2	846.52	203.14	846.27
203.49	846.27	207.26	846	212.23	845.52	213.8	845.37	213.88	845.35
214.75	845.15	219.68	844	220.66	841.17	220.82	840.67	220.86	840.55
223.48	840.64	224.76	840.67	226.76	840.74	229.98	840.81	230.01	840.81
230.08	840.81	233.72	842.52	234.86	843.05	235.38	843.29	235.66	843.43
236.21	843.71	236.5	844	239.05	846	241.46	848	254.76	850
284.42	852	288.88	854	293.27	856	297.15	858	301.81	859

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	207.26	.03	239.05	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
207.26	239.05	13.66	40.54	101.71	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	846.33	Reach Len. (ft)	13.66	40.54	101.71
Crit W.S. (ft)		Flow Area (sq ft)	0.80	99.84	0.07
E.G. Slope (ft/ft)	0.002669	Area (sq ft)	0.80	99.84	0.07
Q Total (cfs)	505.70	Flow (cfs)	0.51	505.18	0.01
Top Width (ft)	37.30	Top Width (ft)	5.11	31.79	0.40
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)	0.64	5.06	0.19
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)	0.16	3.14	0.17
Conv. Total (cfs)	9787.8	Conv. (cfs)	9.8	9777.8	0.3

* Length Wtd. (ft)	*	40.53	* Wetted Per. (ft)	*	5.12	*	35.91	*	0.52	*
* Min Ch El (ft)	*	840.55	* Shear (lb/sq ft)	*	0.03	*	0.46	*	0.02	*
* Alpha	*	1.01	* Stream Power (lb/ft s)	*	301.81	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.09	* Cum Volume (acre-ft)	*	0.07	*	1.19	*	0.20	*
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	0.11	*	0.42	*	0.10	*

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2151.343

INPUT
Description:
Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.98	878	6.13	876.03	6.17	876	6.29	875.93
9.47	874	11.44	872.52	12.11	872	12.65	871.35	13.77	870
14.65	868.93	15.42	868	16.5	866.69	17.46	865.53	18.69	864
19.47	863.17	20.51	862	21.67	861	22.75	860	23.82	859
24.99	858	26.24	856.82	27.2	856	28.48	854.83	29.34	854
32.05	852.92	34.47	852	37.17	851.02	39	850.34	39.72	850.06
39.82	849.92	39.83	850	39.87	849.78	41.86	849.41	42.13	849.32
42.28	849.27	42.78	849.11	43.88	849.36	44.47	849.73	45.06	850
46.41	850.12	46.91	850.14	50.72	850.98	51.64	851.3	52.3	852
56.07	851.52	58.47	851.24	58.9	851.2	59.45	851.18	60.26	851.2
61.24	851.3	67.44	852	67.95	851.18	72.95	850.27	74.79	850
75.62	849.95	90.36	849.07	93.1	849.03	120.88	848	139.59	848
140.42	848.02	140.77	848	146.69	847.7	146.81	847.7	148.43	847.64
148.64	847.63	148.99	847.61	150.1	847.57	151.01	847.51	151.2	847.49
158.79	847.45	173.96	846.85	174.92	846.82	192.39	846	193.92	845.46
194.18	845.38	194.55	845.26	195.1	845.08	195.92	844.81	197.19	844.4
197.4	844.33	198.45	844.21	198.86	844.17	199.24	844.14	199.49	844.12
200.25	844	204.13	840.57	213.18	840.09	213.46	840.5	214.33	842
220.05	844	222.93	846	237.74	848	281.27	850	289.69	852
297.88	854	306.6	856	315.51	858	327.25	860	338.24	862
345.06	864	348.22	866	351.34	868	355.03	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	192.39	.03	222.93	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
192.39 222.93 15.11 62.46 31.51 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
165.206	189.27	865	315.303	323.621	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.62	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.33	Wt. n-Val.	0.035	0.030	0.035	
W.S. Elev (ft)	846.29	Reach Len. (ft)	15.11	62.46	31.51	
Crit W.S. (ft)		Flow Area (sq ft)	0.69	109.91	0.32	
E.G. Slope (ft/ft)	0.001814	Area (sq ft)	0.69	109.91	0.32	
Q Total (cfs)	505.70	Flow (cfs)	0.44	505.10	0.16	
Top Width (ft)	35.83	Top Width (ft)	3.12	30.54	2.17	
Vel Total (ft/s)	4.56	Avg. Vel. (ft/s)	0.64	4.60	0.50	
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)	0.22	3.60	0.15	
Conv. Total (cfs)	11871.9	Conv. (cfs)	10.3	11857.8	3.7	
Length Wtd. (ft)	62.42	Wetted Per. (ft)	3.27	34.19	2.19	
Min Ch El (ft)	840.09	Shear (lb/sq ft)	0.02	0.36	0.02	
Alpha	1.01	Stream Power (lb/ft s)	355.03	0.00	0.00	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.07	1.10	0.20	
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	0.40	0.10	

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2088.858

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.83	878.16	3.08	878	5.81	876.22	6.15	876
6.62	875.72	9.31	874	9.76	873.59	11.38	872	12.39	870.91
13.34	870	15.3	868.07	15.45	867.92	17.37	866	19.09	864.27
19.37	864	21.35	862.09	21.44	862	21.68	861.77	25.21	858.31
25.53	858	25.94	857.61	27.58	856	29.14	854.47	29.62	854
30.58	853.37	33.26	852	36.37	851.08	39.95	850	40.31	849.37
40.48	849.17	40.58	849.14	43.71	848.17	47.53	848.99	48.77	849.22
49.52	849.37	51.13	849.95	51.26	850	51.3	850	56.09	850.47
57.06	850.96	58.98	850.98	62.88	850.98	65.11	850.96	69.51	850.8
71.38	850.78	73.12	850.25	76.65	849.95	77.22	850	94.27	848.74
104.74	848	120.36	847.88	126.07	847.83	129.76	847.81	132.43	847.72
132.74	847.7	140.2	847.42	145.63	847.55	149.1	847.66	151.54	847.58
154.51	847.48	157.14	847.42	159.38	847.19	161.31	846.95	169.55	846
174.79	845.55	175.25	845.5	175.69	845.32	179.16	844	181.88	839.61
181.92	839.54	187.56	839.54	188.6	840.06	189.95	840.78	190.5	840.98
195.33	842	201.7	844	211.61	846	242.96	848	274.51	850
288.61	852	296.68	854	305.19	856	320.33	858	334.82	860
360.81	862								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.035	169.55	.03	211.61	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
169.55 211.61 74.23 80.84 64.54 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
144.3	163.344	865	309.043	336.842	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.49	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.22	Wt. n-Val.	0.035	0.030	0.035	
W.S. Elev (ft)	846.27	Reach Len. (ft)	74.23	80.84	64.54	
Crit W.S. (ft)		Flow Area (sq ft)	0.31	133.22	0.56	
E.G. Slope (ft/ft)	*0.001412	Area (sq ft)	0.31	133.22	0.56	
Q Total (cfs)	505.70	Flow (cfs)	0.13	505.34	0.23	
Top Width (ft)	48.55	Top Width (ft)	2.31	42.06	4.18	
Vel Total (ft/s)	3.77	Avg. Vel. (ft/s)	0.41	3.79	0.42	
Max Chl Dpth (ft)	6.73	Hydr. Depth (ft)	0.13	3.17	0.13	
Conv. Total (cfs)	13455.9	Conv. (cfs)	3.4	13446.4	6.2	
Length Wtd. (ft)	79.95	Wetted Per. (ft)	2.33	45.80	4.19	
Min Ch El (ft)	839.54	Shear (lb/sq ft)	0.01	0.26	0.01	
Alpha	1.01	Stream Power (lb/ft s)	360.81	0.00	0.00	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.07	0.92	0.20	
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	0.34	0.09	

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: Dotson Run
REACH: Dotson Run RS: 2007.945

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.8	878	6.7	876	8.94	874	11.17	872
13.4	870	15.54	868	17.63	866	19.67	864	22.7	862
25.89	860	28.75	858	31.45	856	34.01	854	36.45	852
39.51	850	55.58	848	56.1	848	75.22	848.63	92.88	848.31
95.74	848	107.02	848	137.76	846	147.57	844	153.6	842
160	839.71	171.65	839.93	172.88	842	177.09	844	215.47	846
237.75	848	261.8	850	282.48	852	306.22	854	327.69	856
345.72	858	359.4	860	401.89	864				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	147.57	.03	177.09	.035

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
147.57	177.09	98.28	63.8	21.73	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.41	401.92	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	846.28	Reach Len. (ft)	98.28	63.80	21.73
Crit W.S. (ft)		Flow Area (sq ft)	13.14	150.07	49.52
E.G. Slope (ft/ft)	0.000453	Area (sq ft)	13.14	150.07	49.52
Q Total (cfs)	505.70	Flow (cfs)	11.22	444.22	50.27
Top Width (ft)	85.10	Top Width (ft)	14.10	29.52	41.49
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)	0.85	2.96	1.02
Max Chl Dpth (ft)	6.57	Hydr. Depth (ft)	0.93	5.08	1.19
Conv. Total (cfs)	23771.9	Conv. (cfs)	527.3	20881.7	2362.9
Length Wtd. (ft)	62.09	Wetted Per. (ft)	14.31	31.87	41.55
Min Ch El (ft)	839.71	Shear (lb/sq ft)	0.03	0.13	0.03
Alpha	1.38	Stream Power (lb/ft s)	401.89	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.05	0.66	0.16
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.28	0.06

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1943.117

INPUT
Description:
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05

92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	122.19	844
123.88	842	125.59	840	126.96	838.6	135.43	838.5	140.9	840
143.37	842	145.85	844	147.34	844.65	147.78	844.71	148.2	844.74
149.03	844.8	149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08
155.06	845.18	156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54
172.84	845.78	178.29	846	192.52	846	193.1	846.03	196.43	846.12
209.8	846.59	215.12	846.8	227.61	847.34	230.54	847.44	235.22	848
243.59	848	244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39
257.36	849.34	260.09	849.66	263.47	850	268.64	850.5	281.3	851.62
282.63	851.73	283.51	851.8	284.52	851.89	286.06	852	286.83	851.76
289.02	851.29	293.04	851.72	294.55	851.98	296.13	852.18	308.02	854
311.02	854	314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72
320.59	854.94	323.89	855.28	328.04	855.84	330.54	856	331.73	856.08
333.65	856.19	334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35
350.41	858	351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65
370.33	859.95	378.74	861.6	382.38	862.13	392.13	864	393.43	864.24
394.87	864.54	401.82	866	401.96	866.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
116.12	147.34	42.64	28.07	46.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	849.5	F
141.38	401.96	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.36	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.24	Wt. n-Val.		0.030		
W.S. Elev (ft)	846.12	Reach Len. (ft)	42.64	28.07	46.40	
Crit W.S. (ft)	842.08	Flow Area (sq ft)		128.71		
E.G. Slope (ft/ft)	*0.000612	Area (sq ft)	5.75	154.56	24.07	
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	99.44	Top Width (ft)	19.30	31.22	48.93	
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)		3.93		
Max Chl Dpth (ft)	7.62	Hydr. Depth (ft)		6.56		
Conv. Total (cfs)	20436.5	Conv. (cfs)		20436.5		
Length Wtd. (ft)	28.07	Wetted Per. (ft)		22.42		
Min Ch El (ft)	838.50	Shear (lb/sq ft)		0.22		
Alpha	1.00	Stream Power (lb/ft s)	401.96	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	0.43	0.15	
C & E Loss (ft)		Cum SA (acres)	0.05	0.23	0.04	

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

CULVERT

RIVER: Dotson Run
REACH: Dotson Run RS: 1929.28

INPUT
Description:
Distance from Upstream XS = 8.8
Deck/Roadway Width = 9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
117.54	845.87		138.98	845.99		178.29	846	

Upstream Bridge Cross Section Data
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	122.19	844
123.88	842	125.59	840	126.96	838.6	135.43	838.5	140.9	840
143.37	842	145.85	844	147.34	844.65	147.78	844.71	148.2	844.74
149.03	844.8	149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08
155.06	845.18	156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54
172.84	845.78	178.29	846	192.52	846	193.1	846.03	196.43	846.12
209.8	846.59	215.12	846.8	227.61	847.34	230.54	847.44	235.22	848
243.59	848	244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39
257.36	849.34	260.09	849.66	263.47	850	268.64	850.5	281.3	851.62
282.63	851.73	283.51	851.8	284.52	851.89	286.06	852	286.83	851.76
289.02	851.29	293.04	851.72	294.55	851.98	296.13	852.18	308.02	854
311.02	854	314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72
320.59	854.94	323.89	855.28	328.04	855.84	330.54	856	331.73	856.08
333.65	856.19	334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35
350.41	858	351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65

370.33	859.95	378.74	861.6	382.38	862.13	392.13	864	393.43	864.24
394.87	864.54	401.82	866	401.96	866.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.
116.12 147.34 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	849.5	F
141.38	401.96	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
72.75	846		102.69	845.87		127.63	845.99	
218.19	846							

Downstream Bridge Cross Section Data
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	6.34	856	11.05	854	17.72	852
20.68	850	30.77	848	42.82	846	47.07	845.28	51.09	846
61.92	846.9	72.75	846	99.44	844	101.25	842	103.53	840
108.16	838.43	117.99	838.29	121.08	840	122.61	842	123.84	844
218.49	846	241.67	848	258.48	850	290.85	852	302.89	854
317.83	856	335.26	858	349.67	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.44	.03	123.84	.035

Bank Sta: Left Right Coeff Contr. Expan.
99.44 123.84 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	849.5	F
121.67	349.67	849.5	F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
Downstream Embankment side slope = 2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98

```
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name      Shape      Rise    Span
Culvert #1        Ellipse     5.1     6.7
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                .4                 1
Upstream   Elevation =  838.6
           Centerline Station =  129.54
Downstream Elevation =  838.4
           Centerline Station =  109.76

Culvert Name      Shape      Rise    Span
Culvert #2        Ellipse     6.7     5.1
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 1 - Square edge with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                .4                 1
Upstream   Elevation =  838.5
           Centerline Station =  136.24
Downstream Elevation =  838.3
           Centerline Station =  116.03

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #1
*************************************************************************
* Q Culv Group (cfs)     *  253.63  * Culv Full Len (ft)     *   20.40  *
* # Barrels              *       1  * Culv Vel US (ft/s)     *    9.45  *
* Q Barrel (cfs)         *  253.63  * Culv Vel DS (ft/s)     *    9.45  *
* E.G. US. (ft)          *  846.36  * Culv Inv El Up (ft)    *  838.60  *
* W.S. US. (ft)          *  846.12  * Culv Inv El Dn (ft)    *  838.40  *
* E.G. DS (ft)           *  844.63  * Culv Frctn Ls (ft)     *    0.30  *
* W.S. DS (ft)           *  844.12  * Culv Exit Loss (ft)    *    0.87  *
* Delta EG (ft)          *    1.73  * Culv Entr Loss (ft)    *    0.55  *
* Delta WS (ft)          *    2.00  * Q Weir (cfs)           *   13.43  *
* E.G. IC (ft)           *  844.93  * Weir Sta Lft (ft)      *  121.76  *
* E.G. OC (ft)           *  846.35  * Weir Sta Rgt (ft)      *  141.38  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     *  843.70  * Weir Max Depth (ft)    *    0.46  *
* Culv WS Outlet (ft)    *  843.50  * Weir Avg Depth (ft)    *    0.41  *
* Culv Nml Depth (ft)    *          * Weir Flow Area (sq ft) *    8.06  *
* Culv Crt Depth (ft)    *    3.95  * Min El Weir Flow (ft)  *  845.90  *
*************************************************************************

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #2
```

Q Culv Group (cfs)	238.64	Culv Full Len (ft)			
# Barrels	1	Culv Vel US (ft/s)	9.55		
Q Barrel (cfs)	238.64	Culv Vel DS (ft/s)	9.64		
E.G. US. (ft)	846.36	Culv Inv El Up (ft)	838.50		
W.S. US. (ft)	846.12	Culv Inv El Dn (ft)	838.30		
E.G. DS (ft)	844.63	Culv Frctn Ls (ft)	0.24		
W.S. DS (ft)	844.12	Culv Exit Loss (ft)	0.93		
Delta EG (ft)	1.73	Culv Entr Loss (ft)	0.57		
Delta WS (ft)	2.00	Q Weir (cfs)	13.43		
E.G. IC (ft)	846.14	Weir Sta Lft (ft)	121.76		
E.G. OC (ft)	846.37	Weir Sta Rgt (ft)	141.38		
Culvert Control	Outlet	Weir Submerg	0.00		
Culv WS Inlet (ft)	844.39	Weir Max Depth (ft)	0.46		
Culv WS Outlet (ft)	844.12	Weir Avg Depth (ft)	0.41		
Culv Nml Depth (ft)	6.70	Weir Flow Area (sq ft)	8.06		
Culv Crt Depth (ft)	4.72	Min El Weir Flow (ft)	845.90		

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1915.038

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	6.34	856	11.05	854	17.72	852
20.68	850	30.77	848	42.82	846	47.07	845.28	51.09	846
61.92	846.9	72.75	846	99.44	844	101.25	842	103.53	840
108.16	838.43	117.99	838.29	121.08	840	122.61	842	123.84	844
218.49	846	241.67	848	258.48	850	290.85	852	302.89	854
317.83	856	335.26	858	349.67	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.44	.03	123.84	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.44 123.84 51.87 36.65 46.43 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	849.5	F
121.67	349.67	849.5	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.63	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.51	Wt. n-Val.		0.030		
W.S. Elev (ft)	844.12	Reach Len. (ft)	51.87	36.65	46.43	
Crit W.S. (ft)	841.80	Flow Area (sq ft)		87.94		
E.G. Slope (ft/ft)	*0.001520	Area (sq ft)	0.09	109.92	0.32	
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	31.48	Top Width (ft)	1.56	24.40	5.53	
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)		5.75		
Max Chl Dpth (ft)	5.83	Hydr. Depth (ft)		5.45		
Conv. Total (cfs)	12971.1	Conv. (cfs)		12971.1		
Length Wtd. (ft)	36.65	Wetted Per. (ft)		17.11		
Min Ch El (ft)	838.29	Shear (lb/sq ft)		0.49		
Alpha	1.00	Stream Power (lb/ft s)	349.67	0.00	0.00	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.03	0.39	0.15	
C & E Loss (ft)	0.04	Cum SA (acres)	0.04	0.21	0.01	

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

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1878.276

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.11	858	5.89	856	10.2	854	14.94	852
19.65	850	25.98	848	81.73	846	91.4	844	91.6	842
93.64	840	94.79	838.34	108.63	838.04	109.78	842	111.91	844
119.75	846	154.92	846	165.37	846.17	166.07	846.16	174.43	846.47
176.45	846.47	185.48	846.91	199.44	846.92	206.73	847.11	211.37	847.17
214.75	847.28	216.46	847.34	225.68	847.65	235.89	848	238.73	848.21
239.83	848.22	241.05	848.24	248.43	848.65	250.9	848.71	253.31	848.82
257.07	849.01	265.19	849.44	268.26	849.64	274.18	850	275.43	850
278.91	850.23	282.86	850.4	290.09	850.86	299.01	851.41	307.65	852
323.98	853.7	326.97	854	330.84	854.65	338.48	856	340.6	856.34
345.81	857.22	350.39	858	358.66	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	81.73	.03	119.75	.035

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

```
        81.73  119.75          385.47  390.79   393.3            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    87.9     850       F
  111.31  358.66     850       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  844.53  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.             *          *   0.030  *          *
* W.S. Elev (ft)         *  844.15  * Reach Len. (ft)        *  385.47  *  390.79  *  393.30  *
* Crit W.S. (ft)         *  841.53  * Flow Area (sq ft)      *          *  101.82  *          *
* E.G. Slope (ft/ft)     *0.001771  * Area (sq ft)           *          *  102.12  *          *
* Q Total (cfs)          *  505.70  * Flow (cfs)             *          *  505.70  *          *
* Top Width (ft)         *   21.81  * Top Width (ft)         *          *   21.81  *          *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)       *          *    4.97  *          *
* Max Chl Dpth (ft)      *    6.11  * Hydr. Depth (ft)       *          *    4.94  *          *
* Conv. Total (cfs)      * 12017.4  * Conv. (cfs)            *          * 12017.4  *          *
* Length Wtd. (ft)       *  390.79  * Wetted Per. (ft)       *          *   27.68  *          *
* Min Ch El (ft)         *  838.04  * Shear (lb/sq ft)       *          *    0.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *  358.66  *    0.00  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    0.03  *    0.30  *    0.15  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.04  *    0.19  *    0.01  *
*********************************************************************************************

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

CULVERT


RIVER: Dotson Run
REACH: Dotson Run          RS: 1683.45

INPUT
Description:
Distance from Upstream XS =      155
Deck/Roadway Width        =       98
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
       0     912        0  358.66     906       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      53
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0     860     3.11     858     5.89     856     10.2     854    14.94     852
   19.65     850    25.98     848    81.73     846     91.4     844     91.6     842
   93.64     840    94.79  838.34   108.63  838.04   109.78     842   111.91     844
```

119.75	846	154.92	846	165.37	846.17	166.07	846.16	174.43	846.47
176.45	846.47	185.48	846.91	199.44	846.92	206.73	847.11	211.37	847.17
214.75	847.28	216.46	847.34	225.68	847.65	235.89	848	238.73	848.21
239.83	848.22	241.05	848.24	248.43	848.65	250.9	848.71	253.31	848.82
257.07	849.01	265.19	849.44	268.26	849.64	274.18	850	275.43	850
278.91	850.23	282.86	850.4	290.09	850.86	299.01	851.41	307.65	852
323.98	853.7	326.97	854	330.84	854.65	338.48	856	340.6	856.34
345.81	857.22	350.39	858	358.66	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	81.73	.03	119.75	.035

Bank Sta: Left Right Coeff Contr. Expan.
81.73 119.75 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	87.9	850	F
111.31	358.66	850	F

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	912	0	217.84	908	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.21	856	12.38	854	19.51	852
29.28	850	40.44	848	47.49	846	55.09	844	75.52	844
82.72	842	100.32	840	103.4	838	106.1	836.06	117.23	836.06
118.44	838	119.55	842	127.29	844	137.21	846	148.77	848
154.74	850	160.73	852	166.66	854	172.52	856	178.22	858
183.91	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.32	.03	119.55	.1

Bank Sta: Left Right Coeff Contr. Expan.
100.32 119.55 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	F
124.17	183.91	850	F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
Downstream Embankment side slope = 2 horiz. to 1.0 vertical

Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	5	6

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4.76	380	.011	.011	0	.4	1

Number of Barrels = 2
Upstream Elevation = 838.04
Centerline Stations

Sta.	Sta.
95.9	103.31

Downstream Elevation = 836.06
Centerline Stations

Sta.	Sta.
110.05	119.17

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	505.70	Culv Full Len (ft)			
# Barrels	2	Culv Vel US (ft/s)		11.07	
Q Barrel (cfs)	252.85	Culv Vel DS (ft/s)		8.78	
E.G. US. (ft)	844.53	Culv Inv El Up (ft)		838.04	
W.S. US. (ft)	844.15	Culv Inv El Dn (ft)		836.06	
E.G. DS (ft)	841.83	Culv Frctn Ls (ft)		1.69	
W.S. DS (ft)	840.86	Culv Exit Loss (ft)		0.22	
Delta EG (ft)	2.70	Culv Entr Loss (ft)		0.78	
Delta WS (ft)	3.29	Q Weir (cfs)			
E.G. IC (ft)	844.53	Weir Sta Lft (ft)			
E.G. OC (ft)	844.51	Weir Sta Rgt (ft)			
Culvert Control	Inlet	Weir Submerg			
Culv WS Inlet (ft)	841.85	Weir Max Depth (ft)			
Culv WS Outlet (ft)	840.86	Weir Avg Depth (ft)			
Culv Nml Depth (ft)	3.22	Weir Flow Area (sq ft)			
Culv Crt Depth (ft)	3.81	Min El Weir Flow (ft)		908.63	

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1487.336

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.21	856	12.38	854	19.51	852
29.28	850	40.44	848	47.49	846	55.09	844	75.52	844
82.72	842	100.32	840	103.4	838	106.1	836.06	117.23	836.06
118.44	838	119.55	842	127.29	844	137.21	846	148.77	848
154.74	850	160.73	852	166.66	854	172.52	856	178.22	858
183.91	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.32	.03	119.55	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
100.32 119.55 28.66 33.97 32.56 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	F
124.17	183.91	850	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.83	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.97	Wt. n-Val.		0.030		
W.S. Elev (ft)	840.86	Reach Len. (ft)	28.66	33.97	32.56	
Crit W.S. (ft)	839.73	Flow Area (sq ft)		63.84		
E.G. Slope (ft/ft)	*0.004615	Area (sq ft)	3.26	75.27		
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	26.49	Top Width (ft)	7.57	18.91		
Vel Total (ft/s)	7.92	Avg. Vel. (ft/s)		7.92		
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		4.50		
Conv. Total (cfs)	7443.8	Conv. (cfs)		7443.8		
Length Wtd. (ft)	33.49	Wetted Per. (ft)		17.68		
Min Ch El (ft)	836.06	Shear (lb/sq ft)		1.04		
Alpha	1.00	Stream Power (lb/ft s)	183.91	0.00	0.00	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.03	0.10	0.15	
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.01	0.01	

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

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1453.111

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.12	856	12.34	854	16.85	852
21.69	850	27.29	848	34.22	846	40.67	844	50.67	845.05
68.56	844.75	84.7	844	95.07	842	100.24	840	104.97	838
106.35	837.87	117	836.94	118.69	836.04	124.14	836.06	129.49	838
135.07	840	138.72	840.47	155.96	842	185.72	844	200.02	846
209.69	848	215.1	850	220.32	852	225.56	854	230.85	856
236.52	858	242.53	860						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	117	.03	129.49	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117	129.49	11.26	20.52	423.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.01	Reach Len. (ft)	22.53	22.53	22.53
Crit W.S. (ft)		Flow Area (sq ft)	53.50	55.99	15.71
E.G. Slope (ft/ft)	0.002824	Area (sq ft)	53.50	55.99	15.71
Q Total (cfs)	505.70	Flow (cfs)	81.35	388.93	35.42
Top Width (ft)	47.20	Top Width (ft)	19.38	12.49	15.33
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)	1.52	6.95	2.25
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)	2.76	4.48	1.02
Conv. Total (cfs)	9516.6	Conv. (cfs)	1530.9	7319.2	666.5
Length Wtd. (ft)	22.53	Wetted Per. (ft)	20.02	13.06	15.74
Min Ch El (ft)	836.04	Shear (lb/sq ft)	0.47	0.76	0.18
Alpha	2.32	Stream Power (lb/ft s)	242.53	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.05	0.14
C & E Loss (ft)	0.17	Cum SA (acres)			

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: Dotson Run
REACH: Lower RS: 1430.579

INPUT
Description:

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.11	858	8.04	856	11.95	854	15.92	852
19.94	850	24.07	848	28.31	846	33.45	844	42.62	844
45.48	844.44	60.92	844.38	75.03	844	93.21	842	96.93	840
101.57	838	111.64	836	114.11	835.58	120.54	835.53	121.16	836
123.73	838	126.3	840	129.1	840.85	139.63	840.44	150.45	840.27
154.23	840	182.14	838.32	229.92	838.82	258.27	839.57	311.11	839.46
317.19	837.98	329	840	375.59	840.56	404.82	840.33	462.05	842
462.67	842	505.17	844	509.78	846	515.86	848	524.33	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	93.21	.03	129.1	.035

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
93.21	129.1	9.67	38.92	2.79	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
429.44	484.1	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.42	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.03	Wt. n-Val.		0.030	0.035	
W.S. Elev (ft)	841.39	Reach Len. (ft)	9.67	38.92	2.79	
Crit W.S. (ft)		Flow Area (sq ft)		132.09	523.52	
E.G. Slope (ft/ft)	0.000274	Area (sq ft)		132.09	523.52	
Q Total (cfs)	783.60	Flow (cfs)		251.30	532.30	
Top Width (ft)	335.10	Top Width (ft)		34.76	300.34	
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		1.90	1.02	
Max Chl Dpth (ft)	5.86	Hydr. Depth (ft)		3.80	1.74	
Conv. Total (cfs)	47305.5	Conv. (cfs)		15170.8	32134.7	
Length Wtd. (ft)	26.65	Wetted Per. (ft)		37.41	301.13	
Min Ch El (ft)	835.53	Shear (lb/sq ft)		0.06	0.03	
Alpha	1.30	Stream Power (lb/ft s)	524.33	0.00	0.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	1.18	0.10	
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	0.42	0.12	

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: Dotson Run
REACH: Lower RS: 1390.627

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	7.24	856	10.84	854	14.42	852
18.01	850	21.67	848	25.55	846	29.42	844	61.95	842.98
72.64	843.27	81.46	842	88.36	840	93.36	838	97.18	836
97.88	835.58	119.6	835.53	119.99	836	123.48	838	134.24	840
140.18	840.75	152.92	841.67	188.63	840	226.9	839.56	262.19	839.43
284.16	839.38	285.96	839.41	295.88	839.32	302.17	839.3	308.82	839.72
313.55	840	320.79	840	324.96	839.83	329.06	840	342.7	840
364.42	840.88	400.76	841.01	446.46	842	447.21	842	482.43	843.69
489.96	843.98	490.5	844	495.07	845.97	495.14	846	501.06	848
508.87	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	72.64	.03	152.92	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.64 152.92 46.71 46.06 8.53 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	88.71	842	F
121.23	508.87	842	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
230.05	253.32	850	371.96	469.95	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	840.96	Reach Len. (ft)	24.40	24.40	24.40
Crit W.S. (ft)	838.75	Flow Area (sq ft)		153.42	
E.G. Slope (ft/ft)	0.001420	Area (sq ft)		188.42	191.92
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	238.74	Top Width (ft)		58.09	180.65
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		4.72	
Conv. Total (cfs)	20791.6	Conv. (cfs)		20791.6	
Length Wtd. (ft)	24.40	Wetted Per. (ft)		33.90	
Min Ch El (ft)	835.53	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	508.87	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00	1.03	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.38	0.11

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Dotson Run
REACH: Lower RS: 1370.77

INPUT
Description:
Distance from Upstream XS = 24.4
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
81.27	842.04	841	125	842	841	152.92	841.67	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	7.24	856	10.84	854	14.42	852
18.01	850	21.67	848	25.55	846	29.42	844	61.95	842.98
72.64	843.27	81.46	842	88.36	840	93.36	838	97.18	836
97.88	835.58	119.6	835.53	119.99	836	123.48	838	134.24	840
140.18	840.75	152.92	841.67	188.63	840	226.9	839.56	262.19	839.43
284.16	839.38	285.96	839.41	295.88	839.32	302.17	839.3	308.82	839.72
313.55	840	320.79	840	324.96	839.83	329.06	840	342.7	840
364.42	840.88	400.76	841.01	446.46	842	447.21	842	482.43	843.69
489.96	843.98	490.5	844	495.07	845.97	495.14	846	501.06	848
508.87	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	72.64	.03	152.92	.035

Bank Sta: Left Right Coeff Contr. Expan.
72.64 152.92 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	88.71	842	F
121.23	508.87	842	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
230.05	253.32	850	371.96	469.95	850

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
79.47	842	841	125	842	841
262.03	839.34	0			

Downstream Bridge Cross Section Data
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left Right Coeff Contr. Expan.
87.05 117.07 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	842	F
129	484.72	842	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	841.37	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	840.96	E.G. Elev (ft)	841.33	841.25
Q Total (cfs)	783.60	W.S. Elev (ft)	840.92	840.35
Q Bridge (cfs)	783.60	Crit W.S. (ft)	838.75	839.51
Q Weir (cfs)		Max Chl Dpth (ft)	5.39	4.83
Weir Sta Lft (ft)		Vel Total (ft/s)	5.16	7.47
Weir Sta Rgt (ft)		Flow Area (sq ft)	151.96	104.84
Weir Submerg		Froude # Chl	0.42	0.61
Weir Max Depth (ft)		Specif Force (cu ft)	505.01	403.79
Min El Weir Flow (ft)	842.01	Hydr Depth (ft)	4.67	2.96
Min El Prs (ft)	841.00	W.P. Total (ft)	33.90	40.00
Delta EG (ft)	0.17	Conv. Total (cfs)	20463.6	11107.4
Delta WS (ft)	0.72	Top Width (ft)	39.90	35.46
BR Open Area (sq ft)	127.89	Frctn Loss (ft)	0.03	0.05
BR Open Vel (ft/s)	7.47	C & E Loss (ft)	0.05	0.01
Coef of Q		Shear Total (lb/sq ft)	0.41	0.81
Br Sel Method	Energy only	Power Total (lb/ft s)	0.00	0.00

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

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1344.212

INPUT

Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
87.05 117.07 72.01 71.39 14.36 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	842	F
129	484.72	842	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	840.24	Reach Len. (ft)	72.01	71.39	14.36
Crit W.S. (ft)	839.51	Flow Area (sq ft)		99.13	2.91
E.G. Slope (ft/ft)	*0.005460	Area (sq ft)		99.13	81.64
Q Total (cfs)	783.60	Flow (cfs)		780.04	3.56
Top Width (ft)	158.80	Top Width (ft)		27.43	131.37
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)		7.87	1.22
Max Chl Dpth (ft)	4.72	Hydr. Depth (ft)		3.61	0.24
Conv. Total (cfs)	10604.8	Conv. (cfs)		10556.6	48.1
Length Wtd. (ft)	71.26	Wetted Per. (ft)		31.45	11.93
Min Ch El (ft)	835.52	Shear (lb/sq ft)		1.07	0.08

* Alpha	* 1.05	* Stream Power (lb/ft s)	* 484.72	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.54	* Cum Volume (acre-ft)	* 0.00	* 0.87	* 0.02 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.01	* 0.34	* 0.04 *

Warning: Divided flow computed for this cross-section.
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, water surface was used.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1271.523

INPUT
Description:
Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.2	858.79	6.85	858	8.62	856.91	10.07	856
11.14	855.34	13.3	854	15.18	852.83	16.52	852	19.06	850.43
19.74	850	20.84	849.3	22.92	848	23.33	847.66	25.25	846
26.08	845.26	27.49	844	28.58	843.03	29.73	842	30.96	841.05
33.13	840.27	34.02	840.41	36.07	841.23	51.19	841.68	59.37	841.97
67.89	841.82	71.96	841.82	72.2	841.82	75.27	841.92	75.35	841.92
106.53	840.01	106.67	840	106.74	839.98	106.81	839.96	106.95	839.92
113.82	838	113.91	837.93	116.56	836	116.78	835.84	118.21	834.83
122.48	834.88	126.82	834.92	127.57	835.32	128.85	836	129.53	836.37
129.97	836.61	132.41	838	133.47	838.08	133.56	838.08	160.47	840
168.47	840	207.09	840	213.92	839.97	222.03	839.85	226.17	839.87
226.81	839.87	232.62	839.89	234.55	839.89	240.78	839.91	246.74	839.94
249.78	840	251.67	840	254.9	840.14	256.12	840.2	256.34	840.22
256.61	840.22	257.14	840.22	261.73	840.24	282.88	840.16	283.84	840.11
286.22	840	287.43	839.99	291.41	839.95	303.23	839.78	303.71	839.77
303.8	839.77	303.86	839.77	310	840	317.63	840.62	321.95	840.97
323.81	841.13	324.99	841.23	326.36	841.34	338.44	841.79	402.41	841.79
412.64	842	414.01	842	424.99	842.51	427.91	842.62	432.58	842.8
434.09	842.82	439.15	843.02	444.45	843.22	452.34	843.53	464.52	844
469.1	845.85	469.48	846	469.86	846.13	475.36	848	476.73	848.45
481.34	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	106.53	.03	160.47	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
106.53	160.47	89.77	87.43	7.72	.1 .3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
73.623	99.238	850	155.774	197.012	850	333.886	478.052	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.63	Reach Len. (ft)	89.77	87.43	7.72
Crit W.S. (ft)	839.63	Flow Area (sq ft)		96.36	
E.G. Slope (ft/ft)	0.011058	Area (sq ft)		96.36	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	47.30	Top Width (ft)		47.30	
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)		8.13	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	7451.8	Conv. (cfs)		7451.8	
Length Wtd. (ft)	87.43	Wetted Per. (ft)		49.40	
Min Ch El (ft)	834.83	Shear (lb/sq ft)		1.35	
Alpha	1.00	Stream Power (lb/ft s)	481.34	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.00	0.71	0.00
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.27	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1182.267

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.53	859.26	4.25	858	7.58	856.34	8.26	856
8.93	855.64	11.94	854	15.22	852.06	15.32	852	18.63	850
19.44	849.51	21.9	848	23.73	846.89	25.18	846	27.4	844.66
28.55	844	29.18	843.66	32.14	842	34.95	841.21	38.98	840
44.86	840	45.79	840.33	50.01	841.54	72.63	841.57	73.64	841.56

111.32	840.77	116.31	840.61	116.76	840.6	141.61	840	143.71	840
145.77	839.73	156.51	838.35	159.9	838	162.73	836.14	162.93	836
163.08	835.83	164.88	834	165.07	834.09	165.4	834.17	168	833.99
171.79	833.46	173.18	833.82	173.8	834	178.39	835.04	178.93	835.16
179.85	835.36	182.6	836	185.37	836.74	190.28	838	196.06	838.95
202.48	840	202.73	840	218.29	840.32	237.94	840.72	242.98	840.62
244.59	840.62	248.08	840.63	250.67	840.62	255.29	840.67	258.49	840.67
268.68	840.4	271.78	840.4	320.91	840.02	322.57	840	325.8	840
326.99	840.04	327.88	840.05	328	840.05	328.19	840.05	330.03	840.05
335.01	840.03	340.97	840.15	341.51	840	345.29	840	358.95	841.94
359.36	842	359.42	842	421.64	842.02	432.76	842.1	433.45	842.08
434.3	842.06	435.22	842.04	436.25	842.03	437.45	842.04	437.77	842.05
438.11	842.05	442.91	842.06	458.59	842.04	483.58	843.01	489.59	843.86
490.56	844	491.1	844.2	491.76	844.46	495.81	846	500.13	847.48
501.69	848	507.66	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	141.61	.03	202.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.61	202.48	53.67	51.28	20.67	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
95.931	134.383	850	210.589	303.804	850	368.039	447.687	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.10	Reach Len. (ft)	53.67	51.28	20.67
Crit W.S. (ft)		Flow Area (sq ft)		122.46	
E.G. Slope (ft/ft)	*0.004862	Area (sq ft)		122.46	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	46.33	Top Width (ft)		46.33	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	11238.1	Conv. (cfs)		11238.1	
Length Wtd. (ft)	51.28	Wetted Per. (ft)		48.55	
Min Ch El (ft)	833.46	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	507.66	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.00	0.49	0.00
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.18	0.02

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: Dotson Run
REACH: Lower RS: 1130.779

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.62	858	3.02	857.61	4.62	856	5.34	855.3
6.64	854	7.61	853.07	8.68	852	9.84	850.89	10.73	850
12.05	848.74	12.8	848	14.23	846.62	14.87	846	16.41	844.52
16.94	844	19	842.97	20.88	842	25.46	840.42	26.61	840
26.7	840	26.75	840.01	33.51	841.19	49.84	841.4	55.31	841.49
62.52	841.03	82.74	840.18	83.89	840.17	85.35	840.16	86.11	840.16
88.1	840.15	108.01	840.06	115.16	840	129.22	839.59	133.63	839.44
135.91	839.36	162.48	838.44	172.43	838.11	175.15	838	175.84	837.63
178.69	836	179.32	835.63	181.85	834	182.48	833.66	182.72	833.52
183.58	833.41	186.95	833.08	188.95	832.86	189.1	832.85	189.21	832.89
189.29	832.92	189.66	833.06	192.07	834	194.01	834.71	197.7	836
199.08	836.4	201.24	837.03	204.63	838	205.24	838.1	206.51	838.29
220.99	840	227.14	840.22	227.83	840.23	236.58	840.88	236.77	840.89
238.32	840.87	240.23	840.89	252.65	840.97	254.59	840.93	257.08	840.88
261.75	840.76	273.46	840.7	303.25	840.53	306.54	840.49	311.34	840.98
311.84	840.97	312.83	840.92	322.47	840.76	326.76	840.64	326.89	840.62
328.7	840.44	330.05	840.34	330.9	840.32	333.67	840.14	342.22	840.68
344.75	840.12	345.42	840	346.23	840	350.02	841.02	354.03	842
355.68	842.3	356.13	842.37	356.46	842.45	356.83	842.41	364.03	842.23
364.21	842.23	371.97	842.15	374.9	842.13	418.11	842.07	432.17	842.1
432.4	842.09	432.61	842.08	451.1	842.36	454.08	842.33	475.99	842.24
480.26	842.87	481.8	843.13	487.14	844	487.68	844.16	494.02	846
495.02	846.43	498.69	848	499.31	848.27	503.37	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	175.15	.03	204.63	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
175.15 204.63 16.83 68.95 51.24 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
209.61	307.89	850	369.88	434.47	850

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 839.33	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 1.36	* Wt. n-Val.	*	* 0.030	* *

* W.S. Elev (ft)	*	837.96	* Reach Len. (ft)	*	16.83	*	68.95	*	51.24	*
* Crit W.S. (ft)	*	837.89	* Flow Area (sq ft)	*		*	83.68	*		*
* E.G. Slope (ft/ft)	*	0.009669	* Area (sq ft)	*		*	83.68	*		*
* Q Total (cfs)	*	783.60	* Flow (cfs)	*		*	783.60	*		*
* Top Width (ft)	*	29.29	* Top Width (ft)	*		*	29.29	*		*
* Vel Total (ft/s)	*	9.36	* Avg. Vel. (ft/s)	*		*	9.36	*		*
* Max Chl Dpth (ft)	*	5.11	* Hydr. Depth (ft)	*		*	2.86	*		*
* Conv. Total (cfs)	*	7969.0	* Conv. (cfs)	*		*	7969.0	*		*
* Length Wtd. (ft)	*	68.92	* Wetted Per. (ft)	*		*	31.39	*		*
* Min Ch El (ft)	*	832.85	* Shear (lb/sq ft)	*		*	1.61	*		*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	503.37	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.31	* Cum Volume (acre-ft)	*	0.00	*	0.37	*	0.00	*
* C & E Loss (ft)	*	0.30	* Cum SA (acres)	*	0.01	*	0.14	*	0.02	*

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: Dotson Run
REACH: Lower RS: 1059.794

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	.97	859.29	2.79	858	3.67	857.13	4.78	856
6.11	854.68	6.79	854	8.44	852.37	8.81	852	10.69	850.15
10.84	850	12.52	848.34	12.87	848	12.91	847.96	14.9	846
15.18	845.73	16.94	844	19.55	842.46	20.33	842	20.54	841.91
21.2	841.61	24.81	840	25.17	840	26.02	840.15	30.25	840.88
30.91	840.99	31.99	841.19	34.18	841.22	52.24	841.56	56.47	841.28
68.31	840.33	86.23	840	91.02	839.92	91.95	839.9	116.5	839.48
122.17	839.37	137.44	839.11	143.34	838.98	153.79	838.81	160.44	838.67
165.79	838.58	170.98	838.46	176.81	838.33	191.12	838	196.46	837.37
207.79	836	209.17	834.89	210.23	834	211.98	833.72	218.07	832.86
220.65	832.68	224.71	832.43	225.96	833.06	226.64	833.42	228.14	834.23
230.52	835.56	231.17	835.92	231.31	836	232.89	836.15	234.43	836.27
236.46	836.45	238.1	836.6	239.84	836.75	240.93	836.84	252.95	838
253.03	838	271.56	838.84	297.13	840	326.64	840	333.39	840.27
338.69	840.47	350.73	840.74	355.4	840.61	361.86	840.56	364.63	841.56
365.8	842	371.11	842.88	372.43	843.1	374.71	843.24	379.43	843.52
385.44	843.88	386.06	843.93	387.43	844	412.92	844	416.17	843.92
433.51	843.86	443.65	844	445.87	844.03	446.47	844.04	457.42	844.19
459.73	844.12	465.63	844.1	468.73	844	468.87	844	475.47	843.83
477.17	843.78	478.38	843.84	480.47	843.95	481.35	844	484.51	844.33

486.04	844.6	488.46	844.93	489.68	845.09	493.68	846	494.29	846.2
494.98	846.42	497.91	847.36	499.58	847.9	499.91	848	500.92	848.71
502.89	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	191.12	.03	252.95	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
191.12	252.95	58.98	59.59	160.17	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.94	134.225	850	272.544	295.161	850	368.64	379.248	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.36	Reach Len. (ft)	58.98	59.59	160.17
Crit W.S. (ft)		Flow Area (sq ft)	2.83	165.09	1.47
E.G. Slope (ft/ft)	0.002571	Area (sq ft)	2.83	165.09	1.47
Q Total (cfs)	783.60	Flow (cfs)	0.68	781.90	1.02
Top Width (ft)	85.59	Top Width (ft)	15.71	61.83	8.05
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	0.24	4.74	0.69
Max Chl Dpth (ft)	5.93	Hydr. Depth (ft)	0.18	2.67	0.18
Conv. Total (cfs)	15453.0	Conv. (cfs)	13.4	15419.5	20.0
Length Wtd. (ft)	59.65	Wetted Per. (ft)	15.72	63.76	8.06
Min Ch El (ft)	832.43	Shear (lb/sq ft)	0.03	0.42	0.03
Alpha	1.05	Stream Power (lb/ft s)	502.89	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.18	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.06	0.01

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: Dotson Run
REACH: Lower RS: 1000.000

INPUT
Description:
Station Elevation Data num= 110

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	860	1.19	859.53	2.89	858.89	4.84	858.14	5.21	858
6.28	856.98	6.9	856.39	7.31	856	8.77	854.5	9.26	854
10.51	852.72	11.22	852	12.31	850.89	13.19	850	14.65	848.54
15.19	848	16.15	847.04	17.19	846	19.15	844.03	21.19	842
25.44	840.04	25.54	840	37.8	840	38.94	840.15	39.68	840.27
40.66	840.43	45.13	840.48	61	841.19	63.82	840.87	64.15	840.84
64.55	840.82	70.95	840.64	73.32	840.48	75.09	840.31	77.91	840
85.92	839.79	86.56	839.79	87.34	839.78	88.34	839.77	103.53	839.43
106.19	839.41	113.64	839.32	116.82	839.27	175.72	838.28	192.57	838
193.96	838	203.34	836.32	205.17	836	207.3	834.7	207.6	834.52
208.42	834	209.16	833.78	212.27	832.88	212.99	832.67	214.96	832.11
219.01	832.12	220.62	832.16	222.62	833.26	223.93	834	226.75	835.54
227.6	836	231.04	837.8	231.42	838	257.45	838	260.01	838
267.39	838.56	274.15	839.05	277.04	839.31	278.75	839.43	283.42	839.77
283.85	839.8	286.93	840	307.85	840	309.52	839.97	322.35	839.84
324.78	839.85	334.48	840	336.12	840	338.18	840.07	345.88	840.34
348.53	840.43	349.27	840.46	359.54	840.84	359.67	840.84	359.71	840.85
359.82	840.85	368.97	841.64	370.7	841.83	372.28	842	376.71	842.48
378.18	842.65	380.78	842.95	381.52	842.98	381.59	842.99	381.61	842.99
381.66	843	389.58	843.86	390.42	843.9	392.79	844	392.89	844.03
392.98	844.07	395.81	845.13	398.31	846	398.95	846.21	399.61	846.44
402.46	847.35	404.02	848	404.14	848.05	404.23	848.09	408.66	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	192.57	.03	231.42	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.57	231.42	1	1	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
81.865	144.14	850	276.349	308.556	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.38	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.14	Wt. n-Val.		0.030		
W.S. Elev (ft)	837.24	Reach Len. (ft)				
Crit W.S. (ft)	836.94	Flow Area (sq ft)		91.41		
E.G. Slope (ft/ft)	*0.008011	Area (sq ft)		91.41		
Q Total (cfs)	783.60	Flow (cfs)		783.60		
Top Width (ft)	31.76	Top Width (ft)		31.76		
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57		
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		2.88		
Conv. Total (cfs)	8755.0	Conv. (cfs)		8755.0		
Length Wtd. (ft)		Wetted Per. (ft)		33.99		
Min Ch El (ft)	832.11	Shear (lb/sq ft)		1.34		
Alpha	1.00	Stream Power (lb/ft s)	408.66	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)				
C & E Loss (ft)		Cum SA (acres)				

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1569.420

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.29	868	2.82	867.55	4.62	866	5.69	865.11
6.98	864	8.54	862.71	9.4	862	11.33	860.41	11.82	860
13.83	858.34	14.26	858	14.31	857.95	16.72	856	17.4	855.61
20.29	854	22.07	853.37	25.82	852	27.35	851.42	31.16	850
33.04	849.14	34.28	848.58	35.48	848	36.52	847.5	39.71	846
45.72	844.27	46.68	844	52.67	842.57	55.01	842	56.5	841.12
57.49	840.67	58.83	840	59.18	839.81	59.22	839.78	59.23	839.77
59.37	839.78	62.91	839.96	63.12	839.98	63.32	840	64.77	841.18
65.41	841.7	65.77	842	68.12	843.66	68.63	844	81.3	844
88.11	844.2	138.43	845.68	139.23	845.69	140.89	845.7	152.91	846
174.38	846	176.34	846.04	197.51	846.79	201.21	846.77	209.37	846.86
215.87	846.89	217.91	846.91	219.19	846.99	221.67	847	223.81	847
236.26	847.53	237.19	847.6	238.89	847.67	240.87	847.78	242.18	847.84
243.58	847.94	243.91	847.95	244.19	847.97	244.51	847.99	244.68	848
246.28	848.11	246.66	848.14	246.87	848.15	246.94	848.15	247.29	848.15
247.85	848.15	248.91	848.14	250.86	848.14	252.47	848.15	253.1	848.14
259.15	848.39	261.18	848.47	261.74	848.54	264.78	848.76	271.39	849.54
273.3	849.71	275.34	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.72	.03	68.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45.72	68.63	48.43	53.64	36.38	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.55	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.90	Wt. n-Val.		0.030		
W.S. Elev (ft)	843.64	Reach Len. (ft)	48.43	53.64	36.38	
Crit W.S. (ft)	843.51	Flow Area (sq ft)		41.13		
E.G. Slope (ft/ft)	0.010247	Area (sq ft)		41.13		
Q Total (cfs)	313.80	Flow (cfs)		313.80		
Top Width (ft)	19.92	Top Width (ft)		19.92		
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63		
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		2.06		
Conv. Total (cfs)	3099.9	Conv. (cfs)		3099.9		

* Length Wtd. (ft)	*	53.64	* Wetted Per. (ft)	*		*	21.91	*	*
* Min Ch El (ft)	*	839.77	* Shear (lb/sq ft)	*		*	1.20	*	*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	275.34	*	0.00	*	0.00 *
* Frctn Loss (ft)	*	0.49	* Cum Volume (acre-ft)	*	0.05	*	0.82	*	0.48 *
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*	0.07	*	0.26	*	0.24 *

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1515.286

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.7	868	4.29	866.82	5.39	866	7.85	864.16
8.26	863.86	10.73	862	10.98	861.82	13.4	860	13.7	859.78
16.07	858	16.44	857.73	18.74	856	19.19	855.67	21.41	854
22.23	853.39	24.08	852	26.57	851.11	27.6	850.74	29.55	850
31.75	849.36	32.79	849.08	36.69	848	37.86	847.6	42.53	846
43.51	845.63	48.07	844	52.12	842.63	53.97	842	55.86	841.03
57.85	840	57.98	839.91	58.13	839.83	58.24	839.77	63.6	839.93
64.58	839.96	64.6	839.97	64.93	840	65.18	840.15	68.15	842
70.08	842.48	76.59	844	92.4	844	105.95	844	109	844.03
120.13	844.16	121.34	844.19	134.21	844.36	162.04	844.79	162.84	844.8
167.01	844.89	184.4	845.22	185.51	845.27	195.74	845.16	196.88	845.21
202.03	845.47	203.11	845.52	205.28	845.53	208.44	846	208.67	845.93
208.82	845.79	209.01	845.8	225.66	846.25	226.74	846.28	226.75	846.27
226.76	846.27	227.14	846	228.9	844.86	232.65	844.84	237.17	846
239.47	846.1	242.13	846.22	247.09	846.45	276.5	847.83	279.79	847.99
280.07	848	281.49	848	289.57	849.01	294.96	849.63	295.85	849.73
296.45	849.79	298.05	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.07	.03	76.59	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.07	76.59	15.63	15.77	15.95	.1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
135.997	161.893	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	*	844.00	* Element	*	Left OB	*	Channel	*	Right OB *
* Vel Head (ft)	*	0.72	* Wt. n-Val.	*		*	0.030	*	*

W.S. Elev (ft)	843.28	Reach Len. (ft)	15.63	15.77	15.95
Crit W.S. (ft)	843.01	Flow Area (sq ft)		46.03	
E.G. Slope (ft/ft)	0.008292	Area (sq ft)		46.03	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	23.28	Top Width (ft)		23.28	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	3446.1	Conv. (cfs)		3446.1	
Length Wtd. (ft)	15.77	Wetted Per. (ft)		24.77	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	298.05	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.05	0.76	0.48
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	0.23	0.24

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1499.515

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.77	868	3.47	867.49	5.53	866	7.04	864.89
8.25	864	10.64	862.24	10.96	862	11.81	861.37	13.71	860
14.89	859.16	16.5	858	18.71	856.43	19.31	856	19.56	855.83
22.17	854	23.47	853.08	25.01	852	28.27	850.21	28.62	850
30.14	849.56	30.29	849.52	35.54	848	38.38	847.16	42.33	846
47.24	844.38	48.46	844	52.47	842.43	53.6	842	53.98	841.82
54.58	841.55	57.99	840	58.21	839.9	58.52	839.77	61.55	839.87
65.44	839.96	65.46	839.98	65.49	840	66.04	840.31	68.49	842
80.82	843.88	81.31	843.96	81.42	843.97	81.95	844	90.87	844
123.44	844	137.09	843.98	137.15	843.98	138.15	844	138.83	844.01
150.58	844.21	155.86	844.45	158.44	844.52	159.17	844.54	159.74	844.55
160.3	844.56	160.87	844.58	161.85	844.6	163.17	844.63	164.14	844.65
177.96	845.05	178.84	845.08	179.47	845.1	192.68	845.01	193.65	845.03
200.28	845.37	206.94	845.48	209.42	845.85	209.75	845.9	210.1	845.95
210.48	846	210.74	846	210.83	846.04	210.87	846.05	210.88	846.05
210.94	846.05	211.41	846.04	216.93	846.01	218.7	846	219.16	846
227.72	846	228.71	845.98	228.78	846.04	229.01	845.93	229.62	845.53
230.02	845.25	231.73	844.03	231.76	844	233.06	844	238.2	844.96
240.76	845.44	245.28	846	275.26	847.37	279.47	847.51	282.62	847.62
290.68	848	292.69	848	294.39	848.28	302.89	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.46	.03	80.82	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.46	80.82	42.49 35.17	24.56	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
137.655	163.551	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.16	Reach Len. (ft)	42.49	35.17	24.56
Crit W.S. (ft)		Flow Area (sq ft)		46.79	
E.G. Slope (ft/ft)	0.008757	Area (sq ft)		46.79	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	3353.3	Conv. (cfs)		3353.3	
Length Wtd. (ft)	34.73	Wetted Per. (ft)		26.88	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	302.89	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.05	0.75	0.48
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	0.22	0.24

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1464.257

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.37	868	4.34	867.45	6.89	866	8.91	864.85
10.41	864	13.61	862.17	13.87	862	14.09	861.85	16.93	860
19.87	858.03	22.8	856	23.66	855.4	25.66	854	27	853
28.29	852	30.53	850.25	30.85	850	31.67	849.7	36.3	848
42.32	846	42.34	845.99	47.71	844	51.45	842.52	52.66	842
53.84	841.57	58.23	840	58.43	839.93	59.45	839.63	62.17	839.48
64.07	839.39	64.61	839.89	64.76	840	67.25	841.22	68.67	842
69.29	842.06	71.48	842.29	79.51	842.3	85.98	842.47	86.23	842.48
90.38	842.55	91.59	842.57	98.6	842.74	101.61	842.82	104.64	842.86
146.33	844	180.49	844	181.26	844.02	181.89	844.05	190.71	844.37
193.85	844.48	194.8	844.52	195.93	844.57	198.36	844.7	201.82	844.88
204.86	845.05	212.27	845.39	220.97	845.58	229.69	845.62	230.38	845.6
230.41	845.63	230.5	845.58	232.29	844.43	233	844.05	233.12	844
234.98	844	258.59	846	273.8	846.82	285.11	847.43	293.43	848
301.47	849.38	305.3	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	51.45	.03	71.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.45	71.48	39.61	55.52	66.66	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
244.051	265.678	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.93	Reach Len. (ft)	39.61	55.52	66.66
Crit W.S. (ft)	842.93	Flow Area (sq ft)	0.22	43.37	13.80
E.G. Slope (ft/ft)	*0.006947	Area (sq ft)	0.22	43.37	13.80
Q Total (cfs)	313.80	Flow (cfs)	0.09	287.89	25.82
Top Width (ft)	56.95	Top Width (ft)	1.05	20.03	35.87
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	6.64	1.87
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)	0.21	2.17	0.38
Conv. Total (cfs)	3765.0	Conv. (cfs)	1.1	3454.1	309.8
Length Wtd. (ft)	56.10	Wetted Per. (ft)	1.13	21.28	35.88
Min Ch El (ft)	839.39	Shear (lb/sq ft)	0.08	0.88	0.17
Alpha	1.36	Stream Power (lb/ft s)	305.30	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.05	0.71	0.48
C & E Loss (ft)	0.03	Cum SA (acres)	0.07	0.20	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1406.971

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	860	4.53	858	9.03	856.04	9.12	856	9.29	855.93
14.1	854	16.34	853.16	19.41	852	23.95	850.21	24.45	850
25.22	849.7	28.3	848.48	29.53	848	29.56	847.99	35.13	846
36.59	845.34	39.3	844.24	39.9	844	41.26	843.3	43.86	842
44.28	841.92	44.46	841.88	46.89	841.41	48.18	841.11	49.71	840.82
50.96	840.53	53.07	840.02	53.1	840.01	53.15	840	54.85	839.4
57.03	838.55	58.84	838.46	60.45	838.4	61.66	839.32	62.52	840
64.74	841.72	65.12	842	77.22	842.33	84.67	842.54	91.2	842.72
113.53	843.34	115.46	843.39	122.19	843.58	138.27	844	148.44	843.69
155.6	843.66	160.98	843.64	170.68	843.84	174.81	844	204.08	844
204.64	844.13	205.36	844.29	207	844.07	207.27	844.08	208.57	844.34
208.83	844.43	209.84	844.4	220.31	844.29	227.41	844.26	227.81	844.39
228.54	843.97	237.16	844	240.75	844	245.55	844.17	256.7	844.48
264.78	844.62	268.16	844.76	273.32	844.83	275.68	844.85	277.23	844.86
280.08	844.97	282.36	845	284.56	845.07	287.16	845.13	292.69	845.4
302.58	845.98	302.64	845.99	302.87	846	308.23	847.84	308.7	848
313.06	849.51	314.49	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	43.86	.03	65.12	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
43.86	65.12	39.22 38.06	42.21	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
131.644	175.564	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.55	Reach Len. (ft)	39.22	38.06	42.21
Crit W.S. (ft)	842.01	Flow Area (sq ft)	0.30	51.57	5.53
E.G. Slope (ft/ft)	*0.004903	Area (sq ft)	0.30	51.57	5.53
Q Total (cfs)	313.80	Flow (cfs)	0.12	306.69	6.99
Top Width (ft)	42.30	Top Width (ft)	1.10	21.26	19.94
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	5.95	1.26
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)	0.28	2.43	0.28
Conv. Total (cfs)	4481.7	Conv. (cfs)	1.8	4380.1	99.8
Length Wtd. (ft)	39.07	Wetted Per. (ft)	1.23	22.97	19.95
Min Ch El (ft)	838.40	Shear (lb/sq ft)	0.08	0.69	0.08
Alpha	1.16	Stream Power (lb/ft s)	314.49	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.05	0.65	0.47
C & E Loss (ft)	0.14	Cum SA (acres)	0.07	0.18	0.19

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: Unt to Dotson
REACH: Unt to Dotson RS: 1367.937

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.95	858	5.89	857.65	10.34	856	13.92	854.7
15.81	854	19.11	852.81	21.31	852	24.55	850.8	26.72	850
28.34	849.23	30.9	848	31.75	847.54	34.55	846	36.32	845.07
37.61	844.37	38.28	844	44.55	843.12	53.39	842	56.5	841.27
58.43	840.79	61.61	840	68.13	840	69.28	839.37	69.93	838.93
70.79	838.28	71.98	838.27	73.86	838.27	74.84	839.69	75.02	840
75.47	840.58	76.63	842	90.84	842	106	841.43	139.39	840.19
141.31	840.13	145.93	840.11	147.3	840.1	148.6	840.1	150.59	840.1
150.84	840.09	151.14	840.09	151.37	840.09	151.51	840.1	151.65	840.1
178.81	844.27	179.69	844.27	180.54	844.26	182.65	844.25	187.26	844.08
188.35	844.07	199.49	844.02	202.71	844	210.22	843.53	215.55	843.23
216.93	843.45	217.53	843.59	218.43	843.65	218.52	843.66	234.2	843.52
237.2	843.47	237.46	843.48	237.7	843.41	238.13	843.31	238.65	843.14
239.44	842.84	240.92	842.27	241.65	842	241.86	842	242.64	842.05
246.67	842.3	249.49	842.47	250.51	842.48	257.11	842.6	262.1	842.79
282.62	843.36	286.96	843.45	288.37	843.47	289.91	843.48	294.65	843.57
295.81	843.59	301.31	843.71	308.25	843.9	308.5	843.9	311.35	844
317.09	844.64	318.03	844.75	320.42	845.07	326.86	846	330.02	846.85
334.04	847.8	334.85	848	338.19	848.97	339.42	849.29	341.62	849.9
341.95	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	53.39	.03	76.63	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.39 76.63 25.58 34.6 15.59 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
178.81	341.95	844.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138.358	184.172	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.100	0.030	0.035

* W.S. Elev (ft)	*	842.81	* Reach Len. (ft)	*	25.58	*	34.60	*	15.59	*
* Crit W.S. (ft)	*	841.60	* Flow Area (sq ft)	*	2.57	*	63.73	*	92.02	*
* E.G. Slope (ft/ft)	*	0.000854	* Area (sq ft)	*	2.57	*	63.73	*	100.07	*
* Q Total (cfs)	*	313.80	* Flow (cfs)	*	0.61	*	168.24	*	144.95	*
* Top Width (ft)	*	114.52	* Top Width (ft)	*	6.37	*	23.24	*	84.92	*
* Vel Total (ft/s)	*	1.98	* Avg. Vel. (ft/s)	*	0.24	*	2.64	*	1.58	*
* Max Chl Dpth (ft)	*	4.54	* Hydr. Depth (ft)	*	0.40	*	2.74	*	1.49	*
* Conv. Total (cfs)	*	10736.4	* Conv. (cfs)	*	20.7	*	5756.3	*	4959.3	*
* Length Wtd. (ft)	*	28.44	* Wetted Per. (ft)	*	6.42	*	25.88	*	64.34	*
* Min Ch El (ft)	*	838.27	* Shear (lb/sq ft)	*	0.02	*	0.13	*	0.08	*
* Alpha	*	1.24	* Stream Power (lb/ft s)	*	341.95	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.03	* Cum Volume (acre-ft)	*	0.05	*	0.60	*	0.42	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.07	*	0.16	*	0.14	*

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1332.978

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.88	858.14	6.27	858	6.71	857.84	12.18	856
15.58	854.87	18.17	854	21.93	852.65	23.72	852	25.64	851.29
29.24	850	32.16	848.87	34.54	848	38.36	846.65	40.67	845.75
43.75	844.74	45.45	844.19	46.04	844	46.91	843.92	52.17	843.46
53.75	843.38	68.11	842.12	68.55	842.08	68.78	842.06	68.89	842.06
69.33	842	75.99	840.14	76.64	840	77.74	839.66	82.19	838.19
85.65	838.19	86.76	838.17	87.61	838.7	88.56	839.22	90.01	840
92.07	841.46	92.83	842	119.09	842	143.01	842	151.56	842.72
162.98	843.81	164.04	843.9	164.46	843.94	165.05	844	170.56	844
187.25	844.26	189.41	844.27	189.76	844.27	190.25	844.27	191.13	844.26
193.13	844.22	201.67	844.08	202.76	844.05	204.4	844	207.8	843.89
209.87	843.81	212.33	843.72	218.23	843.42	219.04	843.39	226.47	842.92
227.32	842.85	228.08	842.78	229.95	842.68	231.11	842.69	232.69	842.79
233.69	842.9	239.21	842.86	251.28	842.69	252.28	842.75	253.24	842.49
254.89	842.1	255.19	842	265.84	842	286.65	842.6	288.68	842.65
292.29	842.7	296.15	842.75	298.64	842.8	302.02	842.84	305.08	842.92
309.02	843.03	311.43	843.07	316.18	843.24	322.02	843.5	325.11	843.53
330.81	843.86	331.16	843.86	333.54	844	339.66	845.13	343.55	846
344.26	846.17	351.49	848	360.88	850				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.1	68.11	.03	92.83	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.11	92.83	139.54	106	9.38	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
165.052	188.765	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.67	Reach Len. (ft)	139.54	106.00	9.38
Crit W.S. (ft)	841.39	Flow Area (sq ft)	1.71	69.56	51.83
E.G. Slope (ft/ft)	*0.001511	Area (sq ft)	1.71	69.56	51.83
Q Total (cfs)	313.80	Flow (cfs)	0.41	255.45	57.94
Top Width (ft)	126.40	Top Width (ft)	6.24	24.72	95.45
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	0.24	3.67	1.12
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)	0.27	2.81	0.54
Conv. Total (cfs)	8073.9	Conv. (cfs)	10.7	6572.5	1490.7
Length Wtd. (ft)	95.95	Wetted Per. (ft)	6.26	26.40	95.57
Min Ch El (ft)	838.17	Shear (lb/sq ft)	0.03	0.25	0.05
Alpha	1.72	Stream Power (lb/ft s)	360.88	0.00	0.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.05	0.55	0.39
C & E Loss (ft)	0.09	Cum SA (acres)	0.06	0.14	0.11

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.
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: Unt to Dotson
REACH: Unt to Dotson RS: 1222.955

INPUT
Description:
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.88	868	7.59	866	11.29	864	15.02	862
18.84	860	22.69	858	26.63	856	30.72	854	34.82	852
38.92	850	43.02	848	47.74	846	53.04	844	70.44	842
86.13	840	90.07	838	90.44	837.8	90.73	837.62	90.95	837.51
93.1	837.37	93.55	837.34	93.82	837.34	93.92	837.4	94.12	837.53

94.72	838	96.11	838.9	97.69	840	100.73	840.82	104.97	842
111.84	842	115.56	841.92	115.92	841.92	127.01	841.69	128.09	841.67
130.59	841.62	137.24	841.49	144.6	841.34	199.28	840.97	200.66	840.96
204.23	841	207.55	841.03	219.58	840.95	221.55	840.98	223.77	841.01
237.29	841.32	238.13	841.33	240.62	841.36	242.15	841.39	243.79	841.42
252.47	841.48	252.72	841.48	253.1	841.48	270.05	841.53	272.28	841.55
273.55	841.5	282.4	841.99	282.71	842	336.07	842	342.95	842.38
344.02	842.45	344.89	842.51	350.97	842.9	353.94	843.07	355.98	843.2
357.41	843.29	359.21	843.41	368.65	843.94	369.82	844	375.59	845.5
377.1	846	383.41	847.61	384.05	847.77	384.99	848	389.64	848.91
395.73	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	86.13	.03	97.69	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.13	97.69	96.38	92.93	14.43	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
104.97	395.73	842	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.37	Reach Len. (ft)	96.38	92.93	14.43
Crit W.S. (ft)	841.37	Flow Area (sq ft)	7.32	34.25	3.44
E.G. Slope (ft/ft)	*0.008362	Area (sq ft)	7.32	34.25	27.02
Q Total (cfs)	313.80	Flow (cfs)	7.67	295.96	10.17
Top Width (ft)	124.87	Top Width (ft)	10.72	11.56	102.59
Vel Total (ft/s)	6.97	Avg. Vel. (ft/s)	1.05	8.64	2.95
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)	0.68	2.96	0.69
Conv. Total (cfs)	3431.6	Conv. (cfs)	83.9	3236.5	111.2
Length Wtd. (ft)	67.01	Wetted Per. (ft)	10.80	13.00	5.18
Min Ch El (ft)	837.34	Shear (lb/sq ft)	0.35	1.38	0.35
Alpha	1.46	Stream Power (lb/ft s)	395.73	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	0.42	0.38
C & E Loss (ft)	0.32	Cum SA (acres)	0.04	0.09	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may

indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1128.537

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.82	858	5.15	857.34	7.87	856	9.02	855.43
11.91	854	13.96	852.98	15.94	852	18.64	850.66	19.97	850
23.16	848.41	23.99	848	24.8	847.64	28.53	846	29.16	845.73
33.19	844	33.3	843.99	34.17	843.88	39.82	843.23	49.17	842.15
50.56	842	63.79	840.54	68.71	840	71.35	838.02	71.38	838
71.46	837.97	73.22	837.28	74.18	836.91	74.98	836.73	76.21	836.57
81.66	837.47	84.51	838	85.03	838.2	86.13	838.86	87.33	839.52
88	840	116.55	840	143.04	840	149.01	839.95	149.24	839.95
151.71	839.97	151.87	839.97	155.1	839.98	155.15	839.98	160.09	840
174.23	840	177.87	839.95	177.92	839.95	184.19	839.86	189.92	839.76
193.68	839.85	199.64	839.8	215.13	839.79	221.66	839.9	224.62	839.9
228.2	839.89	239.11	839.96	240.05	840.12	240.52	840.08	258.33	840.57
261.05	840.65	261.99	840.68	262.65	840.7	262.7	840.7	262.71	840.7
262.72	840.7	262.74	840.7	262.77	840.7	262.82	840.69	262.88	840.69
262.95	840.69	263.01	840.69	263.32	840.68	271.64	840.43	299.17	840.97
312.76	841.23	350.43	842	350.64	842	376.13	843.15	384.46	843.55
393.91	844	398.12	845.53	399.43	846	406	848	410.95	848.95
416.25	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.71	.03	88	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
68.71 88 27.18 113.77 5.27 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
327.49	367.363	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.43	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.030	0.035	
W.S. Elev (ft)	841.41	Reach Len. (ft)	27.18	113.77	5.27	
Crit W.S. (ft)		Flow Area (sq ft)	9.09	70.18	280.33	
E.G. Slope (ft/ft)	0.000216	Area (sq ft)	9.09	70.18	280.33	
Q Total (cfs)	313.80	Flow (cfs)	1.57	114.75	197.48	
Top Width (ft)	265.89	Top Width (ft)	12.84	19.29	233.76	
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.17	1.64	0.70	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	0.71	3.64	1.20	
Conv. Total (cfs)	21343.2	Conv. (cfs)	106.8	7804.5	13431.9	
Length Wtd. (ft)	42.29	Wetted Per. (ft)	12.92	20.86	233.80	
Min Ch El (ft)	836.57	Shear (lb/sq ft)	0.01	0.05	0.02	
Alpha	1.69	Stream Power (lb/ft s)	416.25	0.00	0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.02	0.31	0.33	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.06	0.03	

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: Unt to Dotson
REACH: Unt to Dotson RS: 1014.243

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.8	858	11.73	856	17.38	854	22.62	852
27.64	850	32.59	848	40.38	846	50.7	844	87.79	842
112.75	840	119.16	839.33	121.01	838	126.48	836	128.03	835.43
134.3	835.52	135.49	836	140.05	838	143.75	840	146.3	840.65
167.47	840.43	173.05	840	206.14	838.48	236.67	839.61	291.6	838.79
324.11	839.36	362.07	840	379.89	840.61	406.57	840.33	432	842
509.35	844	514.12	846	520.25	848	528.65	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	119.16	.03	146.3	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
119.16 146.3 1 1 1 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev

432 487.76 850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.42	Reach Len. (ft)	24.28	24.28	24.28
Crit W.S. (ft)		Flow Area (sq ft)	23.83	114.03	488.49
E.G. Slope (ft/ft)	0.000049	Area (sq ft)	23.83	114.03	488.49
Q Total (cfs)	313.80	Flow (cfs)	2.46	98.60	212.74
Top Width (ft)	328.14	Top Width (ft)	24.13	27.14	276.87
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)	0.10	0.86	0.44
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)	0.99	4.20	1.76
Conv. Total (cfs)	44651.1	Conv. (cfs)	350.3	14029.9	30270.9
Length Wtd. (ft)	24.28	Wetted Per. (ft)	24.22	29.12	277.01
Min Ch El (ft)	835.43	Shear (lb/sq ft)	0.00	0.01	0.01
Alpha	1.45	Stream Power (lb/ft s)	528.65	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	0.07	0.28
C & E Loss (ft)	0.00	Cum SA (acres)			

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Ex. Rev.

River: Dotson Run Reach: Dotson Run RS: 3183.868 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 3053.784 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2888.080 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used

critical depth
for the water surface and continued on with the calculations.
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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2799.743 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2705.342 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2656.729 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2410.917 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2333.304 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2270.249 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2088.858 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 1943.117 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1929.28 Profile: PF 1 Culv: Culvert #2
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height
of the culvert.
River: Dotson Run Reach: Dotson Run RS: 1915.038 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1878.276 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1683.45 Profile: PF 1 Culv: Culvert #1
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
River: Dotson Run Reach: Dotson Run RS: 1487.336 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1453.111 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1430.579 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1390.627 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Lower RS: 1370.77 Profile: PF 1 Upstream
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, water surface was
used.

River: Dotson Run Reach: Lower RS: 1370.77 Profile: PF 1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Dotson Run Reach: Lower RS: 1344.212 Profile: PF 1
Warning:Divided flow computed for this cross-section.
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, water surface was used.
River: Dotson Run Reach: Lower RS: 1271.523 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Dotson Run Reach: Lower RS: 1182.267 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1130.779 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1059.794 Profile: PF 1
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: Unt to Dotson Reach: Unt to Dotson RS: 1464.257 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Unt to Dotson Reach: Unt to Dotson RS: 1406.971 Profile: PF 1

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: Unt to Dotson Reach: Unt to Dotson RS: 1367.937 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Dotson Reach: Unt to Dotson RS: 1332.978 Profile: PF 1
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.
River: Unt to Dotson Reach: Unt to Dotson RS: 1222.955 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Dotson Reach: Unt to Dotson RS: 1128.537 Profile: PF 1
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.

Supplement 4

HEC-RAS Analysis –Proposed Conditions Summary w/ Cross Sections

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

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

****

PROJECT DATA
Project Title: Dotson Revised
Project File : DotsonRevised.prj
Run Date and Time: 2/10/2014 3:18:27 PM

Project in English units

****

PLAN DATA

Plan Title: Proposed Culverts
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.p03

Geometry Title: Proposed 8' Culvert
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.g03

Flow Title : Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.f01

Plan Summary Information:

Number of:	Cross Sections	= 40	Multiple Openings	=	0
	Culverts	= 3	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: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Dotson Run	Dotson Run	3183.868*	505.7
Dotson Run	Lower	1430.579*	783.6
Dotson Run	Lower	1390.627*	783.6
Unt to Dotson	Unt to Dotson	1569.420*	313.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Dotson Run	Lower	PF 1		Normal S = 0.008

****

GEOMETRY DATA

Geometry Title: Proposed 8' Culvert
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain Revised 2-6-14\Floodplain\DotsonRevised.g03

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Dotson Run	Dotson Run		1
Dotson Run	Lower	1	
Unt to Dotson	Unt to Dotson		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
Dotson Run	Dotson Run	to Dotson Run	Lower	22.53	
Unt to Dotson	Unt to Dotson	to Dotson Run	Lower	24.28	

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 3183.868

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.94	3.39	870.03	3.5	870	4.02	869.82	5.08	869.43
7.69	868.48	8.28	868.26	8.94	868	9.35	867.83	13.36	866
14.07	865.7	17.82	864	22.76	862.47	23.91	862	29.87	861.65
43.53	860.85	49.77	860.52	59.69	860	78.51	858.78	90.5	858
104.73	857.6	125.59	857.11	135.27	856.92	139.09	856.86	141.91	856.83
147.03	856.66	150.64	856.61	157.64	856.32	165.53	856	165.63	856
166.21	855.78	166.86	855.55	169.9	854.49	171.29	854	171.33	853.99
174.63	853.28	181.68	853.16	184.76	853.07	185.09	853.33	185.54	853.69
185.95	854	186.28	854.28	188.75	856	190.49	857.32	191.42	858
193.73	859.79	194.01	860	194.2	860.16	196.56	862	198.3	863.11
199.67	864	201.55	865.07	203.22	866	205.41	867.25	206.23	867.72
206.72	868	208.54	868.82	211.17	870	212.81	870.53	217.49	872
220.61	873	223.77	874	226.98	875.14	229.42	876	232.77	877.45
234.07	878	238.84	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	165.53	.03	188.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
165.53	188.75	137.71	129.12	122.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	857.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	856.48	Reach Len. (ft)	137.71	129.12	122.82
Crit W.S. (ft)	856.48	Flow Area (sq ft)	2.88	58.96	0.15
E.G. Slope (ft/ft)	0.009180	Area (sq ft)	2.88	58.96	0.15
Q Total (cfs)	505.70	Flow (cfs)	4.55	501.08	0.07
Top Width (ft)	35.69	Top Width (ft)	11.84	23.22	0.64

* Vel Total (ft/s)	*	8.16	* Avg. Vel. (ft/s)	*	1.58	*	8.50	*	0.47	*
* Max Chl Dpth (ft)	*	3.41	* Hydr. Depth (ft)	*	0.24	*	2.54	*	0.24	*
* Conv. Total (cfs)	*	5278.1	* Conv. (cfs)	*	47.5	*	5229.8	*	0.8	*
* Length Wtd. (ft)	*	129.58	* Wetted Per. (ft)	*	11.85	*	24.61	*	0.80	*
* Min Ch El (ft)	*	853.07	* Shear (lb/sq ft)	*	0.14	*	1.37	*	0.11	*
* Alpha	*	1.08	* Stream Power (lb/ft s)	*	238.84	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	1.04	* Cum Volume (acre-ft)	*	0.22	*	2.74	*	0.26	*
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*	0.41	*	0.98	*	0.17	*

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 3053.784

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.91	11.74	864.13	11.92	864	12.19	863.79	14.39	862
16.8	860.6	17.83	860	30.38	858.46	38.03	858	38.99	857.98
56.06	857.78	63.03	857.74	66.8	857.7	73.25	857.58	78.67	857.44
84.53	857.3	117.17	856	123.08	856	130.84	855.62	141.38	855.1
146.8	854.77	159.88	854	165.16	852.16	165.64	852.01	165.78	852.21
171.69	851.89	174.3	851.73	174.43	851.97	174.97	852.23	178.57	854
181.54	855.73	182.03	856	183.37	856.85	184.59	857.66	185.06	858
186.95	859.26	187.96	860	188.72	860.57	190.81	862	192.67	863.24
192.9	863.39	193.73	864	194.65	864.68	196.65	866	199.02	867.56
199.73	868	201.84	869.23	203.15	870	205.65	871.48	206.52	872
207.3	872.29	211.65	874	211.87	874.07	217.76	876	220.06	876.8
223.57	878	225.42	878.64	229.37	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	159.88	.03	178.57	.1

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

159.88 178.57 175.37 163.58 152.04 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	856.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	855.45	Reach Len. (ft)	175.37	163.58	152.04
Crit W.S. (ft)	855.45	Flow Area (sq ft)	18.03	54.92	1.81
E.G. Slope (ft/ft)	*0.007099	Area (sq ft)	18.03	54.92	1.81
Q Total (cfs)	505.70	Flow (cfs)	50.92	453.12	1.66
Top Width (ft)	46.83	Top Width (ft)	25.64	18.69	2.49
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)	2.82	8.25	0.92
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	0.70	2.94	0.73
Conv. Total (cfs)	6002.1	Conv. (cfs)	604.4	5378.0	19.7
Length Wtd. (ft)	164.27	Wetted Per. (ft)	25.69	19.76	2.89
Min Ch El (ft)	851.73	Shear (lb/sq ft)	0.31	1.23	0.28
Alpha	1.35	Stream Power (lb/ft s)	229.37	0.00	0.00
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	0.19	2.57	0.26
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.92	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2888.080

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.88	6.02	866.79	6.1	866.79	7.29	866.67	7.42	866.65
8.14	866.54	11.84	866	12.27	866	13.57	865.81	16.86	865.46
19.28	865.2	24.25	864.66	28.51	864.3	32.27	864	33.44	863.87
36.41	863.6	39.16	863.44	41.98	863.32	47.64	862.57	49.07	862.49
51.26	862.22	51.76	862.19	53.3	862	53.4	861.99	53.43	861.98
55.04	861.67	56.18	861.53	57.63	861.54	58.23	861.36	58.86	861.33
61.67	860.59	63.7	860	67.31	858	69.41	856	70.92	855.59
91.84	855.33	111.12	855.09	120.56	854.68	124.92	854.6	126	854.56

126.58	854.54	136.38	854	136.65	853.96	146.77	852.53	149.08	852.2
150.3	852	150.7	851.73	153.26	850	153.35	849.91	154.42	849.01
159.34	849.33	160.42	849.43	161.56	849.81	161.93	850	163.58	850.48
168.7	852	172.6	852.84	177.23	854	179.35	854.32	182.36	854.77
189.85	856	191.95	857.34	193.05	858	194.81	858.99	196.49	860
197.2	860.46	199.93	862	202.41	863.86	202.6	864	202.94	864.26
205.09	865.9	205.22	866	205.29	866.05	205.56	866.26	207.84	868
208.09	868.1	213.52	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	150.3	.03	168.7	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150.3	168.7	81.7	84.14	75.97	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
22.2	94.176	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	854.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	853.19	Reach Len. (ft)	81.70	84.14	75.97
Crit W.S. (ft)	853.19	Flow Area (sq ft)	4.75	54.73	3.23
E.G. Slope (ft/ft)	0.008412	Area (sq ft)	4.75	54.73	3.23
Q Total (cfs)	505.70	Flow (cfs)	12.77	489.81	3.12
Top Width (ft)	31.86	Top Width (ft)	8.17	18.40	5.28
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	2.69	8.95	0.97
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	0.58	2.97	0.61
Conv. Total (cfs)	5513.6	Conv. (cfs)	139.3	5340.3	34.0
Length Wtd. (ft)	83.98	Wetted Per. (ft)	8.26	19.79	5.41
Min Ch El (ft)	849.01	Shear (lb/sq ft)	0.30	1.45	0.31
Alpha	1.20	Stream Power (lb/ft s)	213.52	0.00	0.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.15	2.37	0.25
C & E Loss (ft)	0.16	Cum SA (acres)	0.29	0.85	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2799.743

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.92	1.71	866.54	3.7	866.08	4.04	866	4.89	865.82
7.32	865.51	15.26	864.33	20.48	864	21.81	863.91	22.44	863.85
26.79	863.44	30.46	863.02	38.41	862	53.51	860	55.88	859.58
58.71	859.06	65.42	858	67.07	857.54	69.92	856.69	73.2	856.15
74.3	856	76.92	854.7	77.79	853.95	77.81	853.94	77.85	853.95
77.89	854	78.33	854	80.18	854.17	80.84	854.24	84.42	854.52
87.66	854.68	88.78	854.69	91.66	854.66	94.89	854.46	95.9	854.3
99.55	854.08	100.69	854	102.96	853.74	109.23	853	109.29	853.01
109.32	853.01	109.33	853	119.33	852.55	119.49	852.54	119.85	852.49
119.87	852.49	124.29	852.62	124.74	852.62	125.38	852.57	127.1	852.88
128.36	852.85	129.49	853.03	133.16	853.18	134.16	853.32	134.99	853.45
135.7	853.57	137.02	853.49	138.36	853.6	139.62	853.61	141.06	853.49
141.7	853.48	142.35	853.46	143.09	853.43	143.99	853.38	144.93	853.32
145.74	853.27	147.72	853.12	149.67	852.97	151.88	852.82	153.4	852.67
157.34	852.45	162.4	852.18	165.34	852	166.48	852	166.53	851.99
168.01	851.75	168.66	851.66	170.44	851.33	171.53	851.17	172.89	850.85
175.23	850.48	177.82	850	179.06	849.68	180.54	849.2	181.17	848.9
182.41	848.36	194.25	848.85	195.56	848.93	196.47	849.07	196.92	849.16
200.17	850	200.73	850.17	206.47	852	208.38	852.59	210.52	853.57
211.43	854	211.86	854.16	213.44	854.71	217.1	856	218.71	857.46
219.35	858	221.34	859.82	221.55	860	223.65	861.93	223.73	862
223.85	862.08	224.13	862.35	225.46	863.58	225.89	864	227.14	864.93
228.69	866	230.61	867.32	231.59	868	234.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	177.82	.03	200.73	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
177.82	200.73	62.16	24.26	28.56	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
26.211	98.77	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 852.68	* Element	* Left OB	* Channel	* Right OB *

Vel Head (ft)	0.66	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	852.03	Reach Len. (ft)	62.16	24.26	28.56
Crit W.S. (ft)		Flow Area (sq ft)	11.45	70.31	5.40
E.G. Slope (ft/ft)	0.004229	Area (sq ft)	11.45	70.31	5.40
Q Total (cfs)	505.70	Flow (cfs)	28.93	471.97	4.80
Top Width (ft)	41.62	Top Width (ft)	12.89	22.91	5.82
Vel Total (ft/s)	5.80	Avg. Vel. (ft/s)	2.53	6.71	0.89
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)	0.89	3.07	0.93
Conv. Total (cfs)	7776.7	Conv. (cfs)	444.9	7258.0	73.8
Length Wtd. (ft)	25.36	Wetted Per. (ft)	13.07	23.37	6.11
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.23	0.79	0.23
Alpha	1.26	Stream Power (lb/ft s)	234.54	0.00	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.13	2.25	0.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.27	0.81	0.14

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: Dotson Run
REACH: Dotson Run RS: 2775.485

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.1	.3	867.06	.56	867.02	1.24	866.94	3.89	866.68
5.58	866.45	7.65	866.21	8.24	866.14	9.41	866	9.96	866
17.45	864.41	19.81	864	20.63	864	23.9	863.56	24.45	863.48
27.08	863.08	29.82	862.76	33.42	862	36.03	862	36.44	861.97
44.32	860.46	46.67	860	48.74	860	50.15	859.89	50.47	859.89
53.7	859.68	54.15	859.68	59.39	859.46	82.23	858	93.95	857.07
107.25	856	109.01	855.88	123.01	854.91	136.3	854	144.49	853.66
152	853.34	168.93	852.64	174.31	852.42	176.91	852.32	177.31	852.3
182.92	852	184.97	851.57	194.73	850	196.29	849	197.6	848.36
201.08	848.62	207.34	848.72	214.15	849.75	215.1	850	215.96	850
216.7	850.25	217.36	850.55	220.42	852	223.09	853.46	224.1	854
225.7	854.87	226.56	855.36	227.66	856	228.78	857.01	229.9	858
232.45	859.96	232.5	860	232.52	860.02	232.69	860.15	234.98	862
236.14	862.98	237.35	864	239.68	865.95	239.75	866	241.46	867.38
242.24	868	246.26	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	182.92	.03	220.42	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
182.92 220.42 82.66 67.68 48.19 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
42.1	80.895	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.030	
W.S. Elev (ft)	851.74	Reach Len. (ft)	82.66	67.68	48.19
Crit W.S. (ft)	851.54	Flow Area (sq ft)		71.16	
E.G. Slope (ft/ft)	*0.008530	Area (sq ft)		71.16	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	35.68	Top Width (ft)		35.68	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	5475.4	Conv. (cfs)		5475.4	
Length Wtd. (ft)	67.68	Wetted Per. (ft)		36.76	
Min Ch El (ft)	848.36	Shear (lb/sq ft)		1.03	
Alpha	1.00	Stream Power (lb/ft s)	246.26	0.00	0.00
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.12	2.21	0.24
C & E Loss (ft)	0.03	Cum SA (acres)	0.26	0.80	0.14

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2705.342

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.8	3.16	869.54	14.31	868.41	15.21	868.39	16.74	868.28
20.63	868	22.62	867.21	25.65	866	27.2	865.28	29.71	864.12
29.87	864.05	29.98	864	30.45	863.82	35.8	862	42.28	862
54.7	860.2	57.24	860	76.85	860	95.81	858.47	98.48	858.41
99.1	858.39	99.63	858.35	101.48	858.15	104.98	858.1	106	858
107.86	857.84	112.43	857.42	117.75	856.62	119.6	856.39	120.92	856.27
122.8	856	129.81	855.46	134.78	855.15	142.68	854	145.41	854
146.4	853.92	153.02	853.7	158.99	853.54	185.73	852.35	187.06	852.33
188.4	852.31	191.41	852	191.43	852	194.49	852	199.97	851.01
205.99	850	210.22	848.14	210.53	848	210.63	847.95	211.34	847.62
211.57	847.52	217.01	847.3	222.24	847.42	223.03	847.9	223.21	848
224.35	848.43	225.37	848.98	227.41	850	229.53	850.47	235.93	852
236.43	852.09	239.9	852.67	242.9	853.25	246.76	854	250.47	855.73
251.17	856	252.52	856.74	254.39	858	256.28	859.28	257.78	860
259.64	860.82	262.28	862	263.1	862.47	264.12	863.12	265.36	864

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  266.71  864.69  268.38  865.34  269.97     866  271.85  866.78  274.52     868
  277.75  869.36   279.2     870

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .035  194.49     .03  235.93      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        194.49  235.93             27.35   47.59   60.55             .1       .3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
  69.324  100.13     865 177.199 198.178     860

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         *  851.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.             *          *    0.030 *          *
* W.S. Elev (ft)         *  850.79  * Reach Len. (ft)        *   27.35  *   47.59  *   60.55  *
* Crit W.S. (ft)         *  850.79  * Flow Area (sq ft)      *          *   61.42  *          *
* E.G. Slope (ft/ft)     *0.011030  * Area (sq ft)           *          *   61.42  *          *
* Q Total (cfs)          *  505.70  * Flow (cfs)             *          *  505.70  *          *
* Top Width (ft)         *   29.54  * Top Width (ft)         *          *   29.54  *          *
* Vel Total (ft/s)       *    8.23  * Avg. Vel. (ft/s)       *          *    8.23  *          *
* Max Chl Dpth (ft)      *    3.49  * Hydr. Depth (ft)       *          *    2.08  *          *
* Conv. Total (cfs)      *  4815.0  * Conv. (cfs)            *          *  4815.0  *          *
* Length Wtd. (ft)       *   47.59  * Wetted Per. (ft)       *          *   30.85  *          *
* Min Ch El (ft)         *  847.30  * Shear (lb/sq ft)       *          *    1.37  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *  279.20  *    0.00  *    0.00  *
* Frctn Loss (ft)        *    0.52  * Cum Volume (acre-ft)   *    0.12  *    2.11  *    0.24  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    0.26  *    0.75  *    0.14  *
*************************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical
depth
         for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated water
         surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
program
         defaulted to critical depth.

CROSS SECTION


RIVER: Dotson Run
REACH: Dotson Run          RS: 2656.729

INPUT
Description:
Station Elevation Data     num=      86
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.23	7.65	869.96	7.97	869.94	8.3	869.92	11.84	869.92
12.14	869.91	12.46	869.89	23.56	869.07	32.05	869.78	32.41	870
32.91	870	34.89	869.85	40.03	869.49	40.94	869.32	50.35	868
50.44	868	59.03	866.24	60.14	866	62.05	865.54	68.88	864
74.5	862.68	76.78	862.15	77.46	862	85.23	860	87.89	859.3
90.43	858.69	93.28	858	104.91	856	116.45	855.08	122.11	854.67
123.09	854.62	128.58	854.1	128.7	854.09	129.52	854	133.88	853.6
153.28	853.19	155.19	853.04	155.25	853.04	156.16	853.07	156.19	853.08
156.31	853.07	157.61	853.02	169.34	852.58	169.58	852.58	169.86	852.56
170.88	852.36	171.71	852.34	178.23	852	206.08	850.73	208.01	850.64
214.45	850.4	219.38	850	224.2	848.07	224.36	848	225.47	847.42
232.25	847.25	235.27	847.15	237.09	847.13	239.3	847.05	239.85	847.3
240.37	847.42	241.43	847.72	242.31	848	243.49	848.6	244.76	849.28
246.02	850	248.24	851.63	248.78	852	251.47	852.87	255.14	854
257.21	854.91	259.59	856	260.79	857.1	261.03	857.31	261.81	858
262.86	858.94	264.03	860	265.56	861.35	266.29	862	268.21	863.69
268.55	864	270.44	865.6	270.84	866	271.23	866.41	272.71	868
274.77	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.38	.03	246.02	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.38	246.02	92	68.22	65.11	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.665	124.429	870	178.349	204.346	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	850.09	Reach Len. (ft)	92.00	68.22	65.11
Crit W.S. (ft)	850.09	Flow Area (sq ft)	0.05	59.37	0.01
E.G. Slope (ft/ft)	0.010767	Area (sq ft)	0.05	59.37	0.01
Q Total (cfs)	505.70	Flow (cfs)	0.03	505.67	0.00
Top Width (ft)	27.93	Top Width (ft)	1.16	26.64	0.13
Vel Total (ft/s)	8.51	Avg. Vel. (ft/s)	0.57	8.52	0.17
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.05	2.23	0.05
Conv. Total (cfs)	4873.6	Conv. (cfs)	0.3	4873.3	0.0
Length Wtd. (ft)	68.39	Wetted Per. (ft)	1.17	27.83	0.16
Min Ch El (ft)	847.05	Shear (lb/sq ft)	0.03	1.43	0.03
Alpha	1.00	Stream Power (lb/ft s)	274.77	0.00	0.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.12	2.04	0.24
C & E Loss (ft)	0.08	Cum SA (acres)	0.26	0.72	0.14

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2586.252

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	875.18	.94	875.01	7.34	874	14.24	872.22	15.06	872
17.23	871.05	19.61	870	20.6	868.85	21.11	868.23	21.35	868
21.76	867.55	22.5	866.7	23.01	866	23.85	865.55	27.32	864
27.82	863.79	29.24	863.18	32.07	862	33.49	862	34.84	862.14
49.65	863.14	49.87	863.11	50.91	863.49	51.61	864	54.7	864
56.07	864.04	61.14	864.06	64.87	864.03	68.62	864.03	72.78	864.02
74.16	864	74.52	863.94	74.98	863.84	78.55	863.07	79.73	862.8
83.32	862	83.5	861.94	86.72	860.85	89.57	860	89.85	859.9
94.09	858.36	95.01	858.03	95.08	858	95.86	857.85	105.95	856
108.17	855.88	109.56	855.8	124.79	854.98	133.75	854.34	136.12	854.21
136.61	854.19	137.63	854.09	137.68	854.09	138.12	854.06	139	854
143.53	854	148.16	853.7	150.83	853.51	152.1	853.42	154.24	853.27
159.09	852.9	170.6	852	172.4	851.88	174.75	851.76	176.41	851.67
188.77	850.96	192.92	850.72	195.03	850.59	209.29	850	220.54	849.46
227.17	849.14	234.28	848.57	241.49	848	242.28	847.64	246.2	846.3
251.61	845.94	254.62	845.84	254.79	845.83	262.62	848	263.33	848.63
264.86	850	266.95	851.96	267.23	852.2	269.32	854	270.15	854.53
272.43	856	273.7	856.72	276.03	858	276.96	858.59	278.96	860
279.36	860.29	280.01	860.76	281.75	862	284.35	863.77	284.66	864
285.7	864.69	287.8	866	289.16	866.9	290.93	868	294.06	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	234.28	.03	263.33	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
234.28 263.33 52.67 46.71 56.22 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
97.61	170.13	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.34	Reach Len. (ft)	52.67	46.71	56.22
Crit W.S. (ft)	849.21	Flow Area (sq ft)	3.82	66.12	0.28
E.G. Slope (ft/ft)	0.008050	Area (sq ft)	3.82	66.12	0.28
Q Total (cfs)	505.70	Flow (cfs)	7.11	498.43	0.15
Top Width (ft)	41.02	Top Width (ft)	11.18	29.05	0.79
Vel Total (ft/s)	7.20	Avg. Vel. (ft/s)	1.86	7.54	0.55
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)	0.34	2.28	0.35
Conv. Total (cfs)	5636.4	Conv. (cfs)	79.3	5555.4	1.7
Length Wtd. (ft)	46.91	Wetted Per. (ft)	11.21	29.92	1.06
Min Ch El (ft)	845.83	Shear (lb/sq ft)	0.17	1.11	0.13
Alpha	1.08	Stream Power (lb/ft s)	294.06	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.12	1.94	0.24
C & E Loss (ft)	0.00	Cum SA (acres)	0.24	0.67	0.14

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2539.448

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.37	3.52	878.5	5.19	878	9.98	876.6	12.01	876
24.51	876	24.59	875.96	27.56	874	30.58	872.05	30.65	872
30.71	871.94	30.75	871.9	30.82	871.82	32.09	870	32.17	869.89
34.35	866.49	34.59	866	35.65	864.08	35.69	864	35.98	863.83
39.35	862	39.76	861.86	44.59	860	48.68	860	49.15	859.99
58.98	859.72	69.03	859.64	69.29	859.76	72.88	860.29	74.14	860.08
80.84	859.71	81.74	859.84	81.88	859.79	82.46	859.97	82.52	860
83.73	859.89	84.23	859.84	88.15	858.14	90.33	858	93.99	858
100.28	857.14	101.04	856.72	102.49	856.04	102.59	856	108.52	856
124.3	855.08	129.93	854.86	130.38	854.85	130.59	854.84	140.5	854.38
156.27	854.39	164.55	854.44	165.61	854.45	168.69	854.36	180.46	854.18
180.5	854.18	180.59	854.14	180.9	854	183.76	852.7	185.33	852
194.57	850.2	195.84	850	199.04	850	232.19	848.66	243.29	848.22
248.45	848	250.73	847.38	255.51	846	255.59	846.04	256.05	845.9
260.5	845.66	266.68	845.18	267.41	845.75	267.64	846	268.31	846.43
271.32	848	272.72	849.09	273.94	850	276.12	851.69	277.1	852.47
279.16	854	280.54	854.81	282.68	856	283.61	856.53	285.76	857.7
285.92	857.8	286.2	858	286.53	858.25	289.06	860	289.48	860.31

291.92	862	292.5	862.51	293.66	863.53	294.25	864	295.46	865
296.62	866	298.44	867.48	299.05	868	301.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.45	.03	271.32	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.45	271.32	37.06	57.38	52.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
111.785	193.476	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.86	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.87	Wt. n-Val.	0.035	0.030	0.100	
W.S. Elev (ft)	849.00	Reach Len. (ft)	37.06	57.38	52.68	
Crit W.S. (ft)	848.89	Flow Area (sq ft)	12.17	62.58	0.64	
E.G. Slope (ft/ft)	*0.006658	Area (sq ft)	12.17	62.58	0.64	
Q Total (cfs)	505.70	Flow (cfs)	26.34	478.94	0.42	
Top Width (ft)	48.75	Top Width (ft)	24.60	22.87	1.28	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)	2.17	7.65	0.65	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	0.49	2.74	0.50	
Conv. Total (cfs)	6197.3	Conv. (cfs)	322.8	5869.4	5.1	
Length Wtd. (ft)	56.74	Wetted Per. (ft)	24.62	24.02	1.62	
Min Ch El (ft)	845.18	Shear (lb/sq ft)	0.21	1.08	0.16	
Alpha	1.24	Stream Power (lb/ft s)	301.54	0.00	0.00	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.11	1.87	0.24	
C & E Loss (ft)	0.04	Cum SA (acres)	0.22	0.64	0.14	

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2481.906

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.33	879.3	4.2	878	5.73	877.27	8.32	876
10.69	874.82	11.95	874.18	12.26	874	12.39	873.83	12.83	873.18
13.5	872	14.19	870.99	14.79	870	15.73	868.65	16.13	868
17.3	866.36	17.53	866	18.89	864.11	18.95	864	19.02	863.93
20.69	862	22.08	861.53	26.18	860	30.36	859.38	33.21	859.39
42.26	859.15	59.7	859.16	61.85	858.9	61.89	858.9	62.04	858.87
62.99	858.7	66.59	858	67.28	857.85	67.7	857.79	74.72	856.57

76.33	856.36	77.68	856.24	79.05	856	84.18	854.7	85.22	854.42
87.93	854	88.41	853.98	94.1	853.78	103.56	853.15	105.57	853.06
118.81	852.75	118.97	852.74	119.5	852.75	134.17	852.4	136.62	852.42
137.67	852.42	139.77	852.4	141.64	852.36	152.25	852.1	154.87	852.03
155.51	852	155.77	852	160.72	851.87	165.32	851.68	166.09	851.65
174.44	851.13	178.35	850.93	182.87	850.8	184.71	850.71	186.94	850.66
190.85	850.51	193.06	850.3	195.33	850.15	196.55	850	203.31	849.66
204.16	849.6	210.26	849.28	212.68	849.16	214.18	849.07	226.98	848
231.68	846.23	232.28	846	233.74	845.44	234.45	845.16	243.88	844.82
244.85	844.8	245	844.87	245.36	845.02	247.78	846	248.87	846.56
251.6	848	253.15	848.93	254.92	850	256.79	851.18	258.15	852
259.9	853.08	261.42	854	264.44	855.72	264.91	856	267.09	857.16
267.28	857.27	268.5	858	269.12	858.43	271.49	860	272.21	860.51
274.42	862	274.93	862.45	277.59	864.66	279.12	865.9	279.23	866
279.37	866.11	281.68	868	282.01	868.27	284.14	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	226.98	.03	251.6	.1

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

226.98	251.6		87.12	70.98	70.07	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.453	119.546	870	127.365	138.768	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.76	Reach Len. (ft)	87.12	70.98	70.07
Crit W.S. (ft)		Flow Area (sq ft)	3.45	72.16	0.48
E.G. Slope (ft/ft)	*0.004986	Area (sq ft)	3.45	72.16	0.48
Q Total (cfs)	505.70	Flow (cfs)	5.42	500.04	0.24
Top Width (ft)	34.98	Top Width (ft)	9.09	24.62	1.27
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)	1.57	6.93	0.50
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)	0.38	2.93	0.38
Conv. Total (cfs)	7161.6	Conv. (cfs)	76.7	7081.5	3.4
Length Wtd. (ft)	71.10	Wetted Per. (ft)	9.12	25.88	1.48
Min Ch El (ft)	844.80	Shear (lb/sq ft)	0.12	0.87	0.10
Alpha	1.08	Stream Power (lb/ft s)	284.14	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.10	1.78	0.24
C & E Loss (ft)	0.07	Cum SA (acres)	0.21	0.61	0.14

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2410.917

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.1	878.15	3.35	878	4.35	877.45	5.72	876
6.51	874.96	7.35	874	8.26	872.79	8.84	872	10.09	870.42
10.4	870	11.83	868.18	11.97	868	12.6	867.32	13.33	866.64
13.75	866.25	14.08	866	14.55	865.72	17.87	864	18.99	863.44
21.6	862	24	860.71	25.4	860	26.99	857.6	27.58	856.59
28.74	857.79	29.02	858	30.31	857.71	36.91	856.17	39.64	857.82
39.88	858	40.04	857.97	40.44	857.06	41.27	857.85	51.38	857.97
51.83	857.97	53.07	858	59.64	857.52	59.73	857.51	59.83	857.5
59.89	857.48	65.64	856	67.34	855.34	70.04	854	72.23	852.94
74.91	852	76.06	852	84.43	851.7	94.56	851.39	100.04	851.21
110.69	850.88	116.53	850.71	123.51	850.49	128.22	850.39	133.32	850.26
133.96	850.24	142.62	850.07	142.68	850.07	149.53	850.01	153.5	850
158.66	850	160.71	849.99	174.5	849.99	180.98	850	187.1	850
187.38	850	196.83	850	211.27	849.57	212.67	849.52	212.98	849.51
213.12	849.51	213.23	849.51	213.44	849.51	214.55	849.4	215.86	849.28
218.41	849.06	230.78	848	231.59	847.7	236.04	846	237.27	845.27
237.65	845.07	238.09	844.87	249.94	844.41	254.41	845.66	255.52	846
256.84	846.59	259.68	848	261.32	849.05	264.18	851.05	265.36	852
268.21	853.94	268.3	854	268.51	854.14	269.83	855.04	271.09	856
272.7	856.83	274.93	857.97	274.97	858	274.99	858.01	275.05	858.04
279.21	860	280.63	861.26	281.45	862	281.96	862.53	283.43	864
283.6	864.17	284.58	865.2	285.37	866	286.62	867.28	287.33	868
288.63	869.33	289.29	870	289.9	870.69	291.17	872	292.03	873
292.98	874	293.51	874.44	294.25	874.93	295.97	876	298.74	877.84
298.98	878	299.42	878.29	302.19	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.78	.035	259.68	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230.78	259.68	77.37	77.23	80.15	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.2	113.31	870	160.79	183.695	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.	0.035	0.035	0.100
W.S. Elev (ft)	848.57	Reach Len. (ft)	77.37	77.23	80.15
Crit W.S. (ft)		Flow Area (sq ft)	1.92	86.86	0.26
E.G. Slope (ft/ft)	0.004563	Area (sq ft)	1.92	86.86	0.26
Q Total (cfs)	505.70	Flow (cfs)	2.39	503.21	0.10

* Top Width (ft)	36.49	* Top Width (ft)	6.69	*	28.90	*	0.90 *
* Vel Total (ft/s)	5.68	* Avg. Vel. (ft/s)	1.24	*	5.79	*	0.39 *
* Max Chl Dpth (ft)	4.16	* Hydr. Depth (ft)	0.29	*	3.01	*	0.29 *
* Conv. Total (cfs)	7486.3	* Conv. (cfs)	35.3	*	7449.5	*	1.5 *
* Length Wtd. (ft)	77.23	* Wetted Per. (ft)	6.71	*	30.25	*	1.06 *
* Min Ch El (ft)	844.41	* Shear (lb/sq ft)	0.08	*	0.82	*	0.07 *
* Alpha	1.04	* Stream Power (lb/ft s)	302.19	*	0.00	*	0.00 *
* Frctn Loss (ft)	0.53	* Cum Volume (acre-ft)	0.10	*	1.65	*	0.24 *
* C & E Loss (ft)	0.05	* Cum SA (acres)	0.19	*	0.57	*	0.14 *

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: Dotson Run
REACH: Dotson Run RS: 2333.304

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.3	879.1	3.46	877.71	6.28	876	8.95	874.28
9.39	874	9.5	873.92	11.97	872	13.71	870.56	15.5	868.84
16.28	868	16.59	867.66	18.24	866	19.08	865.31	20.75	864
22.68	862.83	24	862	25.9	860.84	27.23	860	30.16	858.37
30.8	858	31.84	856.45	32.19	855.96	33.11	854.69	33.37	854.32
33.81	854.63	34.58	856	35.96	854.55	37.39	853.28	37.95	854.09
38.19	854.08	41.13	854.16	41.94	854.09	43.96	855.16	44.74	856
45.25	855.29	45.97	855.23	51.44	855.59	53.34	856	57.94	855.55
66.09	854.16	66.95	854	72.95	852.08	73.07	852.04	73.2	852
73.45	851.97	91.51	850	98.4	849.81	99.1	849.8	107.15	849.6
114.56	849.44	121.67	849.3	185.19	848.95	187.32	848.96	188.56	848.97
202.93	848.82	206.38	848.69	206.87	848.7	212.37	848.48	218.94	848.17
219.92	848.12	222.06	848	237.89	846	239.79	845.54	245.29	844
245.74	843.89	246.08	843.78	250.45	843.8	252.11	843.76	252.36	843.9
252.55	844	254.15	845.19	255.37	846	257.98	847.95	258.06	848
258.42	848.29	260.48	849.89	260.62	850	260.89	850.12	263.35	852
267.76	853.58	269.22	854	271.07	854.76	274.47	856	274.52	856.04
277.24	858	278.01	858.59	278.57	859	280.51	860.44	282.66	862
284.98	863.75	285.32	864	287.54	865.73	287.9	866	289.04	866.86
290.13	867.67	290.56	868	290.96	868.31	293.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	222.06	.03	257.98	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
222.06 257.98 67.01 62.63 55.78 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
156.144	188.341	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	848.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	847.51	Reach Len. (ft)	67.01	62.63	55.78
Crit W.S. (ft)	847.51	Flow Area (sq ft)		62.69	
E.G. Slope (ft/ft)	0.011274	Area (sq ft)		62.69	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	31.41	Top Width (ft)		31.41	
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)		8.07	
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	4762.6	Conv. (cfs)		4762.6	
Length Wtd. (ft)	62.68	Wetted Per. (ft)		33.01	
Min Ch El (ft)	843.76	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	293.23	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.09	1.52	0.24
C & E Loss (ft)	0.16	Cum SA (acres)	0.19	0.52	0.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2270.249

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.42	878.24	3.9	878	4	877.94	7.49	876

9.48	874.36	12.39	872.26	12.8	872	15.95	870	18.64	868.18
18.9	868	20.26	867.1	21.98	866	23.01	865.34	25.21	864
26.46	863.29	28.39	862	31.62	860.1	31.78	860	31.93	859.91
35.23	858	37.03	856.79	38.35	856	39.5	853.58	40.24	852.43
40.95	853.34	41.65	854	45.4	853.12	48.03	852.49	48.33	852.67
49.12	853.16	49.75	854	51.55	853.86	51.6	853.56	51.71	853.85
57	853.82	58.71	853.81	58.87	853.59	59.86	853.81	63.24	853.86
69.44	854	76.99	852.09	77.39	852	81.16	850.11	81.4	850
83.81	849.92	86.87	849.82	117.51	848.78	130.16	848.39	136.37	848.2
136.66	848.19	142.63	848.02	142.7	848.01	143.25	848	207.42	848
216.93	847.28	233.71	846	236.61	844.94	239.08	844	239.47	843.82
240.27	843.41	250.07	842.67	250.72	842.62	250.91	842.69	256.2	844
259.59	845.69	260.14	846	262.74	847.46	263.45	848	263.9	848.31
267.64	850	289.24	861						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	233.71	.03	259.59	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
233.71	259.59	73.07	75.65	77.19	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
107.731	172.984	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	847.18	Reach Len. (ft)	73.07	75.65	77.19
Crit W.S. (ft)		Flow Area (sq ft)	9.18	88.45	1.98
E.G. Slope (ft/ft)	*0.002575	Area (sq ft)	9.18	88.45	1.98
Q Total (cfs)	505.70	Flow (cfs)	13.91	490.67	1.12
Top Width (ft)	44.05	Top Width (ft)	15.51	25.88	2.66
Vel Total (ft/s)	5.08	Avg. Vel. (ft/s)	1.52	5.55	0.57
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)	0.59	3.42	0.75
Conv. Total (cfs)	9964.8	Conv. (cfs)	274.1	9668.5	22.1
Length Wtd. (ft)	75.59	Wetted Per. (ft)	15.56	26.98	3.05
Min Ch El (ft)	842.62	Shear (lb/sq ft)	0.09	0.53	0.10
Alpha	1.16	Stream Power (lb/ft s)	289.24	0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.09	1.41	0.23
C & E Loss (ft)	0.07	Cum SA (acres)	0.17	0.47	0.13

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: Dotson Run
REACH: Dotson Run RS: 2193.833

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	.96	879.31	2.65	878	3.79	877.2	5.33	876
7.74	874.21	8.01	874	8.26	873.79	9.32	872.99	10.73	872
11.24	871.41	12.53	870	13.6	868.79	14.28	868	15.46	866.67
16.73	865.18	17.84	864	18.18	863.7	19.69	862	21.8	860.19
22.12	860	23.89	858.49	24.52	858	26.52	856.29	26.88	856
27.95	855.36	29.84	854	32.97	852.76	34.8	852	37.45	850.93
38.14	850.56	38.73	850.39	39.48	850.16	39.73	850.07	39.8	850.03
39.84	849.98	39.84	850	39.85	849.93	40.89	849.74	41.96	850
42.06	850	42.77	850.16	45.14	850.63	48.25	851.89	48.53	852
48.6	851.99	56.94	851.7	66.68	852.06	68.61	852	69.86	851.54
74.83	850	105.59	848.9	125.04	848.24	132.09	848	133.25	847.98
133.64	847.98	136.93	847.94	138.55	847.92	139.52	847.91	140.5	847.92
148.4	847.99	149.64	847.96	166.22	847.95	167.27	847.96	168.89	847.91
169.97	847.91	171.62	847.86	196.87	846.67	199.2	846.52	203.14	846.27
203.49	846.27	207.26	846	212.23	845.52	213.8	845.37	213.88	845.35
214.75	845.15	219.68	844	220.66	841.17	220.82	840.67	220.86	840.55
223.48	840.64	224.76	840.67	226.76	840.74	229.98	840.81	230.01	840.81
230.08	840.81	233.72	842.52	234.86	843.05	235.38	843.29	235.66	843.43
236.21	843.71	236.5	844	239.05	846	241.46	848	254.76	850
265.03	852	281.33	859.84	301.81	860.45				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	207.26	.03	239.05	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
207.26	239.05	13.66	40.54	101.71	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.45	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.22	Wt. n-Val.	0.035	0.030	0.100	
W.S. Elev (ft)	847.23	Reach Len. (ft)	13.66	40.54	101.71	
Crit W.S. (ft)		Flow Area (sq ft)	12.55	128.36	0.91	
E.G. Slope (ft/ft)	0.001102	Area (sq ft)	12.55	128.36	0.91	
Q Total (cfs)	505.70	Flow (cfs)	12.06	493.36	0.27	
Top Width (ft)	55.54	Top Width (ft)	22.27	31.79	1.48	
Vel Total (ft/s)	3.57	Avg. Vel. (ft/s)	0.96	3.84	0.30	
Max Chl Dpth (ft)	6.68	Hydr. Depth (ft)	0.56	4.04	0.61	
Conv. Total (cfs)	15235.0	Conv. (cfs)	363.4	14863.3	8.2	
Length Wtd. (ft)	40.42	Wetted Per. (ft)	22.30	35.91	1.93	
Min Ch El (ft)	840.55	Shear (lb/sq ft)	0.04	0.25	0.03	

* Alpha	* 1.14	* Stream Power (lb/ft s)	* 301.81	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 0.07	* 1.22	* 0.23 *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.14	* 0.42	* 0.13 *

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2151.343

INPUT
Description:
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.98	878	6.13	876.03	6.17	876	6.29	875.93
9.47	874	11.44	872.52	12.11	872	12.65	871.35	13.77	870
14.65	868.93	15.42	868	16.5	866.69	17.46	865.53	18.69	864
19.47	863.17	20.51	862	21.67	861	22.75	860	23.82	859
24.99	858	26.24	856.82	27.2	856	28.48	854.83	29.34	854
32.05	852.92	34.47	852	37.17	851.02	39	850.34	39.72	850.06
39.82	849.92	39.83	850	39.87	849.78	41.86	849.41	42.13	849.32
42.28	849.27	42.78	849.11	43.88	849.36	44.47	849.73	45.06	850
46.41	850.12	46.91	850.14	50.72	850.98	51.64	851.3	52.3	852
56.07	851.52	58.47	851.24	58.9	851.2	59.45	851.18	60.26	851.2
61.24	851.3	67.44	852	67.95	851.18	72.95	850.27	74.79	850
75.62	849.95	90.36	849.07	93.1	849.03	120.88	848	139.59	848
140.42	848.02	140.77	848	146.69	847.7	146.81	847.7	148.43	847.64
148.64	847.63	148.99	847.61	150.1	847.57	151.01	847.51	151.2	847.49
158.79	847.45	173.96	846.85	174.92	846.82	192.39	846	193.92	845.46
194.18	845.38	194.55	845.26	195.1	845.08	195.92	844.81	197.19	844.4
197.4	844.33	198.45	844.21	198.86	844.17	199.24	844.14	199.49	844.12
200.25	844	204.13	840.57	213.18	840.09	213.46	840.5	214.33	842
220.05	844	222.93	846	237.74	848	251.91	850	258.96	853.43
279.18	853.14	284.09	850.89	289.69	852	297.88	854	306.6	856
315.51	858	327.25	860	338.24	862	345.06	864	348.22	866
351.34	868	355.03	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	192.39	.03	222.93	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
192.39 222.93 15.11 62.46 31.51 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
165.206	189.27	865	315.303	323.621	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	847.21	Reach Len. (ft)	15.11	62.46	31.51
Crit W.S. (ft)		Flow Area (sq ft)	3.55	137.89	5.42
E.G. Slope (ft/ft)	0.000825	Area (sq ft)	3.55	137.89	5.42
Q Total (cfs)	505.70	Flow (cfs)	3.87	497.13	4.70
Top Width (ft)	42.96	Top Width (ft)	3.46	30.54	8.96
Vel Total (ft/s)	3.44	Avg. Vel. (ft/s)	1.09	3.61	0.87
Max Chl Dpth (ft)	7.12	Hydr. Depth (ft)	1.03	4.52	0.60
Conv. Total (cfs)	17603.9	Conv. (cfs)	134.8	17305.6	163.5
Length Wtd. (ft)	61.76	Wetted Per. (ft)	4.54	34.19	9.04
Min Ch El (ft)	840.09	Shear (lb/sq ft)	0.04	0.21	0.03
Alpha	1.08	Stream Power (lb/ft s)	355.03	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.07	1.10	0.22
C & E Loss (ft)	0.02	Cum SA (acres)	0.14	0.40	0.12

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 2088.858

INPUT
Description:
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.83	878.16	3.08	878	5.81	876.22	6.15	876
6.62	875.72	9.31	874	9.76	873.59	11.38	872	12.39	870.91
13.34	870	15.3	868.07	15.45	867.92	17.37	866	19.09	864.27
19.37	864	21.35	862.09	21.44	862	21.68	861.77	25.21	858.31
25.53	858	25.94	857.61	27.58	856	29.14	854.47	29.62	854
30.58	853.37	33.26	852	36.37	851.08	39.95	850	40.31	849.37
40.48	849.17	40.58	849.14	43.71	848.17	47.53	848.99	48.77	849.22
49.52	849.37	51.13	849.95	51.26	850	51.3	850	56.09	850.47
57.06	850.96	58.98	850.98	62.88	850.98	65.11	850.96	69.51	850.8
71.38	850.78	73.12	850.25	76.65	849.95	77.22	850	94.27	848.74
104.74	848	120.36	847.88	126.07	847.83	129.76	847.81	132.43	847.72
132.74	847.7	140.2	847.42	145.63	847.55	149.1	847.66	151.54	847.58
154.51	847.48	157.14	847.42	159.38	847.19	161.31	846.95	169.55	846
174.79	845.55	175.25	845.5	175.69	845.32	179.16	844	181.88	839.61
181.92	839.54	187.56	839.54	188.6	840.06	189.95	840.78	190.5	840.98
195.33	842	201.7	844	211.61	846	230.68	848	237.84	851.31
259.84	852.3	267.38	849.35	274.51	850	288.61	852	296.68	854
305.19	856	320.33	858	334.82	860	360.81	862		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.035	169.55	.03	211.61	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
169.55	211.61	74.23	80.84	64.54	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
144.3	163.344	865	309.043	336.842	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	847.22	Reach Len. (ft)	74.23	80.84	64.54
Crit W.S. (ft)		Flow Area (sq ft)	5.35	173.30	7.09
E.G. Slope (ft/ft)	*0.000566	Area (sq ft)	5.35	173.30	7.09
Q Total (cfs)	505.70	Flow (cfs)	4.62	495.95	5.13
Top Width (ft)	59.89	Top Width (ft)	6.21	42.06	11.63
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)	0.86	2.86	0.72
Max Chl Dpth (ft)	7.68	Hydr. Depth (ft)	0.86	4.12	0.61
Conv. Total (cfs)	21253.9	Conv. (cfs)	194.4	20843.9	215.6
Length Wtd. (ft)	79.93	Wetted Per. (ft)	6.75	45.80	11.69
Min Ch El (ft)	839.54	Shear (lb/sq ft)	0.03	0.13	0.02
Alpha	1.09	Stream Power (lb/ft s)	360.81	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.07	0.88	0.22
C & E Loss (ft)	0.01	Cum SA (acres)	0.14	0.34	0.11

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: Dotson Run
REACH: Dotson Run RS: 2007.945

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.8	878	6.7	876	8.94	874	11.17	872
13.4	870	15.54	868	17.63	866	19.67	864	22.7	862
25.89	860	28.75	858	31.45	856	34.01	854	36.45	852
39.51	850	55.58	848	56.1	848	75.22	848.63	92.88	848.31
95.74	848	107.02	848	137.76	846	147.57	844	153.6	842
160	838.71	171.65	838.93	172.88	842	177.09	844	215.47	846
237.75	848	261.8	850	282.48	852	306.22	854	327.69	856
345.72	858	359.4	860	401.89	864				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	147.57	.03	177.09	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
147.57	177.09	98.28	63.8	21.73	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	149.9	849.5	F
190.5	401.89	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.41	401.92	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	847.22	Reach Len. (ft)	98.28	63.80	21.73
Crit W.S. (ft)	842.26	Flow Area (sq ft)		184.87	38.47
E.G. Slope (ft/ft)	*0.000227	Area (sq ft)	33.17	193.26	93.40
Q Total (cfs)	505.70	Flow (cfs)		456.10	49.60
Top Width (ft)	110.00	Top Width (ft)	28.53	29.52	51.95
Vel Total (ft/s)	2.26	Avg. Vel. (ft/s)		2.47	1.29
Max Chl Dpth (ft)	8.51	Hydr. Depth (ft)		6.80	2.87
Conv. Total (cfs)	33591.9	Conv. (cfs)		30297.3	3294.6
Length Wtd. (ft)	63.80	Wetted Per. (ft)		30.71	13.43
Min Ch El (ft)	838.71	Shear (lb/sq ft)		0.09	0.04
Alpha	1.10	Stream Power (lb/ft s)	401.89	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.03	0.54	0.15
C & E Loss (ft)		Cum SA (acres)	0.11	0.28	0.06

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

CULVERT

RIVER: Dotson Run
REACH: Dotson Run RS: 1976.738

INPUT
Description:
Distance from Upstream XS = 14.59
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
105.01	847.47	118.15	848	147.38	849.15
158.98	849.48	167.22	849.67	188	850
220.8	850.49	261.8	850		

Upstream Bridge Cross Section Data
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.8	878	6.7	876	8.94	874	11.17	872
13.4	870	15.54	868	17.63	866	19.67	864	22.7	862
25.89	860	28.75	858	31.45	856	34.01	854	36.45	852
39.51	850	55.58	848	56.1	848	75.22	848.63	92.88	848.31
95.74	848	107.02	848	137.76	846	147.57	844	153.6	842
160	838.71	171.65	838.93	172.88	842	177.09	844	215.47	846
237.75	848	261.8	850	282.48	852	306.22	854	327.69	856
345.72	858	359.4	860	401.89	864				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	147.57	.03	177.09	.035

Bank Sta: Left Right Coeff Contr. Expan.
147.57 177.09 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	149.9	849.5	F
190.5	401.89	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.41	401.92	870

Downstream Deck/Roadway Coordinates
num= 9

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
88.78	847.09	90.34	847.47	103.35	848
137.19	849.15	148.59	849.48	160.46	849.67
186.15	850	220.94	850.49	263.47	850

Downstream Bridge Cross Section Data
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74

34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	122.19	844
123.88	842	125.59	840	126.96	838.6	135.43	838.5	140.9	840
143.37	842	145.85	844	147.34	844.65	147.78	844.71	148.2	844.74
149.03	844.8	149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08
155.06	845.18	156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54
172.84	845.78	178.29	846	192.52	846	193.1	846.03	196.43	846.12
209.8	846.59	215.12	846.8	227.61	847.34	230.54	847.44	235.22	848
243.59	848	244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39
257.36	849.34	260.09	849.66	263.47	850	268.64	850.5	281.3	851.62
282.63	851.73	283.51	851.8	284.52	851.89	286.06	852	286.83	851.76
289.02	851.29	293.04	851.72	294.55	851.98	296.13	852.18	308.02	854
311.02	854	314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72
320.59	854.94	323.89	855.28	328.04	855.84	330.54	856	331.73	856.08
333.65	856.19	334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35
350.41	858	351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65
370.33	859.95	378.74	861.6	382.38	862.13	392.13	864	393.43	864.24
394.87	864.54	401.82	866	401.96	866.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
116.12	147.34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	849.5	F
141.38	401.96	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	8	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	7.18	46	.025	.03	2	.5	1

Number of Barrels = 2
Upstream Elevation = 836.63
Centerline Stations

Sta.	Sta.
157.65	168.91

Downstream Elevation = 836.6
Centerline Stations

Sta.	Sta.
124.6	136.83

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	505.70	Culv Full Len (ft)	46.00		
# Barrels	2	Culv Vel US (ft/s)	6.25		
Q Barrel (cfs)	252.85	Culv Vel DS (ft/s)	6.25		
E.G. US. (ft)	847.31	Culv Inv El Up (ft)	836.63		
W.S. US. (ft)	847.22	Culv Inv El Dn (ft)	836.60		
E.G. DS (ft)	846.36	Culv Frctn Ls (ft)	0.28		
W.S. DS (ft)	846.12	Culv Exit Loss (ft)	0.37		
Delta EG (ft)	0.95	Culv Entr Loss (ft)	0.30		
Delta WS (ft)	1.10	Q Weir (cfs)			
E.G. IC (ft)	843.83	Weir Sta Lft (ft)			
E.G. OC (ft)	847.31	Weir Sta Rgt (ft)			
Culvert Control	Outlet	Weir Submerg			
Culv WS Inlet (ft)	844.63	Weir Max Depth (ft)			
Culv WS Outlet (ft)	844.60	Weir Avg Depth (ft)			
Culv Nml Depth (ft)		Weir Flow Area (sq ft)			
Culv Crt Depth (ft)	5.20	Min El Weir Flow (ft)	849.23		

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1943.117

INPUT
Description:
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38

48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	122.19	844
123.88	842	125.59	840	126.96	838.6	135.43	838.5	140.9	840
143.37	842	145.85	844	147.34	844.65	147.78	844.71	148.2	844.74
149.03	844.8	149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08
155.06	845.18	156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54
172.84	845.78	178.29	846	192.52	846	193.1	846.03	196.43	846.12
209.8	846.59	215.12	846.8	227.61	847.34	230.54	847.44	235.22	848
243.59	848	244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39
257.36	849.34	260.09	849.66	263.47	850	268.64	850.5	281.3	851.62
282.63	851.73	283.51	851.8	284.52	851.89	286.06	852	286.83	851.76
289.02	851.29	293.04	851.72	294.55	851.98	296.13	852.18	308.02	854
311.02	854	314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72
320.59	854.94	323.89	855.28	328.04	855.84	330.54	856	331.73	856.08
333.65	856.19	334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35
350.41	858	351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65
370.33	859.95	378.74	861.6	382.38	862.13	392.13	864	393.43	864.24
394.87	864.54	401.82	866	401.96	866.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

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

116.12	147.34	42.64	28.07	46.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	849.5	F
141.38	401.96	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	846.12	Reach Len. (ft)	42.64	28.07	46.40
Crit W.S. (ft)	842.08	Flow Area (sq ft)		128.71	
E.G. Slope (ft/ft)	0.000612	Area (sq ft)	5.75	154.56	24.07
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	99.44	Top Width (ft)	19.30	31.22	48.93
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)		3.93	
Max Chl Dpth (ft)	7.62	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	20436.5	Conv. (cfs)		20436.5	
Length Wtd. (ft)	28.07	Wetted Per. (ft)		22.42	

* Min Ch El (ft)	*	838.50	* Shear (lb/sq ft)	*		*	0.22	*			*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	401.96	*	0.00	*	0.00		*
* Frctn Loss (ft)	*		* Cum Volume (acre-ft)	*	0.03	*	0.43	*	0.15		*
* C & E Loss (ft)	*		* Cum SA (acres)	*	0.05	*	0.23	*	0.04		*

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

CULVERT

RIVER: Dotson Run
REACH: Dotson Run RS: 1929.28

INPUT
Description:
Distance from Upstream XS = 8.8
Deck/Roadway Width = 9
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
117.54	845.87	138.98	845.99	178.29	846

Upstream Bridge Cross Section Data
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	122.19	844
123.88	842	125.59	840	126.96	838.6	135.43	838.5	140.9	840
143.37	842	145.85	844	147.34	844.65	147.78	844.71	148.2	844.74
149.03	844.8	149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08
155.06	845.18	156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54
172.84	845.78	178.29	846	192.52	846	193.1	846.03	196.43	846.12
209.8	846.59	215.12	846.8	227.61	847.34	230.54	847.44	235.22	848
243.59	848	244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39
257.36	849.34	260.09	849.66	263.47	850	268.64	850.5	281.3	851.62
282.63	851.73	283.51	851.8	284.52	851.89	286.06	852	286.83	851.76
289.02	851.29	293.04	851.72	294.55	851.98	296.13	852.18	308.02	854

311.02	854	314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72
320.59	854.94	323.89	855.28	328.04	855.84	330.54	856	331.73	856.08
333.65	856.19	334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35
350.41	858	351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65
370.33	859.95	378.74	861.6	382.38	862.13	392.13	864	393.43	864.24
394.87	864.54	401.82	866	401.96	866.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
116.12	147.34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	849.5	F
141.38	401.96	849.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

Downstream Deck/Roadway Coordinates
num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
72.75	846	102.69	845.87	127.63	845.99
218.19	846				

Downstream Bridge Cross Section Data
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	6.34	856	11.05	854	17.72	852
20.68	850	30.77	848	42.82	846	47.07	845.28	51.09	846
61.92	846.9	72.75	846	99.44	844	101.25	842	103.53	840
108.16	838.43	117.99	838.29	121.08	840	122.61	842	123.84	844
218.49	846	241.67	848	258.48	850	290.85	852	302.89	854
317.83	856	335.26	858	349.67	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.44	.03	123.84	.035

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
99.44	123.84	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	849.5	F
121.67	349.67	849.5	F

```
Upstream Embankment side slope              =       2 horiz. to 1.0 vertical
Downstream Embankment side slope            =       2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name      Shape      Rise    Span
Culvert #1        Ellipse     5.1     6.7
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                .4                1
Upstream   Elevation =  838.6
           Centerline Station =  129.54
Downstream Elevation =  838.4
           Centerline Station =  109.76

Culvert Name      Shape      Rise    Span
Culvert #2        Ellipse     6.7     5.1
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 1 - Square edge with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                .4                1
Upstream   Elevation =  838.5
           Centerline Station =  136.24
Downstream Elevation =  838.3
           Centerline Station =  116.03

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #1
*********************************************************************
* Q Culv Group (cfs)     *  253.63  * Culv Full Len (ft)     *   20.40  *
* # Barrels              *       1  * Culv Vel US (ft/s)     *    9.45  *
* Q Barrel (cfs)         *  253.63  * Culv Vel DS (ft/s)     *    9.45  *
* E.G. US. (ft)          *  846.36  * Culv Inv El Up (ft)    *  838.60  *
* W.S. US. (ft)          *  846.12  * Culv Inv El Dn (ft)    *  838.40  *
* E.G. DS (ft)           *  844.63  * Culv Frctn Ls (ft)     *    0.30  *
* W.S. DS (ft)           *  844.12  * Culv Exit Loss (ft)    *    0.87  *
* Delta EG (ft)          *    1.73  * Culv Entr Loss (ft)    *    0.55  *
* Delta WS (ft)          *    2.00  * Q Weir (cfs)           *   13.43  *
* E.G. IC (ft)           *  844.93  * Weir Sta Lft (ft)      *  121.76  *
* E.G. OC (ft)           *  846.35  * Weir Sta Rgt (ft)      *  141.38  *
* Culvert Control        *  Outlet  * Weir Submerg           *    0.00  *
* Culv WS Inlet (ft)     *  843.70  * Weir Max Depth (ft)    *    0.46  *
* Culv WS Outlet (ft)    *  843.50  * Weir Avg Depth (ft)    *    0.41  *
* Culv Nml Depth (ft)    *          * Weir Flow Area (sq ft) *    8.06  *
```

* Culv Crt Depth (ft)	3.95	* Min El Weir Flow (ft)	845.90		

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #2

* Q Culv Group (cfs)	238.64	* Culv Full Len (ft)			
* # Barrels	1	* Culv Vel US (ft/s)	9.55		
* Q Barrel (cfs)	238.64	* Culv Vel DS (ft/s)	9.64		
* E.G. US. (ft)	846.36	* Culv Inv El Up (ft)	838.50		
* W.S. US. (ft)	846.12	* Culv Inv El Dn (ft)	838.30		
* E.G. DS (ft)	844.63	* Culv Frctn Ls (ft)	0.24		
* W.S. DS (ft)	844.12	* Culv Exit Loss (ft)	0.93		
* Delta EG (ft)	1.73	* Culv Entr Loss (ft)	0.57		
* Delta WS (ft)	2.00	* Q Weir (cfs)	13.43		
* E.G. IC (ft)	846.14	* Weir Sta Lft (ft)	121.76		
* E.G. OC (ft)	846.37	* Weir Sta Rgt (ft)	141.38		
* Culvert Control	Outlet	* Weir Submerg	0.00		
* Culv WS Inlet (ft)	844.39	* Weir Max Depth (ft)	0.46		
* Culv WS Outlet (ft)	844.12	* Weir Avg Depth (ft)	0.41		
* Culv Nml Depth (ft)	6.70	* Weir Flow Area (sq ft)	8.06		
* Culv Crt Depth (ft)	4.72	* Min El Weir Flow (ft)	845.90		

Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1915.038

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	6.34	856	11.05	854	17.72	852
20.68	850	30.77	848	42.82	846	47.07	845.28	51.09	846
61.92	846.9	72.75	846	99.44	844	101.25	842	103.53	840
108.16	838.43	117.99	838.29	121.08	840	122.61	842	123.84	844
218.49	846	241.67	848	258.48	850	290.85	852	302.89	854
317.83	856	335.26	858	349.67	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.44	.03	123.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.44	123.84	51.87	36.65	46.43	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	849.5	F
121.67	349.67	849.5	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.63	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.51	Wt. n-Val.		0.030		
W.S. Elev (ft)	844.12	Reach Len. (ft)	51.87	36.65	46.43	
Crit W.S. (ft)	841.80	Flow Area (sq ft)		87.94		
E.G. Slope (ft/ft)	0.001520	Area (sq ft)	0.09	109.92	0.32	
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	31.48	Top Width (ft)	1.56	24.40	5.53	
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)		5.75		
Max Chl Dpth (ft)	5.83	Hydr. Depth (ft)		5.45		
Conv. Total (cfs)	12971.1	Conv. (cfs)		12971.1		
Length Wtd. (ft)	36.65	Wetted Per. (ft)		17.11		
Min Ch El (ft)	838.29	Shear (lb/sq ft)		0.49		
Alpha	1.00	Stream Power (lb/ft s)	349.67	0.00	0.00	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.03	0.39	0.15	
C & E Loss (ft)	0.04	Cum SA (acres)	0.04	0.21	0.01	

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

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1878.276

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.11	858	5.89	856	10.2	854	14.94	852
19.65	850	25.98	848	81.73	846	91.4	844	91.6	842
93.64	840	94.79	838.34	108.63	838.04	109.78	842	111.91	844
119.75	846	154.92	846	165.37	846.17	166.07	846.16	174.43	846.47
176.45	846.47	185.48	846.91	199.44	846.92	206.73	847.11	211.37	847.17
214.75	847.28	216.46	847.34	225.68	847.65	235.89	848	238.73	848.21
239.83	848.22	241.05	848.24	248.43	848.65	250.9	848.71	253.31	848.82
257.07	849.01	265.19	849.44	268.26	849.64	274.18	850	275.43	850
278.91	850.23	282.86	850.4	290.09	850.86	299.01	851.41	307.65	852
323.98	853.7	326.97	854	330.84	854.65	338.48	856	340.6	856.34
345.81	857.22	350.39	858	358.66	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
*********************************************
       0    .035   81.73     .03  119.75    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         81.73  119.75          385.47  390.79   393.3            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    87.9     850       F
  111.31  358.66     850       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         *  844.53  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.38  * Wt. n-Val.            *          *   0.030  *          *
* W.S. Elev (ft)         *  844.15  * Reach Len. (ft)       *  385.47  *  390.79  *  393.30  *
* Crit W.S. (ft)         *  841.53  * Flow Area (sq ft)     *          *  101.82  *          *
* E.G. Slope (ft/ft)     *0.001771  * Area (sq ft)          *          *  102.12  *          *
* Q Total (cfs)          *  505.70  * Flow (cfs)            *          *  505.70  *          *
* Top Width (ft)         *   21.81  * Top Width (ft)        *          *   21.81  *          *
* Vel Total (ft/s)       *    4.97  * Avg. Vel. (ft/s)      *          *    4.97  *          *
* Max Chl Dpth (ft)      *    6.11  * Hydr. Depth (ft)      *          *    4.94  *          *
* Conv. Total (cfs)      * 12017.4  * Conv. (cfs)           *          * 12017.4  *          *
* Length Wtd. (ft)       *  390.79  * Wetted Per. (ft)      *          *   27.68  *          *
* Min Ch El (ft)         *  838.04  * Shear (lb/sq ft)      *          *    0.41  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *  358.66  *    0.00  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)  *    0.03  *    0.30  *    0.15  *
* C & E Loss (ft)        *          * Cum SA (acres)        *    0.04  *    0.19  *    0.01  *
*****************************************************************************************

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

CULVERT


RIVER: Dotson Run
REACH: Dotson Run          RS: 1683.45

INPUT
Description:
Distance from Upstream XS =      155
Deck/Roadway Width        =       98
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
       0     912        0  358.66     906        0

Upstream Bridge Cross Section Data
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

0	860	3.11	858	5.89	856	10.2	854	14.94	852
19.65	850	25.98	848	81.73	846	91.4	844	91.6	842
93.64	840	94.79	838.34	108.63	838.04	109.78	842	111.91	844
119.75	846	154.92	846	165.37	846.17	166.07	846.16	174.43	846.47
176.45	846.47	185.48	846.91	199.44	846.92	206.73	847.11	211.37	847.17
214.75	847.28	216.46	847.34	225.68	847.65	235.89	848	238.73	848.21
239.83	848.22	241.05	848.24	248.43	848.65	250.9	848.71	253.31	848.82
257.07	849.01	265.19	849.44	268.26	849.64	274.18	850	275.43	850
278.91	850.23	282.86	850.4	290.09	850.86	299.01	851.41	307.65	852
323.98	853.7	326.97	854	330.84	854.65	338.48	856	340.6	856.34
345.81	857.22	350.39	858	358.66	860				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	81.73	.03	119.75	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
81.73	119.75	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	87.9	850	F
111.31	358.66	850	F

Downstream Deck/Roadway Coordinates num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	912	0	217.84	908	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.21	856	12.38	854	19.51	852
29.28	850	40.44	848	47.49	846	55.09	844	75.52	844
82.72	842	100.32	840	103.4	838	106.1	836.06	117.23	836.06
118.44	838	119.55	842	127.29	844	137.21	846	148.77	848
154.74	850	160.73	852	166.66	854	172.52	856	178.22	858
183.91	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.32	.03	119.55	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
100.32	119.55	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	F

124.17 183.91 850 F

Upstream Embankment side slope = 2 horiz. to 1.0 vertical
Downstream Embankment side slope = 2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	5	6

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4.76	380	.011	.011	0	.4	1

Number of Barrels = 2
Upstream Elevation = 838.04
Centerline Stations

Sta.	Sta.
95.9	103.31

Downstream Elevation = 836.06
Centerline Stations

Sta.	Sta.
110.05	119.17

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	505.70	Culv Full Len (ft)			
# Barrels	2	Culv Vel US (ft/s)	11.07		
Q Barrel (cfs)	252.85	Culv Vel DS (ft/s)	8.78		
E.G. US. (ft)	844.53	Culv Inv El Up (ft)	838.04		
W.S. US. (ft)	844.15	Culv Inv El Dn (ft)	836.06		
E.G. DS (ft)	841.84	Culv Frctn Ls (ft)	1.69		
W.S. DS (ft)	840.86	Culv Exit Loss (ft)	0.22		
Delta EG (ft)	2.70	Culv Entr Loss (ft)	0.78		
Delta WS (ft)	3.29	Q Weir (cfs)			
E.G. IC (ft)	844.53	Weir Sta Lft (ft)			
E.G. OC (ft)	844.51	Weir Sta Rgt (ft)			
Culvert Control	Inlet	Weir Submerg			
Culv WS Inlet (ft)	841.85	Weir Max Depth (ft)			
Culv WS Outlet (ft)	840.86	Weir Avg Depth (ft)			
Culv Nml Depth (ft)	3.22	Weir Flow Area (sq ft)			
Culv Crt Depth (ft)	3.81	Min El Weir Flow (ft)	908.63		

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1487.336

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.21	856	12.38	854	19.51	852
29.28	850	40.44	848	47.49	846	55.09	844	75.52	844
82.72	842	100.32	840	103.4	838	106.1	836.06	117.23	836.06
118.44	838	119.55	842	127.29	844	137.21	846	148.77	848
154.74	850	160.73	852	166.66	854	172.52	856	178.22	858
183.91	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.32	.03	119.55	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
100.32	119.55	28.66	33.97	32.56	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	F
124.17	183.91	850	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.84	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.97	Wt. n-Val.		0.030		
W.S. Elev (ft)	840.86	Reach Len. (ft)	28.66	33.97	32.56	
Crit W.S. (ft)	839.73	Flow Area (sq ft)		63.85		
E.G. Slope (ft/ft)	0.004614	Area (sq ft)	3.26	75.28		
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	26.49	Top Width (ft)	7.58	18.91		
Vel Total (ft/s)	7.92	Avg. Vel. (ft/s)		7.92		
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		4.50		
Conv. Total (cfs)	7445.0	Conv. (cfs)		7445.0		
Length Wtd. (ft)	33.49	Wetted Per. (ft)		17.68		
Min Ch El (ft)	836.06	Shear (lb/sq ft)		1.04		
Alpha	1.00	Stream Power (lb/ft s)	183.91	0.00	0.00	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.03	0.10	0.15	
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.01	0.01	

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

CROSS SECTION

RIVER: Dotson Run
REACH: Dotson Run RS: 1453.111

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.09	858	8.12	856	12.34	854	16.85	852
21.69	850	27.29	848	34.22	846	40.67	844	50.67	845.05
68.56	844.75	84.7	844	95.07	842	100.24	840	104.97	838
106.35	837.87	117	836.94	118.69	836.04	124.14	836.06	129.49	838
135.07	840	138.72	840.47	155.96	842	185.72	844	200.02	846
209.69	848	215.1	850	220.32	852	225.56	854	230.85	856
236.52	858	242.53	860						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	117	.03	129.49	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
117 129.49 11.26 20.52 423.49 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.01	Reach Len. (ft)	22.53	22.53	22.53
Crit W.S. (ft)		Flow Area (sq ft)	53.50	55.99	15.72
E.G. Slope (ft/ft)	*0.002823	Area (sq ft)	53.50	55.99	15.72
Q Total (cfs)	505.70	Flow (cfs)	81.35	388.92	35.43
Top Width (ft)	47.21	Top Width (ft)	19.38	12.49	15.34
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)	1.52	6.95	2.25
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)	2.76	4.48	1.02
Conv. Total (cfs)	9518.5	Conv. (cfs)	1531.2	7320.4	666.8
Length Wtd. (ft)	22.53	Wetted Per. (ft)	20.02	13.06	15.74
Min Ch El (ft)	836.04	Shear (lb/sq ft)	0.47	0.76	0.18
Alpha	2.32	Stream Power (lb/ft s)	242.53	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	0.05	0.14
C & E Loss (ft)	0.17	Cum SA (acres)			

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: Dotson Run

REACH: Lower RS: 1430.579

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.11	858	8.04	856	11.95	854	15.92	852
19.94	850	24.07	848	28.31	846	33.45	844	42.62	844
45.48	844.44	60.92	844.38	75.03	844	93.21	842	96.93	840
101.57	838	111.64	836	114.11	835.58	120.54	835.53	121.16	836
123.73	838	126.3	840	129.1	840.85	139.63	840.44	150.45	840.27
154.23	840	182.14	838.32	229.92	838.82	258.27	839.57	311.11	839.46
317.19	837.98	329	840	375.59	840.56	404.82	840.33	462.05	842
462.67	842	505.17	844	509.78	846	515.86	848	524.33	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	93.21	.03	129.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
93.21	129.1	9.67	38.92	2.79	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	841.39	Reach Len. (ft)	9.67	38.92	2.79
Crit W.S. (ft)		Flow Area (sq ft)		132.08	525.47
E.G. Slope (ft/ft)	*0.000281	Area (sq ft)		132.08	525.47
Q Total (cfs)	783.60	Flow (cfs)		254.46	529.14
Top Width (ft)	346.83	Top Width (ft)		34.76	312.07
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.93	1.01
Max Chl Dpth (ft)	5.86	Hydr. Depth (ft)		3.80	1.68
Conv. Total (cfs)	46713.7	Conv. (cfs)		15169.7	31544.1
Length Wtd. (ft)	26.72	Wetted Per. (ft)		37.41	312.52
Min Ch El (ft)	835.53	Shear (lb/sq ft)		0.06	0.03
Alpha	1.33	Stream Power (lb/ft s)	524.33	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	1.18	0.10
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	0.42	0.12

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: Dotson Run
REACH: Lower RS: 1390.627

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	7.24	856	10.84	854	14.42	852
18.01	850	21.67	848	25.55	846	29.42	844	61.95	842.98
72.64	843.27	81.46	842	88.36	840	93.36	838	97.18	836
97.88	835.58	119.6	835.53	119.99	836	123.48	838	134.24	840
140.18	840.75	152.92	841.67	188.63	840	226.9	839.56	262.19	839.43
284.16	839.38	285.96	839.41	295.88	839.32	302.17	839.3	308.82	839.72
313.55	840	320.79	840	324.96	839.83	329.06	840	342.7	840
364.42	840.88	400.76	841.01	446.46	842	447.21	842	482.43	843.69
489.96	843.98	490.5	844	495.07	845.97	495.14	846	501.06	848
508.87	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	72.64	.03	152.92	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
72.64 152.92 46.71 46.06 8.53 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	88.71	842	F
121.23	508.87	842	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
230.05	253.32	850	371.96	469.95	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	840.96	Reach Len. (ft)	24.40	24.40	24.40
Crit W.S. (ft)	838.75	Flow Area (sq ft)		153.42	
E.G. Slope (ft/ft)	*0.001420	Area (sq ft)		188.42	191.92
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	238.74	Top Width (ft)		58.09	180.65
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		4.72	
Conv. Total (cfs)	20791.6	Conv. (cfs)		20791.6	
Length Wtd. (ft)	24.40	Wetted Per. (ft)		33.90	
Min Ch El (ft)	835.53	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	508.87	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00	1.03	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.38	0.11

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

BRIDGE

RIVER: Dotson Run
REACH: Lower RS: 1370.77

INPUT
Description:
Distance from Upstream XS = 24.4
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
81.27	842.04	841	125	842	841	152.92	841.67	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	7.24	856	10.84	854	14.42	852
18.01	850	21.67	848	25.55	846	29.42	844	61.95	842.98
72.64	843.27	81.46	842	88.36	840	93.36	838	97.18	836
97.88	835.58	119.6	835.53	119.99	836	123.48	838	134.24	840
140.18	840.75	152.92	841.67	188.63	840	226.9	839.56	262.19	839.43
284.16	839.38	285.96	839.41	295.88	839.32	302.17	839.3	308.82	839.72
313.55	840	320.79	840	324.96	839.83	329.06	840	342.7	840
364.42	840.88	400.76	841.01	446.46	842	447.21	842	482.43	843.69
489.96	843.98	490.5	844	495.07	845.97	495.14	846	501.06	848
508.87	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	72.64	.03	152.92	.035

Bank Sta: Left Right Coeff Contr. Expan.
72.64 152.92 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	88.71	842	F
121.23	508.87	842	F

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
230.05	253.32	850	371.96	469.95	850

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
79.47	842	841	125	842	841
262.03	839.34	0			

Downstream Bridge Cross Section Data
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left Right Coeff Contr. Expan.
87.05 117.07 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	842	F
129	484.72	842	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	841.37	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	840.96	E.G. Elev (ft)	841.33	841.25
Q Total (cfs)	783.60	W.S. Elev (ft)	840.92	840.35
Q Bridge (cfs)	783.60	Crit W.S. (ft)	838.75	839.51
Q Weir (cfs)		Max Chl Dpth (ft)	5.39	4.83
Weir Sta Lft (ft)		Vel Total (ft/s)	5.16	7.47
Weir Sta Rgt (ft)		Flow Area (sq ft)	151.96	104.84
Weir Submerg		Froude # Chl	0.42	0.61
Weir Max Depth (ft)		Specif Force (cu ft)	505.01	403.79
Min El Weir Flow (ft)	842.01	Hydr Depth (ft)	4.67	2.96
Min El Prs (ft)	841.00	W.P. Total (ft)	33.90	40.00
Delta EG (ft)	0.17	Conv. Total (cfs)	20463.6	11107.4
Delta WS (ft)	0.72	Top Width (ft)	39.90	35.46
BR Open Area (sq ft)	127.89	Frctn Loss (ft)	0.03	0.05
BR Open Vel (ft/s)	7.47	C & E Loss (ft)	0.05	0.01
Coef of Q		Shear Total (lb/sq ft)	0.41	0.81
Br Sel Method	Energy only	Power Total (lb/ft s)	0.00	0.00

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

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1344.212

INPUT

Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
87.05 117.07 72.01 71.39 14.36 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	842	F
129	484.72	842	F

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	840.24	Reach Len. (ft)	72.01	71.39	14.36
Crit W.S. (ft)	839.51	Flow Area (sq ft)		99.13	2.91
E.G. Slope (ft/ft)	*0.005460	Area (sq ft)		99.13	81.64
Q Total (cfs)	783.60	Flow (cfs)		780.04	3.56
Top Width (ft)	158.80	Top Width (ft)		27.43	131.37
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)		7.87	1.22
Max Chl Dpth (ft)	4.72	Hydr. Depth (ft)		3.61	0.24
Conv. Total (cfs)	10604.8	Conv. (cfs)		10556.6	48.1
Length Wtd. (ft)	71.26	Wetted Per. (ft)		31.45	11.93
Min Ch El (ft)	835.52	Shear (lb/sq ft)		1.07	0.08

* Alpha	*	1.05	* Stream Power (lb/ft s)	*	484.72	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.54	* Cum Volume (acre-ft)	*	0.00	*	0.87	*	0.02	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.01	*	0.34	*	0.04	*

Warning: Divided flow computed for this cross-section.
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, water surface was used.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1271.523

INPUT
Description:
Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.2	858.79	6.85	858	8.62	856.91	10.07	856
11.14	855.34	13.3	854	15.18	852.83	16.52	852	19.06	850.43
19.74	850	20.84	849.3	22.92	848	23.33	847.66	25.25	846
26.08	845.26	27.49	844	28.58	843.03	29.73	842	30.96	841.05
33.13	840.27	34.02	840.41	36.07	841.23	51.19	841.68	59.37	841.97
67.89	841.82	71.96	841.82	72.2	841.82	75.27	841.92	75.35	841.92
106.53	840.01	106.67	840	106.74	839.98	106.81	839.96	106.95	839.92
113.82	838	113.91	837.93	116.56	836	116.78	835.84	118.21	834.83
122.48	834.88	126.82	834.92	127.57	835.32	128.85	836	129.53	836.37
129.97	836.61	132.41	838	133.47	838.08	133.56	838.08	160.47	840
168.47	840	207.09	840	213.92	839.97	222.03	839.85	226.17	839.87
226.81	839.87	232.62	839.89	234.55	839.89	240.78	839.91	246.74	839.94
249.78	840	251.67	840	254.9	840.14	256.12	840.2	256.34	840.22
256.61	840.22	257.14	840.22	261.73	840.24	282.88	840.16	283.84	840.11
286.22	840	287.43	839.99	291.41	839.95	303.23	839.78	303.71	839.77
303.8	839.77	303.86	839.77	310	840	317.63	840.62	321.95	840.97
323.81	841.13	324.99	841.23	326.36	841.34	338.44	841.79	402.41	841.79
412.64	842	414.01	842	424.99	842.51	427.91	842.62	432.58	842.8
434.09	842.82	439.15	843.02	444.45	843.22	452.34	843.53	464.52	844
469.1	845.85	469.48	846	469.86	846.13	475.36	848	476.73	848.45
481.34	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	106.53	.03	160.47	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
106.53	160.47	89.77	87.43	7.72	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
73.623	99.238	850	155.774	197.012	850	333.886	478.052	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.63	Reach Len. (ft)	89.77	87.43	7.72
Crit W.S. (ft)	839.63	Flow Area (sq ft)		96.36	
E.G. Slope (ft/ft)	0.011058	Area (sq ft)		96.36	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	47.30	Top Width (ft)		47.30	
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)		8.13	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	7451.8	Conv. (cfs)		7451.8	
Length Wtd. (ft)	87.43	Wetted Per. (ft)		49.40	
Min Ch El (ft)	834.83	Shear (lb/sq ft)		1.35	
Alpha	1.00	Stream Power (lb/ft s)	481.34	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.00	0.71	0.00
C & E Loss (ft)	0.12	Cum SA (acres)	0.01	0.27	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1182.267

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.53	859.26	4.25	858	7.58	856.34	8.26	856
8.93	855.64	11.94	854	15.22	852.06	15.32	852	18.63	850
19.44	849.51	21.9	848	23.73	846.89	25.18	846	27.4	844.66
28.55	844	29.18	843.66	32.14	842	34.95	841.21	38.98	840
44.86	840	45.79	840.33	50.01	841.54	72.63	841.57	73.64	841.56

111.32	840.77	116.31	840.61	116.76	840.6	141.61	840	143.71	840
145.77	839.73	156.51	838.35	159.9	838	162.73	836.14	162.93	836
163.08	835.83	164.88	834	165.07	834.09	165.4	834.17	168	833.99
171.79	833.46	173.18	833.82	173.8	834	178.39	835.04	178.93	835.16
179.85	835.36	182.6	836	185.37	836.74	190.28	838	196.06	838.95
202.48	840	202.73	840	218.29	840.32	237.94	840.72	242.98	840.62
244.59	840.62	248.08	840.63	250.67	840.62	255.29	840.67	258.49	840.67
268.68	840.4	271.78	840.4	320.91	840.02	322.57	840	325.8	840
326.99	840.04	327.88	840.05	328	840.05	328.19	840.05	330.03	840.05
335.01	840.03	340.97	840.15	341.51	840	345.29	840	358.95	841.94
359.36	842	359.42	842	421.64	842.02	432.76	842.1	433.45	842.08
434.3	842.06	435.22	842.04	436.25	842.03	437.45	842.04	437.77	842.05
438.11	842.05	442.91	842.06	458.59	842.04	483.58	843.01	489.59	843.86
490.56	844	491.1	844.2	491.76	844.46	495.81	846	500.13	847.48
501.69	848	507.66	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	141.61	.03	202.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.61	202.48	53.67	51.28	20.67	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
95.931	134.383	850	210.589	303.804	850	368.039	447.687	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.10	Reach Len. (ft)	53.67	51.28	20.67
Crit W.S. (ft)		Flow Area (sq ft)		122.46	
E.G. Slope (ft/ft)	*0.004862	Area (sq ft)		122.46	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	46.33	Top Width (ft)		46.33	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	11238.1	Conv. (cfs)		11238.1	
Length Wtd. (ft)	51.28	Wetted Per. (ft)		48.55	
Min Ch El (ft)	833.46	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	507.66	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.00	0.49	0.00
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.18	0.02

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: Dotson Run
REACH: Lower RS: 1130.779

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.62	858	3.02	857.61	4.62	856	5.34	855.3
6.64	854	7.61	853.07	8.68	852	9.84	850.89	10.73	850
12.05	848.74	12.8	848	14.23	846.62	14.87	846	16.41	844.52
16.94	844	19	842.97	20.88	842	25.46	840.42	26.61	840
26.7	840	26.75	840.01	33.51	841.19	49.84	841.4	55.31	841.49
62.52	841.03	82.74	840.18	83.89	840.17	85.35	840.16	86.11	840.16
88.1	840.15	108.01	840.06	115.16	840	129.22	839.59	133.63	839.44
135.91	839.36	162.48	838.44	172.43	838.11	175.15	838	175.84	837.63
178.69	836	179.32	835.63	181.85	834	182.48	833.66	182.72	833.52
183.58	833.41	186.95	833.08	188.95	832.86	189.1	832.85	189.21	832.89
189.29	832.92	189.66	833.06	192.07	834	194.01	834.71	197.7	836
199.08	836.4	201.24	837.03	204.63	838	205.24	838.1	206.51	838.29
220.99	840	227.14	840.22	227.83	840.23	236.58	840.88	236.77	840.89
238.32	840.87	240.23	840.89	252.65	840.97	254.59	840.93	257.08	840.88
261.75	840.76	273.46	840.7	303.25	840.53	306.54	840.49	311.34	840.98
311.84	840.97	312.83	840.92	322.47	840.76	326.76	840.64	326.89	840.62
328.7	840.44	330.05	840.34	330.9	840.32	333.67	840.14	342.22	840.68
344.75	840.12	345.42	840	346.23	840	350.02	841.02	354.03	842
355.68	842.3	356.13	842.37	356.46	842.45	356.83	842.41	364.03	842.23
364.21	842.23	371.97	842.15	374.9	842.13	418.11	842.07	432.17	842.1
432.4	842.09	432.61	842.08	451.1	842.36	454.08	842.33	475.99	842.24
480.26	842.87	481.8	843.13	487.14	844	487.68	844.16	494.02	846
495.02	846.43	498.69	848	499.31	848.27	503.37	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	175.15	.03	204.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
175.15	204.63	16.83	68.95	51.24	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
209.61	307.89	850	369.88	434.47	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.030	

* W.S. Elev (ft)	*	837.96	* Reach Len. (ft)	*	16.83	*	68.95	*	51.24	*
* Crit W.S. (ft)	*	837.89	* Flow Area (sq ft)	*		*	83.68	*		*
* E.G. Slope (ft/ft)	*	0.009669	* Area (sq ft)	*		*	83.68	*		*
* Q Total (cfs)	*	783.60	* Flow (cfs)	*		*	783.60	*		*
* Top Width (ft)	*	29.29	* Top Width (ft)	*		*	29.29	*		*
* Vel Total (ft/s)	*	9.36	* Avg. Vel. (ft/s)	*		*	9.36	*		*
* Max Chl Dpth (ft)	*	5.11	* Hydr. Depth (ft)	*		*	2.86	*		*
* Conv. Total (cfs)	*	7969.0	* Conv. (cfs)	*		*	7969.0	*		*
* Length Wtd. (ft)	*	68.92	* Wetted Per. (ft)	*		*	31.39	*		*
* Min Ch El (ft)	*	832.85	* Shear (lb/sq ft)	*		*	1.61	*		*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	503.37	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.31	* Cum Volume (acre-ft)	*	0.00	*	0.37	*	0.00	*
* C & E Loss (ft)	*	0.30	* Cum SA (acres)	*	0.01	*	0.14	*	0.02	*

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: Dotson Run
REACH: Lower RS: 1059.794

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	.97	859.29	2.79	858	3.67	857.13	4.78	856
6.11	854.68	6.79	854	8.44	852.37	8.81	852	10.69	850.15
10.84	850	12.52	848.34	12.87	848	12.91	847.96	14.9	846
15.18	845.73	16.94	844	19.55	842.46	20.33	842	20.54	841.91
21.2	841.61	24.81	840	25.17	840	26.02	840.15	30.25	840.88
30.91	840.99	31.99	841.19	34.18	841.22	52.24	841.56	56.47	841.28
68.31	840.33	86.23	840	91.02	839.92	91.95	839.9	116.5	839.48
122.17	839.37	137.44	839.11	143.34	838.98	153.79	838.81	160.44	838.67
165.79	838.58	170.98	838.46	176.81	838.33	191.12	838	196.46	837.37
207.79	836	209.17	834.89	210.23	834	211.98	833.72	218.07	832.86
220.65	832.68	224.71	832.43	225.96	833.06	226.64	833.42	228.14	834.23
230.52	835.56	231.17	835.92	231.31	836	232.89	836.15	234.43	836.27
236.46	836.45	238.1	836.6	239.84	836.75	240.93	836.84	252.95	838
253.03	838	271.56	838.84	297.13	840	326.64	840	333.39	840.27
338.69	840.47	350.73	840.74	355.4	840.61	361.86	840.56	364.63	841.56
365.8	842	371.11	842.88	372.43	843.1	374.71	843.24	379.43	843.52
385.44	843.88	386.06	843.93	387.43	844	412.92	844	416.17	843.92
433.51	843.86	443.65	844	445.87	844.03	446.47	844.04	457.42	844.19
459.73	844.12	465.63	844.1	468.73	844	468.87	844	475.47	843.83
477.17	843.78	478.38	843.84	480.47	843.95	481.35	844	484.51	844.33

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  486.04   844.6  488.46  844.93  489.68  845.09  493.68     846  494.29   846.2
  494.98  846.42  497.91  847.36  499.58   847.9  499.91     848  500.92  848.71
  502.89     850
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Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	191.12	.03	252.95	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
191.12	252.95	58.98	59.59	160.17	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.94	134.225	850	272.544	295.161	850	368.64	379.248	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.36	Reach Len. (ft)	58.98	59.59	160.17
Crit W.S. (ft)		Flow Area (sq ft)	2.83	165.09	1.47
E.G. Slope (ft/ft)	*0.002571	Area (sq ft)	2.83	165.09	1.47
Q Total (cfs)	783.60	Flow (cfs)	0.68	781.90	1.02
Top Width (ft)	85.59	Top Width (ft)	15.71	61.83	8.05
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	0.24	4.74	0.69
Max Chl Dpth (ft)	5.93	Hydr. Depth (ft)	0.18	2.67	0.18
Conv. Total (cfs)	15453.0	Conv. (cfs)	13.4	15419.5	20.0
Length Wtd. (ft)	59.65	Wetted Per. (ft)	15.72	63.76	8.06
Min Ch El (ft)	832.43	Shear (lb/sq ft)	0.03	0.42	0.03
Alpha	1.05	Stream Power (lb/ft s)	502.89	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.18	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.06	0.01

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: Dotson Run
REACH: Lower RS: 1000.000

INPUT
Description:
Station Elevation Data num= 110

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	860	1.19	859.53	2.89	858.89	4.84	858.14	5.21	858
6.28	856.98	6.9	856.39	7.31	856	8.77	854.5	9.26	854
10.51	852.72	11.22	852	12.31	850.89	13.19	850	14.65	848.54
15.19	848	16.15	847.04	17.19	846	19.15	844.03	21.19	842
25.44	840.04	25.54	840	37.8	840	38.94	840.15	39.68	840.27
40.66	840.43	45.13	840.48	61	841.19	63.82	840.87	64.15	840.84
64.55	840.82	70.95	840.64	73.32	840.48	75.09	840.31	77.91	840
85.92	839.79	86.56	839.79	87.34	839.78	88.34	839.77	103.53	839.43
106.19	839.41	113.64	839.32	116.82	839.27	175.72	838.28	192.57	838
193.96	838	203.34	836.32	205.17	836	207.3	834.7	207.6	834.52
208.42	834	209.16	833.78	212.27	832.88	212.99	832.67	214.96	832.11
219.01	832.12	220.62	832.16	222.62	833.26	223.93	834	226.75	835.54
227.6	836	231.04	837.8	231.42	838	257.45	838	260.01	838
267.39	838.56	274.15	839.05	277.04	839.31	278.75	839.43	283.42	839.77
283.85	839.8	286.93	840	307.85	840	309.52	839.97	322.35	839.84
324.78	839.85	334.48	840	336.12	840	338.18	840.07	345.88	840.34
348.53	840.43	349.27	840.46	359.54	840.84	359.67	840.84	359.71	840.85
359.82	840.85	368.97	841.64	370.7	841.83	372.28	842	376.71	842.48
378.18	842.65	380.78	842.95	381.52	842.98	381.59	842.99	381.61	842.99
381.66	843	389.58	843.86	390.42	843.9	392.79	844	392.89	844.03
392.98	844.07	395.81	845.13	398.31	846	398.95	846.21	399.61	846.44
402.46	847.35	404.02	848	404.14	848.05	404.23	848.09	408.66	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	192.57	.03	231.42	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.57	231.42	1	1	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
81.865	144.14	850	276.349	308.556	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	837.24	Reach Len. (ft)			
Crit W.S. (ft)	836.94	Flow Area (sq ft)		91.41	
E.G. Slope (ft/ft)	*0.008011	Area (sq ft)		91.41	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	31.76	Top Width (ft)		31.76	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		2.88	
Conv. Total (cfs)	8755.0	Conv. (cfs)		8755.0	
Length Wtd. (ft)		Wetted Per. (ft)		33.99	
Min Ch El (ft)	832.11	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	408.66	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1569.420

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.29	868	2.82	867.55	4.62	866	5.69	865.11
6.98	864	8.54	862.71	9.4	862	11.33	860.41	11.82	860
13.83	858.34	14.26	858	14.31	857.95	16.72	856	17.4	855.61
20.29	854	22.07	853.37	25.82	852	27.35	851.42	31.16	850
33.04	849.14	34.28	848.58	35.48	848	36.52	847.5	39.71	846
45.72	844.27	46.68	844	52.67	842.57	55.01	842	56.5	841.12
57.49	840.67	58.83	840	59.18	839.81	59.22	839.78	59.23	839.77
59.37	839.78	62.91	839.96	63.12	839.98	63.32	840	64.77	841.18
65.41	841.7	65.77	842	68.12	843.66	68.63	844	81.3	844
88.11	844.2	138.43	845.68	139.23	845.69	140.89	845.7	152.91	846
174.38	846	176.34	846.04	197.51	846.79	201.21	846.77	209.37	846.86
215.87	846.89	217.91	846.91	219.19	846.99	221.67	847	223.81	847
236.26	847.53	237.19	847.6	238.89	847.67	240.87	847.78	242.18	847.84
243.58	847.94	243.91	847.95	244.19	847.97	244.51	847.99	244.68	848
246.28	848.11	246.66	848.14	246.87	848.15	246.94	848.15	247.29	848.15
247.85	848.15	248.91	848.14	250.86	848.14	252.47	848.15	253.1	848.14
259.15	848.39	261.18	848.47	261.74	848.54	264.78	848.76	271.39	849.54
273.3	849.71	275.34	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.72	.03	68.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45.72	68.63	48.43	53.64	36.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.64	Reach Len. (ft)	48.43	53.64	36.38
Crit W.S. (ft)	843.51	Flow Area (sq ft)		41.13	
E.G. Slope (ft/ft)	*0.010247	Area (sq ft)		41.13	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	19.92	Top Width (ft)		19.92	
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	3099.9	Conv. (cfs)		3099.9	

Length Wtd. (ft)	53.64	Wetted Per. (ft)		21.91			
Min Ch El (ft)	839.77	Shear (lb/sq ft)		1.20			
Alpha	1.00	Stream Power (lb/ft s)	275.34	0.00	0.00		
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.05	0.82	0.49		
C & E Loss (ft)	0.05	Cum SA (acres)	0.07	0.26	0.24		

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1515.286

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.7	868	4.29	866.82	5.39	866	7.85	864.16
8.26	863.86	10.73	862	10.98	861.82	13.4	860	13.7	859.78
16.07	858	16.44	857.73	18.74	856	19.19	855.67	21.41	854
22.23	853.39	24.08	852	26.57	851.11	27.6	850.74	29.55	850
31.75	849.36	32.79	849.08	36.69	848	37.86	847.6	42.53	846
43.51	845.63	48.07	844	52.12	842.63	53.97	842	55.86	841.03
57.85	840	57.98	839.91	58.13	839.83	58.24	839.77	63.6	839.93
64.58	839.96	64.6	839.97	64.93	840	65.18	840.15	68.15	842
70.08	842.48	76.59	844	92.4	844	105.95	844	109	844.03
120.13	844.16	121.34	844.19	134.21	844.36	162.04	844.79	162.84	844.8
167.01	844.89	184.4	845.22	185.51	845.27	195.74	845.16	196.88	845.21
202.03	845.47	203.11	845.52	205.28	845.53	208.44	846	208.67	845.93
208.82	845.79	209.01	845.8	225.66	846.25	226.74	846.28	226.75	846.27
226.76	846.27	227.14	846	228.9	844.86	232.65	844.84	237.17	846
239.47	846.1	242.13	846.22	247.09	846.45	276.5	847.83	279.79	847.99
280.07	848	281.49	848	289.57	849.01	294.96	849.63	295.85	849.73
296.45	849.79	298.05	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.07	.03	76.59	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.07	76.59	15.63	15.77	15.95	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
135.997	161.893	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.00	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.72	Wt. n-Val.		0.030		

W.S. Elev (ft)	843.28	Reach Len. (ft)	15.63	15.77	15.95
Crit W.S. (ft)	843.01	Flow Area (sq ft)		46.03	
E.G. Slope (ft/ft)	*0.008292	Area (sq ft)		46.03	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	23.28	Top Width (ft)		23.28	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	3446.1	Conv. (cfs)		3446.1	
Length Wtd. (ft)	15.77	Wetted Per. (ft)		24.77	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	298.05	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.05	0.76	0.49
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	0.23	0.24

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1499.515

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.77	868	3.47	867.49	5.53	866	7.04	864.89
8.25	864	10.64	862.24	10.96	862	11.81	861.37	13.71	860
14.89	859.16	16.5	858	18.71	856.43	19.31	856	19.56	855.83
22.17	854	23.47	853.08	25.01	852	28.27	850.21	28.62	850
30.14	849.56	30.29	849.52	35.54	848	38.38	847.16	42.33	846
47.24	844.38	48.46	844	52.47	842.43	53.6	842	53.98	841.82
54.58	841.55	57.99	840	58.21	839.9	58.52	839.77	61.55	839.87
65.44	839.96	65.46	839.98	65.49	840	66.04	840.31	68.49	842
80.82	843.88	81.31	843.96	81.42	843.97	81.95	844	90.87	844
123.44	844	137.09	843.98	137.15	843.98	138.15	844	138.83	844.01
150.58	844.21	155.86	844.45	158.44	844.52	159.17	844.54	159.74	844.55
160.3	844.56	160.87	844.58	161.85	844.6	163.17	844.63	164.14	844.65
177.96	845.05	178.84	845.08	179.47	845.1	192.68	845.01	193.65	845.03
200.28	845.37	206.94	845.48	209.42	845.85	209.75	845.9	210.1	845.95
210.48	846	210.74	846	210.83	846.04	210.87	846.05	210.88	846.05
210.94	846.05	211.41	846.04	216.93	846.01	218.7	846	219.16	846
227.72	846	228.71	845.98	228.78	846.04	229.01	845.93	229.62	845.53
230.02	845.25	231.73	844.03	231.76	844	233.06	844	238.2	844.96
240.76	845.44	245.28	846	275.26	847.37	279.47	847.51	282.62	847.62
290.68	848	292.69	848	294.39	848.28	302.89	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.46	.03	80.82	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
48.46 80.82 42.49 35.17 24.56 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
137.655	163.551	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.16	Reach Len. (ft)	42.49	35.17	24.56
Crit W.S. (ft)		Flow Area (sq ft)		46.79	
E.G. Slope (ft/ft)	0.008757	Area (sq ft)		46.79	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	3353.3	Conv. (cfs)		3353.3	
Length Wtd. (ft)	34.73	Wetted Per. (ft)		26.88	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	302.89	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.05	0.75	0.49
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	0.22	0.24

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1464.257

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.37	868	4.34	867.45	6.89	866	8.91	864.85
10.41	864	13.61	862.17	13.87	862	14.09	861.85	16.93	860
19.87	858.03	22.8	856	23.66	855.4	25.66	854	27	853
28.29	852	30.53	850.25	30.85	850	31.67	849.7	36.3	848
42.32	846	42.34	845.99	47.71	844	51.45	842.52	52.66	842
53.84	841.57	58.23	840	58.43	839.93	59.45	839.63	62.17	839.48
64.07	839.39	64.61	839.89	64.76	840	67.25	841.22	68.67	842
69.29	842.06	71.48	842.29	79.51	842.3	85.98	842.47	86.23	842.48
90.38	842.55	91.59	842.57	98.6	842.74	101.61	842.82	104.64	842.86
146.33	844	180.49	844	181.26	844.02	181.89	844.05	190.71	844.37
193.85	844.48	194.8	844.52	195.93	844.57	198.36	844.7	201.82	844.88
204.86	845.05	212.27	845.39	220.97	845.58	229.69	845.62	230.38	845.6
230.41	845.63	230.5	845.58	232.29	844.43	233	844.05	233.12	844
234.98	844	258.59	846	273.8	846.82	285.11	847.43	293.43	848
301.47	849.38	305.3	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	51.45	.03	71.48	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
51.45 71.48 39.61 55.52 66.66 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
244.051	265.678	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.93	Reach Len. (ft)	39.61	55.52	66.66
Crit W.S. (ft)	842.93	Flow Area (sq ft)	0.22	43.37	13.80
E.G. Slope (ft/ft)	*0.006947	Area (sq ft)	0.22	43.37	13.80
Q Total (cfs)	313.80	Flow (cfs)	0.09	287.89	25.82
Top Width (ft)	56.95	Top Width (ft)	1.05	20.03	35.87
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	6.64	1.87
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)	0.21	2.17	0.38
Conv. Total (cfs)	3765.0	Conv. (cfs)	1.1	3454.1	309.8
Length Wtd. (ft)	56.10	Wetted Per. (ft)	1.13	21.28	35.88
Min Ch El (ft)	839.39	Shear (lb/sq ft)	0.08	0.88	0.17
Alpha	1.36	Stream Power (lb/ft s)	305.30	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.05	0.71	0.48
C & E Loss (ft)	0.03	Cum SA (acres)	0.07	0.20	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1406.971

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	860	4.53	858	9.03	856.04	9.12	856	9.29	855.93
14.1	854	16.34	853.16	19.41	852	23.95	850.21	24.45	850
25.22	849.7	28.3	848.48	29.53	848	29.56	847.99	35.13	846
36.59	845.34	39.3	844.24	39.9	844	41.26	843.3	43.86	842
44.28	841.92	44.46	841.88	46.89	841.41	48.18	841.11	49.71	840.82
50.96	840.53	53.07	840.02	53.1	840.01	53.15	840	54.85	839.4
57.03	838.55	58.84	838.46	60.45	838.4	61.66	839.32	62.52	840
64.74	841.72	65.12	842	77.22	842.33	84.67	842.54	91.2	842.72
113.53	843.34	115.46	843.39	122.19	843.58	138.27	844	148.44	843.69
155.6	843.66	160.98	843.64	170.68	843.84	174.81	844	204.08	844
204.64	844.13	205.36	844.29	207	844.07	207.27	844.08	208.57	844.34
208.83	844.43	209.84	844.4	220.31	844.29	227.41	844.26	227.81	844.39
228.54	843.97	237.16	844	240.75	844	245.55	844.17	256.7	844.48
264.78	844.62	268.16	844.76	273.32	844.83	275.68	844.85	277.23	844.86
280.08	844.97	282.36	845	284.56	845.07	287.16	845.13	292.69	845.4
302.58	845.98	302.64	845.99	302.87	846	308.23	847.84	308.7	848
313.06	849.51	314.49	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	43.86	.03	65.12	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
43.86	65.12	39.22	38.06	42.21	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
131.644	175.564	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.55	Reach Len. (ft)	39.22	38.06	42.21
Crit W.S. (ft)	842.01	Flow Area (sq ft)	0.30	51.57	5.53
E.G. Slope (ft/ft)	*0.004903	Area (sq ft)	0.30	51.57	5.53
Q Total (cfs)	313.80	Flow (cfs)	0.12	306.69	6.99
Top Width (ft)	42.30	Top Width (ft)	1.10	21.26	19.94
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	5.95	1.26
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)	0.28	2.43	0.28
Conv. Total (cfs)	4481.7	Conv. (cfs)	1.8	4380.1	99.8
Length Wtd. (ft)	39.07	Wetted Per. (ft)	1.23	22.97	19.95
Min Ch El (ft)	838.40	Shear (lb/sq ft)	0.08	0.69	0.08
Alpha	1.16	Stream Power (lb/ft s)	314.49	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.05	0.65	0.47
C & E Loss (ft)	0.14	Cum SA (acres)	0.07	0.18	0.19

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: Unt to Dotson
REACH: Unt to Dotson RS: 1367.937

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.95	858	5.89	857.65	10.34	856	13.92	854.7
15.81	854	19.11	852.81	21.31	852	24.55	850.8	26.72	850
28.34	849.23	30.9	848	31.75	847.54	34.55	846	36.32	845.07
37.61	844.37	38.28	844	44.55	843.12	53.39	842	56.5	841.27
58.43	840.79	61.61	840	68.13	840	69.28	839.37	69.93	838.93
70.79	838.28	71.98	838.27	73.86	838.27	74.84	839.69	75.02	840
75.47	840.58	76.63	842	90.84	842	106	841.43	139.39	840.19
141.31	840.13	145.93	840.11	147.3	840.1	148.6	840.1	150.59	840.1
150.84	840.09	151.14	840.09	151.37	840.09	151.51	840.1	151.65	840.1
178.81	844.27	179.69	844.27	180.54	844.26	182.65	844.25	187.26	844.08
188.35	844.07	199.49	844.02	202.71	844	210.22	843.53	215.55	843.23
216.93	843.45	217.53	843.59	218.43	843.65	218.52	843.66	234.2	843.52
237.2	843.47	237.46	843.48	237.7	843.41	238.13	843.31	238.65	843.14
239.44	842.84	240.92	842.27	241.65	842	241.86	842	242.64	842.05
246.67	842.3	249.49	842.47	250.51	842.48	257.11	842.6	262.1	842.79
282.62	843.36	286.96	843.45	288.37	843.47	289.91	843.48	294.65	843.57
295.81	843.59	301.31	843.71	308.25	843.9	308.5	843.9	311.35	844
317.09	844.64	318.03	844.75	320.42	845.07	326.86	846	330.02	846.85
334.04	847.8	334.85	848	338.19	848.97	339.42	849.29	341.62	849.9
341.95	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	53.39	.03	76.63	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
53.39 76.63 25.58 34.6 15.59 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
178.81	341.95	844.5	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138.358	184.172	850

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 842.88	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.100	* 0.030	* 0.035 *

W.S. Elev (ft)	842.81	Reach Len. (ft)	25.58	34.60	15.59
Crit W.S. (ft)	841.60	Flow Area (sq ft)	2.57	63.73	92.02
E.G. Slope (ft/ft)	0.000854	Area (sq ft)	2.57	63.73	100.07
Q Total (cfs)	313.80	Flow (cfs)	0.61	168.24	144.95
Top Width (ft)	114.52	Top Width (ft)	6.37	23.24	84.92
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)	0.24	2.64	1.58
Max Chl Dpth (ft)	4.54	Hydr. Depth (ft)	0.40	2.74	1.49
Conv. Total (cfs)	10736.4	Conv. (cfs)	20.7	5756.3	4959.3
Length Wtd. (ft)	28.44	Wetted Per. (ft)	6.42	25.88	64.34
Min Ch El (ft)	838.27	Shear (lb/sq ft)	0.02	0.13	0.08
Alpha	1.24	Stream Power (lb/ft s)	341.95	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.05	0.60	0.42
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	0.16	0.14

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1332.978

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.88	858.14	6.27	858	6.71	857.84	12.18	856
15.58	854.87	18.17	854	21.93	852.65	23.72	852	25.64	851.29
29.24	850	32.16	848.87	34.54	848	38.36	846.65	40.67	845.75
43.75	844.74	45.45	844.19	46.04	844	46.91	843.92	52.17	843.46
53.75	843.38	68.11	842.12	68.55	842.08	68.78	842.06	68.89	842.06
69.33	842	75.99	840.14	76.64	840	77.74	839.66	82.19	838.19
85.65	838.19	86.76	838.17	87.61	838.7	88.56	839.22	90.01	840
92.07	841.46	92.83	842	119.09	842	143.01	842	151.56	842.72
162.98	843.81	164.04	843.9	164.46	843.94	165.05	844	170.56	844
187.25	844.26	189.41	844.27	189.76	844.27	190.25	844.27	191.13	844.26
193.13	844.22	201.67	844.08	202.76	844.05	204.4	844	207.8	843.89
209.87	843.81	212.33	843.72	218.23	843.42	219.04	843.39	226.47	842.92
227.32	842.85	228.08	842.78	229.95	842.68	231.11	842.69	232.69	842.79
233.69	842.9	239.21	842.86	251.28	842.69	252.28	842.75	253.24	842.49
254.89	842.1	255.19	842	265.84	842	286.65	842.6	288.68	842.65
292.29	842.7	296.15	842.75	298.64	842.8	302.02	842.84	305.08	842.92
309.02	843.03	311.43	843.07	316.18	843.24	322.02	843.5	325.11	843.53
330.81	843.86	331.16	843.86	333.54	844	339.66	845.13	343.55	846
344.26	846.17	351.49	848	360.88	850				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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*********************************************
       0      .1   68.11     .03   92.83    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         68.11   92.83           139.54     106    9.38             .1      .3
Blocked Obstructions     num=        1
   Sta L    Sta R    Elev
************************
 165.052 188.765     855

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         *  842.84  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.17  * Wt. n-Val.             *   0.100  *   0.030  *   0.035  *
* W.S. Elev (ft)         *  842.67  * Reach Len. (ft)        *  139.54  *  106.00  *    9.38  *
* Crit W.S. (ft)         *  841.39  * Flow Area (sq ft)      *    1.71  *   69.56  *   51.83  *
* E.G. Slope (ft/ft)     *0.001511  * Area (sq ft)           *    1.71  *   69.56  *   51.83  *
* Q Total (cfs)          *  313.80  * Flow (cfs)             *    0.41  *  255.45  *   57.94  *
* Top Width (ft)         *  126.40  * Top Width (ft)         *    6.24  *   24.72  *   95.45  *
* Vel Total (ft/s)       *    2.55  * Avg. Vel. (ft/s)       *    0.24  *    3.67  *    1.12  *
* Max Chl Dpth (ft)      *    4.50  * Hydr. Depth (ft)       *    0.27  *    2.81  *    0.54  *
* Conv. Total (cfs)      *  8073.9  * Conv. (cfs)            *    10.7  *  6572.5  *  1490.7  *
* Length Wtd. (ft)       *   95.95  * Wetted Per. (ft)       *    6.26  *   26.40  *   95.57  *
* Min Ch El (ft)         *  838.17  * Shear (lb/sq ft)       *    0.03  *    0.25  *    0.05  *
* Alpha                  *    1.72  * Stream Power (lb/ft s) *  360.88  *    0.00  *    0.00  *
* Frctn Loss (ft)        *    0.29  * Cum Volume (acre-ft)   *    0.05  *    0.55  *    0.39  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)         *    0.06  *    0.14  *    0.11  *
*************************************************************************************************

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.
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: Unt to Dotson
REACH: Unt to Dotson      RS: 1222.955

INPUT
Description:
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0     870    3.88     868    7.59     866   11.29     864   15.02     862
   18.84     860   22.69     858   26.63     856   30.72     854   34.82     852
   38.92     850   43.02     848   47.74     846   53.04     844   70.44     842
   86.13     840   90.07     838   90.44   837.8   90.73  837.62   90.95  837.51
    93.1  837.37   93.55  837.34   93.82  837.34   93.92   837.4   94.12  837.53
```

94.72	838	96.11	838.9	97.69	840	100.73	840.82	104.97	842
111.84	842	115.56	841.92	115.92	841.92	127.01	841.69	128.09	841.67
130.59	841.62	137.24	841.49	144.6	841.34	199.28	840.97	200.66	840.96
204.23	841	207.55	841.03	219.58	840.95	221.55	840.98	223.77	841.01
237.29	841.32	238.13	841.33	240.62	841.36	242.15	841.39	243.79	841.42
252.47	841.48	252.72	841.48	253.1	841.48	270.05	841.53	272.28	841.55
273.55	841.5	282.4	841.99	282.71	842	336.07	842	342.95	842.38
344.02	842.45	344.89	842.51	350.97	842.9	353.94	843.07	355.98	843.2
357.41	843.29	359.21	843.41	368.65	843.94	369.82	844	375.59	845.5
377.1	846	383.41	847.61	384.05	847.77	384.99	848	389.64	848.91
395.73	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	86.13	.03	97.69	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.13	97.69	96.38	92.93	14.43	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
104.97	395.73	842	F

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 842.46	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 1.10	* Wt. n-Val.	* 0.100	* 0.030	* 0.035
* W.S. Elev (ft)	* 841.37	* Reach Len. (ft)	* 96.38	* 92.93	* 14.43
* Crit W.S. (ft)	* 841.37	* Flow Area (sq ft)	* 7.32	* 34.25	* 3.44
* E.G. Slope (ft/ft)	*0.008362	* Area (sq ft)	* 7.32	* 34.25	* 27.02
* Q Total (cfs)	* 313.80	* Flow (cfs)	* 7.67	* 295.96	* 10.17
* Top Width (ft)	* 124.87	* Top Width (ft)	* 10.72	* 11.56	* 102.59
* Vel Total (ft/s)	* 6.97	* Avg. Vel. (ft/s)	* 1.05	* 8.64	* 2.95
* Max Chl Dpth (ft)	* 4.03	* Hydr. Depth (ft)	* 0.68	* 2.96	* 0.69
* Conv. Total (cfs)	* 3431.6	* Conv. (cfs)	* 83.9	* 3236.5	* 111.2
* Length Wtd. (ft)	* 67.01	* Wetted Per. (ft)	* 10.80	* 13.00	* 5.18
* Min Ch El (ft)	* 837.34	* Shear (lb/sq ft)	* 0.35	* 1.38	* 0.35
* Alpha	* 1.46	* Stream Power (lb/ft s)	* 395.73	* 0.00	* 0.00
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	* 0.04	* 0.42	* 0.38
* C & E Loss (ft)	* 0.32	* Cum SA (acres)	* 0.04	* 0.09	* 0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may

indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Dotson
REACH: Unt to Dotson RS: 1128.537

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.82	858	5.15	857.34	7.87	856	9.02	855.43
11.91	854	13.96	852.98	15.94	852	18.64	850.66	19.97	850
23.16	848.41	23.99	848	24.8	847.64	28.53	846	29.16	845.73
33.19	844	33.3	843.99	34.17	843.88	39.82	843.23	49.17	842.15
50.56	842	63.79	840.54	68.71	840	71.35	838.02	71.38	838
71.46	837.97	73.22	837.28	74.18	836.91	74.98	836.73	76.21	836.57
81.66	837.47	84.51	838	85.03	838.2	86.13	838.86	87.33	839.52
88	840	116.55	840	143.04	840	149.01	839.95	149.24	839.95
151.71	839.97	151.87	839.97	155.1	839.98	155.15	839.98	160.09	840
174.23	840	177.87	839.95	177.92	839.95	184.19	839.86	189.92	839.76
193.68	839.85	199.64	839.8	215.13	839.79	221.66	839.9	224.62	839.9
228.2	839.89	239.11	839.96	240.05	840.12	240.52	840.08	258.33	840.57
261.05	840.65	261.99	840.68	262.65	840.7	262.7	840.7	262.71	840.7
262.72	840.7	262.74	840.7	262.77	840.7	262.82	840.69	262.88	840.69
262.95	840.69	263.01	840.69	263.32	840.68	271.64	840.43	299.17	840.97
312.76	841.23	350.43	842	350.64	842	376.13	843.15	384.46	843.55
393.91	844	398.12	845.53	399.43	846	406	848	410.95	848.95
416.25	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.71	.03	88	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
68.71 88 27.18 113.77 5.27 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
327.49	367.363	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.43	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.030	0.035	
W.S. Elev (ft)	841.41	Reach Len. (ft)	27.18	113.77	5.27	
Crit W.S. (ft)		Flow Area (sq ft)	9.09	70.18	280.38	
E.G. Slope (ft/ft)	0.000216	Area (sq ft)	9.09	70.18	280.38	
Q Total (cfs)	313.80	Flow (cfs)	1.57	114.73	197.50	
Top Width (ft)	265.90	Top Width (ft)	12.84	19.29	233.77	
Vel Total (ft/s)	0.87	Avg. Vel. (ft/s)	0.17	1.63	0.70	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	0.71	3.64	1.20	
Conv. Total (cfs)	21348.2	Conv. (cfs)	106.9	7805.4	13436.0	
Length Wtd. (ft)	42.29	Wetted Per. (ft)	12.92	20.86	233.81	
Min Ch El (ft)	836.57	Shear (lb/sq ft)	0.01	0.05	0.02	
Alpha	1.69	Stream Power (lb/ft s)	416.25	0.00	0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.02	0.31	0.33	
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	0.06	0.03	

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: Unt to Dotson
REACH: Unt to Dotson RS: 1014.243

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.8	858	11.73	856	17.38	854	22.62	852
27.64	850	32.59	848	40.38	846	50.7	844	87.79	842
112.75	840	119.16	839.33	121.01	838	126.48	836	128.03	835.43
134.3	835.52	135.49	836	140.05	838	143.75	840	146.3	840.65
167.47	840.43	173.05	840	206.14	838.48	236.67	839.61	291.6	838.79
324.11	839.36	362.07	840	379.89	840.61	406.57	840.33	432	842
509.35	844	514.12	846	520.25	848	528.65	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	119.16	.03	146.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
119.16	146.3	1	1	1	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev

432 487.76 850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.43	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.01	Wt. n-Val.	0.100	0.030	0.035	
W.S. Elev (ft)	841.42	Reach Len. (ft)	24.28	24.28	24.28	
Crit W.S. (ft)		Flow Area (sq ft)	23.84	114.04	488.57	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)	23.84	114.04	488.57	
Q Total (cfs)	313.80	Flow (cfs)	2.46	98.59	212.75	
Top Width (ft)	328.15	Top Width (ft)	24.14	27.14	276.87	
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)	0.10	0.86	0.44	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)	0.99	4.20	1.76	
Conv. Total (cfs)	44661.3	Conv. (cfs)	350.4	14031.6	30279.3	
Length Wtd. (ft)	24.28	Wetted Per. (ft)	24.23	29.12	277.01	
Min Ch El (ft)	835.43	Shear (lb/sq ft)	0.00	0.01	0.01	
Alpha	1.45	Stream Power (lb/ft s)	528.65	0.00	0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	0.07	0.28	
C & E Loss (ft)	0.00	Cum SA (acres)				

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Culverts

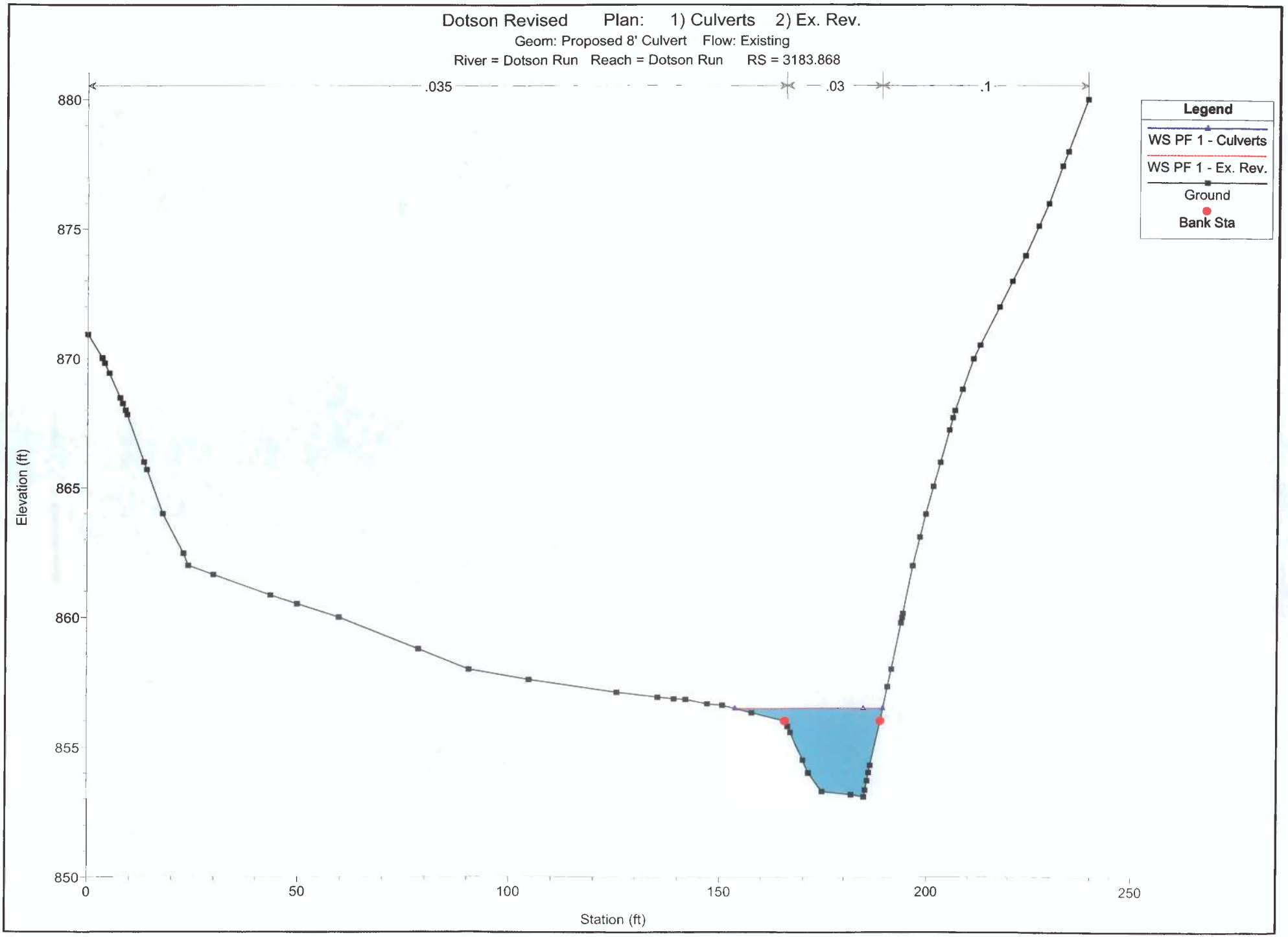
River: Dotson Run Reach: Dotson Run RS: 3183.868 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 3053.784 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2888.080 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used

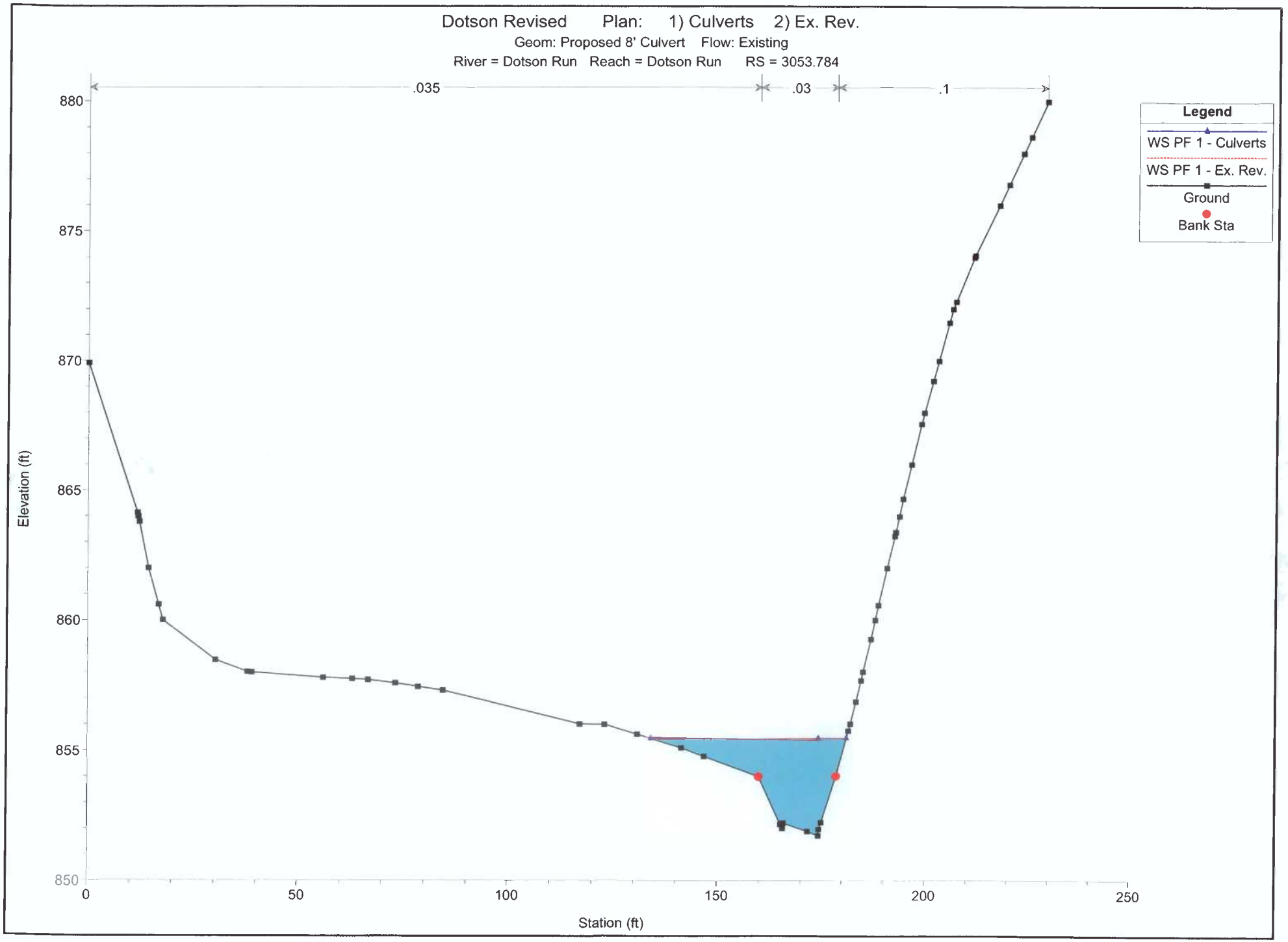
critical depth
for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2799.743 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2705.342 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2656.729 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2410.917 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2333.304 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

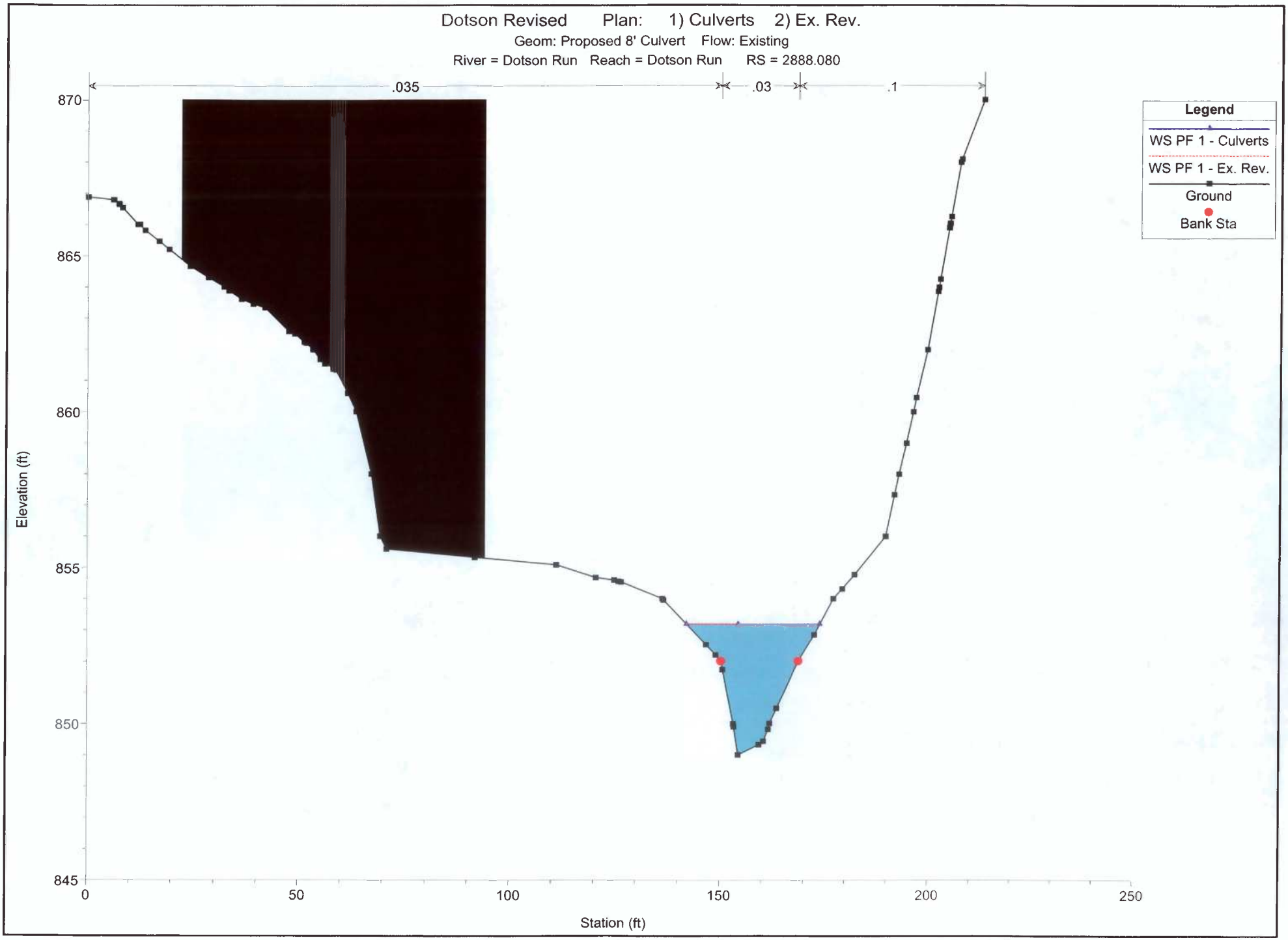
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Dotson Run RS: 2270.249 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Dotson Run Reach: Dotson Run RS: 2151.343 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Dotson Run Reach: Dotson Run RS: 2088.858 Profile: PF 1
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: Dotson Run Reach: Dotson Run RS: 2007.945 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1943.117 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1929.28 Profile: PF 1 Culv: Culvert #2
Note: The normal depth exceeds the height of the culvert. The program assumes that the normal depth is equal to the height
of the culvert.
River: Dotson Run Reach: Dotson Run RS: 1915.038 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1878.276 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1683.45 Profile: PF 1 Culv: Culvert #1
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
River: Dotson Run Reach: Dotson Run RS: 1487.336 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Dotson Run RS: 1453.111 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1430.579 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1390.627 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Lower RS: 1370.77 Profile: PF 1 Upstream

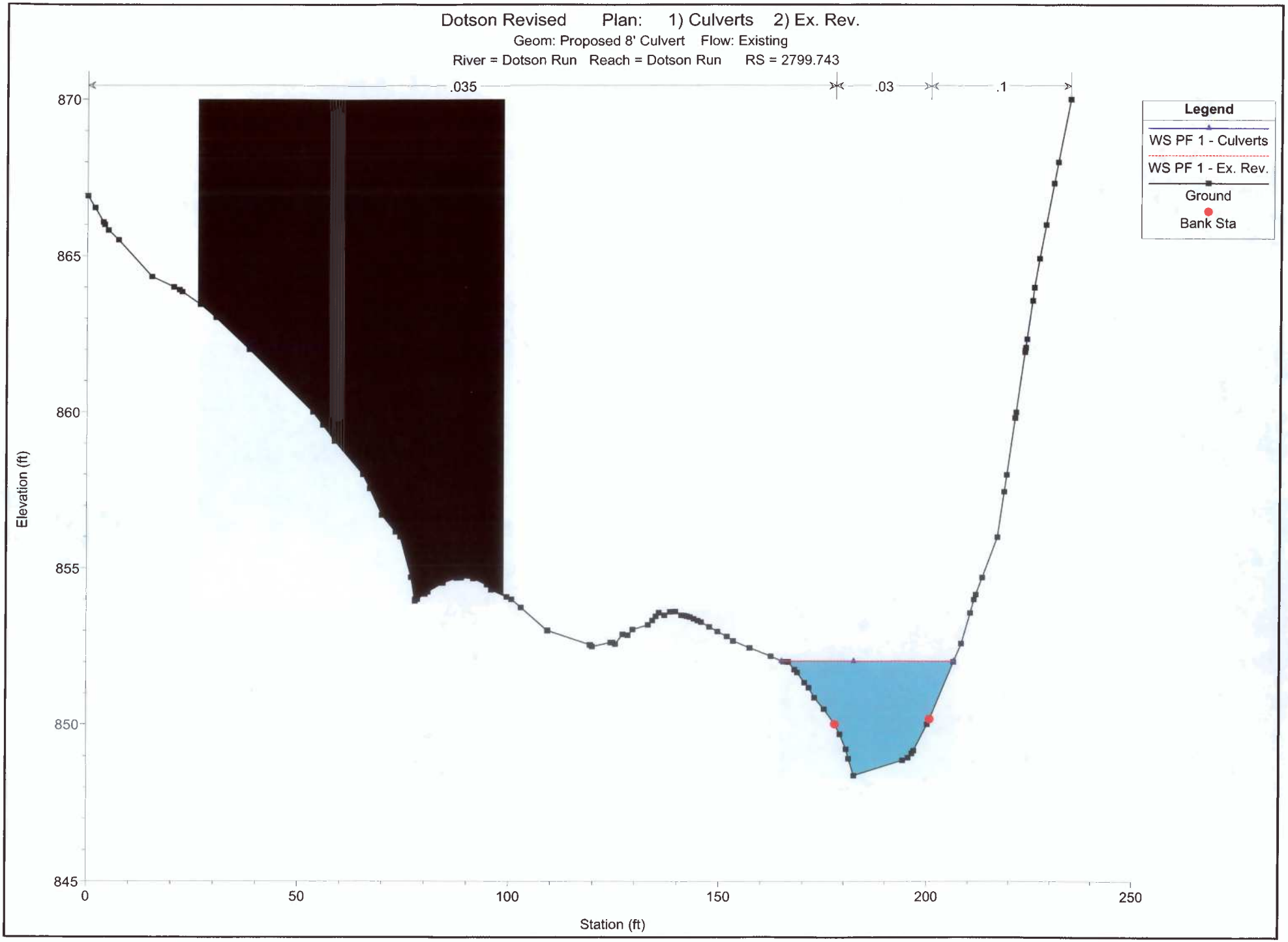
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Lower RS: 1370.77 Profile: PF 1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Dotson Run Reach: Lower RS: 1344.212 Profile: PF 1
Warning:Divided flow computed for this cross-section.
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, water surface was
used.
River: Dotson Run Reach: Lower RS: 1271.523 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Lower RS: 1182.267 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1130.779 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1059.794 Profile: PF 1
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: Unt to Dotson Reach: Unt to Dotson RS: 1464.257 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

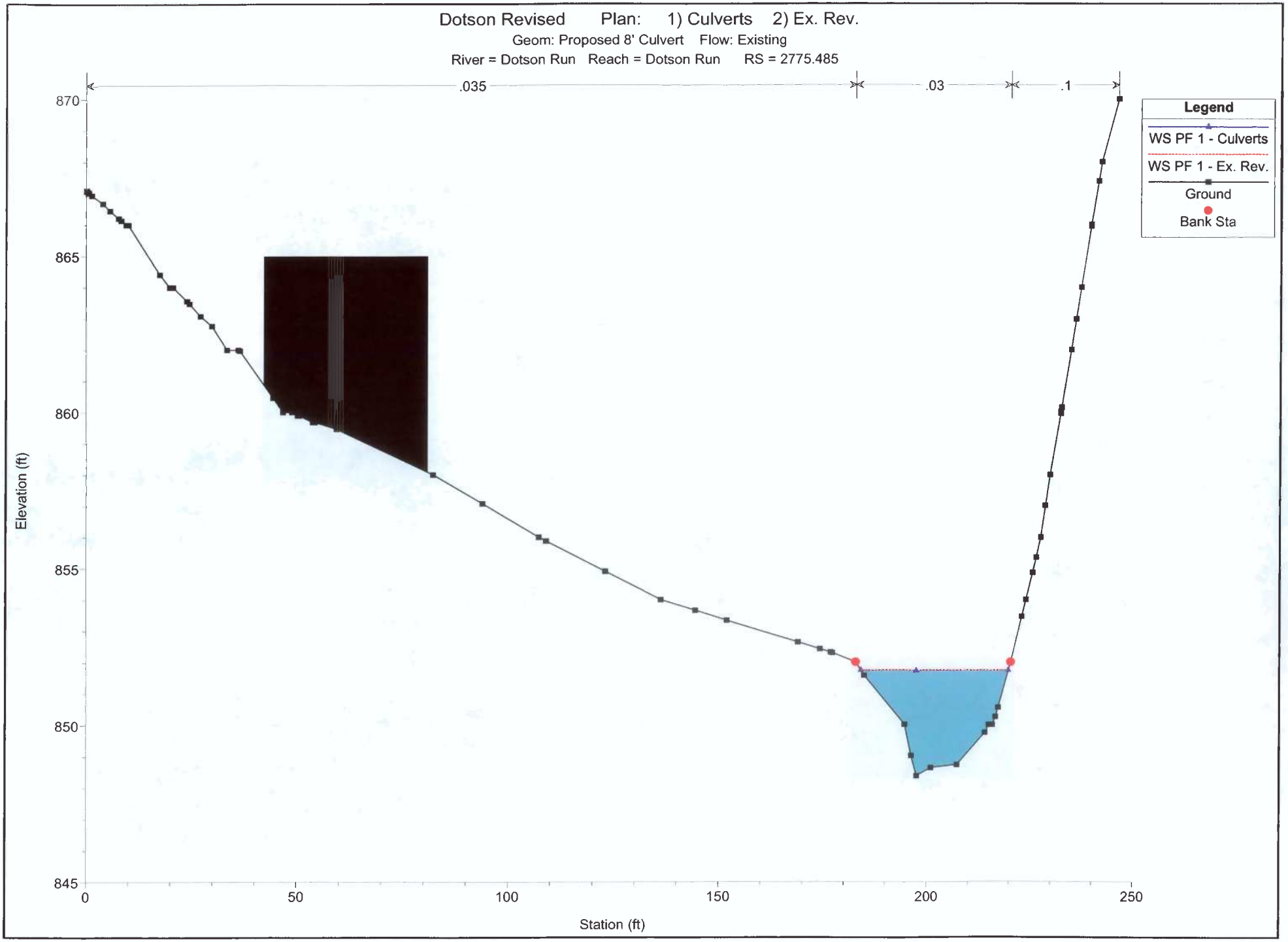
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Unt to Dotson Reach: Unt to Dotson RS: 1406.971 Profile: PF 1
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: Unt to Dotson Reach: Unt to Dotson RS: 1367.937 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Dotson Reach: Unt to Dotson RS: 1332.978 Profile: PF 1
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.
River: Unt to Dotson Reach: Unt to Dotson RS: 1222.955 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Dotson Reach: Unt to Dotson RS: 1128.537 Profile: PF 1
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.

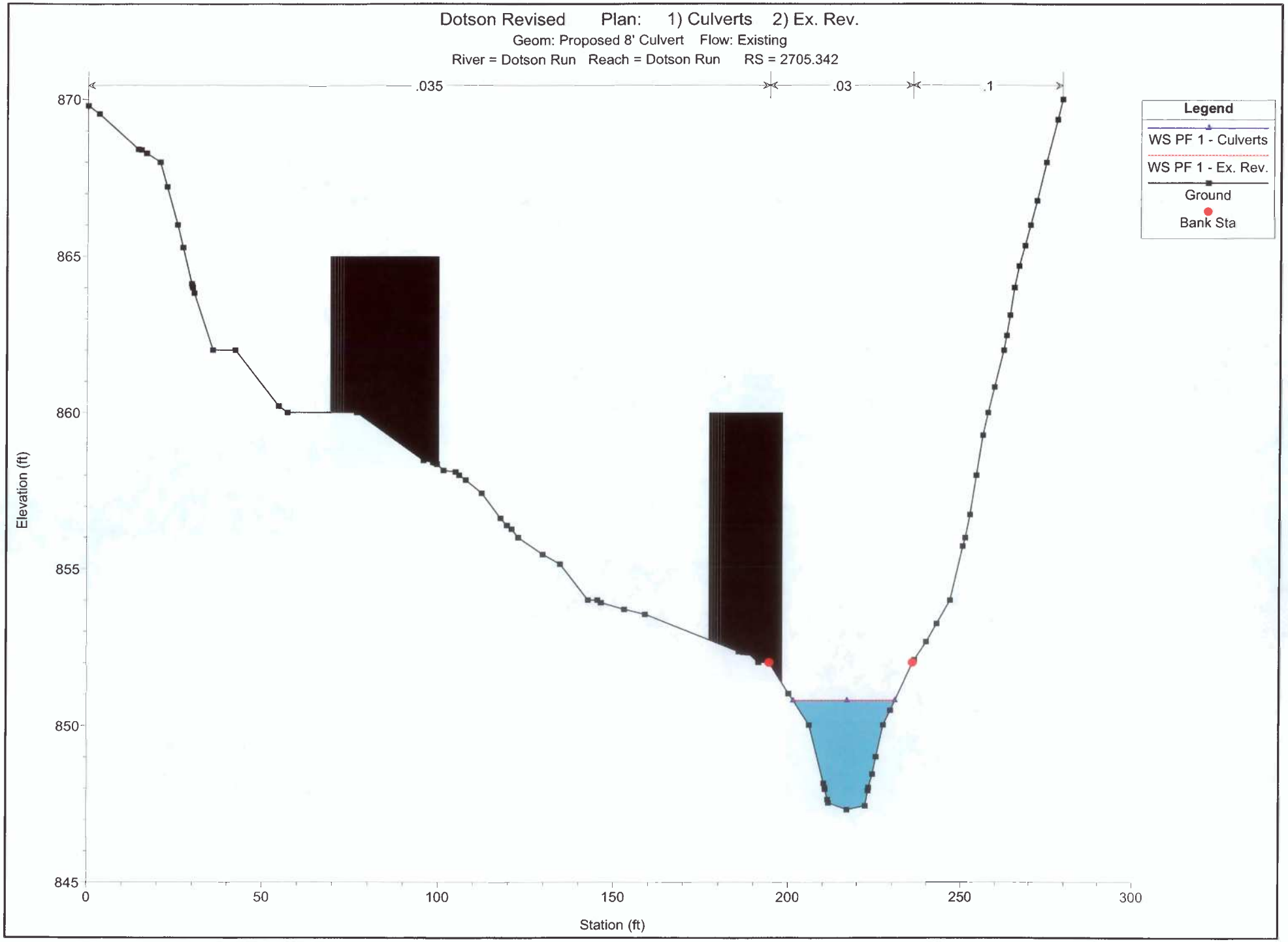

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 3183.868
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
0
50
100
150
200
250
Station (ft)

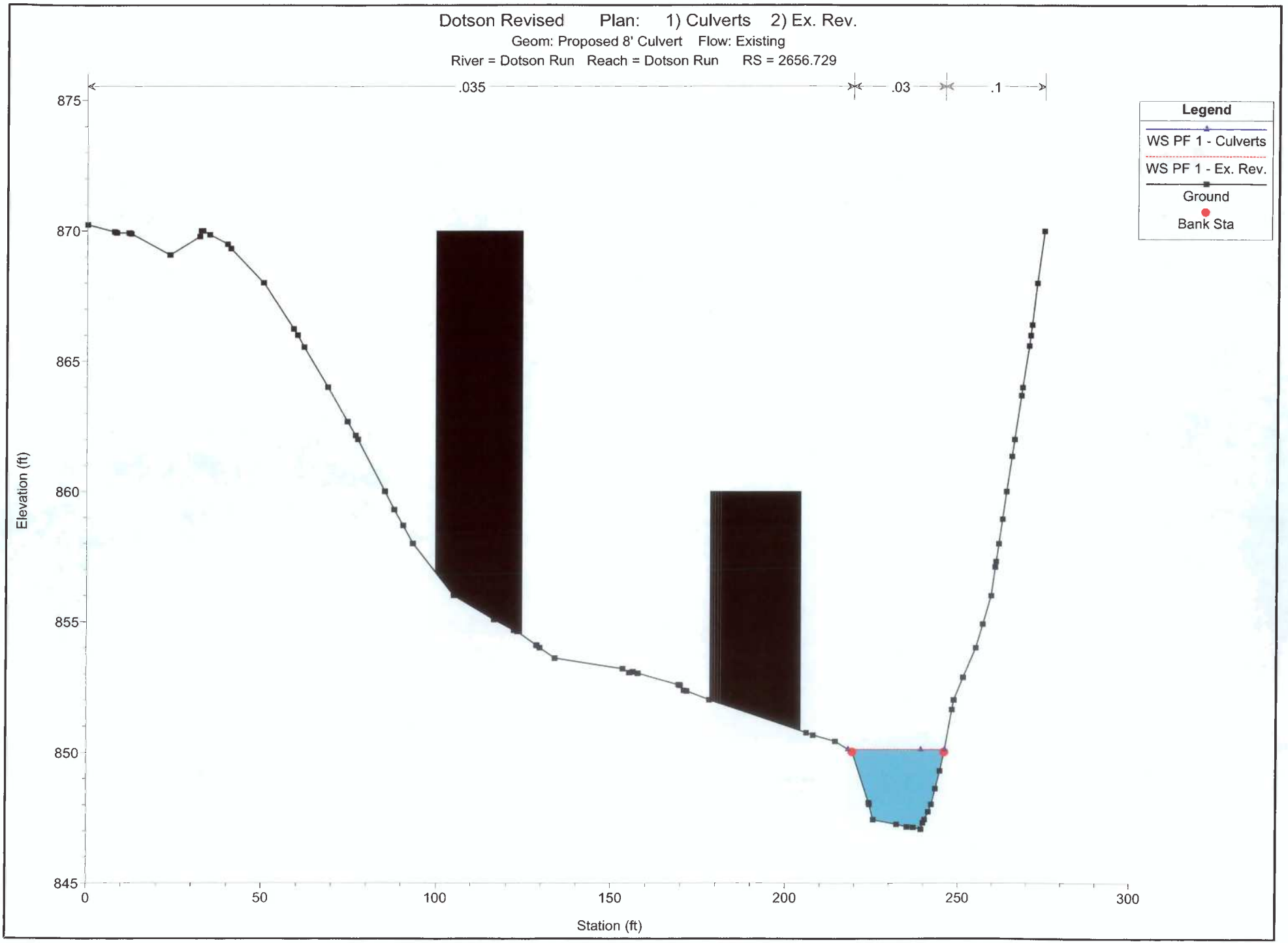

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 3053.784
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
0
50
100
150
200
250
Station (ft)

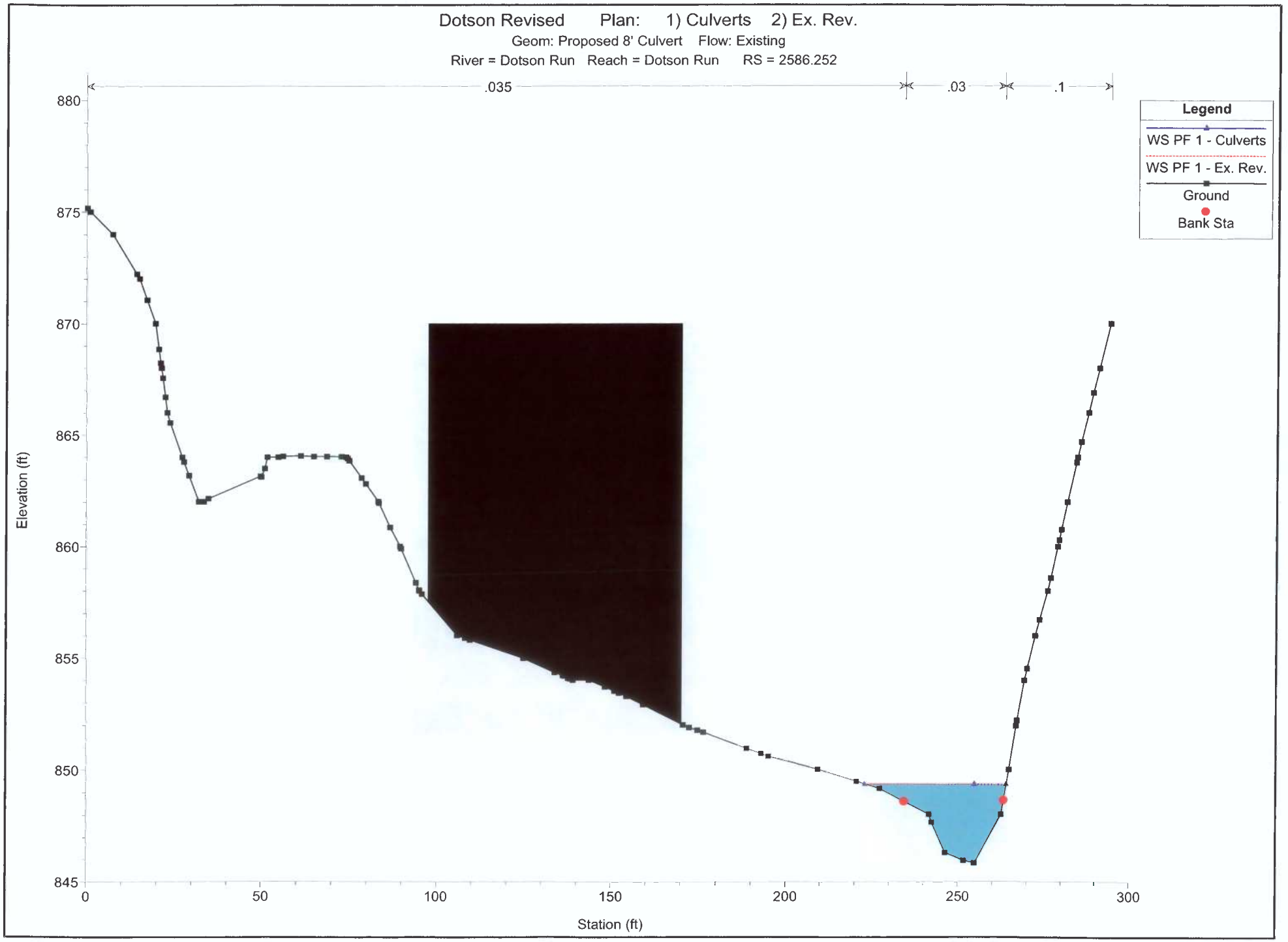

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2888.080
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)

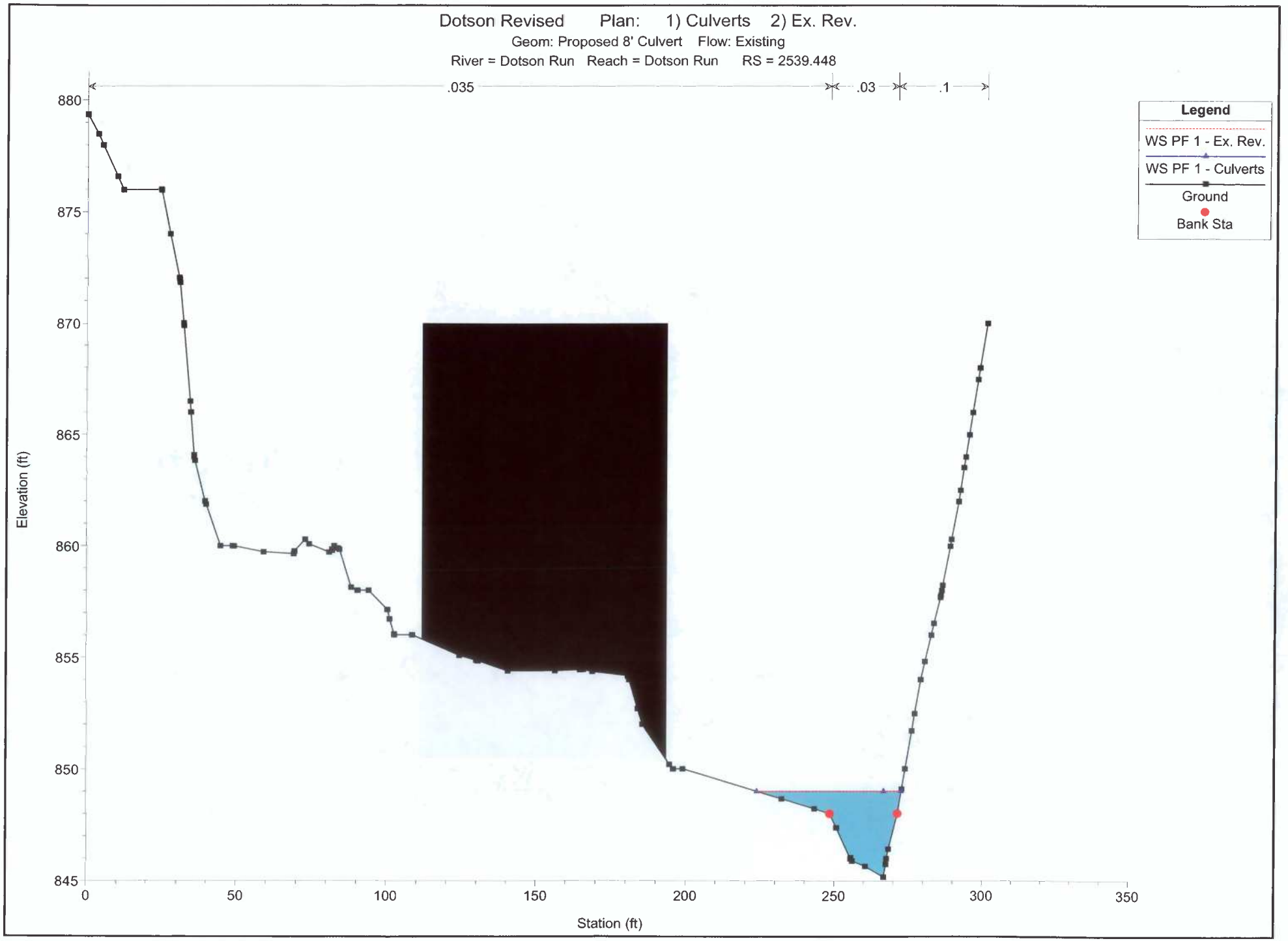

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2799.743
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)

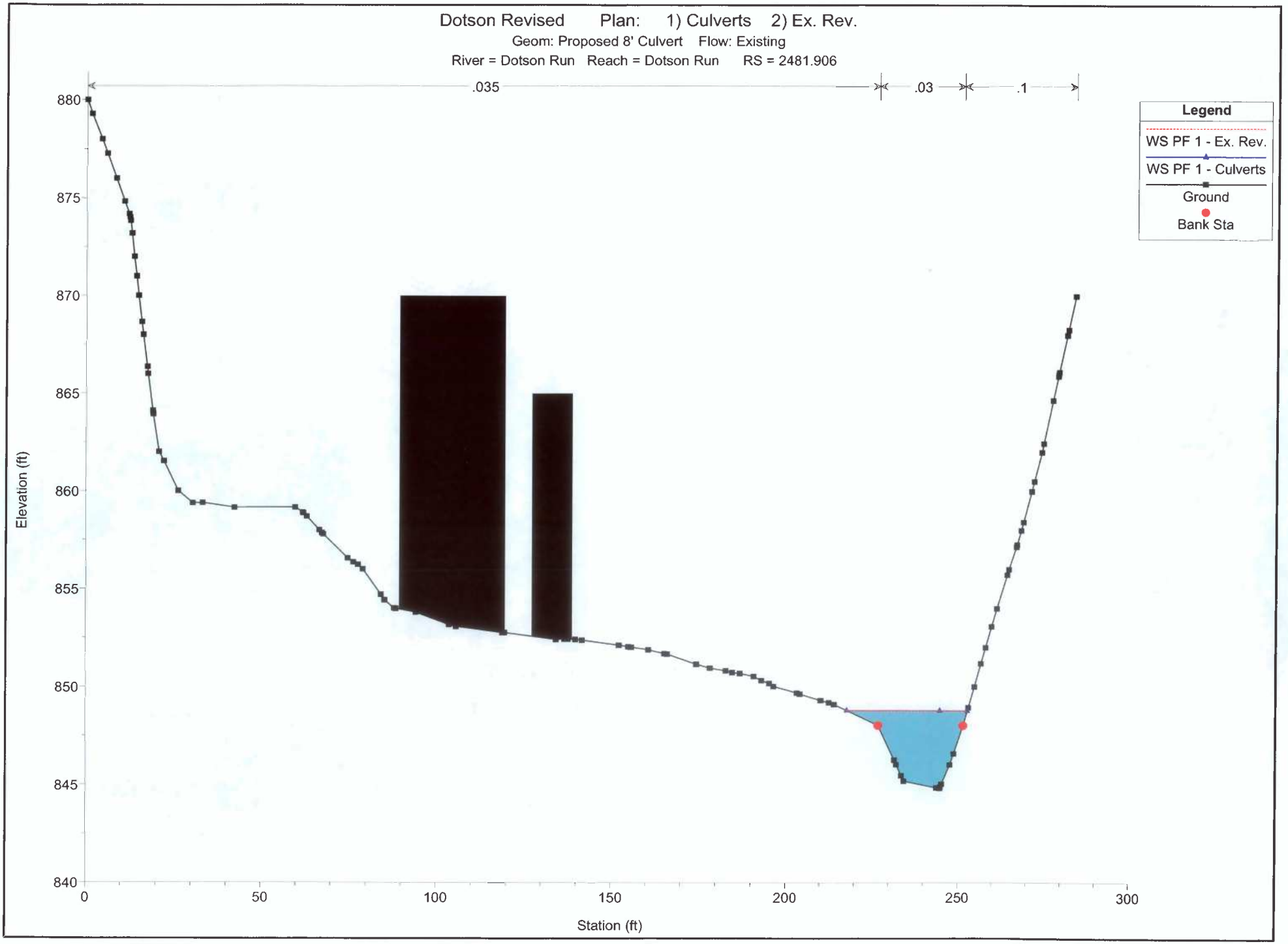

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2775.485
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)

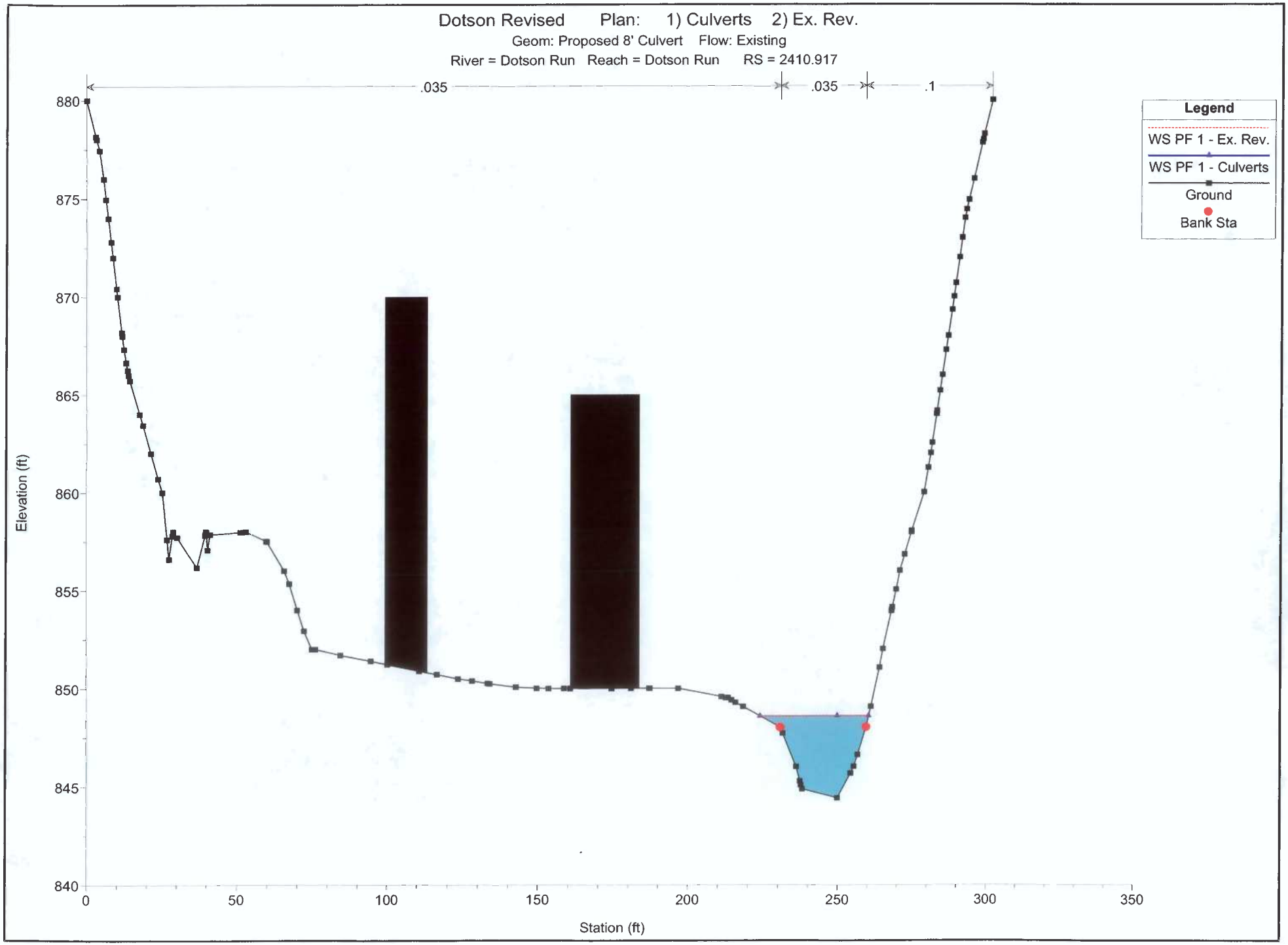

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2705.342
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)

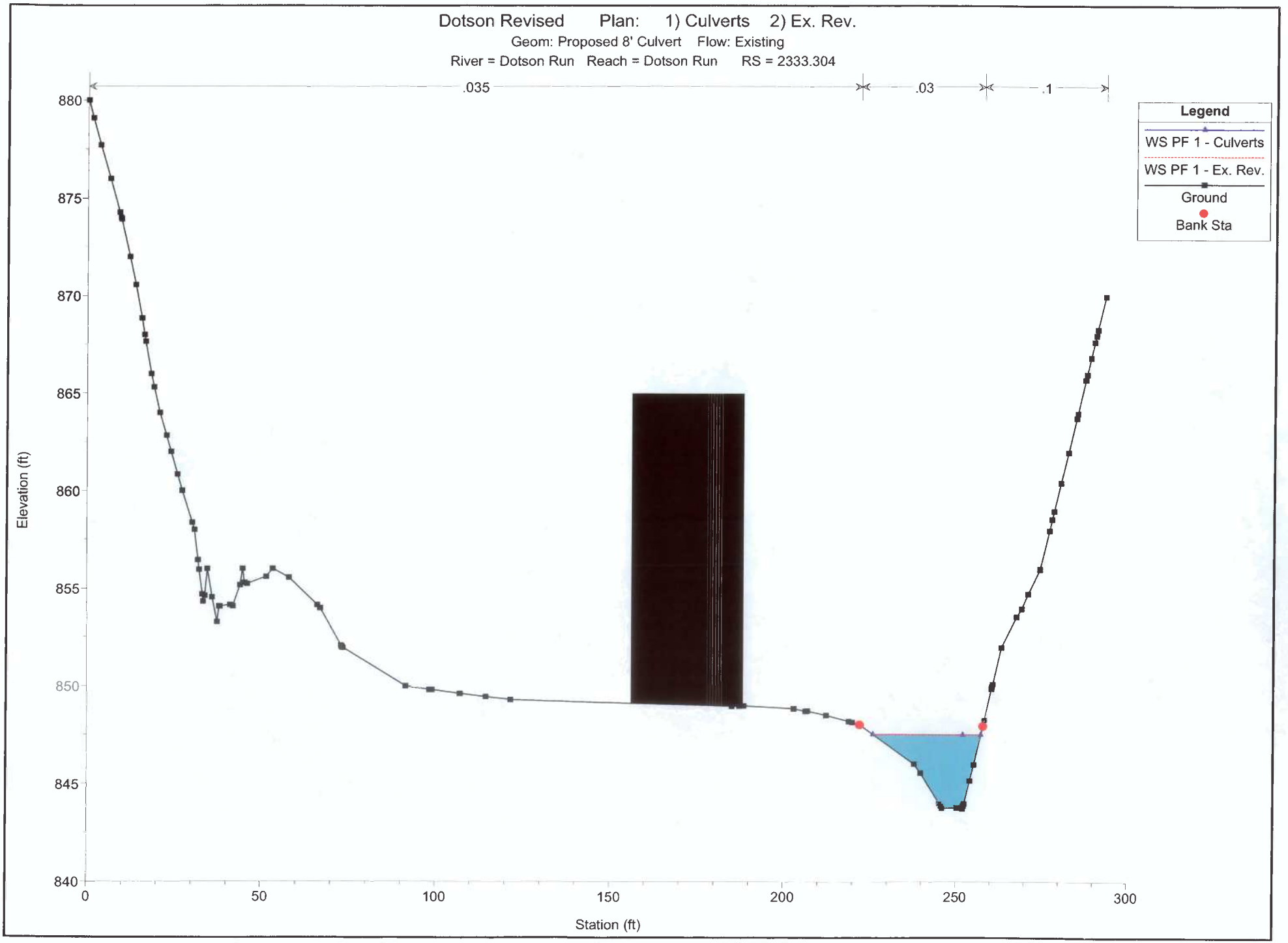

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2656.729
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
875
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)

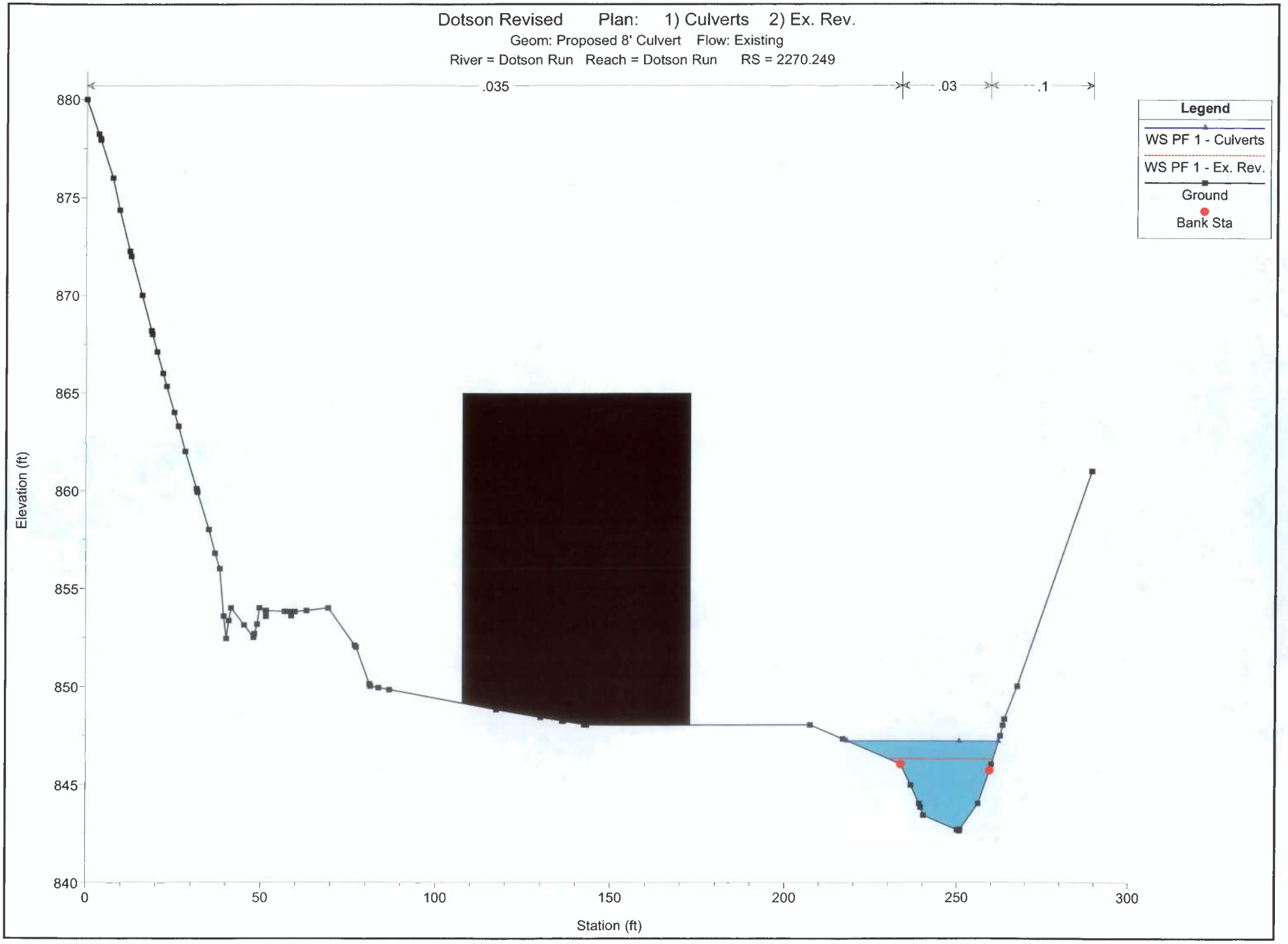

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2586.252
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)

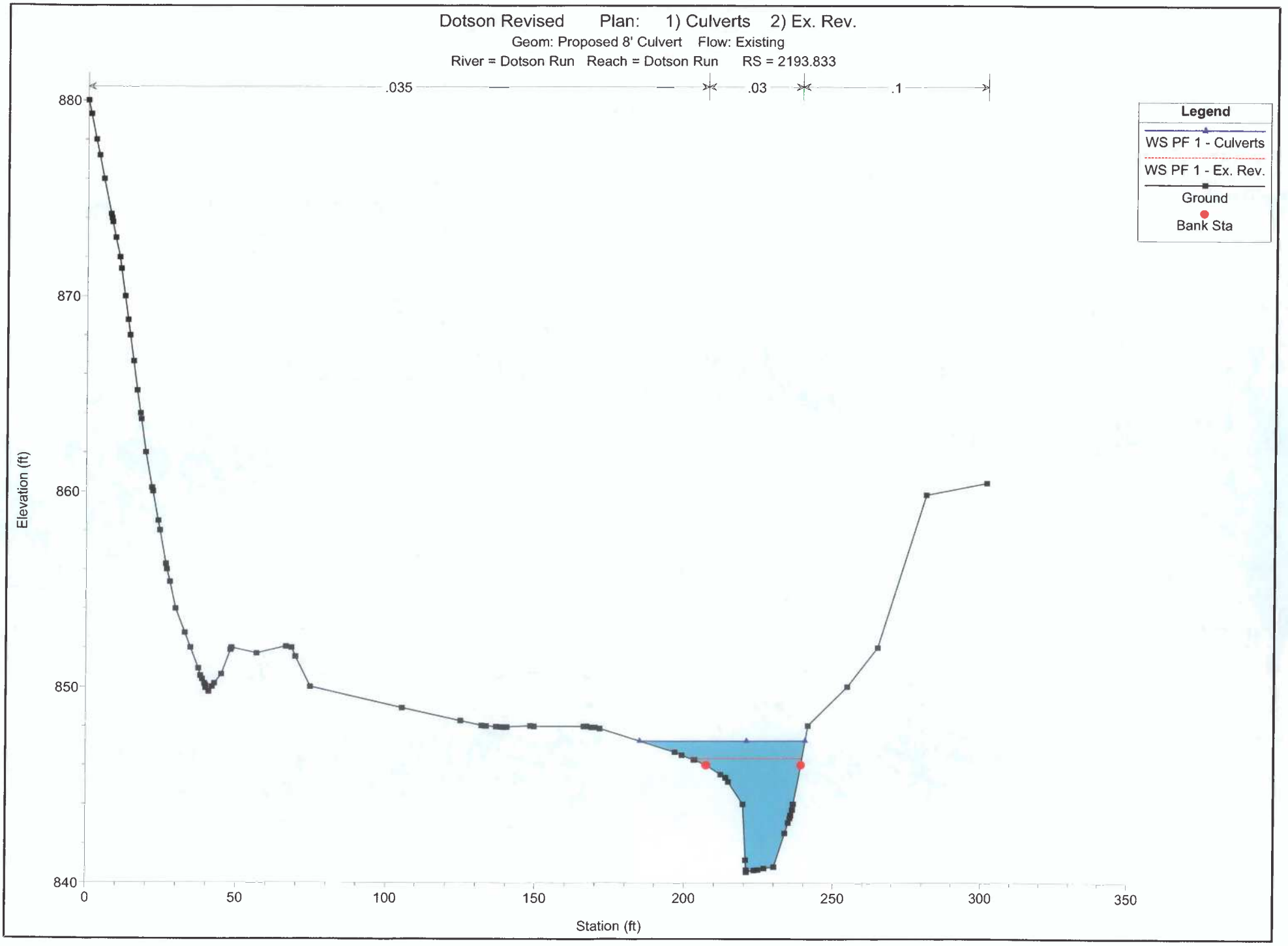

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2539.448
.035
.03
.1
Legend
WS PF 1 - Ex. Rev.
WS PF 1 - Culverts
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
0
50
100
150
200
250
300
350
Station (ft)

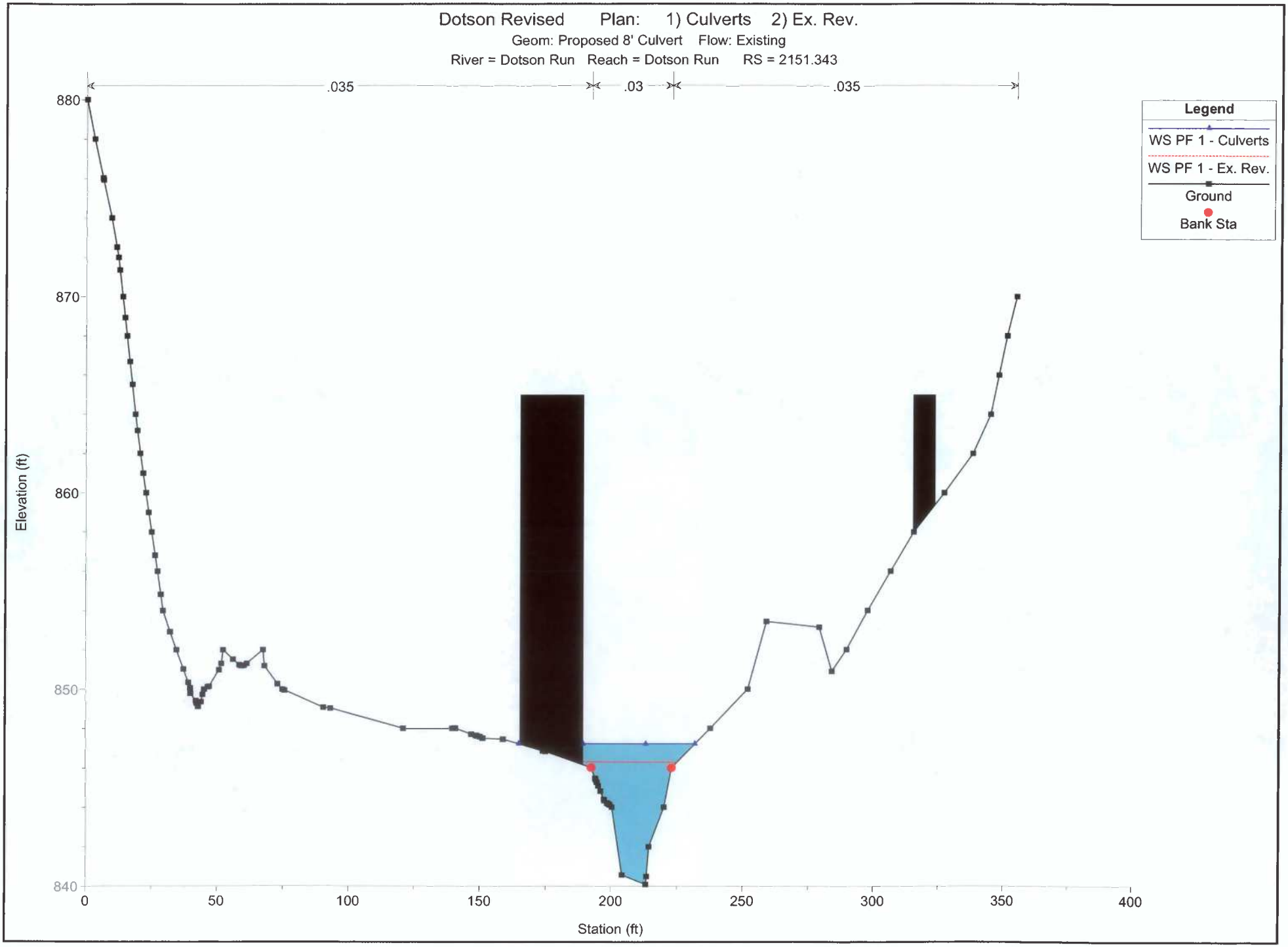

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2481.906
.035
.03
.1
Legend
WS PF 1 - Ex. Rev.
WS PF 1 - Culverts
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
840
0
50
100
150
200
250
300
Station (ft)

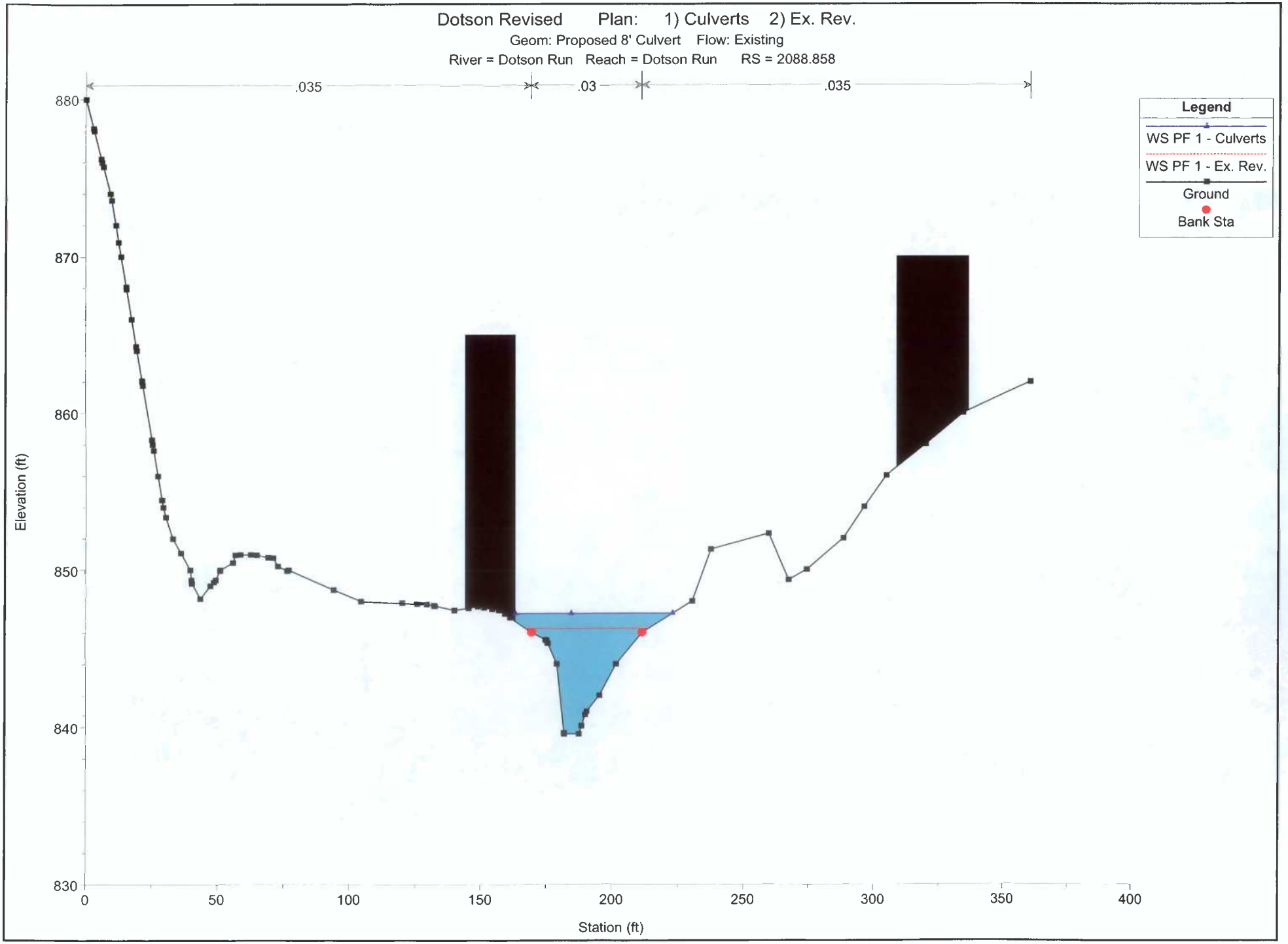

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2410.917
.035
.035
.1
Legend
WS PF 1 - Ex. Rev.
WS PF 1 - Culverts
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
840
0
50
100
150
200
250
300
350
Station (ft)

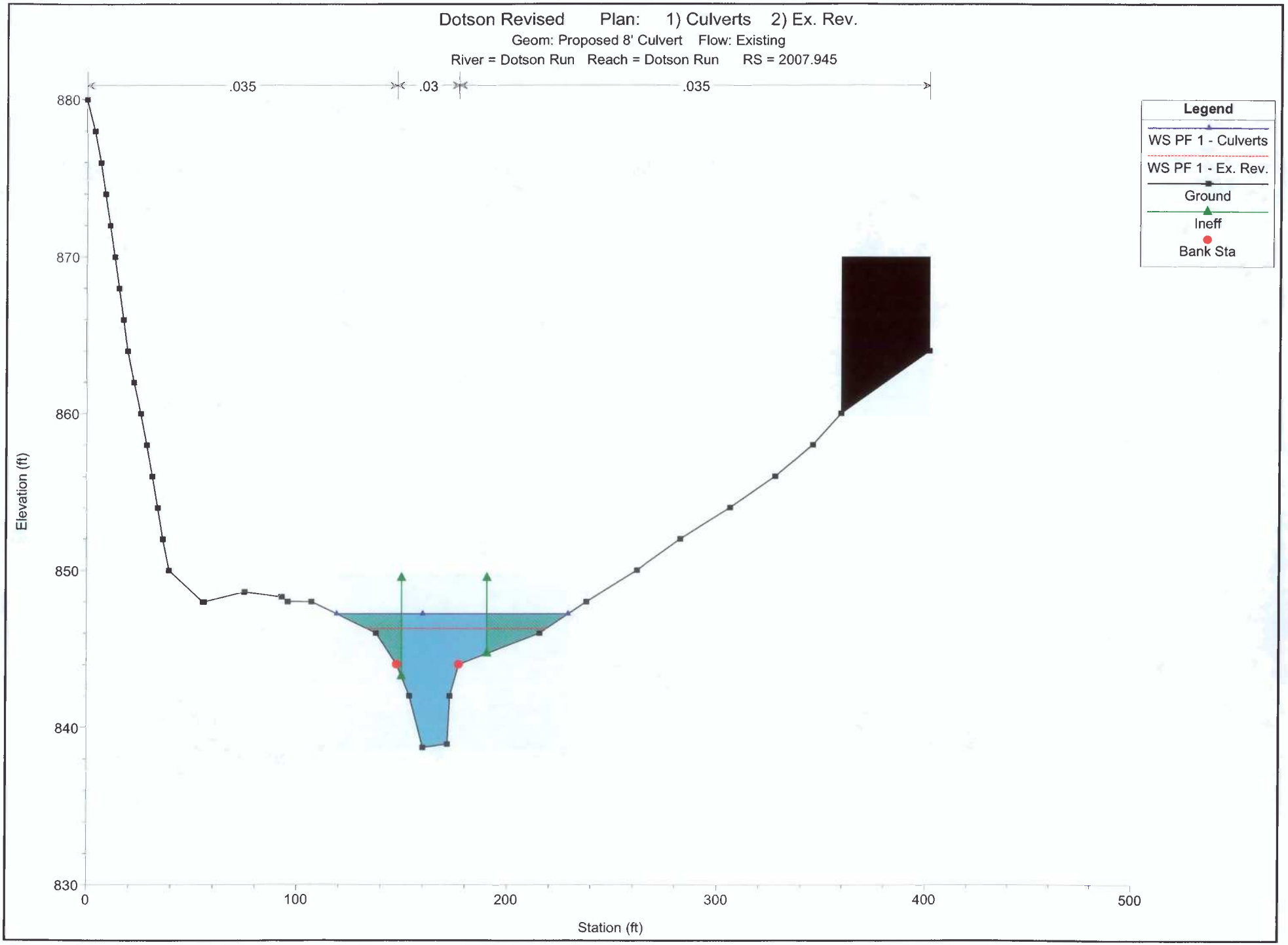

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2333.304
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
840
0
50
100
150
200
250
300
Station (ft)

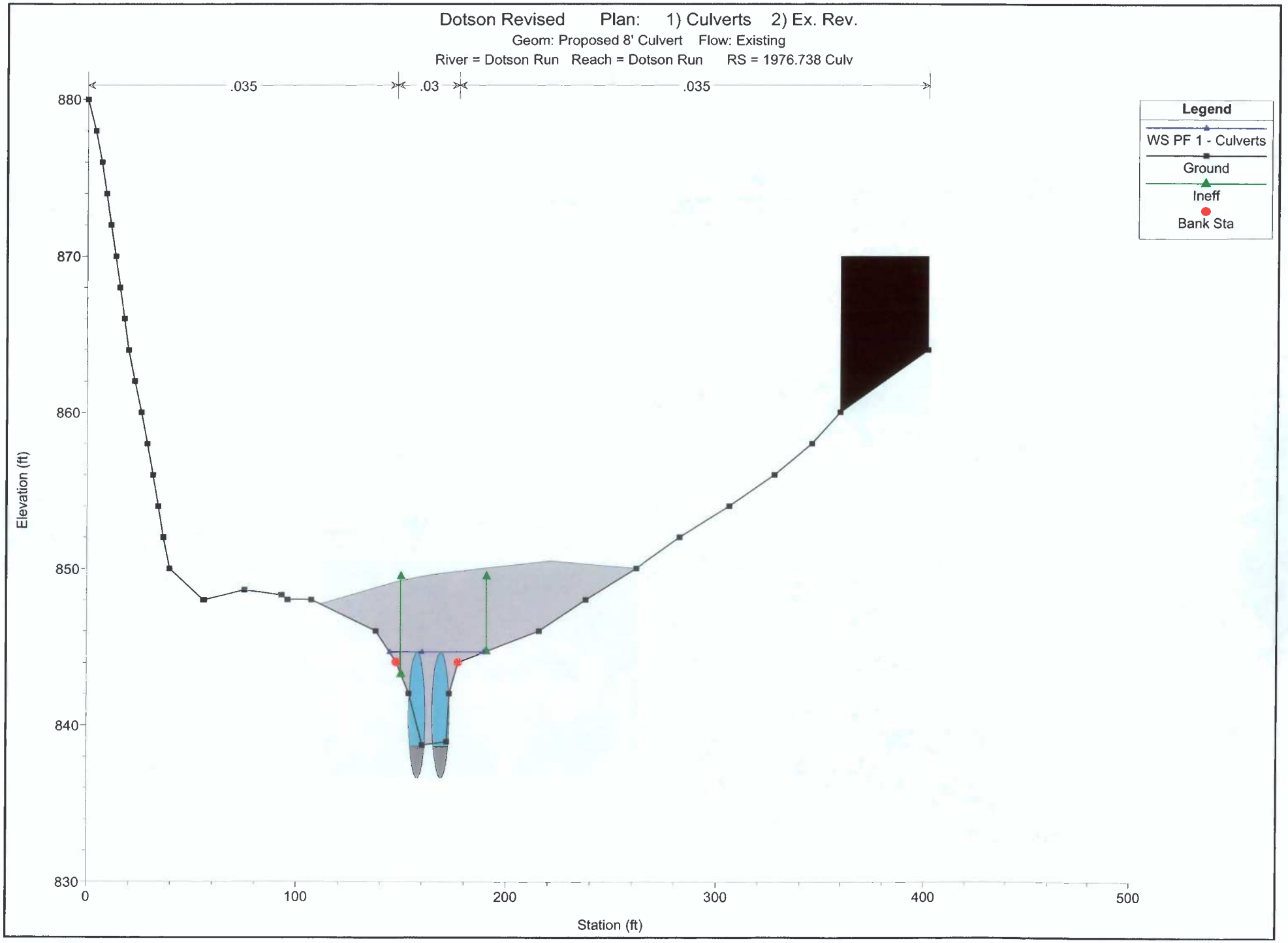

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2270.249
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
840
0
50
100
150
200
250
300
Station (ft)

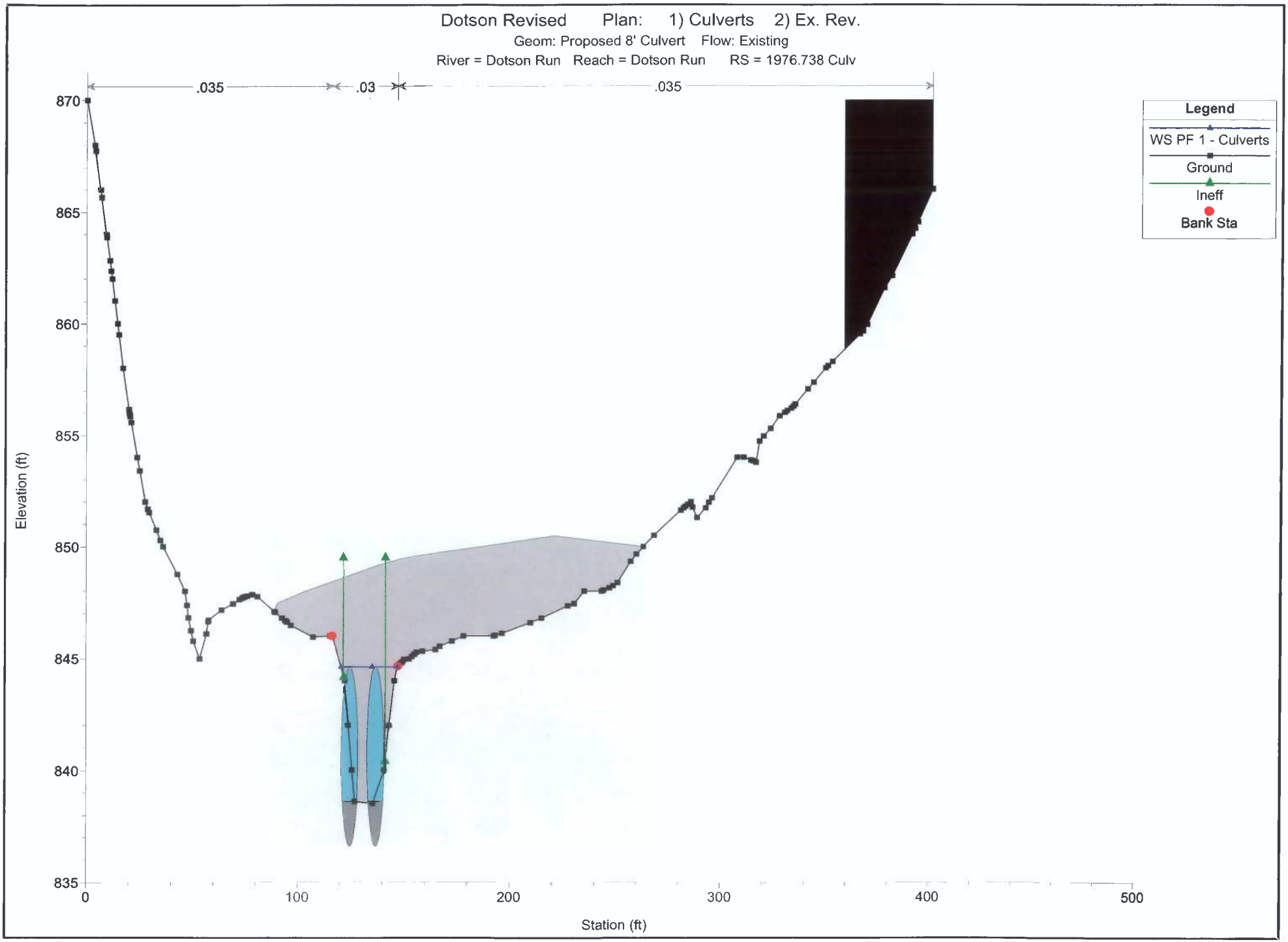

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2193.833
.035
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
870
860
850
840
0
50
100
150
200
250
300
350
Station (ft)

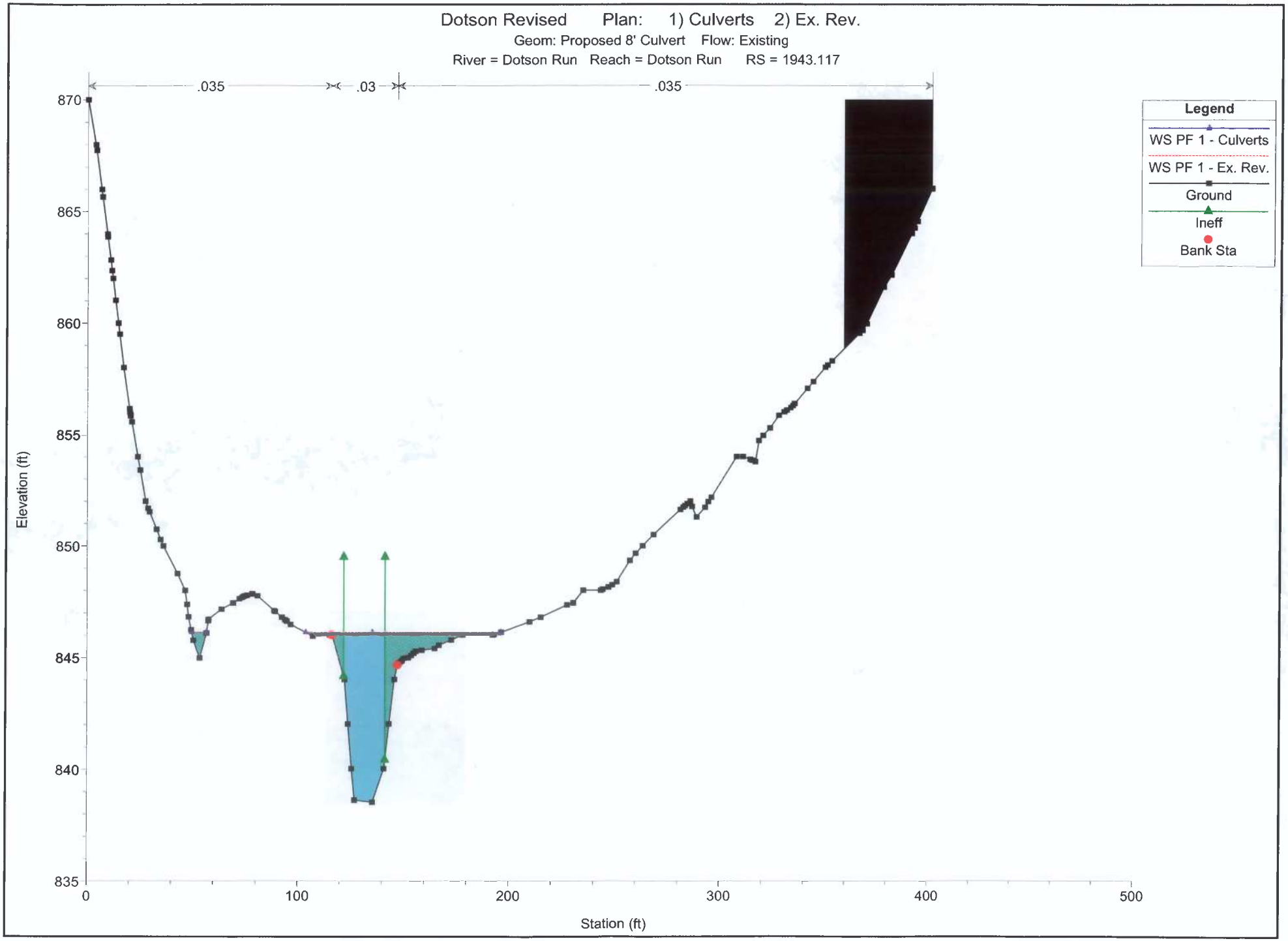

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2151.343
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
870
860
850
840
0
50
100
150
200
250
300
350
400
Station (ft)

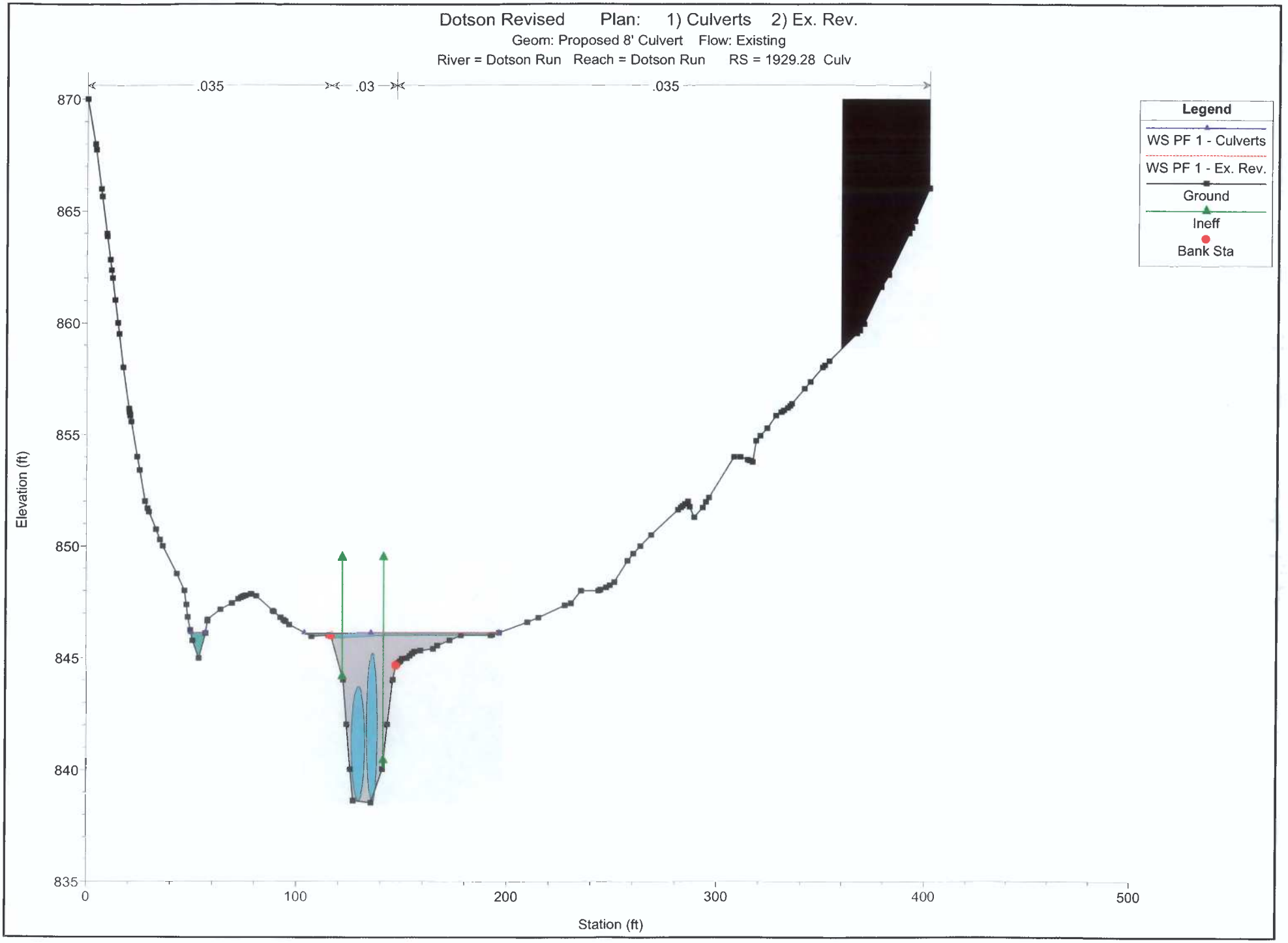

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2088.858
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
880
870
860
850
840
830
0
50
100
150
200
250
300
350
400
Station (ft)

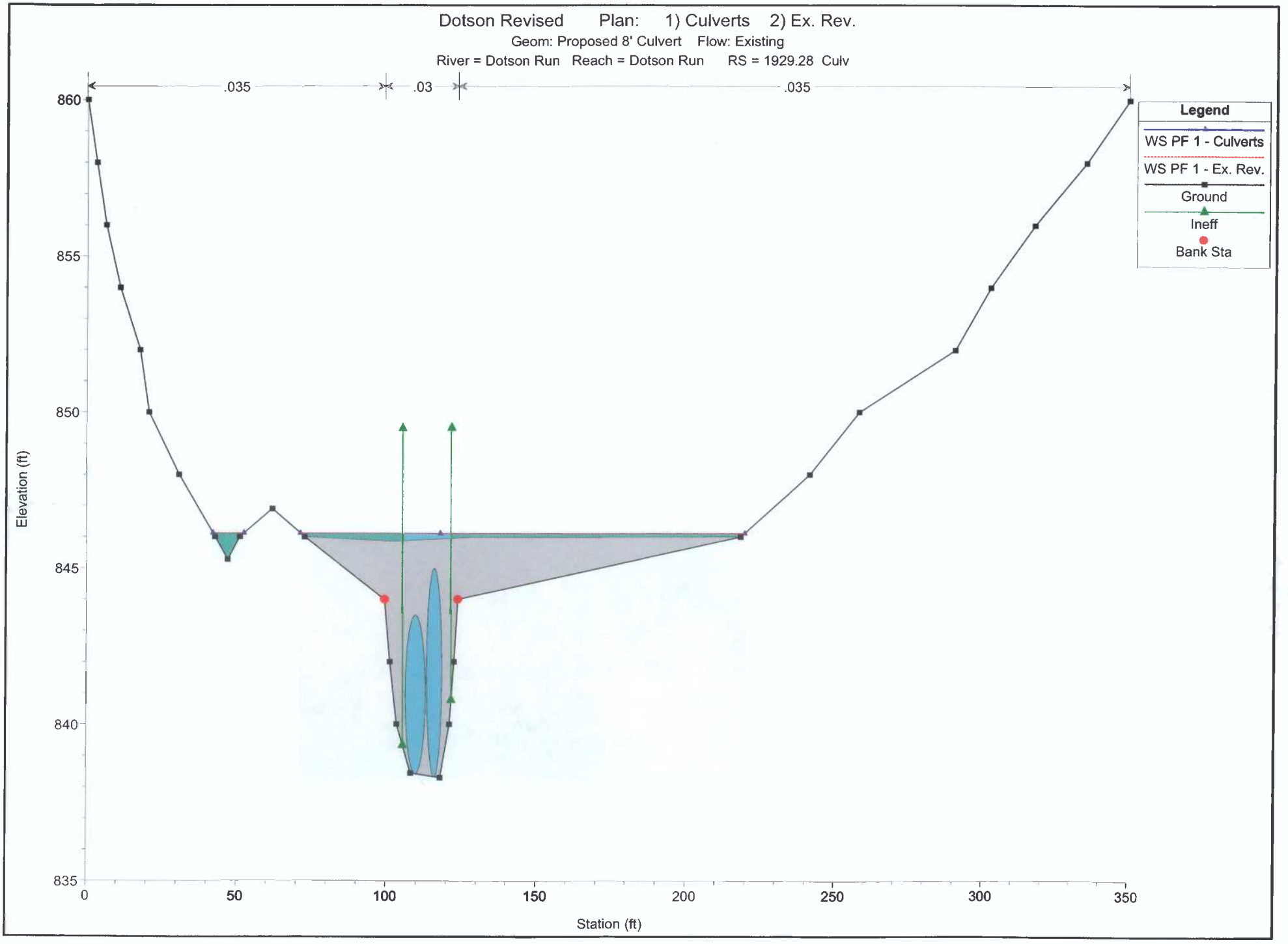

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 2007.945
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
880
870
860
850
840
830
0
100
200
300
400
500
Station (ft)

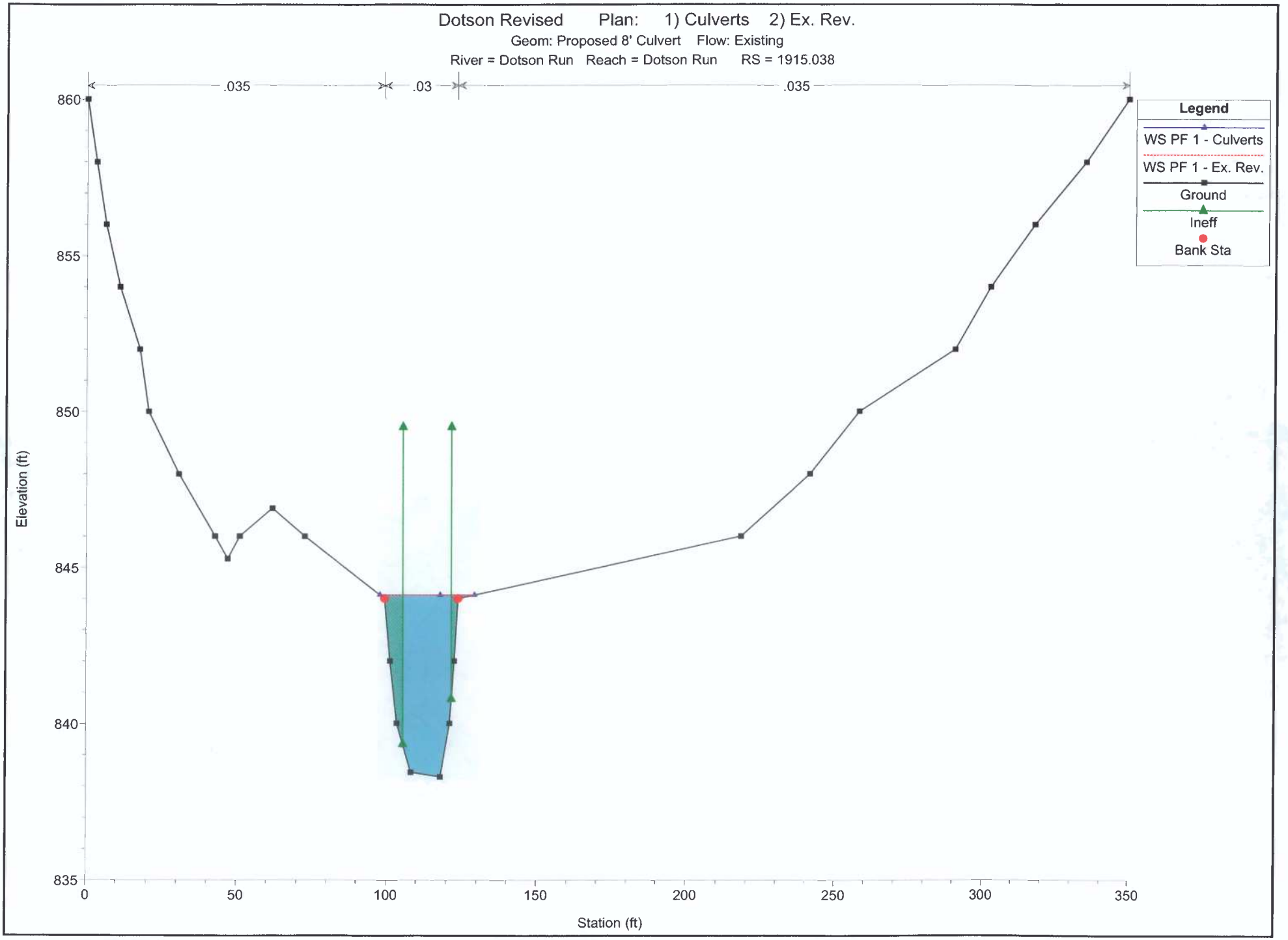

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1976.738 Culv
.035
.03
.035
Legend
WS PF 1 - Culverts
Ground
Ineff
Bank Sta
Elevation (ft)
880
870
860
850
840
830
0
100
200
300
400
500
Station (ft)

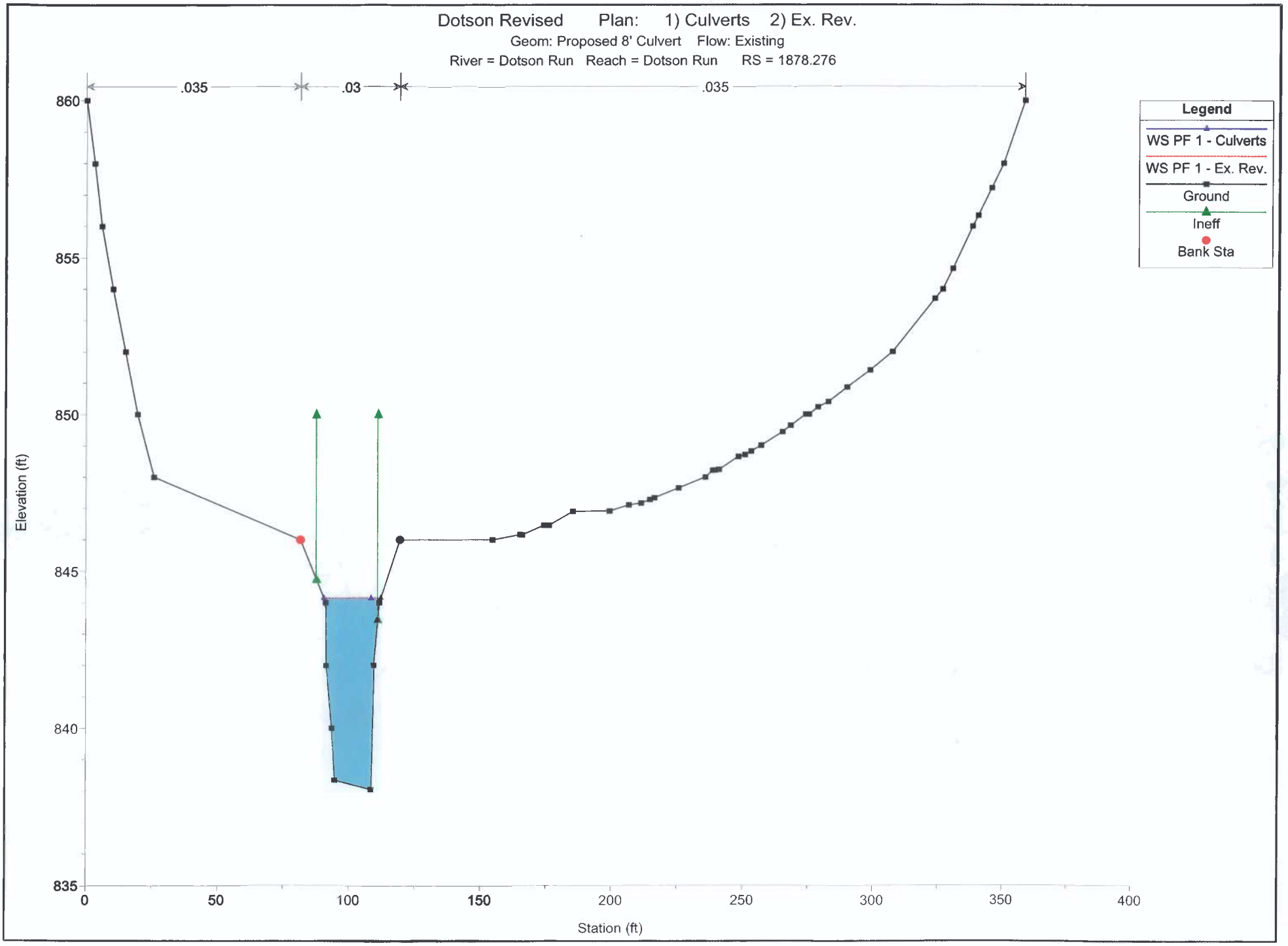

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1976.738 Culv
.035
.03
.035
Legend
WS PF 1 - Culverts
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)

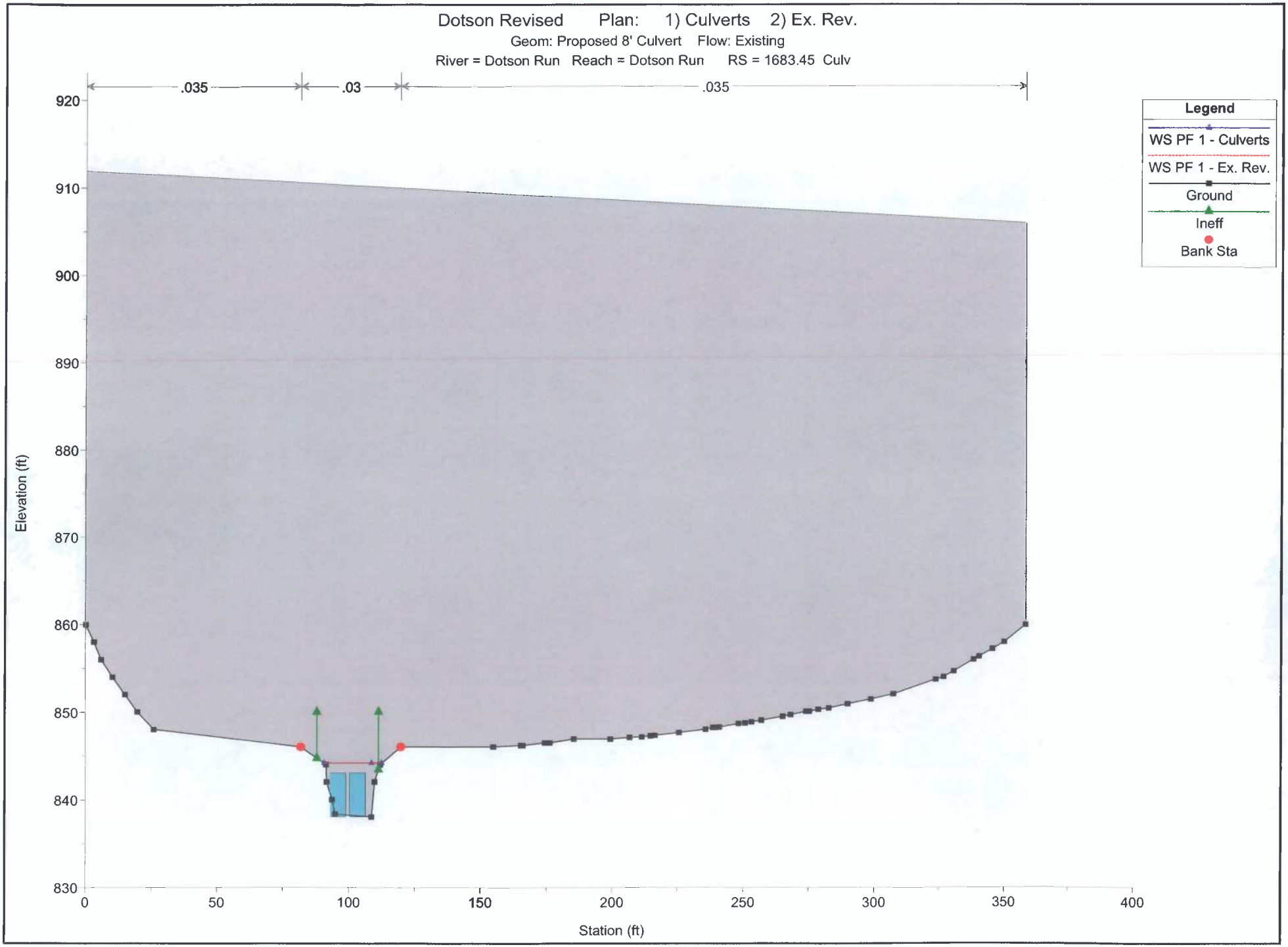

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1943.117
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)

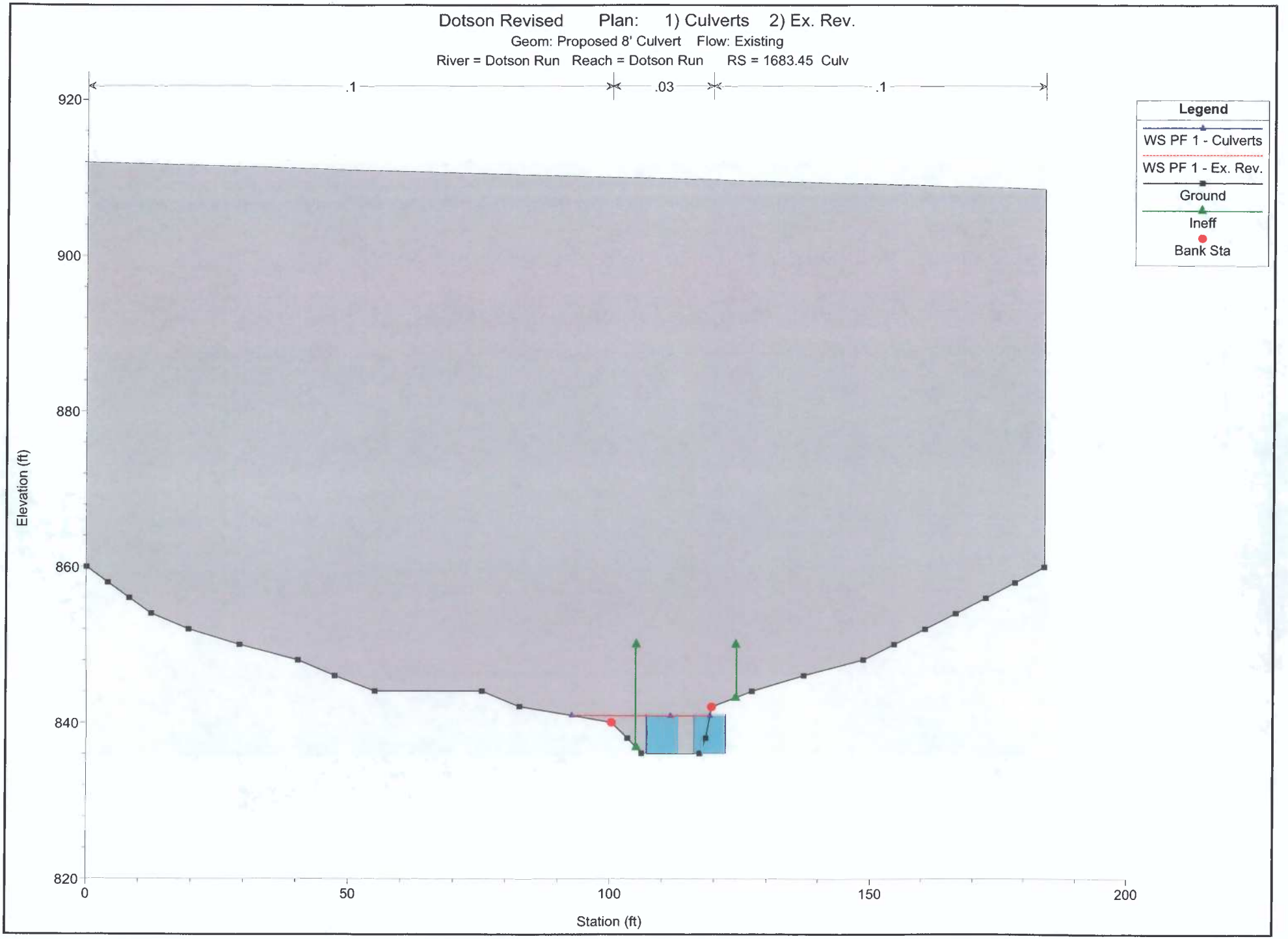

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1929.28 Culv
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)

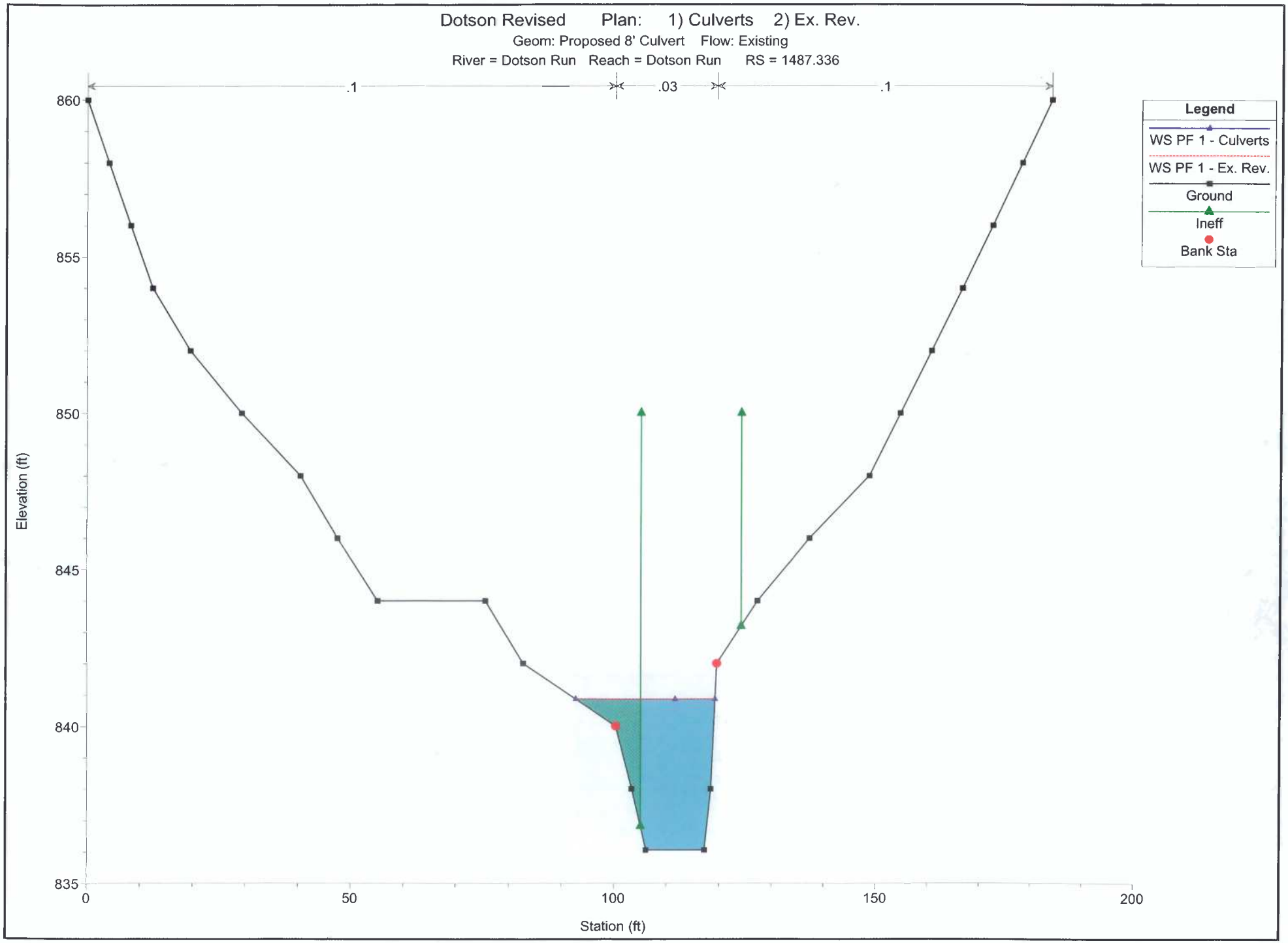

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1929.28 Culv
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)

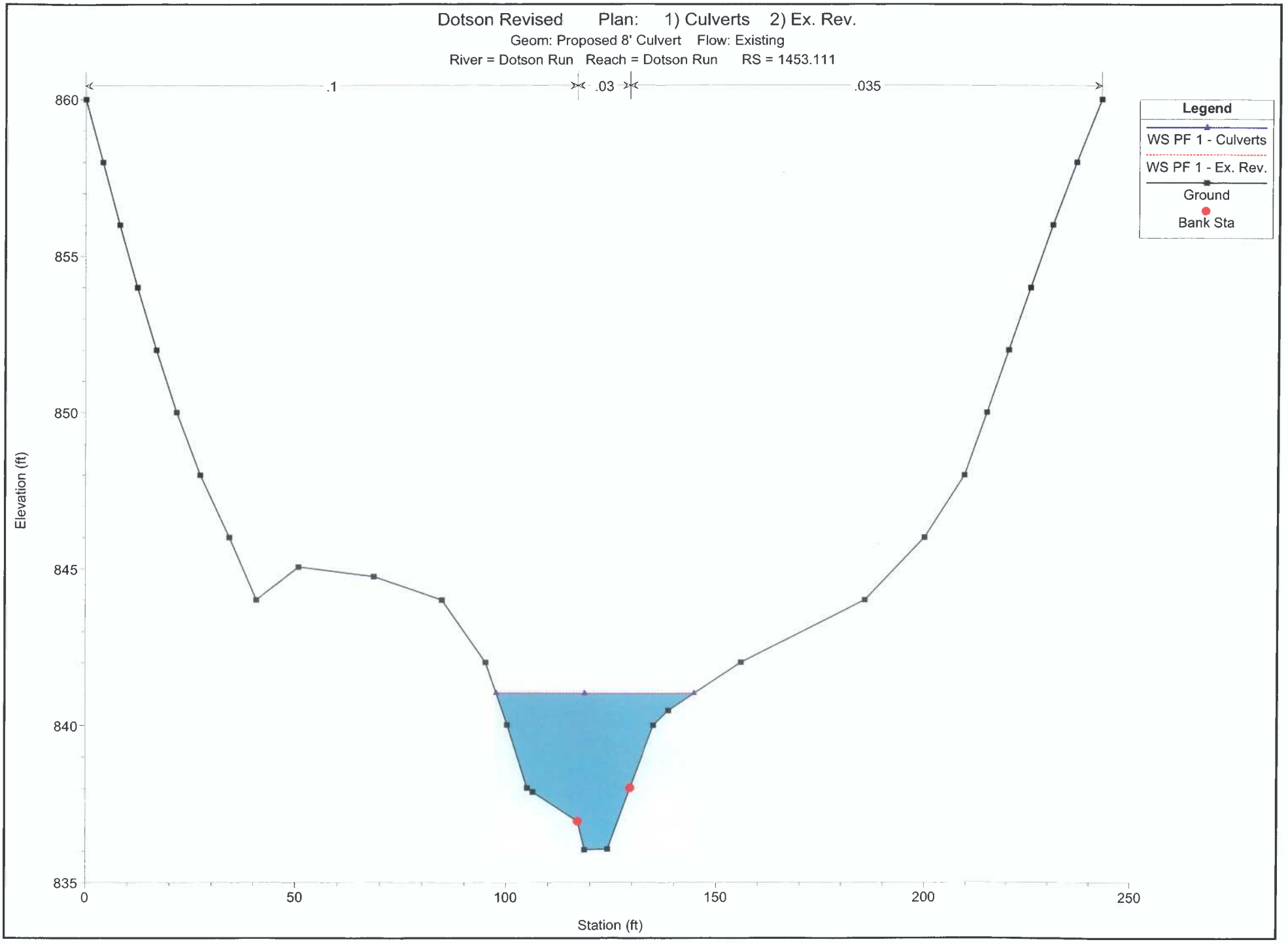

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1915.038
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)

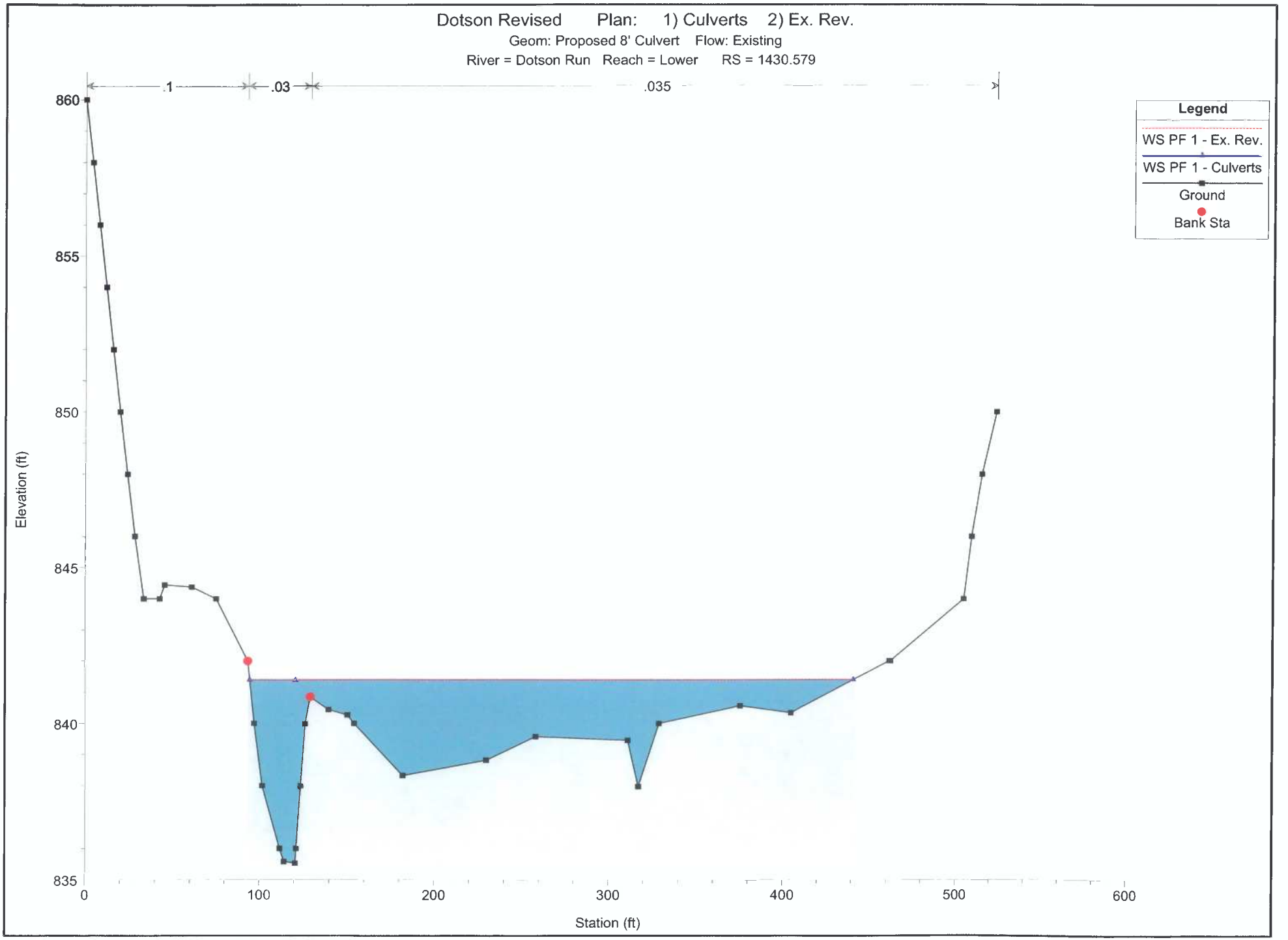

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1878.276
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
400
Station (ft)

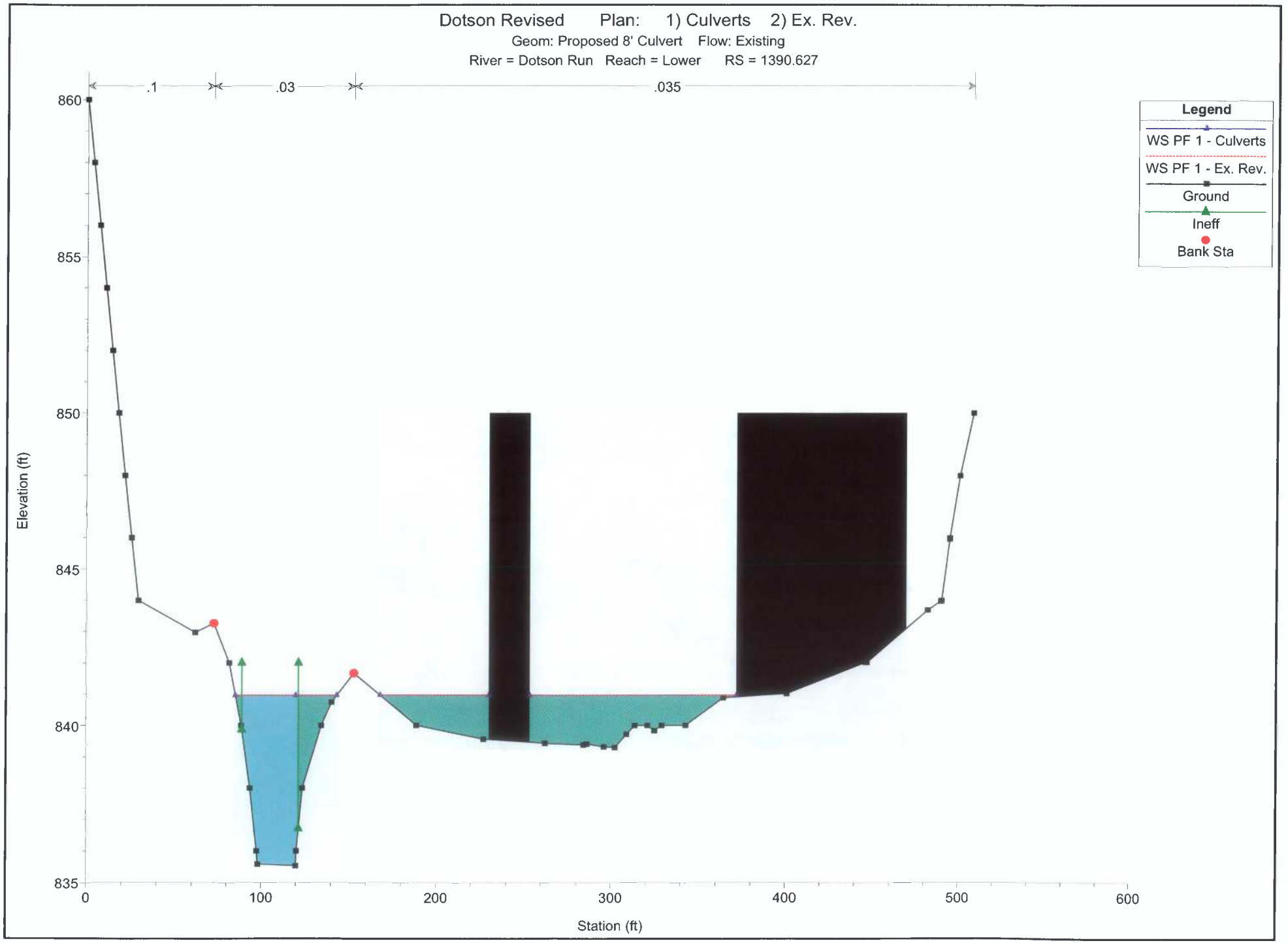

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1683.45 Culv
.035
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
920
910
900
890
880
870
860
850
840
830
0
50
100
150
200
250
300
350
400
Station (ft)

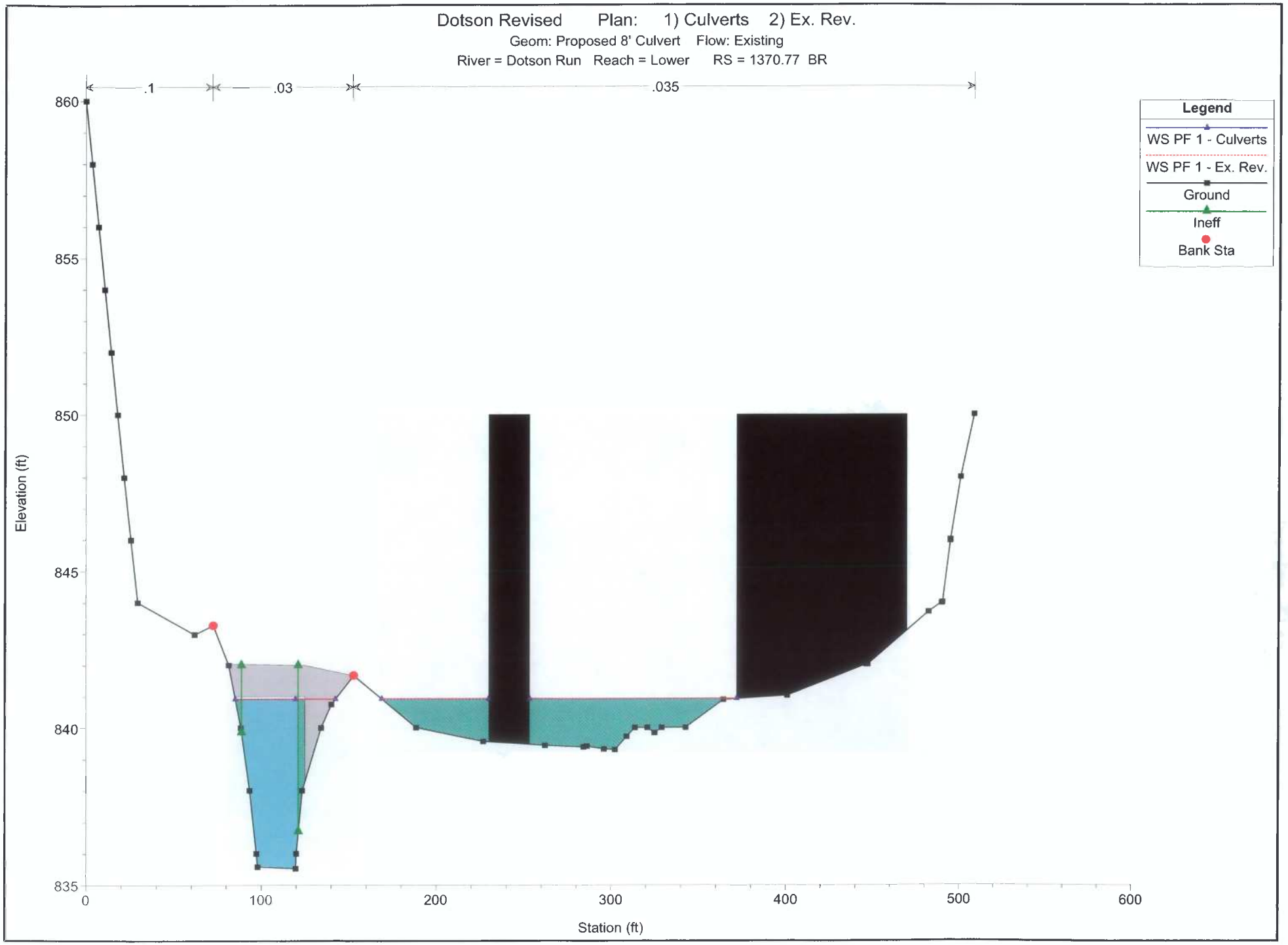

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1683.45 Culv
.1
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
920
900
880
860
840
820
0
50
100
150
200
Station (ft)

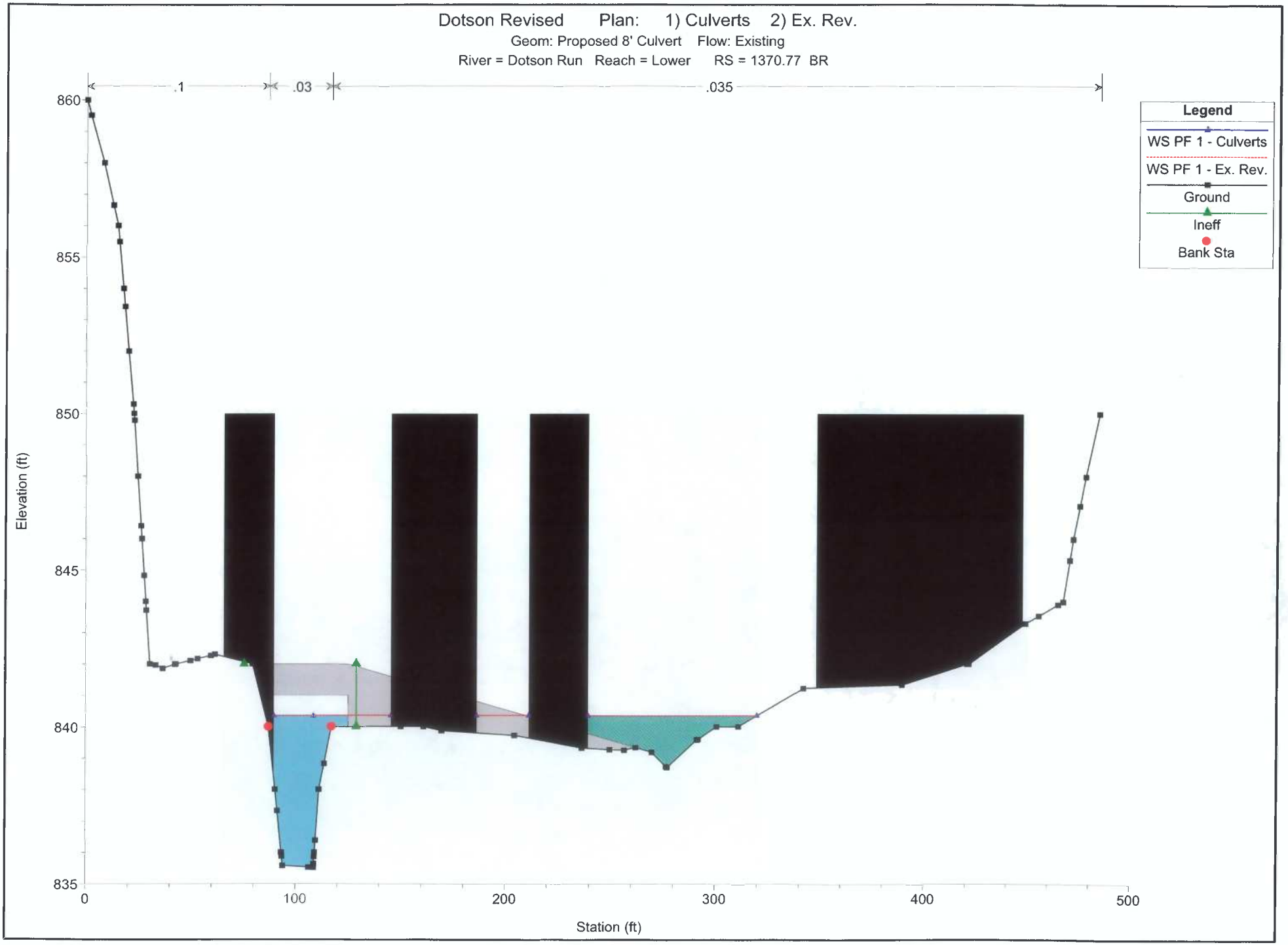

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1487.336
.1
.03
.1
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
Station (ft)

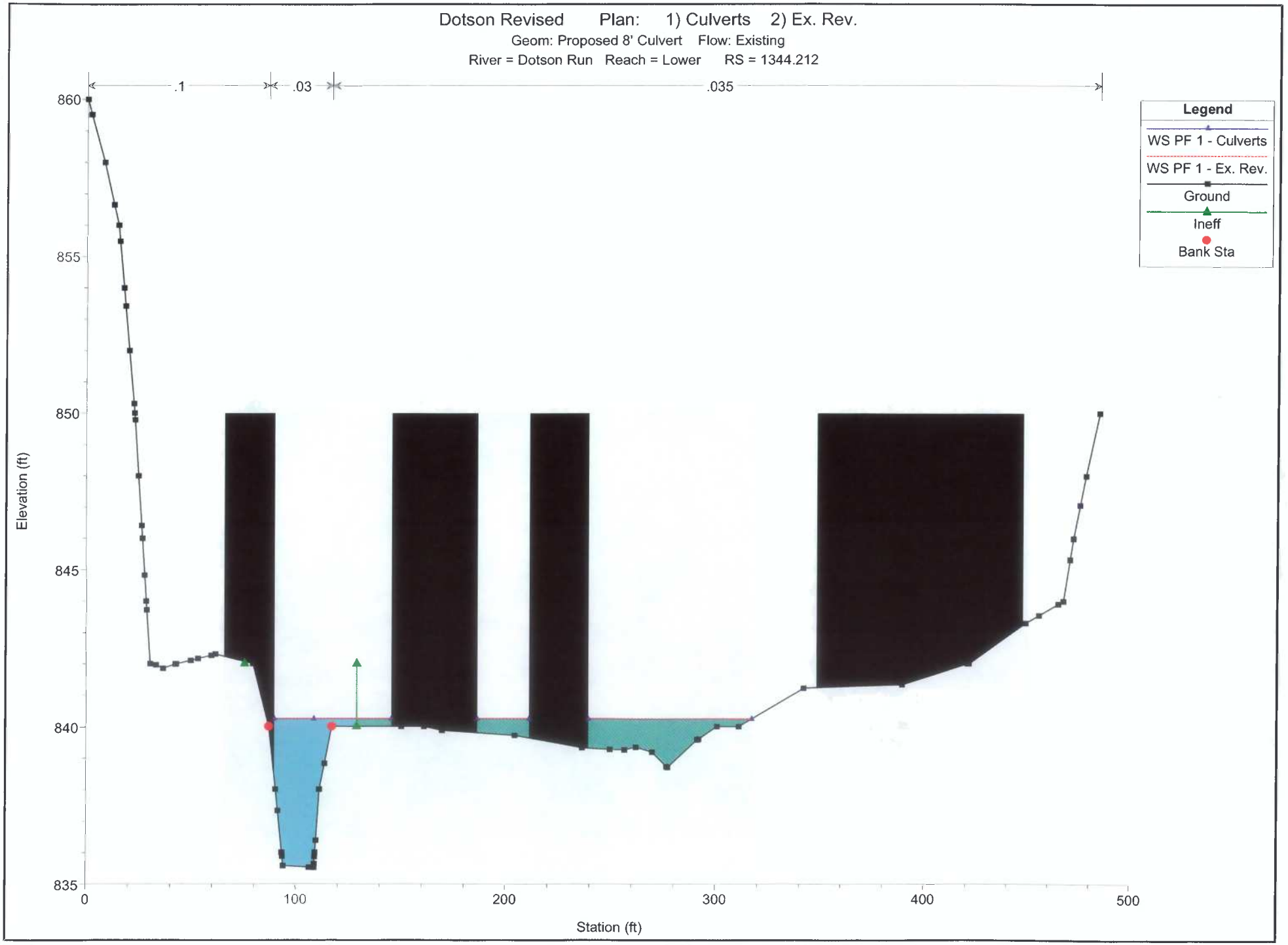

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Dotson Run RS = 1453.111
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
Station (ft)

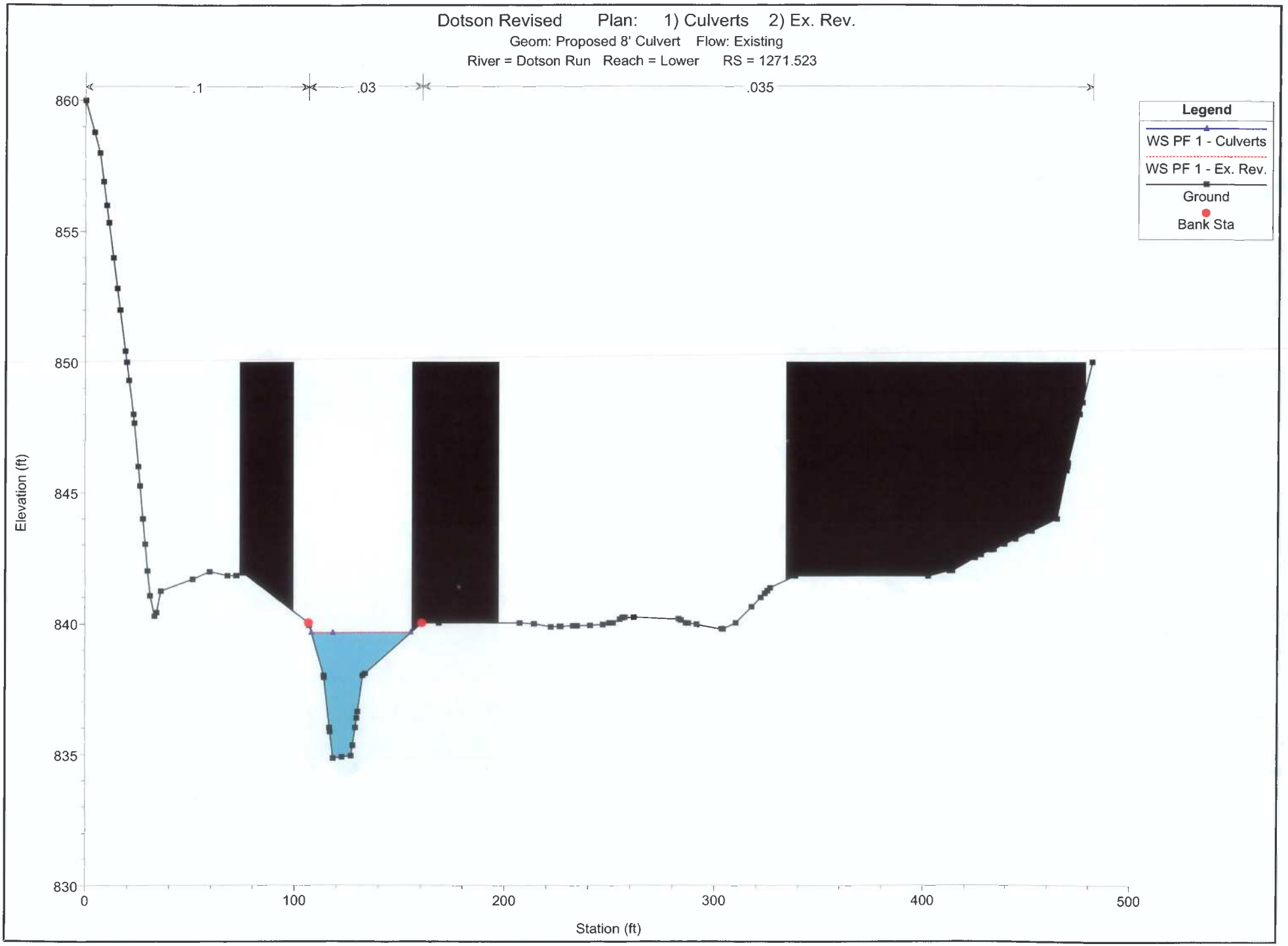

Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1430.579
.1
.03
.035
Legend
WS PF 1 - Ex. Rev.
WS PF 1 - Culverts
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1390.627
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1370.77 BR
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1370.77 BR
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1344.212
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1271.523
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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855
850
845
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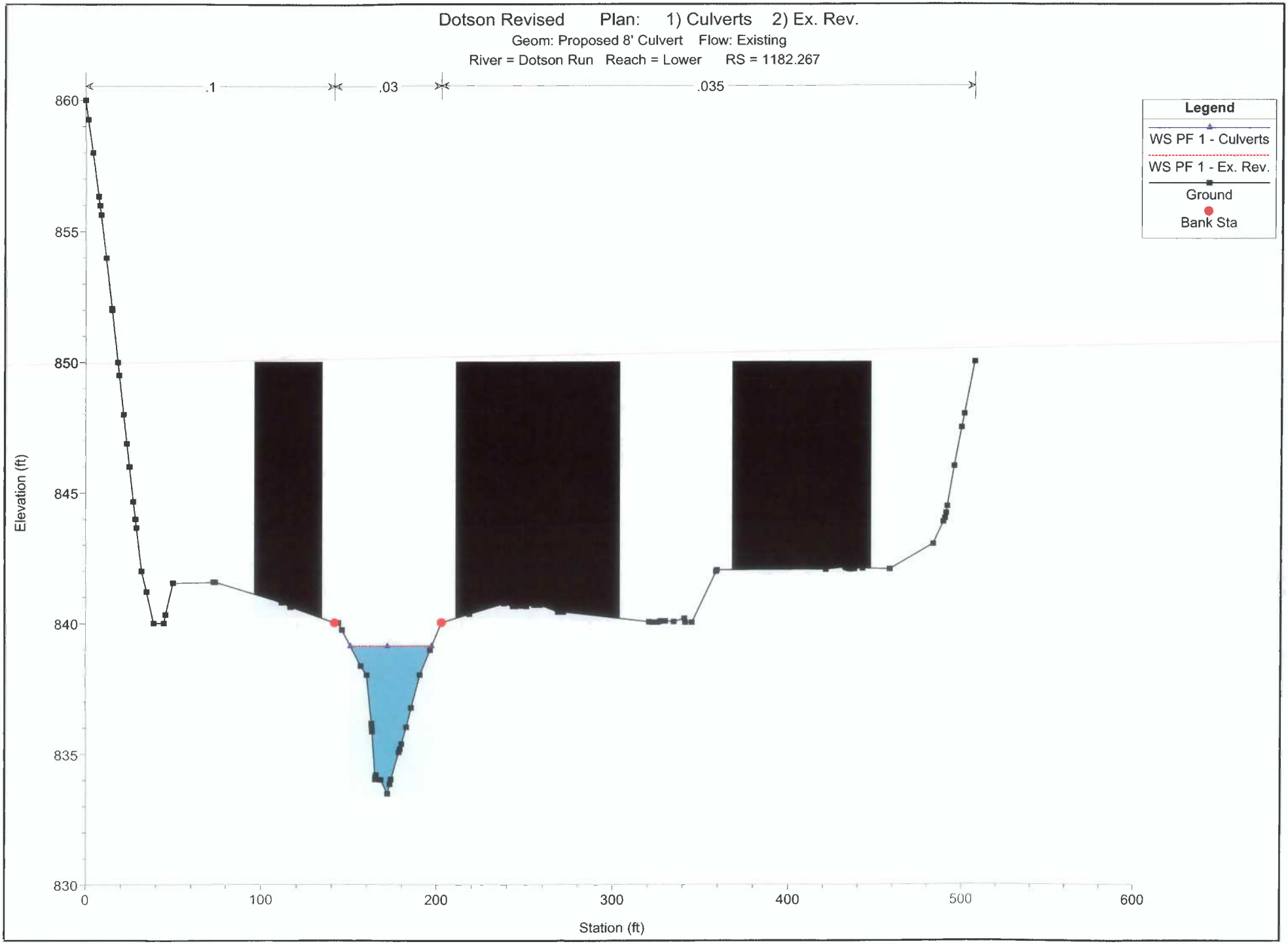
835
830
0
100
200
300
400
500
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1182.267
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
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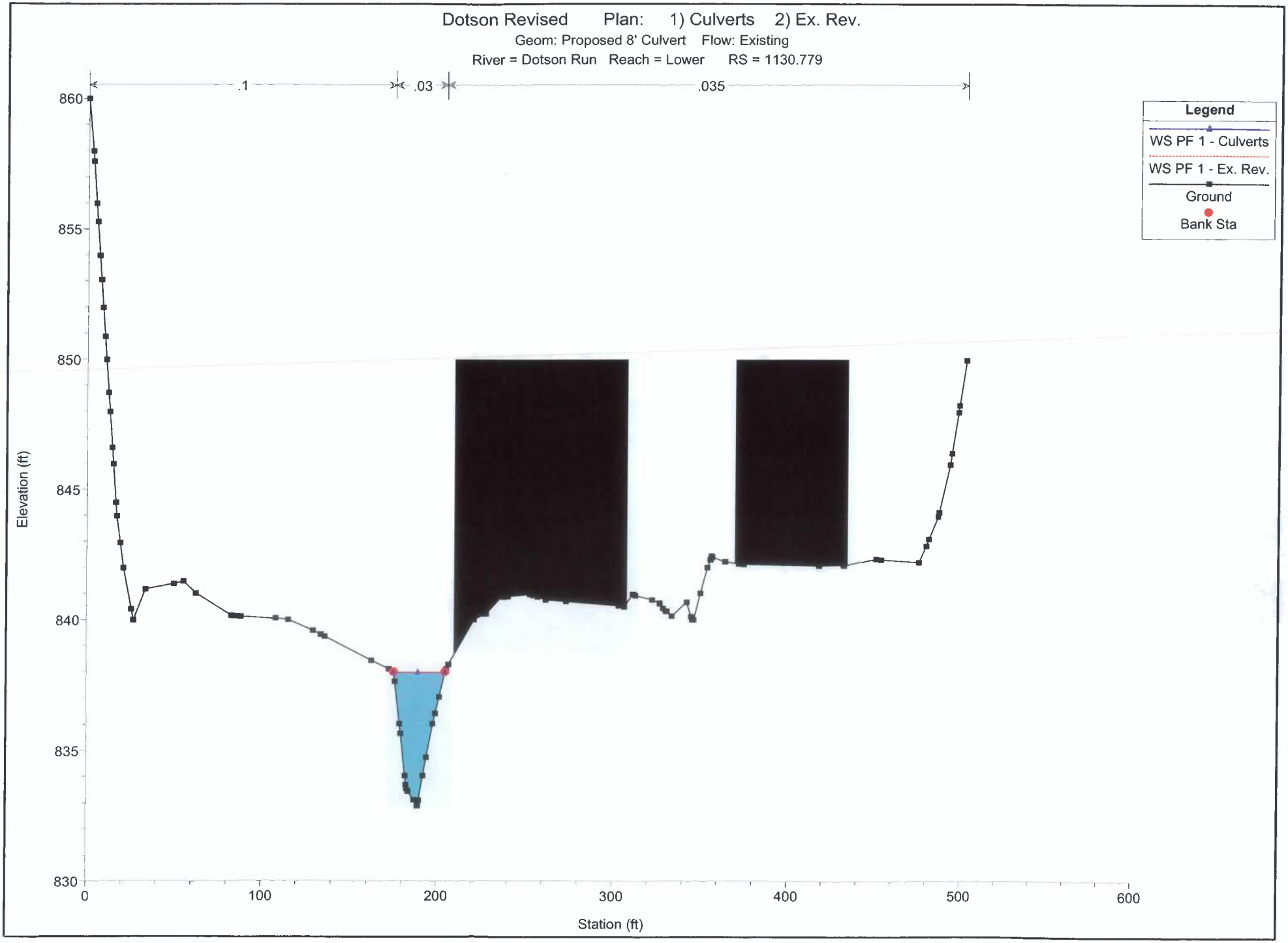
830
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1130.779
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
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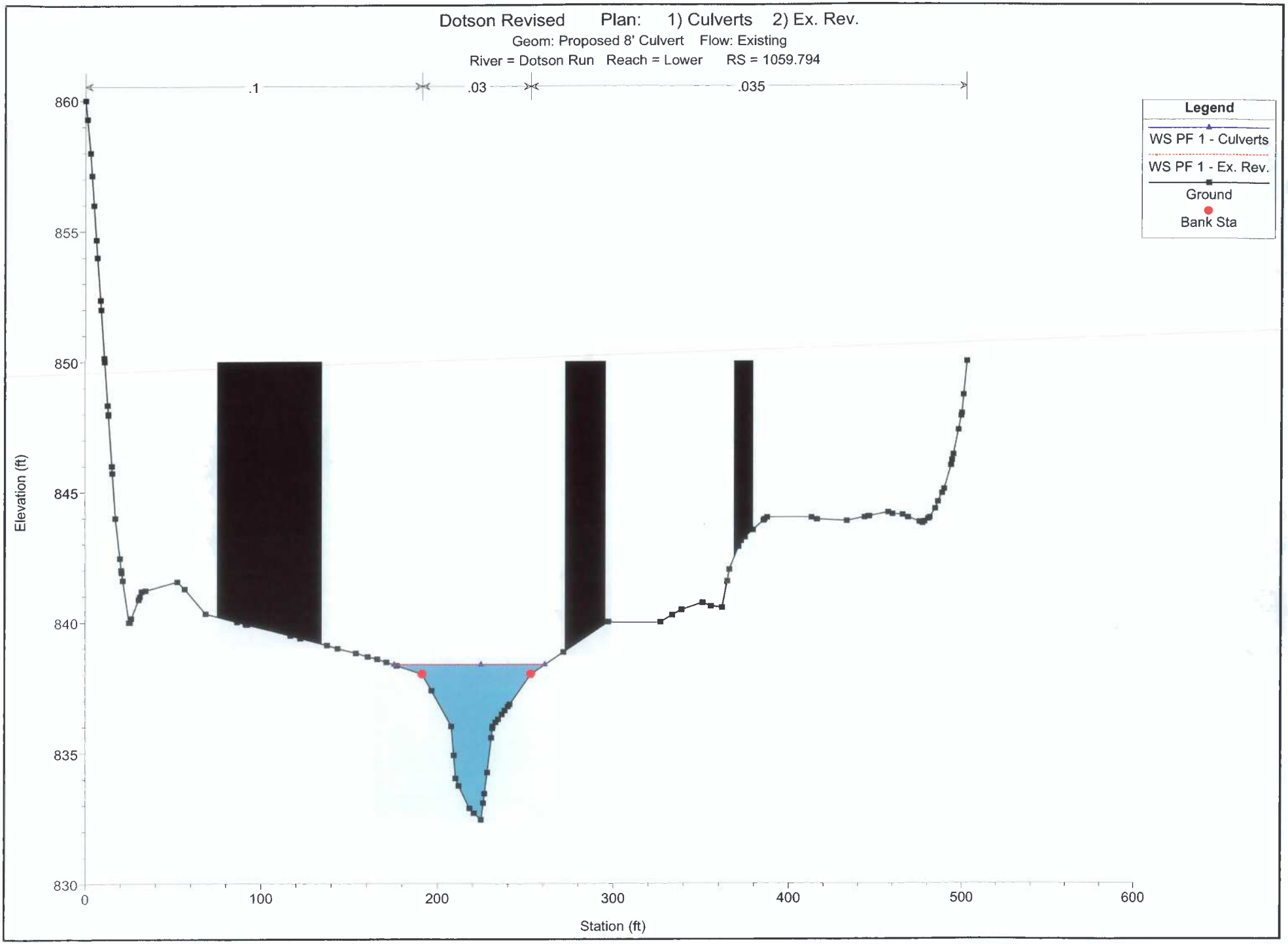
830
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1059.794
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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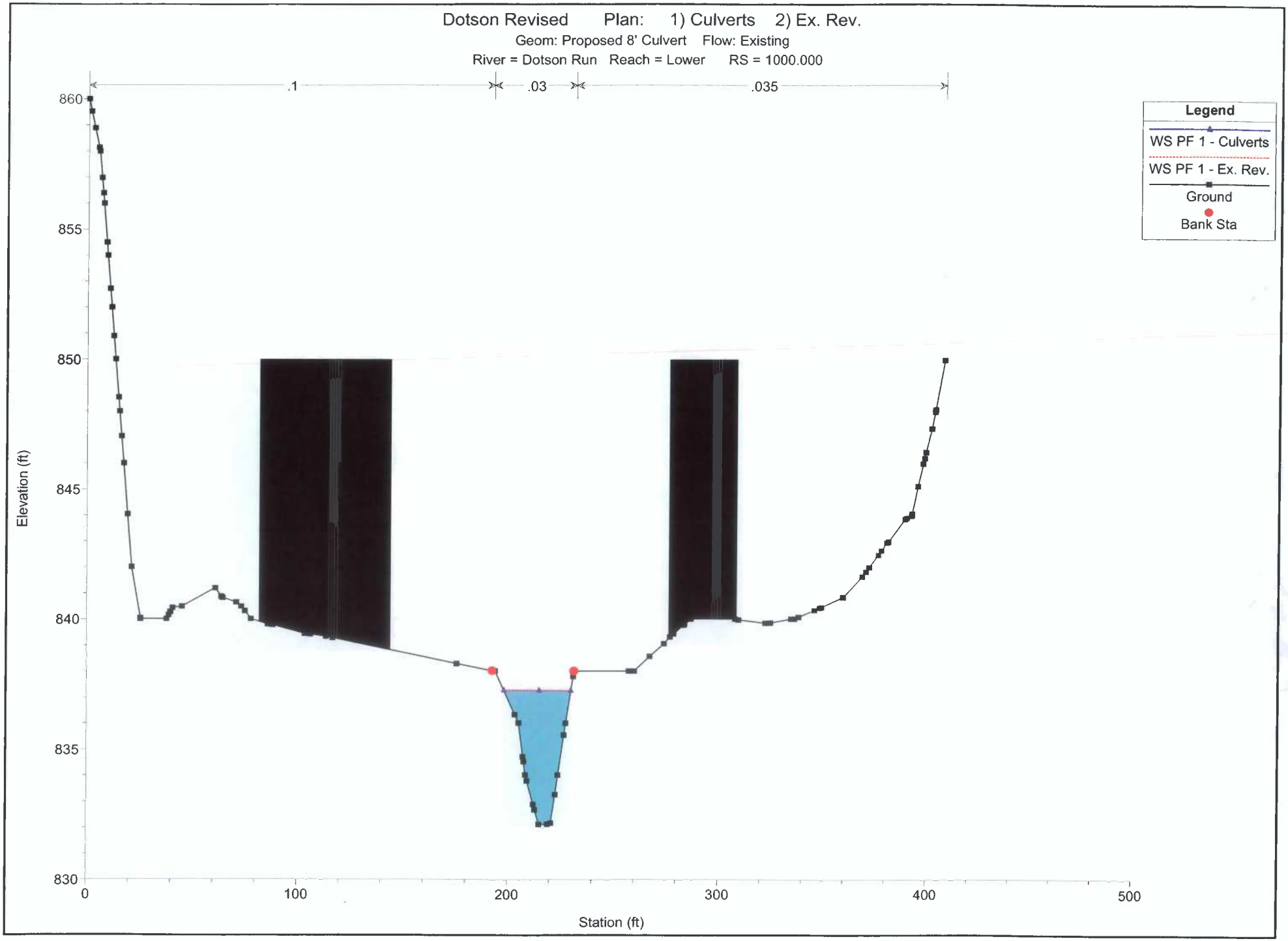
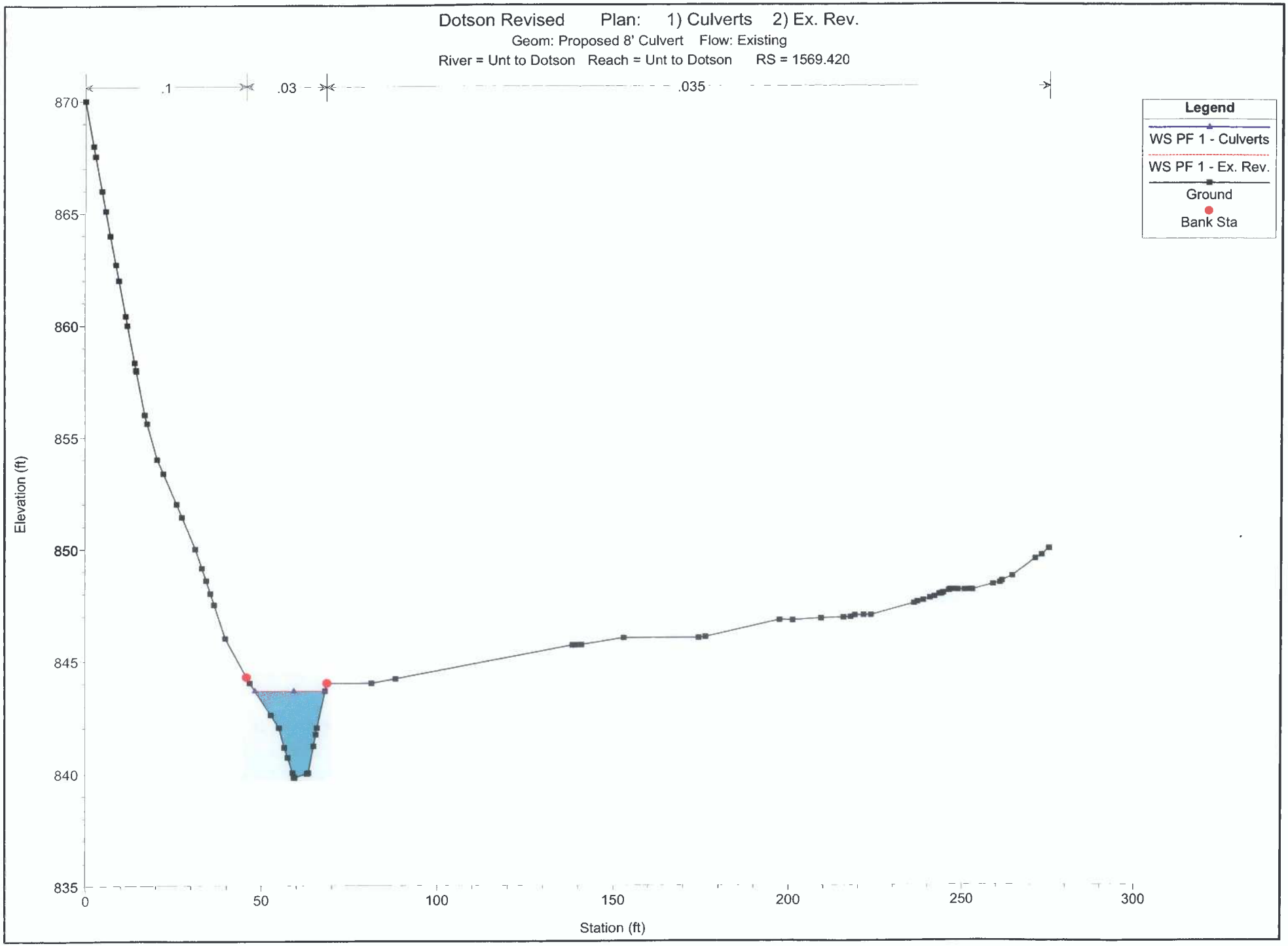
855
850
845
840
835
830
0
100
200
300
400
500
600
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Dotson Run Reach = Lower RS = 1000.000
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1569.420
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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860
855
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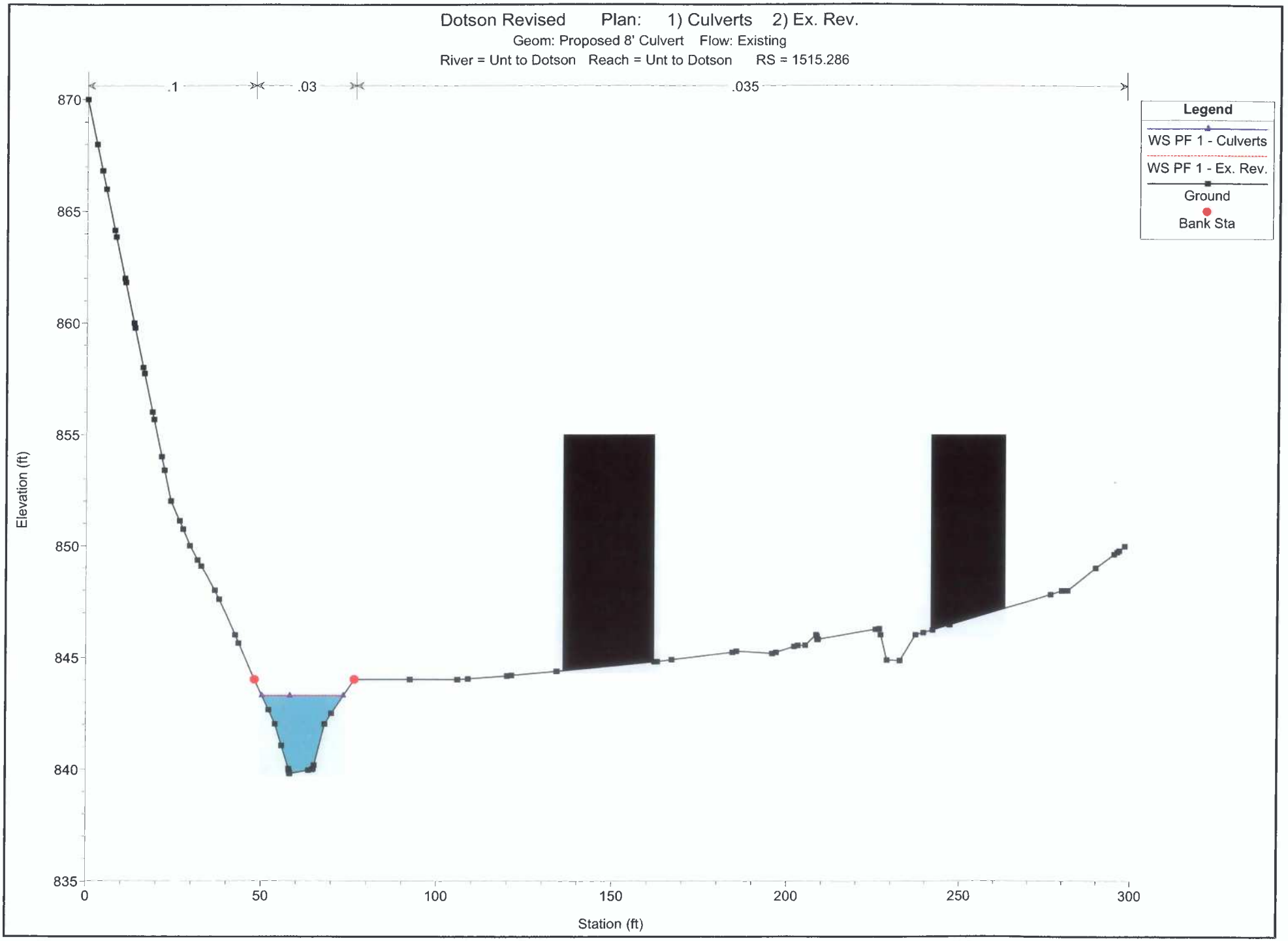
845
840
835
0
50
100
150
200
250
300
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1515.286
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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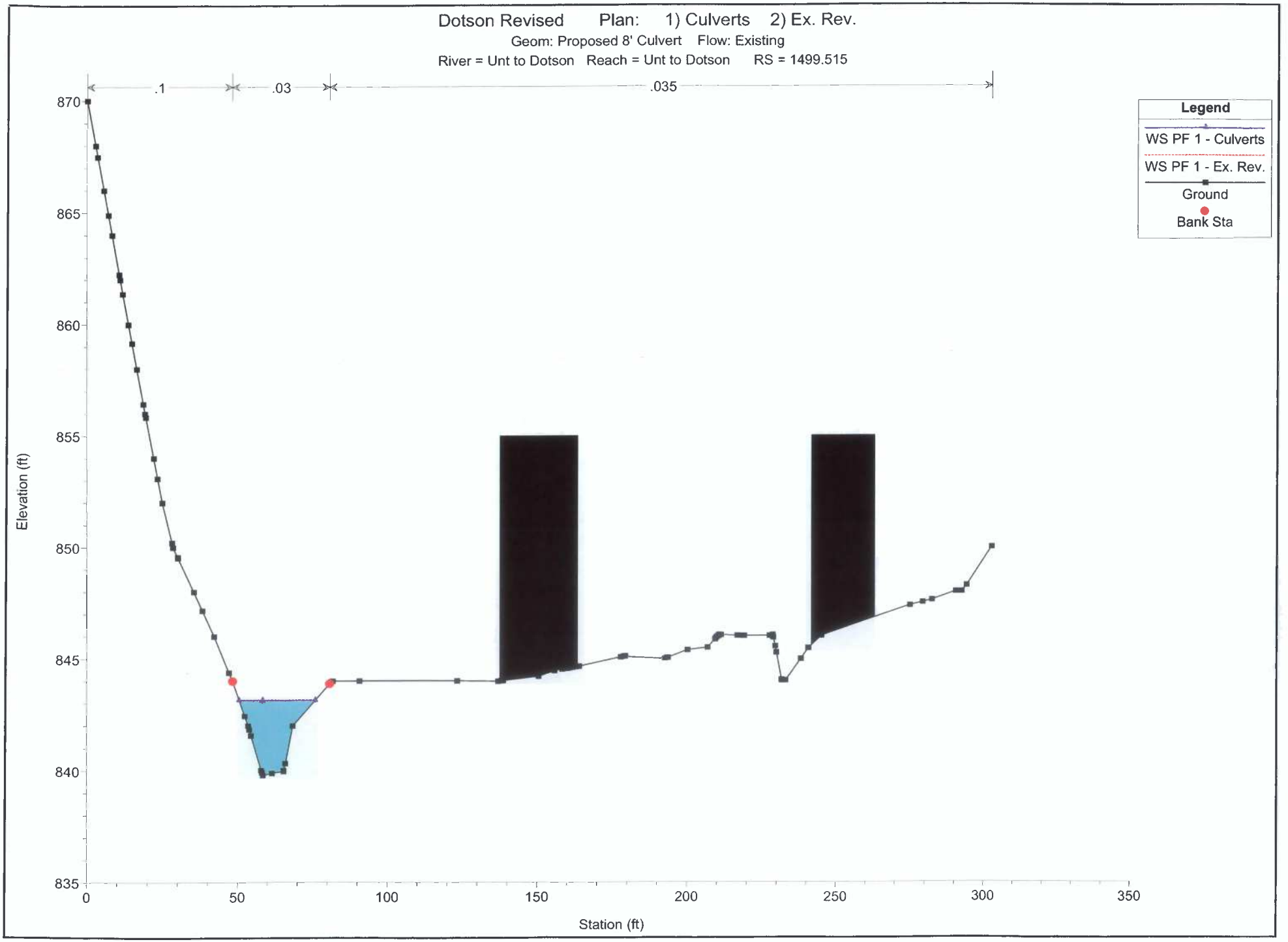
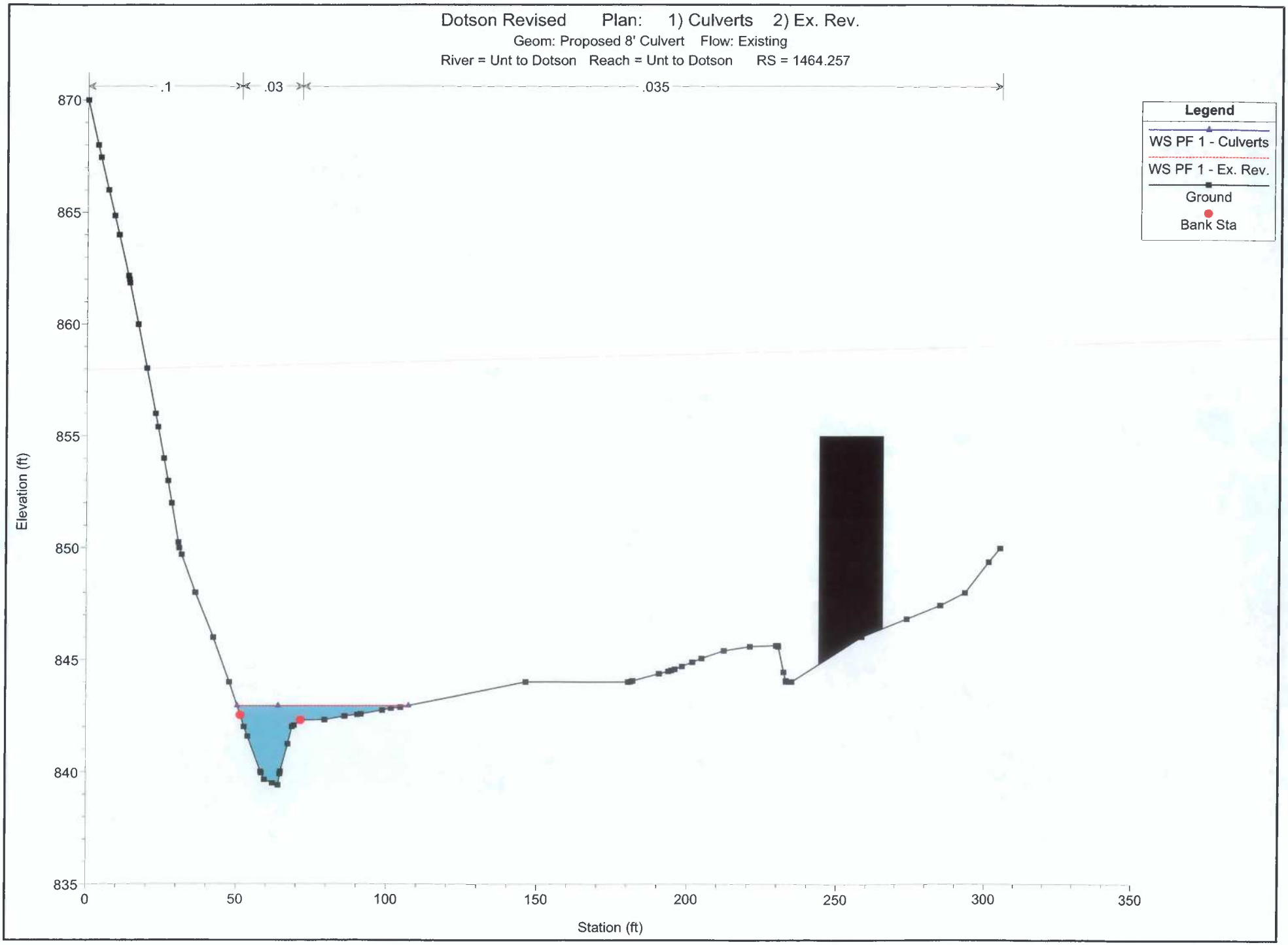
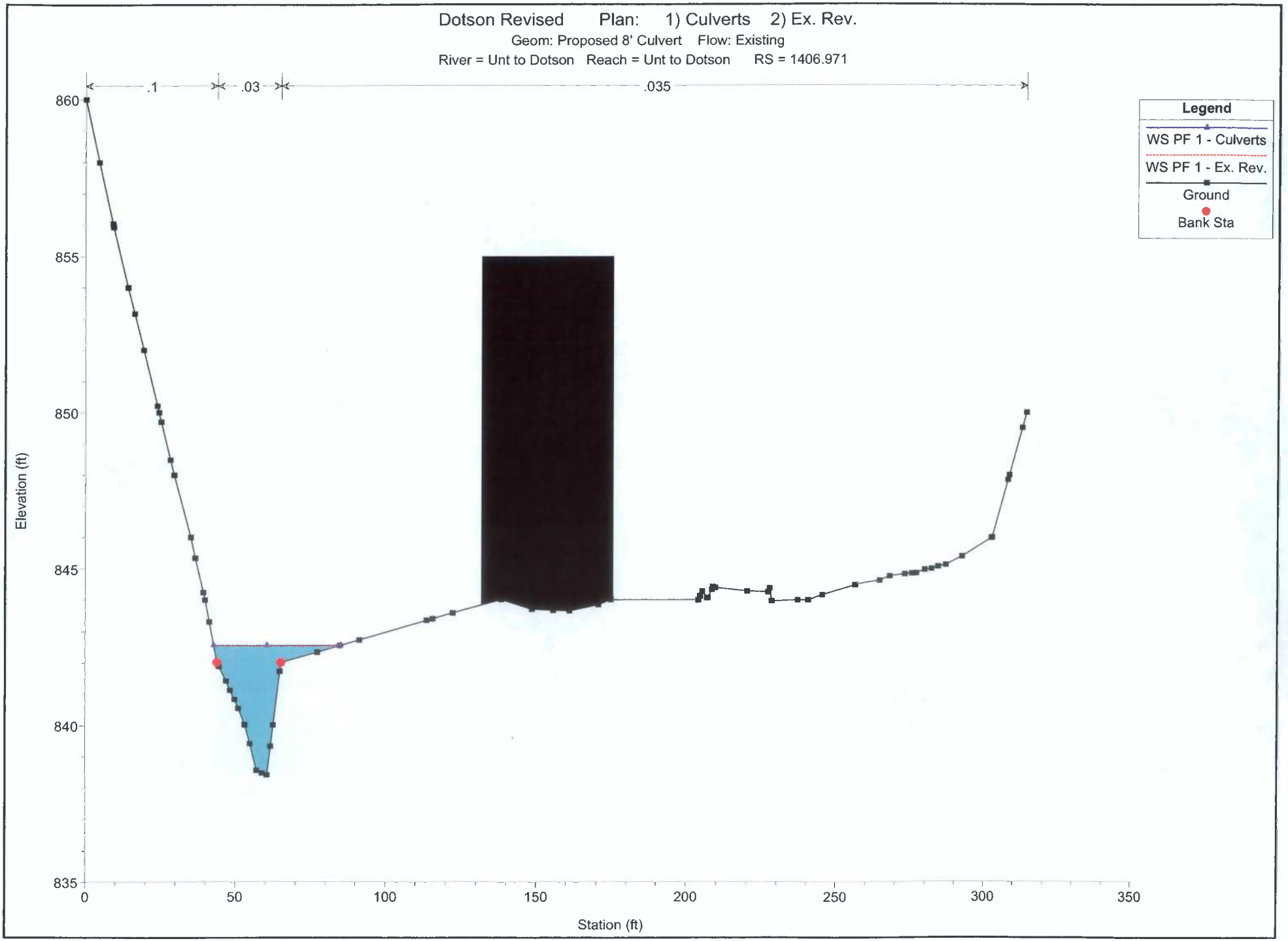
860
855
850
845
840
835
0
50
100
150
200
250
300
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1499.515
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1464.257
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1406.971
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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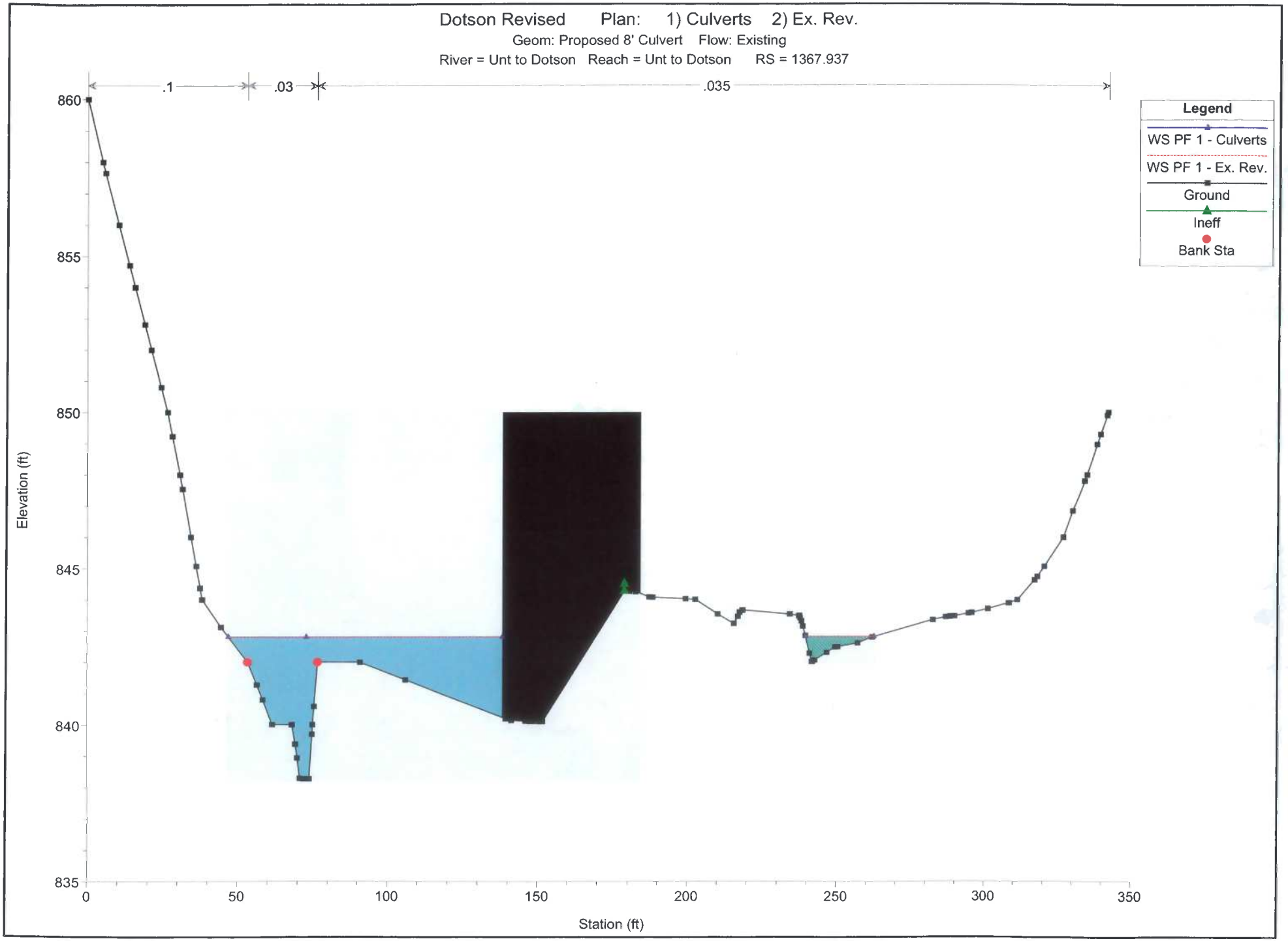
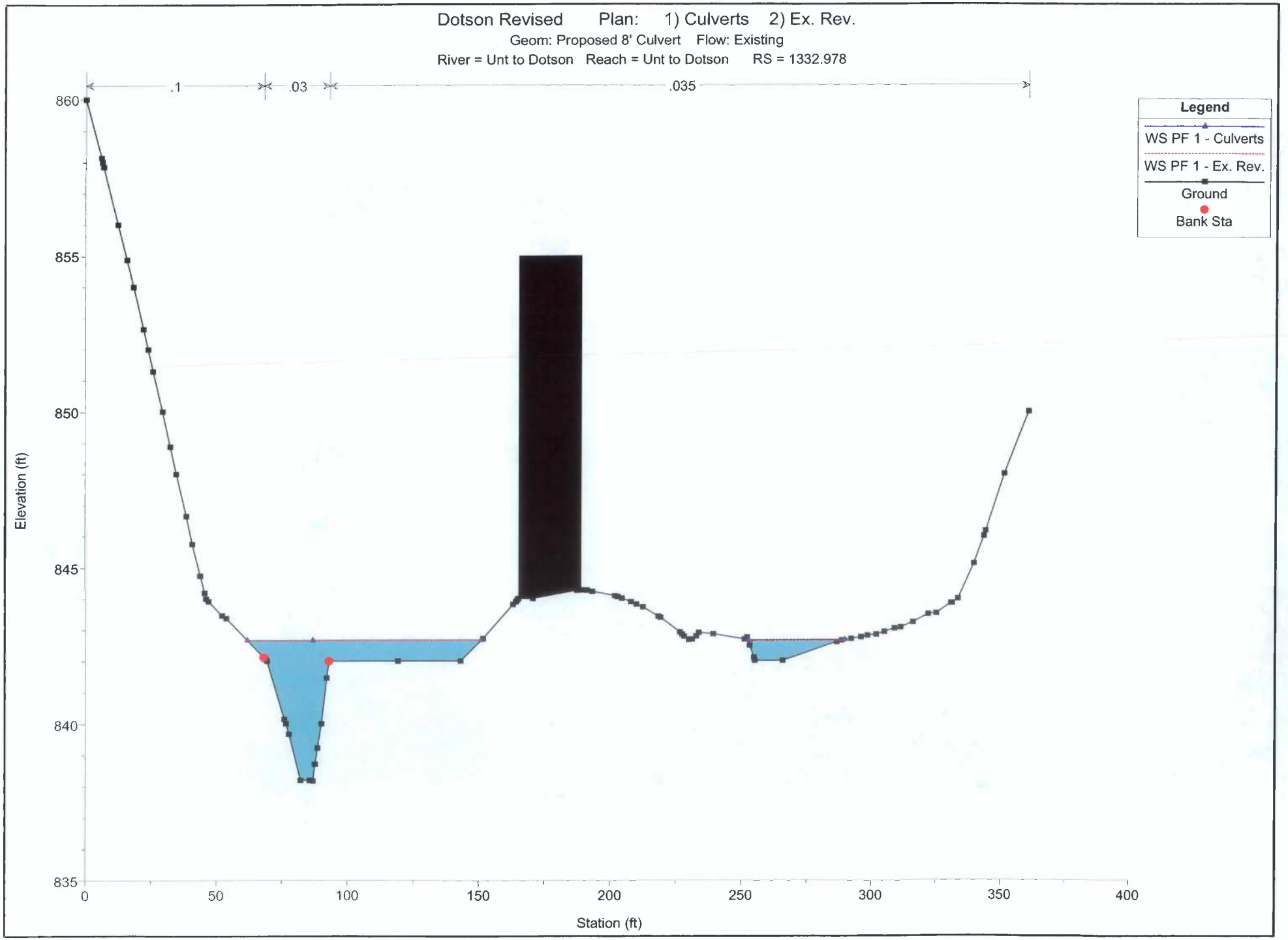
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1367.937
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1332.978
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
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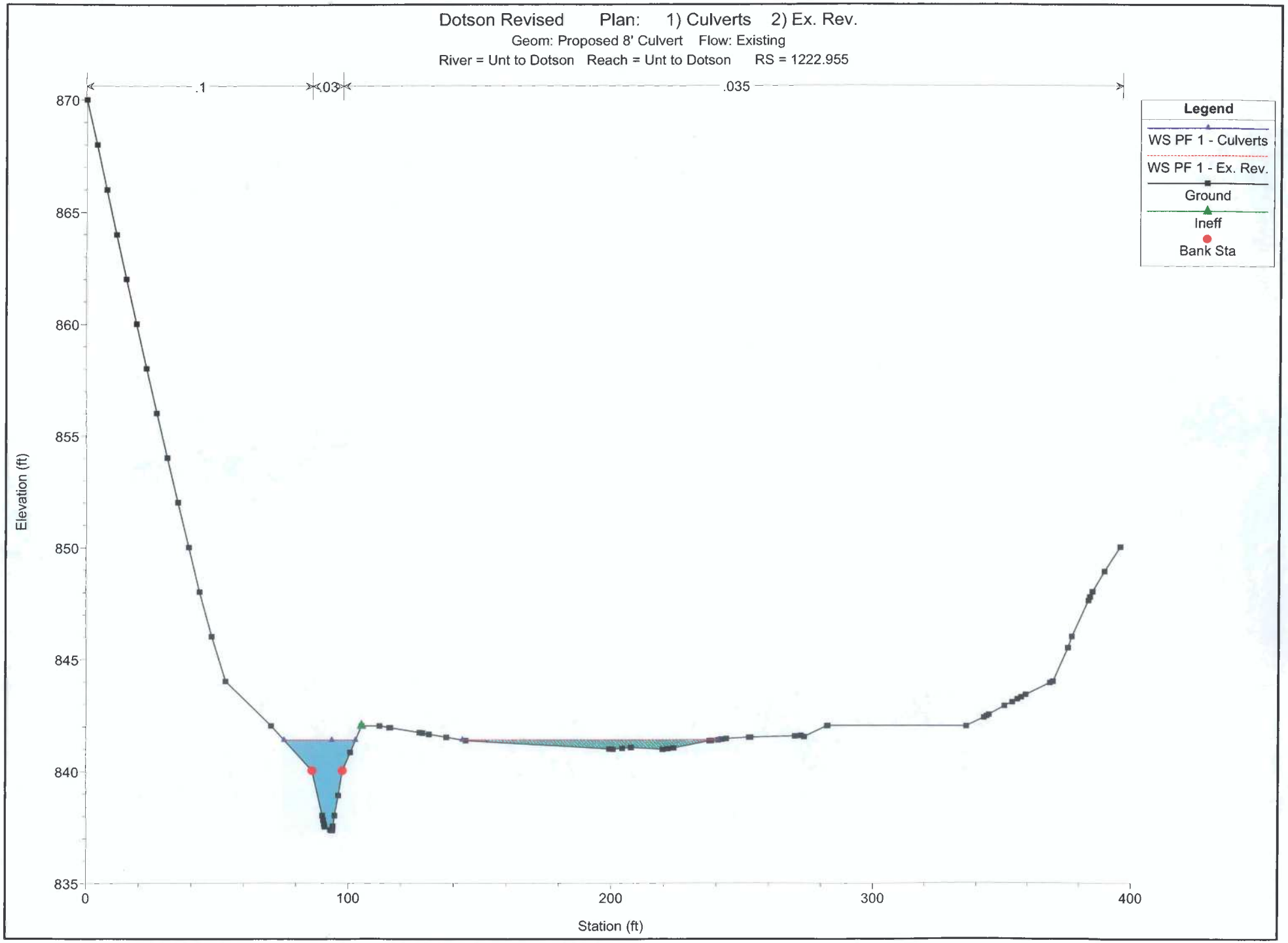
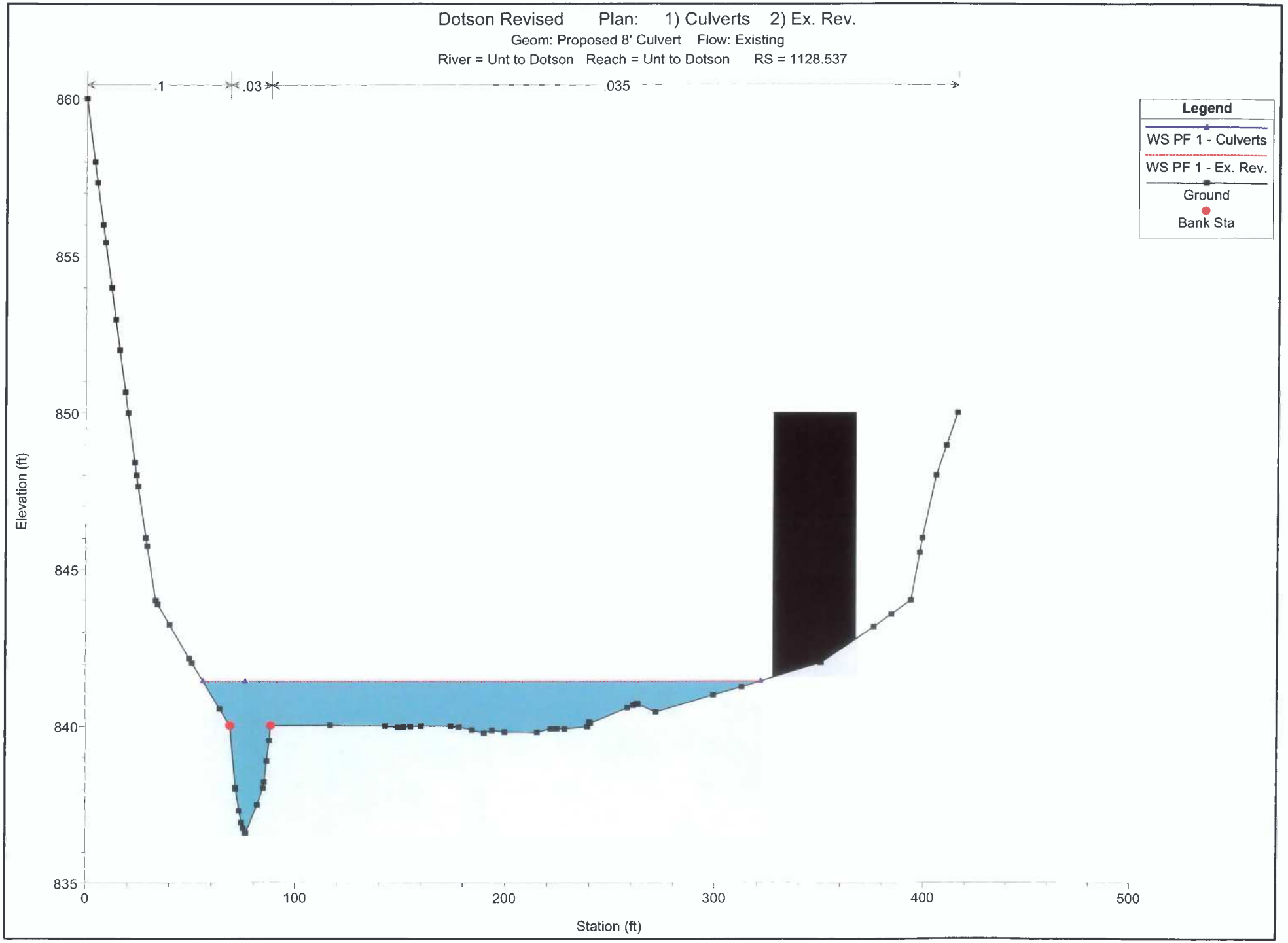
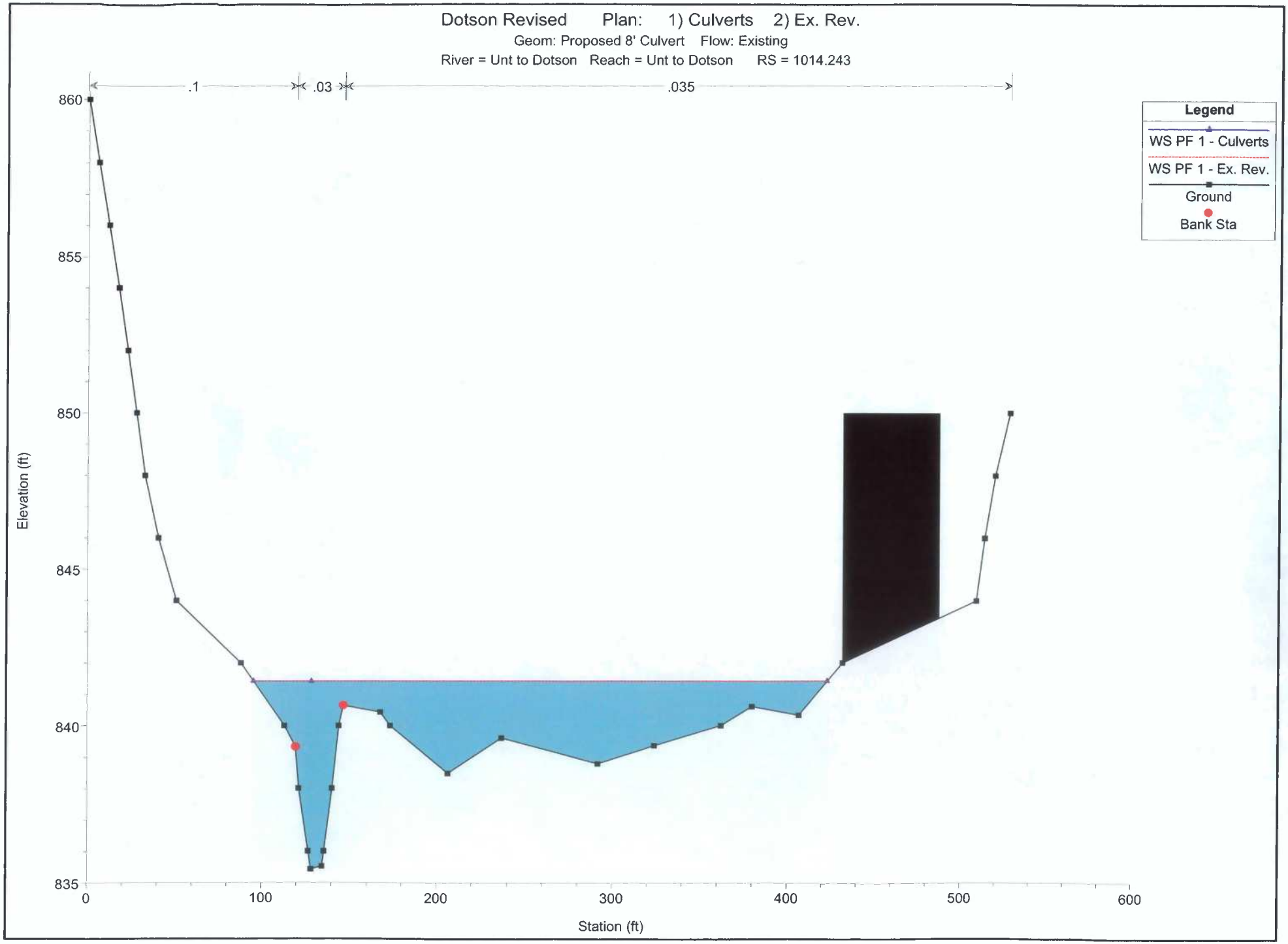
855
850
845
840
835
0
50
100
150
200
250
300
350
400
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1222.955
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1128.537
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Revised Plan: 1) Culverts 2) Ex. Rev.
Geom: Proposed 8' Culvert Flow: Existing
River = Unt to Dotson Reach = Unt to Dotson RS = 1014.243
.1
.03
.035
Legend
WS PF 1 - Culverts
WS PF 1 - Ex. Rev.
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)

Pennsylvania Soil & Rock, Inc. **February 6, 2014**

Drainage Installation Cost Calculation DETAIL C

Example Site Area:

- Dale Well Site, south side of pad from DL-22 to DL-26
- Approximately 450 lineal feet of 40 ft (overall) high fill embankment.

Evaluation:

Assume that bonding benches will be extended one full bench beyond (upslope) the crest of the proposed fill slope for the pad. See attached Typical Design Detail.

- For the Dale example, the subject section of keyway is 550 ft long = **500 ft of 4" keyway drain**
- Keyway requires 6 outlets at 100 ft intervals. 6 outlets x 50 ft each = **300 ft of 4" perforated drain**
- Keyway drain 550 ft x 3 ft high x 2 ft thick = 3,300 ft^3#57 aggregate
- 300 lineal ft of outlet drain x 2 ft x 2 ft = 1,200 ft^3 #57 aggregate
- Approximately 4,500 ft^3 of aggregate = 167 yd^3 x 1.35 = **225 tons of #57 aggregate**
- Non-woven filter fabric, 6 ft x 550 lineal feet = **3,300 ft^2 filter fabric**

- For the Dale site example, a total of 4 bonding benches would be required above the keyway
- 4 bonding benches x 450 lineal feet x 25 ft^2/ft of bench = 45,000 ft^3 = **1,667 $yd^3$of additional excavation.**
- (4 bonding benches x 450 lineal feet) + (300 ft of outlet x 2 per bench) = **2,400 ft of 4" perforated drain pipe.**
- 4 bonding benches x 450 lineal ft x 3 ft high x 2 ft thick = 10,800 ft^3#57 aggregate
- 600 lineal ft of outlet drain x 2 ft x 2 ft = 2,400 ft^3 #57 aggregate
- Approximately 13,200 ft^3 of aggregate = 489 yd^3 x 1.35 = **660 tons of #57 aggregate**
- Non-woven filter fabric, 6 ft x 4 bonding benches x 450 lineal feet = **10,800 ft^2 filter fabric**

Total Estimated Cost of Installation of Proposed Drain System:

1,667 $yd^3$of additional excavation x \$3.75/ yd^3 = **\$6,251**

3,200 ft of 4" perforated drain pipe x \$0.43/ft = **\$1,376**

3,200 ft of Trench Excavation x \$2.00/ft = **\$6,400**

885 tons of #57 aggregate x \$39/ton installed = **\$34,515**

1,567 yd^2 filter fabric x \$1.10/ yd^2 = **\$1,724**

\$50,266 / 450 lineal feet = \$111.70 per lineal foot of 40 high fill embankment.

For a 30 ft high fill embankment the cost would be approximately 75% of the Example Cost = \$83.78/ft

For a 20 ft high fill embankment the cost would be approximately 50% of the Example Cost = \$55.85/ft

ANTERO RESOURCES CORPORATION

SCHEDULE OF QUANTITIES

CLEARING & GRUBBING; EROSION & SEDIMENT CONTROLS	DOTSON HOLLAND WELL PAD			
	QUANTITY	UNIT	UNIT PRICE	FINAL PRICE
MOBILIZATION	1.0	EA	$17,510.00	$17,510.00
CONSTRUCTION ENTRANCE	1.0	EA	$2,517.00	$2,517.00
CLEARING AND GRUBBING (TREE REMOVAL = 22.8 ACRES)	0.6	AC	$3,821.00	$2,292.60
JUTE MATTING - SLOPE MATTING	481.1	SY	$2.10	$1,010.31
24" COMPOST FILTER SOCK	0.0	LF	$9.40	$0.00
32" COMPOST FILTER SOCK	0.0	LF	$13.50	$0.00
24" COMPOST SOCK DIVERSION	0.0	LF	$9.40	$0.00
SUPER SILT FENCE	223.5	LF	$8.60	$1,922.10
TOTAL				**$25,252.01**

RETAINING STRUCTURES				
	QUANTITY	UNIT	UNIT PRICE	FINAL PRICE
GABION CAGES WITH STONE (3' X 3' X 6')	38.0	EA	$170.00	$6,460.00
TOTAL				**$6,460.00**

SITE - UNCLASSIFIED EXCAVATION				
	QUANTITY	UNIT	UNIT PRICE	FINAL PRICE
WELL PAD	0.0	CY	$3.80	$0.00
ACCESS ROADS	6.4	CY	$4.00	$25.60
WATER CONTAINMENT PAD "A"	0.0	CY	$4.10	$0.00
STAGING AREA	0.0	CY	$7.00	$0.00
WATER CONTAINMENT PAD "B"	0.0	CY	$4.10	$0.00
EXCESS MATERIAL STOCKPILES	0.0	CY	$3.90	$0.00
TOPSOIL STOCKPILES	0.0	CY	$3.90	$0.00
TOTAL				**$25.60**

SUMP(S) PER ANTERO RESOURCES STANDARD DETAIL				
	QUANTITY	UNIT	UNIT PRICE	FINAL PRICE
INSTALL 102" x 78" x 44" PRE CAST SUMP - SEE ANTERO RESOURCES SUMP DETAIL	0.0	EA	$775.40	$0.00
4" PVC CONNECTIVE PIPE (ANTERO SUMP DRAIN DETAIL)	0.0	LF	$9.60	$0.00
TOTAL				**$0.00**

AGGREGATE SURFACING - SPREADING, COMPACTION, and/or INSTALLATION				
	QUANTITY	UNIT	UNIT PRICE	FINAL PRICE
WELL PAD 6" OR 4" MINUS CRUSHER RUN AGGREGATE (6" THICK)	0.0	TON	$2.60	$0.00
WELL PAD 1 1/2" or 3/4" CRUSHER RUN STONE (2" THICK)	0.0	TON	$2.90	$0.00
WELL PAD GEOTEXTILE FABRIC (US 200)	0.0	SY	$0.80	$0.00
ACCESS ROADS 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	192.3	TON	$2.80	$538.44
ACCESS ROAD 1 1/2" OR 3/4" CRUSHER RUN STONE (2" THICK)	48.1	TON	$2.90	$139.49
ACCESS ROADS GEOTEXTILE FABRIC (US 200)	864.7	SY	$0.70	$605.29
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT		SY	$1.90	$0.00
WATER CONTAINMENT PAD "A" 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	0.0	TON	$2.60	$0.00
WATER CONTAINMENT PAD "A" 1 1/2" or 3/4" CRUSHER RUN STONE (2" THICK)	0.0	TON	$2.60	$0.00
WATER CONTAINMENT PAD "A" GEOTEXTILE FABRIC (US 200)	0.0	SY	$0.70	$0.00
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT		SY	$2.10	$0.00
STAGING AREA 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	0.0	TON	$3.80	$0.00
STAGING AREA 1 1/2" or 3/4" CRUSHER RUN AGGREGATE (2" THICK)	0.0	TON	$3.80	$0.00
STAGING AREA GEOTEXTILE FABRIC (US 200)	0.0	SY	$0.70	$0.00
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT		SY	$1.50	$0.00

ANTERO RESOURCES CORPORATION

SCHEDULE OF QUANTITIES

WATER CONTAINMENT PAD "B" 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	0.0	TON	$2.60	$0.00
WATER CONTAINMENT PAD "B" 1 1/2" or 3/4" CRUSHER RUN AGGREGATE (2" THICK)	0.0	TON	$2.60	$0.00
WATER CONTAINMENT PAD "B" GEOTEXTILE FABRIC (US 200)	0.0	SY	$0.70	$0.00
*INSTALL TENSAR TX190 GEOGRID or EQUIVALENT		SY	$2.10	$0.00
TOTAL				**$1,283.22**

ROAD CULVERTS				
	QUANTITY	**UNIT**	**UNIT PRICE**	**FINAL PRICE**
15" HDPE	0.0	LF	$20.10	$0.00
30" HDPE	49.0	LF	$12.00	$588.00
6'x8' CONCRETE BOX CULVERT (total)	96.0	LF	$875.00	$84,000.00
R4 RIP RAP (INLETS/OUTLETS)	10.9	TON	$29.00	$316.10
AASHTO #1 STONE (DITCH CHECKS)	0.5	TON	$51.80	$25.90
DITCH LINING - (ACCESS ROAD) SYNTHETIC MATTING (TRM)	126.6	SY	$3.80	$481.08
DITCH LINING - (ACCESS ROAD) ROCK-LINED DITCH (R4)	0.0	TON	$16.80	$0.00
TOTAL				**$85,411.08**

SEEDING				
	QUANTITY	**UNIT**	**UNIT PRICE**	**FINAL PRICE**
SITE SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	0.5	AC	$3,302.00	$1,651.00
TOTAL				**$1,651.00**

LINER SYSTEM				
	QUANTITY	**UNIT**	**QUANTITY**	**UNIT**
60 MIL TEXTURED PRIMARY LINER	0.0	SY		$0.00
16 OZ. NON-WOVEN GEOTEXTILE FABRIC CUSHION	0.0	SY		$0.00
TOTAL				**$0.00**
NOTE: THE SQUARE YARDAGE FOR THE LINER SYSTEM DOES NOT ACCOUNT FOR MATERIAL OVERLAP AND WASTE.				

UNFORESEEN SITE CONDITIONS				
	QUANTITY	**UNIT**	**UNIT PRICE**	**FINAL PRICE**
*FRENCH DRAINS		FT	$10.60	$0.00
*PHASE 1 FENCING - STEEL CORRUGATED PANELS w/"T" POST (10 FT CENTERS) - WETLAND PROTECTION		LF	$10.20	$0.00
*PHASE 2 FENCING - SILT FENCE AND OR FILTER SOCK OUTSIDE OF PHASE 3 FENCING - WETLAND PROTECTION		LF	$7.10	$0.00
*PHASE 3 FENCING - ORANGE SAFETY FENCE w/"T" POST (10FT CENTERS) - WETLAND PROTECTION		LF	$3.50	$0.00
*SILT FENCE		LF	$3.00	$0.00
*TEMPORARY SEEDING		AC	$1,581.00	$0.00
*CONSTRUCTION STAKEOUT		HOUR	$90.00	$0.00
* 4 FT FARM FENCE (WOOD CORNER AND PULL POST & "T" POST - 10 FT SPACING)		LF	$16.50	$0.00
* 5 STRAND BARB WIRE FENCE (WOOD CORNER AND PULL POST & "T" POST - 10 FT SPACING)		LF		$0.00
TOTAL				**$0.00**

GRAND TOTAL	**$120,082.91**

ANTERO RESOURCES WILL PROVIDE THE FOLLOWING:

102" x 78" x 44" PRE CAST SUMP
VALVE FOR SUMP DISCHARGE
TX 190 GEOGRID OR EQUIVALENT
GEOTEXTILE FABRIC (US 200) OR EQUIVALENT
ALL HDPE CULVERT PIPE
ALL AGGREGATE

NAVITUS
ENGINEERING INC.

151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185

October 16, 2013

Doddridge County Commission
118 East Court Street
West Union, WV 26456

Attn: Dan Wellings, Doddridge County Floodplain Administrator

Re: Dotson Holland Stream Crossing - Floodplain Analysis

Dear Mr. Wellings:

Navitus Engineering has completed a floodplain analysis of the proposed Dotson Holland site stream crossing over Dotson Run and located just south of Greenwood, along County Route 50/30 in Doddridge County, West Virginia. This site is located within a FEMA Flood Zone A, as shown on the Flood Insurance Rate Maps (FIRM) from the National Flood Insurance Program (NFIP), Map Numbers 54017C0100C, dated October 4, 2011. Being that the site is located in a Flood Zone A, base flood elevations for this area have not been established and no detailed study information was found in the Flood Insurance Study for Doddridge County, dated October 4, 2011.

In order to establish base flood elevations for this site, a hydrologic and hydraulic analysis was preformed as outlined in the current Doddridge County Floodplain Ordinance, enacted May 21st, 2013. Using field shot data, 10-foot interval topography converted from 3 meter West Virginia GIS Technical Center DEM data, and information taken from USGS 7.5 Minute Series Topographic Maps, a drainage analysis was performed for the Dotson Run drainage shed. Upon establishing the peak flow drainage calculations for the 100-year storm event, a HEC-RAS river analysis was conducted for a section of Dotson Run adjacent to the development area and Base Flood Elevations (BFE) were established. The resulting BFEs were used to establish adjusted floodplain boundaries for the segment of Dotson Run being studied. These boundaries are shown on the attached Floodplain Exhibit of this development site.

In addition to establishing BFEs, a proposed conditions analysis was performed to determine the impacts of the proposed entrance road and stream crossing over Dotson Run. The proposed grading and culverts were added into the cross sections and the manning's "n" values were adjusted. The model was run with these changes to determine the impacts of the proposed access road and culverts. The results of this analysis indicate that the proposed improvement will cause a maximum increase of 0.8' in the BFEs in this area and no upstream or downstream properties will be adversely impacted. The maximum increase in the BFE occurs at River Stations 20+19.079 and 20+88.858. The cross section at River Station 20+19.079 has an existing BFE of 846.4 and a proposed BFE of 847.2 and the cross section at River Station 20+88.858 has an existing BFE of 846.4 and a proposed BFE of 847.2. The Dotson Holland Well Pad Site Plan (attached) contains a FEMA FIRM Map exhibit showing the proposed access road site overlaid on the FIRM Map. This map contains approximate property lines and owner information.

Attached are the following documents associated with this submission:

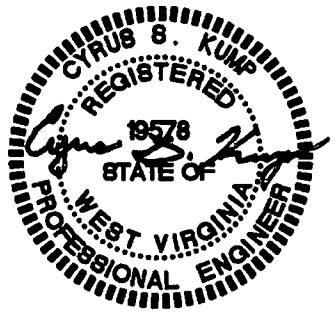
- A Floodplain Analysis of Dotson Run documenting the methods used for the analysis, drainage computations, cross sections, and a narrative to describe the analysis. Included with this analysis are exhibits that identify the existing and proposed 100-year floodplain.
- The Dotson Holland Well Pad Site Plan, prepared by Navitus Engineering, Inc. which includes additional site design and construction specifications.
- Floodplain Permit Application Fee
- Doddridge County Improvement Location Permit Application

Should any questions or comments arise during the review, please let us know and we will work to address them. Please let me know if you should need additional information. You can reach me by phone (540) 336-9486 or email: dmurphy@navituseng.com.

Sincerely,
Navitus Engineering, Inc.

Daniel E. Murphy, CFM

Daniel E. Murphy, CFM
#US-13-07064
Certified Floodplain Manager (CFM®)



1. Objective

The objective of this floodplain analysis was to establish boundaries for the existing and proposed conditions of the 100 year base flood elevations. The proposed condition includes the installation of two (2) 6'x8' concrete box culverts and an access road to provide access to a well pad site, where the proposed access road and stream crossing is within FEMA Flood Zone "A".

2. Existing Conditions

2.1. Property Description

This site is located in Doddridge County, West Virginia along Dotson Run and County Route 50/31 south of Greenwood. The proposed access road entrance is located along County Route 50/31. The proposed culverts are located upstream of (2) 6.7'x5.1' elliptical steel culverts under an existing an access road, and upstream of (2) 5'x6' concrete box culverts under US. Rt. 50. The proposed culverts are larger than both sets of existing culverts along Dotson Run.

2.2. Floodplain Delineation

The approximate limit of the 100-year floodplain (a flood event that has a 1% chance of being equaled or exceeded in any given year) is shown on FEMA Flood Insurance Rate Map (FIRM) for Doddridge County on panels 54017C0100C effective October 4, 2011. This floodplain is located in flood zone designation "A" and no base flood elevations have been established.

2.3. Floodplain Ordinance

This site is administered under the Doddridge County Floodplain Ordinance, enacted May 31st, 2013.

Per Section 4.4.A of the ordinance, when a site is located in FEMA Flood Zone designation "A" the Floodplain Administrator shall use elevation and floodway information from Federal, State, or other acceptable sources when available to determine the elevation above which development will reasonably safe from flooding.

Per Section 4.4.B. of the ordinance, when data from an acceptable source is not available, the Floodplain Administrator shall review, or shall cause to be reviewed; all proposed development to determine (1) the amount being invested and (2) the specific flood risk at the site. The Floodplain Administrator shall then require the applicant to determine the elevation above which the development and adjacent properties including but not limited to existing buildings will be reasonably safe from flooding using hydrologic and hydraulic analyses or other techniques. When hydrologic and hydraulic analyses are required, they shall only be prepared by a registered professional engineer who shall certify that the methods used correctly reflect currently accepted technical concepts. The resulting study shall include a

cover letter, signed by the responsible professional, providing a statement of findings in basic terms. In addition, studies, analyses, computations, etc. shall be submitted in sufficient detail to allow a thorough review by the Floodplain Administrator.
Per Section 4.4.C. of the ordinance, any development and/or use of land shall be permitted provided that all such uses, activities and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained herein and in all other applicable Federal and State Laws, Ordinances and Regulations.

Per Section 4.4.D. of the ordinance, within any apportioned Floodplain Zone (Zone A) without Floodway Area, no new construction or development shall be allowed unless it is demonstrated that the cumulative impact of the proposed development, when combined with all other existing and anticipated development, will not increase the elevation of the 100-year flood more than one (1) foot at any point.

Per Section 4.5.A of the ordinance, any developer shall notify in writing, by certified mail, Doddridge County's Floodplain Administrator, the State Coordinating Office, and adjacent communities and any adjacent property owners of all such intended activities prior to the alteration of the stream. Copies of all required notifications must be submitted to the Federal Insurance Administration. In addition prior to issuing the local permit the Floodplain Administrator shall require copies of all necessary permits from those government agencies from which Federal or State Law requires approval.

Per Section 4.5.B a stream crossing analysis for the proposed permanent crossing of Dotson Run has been provided under separate cover and includes a cover letter signed by the responsible professional, a detailed report, hydraulic and hydrologic computations and a sitemap detailing the planned construction.

Per Section 4.5.C of this ordinance the crossing site has been designed with "best practice" techniques in mind. A dual 6'x8' concrete box culvert was selected to pass the base flow and 10 year storm event. The culvert will be embedded 18 inches to allow for aquatic passage. The culvert was designed to specifically pass the 10 year storm event in order to remain as a permanent crossing. All fill utilized will be 2-4" clean rock aggregate with a 4-6" large angular durable rock base to minimize erosion during storm events. Gabion basket wing walls will be utilized to minimize scour around the culvert. Sandbag cofferdams and a pump around system will be utilized during construction to minimize erosion. The proposed culverts are located approximately 15' upstream from a set of existing 6.7'x5.1' elliptical steel culverts and 80' upstream of existing dual 5'x6' concrete box culverts under Route 50.

Per Section 4.5.E of this ordinance the Developer shall provide Doddridge County with all required legal agreements detailing inspections and maintenance.

Per Section 5.1 of this ordinance Permits are required for the construction of the permanent stream crossing. The format of the permit will coincide with the requirements set forth in Section 5.2 of the ordinance.

Per Section 6.1E of this ordinance the fill associated with this plan has been designed to not adversely affect adjacent properties. The access road and culvert were located to minimize floodway constriction and the height above the existing grade was minimized to allow as much flow as possible to be unimpeded. Impacts to the 100 year are demonstrated later in this report, however, increases to the 100 year base flood elevations were limited to approximately 250' upstream of the proposed culvert and returned to 0.0' of impact approximately 315' upstream of the proposed culvert. The nearest upstream structure is a garage located 70' from the culvert and had 0.8' of impact to the 100 year base flood elevation at that location. Impacts downstream of the proposed culvert were limited to immediately past the culvert and returned to 0.0' of impact immediately. The nearest downstream structure is an existing house located approximately 600' downstream from the culvert. Fill as stated above shall consist of 2-4" clean rock aggregate with a 4-6" large angular durable rock base. No less than 2:1 slopes will be utilized in the construction of the proposed crossing.

Per Section 6.1F the structure has been placed with the longitudinal axis parallel to the direction of flood flow and to maintain the same flood-flow lines of the adjoining structures.

Per Section 6.1G the culverts will be securely anchored to prevent flotation, collapse, and lateral movement.

Per Section 6.1.I of this ordinance, no material or equipment storage shall be allowed within the vicinity of the entrance. The storage of all material and equipment shall be onsite and away from the entrance.

Per Section 6.1.K of this ordinance, a flow line is proposed along the entrance to allow adequate drainage across the proposed entrance.

All other specific requirements covered in Section 6.1 of this ordinance are not applicable to this design. (Sections 6.1.A, 6.1.B, 6.1.C, 6.1.D, 6.1.H, and 6.1.L)

The developer shall conform with all administrative procedures as outline in Article 7 of this ordinance.

2.4. Dotson Run Characteristics

Dotson Run is located in the New Milton District of Doddridge County and flows in a northwesterly direction. The drainage area flowing to Dotson Run at the stream crossing is approximately 691 acres of forested and agricultural land with an average basin slope of 28.6%.

3. Analysis Information

3.1. HEC-RAS

A HEC-RAS hydraulic analysis was performed for the portion of the Dotson Run that has an impact on the BFE's across the property. HEC-RAS is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels. The steady flow system is designed for applications in floodplain management and flood insurance studies.

3.2. Analysis Limits

The analysis information is based upon two foot interval aerial shot topography by Blue Mountain Aerial Mapping. The upstream analysis limit for Dotson Run is located approximately 1,165 feet upstream from the proposed stream crossing and represents the 31+83.868 section. The downstream analysis limit for Dotson Run is located approximately 1,020 feet downstream of the proposed stream crossing and represents the 10+00.000 section. These limits were selected so that the HEC-RAS model would accurately determine the base flood elevations on site and off site.

3.3. Flow Data

The hydrologic analysis utilized USDA soil surveys for computation of drainage shed curve numbers, aerial topography and 3 meter West Virginia GIS Technical Center DEM to determine the drainage area(s) and time of concentration path(s). The peak 100-year discharge within the inundation area was determined through TR-55 SCS methodology. Time of concentration paths were calculated utilizing the SCS lag method. The hydrologic calculations for the drainage area were performed using HEC-HMS. See the table below for a summary of the flow conditions, and see Supplement 1 for the complete Drainage Computations.

Stream	**Drainage Area**	**Flow (cfs)**	**Note**
Dotson Run	691.11 Ac.	505.7	Upper Reach
Dotson Run	556.83 Ac.	783.6	Lower Reach

3.4. Cross Section Data

The cross sections were employed at significant changes in site features. This includes major bends in the stream channel, areas of major contraction and expansion of the floodplain area, upstream and downstream of existing culverts, and at building obstructions (cross sections were compiled using Aerial Mapping by Blue Mountain Aerial Mapping).

3.5. Manning's n-value

The channel and overbank areas were assigned manning's n-values based on photographs and close inspection of existing aerial photography. The chart below describes the manning's n values used in this study.

Manning's n value	Description	Portion Used
.1	Heavy stand of timber, few down trees, little undergrowth, flow below branches	Floodplains
.03	Clean, straight, full, no rifts or deep pools	Main Channel
.035	High grass	Floodplains
.06	Light Brush and trees, in summer	Floodplains

4. Results

4.1. Existing Conditions

Since the site is in Zone "A" floodplain area as shown on the FIRM, the existing condition model was based on existing topography and drainage computations. This information was processed in HEC-RAS to determine the existing conditions of the Base Flood Elevations.

4.2. Proposed Conditions

The proposed conditions model was based on the proposed topography for the site access road and proposed culverts in the stream. This information was added into the existing conditions cross sections, and then was processed in HEC-RAS to determine the proposed conditions of the Base Flood Elevations. A summary of elevation changes showing the existing and proposed BFEs at the various cross sections has been provided below. As shown in the table, the proposed development will not increase the existing BFEs more than 0.8' throughout the project area and return to 0.0' approximately 314' upstream of the proposed culverts at Station 23+33.304. BFE's return to 0.0' of impact immediately downstream of the proposed culverts.

DOTSON HOLLAND STREAM CROSSING
SUMMARY OF COMPUTED ELEVATIONS

CROSS SECTION STATION	RIVER NAME	100 YEAR BASE FLOOD ELEVATION		
		EXISTING CONDITIONS MODEL	PROPOSED CONDITIONS MODEL	PROPOSED DIFFERENCE
3183.868	Dotson Run Upper	856.5	856.5	0.0
3053.784	Dotson Run Upper	855.5	855.5	0.0
2888.080	Dotson Run Upper	853.2	853.2	0.0
2799.727	Dotson Run Upper	852.3	852.3	0.0
2775.485	Dotson Run Upper	852.2	852.2	0.0
2761.408	Dotson Run Upper	852.0	852.0	0.0
2759.869	Dotson Run Upper	851.5	851.5	0.0
2705.342	Dotson Run Upper	850.8	850.8	0.0

2656.729	Dotson Run Upper	850.1	850.1	0.0
2587.689	Dotson Run Upper	849.6	849.6	0.0
2586.252	Dotson Run Upper	849.7	849.7	0.0
2570.250	Dotson Run Upper	849.5	849.5	0.0
2569.491	Dotson Run Upper	849.2	849.2	0.0
2539.448	Dotson Run Upper	848.9	848.9	0.0
2481.906	Dotson Run Upper	848.6	848.6	0.0
2412.823	Dotson Run Upper	848.5	848.5	0.0
2410.917	Dotson Run Upper	848.5	848.5	0.0
2333.304	Dotson Run Upper	847.5	847.5	0.0
2270.249	Dotson Run Upper	846.5	847.1	+ 0.6
2193.833	Dotson Run Upper	846.5	847.2	+ 0.7
2151.343	Dotson Run Upper	846.5	847.2	+ 0.7
2088.858	Dotson Run Upper	846.4	847.2	+ 0.8
2019.079	Dotson Run Upper	846.4	847.2	+ 0.8
1943.117	Dotson Run Upper	846.2	846.2	0.0
1915.038	Dotson Run Upper	844.4	844.4	0.0
1878.276	Dotson Run Upper	844.2	844.2	0.0
1487.336	Dotson Run Upper	841.1	841.1	0.0
1440.621	Dotson Run Upper	841.5	841.5	0.0
1400.977	Dotson Run Lower	841.1	841.1	0.0
1344.212	Dotson Run Lower	840.2	840.2	0.0
1289.476	Dotson Run Lower	840.5	840.5	0.0
1271.523	Dotson Run Lower	839.6	839.6	0.0
1182.267	Dotson Run Lower	839.2	839.2	0.0
1143.687	Dotson Run Lower	838.1	838.1	0.0
1130.779	Dotson Run Lower	838.1	838.1	0.0
1059.794	Dotson Run Lower	838.4	838.4	0.0
1000.000	Dotson Run Lower	837.2	837.2	0.0
1569.420	Unnamed Trib. To Dotson Run	843.6	843.6	0.0
1515.286	Unnamed Trib. To Dotson Run	843.3	843.3	0.0
1499.515	Unnamed Trib. To Dotson Run	843.2	843.2	0.0
1464.257	Unnamed Trib. To Dotson Run	842.9	842.9	0.0
1406.971	Unnamed Trib. To Dotson Run	842.3	842.3	0.0
1367.937	Unnamed Trib. To Dotson Run	842.6	842.6	0.0
1359.780	Unnamed Trib. To Dotson Run	842.6	842.6	0.0
1332.978	Unnamed Trib. To Dotson Run	842.3	842.3	0.0
1284.508	Unnamed Trib. To Dotson Run	841.3	841.3	0.0
1128.537	Unnamed Trib. To Dotson Run	841.5	841.5	0.0

5. Conclusion

The results of this floodplain analysis indicate that there will be minimal changes in the 100 year base flood elevation on the subject property and no impacts to upstream and downstream properties along Dotson Run. The largest increase in base flood elevation is 0.8' on the subject property and is located on site directly upstream of the stream crossing.

APPENDIX

Exhibit A	FIRM Panel 54017C0100C
Exhibit B	Overall Plan
Exhibit C	Existing Conditions Plan
Exhibit D	Proposed Conditions Plan
Supplement 1	Drainage Computations
Supplement 2	HEC-RAS Analysis –Existing Conditions Summary
Supplement 3	HEC-RAS Analysis –Proposed Conditions Summary w/ Cross Sections

Exhibit A

FIRM Panel 54017C0100C

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

0 600 1200 METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0100C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 100 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0100	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
54017C0100C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

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

Exhibit B

Overall Plan

OVERALL PLAN

DOTSON HOLLAND
FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 200'
JOB NO. ANT024
DOTSON HOLLAND
DATE: 10/16/2013

ANTERO RESOURCES

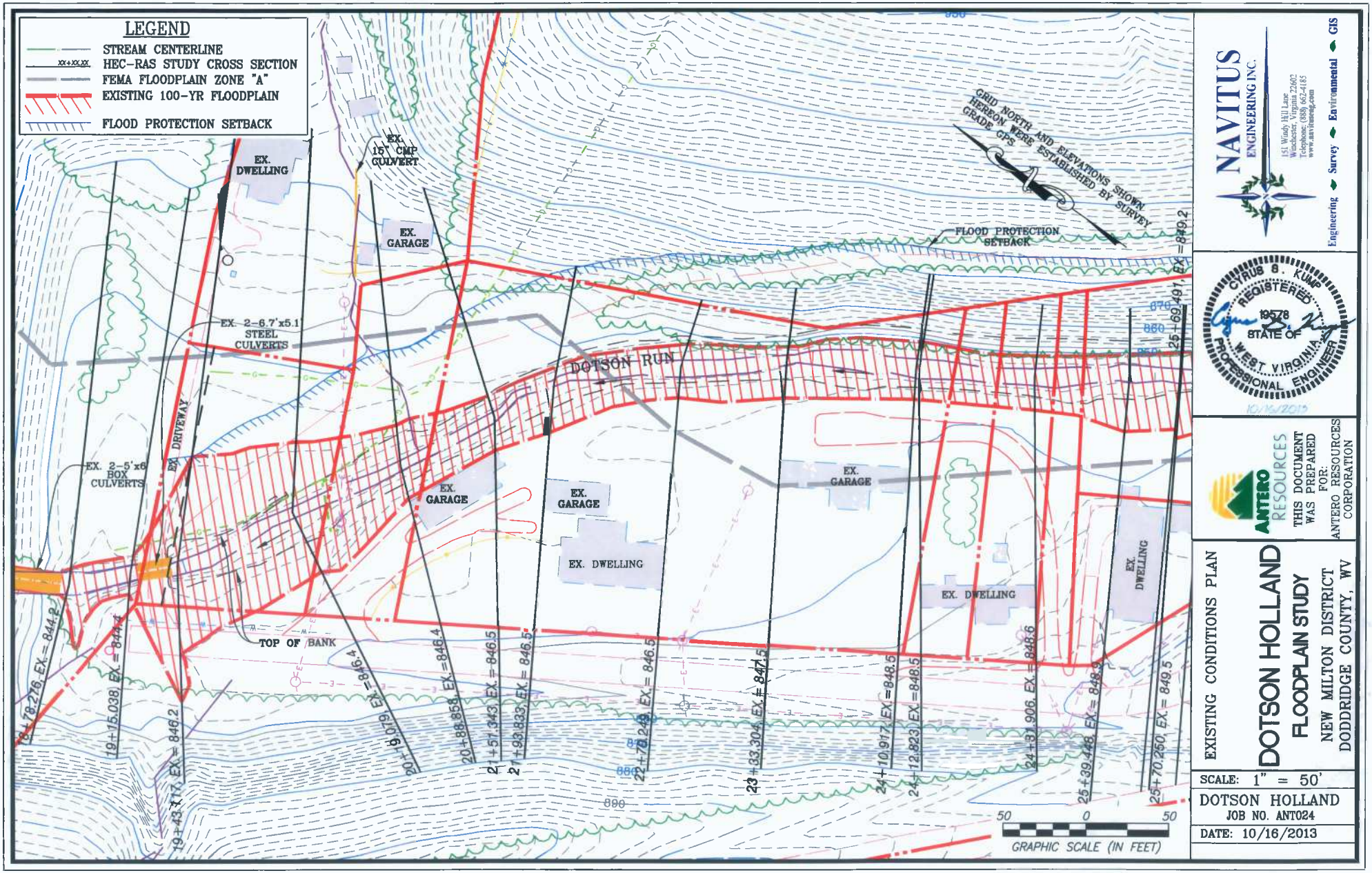
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

PROFESSIONAL ENGINEER
CYRUS B. KAMALI
STATE OF WEST VIRGINIA
REGISTERED

NAVITUS ENGINEERING INC.
151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185
www.navituseng.com
Engineering • Survey • Environmental • GIS

Exhibit C

Existing Conditions Plan



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Winchester, Virginia 22602
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www.navitusengg.com
Engineering • Survey • Environmental • GIS

CYRUS S. KUMP
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/16/2013

ANTERO RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

EXISTING CONDITIONS PLAN

DOTSON HOLLAND FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

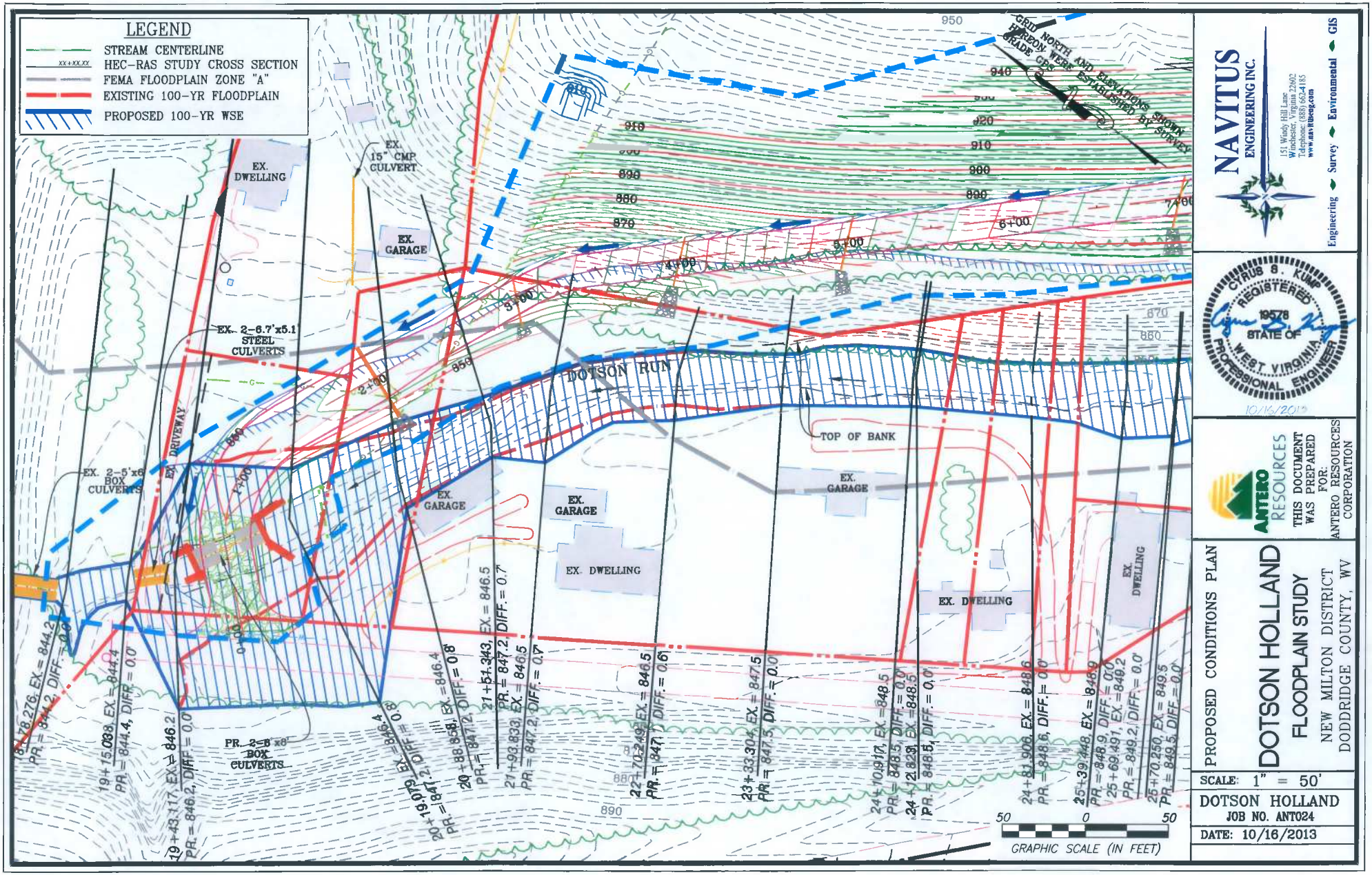
SCALE: 1" = 50'

DOTSON HOLLAND
JOB NO. ANT024

DATE: 10/16/2013

Exhibit D

Proposed Conditions Plan



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CYRUS S. KUMP
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/16/2013

ANTERO RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

PROPOSED CONDITIONS PLAN

DOTSON HOLLAND FLOODPLAIN STUDY

NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 50'

DOTSON HOLLAND
JOB NO. ANT024

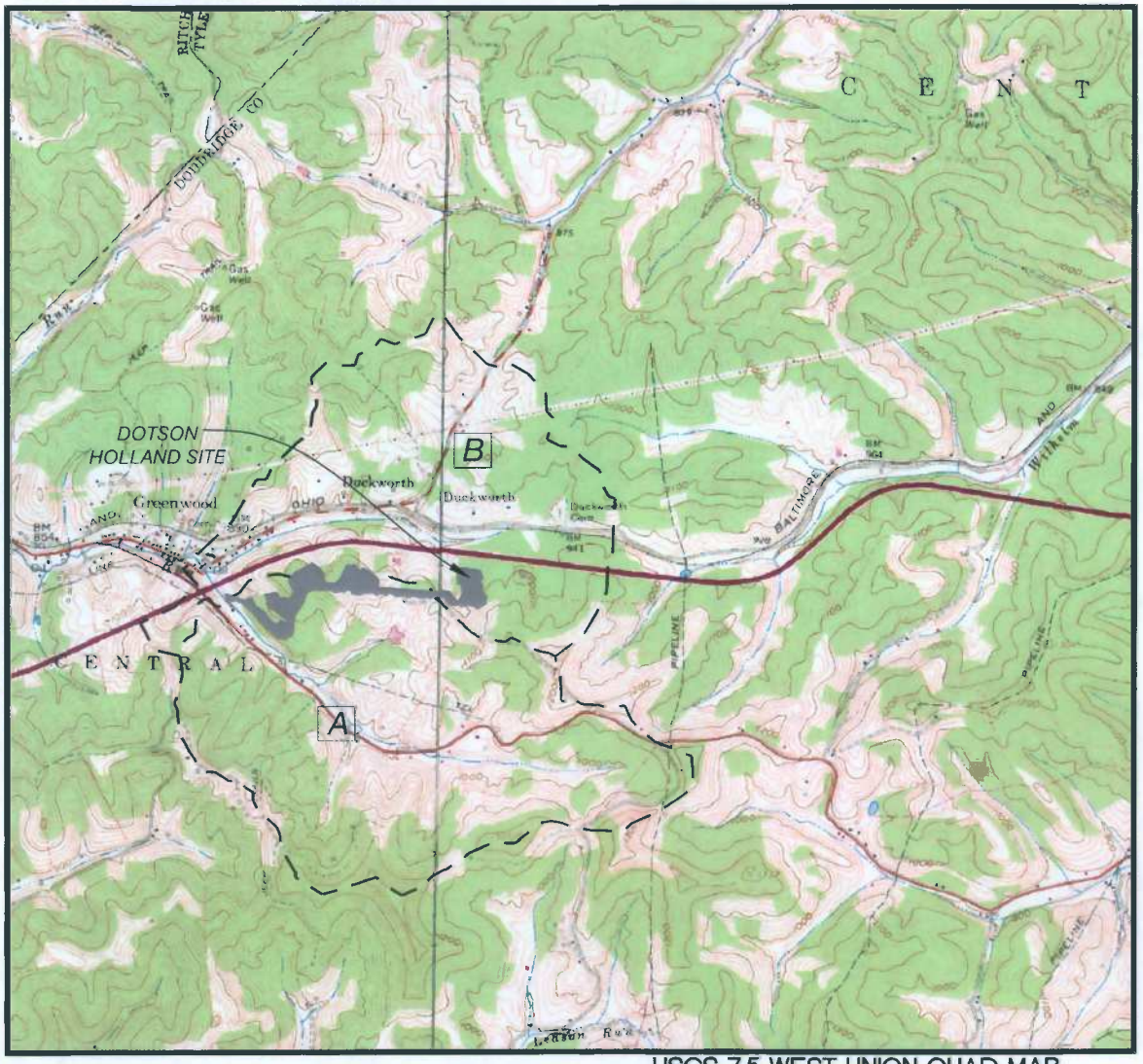
DATE: 10/16/2013

Supplement 1

Drainage Computations

DRAINAGE MAP

USGS 7.5 PENNSBORO QUAD MAP



USGS 7.5 WEST UNION QUAD MAP

WEST VIRGINIA STATE PLANE
COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS
& OPUS POST-PROCESSING

KEY	HYDROLOGIC ELEMENT	DRAINAGE AREA (SQ. MI.)
A	UPPER DOTSON RUN	1.080
B	LOWER DOTSON RUN	0.869
	TOTAL	1.949

2000 0 2000
GRAPHIC SCALE (IN FEET)

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CYRUS S. KUMP
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19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/16/2013

ANTERO RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

DRAINAGE MAP

DOTSON HOLLAND
FLOODPLAIN STUDY
NEW MILTON DISTRICT
DODDRIDGE COUNTY, WV

SCALE: 1" = 2000'

DOTSON HOLLAND
JOB NO. ANT024

DATE: 10/16/2013

Project: Alvadore Property Simulation Run: 100 YR

Start of Run: 19Dec2012, 00:00 Basin Model: Basin 1
End of Run: 20Dec2012, 00:05 Meteorologic Model: 100 YR
Compute Time: 21Feb2013, 16:06:14 Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
Subbasin-1	1.08	505.7	19Dec2012, 13:10	125.5
Subbasin-2	0.87	313.8	19Dec2012, 13:45	99.7
Junction-1	1.95	783.6	19Dec2012, 13:20	225.2

Supplement 2

HEC-RAS Analysis –Existing Conditions Summary

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

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

****

PROJECT DATA
Project Title: Dotson Holland SC
Project File : AlvadoreSC.prj
Run Date and Time: 9/30/2013 3:28:14 PM

Project in English units

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PLAN DATA

Plan Title: Existing
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.p01

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.g01

Flow Title : Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.f01

Plan Summary Information:

Number of:	Cross Sections	= 47	Multiple Openings	=	0
	Culverts	= 2	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

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FLOW DATA

Flow Title: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Dotson Run	Upper	3183.868	505.7
Dotson Run	Upper	1440.621	783.6
Dotson Run	Lower	1400.977	783.6
Unt to Doston	Lower	1569.420	313.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Dotson Run	Lower	PF 1		Normal S = 0.008

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GEOMETRY DATA

Geometry Title: Existing
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Dotson Run	Upper		1
Dotson Run	Lower	1	
Unt to Doston	Lower		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
Dotson Run	Upper	to Dotson Run	Lower	38.69	0
Unt to Doston	Lower	to Dotson Run	Lower	0	0

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 3183.868

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.94	3.39	870.03	3.5	870	4.02	869.82	5.08	869.43
7.69	868.48	8.28	868.26	8.94	868	9.35	867.83	13.36	866
14.07	865.7	17.82	864	22.76	862.47	23.91	862	29.87	861.65
43.53	860.85	49.77	860.52	59.69	860	78.51	858.78	90.5	858
104.73	857.6	125.59	857.11	135.27	856.92	139.09	856.86	141.91	856.83
147.03	856.66	150.64	856.61	157.64	856.32	165.53	856	165.63	856
166.21	855.78	166.86	855.55	169.9	854.49	171.29	854	171.33	853.99
174.63	853.28	181.68	853.16	184.76	853.07	185.09	853.33	185.54	853.69
185.95	854	186.28	854.28	188.75	856	190.49	857.32	191.42	858
193.73	859.79	194.01	860	194.2	860.16	196.56	862	198.3	863.11
199.67	864	201.55	865.07	203.22	866	205.41	867.25	206.23	867.72
206.72	868	208.54	868.82	211.17	870	212.81	870.53	217.49	872
220.61	873	223.77	874	226.98	875.14	229.42	876	232.77	877.45
234.07	878	238.84	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	165.53	.03	188.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
165.53	188.75	137.71	129.12	122.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	857.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	856.48	Reach Len. (ft)	137.71	129.12	122.82
Crit W.S. (ft)	856.48	Flow Area (sq ft)	2.88	58.96	0.15
E.G. Slope (ft/ft)	0.009180	Area (sq ft)	2.88	58.96	0.15
Q Total (cfs)	505.70	Flow (cfs)	4.55	501.08	0.07
Top Width (ft)	35.69	Top Width (ft)	11.84	23.22	0.64
Vel Total (ft/s)	8.16	Avg. Vel. (ft/s)	1.58	8.50	0.47
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)	0.24	2.54	0.24
Conv. Total (cfs)	5278.1	Conv. (cfs)	47.5	5229.8	0.8

* Length Wtd. (ft)	*	129.58	* Wetted Per. (ft)	*	11.85	*	24.61	*	0.80	*
* Min Ch El (ft)	*	853.07	* Shear (lb/sq ft)	*	0.14	*	1.37	*	0.11	*
* Alpha	*	1.08	* Stream Power (lb/ft s)	*	238.84	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	1.04	* Cum Volume (acre-ft)	*	0.19	*	2.79	*	3.18	*
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*	0.36	*	1.02	*	1.65	*

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 3053.784

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.91	11.74	864.13	11.92	864	12.19	863.79	14.39	862
16.8	860.6	17.83	860	30.38	858.46	38.03	858	38.99	857.98
56.06	857.78	63.03	857.74	66.8	857.7	73.25	857.58	78.67	857.44
84.53	857.3	117.17	856	123.08	856	130.84	855.62	141.38	855.1
146.8	854.77	159.88	854	165.16	852.16	165.64	852.01	165.78	852.21
171.69	851.89	174.3	851.73	174.43	851.97	174.97	852.23	178.57	854
181.54	855.73	182.03	856	183.37	856.85	184.59	857.66	185.06	858
186.95	859.26	187.96	860	188.72	860.57	190.81	862	192.67	863.24
192.9	863.39	193.73	864	194.65	864.68	196.65	866	199.02	867.56
199.73	868	201.84	869.23	203.15	870	205.65	871.48	206.52	872
207.3	872.29	211.65	874	211.87	874.07	217.76	876	220.06	876.8
223.57	878	225.42	878.64	229.37	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	159.88	.03	178.57	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
159.88	178.57	175.37	163.58	152.04	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	856.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	855.45	Reach Len. (ft)	175.37	163.58	152.04
Crit W.S. (ft)	855.45	Flow Area (sq ft)	18.03	54.92	1.81
E.G. Slope (ft/ft)	*0.007099	Area (sq ft)	18.03	54.92	1.81
Q Total (cfs)	505.70	Flow (cfs)	50.92	453.12	1.66
Top Width (ft)	46.83	Top Width (ft)	25.64	18.69	2.49
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)	2.82	8.25	0.92
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	0.70	2.94	0.73
Conv. Total (cfs)	6002.1	Conv. (cfs)	604.4	5378.0	19.7
Length Wtd. (ft)	164.27	Wetted Per. (ft)	25.69	19.76	2.89
Min Ch El (ft)	851.73	Shear (lb/sq ft)	0.31	1.23	0.28
Alpha	1.35	Stream Power (lb/ft s)	229.37	0.00	0.00
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	0.16	2.62	3.18
C & E Loss (ft)	0.02	Cum SA (acres)	0.30	0.95	1.64

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2888.080

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.88	6.02	866.79	6.1	866.79	7.29	866.67	7.42	866.65
8.14	866.54	11.84	866	12.27	866	13.57	865.81	16.86	865.46
19.28	865.2	24.25	864.66	28.51	864.3	32.27	864	33.44	863.87
36.41	863.6	39.16	863.44	41.98	863.32	47.64	862.57	49.07	862.49
51.26	862.22	51.76	862.19	53.3	862	53.4	861.99	53.43	861.98
55.04	861.67	56.18	861.53	57.63	861.54	58.23	861.36	58.86	861.33
61.67	860.59	63.7	860	67.31	858	69.41	856	70.92	855.59
91.84	855.33	111.12	855.09	120.56	854.68	124.92	854.6	126	854.56
126.58	854.54	136.38	854	136.65	853.96	146.77	852.53	149.08	852.2
150.3	852	150.7	851.73	153.26	850	153.35	849.91	154.42	849.01
159.34	849.33	160.42	849.43	161.56	849.81	161.93	850	163.58	850.48

168.7	852	172.6	852.84	177.23	854	179.35	854.32	182.36	854.77
189.85	856	191.95	857.34	193.05	858	194.81	858.99	196.49	860
197.2	860.46	199.93	862	202.41	863.86	202.6	864	202.94	864.26
205.09	865.9	205.22	866	205.29	866.05	205.56	866.26	207.84	868
208.09	868.1	213.52	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	150.3	.03	168.7	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150.3	168.7	81.7 84.16	75.97	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
22.2	94.176	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	854.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	853.19	Reach Len. (ft)	81.70	84.16	75.97
Crit W.S. (ft)	853.19	Flow Area (sq ft)	4.75	54.73	3.23
E.G. Slope (ft/ft)	*0.008412	Area (sq ft)	4.75	54.73	3.23
Q Total (cfs)	505.70	Flow (cfs)	12.77	489.81	3.12
Top Width (ft)	31.86	Top Width (ft)	8.17	18.40	5.28
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	2.69	8.95	0.97
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	0.58	2.97	0.61
Conv. Total (cfs)	5513.6	Conv. (cfs)	139.3	5340.3	34.0
Length Wtd. (ft)	83.97	Wetted Per. (ft)	8.26	19.79	5.41
Min Ch El (ft)	849.01	Shear (lb/sq ft)	0.30	1.45	0.31
Alpha	1.20	Stream Power (lb/ft s)	213.52	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.11	2.41	3.17
C & E Loss (ft)	0.20	Cum SA (acres)	0.23	0.89	1.63

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2799.727

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.92	1.71	866.54	3.7	866.08	4.04	866	4.89	865.82
7.32	865.51	15.26	864.33	20.48	864	21.81	863.91	22.44	863.85
26.79	863.44	30.46	863.02	38.41	862	53.51	860	55.88	859.58
58.71	859.06	65.42	858	67.07	857.54	69.92	856.69	73.2	856.15
74.3	856	76.92	854.7	77.79	853.95	77.81	853.94	77.85	853.95
77.89	854	78.33	854	80.18	854.17	80.84	854.24	84.42	854.52
87.66	854.68	88.78	854.69	91.66	854.66	94.89	854.46	95.9	854.3
99.55	854.08	100.69	854	102.96	853.74	109.23	853	109.29	853.01
109.32	853.01	109.33	853	119.33	852.55	119.49	852.54	119.85	852.49
119.87	852.49	124.29	852.62	124.74	852.62	125.38	852.57	127.1	852.88
128.36	852.85	129.49	853.03	133.16	853.18	134.16	853.32	134.99	853.45
135.7	853.57	137.02	853.49	138.36	853.6	139.62	853.61	141.06	853.49
141.7	853.48	142.35	853.46	143.09	853.43	143.99	853.38	144.93	853.32
145.74	853.27	147.72	853.12	149.67	852.97	151.88	852.82	153.4	852.67
157.34	852.45	162.4	852.18	165.34	852	166.48	852	166.53	851.99
168.01	851.75	168.66	851.66	170.44	851.33	171.53	851.17	172.89	850.85
175.23	850.48	177.82	850	179.06	849.68	180.54	849.2	181.17	848.9
182.41	848.36	194.25	848.85	195.56	848.93	196.47	849.07	196.92	849.16
200.17	850	200.73	850.17	206.47	852	208.38	852.59	210.52	853.57
211.43	854	211.86	854.16	213.44	854.71	217.1	856	218.71	857.46
219.35	858	221.34	859.82	221.55	860	223.65	861.93	223.73	862
223.85	862.08	224.13	862.35	225.46	863.58	225.89	864	227.14	864.93
228.69	866	230.61	867.32	231.59	868	234.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	177.82	.03	200.73	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
177.82	200.73	62.16	24.24	28.56	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
26.211	98.77	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 852.82	* Element	* Left OB	* Channel	* Right OB *

Vel Head (ft)	0.54	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	852.28	Reach Len. (ft)	62.16	24.24	28.56
Crit W.S. (ft)		Flow Area (sq ft)	15.33	76.23	7.01
E.G. Slope (ft/ft)	0.003155	Area (sq ft)	15.33	76.23	7.01
Q Total (cfs)	505.70	Flow (cfs)	33.42	466.42	5.86
Top Width (ft)	46.92	Top Width (ft)	17.35	22.91	6.66
Vel Total (ft/s)	5.13	Avg. Vel. (ft/s)	2.18	6.12	0.84
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)	0.88	3.33	1.05
Conv. Total (cfs)	9002.6	Conv. (cfs)	594.9	8303.4	104.3
Length Wtd. (ft)	25.53	Wetted Per. (ft)	17.54	23.37	6.98
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.17	0.64	0.20
Alpha	1.32	Stream Power (lb/ft s)	234.54	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.09	2.28	3.16
C & E Loss (ft)	0.01	Cum SA (acres)	0.21	0.85	1.62

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2775.485

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.1	.3	867.06	.56	867.02	1.24	866.94	3.89	866.68
5.58	866.45	7.65	866.21	8.24	866.14	9.41	866	9.96	866
17.45	864.41	19.81	864	20.63	864	23.9	863.56	24.45	863.48
27.08	863.08	29.82	862.76	33.42	862	36.03	862	36.44	861.97
44.32	860.46	46.67	860	48.74	860	50.15	859.89	50.47	859.89
53.7	859.68	54.15	859.68	59.39	859.46	82.23	858	93.95	857.07
107.25	856	109.01	855.88	123.01	854.91	136.3	854	144.49	853.66
152	853.34	168.93	852.64	174.31	852.42	176.91	852.32	177.31	852.3
182.92	852	184.97	851.57	194.73	850	196.29	849	197.6	848.36
201.08	848.62	207.34	848.72	214.15	849.75	215.1	850	215.96	850
216.7	850.25	217.36	850.55	220.42	852	223.09	853.46	224.1	854
225.7	854.87	226.56	855.36	227.66	856	228.78	857.01	229.9	858
232.45	859.96	232.5	860	232.52	860.02	232.69	860.15	234.98	862
236.14	862.98	237.35	864	239.68	865.95	239.75	866	241.46	867.38
242.24	868	246.26	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	182.92	.03	220.42	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
182.92	220.42	13.77	14.01	9.73	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev

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62.261 80.895 865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.72	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.50	Wt. n-Val.	0.035	0.030	0.100	
W.S. Elev (ft)	852.22	Reach Len. (ft)	13.77	14.01	9.73	
Crit W.S. (ft)		Flow Area (sq ft)	0.44	89.01	0.04	
E.G. Slope (ft/ft)	0.004323	Area (sq ft)	0.44	89.01	0.04	
Q Total (cfs)	505.70	Flow (cfs)	0.28	505.41	0.01	
Top Width (ft)	41.97	Top Width (ft)	4.07	37.50	0.40	
Vel Total (ft/s)	5.65	Avg. Vel. (ft/s)	0.64	5.68	0.20	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)	0.11	2.37	0.11	
Conv. Total (cfs)	7691.2	Conv. (cfs)	4.3	7686.7	0.1	
Length Wtd. (ft)	14.01	Wetted Per. (ft)	4.08	38.66	0.45	
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.03	0.62	0.03	
Alpha	1.01	Stream Power (lb/ft s)	246.26	0.00	0.00	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.08	2.24	3.16	
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	0.83	1.61	

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2761.408

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.93	.06	867.93	.58	867.9	7.74	867.05	8.86	866.95
10.57	866.66	12.49	866.2	13.37	866	14.47	865.74	20.66	864.42
22.7	864	25.52	863.45	26.73	863.21	31.9	862.43	32.89	862.34
35.64	862	36.98	861.82	43.59	861.05	46.55	861.05	48.21	860.89
56.87	860	64.94	859.34	83.55	858	84.96	858	105.55	856.12
107.02	856	125.11	854.75	135.98	854	174.96	852.45	184.89	852.08
186.9	852	197.76	850.25	199.36	850	199.45	849.94	203.58	848.36
211.31	848.37	214.75	848.43	215.9	848.61	217.1	848.92	217.79	849.32
218.77	850	220.54	851.28	221.77	852	222.53	852.46	224.42	853.59
224.87	853.87	225.06	854	227.09	855.28	227.84	855.78	228.16	856
229.11	856.61	231.56	858	232.48	858.52	234.87	859.97	234.91	860
236.74	861.51	237.39	862	239.31	863.74	239.62	864	241.64	865.86
241.8	866	242.1	866.22	242.38	866.39	245.22	868	249.86	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	186.9	.03	221.77	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
186.9 221.77 14.86 1.54 2.17 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
65.216	83.85	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.035	0.030	0.000
W.S. Elev (ft)	852.04	Reach Len. (ft)	14.86	1.54	2.17
Crit W.S. (ft)	851.45	Flow Area (sq ft)	0.02	81.40	0.00
E.G. Slope (ft/ft)	*0.005365	Area (sq ft)	0.02	81.40	0.00
Q Total (cfs)	505.70	Flow (cfs)	0.01	505.69	0.00
Top Width (ft)	35.98	Top Width (ft)	1.04	34.87	0.07
Vel Total (ft/s)	6.21	Avg. Vel. (ft/s)	0.23	6.21	0.07
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)	0.02	2.33	0.02
Conv. Total (cfs)	6904.1	Conv. (cfs)	0.1	6904.1	0.0
Length Wtd. (ft)	1.54	Wetted Per. (ft)	1.04	36.32	0.08
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.01	0.75	
Alpha	1.00	Stream Power (lb/ft s)	249.86	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	2.21	3.16
C & E Loss (ft)	0.04	Cum SA (acres)	0.19	0.82	1.61

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: Dotson Run
REACH: Upper RS: 2759.869

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	868.05	1.36	868	3.74	867.31	8.73	866	12.08	864.95
16.68	864	24.51	862.84	26.14	862.61	27.07	862.45	28.86	862.22
29.99	862	31.62	861.88	32.34	861.83	50.22	860.54	57.14	860.06
57.98	860	58.96	860	85.13	858	102.05	856.64	108.94	856
126.68	854.78	138.08	854	141.23	853.89	145.81	853.72	183.71	852.28
187.39	852.14	191.18	852	192.54	851.78	203.05	850	205.22	849.36
207.77	848.36	217.41	848.37	218.83	848.39	219.29	848.46	219.76	848.59
220.03	848.74	220.48	849.05	221.53	850	223.2	851.19	224.4	852
225.64	852.71	226.73	853.4	227.38	853.79	227.72	854	229.46	855.01
231.49	856	231.51	856	232.88	856.81	234.98	858	236.75	859.01
238.04	859.79	238.38	860	240.61	861.84	240.8	862	240.93	862.12

243.02	864	243.42	864.35	243.99	864.89	245.21	866	247.92	867.55
248.71	868	249.4	868.3	251.69	869.27	253.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	191.18	.03	224.4	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
191.18	224.4	54.03	53.26	36.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
48.283	90.702	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	851.54	Reach Len. (ft)	54.03	53.26	36.68
Crit W.S. (ft)	851.54	Flow Area (sq ft)		61.55	
E.G. Slope (ft/ft)	0.011112	Area (sq ft)		61.55	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	29.76	Top Width (ft)		29.76	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	4797.4	Conv. (cfs)		4797.4	
Length Wtd. (ft)	53.26	Wetted Per. (ft)		31.18	
Min Ch El (ft)	848.36	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	253.23	0.00	0.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.08	2.21	3.16
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	0.82	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2705.342

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.8	3.16	869.54	14.31	868.41	15.21	868.39	16.74	868.28
20.63	868	22.62	867.21	25.65	866	27.2	865.28	29.71	864.12
29.87	864.05	29.98	864	30.45	863.82	35.8	862	42.28	862
54.7	860.2	57.24	860	76.85	860	95.81	858.47	98.48	858.41
99.1	858.39	99.63	858.35	101.48	858.15	104.98	858.1	106	858
107.86	857.84	112.43	857.42	117.75	856.62	119.6	856.39	120.92	856.27
122.8	856	129.81	855.46	134.78	855.15	142.68	854	145.41	854
146.4	853.92	153.02	853.7	158.99	853.54	185.73	852.35	187.06	852.33
188.4	852.31	191.41	852	191.43	852	194.49	852	199.97	851.01
205.99	850	210.22	848.14	210.53	848	210.63	847.95	211.34	847.62
211.57	847.52	217.01	847.3	222.24	847.42	223.03	847.9	223.21	848
224.35	848.43	225.37	848.98	227.41	850	229.53	850.47	235.93	852
236.43	852.09	239.9	852.67	242.9	853.25	246.76	854	250.47	855.73
251.17	856	252.52	856.74	254.39	858	256.28	859.28	257.78	860
259.64	860.82	262.28	862	263.1	862.47	264.12	863.12	265.36	864
266.71	864.69	268.38	865.34	269.97	866	271.85	866.78	274.52	868
277.75	869.36	279.2	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	194.49	.03	235.93	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
194.49	235.93	27.35	47.59	60.55	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
69.324	100.13	865	177.199	198.178	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	850.79	Reach Len. (ft)	27.35	47.59	60.55
Crit W.S. (ft)	850.79	Flow Area (sq ft)		61.42	
E.G. Slope (ft/ft)	*0.011030	Area (sq ft)		61.42	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	29.54	Top Width (ft)		29.54	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		2.08	
Conv. Total (cfs)	4815.0	Conv. (cfs)		4815.0	
Length Wtd. (ft)	47.59	Wetted Per. (ft)		30.85	
Min Ch El (ft)	847.30	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	279.20	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.08	2.13	3.16
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	0.78	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2656.729

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.23	7.65	869.96	7.97	869.94	8.3	869.92	11.84	869.92
12.14	869.91	12.46	869.89	23.56	869.07	32.05	869.78	32.41	870
32.91	870	34.89	869.85	40.03	869.49	40.94	869.32	50.35	868
50.44	868	59.03	866.24	60.14	866	62.05	865.54	68.88	864
74.5	862.68	76.78	862.15	77.46	862	85.23	860	87.89	859.3
90.43	858.69	93.28	858	104.91	856	116.45	855.08	122.11	854.67
123.09	854.62	128.58	854.1	128.7	854.09	129.52	854	133.88	853.6
153.28	853.19	155.19	853.04	155.25	853.04	156.16	853.07	156.19	853.08
156.31	853.07	157.61	853.02	169.34	852.58	169.58	852.58	169.86	852.56
170.88	852.36	171.71	852.34	178.23	852	206.08	850.73	208.01	850.64
214.45	850.4	219.38	850	224.2	848.07	224.36	848	225.47	847.42
232.25	847.25	235.27	847.15	237.09	847.13	239.3	847.05	239.85	847.3
240.37	847.42	241.43	847.72	242.31	848	243.49	848.6	244.76	849.28
246.02	850	248.24	851.63	248.78	852	251.47	852.87	255.14	854
257.21	854.91	259.59	856	260.79	857.1	261.03	857.31	261.81	858
262.86	858.94	264.03	860	265.56	861.35	266.29	862	268.21	863.69
268.55	864	270.44	865.6	270.84	866	271.23	866.41	272.71	868
274.77	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.38	.03	246.02	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.38	246.02	67.88	66.8	62.5	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.665	124.429	870	178.349	204.346	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	850.09	Reach Len. (ft)	67.88	66.80	62.50
Crit W.S. (ft)	850.09	Flow Area (sq ft)	0.05	59.37	0.01
E.G. Slope (ft/ft)	0.010767	Area (sq ft)	0.05	59.37	0.01
Q Total (cfs)	505.70	Flow (cfs)	0.03	505.67	0.00
Top Width (ft)	27.93	Top Width (ft)	1.16	26.64	0.13
Vel Total (ft/s)	8.51	Avg. Vel. (ft/s)	0.57	8.52	0.17
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.05	2.23	0.05
Conv. Total (cfs)	4873.6	Conv. (cfs)	0.3	4873.3	0.0
Length Wtd. (ft)	66.84	Wetted Per. (ft)	1.17	27.83	0.16
Min Ch El (ft)	847.05	Shear (lb/sq ft)	0.03	1.43	0.03
Alpha	1.00	Stream Power (lb/ft s)	274.77	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.08	2.07	3.16
C & E Loss (ft)	0.10	Cum SA (acres)	0.19	0.75	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2587.689

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	874.22	.99	874.17	1.86	874	5.41	873.24	10.44	872
13.05	870.57	14.06	870	15.39	869.09	17.07	868	19.86	866.04
19.9	866.02	19.93	866	19.97	865.98	20.02	865.96	20.12	865.93
22.65	865.03	23.69	864.87	24.98	864.5	25.64	864.34	26.05	864.26
29.25	864.27	29.85	864.21	30.41	864.19	32.54	864.22	32.9	864.22
33.17	864.23	33.56	864.25	36.05	864.35	37.34	864.42	40.15	864.59
40.96	864.64	46.3	864.49	51.54	864.56	51.57	864.56	51.85	864.64
52.55	864.62	68.09	865.18	71.1	865.13	72.43	864.73	78.36	864.04
79.87	864	83.09	863.15	86.39	862	86.89	861.83	92.3	860
96.2	858.7	98.24	858	99.04	857.83	100.98	857.59	107.11	856.64
111.76	856	112.99	856	139.53	854	146.97	853.31	152.16	852.79
159.21	852.21	161.89	852	162.3	852	175.26	851.49	208.25	850
216.63	849.56	217	849.54	221.66	849.17	236.36	848	236.5	847.93
241.12	846.33	246	846	248.72	845.91	249.6	845.86	253.31	846.88
257.37	848	257.75	848.34	259.62	850	261.23	851.5	263.81	853.67

264.06	853.87	264.23	854	264.8	854.38	267.33	856	269.3	857.1
270.94	858	272.09	858.74	273.9	860	274.39	860.35	274.85	860.68
276.71	862	279.07	863.6	279.62	864	281.51	865.24	282.73	866
285.11	867.56	285.82	868	287.04	868.78	288.84	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	236.36	.03	257.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
236.36	257.75	24.12	1.44	2.62	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
116.56	144.303	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.56	Reach Len. (ft)	24.12	1.44	2.62
Crit W.S. (ft)	849.33	Flow Area (sq ft)	15.24	61.98	0.83
E.G. Slope (ft/ft)	0.005775	Area (sq ft)	15.24	61.98	0.83
Q Total (cfs)	505.70	Flow (cfs)	41.39	463.76	0.56
Top Width (ft)	42.45	Top Width (ft)	19.68	21.39	1.37
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)	2.71	7.48	0.67
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)	0.77	2.90	0.61
Conv. Total (cfs)	6654.7	Conv. (cfs)	544.6	6102.7	7.3
Length Wtd. (ft)	2.72	Wetted Per. (ft)	19.75	22.11	1.83
Min Ch El (ft)	845.86	Shear (lb/sq ft)	0.28	1.01	0.16
Alpha	1.24	Stream Power (lb/ft s)	288.84	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	1.97	3.16
C & E Loss (ft)	0.05	Cum SA (acres)	0.18	0.71	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2586.252

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	875.18	.94	875.01	7.34	874	14.24	872.22	15.06	872
17.23	871.05	19.61	870	20.6	868.85	21.11	868.23	21.35	868
21.76	867.55	22.5	866.7	23.01	866	23.85	865.55	27.32	864
27.82	863.79	29.24	863.18	32.07	862	33.49	862	34.84	862.14
49.65	863.14	49.87	863.11	50.91	863.49	51.61	864	54.7	864

56.07	864.04	61.14	864.06	64.87	864.03	68.62	864.03	72.78	864.02
74.16	864	74.52	863.94	74.98	863.84	78.55	863.07	79.73	862.8
83.32	862	83.5	861.94	86.72	860.85	89.57	860	89.85	859.9
94.09	858.36	95.01	858.03	95.08	858	95.86	857.85	105.95	856
108.17	855.88	109.56	855.8	124.79	854.98	133.75	854.34	136.12	854.21
136.61	854.19	137.63	854.09	137.68	854.09	138.12	854.06	139	854
143.53	854	148.16	853.7	150.83	853.51	152.1	853.42	154.24	853.27
159.09	852.9	170.6	852	172.4	851.88	174.75	851.76	176.41	851.67
188.77	850.96	192.92	850.72	195.03	850.59	209.29	850	220.54	849.46
227.17	849.14	234.28	848.57	241.49	848	242.28	847.64	246.2	846.3
251.61	845.94	254.62	845.84	254.79	845.83	262.62	848	263.33	848.63
264.86	850	266.95	851.96	267.23	852.2	269.32	854	270.15	854.53
272.43	856	273.7	856.72	276.03	858	276.96	858.59	278.96	860
279.36	860.29	280.01	860.76	281.75	862	284.35	863.77	284.66	864
285.7	864.69	287.8	866	289.16	866.9	290.93	868	294.06	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	234.28	.03	263.33	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
234.28	263.33	16.45	15.93	22.83	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
157.809	174.363	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.66	Reach Len. (ft)	16.45	15.93	22.83
Crit W.S. (ft)		Flow Area (sq ft)	8.60	75.63	0.60
E.G. Slope (ft/ft)	0.004963	Area (sq ft)	8.60	75.63	0.60
Q Total (cfs)	505.70	Flow (cfs)	15.71	489.66	0.33
Top Width (ft)	48.20	Top Width (ft)	17.99	29.05	1.15
Vel Total (ft/s)	5.96	Avg. Vel. (ft/s)	1.83	6.47	0.55
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)	0.48	2.60	0.52
Conv. Total (cfs)	7178.4	Conv. (cfs)	222.9	6950.8	4.7
Length Wtd. (ft)	15.97	Wetted Per. (ft)	18.03	29.92	1.55
Min Ch El (ft)	845.83	Shear (lb/sq ft)	0.15	0.78	0.12
Alpha	1.15	Stream Power (lb/ft s)	294.06	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.06	1.97	3.16
C & E Loss (ft)	0.01	Cum SA (acres)	0.16	0.71	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2570.250

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	876.41	.1	876.4	.47	876.32	1.94	876	2.73	875.83
10.84	874	17.73	872.24	19.02	872	20.53	871.22	21.84	870.45
22.58	870	22.7	869.86	24.44	868	24.96	867.4	26.33	866
29.5	864.07	29.61	864	32.58	862.71	33.97	862	43.76	862
45.56	862.06	48.28	862.12	53.32	862.09	54.99	862.09	57.23	862.08
60.65	862.08	61.93	862.07	63.02	862.07	66.98	862.08	67.23	862.1
67.4	862.09	69.46	862.14	74.01	862	75.19	861.67	80.24	860
84.42	858.37	85.44	858	92.83	857.31	94.17	857.13	95.01	857.02
103.59	856	103.76	856	123.06	855.09	145.1	854	172.62	852
188.19	850.86	189.63	850.75	190.86	850.66	202.29	850	215.17	849.48
217.36	849.37	220.54	849.22	222.2	849.13	224.01	849.04	229.04	848.77
234.78	848.51	242.58	848.07	242.72	848.06	243.78	848	247.55	846.3
247.97	846.1	248.32	846.09	256.82	845.65	260.26	846.87	265.11	848
267.73	849.91	268.16	850.24	270.5	852	272.99	853.98	273.01	854
274.94	855.39	275.77	856	277.02	856.8	278.73	858	279.96	858.91
281.45	859.98	281.48	860	283.51	861.49	284.21	862	285.47	862.88
287.12	864	288.59	864.92	292.36	867.42	293.26	868	295.86	869.74
296.27	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	242.58	.03	265.11	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
242.58	265.11	4.97	.76	1.41	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
153.571	170.132	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.50	Reach Len. (ft)	4.97	0.76	1.41
Crit W.S. (ft)	849.22	Flow Area (sq ft)	19.57	65.28	1.55
E.G. Slope (ft/ft)	0.005076	Area (sq ft)	19.57	65.28	1.55
Q Total (cfs)	505.70	Flow (cfs)	46.58	457.94	1.18
Top Width (ft)	52.57	Top Width (ft)	27.98	22.53	2.06
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)	2.38	7.01	0.76
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)	0.70	2.90	0.75
Conv. Total (cfs)	7097.7	Conv. (cfs)	653.8	6427.4	16.5
Length Wtd. (ft)	1.11	Wetted Per. (ft)	28.02	23.29	2.55
Min Ch El (ft)	845.65	Shear (lb/sq ft)	0.22	0.89	0.19
Alpha	1.32	Stream Power (lb/ft s)	296.27	0.00	0.00

* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	* 0.06	* 1.95 * 3.16 *
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 0.16	* 0.70 * 1.61 *

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2569.491

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	876.62	3.15	876.04	3.38	876	3.7	875.92	6.61	875.19
11.9	874	16.93	872.72	19.13	872	21.58	870.62	22.8	870
25.29	868.27	25.58	868	26.54	867.18	27.69	866	28.86	865.29
30.96	864	31.47	863.78	34.94	862	44.91	862	45	862
48.39	861.85	51.48	861.83	54.33	861.8	56.12	861.79	58.19	861.78
61.54	861.77	63.3	861.76	66.74	861.77	69.58	861.91	71.48	862.01
71.96	862	73.44	861.56	76.02	860.85	78.61	860	82.26	858.6
83.83	858	87.96	857.66	91.73	857.27	99.08	856.59	101.72	856.23
103.36	856.02	103.53	856	104.05	856	139.62	854.34	143.16	854.17
147.36	854	173.48	852	182.98	851.3	192.83	850.58	193.78	850.51
194.6	850.45	202.54	850	218.37	849.36	220.95	849.24	223.1	849.14
224.67	849.06	228.64	848.86	234.3	848.56	238.31	848.37	244.96	848
248.85	846.25	249.01	846.18	249.23	846.1	249.36	846.1	258.15	845.65
261.87	846.96	266.32	848	268.91	849.89	269.07	850	270.14	850.79
271.75	852	272.91	852.92	274.3	854	275.64	854.97	277.05	856
278.11	856.68	280	858	281.36	859.01	282.59	859.89	282.74	860
284.82	861.53	285.46	862	286.62	862.8	288.37	864	289.56	864.74
293.97	867.67	294.48	868	297.47	870				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	244.96	.03	266.32	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
244.96	266.32	31.26 30.04	32.01	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
109.625	173.268	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 850.17	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.95	* Wt. n-Val.	* 0.035	* 0.030	* 0.100 *
* W.S. Elev (ft)	* 849.22	* Reach Len. (ft)	* 31.26	* 30.04	* 32.01 *
* Crit W.S. (ft)	* 849.22	* Flow Area (sq ft)	* 14.16	* 57.77	* 1.03 *

* E.G. Slope (ft/ft)	*0.007440	* Area (sq ft)	* 14.16	* 57.77	* 1.03	*	
* Q Total (cfs)	* 505.70	* Flow (cfs)	* 36.81	* 468.07	* 0.82	*	
* Top Width (ft)	* 46.68	* Top Width (ft)	* 23.65	* 21.36	* 1.68	*	
* Vel Total (ft/s)	* 6.93	* Avg. Vel. (ft/s)	* 2.60	* 8.10	* 0.80	*	
* Max Chl Dpth (ft)	* 3.57	* Hydr. Depth (ft)	* 0.60	* 2.70	* 0.61	*	
* Conv. Total (cfs)	* 5862.8	* Conv. (cfs)	* 426.7	* 5426.6	* 9.5	*	
* Length Wtd. (ft)	* 30.11	* Wetted Per. (ft)	* 23.68	* 22.12	* 2.07	*	
* Min Ch El (ft)	* 845.65	* Shear (lb/sq ft)	* 0.28	* 1.21	* 0.23	*	
* Alpha	* 1.27	* Stream Power (lb/ft s)	* 297.47	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.23	* Cum Volume (acre-ft)	* 0.06	* 1.95	* 3.16	*	
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.15	* 0.70	* 1.61	*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2539.448

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.37	3.52	878.5	5.19	878	9.98	876.6	12.01	876
24.51	876	24.59	875.96	27.56	874	30.58	872.05	30.65	872
30.71	871.94	30.75	871.9	30.82	871.82	32.09	870	32.17	869.89
34.35	866.49	34.59	866	35.65	864.08	35.69	864	35.98	863.83
39.35	862	39.76	861.86	44.59	860	48.68	860	49.15	859.99
58.98	859.72	69.03	859.64	69.29	859.76	72.88	860.29	74.14	860.08
80.84	859.71	81.74	859.84	81.88	859.79	82.46	859.97	82.52	860
83.73	859.89	84.23	859.84	88.15	858.14	90.33	858	93.99	858
100.28	857.14	101.04	856.72	102.49	856.04	102.59	856	108.52	856
124.3	855.08	129.93	854.86	130.38	854.85	130.59	854.84	140.5	854.38
156.27	854.39	164.55	854.44	165.61	854.45	168.69	854.36	180.46	854.18
180.5	854.18	180.59	854.14	180.9	854	183.76	852.7	185.33	852
194.57	850.2	195.84	850	199.04	850	232.19	848.66	243.29	848.22
248.45	848	250.73	847.38	255.51	846	255.59	846.04	256.05	845.9
260.5	845.66	266.68	845.18	267.41	845.75	267.64	846	268.31	846.43
271.32	848	272.72	849.09	273.94	850	276.12	851.69	277.1	852.47
279.16	854	280.54	854.81	282.68	856	283.61	856.53	285.76	857.7
285.92	857.8	286.2	858	286.53	858.25	289.06	860	289.48	860.31
291.92	862	292.5	862.51	293.66	863.53	294.25	864	295.46	865

296.62	866	298.44	867.48	299.05	868	301.54	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.45	.03	271.32	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.45	271.32	37.06	57.38	52.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
111.785	193.476	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.91	Reach Len. (ft)	37.06	57.38	52.68
Crit W.S. (ft)	848.89	Flow Area (sq ft)	10.19	60.67	0.54
E.G. Slope (ft/ft)	0.007519	Area (sq ft)	10.19	60.67	0.54
Q Total (cfs)	505.70	Flow (cfs)	22.10	483.25	0.35
Top Width (ft)	46.57	Top Width (ft)	22.53	22.87	1.17
Vel Total (ft/s)	7.08	Avg. Vel. (ft/s)	2.17	7.97	0.65
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	0.45	2.65	0.46
Conv. Total (cfs)	5832.0	Conv. (cfs)	254.9	5573.1	4.0
Length Wtd. (ft)	56.86	Wetted Per. (ft)	22.54	24.02	1.49
Min Ch El (ft)	845.18	Shear (lb/sq ft)	0.21	1.19	0.17
Alpha	1.21	Stream Power (lb/ft s)	301.54	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.05	1.90	3.16
C & E Loss (ft)	0.04	Cum SA (acres)	0.14	0.69	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2481.906

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.33	879.3	4.2	878	5.73	877.27	8.32	876
10.69	874.82	11.95	874.18	12.26	874	12.39	873.83	12.83	873.18
13.5	872	14.19	870.99	14.79	870	15.73	868.65	16.13	868
17.3	866.36	17.53	866	18.89	864.11	18.95	864	19.02	863.93
20.69	862	22.08	861.53	26.18	860	30.36	859.38	33.21	859.39
42.26	859.15	59.7	859.16	61.85	858.9	61.89	858.9	62.04	858.87
62.99	858.7	66.59	858	67.28	857.85	67.7	857.79	74.72	856.57
76.33	856.36	77.68	856.24	79.05	856	84.18	854.7	85.22	854.42

87.93	854	88.41	853.98	94.1	853.78	103.56	853.15	105.57	853.06
118.81	852.75	118.97	852.74	119.5	852.75	134.17	852.4	136.62	852.42
137.67	852.42	139.77	852.4	141.64	852.36	152.25	852.1	154.87	852.03
155.51	852	155.77	852	160.72	851.87	165.32	851.68	166.09	851.65
174.44	851.13	178.35	850.93	182.87	850.8	184.71	850.71	186.94	850.66
190.85	850.51	193.06	850.3	195.33	850.15	196.55	850	203.31	849.66
204.16	849.6	210.26	849.28	212.68	849.16	214.18	849.07	226.98	848
231.68	846.23	232.28	846	233.74	845.44	234.45	845.16	243.88	844.82
244.85	844.8	245	844.87	245.36	845.02	247.78	846	248.87	846.56
251.6	848	253.15	848.93	254.92	850	256.79	851.18	258.15	852
259.9	853.08	261.42	854	264.44	855.72	264.91	856	267.09	857.16
267.28	857.27	268.5	858	269.12	858.43	271.49	860	272.21	860.51
274.42	862	274.93	862.45	277.59	864.66	279.12	865.9	279.23	866
279.37	866.11	281.68	868	282.01	868.27	284.14	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	226.98	.03	251.6	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
226.98	251.6	68.83	69.08	67.61	.1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.453	119.546	870	127.365	138.768	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.62	Reach Len. (ft)	68.83	69.08	67.61
Crit W.S. (ft)	848.18	Flow Area (sq ft)	2.29	68.69	0.32
E.G. Slope (ft/ft)	0.005925	Area (sq ft)	2.29	68.69	0.32
Q Total (cfs)	505.70	Flow (cfs)	3.42	502.13	0.15
Top Width (ft)	33.06	Top Width (ft)	7.40	24.62	1.03
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)	1.49	7.31	0.47
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	0.31	2.79	0.31
Conv. Total (cfs)	6569.5	Conv. (cfs)	44.4	6523.2	2.0
Length Wtd. (ft)	69.08	Wetted Per. (ft)	7.43	25.88	1.20
Min Ch El (ft)	844.80	Shear (lb/sq ft)	0.11	0.98	0.10
Alpha	1.06	Stream Power (lb/ft s)	284.14	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.04	1.82	3.16
C & E Loss (ft)	0.09	Cum SA (acres)	0.12	0.65	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2412.823

INPUT
Description:
Station Elevation Data num= 127

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.48	878.38	3.09	878	3.74	877.59	6.28	876
7.12	875.16	8.13	874	8.6	873.38	9.65	872.22	9.87	872
10.13	871.77	11.99	870	13.3	868.88	14.26	868	15.55	867.04
16.95	866	18.99	864.66	21.02	863.16	22.85	862	24.14	861.29
26.66	860	27.35	858.28	27.81	857.47	28.09	857	28.53	857.24
29.26	857.64	30.51	858	31.08	857.27	35.17	857.02	37.17	856.58
37.64	857.05	38.92	858	40.77	857.65	40.88	857.41	41.1	857.62
43.88	857.66	49.32	857.6	50.41	857.64	51.16	857.66	51.6	857.67
52.88	857.73	57.41	857.61	58.46	858	63.6	857.41	63.66	857.4
63.69	857.4	63.7	857.4	67.43	856	68.35	855.53	71.52	854
77.36	853.36	85.25	852	97.67	851.59	100.04	851.52	115.8	851
119.13	850.92	122.83	850.82	124.98	850.75	143.17	850.35	143.46	850.35
149.37	850.29	150.13	850.28	159.54	850.24	172.27	850.21	179.42	850.05
183.69	850.02	192.18	850.02	196.11	850	199.68	850	206.43	849.79
209.72	849.68	211.18	849.64	212.25	849.62	213.07	849.61	214.2	849.59
215.18	849.5	230.79	848.07	231.57	848	235.09	846.67	235.87	846.38
236.87	846	237.84	845.43	238.66	844.97	238.84	844.89	239.42	844.86
250.88	844.41	256.15	845.88	256.54	846	256.99	846.2	259.68	847.54
260.59	848	260.82	848.17	264.35	850.64	266.04	852	268.53	853.7
268.98	854	270.05	854.68	270.99	855.32	271.88	856	273.02	856.59
274.58	857.39	275.71	858	275.8	858.04	277.66	858.92	279.94	860
281.4	861.3	281.94	861.79	282.23	862	282.33	862.09	284.23	864
284.58	864.34	286.15	866	286.22	866.07	288.11	868	288.15	868.04
290.07	870	290.07	870.01	290.2	870.14	291.99	872	292.17	872.2
293.87	874	294.84	874.8	296.18	875.69	296.67	876	297.65	876.65
299.79	878	303.07	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.79	.03	260.59	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230.79	260.59	18.34	1.91	2.49	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.754	119.847	870	127.32	138.72	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.50	Reach Len. (ft)	18.34	1.91	2.49
Crit W.S. (ft)		Flow Area (sq ft)	1.00	85.49	0.17
E.G. Slope (ft/ft)	0.003699	Area (sq ft)	1.00	85.49	0.17
Q Total (cfs)	505.70	Flow (cfs)	0.92	504.73	0.05

Top Width (ft)	35.16	Top Width (ft)	4.67	29.80	0.70
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)	0.92	5.90	0.31
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)	0.21	2.87	0.25
Conv. Total (cfs)	8315.1	Conv. (cfs)	15.1	8299.1	0.9
Length Wtd. (ft)	1.95	Wetted Per. (ft)	4.68	31.16	0.86
Min Ch El (ft)	844.41	Shear (lb/sq ft)	0.05	0.63	0.05
Alpha	1.02	Stream Power (lb/ft s)	303.07	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	1.70	3.16
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	0.61	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2410.917

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.1	878.15	3.35	878	4.35	877.45	5.72	876
6.51	874.96	7.35	874	8.26	872.79	8.84	872	10.09	870.42
10.4	870	11.83	868.18	11.97	868	12.6	867.32	13.33	866.64
13.75	866.25	14.08	866	14.55	865.72	17.87	864	18.99	863.44
21.6	862	24	860.71	25.4	860	26.99	857.6	27.58	856.59
28.74	857.79	29.02	858	30.31	857.71	36.91	856.17	39.64	857.82
39.88	858	40.04	857.97	40.44	857.06	41.27	857.85	51.38	857.97
51.83	857.97	53.07	858	59.64	857.52	59.73	857.51	59.83	857.5
59.89	857.48	65.64	856	67.34	855.34	70.04	854	72.23	852.94
74.91	852	76.06	852	84.43	851.7	94.56	851.39	100.04	851.21
110.69	850.88	116.53	850.71	123.51	850.49	128.22	850.39	133.32	850.26
133.96	850.24	142.62	850.07	142.68	850.07	149.53	850.01	153.5	850
158.66	850	160.71	849.99	174.5	849.99	180.98	850	187.1	850
187.38	850	196.83	850	211.27	849.57	212.67	849.52	212.98	849.51
213.12	849.51	213.23	849.51	213.44	849.51	214.55	849.4	215.86	849.28
218.41	849.06	230.78	848	231.59	847.7	236.04	846	237.27	845.27
237.65	845.07	238.09	844.87	249.94	844.41	254.41	845.66	255.52	846
256.84	846.59	259.68	848	261.32	849.05	264.18	851.05	265.36	852
268.21	853.94	268.3	854	268.51	854.14	269.83	855.04	271.09	856
272.7	856.83	274.93	857.97	274.97	858	274.99	858.01	275.05	858.04
279.21	860	280.63	861.26	281.45	862	281.96	862.53	283.43	864
283.6	864.17	284.58	865.2	285.37	866	286.62	867.28	287.33	868
288.63	869.33	289.29	870	289.9	870.69	291.17	872	292.03	873
292.98	874	293.51	874.44	294.25	874.93	295.97	876	298.74	877.84
298.98	878	299.42	878.29	302.19	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.78	.03	259.68	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
230.78 259.68 77.37 77.23 80.15 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
160.79	183.695	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.47	Reach Len. (ft)	77.37	77.23	80.15
Crit W.S. (ft)		Flow Area (sq ft)	1.30	83.92	0.17
E.G. Slope (ft/ft)	0.003776	Area (sq ft)	1.30	83.92	0.17
Q Total (cfs)	505.70	Flow (cfs)	1.29	504.35	0.05
Top Width (ft)	35.14	Top Width (ft)	5.51	28.90	0.74
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)	0.99	6.01	0.31
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	0.24	2.90	0.24
Conv. Total (cfs)	8229.6	Conv. (cfs)	21.0	8207.7	0.9
Length Wtd. (ft)	77.23	Wetted Per. (ft)	5.53	30.25	0.88
Min Ch El (ft)	844.41	Shear (lb/sq ft)	0.06	0.65	0.05
Alpha	1.03	Stream Power (lb/ft s)	302.19	0.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.04	1.69	3.16
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	0.61	1.61

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: Dotson Run
REACH: Upper RS: 2333.304

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.3	879.1	3.46	877.71	6.28	876	8.95	874.28
9.39	874	9.5	873.92	11.97	872	13.71	870.56	15.5	868.84
16.28	868	16.59	867.66	18.24	866	19.08	865.31	20.75	864
22.68	862.83	24	862	25.9	860.84	27.23	860	30.16	858.37
30.8	858	31.84	856.45	32.19	855.96	33.11	854.69	33.37	854.32
33.81	854.63	34.58	856	35.96	854.55	37.39	853.28	37.95	854.09
38.19	854.08	41.13	854.16	41.94	854.09	43.96	855.16	44.74	856
45.25	855.29	45.97	855.23	51.44	855.59	53.34	856	57.94	855.55
66.09	854.16	66.95	854	72.95	852.08	73.07	852.04	73.2	852
73.45	851.97	91.51	850	98.4	849.81	99.1	849.8	107.15	849.6

114.56	849.44	121.67	849.3	185.19	848.95	187.32	848.96	188.56	848.97
202.93	848.82	206.38	848.69	206.87	848.7	212.37	848.48	218.94	848.17
219.92	848.12	222.06	848	237.89	846	239.79	845.54	245.29	844
245.74	843.89	246.08	843.78	250.45	843.8	252.11	843.76	252.36	843.9
252.55	844	254.15	845.19	255.37	846	257.98	847.95	258.06	848
258.42	848.29	260.48	849.89	260.62	850	260.89	850.12	263.35	852
267.76	853.58	269.22	854	271.07	854.76	274.47	856	274.52	856.04
277.24	858	278.01	858.59	278.57	859	280.51	860.44	282.66	862
284.98	863.75	285.32	864	287.54	865.73	287.9	866	289.04	866.86
290.13	867.67	290.56	868	290.96	868.31	293.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	222.06	.03	257.98	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
222.06	257.98	67.01	62.63	55.78	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
156.144	188.341	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	848.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	847.50	Reach Len. (ft)	67.01	62.63	55.78
Crit W.S. (ft)	847.50	Flow Area (sq ft)		62.55	
E.G. Slope (ft/ft)	*0.011340	Area (sq ft)		62.55	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	31.37	Top Width (ft)		31.37	
Vel Total (ft/s)	8.08	Avg. Vel. (ft/s)		8.08	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	4748.9	Conv. (cfs)		4748.9	
Length Wtd. (ft)	62.64	Wetted Per. (ft)		32.96	
Min Ch El (ft)	843.76	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	293.23	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.04	1.56	3.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.11	0.56	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2270.249

INPUT
Description:
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.42	878.24	3.9	878	4	877.94	7.49	876
9.48	874.36	12.39	872.26	12.8	872	15.95	870	18.64	868.18
18.9	868	20.26	867.1	21.98	866	23.01	865.34	25.21	864
26.46	863.29	28.39	862	31.62	860.1	31.78	860	31.93	859.91
35.23	858	37.03	856.79	38.35	856	39.5	853.58	40.24	852.43
40.95	853.34	41.65	854	45.4	853.12	48.03	852.49	48.33	852.67
49.12	853.16	49.75	854	51.55	853.86	51.6	853.56	51.71	853.85
57	853.82	58.71	853.81	58.87	853.59	59.86	853.81	63.24	853.86
69.44	854	76.99	852.09	77.39	852	81.16	850.11	81.4	850
83.81	849.92	86.87	849.82	117.51	848.78	130.16	848.39	136.37	848.2
136.66	848.19	142.63	848.02	142.7	848.01	143.25	848	207.42	848
216.93	847.28	233.71	846	236.61	844.94	239.08	844	239.47	843.82
240.27	843.41	250.07	842.67	250.72	842.62	250.91	842.69	256.2	844
259.59	845.69	260.14	846	262.74	847.46	263.45	848	263.9	848.31
267.69	850	270.8	851.02	273.88	852	274.78	852.33	278.49	853.69
279.94	854	280.85	854.6	281.79	855.18	283.19	856	285.11	857.24
285.84	857.7	286.28	858	286.53	858.18	289.24	860		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	233.71	.03	259.59	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
233.71 259.59 73.07 75.65 77.19 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
107.731	172.984	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	846.46	Reach Len. (ft)	73.07	75.65	77.19
Crit W.S. (ft)	846.05	Flow Area (sq ft)	1.36	69.60	0.52
E.G. Slope (ft/ft)	0.006035	Area (sq ft)	1.36	69.60	0.52
Q Total (cfs)	505.70	Flow (cfs)	1.66	503.75	0.29
Top Width (ft)	33.21	Top Width (ft)	5.96	25.88	1.36

* Vel Total (ft/s)	*	7.08	*	Avg. Vel. (ft/s)	*	1.23	*	7.24	*	0.55	*
* Max Chl Dpth (ft)	*	3.84	*	Hydr. Depth (ft)	*	0.23	*	2.69	*	0.38	*
* Conv. Total (cfs)	*	6509.6	*	Conv. (cfs)	*	21.4	*	6484.4	*	3.7	*
* Length Wtd. (ft)	*	75.64	*	Wetted Per. (ft)	*	5.98	*	26.98	*	1.56	*
* Min Ch El (ft)	*	842.62	*	Shear (lb/sq ft)	*	0.09	*	0.97	*	0.13	*
* Alpha	*	1.04	*	Stream Power (lb/ft s)	*	289.24	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.26	*	Cum Volume (acre-ft)	*	0.04	*	1.47	*	3.15	*
* C & E Loss (ft)	*	0.14	*	Cum SA (acres)	*	0.10	*	0.52	*	1.61	*

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: Dotson Run
REACH: Upper RS: 2193.833

INPUT
Description:
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	.96	879.31	2.65	878	3.79	877.2	5.33	876
7.74	874.21	8.01	874	8.26	873.79	9.32	872.99	10.73	872
11.24	871.41	12.53	870	13.6	868.79	14.28	868	15.46	866.67
16.73	865.18	17.84	864	18.18	863.7	19.69	862	21.8	860.19
22.12	860	23.89	858.49	24.52	858	26.52	856.29	26.88	856
27.95	855.36	29.84	854	32.97	852.76	34.8	852	37.45	850.93
38.14	850.56	38.73	850.39	39.48	850.16	39.73	850.07	39.8	850.03
39.84	849.98	39.84	850	39.85	849.93	40.89	849.74	41.96	850
42.06	850	42.77	850.16	45.14	850.63	48.25	851.89	48.53	852
48.6	851.99	56.94	851.7	66.68	852.06	68.61	852	69.86	851.54
74.83	850	105.59	848.9	125.04	848.24	132.09	848	133.25	847.98
133.64	847.98	136.93	847.94	138.55	847.92	139.52	847.91	140.5	847.92
148.4	847.99	149.64	847.96	166.22	847.95	167.27	847.96	168.89	847.91
169.97	847.91	171.62	847.86	196.87	846.67	199.2	846.52	203.14	846.27
203.49	846.27	207.26	846	212.23	845.52	213.8	845.37	213.88	845.35
214.75	845.15	219.68	844	220.66	841.17	220.82	840.67	220.86	840.55
223.48	840.64	224.76	840.67	226.76	840.74	229.98	840.81	230.01	840.81
230.08	840.81	233.72	842.52	234.86	843.05	235.38	843.29	235.66	843.43
236.21	843.71	236.74	844	237.01	844.21	238.98	846	240.25	846.97
241.54	848	251.83	849.96	252.07	850	254.49	850	259.56	850.38
273.11	851.4	276.85	851.65	282.54	852	286.97	853.33	288.05	853.66
288.84	854	289.2	854.16	293.18	856	294.81	856.75	297.59	858
299.39	858.91	301.81	860						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
      0    .035  207.26     .03  238.98      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        207.26  238.98             13.66   40.54  101.71            .1       .3
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
 109.211 171.366     865
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	846.52	Reach Len. (ft)	13.66	40.54	101.71
Crit W.S. (ft)		Flow Area (sq ft)	2.00	105.88	0.17
E.G. Slope (ft/ft)	0.002182	Area (sq ft)	2.00	105.88	0.17
Q Total (cfs)	505.70	Flow (cfs)	1.57	504.09	0.04
Top Width (ft)	40.39	Top Width (ft)	8.00	31.72	0.68
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	0.79	4.76	0.24
Max Chl Dpth (ft)	5.97	Hydr. Depth (ft)	0.25	3.34	0.26
Conv. Total (cfs)	10825.5	Conv. (cfs)	33.6	10791.0	0.9
Length Wtd. (ft)	40.48	Wetted Per. (ft)	8.01	35.87	0.85
Min Ch El (ft)	840.55	Shear (lb/sq ft)	0.03	0.40	0.03
Alpha	1.03	Stream Power (lb/ft s)	301.81	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.03	1.32	3.15
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	0.47	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2151.343

INPUT
Description:
Station Elevation Data num= 134

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.98	878	6.13	876.03	6.17	876	6.29	875.93
9.47	874	11.44	872.52	12.11	872	12.65	871.35	13.77	870
14.65	868.93	15.42	868	16.5	866.69	17.46	865.53	18.69	864
19.47	863.17	20.51	862	21.67	861	22.75	860	23.82	859
24.99	858	26.24	856.82	27.2	856	28.48	854.83	29.34	854
32.05	852.92	34.47	852	37.17	851.02	39	850.34	39.72	850.06
39.82	849.92	39.83	850	39.87	849.78	41.86	849.41	42.13	849.32
42.28	849.27	42.78	849.11	43.88	849.36	44.47	849.73	45.06	850
46.41	850.12	46.91	850.14	50.72	850.98	51.64	851.3	52.3	852
56.07	851.52	58.47	851.24	58.9	851.2	59.45	851.18	60.26	851.2
61.24	851.3	67.44	852	67.95	851.18	72.95	850.27	74.79	850
75.62	849.95	90.36	849.07	93.1	849.03	120.88	848	139.59	848
140.42	848.02	140.77	848	146.69	847.7	146.81	847.7	148.43	847.64

148.64	847.63	148.99	847.61	150.1	847.57	151.01	847.51	151.2	847.49
158.79	847.45	173.96	846.85	174.92	846.82	192.39	846	193.92	845.46
194.18	845.38	194.55	845.26	195.1	845.08	195.92	844.81	197.19	844.4
197.4	844.33	198.45	844.21	198.86	844.17	199.24	844.14	199.49	844.12
200.25	844	204.13	840.57	213.18	840.09	213.46	840.5	214.28	842
217.36	843.27	218.3	843.62	219.13	844	221.78	845.92	221.99	846.05
222.3	846.27	222.38	846	222.63	846.39	222.69	846.43	222.84	846.46
223.62	846.6	231.44	848	244.97	848.72	249.45	848.96	268.8	850
273.63	850.46	280.2	851.06	290.4	852	293	852.69	298.07	854
304.16	855.78	304.88	856	306.35	856.51	310	857.53	311.08	857.85
313.81	858.31	314.77	858.46	317	858.78	319.94	859.2	321.46	859.46
325.19	860	325.91	860.12	327.12	860.28	330.37	860.83	332.6	861.14
338.18	862	343.1	863.36	345.01	864	346.94	865.27	348.17	866
349.47	866.8	351.28	868	353.05	868.99	355.03	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	192.39	.03	221.78	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
192.39	221.78	15.11	62.46	31.51	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
165.206	189.27	865	315.303	323.621	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	846.47	Reach Len. (ft)	15.11	62.46	31.51
Crit W.S. (ft)		Flow Area (sq ft)	1.22	111.69	0.30
E.G. Slope (ft/ft)	0.001645	Area (sq ft)	1.22	111.69	0.30
Q Total (cfs)	505.70	Flow (cfs)	1.06	504.48	0.16
Top Width (ft)	33.60	Top Width (ft)	3.12	29.39	1.09
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)	0.86	4.52	0.55
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)	0.39	3.80	0.27
Conv. Total (cfs)	12470.0	Conv. (cfs)	26.0	12440.0	4.0
Length Wtd. (ft)	62.35	Wetted Per. (ft)	3.44	33.12	1.63
Min Ch El (ft)	840.09	Shear (lb/sq ft)	0.04	0.35	0.02
Alpha	1.02	Stream Power (lb/ft s)	355.03	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.03	1.22	3.15
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	0.44	1.60

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2088.858

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.83	878.16	3.08	878	5.81	876.22	6.15	876
6.62	875.72	9.31	874	9.76	873.59	11.38	872	12.39	870.91
13.34	870	15.3	868.07	15.45	867.92	17.37	866	19.09	864.27
19.37	864	21.35	862.09	21.44	862	21.68	861.77	25.21	858.31
25.53	858	25.94	857.61	27.58	856	29.14	854.47	29.62	854
30.58	853.37	33.26	852	36.37	851.08	39.95	850	40.31	849.37
40.48	849.17	40.58	849.14	43.71	848.17	47.53	848.99	48.77	849.22
49.52	849.37	51.13	849.95	51.26	850	51.3	850	56.09	850.47
57.06	850.96	58.98	850.98	62.88	850.98	65.11	850.96	69.51	850.8
71.38	850.78	73.12	850.25	76.65	849.95	77.22	850	94.27	848.74
104.74	848	120.36	847.88	126.07	847.83	129.76	847.81	132.43	847.72
132.74	847.7	140.2	847.42	145.63	847.55	149.1	847.66	151.54	847.58
154.51	847.48	157.14	847.42	159.38	847.19	161.31	846.95	169.55	846
174.79	845.55	175.25	845.5	175.69	845.32	179.16	844	181.88	839.61
181.92	839.54	187.56	839.54	188.6	840.06	189.95	840.78	190.5	840.98
192.8	842	197.45	843.35	199.54	844	202.02	844.59	204.69	845.2
205.05	845.28	205.37	845.47	205.44	845.52	205.54	845.58	205.64	845.64
205.75	845.7	205.8	846	205.85	845.75	207.93	846.19	208.09	846.2
208.3	846.2	208.54	846.2	208.8	846.2	223.1	847.55	223.32	847.55
223.55	847.54	223.7	847.53	223.77	847.53	223.96	847.53	224.13	847.53
224.26	847.53	224.41	847.54	224.6	847.55	226.41	848	235.8	848
240.75	848.23	241.22	848.24	255.66	849.82	256.67	850	265.36	850.83
278.82	852	283.05	852.45	296.75	854	299.18	854.41	308.41	856
315.47	857.18	320.33	858	325.42	858.76	334.82	860	340.4	860.49
341.5	860.59	345.67	860.88	348.3	861.06	349.17	861.1	350.26	861.16
360.81	862								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	169.55	.03	205.37	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
169.55 205.37 32.84 69.71 47.03 .1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
144.3	163.344	865	309.043	336.842	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	846.41	Reach Len. (ft)	32.84	69.71	47.03
Crit W.S. (ft)		Flow Area (sq ft)	0.74	124.30	1.71
E.G. Slope (ft/ft)	0.001461	Area (sq ft)	0.74	124.30	1.71
Q Total (cfs)	505.70	Flow (cfs)	0.41	504.12	1.17

* Top Width (ft)	*	45.06	* Top Width (ft)	*	3.57	*	35.82	*	5.67	*
* Vel Total (ft/s)	*	3.99	* Avg. Vel. (ft/s)	*	0.56	*	4.06	*	0.68	*
* Max Chl Dpth (ft)	*	6.87	* Hydr. Depth (ft)	*	0.21	*	3.47	*	0.30	*
* Conv. Total (cfs)	*	13228.9	* Conv. (cfs)	*	10.8	*	13187.5	*	30.5	*
* Length Wtd. (ft)	*	68.90	* Wetted Per. (ft)	*	3.59	*	39.65	*	6.25	*
* Min Ch El (ft)	*	839.54	* Shear (lb/sq ft)	*	0.02	*	0.29	*	0.02	*
* Alpha	*	1.03	* Stream Power (lb/ft s)	*	360.81	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	0.03	*	1.05	*	3.15	*
* C & E Loss (ft)	*	0.03	* Cum SA (acres)	*	0.09	*	0.39	*	1.60	*

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: Dotson Run
REACH: Upper RS: 2019.079

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.19	878	4.73	877.08	6.47	876	7.95	875.06
9.49	874	12.03	872.16	12.25	872	13.62	871	14.96	870
15.46	869.61	17.58	868	19.24	866.67	20.11	866	21.8	864.54
22.45	864	24.43	862.17	24.61	862	26.7	860.08	26.78	860
28.31	858.59	28.95	858	28.98	857.97	31.11	856	31.29	855.84
33.28	854	33.75	853.59	35.44	852	40.66	850.24	41.22	850
46.1	848.17	46.96	847.83	47.02	847.81	48.12	847.52	51.67	847.46
51.74	847.45	51.84	846.84	57.38	847.73	59.47	848.09	59.98	848.18
62.96	848.84	66.46	849.61	68.28	850	87.86	850	91.25	849.64
92.19	849.58	100.48	848.64	114.19	848.21	119.21	848	121.69	847.89
122.47	847.87	122.59	847.84	129.22	846.83	135.19	846.43	141.56	846
148.12	846	152.29	845.8	155.48	845.64	157.15	844.33	157.4	844.14
157.46	844.09	157.49	844.06	157.5	844.05	157.51	844.04	157.52	844
157.68	843.95	163.46	842	166.92	841.09	167.96	840.76	168.12	840.71
168.44	840.54	169.45	840.02	175.42	840	177.3	839.97	179.85	839.92
180.2	840.37	180.73	841.04	181.71	842	184.16	843.42	186.57	844.72
186.58	844	186.74	844.76	186.96	844.82	187.08	844.85	190.89	845.01
201.01	845.43	202.22	845.48	212.49	846	217.13	846.34	232.02	847.43
239.55	848	246.91	848.65	262.8	850	284.93	851.94	285.34	851.98
285.7	852	289.23	852.29	310.22	854	314.98	854.42	327.32	855.64
330.39	855.93	330.97	856	331.23	856.03	331.3	856.04	331.48	856.06
332.21	856.15	340.56	857.14	347.46	858	365.87	859.3	375.94	860
388.84	861.01	396.95	861.64	401.1	862	403.75	862	407.65	862.38
408.87	862.51	409.68	862.59						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	155.48	.03	186.57	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
155.48	186.57	139.23	74.9	44.83	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
361.7	401.511	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	846.42	Reach Len. (ft)	139.23	74.90	44.83
Crit W.S. (ft)		Flow Area (sq ft)	8.49	146.77	28.11
E.G. Slope (ft/ft)	0.000606	Area (sq ft)	8.49	146.77	28.11
Q Total (cfs)	505.70	Flow (cfs)	4.98	474.36	26.36
Top Width (ft)	82.92	Top Width (ft)	20.16	31.09	31.67
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)	0.59	3.23	0.94
Max Chl Dpth (ft)	6.50	Hydr. Depth (ft)	0.42	4.72	0.89
Conv. Total (cfs)	20547.1	Conv. (cfs)	202.2	19273.7	1071.2
Length Wtd. (ft)	74.43	Wetted Per. (ft)	20.18	34.00	33.05
Min Ch El (ft)	839.92	Shear (lb/sq ft)	0.02	0.16	0.03
Alpha	1.29	Stream Power (lb/ft s)	409.68	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.03	0.83	3.14
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	0.34	1.58

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1943.117

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47

107.17	845.95	115.23	846	116.12	846	116.35	846	117.19	845.98
118.89	845.93	121.54	844.84	123.62	844	124.23	843.09	125.03	842
126.81	838.22	126.88	838.44	126.88	840	126.89	838.5	137.29	838.81
137.35	838.75	137.51	838.88	138.74	839.92	139.27	840.36	140.24	842.68
142.43	844	147.34	844.65	147.78	844.71	148.2	844.74	149.03	844.8
149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08	155.06	845.18
156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54	172.84	845.78
178.29	846	192.52	846	193.1	846.03	196.43	846.12	209.8	846.59
215.12	846.8	227.61	847.34	230.54	847.44	235.22	848	243.59	848
244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39	257.36	849.34
260.09	849.66	263.47	850	268.64	850.5	281.3	851.62	282.63	851.73
283.51	851.8	284.52	851.89	286.06	852	286.83	851.76	289.02	851.29
293.04	851.72	294.55	851.98	296.13	852.18	308.02	854	311.02	854
314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72	320.59	854.94
323.89	855.28	328.04	855.84	330.54	856	331.73	856.08	333.65	856.19
334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35	350.41	858
351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65	370.33	859.95
378.74	861.6	382.38	862.13	392.13	864	393.43	864.24	394.87	864.54
401.82	866	401.96	866.03						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

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

116.12	147.34	42.64	28.07	46.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	850	T
141.38	401.96	850	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.030	
W.S. Elev (ft)	846.23	Reach Len. (ft)	42.64	28.07	46.40
Crit W.S. (ft)	842.37	Flow Area (sq ft)		119.73	
E.G. Slope (ft/ft)	*0.001086	Area (sq ft)	8.02	134.98	29.62
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	105.25	Top Width (ft)	21.94	31.22	52.09
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)		4.22	
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)		6.10	
Conv. Total (cfs)	15345.3	Conv. (cfs)		15345.3	
Length Wtd. (ft)	28.07	Wetted Per. (ft)		28.76	
Min Ch El (ft)	838.22	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	401.96	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	0.59	3.11

* C & E Loss (ft)	*	* Cum SA (acres)	*	0.01	*	0.28	*	1.54	*

CULVERT

RIVER: Dotson Run
REACH: Upper RS: 1929.28

INPUT
Description:
Distance from Upstream XS = 8.7
Deck/Roadway Width = 8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
107.17	845.95	178.29	846
0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	117.19	845.98
118.89	845.93	121.54	844.84	123.62	844	124.23	843.09	125.03	842
126.81	838.22	126.88	838.44	126.88	840	126.89	838.5	137.29	838.81
137.35	838.75	137.51	838.88	138.74	839.92	139.27	840.36	140.24	842.68
142.43	844	147.34	844.65	147.78	844.71	148.2	844.74	149.03	844.8
149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08	155.06	845.18
156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54	172.84	845.78
178.29	846	192.52	846	193.1	846.03	196.43	846.12	209.8	846.59
215.12	846.8	227.61	847.34	230.54	847.44	235.22	848	243.59	848
244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39	257.36	849.34
260.09	849.66	263.47	850	268.64	850.5	281.3	851.62	282.63	851.73
283.51	851.8	284.52	851.89	286.06	852	286.83	851.76	289.02	851.29
293.04	851.72	294.55	851.98	296.13	852.18	308.02	854	311.02	854
314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72	320.59	854.94
323.89	855.28	328.04	855.84	330.54	856	331.73	856.08	333.65	856.19
334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35	350.41	858
351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65	370.33	859.95

378.74	861.6	382.38	862.13	392.13	864	393.43	864.24	394.87	864.54
401.82	866	401.96	866.03						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.

116.12	147.34	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	850	T
141.38	401.96	850	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

Downstream Deck/Roadway Coordinates num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
99.07	846	160.33	846	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	4.33	857.12	6.34	856	10.88	854.07
11.05	854	11.72	853.79	14.23	853.05	17.72	852	17.84	851.96
18.29	851.71	20.68	850	23.07	848.55	24.07	848.44	25.61	848.36
27.89	848.22	30.77	848	31.15	847.94	31.4	847.88	36.21	846.9
40.16	845.81	41.72	845.84	42.82	846	47.38	845.46	48.73	845.32
49.07	845.46	49.87	845.68	50.55	845.84	51.09	846	53.54	845.97
59.84	845.88	63.96	845.82	64.34	845.82	64.52	845.82	65.51	845.81
65.78	845.81	72.86	846.02	73.6	846.02	76.93	845.95	80.7	845.86
81.88	845.86	82.39	845.86	82.82	845.86	83.18	845.87	83.46	845.87
84.3	845.88	92.57	845.95	97.31	845.99	99.07	846	99.87	844.7
100.07	844.49	100.42	844.39	100.78	844.29	103.17	843.65	103.89	843.78
104.25	843.86	104.73	844	104.93	843.74	106.07	842	106.87	838.56
106.94	838.45	118.38	838.54	118.53	840	119.53	840.69	119.96	841.98
119.98	842.05	120.06	842.17	120.2	842.35	120.39	842.59	120.96	843.28
121.02	843.36	121.12	843.24	121.17	842	121.21	843.15	122.41	843.76
122.65	843.83	122.77	843.88	122.88	843.93	123.46	844	123.66	844.37
124.03	844.58	124.14	844.61	124.83	845.3	126	845.08	127.24	845.6
127.32	845.62	130.04	845.51	130.19	845.53	132.02	845.69	132.76	845.73
138.87	845.65	139.26	845.68	146.86	845.67	147.42	845.67	157.94	845.77
160.33	846	176.12	846	180.44	846.02	192.63	846.06	197.45	846.15
203.15	846.24	206.97	846.38	209.3	846.51	224.6	847.41	234.95	848
236.16	848.05	237.79	848.21	247.29	848.91	261.26	850	263.21	850.09
284.62	851.72	285.01	852	285.42	851.83	291.59	852.68	295.6	853.17

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  296.6  853.27  302.89     854  313.59  855.36  317.83     856  332.38  857.67
 334.32  857.89  334.71  857.93  334.89  857.95  335.26     858   335.3     858
 349.67     860

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .035   99.07     .03  127.24    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         99.07  127.24            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  105.53     850          T
  121.67  349.67     850          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 Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1       Ellipse     5.1     6.7
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                    .4                1
Upstream   Elevation =  838.6
           Centerline Station =  129.11
Downstream Elevation =  838.3
           Centerline Station =  110.88

Culvert Name     Shape      Rise    Span
Culvert #2       Ellipse     6.7     5.1
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               3.2    20.4     .024     .024        0                    .4                1
Upstream   Elevation =  838.5
           Centerline Station =  134.83
Downstream Elevation =  838.1
           Centerline Station =  117.12

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #1
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Q Culv Group (cfs)	244.15	Culv Full Len (ft)	20.40		
# Barrels	1	Culv Vel US (ft/s)	9.10		
Q Barrel (cfs)	244.15	Culv Vel DS (ft/s)	9.10		
E.G. US. (ft)	846.51	Culv Inv El Up (ft)	838.60		
W.S. US. (ft)	846.23	Culv Inv El Dn (ft)	838.30		
E.G. DS (ft)	845.03	Culv Frctn Ls (ft)	0.28		
W.S. DS (ft)	844.43	Culv Exit Loss (ft)	0.69		
Delta EG (ft)	1.48	Culv Entr Loss (ft)	0.51		
Delta WS (ft)	1.80	Q Weir (cfs)	20.50		
E.G. IC (ft)	844.71	Weir Sta Lft (ft)	121.76		
E.G. OC (ft)	846.50	Weir Sta Rgt (ft)	141.38		
Culvert Control	Outlet	Weir Submerg	0.00		
Culv WS Inlet (ft)	843.70	Weir Max Depth (ft)	0.55		
Culv WS Outlet (ft)	843.40	Weir Avg Depth (ft)	0.54		
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	10.68		
Culv Crt Depth (ft)	3.89	Min El Weir Flow (ft)	846.01		

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #2

Q Culv Group (cfs)	241.05	Culv Full Len (ft)			
# Barrels	1	Culv Vel US (ft/s)	9.39		
Q Barrel (cfs)	241.05	Culv Vel DS (ft/s)	9.18		
E.G. US. (ft)	846.51	Culv Inv El Up (ft)	838.50		
W.S. US. (ft)	846.23	Culv Inv El Dn (ft)	838.10		
E.G. DS (ft)	845.03	Culv Frctn Ls (ft)	0.24		
W.S. DS (ft)	844.43	Culv Exit Loss (ft)	0.71		
Delta EG (ft)	1.48	Culv Entr Loss (ft)	0.55		
Delta WS (ft)	1.80	Q Weir (cfs)	20.50		
E.G. IC (ft)	845.73	Weir Sta Lft (ft)	121.76		
E.G. OC (ft)	846.52	Weir Sta Rgt (ft)	141.38		
Culvert Control	Outlet	Weir Submerg	0.00		
Culv WS Inlet (ft)	844.60	Weir Max Depth (ft)	0.55		
Culv WS Outlet (ft)	844.43	Weir Avg Depth (ft)	0.54		
Culv Nml Depth (ft)	4.63	Weir Flow Area (sq ft)	10.68		
Culv Crt Depth (ft)	4.74	Min El Weir Flow (ft)	846.01		

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1915.038

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	4.33	857.12	6.34	856	10.88	854.07
11.05	854	11.72	853.79	14.23	853.05	17.72	852	17.84	851.96
18.29	851.71	20.68	850	23.07	848.55	24.07	848.44	25.61	848.36

27.89	848.22	30.77	848	31.15	847.94	31.4	847.88	36.21	846.9
40.16	845.81	41.72	845.84	42.82	846	47.38	845.46	48.73	845.32
49.07	845.46	49.87	845.68	50.55	845.84	51.09	846	53.54	845.97
59.84	845.88	63.96	845.82	64.34	845.82	64.52	845.82	65.51	845.81
65.78	845.81	72.86	846.02	73.6	846.02	76.93	845.95	80.7	845.86
81.88	845.86	82.39	845.86	82.82	845.86	83.18	845.87	83.46	845.87
84.3	845.88	92.57	845.95	97.31	845.99	99.07	846	99.87	844.7
100.07	844.49	100.42	844.39	100.78	844.29	103.17	843.65	103.89	843.78
104.25	843.86	104.73	844	104.93	843.74	106.07	842	106.87	838.56
106.94	838.45	118.38	838.54	118.53	840	119.53	840.69	119.96	841.98
119.98	842.05	120.06	842.17	120.2	842.35	120.39	842.59	120.96	843.28
121.02	843.36	121.12	843.24	121.17	842	121.21	843.15	122.41	843.76
122.65	843.83	122.77	843.88	122.88	843.93	123.46	844	123.66	844.37
124.03	844.58	124.14	844.61	124.83	845.3	126	845.08	127.24	845.6
127.32	845.62	130.04	845.51	130.19	845.53	132.02	845.69	132.76	845.73
138.87	845.65	139.26	845.68	146.86	845.67	147.42	845.67	157.94	845.77
160.33	846	176.12	846	180.44	846.02	192.63	846.06	197.45	846.15
203.15	846.24	206.97	846.38	209.3	846.51	224.6	847.41	234.95	848
236.16	848.05	237.79	848.21	247.29	848.91	261.26	850	263.21	850.09
284.62	851.72	285.01	852	285.42	851.83	291.59	852.68	295.6	853.17
296.6	853.27	302.89	854	313.59	855.36	317.83	856	332.38	857.67
334.32	857.89	334.71	857.93	334.89	857.95	335.26	858	335.3	858
349.67	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.07	.03	127.24	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.07	127.24	51.87	36.65	46.43	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	850	T
121.67	349.67	850	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	845.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.030	
W.S. Elev (ft)	844.43	Reach Len. (ft)	51.87	36.65	46.43
Crit W.S. (ft)		Flow Area (sq ft)		81.55	
E.G. Slope (ft/ft)	0.003230	Area (sq ft)		85.69	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	23.49	Top Width (ft)		23.49	
Vel Total (ft/s)	6.20	Avg. Vel. (ft/s)		6.20	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		5.05	
Conv. Total (cfs)	8898.4	Conv. (cfs)		8898.4	
Length Wtd. (ft)	36.65	Wetted Per. (ft)		24.94	
Min Ch El (ft)	838.45	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)	349.67	0.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.00	0.54	3.11

* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.00	* 0.27	* 1.51 *

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1878.276

INPUT
Description:
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.11	858	4.95	856.68	5.89	856	9.3	854.39
10.2	854	11.69	853.38	14.94	852	16.31	851.43	19.65	850
25.57	848.1	25.73	848.09	25.98	848	29.04	848	31.77	847.74
36.3	847.63	38.27	847.46	39.8	847.42	42.31	847.41	42.95	847.33
43.66	847.26	47.92	847.27	49.11	847.21	54.05	847.24	55.2	847.21
56.56	847.17	57.15	847.15	61.24	847.22	63.55	847.24	64.56	847.26
68.9	847.35	70.34	847.3	72.45	847.09	73.51	847.08	74.42	846.99
81.73	846	82.96	845.83	83.2	845.79	85.71	845.4	87.28	845.03
89.12	844.62	90.14	844.34	91.2	843.84	91.53	843.95	91.56	842.03
91.87	843.18	92.02	843.24	93.61	840.81	93.64	840	103.48	839.45
108.45	839.48	108.57	839.37	108.63	839.32	109.75	841.79	109.78	842
109.84	842.54	110.39	844.27	112.58	844.66	114.63	845.11	115.33	845.28
115.97	845.5	119.22	845.78	119.56	845.86	119.71	845.9	122.93	845.85
123.19	845.87	123.33	845.88	126.78	845.77	127.26	845.8	130.17	845.71
133.36	845.7	135.87	845.78	136.29	845.81	136.37	845.81	142.18	845.9
142.28	845.91	153.25	845.98	153.46	846	154.92	846	165.37	846.17
166.07	846.16	174.43	846.47	176.45	846.47	185.48	846.91	199.44	846.92
206.73	847.11	211.37	847.17	214.75	847.28	216.46	847.34	225.68	847.65
235.89	848	238.73	848.21	239.83	848.22	241.05	848.24	248.43	848.65
250.9	848.71	253.31	848.82	257.07	849.01	265.19	849.44	268.26	849.64
274.18	850	275.43	850	278.91	850.23	282.86	850.4	290.09	850.86
299.01	851.41	307.65	852	323.98	853.7	326.97	854	330.84	854.65
338.48	856	340.6	856.34	345.81	857.22	350.39	858	358.66	860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	82.96	.03	119.22	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
82.96	119.22	393.44	390.79	364.49	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	87.9	850	T
111.31	358.66	850	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.030	
W.S. Elev (ft)	844.24	Reach Len. (ft)	393.44	390.79	364.49
Crit W.S. (ft)	842.83	Flow Area (sq ft)		78.38	
E.G. Slope (ft/ft)	0.004420	Area (sq ft)		78.38	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	20.02	Top Width (ft)		20.02	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)		6.45	
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)		3.91	
Conv. Total (cfs)	7606.3	Conv. (cfs)		7606.3	
Length Wtd. (ft)	390.79	Wetted Per. (ft)		28.58	
Min Ch El (ft)	839.32	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	358.66	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	0.47	3.11
C & E Loss (ft)		Cum SA (acres)	0.00	0.25	1.51

CULVERT

RIVER: Dotson Run
REACH: Upper RS: 1683.45

INPUT
Description:
Distance from Upstream XS = 155
Deck/Roadway Width = 98
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	912	0	358.66	906	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.11	858	4.95	856.68	5.89	856	9.3	854.39
10.2	854	11.69	853.38	14.94	852	16.31	851.43	19.65	850
25.57	848.1	25.73	848.09	25.98	848	29.04	848	31.77	847.74
36.3	847.63	38.27	847.46	39.8	847.42	42.31	847.41	42.95	847.33
43.66	847.26	47.92	847.27	49.11	847.21	54.05	847.24	55.2	847.21
56.56	847.17	57.15	847.15	61.24	847.22	63.55	847.24	64.56	847.26
68.9	847.35	70.34	847.3	72.45	847.09	73.51	847.08	74.42	846.99
81.73	846	82.96	845.83	83.2	845.79	85.71	845.4	87.28	845.03
89.12	844.62	90.14	844.34	91.2	843.84	91.53	843.95	91.56	842.03
91.87	843.18	92.02	843.24	93.61	840.81	93.64	840	103.48	839.45
108.45	839.48	108.57	839.37	108.63	839.32	109.75	841.79	109.78	842
109.84	842.54	110.39	844.27	112.58	844.66	114.63	845.11	115.33	845.28
115.97	845.5	119.22	845.78	119.56	845.86	119.71	845.9	122.93	845.85
123.19	845.87	123.33	845.88	126.78	845.77	127.26	845.8	130.17	845.71

133.36	845.7	135.87	845.78	136.29	845.81	136.37	845.81	142.18	845.9
142.28	845.91	153.25	845.98	153.46	846	154.92	846	165.37	846.17
166.07	846.16	174.43	846.47	176.45	846.47	185.48	846.91	199.44	846.92
206.73	847.11	211.37	847.17	214.75	847.28	216.46	847.34	225.68	847.65
235.89	848	238.73	848.21	239.83	848.22	241.05	848.24	248.43	848.65
250.9	848.71	253.31	848.82	257.07	849.01	265.19	849.44	268.26	849.64
274.18	850	275.43	850	278.91	850.23	282.86	850.4	290.09	850.86
299.01	851.41	307.65	852	323.98	853.7	326.97	854	330.84	854.65
338.48	856	340.6	856.34	345.81	857.22	350.39	858	358.66	860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	82.96	.03	119.22	.035

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
82.96	119.22	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	87.9	850	T
111.31	358.66	850	T

Downstream Deck/Roadway Coordinates num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	912	0	217.84	908	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.37	858.93	4.44	858	5.54	857.51	8.88	856
9.13	855.89	10.34	855.35	12.63	854.27	13.2	854	19.52	852.05
19.68	852	19.71	851.99	19.8	851.97	25.39	850.8	27.23	850.42
29.39	850	32.05	849.42	33.45	849.21	34.33	849.06	34.84	848.98
35.33	848.9	36.71	848.66	38.64	848.3	40.47	848	41.58	847.54
46.31	846	46.43	845.96	46.76	845.86	51.3	844.51	53.31	844
83.64	844	84.46	843.75	85.37	843.37	86.95	842.77	87.44	842.53
88.65	842	91.49	842	92.88	842	96.25	840.54	96.48	840.54
96.57	840.54	96.6	840.54	96.66	840.53	96.98	840.52	97.6	840.5
98.27	840.47	99.57	840.44	100.92	840.29	102.43	840.02	102.52	840
104.08	839.26	104.87	838.81	105.36	838.56	105.48	838.49	106.22	838
106.88	837.66	109.21	836.06	114.92	836.06	120.34	836.06	121.41	837.74
121.54	838	121.66	839.04	122.65	842	122.91	842.08	123.16	842.14
126.11	842.9	128.19	843.42	129.09	843.66	130.39	844	131.49	844.28
131.86	844.33	132.22	844.4	132.63	844.48	135.06	844.97	135.23	845.01
136.56	845.28	137.67	845.5	140.32	846	141.03	846.16	144.31	846.77
151.49	847.94	151.7	847.97	151.78	847.98	151.87	848	157.85	850
162.54	851.57	163.83	852	165.22	852.46	169.77	854	174.58	855.64
175.62	856	177.07	856.51	181.33	858	182.83	858.53	185.78	859.57
187.02	860	187.98	860.32	192.98	862	194.99	862.67	199	864

```
  199.55  864.18  201.14  864.71  203.83  865.58  205.17     866  208.29     867
  211.47     868  212.99  868.48  217.84     870

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0      .1   92.88     .03  122.65      .1

Bank Sta: Left   Right    Coeff Contr.   Expan.
         92.88  122.65            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  105.05     850          T
  124.17  217.84     850          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 Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       5       6
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
               4.76     380     .011     .011        0                    .4                 1
Number of Barrels =  2
Upstream   Elevation =  838.4
Centerline Stations
    Sta.    Sta.
    95.9  103.31
Downstream Elevation =  835.6
Centerline Stations
    Sta.    Sta.
  110.05  119.17

CULVERT OUTPUT  Profile #PF 1  Culv Group:  Culvert #1
************************************************************************
* Q Culv Group (cfs)     *  505.70  * Culv Full Len (ft)     *  113.13  *
* # Barrels              *       2  * Culv Vel US (ft/s)     *   11.07  *
* Q Barrel (cfs)         *  252.85  * Culv Vel DS (ft/s)     *    8.43  *
* E.G. US. (ft)          *  844.89  * Culv Inv El Up (ft)    *  838.40  *
* W.S. US. (ft)          *  844.24  * Culv Inv El Dn (ft)    *  835.60  *
* E.G. DS (ft)           *  841.80  * Culv Frctn Ls (ft)     *    1.86  *
* W.S. DS (ft)           *  841.14  * Culv Exit Loss (ft)    *    0.45  *
* Delta EG (ft)          *    3.09  * Culv Entr Loss (ft)    *    0.78  *
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* Delta WS (ft)	* 3.10	* Q Weir (cfs)	*	*	
* E.G. IC (ft)	* 844.89	* Weir Sta Lft (ft)	*	*	
* E.G. OC (ft)	* 844.87	* Weir Sta Rgt (ft)	*	*	
* Culvert Control	* Inlet	* Weir Submerg	*	*	
* Culv WS Inlet (ft)	* 842.21	* Weir Max Depth (ft)	*	*	
* Culv WS Outlet (ft)	* 840.60	* Weir Avg Depth (ft)	*	*	
* Culv Nml Depth (ft)	* 2.83	* Weir Flow Area (sq ft)	*	*	
* Culv Crt Depth (ft)	* 3.81	* Min El Weir Flow (ft)	* 908.01	*	

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1487.336

INPUT
Description:
Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.37	858.93	4.44	858	5.54	857.51	8.88	856
9.13	855.89	10.34	855.35	12.63	854.27	13.2	854	19.52	852.05
19.68	852	19.71	851.99	19.8	851.97	25.39	850.8	27.23	850.42
29.39	850	32.05	849.42	33.45	849.21	34.33	849.06	34.84	848.98
35.33	848.9	36.71	848.66	38.64	848.3	40.47	848	41.58	847.54
46.31	846	46.43	845.96	46.76	845.86	51.3	844.51	53.31	844
83.64	844	84.46	843.75	85.37	843.37	86.95	842.77	87.44	842.53
88.65	842	91.49	842	92.88	842	96.25	840.54	96.48	840.54
96.57	840.54	96.6	840.54	96.66	840.53	96.98	840.52	97.6	840.5
98.27	840.47	99.57	840.44	100.92	840.29	102.43	840.02	102.52	840
104.08	839.26	104.87	838.81	105.36	838.56	105.48	838.49	106.22	838
106.88	837.66	109.21	836.06	114.92	836.06	120.34	836.06	121.41	837.74
121.54	838	121.66	839.04	122.65	842	122.91	842.08	123.16	842.14
126.11	842.9	128.19	843.42	129.09	843.66	130.39	844	131.49	844.28
131.86	844.33	132.22	844.4	132.63	844.48	135.06	844.97	135.23	845.01
136.56	845.28	137.67	845.5	140.32	846	141.03	846.16	144.31	846.77
151.49	847.94	151.7	847.97	151.78	847.98	151.87	848	157.85	850
162.54	851.57	163.83	852	165.22	852.46	169.77	854	174.58	855.64
175.62	856	177.07	856.51	181.33	858	182.83	858.53	185.78	859.57
187.02	860	187.98	860.32	192.98	862	194.99	862.67	199	864
199.55	864.18	201.14	864.71	203.83	865.58	205.17	866	208.29	867
211.47	868	212.99	868.48	217.84	870				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	92.88	.03	122.65	.1

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

92.88 122.65 20.42 46.43 442.24 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	T
124.17	217.84	850	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.80	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.65	Wt. n-Val.		0.030		
W.S. Elev (ft)	841.14	Reach Len. (ft)	20.42	46.43	442.24	
Crit W.S. (ft)		Flow Area (sq ft)		77.98		
E.G. Slope (ft/ft)	0.003099	Area (sq ft)		87.67		
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	27.50	Top Width (ft)		27.50		
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)		6.48		
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)		4.50		
Conv. Total (cfs)	9084.5	Conv. (cfs)		9084.5		
Length Wtd. (ft)	197.89	Wetted Per. (ft)		21.62		
Min Ch El (ft)	836.06	Shear (lb/sq ft)		0.70		
Alpha	1.00	Stream Power (lb/ft s)	217.84	0.00	0.00	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	0.26	3.11	
C & E Loss (ft)	0.19	Cum SA (acres)	0.00	0.03	1.51	

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: Dotson Run
REACH: Upper RS: 1440.621

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.55	858.23	3.99	858	4.85	857.55	7.94	856
11.16	854.46	12.09	854	16.36	852.02	16.41	852	20.33	850.21
20.85	850	24.39	848.41	25.46	848	28.22	846.74	28.71	846.53
30.17	846.01	30.2	846	32.26	845.54	33.45	845.2	35.34	844.74
37.7	844	68.57	844	78.77	844	87	842.65	90.09	842
94.97	840.5	95.98	840.21	96.26	840.14	96.89	840	99.67	839.25
100.96	838.9	103.79	838	104.67	837.82	105.12	837.75	108.19	837.17
109.92	836.9	111.26	836.67	113.61	836.29	115.24	836	116.94	835.63
121	835.6	123.23	835.55	124.09	835.53	124.57	835.53	124.64	835.58
124.95	835.72	125.68	836	127.17	836.95	128.61	837.68	129.33	838

130	838.3	131.26	838.86	133.75	840	163.83	840	164.35	839.97
164.48	839.97	168.68	839.8	174.05	839.58	174.27	839.57	176.56	839.52
182.89	839.29	186.08	839.23	191.53	839.04	194.31	838.99	196.69	838.96
201.38	838.8	204.4	838.76	227.25	838.89	233.73	838.97	233.83	838.97
234.41	838.99	237.11	839.07	253.39	839.58	265.89	839.44	267.32	839.4
277.29	839.1	277.42	839.09	277.46	839.09	286.46	839.07	286.57	839.07
287.43	839.05	291.65	838.88	303.19	839.12	307.14	839.26	314.67	839.39
315.67	839.4	316.25	839.39	321.44	839.4	325.04	839.58	334.56	840
337.67	840	348.71	839.54	358.99	840	366.37	840	379	840.52
402.86	840.65	465.15	842	465.71	842	506.38	843.95	507.71	844
509.93	844.97	512.41	846	515.54	847.03	518.51	848	527.43	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	96.89	.03	133.75	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
96.89	133.75	20.92 38.69	9.9	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
431.204	486.167	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.50	Reach Len. (ft)	38.69	38.69	38.69
Crit W.S. (ft)		Flow Area (sq ft)	4.04	156.99	537.98
E.G. Slope (ft/ft)	0.000212	Area (sq ft)	4.04	156.99	537.98
Q Total (cfs)	783.60	Flow (cfs)	0.72	289.48	493.40
Top Width (ft)	339.48	Top Width (ft)	5.16	36.86	297.45
Vel Total (ft/s)	1.12	Avg. Vel. (ft/s)	0.18	1.84	0.92
Max Chl Dpth (ft)	5.97	Hydr. Depth (ft)	0.78	4.26	1.81
Conv. Total (cfs)	53807.0	Conv. (cfs)	49.6	19877.7	33879.7
Length Wtd. (ft)	38.69	Wetted Per. (ft)	5.38	38.41	297.79
Min Ch El (ft)	835.53	Shear (lb/sq ft)	0.01	0.05	0.02
Alpha	1.42	Stream Power (lb/ft s)	527.43	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.00	0.13	0.38
C & E Loss (ft)	0.04	Cum SA (acres)			

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1400.977

INPUT
Description:
Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.67	858	5.24	857.14	7.32	856	8.86	855.16
10.97	854	12.78	853	14.61	852	17.39	850.46	18.24	850
22.02	848.03	22.06	848	26.1	846	26.36	845.87	30.17	844
40.79	844	55.28	843.27	56.38	843.27	56.96	843.27	61.35	843.41
62.39	843.41	63.22	843.41	65.05	843.43	65.61	843.43	66.13	843.43
67.97	843.46	69.55	843.49	70.2	843.48	81.27	842.04	81.58	842
81.8	842	81.88	841.96	82.75	841.61	83.03	841.52	83.62	841.34
84.95	840.74	86.13	840.52	86.71	840.26	88.35	840	90.08	840
91.16	839.59	92.75	838.89	94.6	838	97.52	836.48	98.46	836
98.82	835.81	99.25	835.58	103.46	835.56	111.34	835.53	112.13	835.85
112.4	836	114.15	836.86	116.5	837.99	119.05	839.09	119.93	839.27
120.47	839.28	120.63	839.3	121.24	839.41	121.51	839.4	123.2	839.74
123.31	839.75	123.46	839.78	124.49	840	136.24	840	136.34	839.97
136.38	839.97	138.21	839.28	140.5	839.09	141.96	838.74	142.52	838.6
148.06	838.27	148.24	838.24	152.24	838	158.88	838	161.58	838
164.35	838.62	167.83	839.4	170.6	840	174.95	840.39	177.12	840.59
177.85	840.66	180.74	840.72	181.18	840.72	185.06	840.49	193.96	840
199.83	839.92	216.61	839.45	229.32	839.58	246	839.53	263.57	839.46
283.05	839.41	286.53	839.35	289.11	839.37	289.97	839.36	299.75	839.28
303.86	839.27	308.43	839.55	315.22	839.95	316.18	840	324.23	840
328.99	839.8	333.6	840	346.6	840	367.82	840.86	404.74	841.02
449.89	842	450.67	842	483.53	843.58	490.35	843.84	494.66	844
497.1	845.05	499.46	846	502.16	846.91	505.4	848	507.24	848.47
512.5	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	88.35	.03	124.49	.035

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

88.35	124.49	46.71	56.17	4.15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	62.27	845	T
144	512.5	845	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
406.569	474.192	850	233.987	261.785	850

CROSS SECTION OUTPUT Profile #PF 1

Element	Left OB	Channel	Right OB
E.G. Elev (ft)	841.47		
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.06	Reach Len. (ft)	24.40	24.40	24.40
Crit W.S. (ft)	839.74	Flow Area (sq ft)	2.54	134.52	27.71
E.G. Slope (ft/ft)	0.002132	Area (sq ft)	2.54	134.52	308.72
Q Total (cfs)	783.60	Flow (cfs)	1.23	714.19	68.18
Top Width (ft)	294.53	Top Width (ft)	4.11	36.14	254.28

* Vel Total (ft/s)	*	4.76	*	Avg. Vel. (ft/s)	*	0.48	*	5.31	*	2.46	*
* Max Chl Dpth (ft)	*	5.53	*	Hydr. Depth (ft)	*	0.62	*	3.72	*	1.42	*
* Conv. Total (cfs)	*	16969.3	*	Conv. (cfs)	*	26.6	*	15466.3	*	1476.4	*
* Length Wtd. (ft)	*	24.40	*	Wetted Per. (ft)	*	4.28	*	38.03	*	19.71	*
* Min Ch El (ft)	*	835.53	*	Shear (lb/sq ft)	*	0.08	*	0.47	*	0.19	*
* Alpha	*	1.16	*	Stream Power (lb/ft s)	*	512.50	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.06	*	Cum Volume (acre-ft)	*	0.00	*	1.07	*	0.13	*
* C & E Loss (ft)	*	0.02	*	Cum SA (acres)	*	0.02	*	0.39	*	0.15	*

Warning: Divided flow computed for this cross-section.

BRIDGE

RIVER: Dotson Run
REACH: Lower RS: 1370.77

INPUT
Description:
Distance from Upstream XS = 24.4
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
81.27	842.04	841	125	842	841
180.74	840.72	0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.67	858	5.24	857.14	7.32	856	8.86	855.16
10.97	854	12.78	853	14.61	852	17.39	850.46	18.24	850
22.02	848.03	22.06	848	26.1	846	26.36	845.87	30.17	844
40.79	844	55.28	843.27	56.38	843.27	56.96	843.27	61.35	843.41
62.39	843.41	63.22	843.41	65.05	843.43	65.61	843.43	66.13	843.43
67.97	843.46	69.55	843.49	70.2	843.48	81.27	842.04	81.58	842
81.8	842	81.88	841.96	82.75	841.61	83.03	841.52	83.62	841.34
84.95	840.74	86.13	840.52	86.71	840.26	88.35	840	90.08	840
91.16	839.59	92.75	838.89	94.6	838	97.52	836.48	98.46	836
98.82	835.81	99.25	835.58	103.46	835.56	111.34	835.53	112.13	835.85
112.4	836	114.15	836.86	116.5	837.99	119.05	839.09	119.93	839.27
120.47	839.28	120.63	839.3	121.24	839.41	121.51	839.4	123.2	839.74
123.31	839.75	123.46	839.78	124.49	840	136.24	840	136.34	839.97
136.38	839.97	138.21	839.28	140.5	839.09	141.96	838.74	142.52	838.6
148.06	838.27	148.24	838.24	152.24	838	158.88	838	161.58	838
164.35	838.62	167.83	839.4	170.6	840	174.95	840.39	177.12	840.59
177.85	840.66	180.74	840.72	181.18	840.72	185.06	840.49	193.96	840
199.83	839.92	216.61	839.45	229.32	839.58	246	839.53	263.57	839.46
283.05	839.41	286.53	839.35	289.11	839.37	289.97	839.36	299.75	839.28

303.86	839.27	308.43	839.55	315.22	839.95	316.18	840	324.23	840
328.99	839.8	333.6	840	346.6	840	367.82	840.86	404.74	841.02
449.89	842	450.67	842	483.53	843.58	490.35	843.84	494.66	844
497.1	845.05	499.46	846	502.16	846.91	505.4	848	507.24	848.47
512.5	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	88.35	.03	124.49	.035

Bank Sta: Left Right Coeff Contr. Expan.
88.35 124.49 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	62.27	845	T
144	512.5	845	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
406.569	474.192	850	233.987	261.785	850

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
79.47	842	841	125	842	841	262.03	839.34	0	

Downstream Bridge Cross Section Data
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0      .1   87.05     .03  117.07    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         87.05  117.07            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   75.47     845       T
     129  484.72     845       T
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************************************
  65.818  89.644     850 145.578 186.446     850 211.358 239.365     850
 348.471   447.8     850

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

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1
*******************************************************************************
* E.G. US. (ft)          *     841.47  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     841.06  * E.G. Elev (ft)        *     841.38  *     841.31  *
* Q Total (cfs)          *     783.60  * W.S. Elev (ft)        *     840.76  *     840.47  *
* Q Bridge (cfs)         *     783.60  * Crit W.S. (ft)        *     839.65  *     839.51  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *       5.23  *       4.95  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *       6.25  *       7.18  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)     *     125.45  *     109.15  *
* Weir Submerg           *             * Froude # Chl          *       0.49  *       0.58  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)  *     417.59  *     410.07  *
* Min El Weir Flow (ft)  *     841.93  * Hydr Depth (ft)       *       3.13  *       3.08  *
* Min El Prs (ft)        *     841.00  * W.P. Total (ft)       *      42.91  *      40.24  *
* Delta EG (ft)          *       0.27  * Conv. Total (cfs)     *    13456.0  *    11722.0  *
```

* Delta WS (ft)	* 0.83	* Top Width (ft)	* 40.11	* 35.44	*
* BR Open Area (sq ft)	* 127.89	* Frctn Loss (ft)	* 0.05	* 0.10	*
* BR Open Vel (ft/s)	* 7.18	* C & E Loss (ft)	* 0.02	* 0.01	*
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.62	* 0.76	*
* Br Sel Method	*Energy only	* Power Total (lb/ft s)	* 0.00	* 0.00	*

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1344.212

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
87.05 117.07 52.02 54.01 8.98 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	845	T
129	484.72	845	T

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	840.23	Reach Len. (ft)	52.02	54.01	8.98
Crit W.S. (ft)	839.49	Flow Area (sq ft)		98.89	2.80
E.G. Slope (ft/ft)	0.005505	Area (sq ft)		98.89	80.50
Q Total (cfs)	783.60	Flow (cfs)		780.24	3.36
Top Width (ft)	158.58	Top Width (ft)		27.43	131.15
Vel Total (ft/s)	7.71	Avg. Vel. (ft/s)		7.89	1.20
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.61	0.23
Conv. Total (cfs)	10561.4	Conv. (cfs)		10516.1	45.3
Length Wtd. (ft)	51.27	Wetted Per. (ft)		31.44	11.93
Min Ch El (ft)	835.52	Shear (lb/sq ft)		1.08	0.08
Alpha	1.04	Stream Power (lb/ft s)	484.72	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.00	0.92	0.02
C & E Loss (ft)	0.18	Cum SA (acres)	0.01	0.35	0.05

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: Dotson Run
REACH: Lower RS: 1289.476

INPUT
Description:
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.95	859.42	6.86	858	7.55	857.57	10.23	856
11.69	855.08	13.44	854	15	853.02	16.65	852	18.34	850.94
19.86	850	20.95	849.14	22.34	848	23.28	847.18	24.61	846
25.6	845.11	26.86	844	27.94	843.03	29.11	842	34.74	841.24
34.84	841.23	34.88	841.22	35.13	841.2	35.56	841.21	35.82	841.22
54.34	842	65.25	842	66.38	841.97	68.85	841.89	69.07	841.89
69.1	841.89	69.25	841.89	69.84	841.91	72.1	841.98	72.63	842
78.78	842	96.94	840.39	100.79	840	102.08	839.34	104.82	838
107.86	836.2	108.19	836	108.51	836	111.07	835.72	113.49	835.5
115.9	835.12	117.69	835.12	121.07	834.96	121.71	835.45	122.31	836
123.88	837.07	125.48	838	130.37	838.47	131.43	838.49	135.91	838.85
137.38	838.97	138.94	839.09	139.73	839.15	141.09	839.11	153.61	840
168.24	840	189.33	840	210.06	839.9	233.1	839.59	235.5	839.6
237.43	839.6	240.51	839.61	246.99	839.61	248.87	839.62	250.7	839.63
253.25	839.68	253.73	839.72	254.81	839.72	258.24	839.75	262.74	839.77
269.81	839.83	273.73	839.8	277.69	839.81	280.93	839.8	283.25	839.76
286.07	839.68	292.52	839.54	298.91	839.72	303.23	839.9	304.08	839.93
305.73	839.98	306.15	840	306.99	840.07	310.63	840.37	312.92	840.57

315.55	840.78	337.94	841.62	396.92	841.65	413.49	842	414.73	842
431.79	842.8	436.17	842.97	443.03	843.23	443.94	843.24	451.1	843.52
458.38	843.8	463.61	844	465.45	844.75	468.49	846	473.28	847.62
474.42	848	480.68	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.79	.03	153.61	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
100.79	153.61	20.02	17.74	5.38	.1	.3

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
72.455	103.347	850	152.674	194.298	850	222.966	253.434	850
329.672	444.58	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.81	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.36	Wt. n-Val.		0.030	0.035	
W.S. Elev (ft)	840.45	Reach Len. (ft)	20.02	17.74	5.38	
Crit W.S. (ft)	839.78	Flow Area (sq ft)		135.78	54.31	
E.G. Slope (ft/ft)	0.003046	Area (sq ft)		135.78	54.31	
Q Total (cfs)	783.60	Flow (cfs)		691.57	92.03	
Top Width (ft)	136.11	Top Width (ft)		49.33	86.78	
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		5.09	1.69	
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		2.75	0.63	
Conv. Total (cfs)	14197.7	Conv. (cfs)		12530.3	1667.4	
Length Wtd. (ft)	17.01	Wetted Per. (ft)		53.39	88.77	
Min Ch El (ft)	834.96	Shear (lb/sq ft)		0.48	0.12	
Alpha	1.37	Stream Power (lb/ft s)	480.68	0.00	0.00	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	0.77	0.01	
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.30	0.02	

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.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1271.523

INPUT
Description:

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.2	858.79	6.85	858	8.62	856.91	10.07	856
11.14	855.34	13.3	854	15.18	852.83	16.52	852	19.06	850.43
19.74	850	20.84	849.3	22.92	848	23.33	847.66	25.25	846
26.08	845.26	27.49	844	28.58	843.03	29.73	842	30.96	841.05
33.13	840.27	34.02	840.41	36.07	841.23	51.19	841.68	59.37	841.97
67.89	841.82	71.96	841.82	72.2	841.82	75.27	841.92	75.35	841.92
106.53	840.01	106.67	840	106.74	839.98	106.81	839.96	106.95	839.92
113.82	838	113.91	837.93	116.56	836	116.78	835.84	118.21	834.83
122.48	834.88	126.82	834.92	127.57	835.32	128.85	836	129.53	836.37
129.97	836.61	132.41	838	133.47	838.08	133.56	838.08	160.47	840
168.47	840	207.09	840	213.92	839.97	222.03	839.85	226.17	839.87
226.81	839.87	232.62	839.89	234.55	839.89	240.78	839.91	246.74	839.94
249.78	840	251.67	840	254.9	840.14	256.12	840.2	256.34	840.22
256.61	840.22	257.14	840.22	261.73	840.24	282.88	840.16	283.84	840.11
286.22	840	287.43	839.99	291.41	839.95	303.23	839.78	303.71	839.77
303.8	839.77	303.86	839.77	310	840	317.63	840.62	321.95	840.97
323.81	841.13	324.99	841.23	326.36	841.34	338.44	841.79	402.41	841.79
412.64	842	414.01	842	424.99	842.51	427.91	842.62	432.58	842.8
434.09	842.82	439.15	843.02	444.45	843.22	452.34	843.53	464.52	844
469.1	845.85	469.48	846	469.86	846.13	475.36	848	476.73	848.45
481.34	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	106.53	.03	160.47	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
106.53	160.47	89.77	87.43	7.72	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
73.623	99.238	850	155.774	197.012	850	333.886	478.052	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.63	Reach Len. (ft)	89.77	87.43	7.72
Crit W.S. (ft)	839.63	Flow Area (sq ft)		96.36	
E.G. Slope (ft/ft)	0.011058	Area (sq ft)		96.36	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	47.30	Top Width (ft)		47.30	
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)		8.13	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	7451.8	Conv. (cfs)		7451.8	
Length Wtd. (ft)	87.43	Wetted Per. (ft)		49.40	
Min Ch El (ft)	834.83	Shear (lb/sq ft)		1.35	
Alpha	1.00	Stream Power (lb/ft s)	481.34	0.00	0.00

* Frctn Loss (ft)	* 0.57	* Cum Volume (acre-ft)	* 0.00	* 0.72	* 0.00 *
* C & E Loss (ft)	* 0.14	* Cum SA (acres)	* 0.01	* 0.28	* 0.02 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1182.267

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.53	859.26	4.25	858	7.58	856.34	8.26	856
8.93	855.64	11.94	854	15.22	852.06	15.32	852	18.63	850
19.44	849.51	21.9	848	23.73	846.89	25.18	846	27.4	844.66
28.55	844	29.18	843.66	32.14	842	34.95	841.21	38.98	840
44.86	840	45.79	840.33	50.01	841.54	72.63	841.57	73.64	841.56
111.32	840.77	116.31	840.61	116.76	840.6	141.61	840	143.71	840
145.77	839.73	156.51	838.35	159.9	838	162.73	836.14	162.93	836
163.08	835.83	164.88	834	165.07	834.09	165.4	834.17	168	833.99
171.79	833.46	173.18	833.82	173.8	834	178.39	835.04	178.93	835.16
179.85	835.36	182.6	836	185.37	836.74	190.28	838	196.06	838.95
202.48	840	202.73	840	218.29	840.32	237.94	840.72	242.98	840.62
244.59	840.62	248.08	840.63	250.67	840.62	255.29	840.67	258.49	840.67
268.68	840.4	271.78	840.4	320.91	840.02	322.57	840	325.8	840
326.99	840.04	327.88	840.05	328	840.05	328.19	840.05	330.03	840.05
335.01	840.03	340.97	840.15	341.51	840	345.29	840	358.95	841.94
359.36	842	359.42	842	421.64	842.02	432.76	842.1	433.45	842.08
434.3	842.06	435.22	842.04	436.25	842.03	437.45	842.04	437.77	842.05
438.11	842.05	442.91	842.06	458.59	842.04	483.58	843.01	489.59	843.86
490.56	844	491.1	844.2	491.76	844.46	495.81	846	500.13	847.48
501.69	848	507.66	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	141.61	.03	202.48	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
141.61 202.48 34.47 38.39 78.71 .1 .3
Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
95.931	134.383	850	210.589	303.804	850	368.039	447.687	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.24	Reach Len. (ft)	34.47	38.39	78.71
Crit W.S. (ft)		Flow Area (sq ft)		129.21	
E.G. Slope (ft/ft)	0.004291	Area (sq ft)		129.21	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	48.31	Top Width (ft)		48.31	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	11962.9	Conv. (cfs)		11962.9	
Length Wtd. (ft)	38.39	Wetted Per. (ft)		50.56	
Min Ch El (ft)	833.46	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	507.66	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.50	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.18	0.02

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: Dotson Run
REACH: Lower RS: 1143.687

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.45	858	4.28	857.27	5.76	856	6.61	855.3
8.1	854	8.96	853.29	11.8	850.81	12.78	850	14.14	848.81
15.12	848	16.48	846.81	17.46	846	18.83	844.81	19.8	844
21.95	842.81	23.45	842	28.42	840.61	30.52	840	32.33	840
32.58	840.05	35.89	840.73	36.41	840.84	36.78	840.91	38.35	841.19
47.92	841.31	60.64	841.49	83.47	840.71	94.68	840.25	99.89	840.23
102.3	840.21	109.08	840.15	119.16	840.08	127.82	840	136.11	839.68
138.7	839.55	156.23	838.68	169.97	838	171.29	837.34	173.92	836

177.49	834.22	177.93	834	177.97	833.98	178.63	833.66	182.66	833.12
184.85	832.85	186	833.52	186.76	834	190.53	835.56	191.61	836
194.98	836.84	196.79	837.24	199.7	838	204.44	838.89	205.4	839.06
207.95	839.53	208.54	839.64	208.78	839.68	208.99	839.71	211.57	840
225.39	840.47	232.67	840.72	232.94	840.73	236.56	840.99	241.95	840.91
248.27	840.99	251.14	841.01	255.1	840.93	258.88	840.83	266.36	840.63
266.59	840.63	270.41	840.6	271.16	840.59	306.87	840.41	307.14	840.41
307.55	840.4	308.6	840.37	313.38	840.81	315.17	840.66	317.56	840.47
319.43	840.32	322.86	840.28	323.36	840.18	323.4	840.17	323.98	840.1
324.34	840.07	324.52	840.04	324.65	840.03	324.92	840.02	325.39	840
326.03	840.01	326.14	840.01	327.04	840.05	327.62	840.09	327.86	840.11
327.92	840.12	327.93	840.11	329.81	840.06	330.64	840.01	341.16	840.67
344.19	840.01	344.25	840	345.51	840	351.85	841.59	355.49	842
355.51	842	355.59	842	360.78	842.13	371.13	842.1	430.88	842.07
433.44	842.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	169.97	.03	199.7	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
169.97	199.7		19.24	12.91	64.41	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
209.527	306.69	850	369.765	433.44	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.07	Reach Len. (ft)	19.24	12.91	64.41
Crit W.S. (ft)	838.07	Flow Area (sq ft)	0.05	82.05	0.01
E.G. Slope (ft/ft)	*0.010492	Area (sq ft)	0.05	82.05	0.01
Q Total (cfs)	783.60	Flow (cfs)	0.01	783.58	0.01
Top Width (ft)	31.57	Top Width (ft)	1.46	29.73	0.38
Vel Total (ft/s)	9.54	Avg. Vel. (ft/s)	0.17	9.55	0.47
Max Chl Dpth (ft)	5.22	Hydr. Depth (ft)	0.04	2.76	0.04
Conv. Total (cfs)	7650.2	Conv. (cfs)	0.1	7650.1	0.1
Length Wtd. (ft)	12.91	Wetted Per. (ft)	1.46	31.77	0.39
Min Ch El (ft)	832.85	Shear (lb/sq ft)	0.02	1.69	0.02
Alpha	1.00	Stream Power (lb/ft s)	433.44	0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	0.40	0.00
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.15	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water

surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1130.779

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.62	858	3.02	857.61	4.62	856	5.34	855.3
6.64	854	7.61	853.07	8.68	852	9.84	850.89	10.73	850
12.05	848.74	12.8	848	14.23	846.62	14.87	846	16.41	844.52
16.94	844	19	842.97	20.88	842	25.46	840.42	26.61	840
26.7	840	26.75	840.01	33.51	841.19	49.84	841.4	55.31	841.49
62.52	841.03	82.74	840.18	83.89	840.17	85.35	840.16	86.11	840.16
88.1	840.15	108.01	840.06	115.16	840	129.22	839.59	133.63	839.44
137.6	839.3	162.48	838.44	172.43	838.11	175.15	838	175.84	837.63
178.69	836	179.32	835.63	181.85	834	182.48	833.66	182.72	833.52
183.58	833.41	186.4	833.14	188.86	832.88	189.22	832.85	189.49	832.95
189.72	833.03	191.02	833.52	192.3	834	192.97	834.24	195.46	835.07
197.58	835.79	198.31	836	203.53	837.4	205.87	838	205.88	838
224.41	840	225.22	840.01	226.11	840.07	232.46	840.39	234.83	840.55
235.89	840.61	236.1	840.63	237.22	840.67	246.45	840.9	253.28	840.94
253.57	840.93	253.92	840.92	254.53	840.91	286.91	840.81	292.62	840.78
309.51	840.62	310.46	840.71	314.14	840.6	317.67	840.41	320.4	840.18
320.8	840.17	321.14	840.18	323.6	840.13	323.85	840.13	326.72	840.16
326.82	840.16	327.7	840.19	329.65	840.25	331.26	840.37	331.42	840.39
341.07	840.67	341.65	840.64	342.78	840.71	343.1	840.64	343.24	840.62
343.33	840.61	345.81	841.1	348.8	841.54	351.84	842	355.69	842.95
356.81	843.23	357.01	843.28	357.19	843.32	358.21	843.23	358.99	843.24
371.74	842.73	372	842.73	393.49	842.68	394.31	842.67	395.73	842.65
396.86	842.63	399.4	842.64	401.67	842.68	430.25	842.74	433.11	842.83
435.02	842.87	453.86	842.89	468.41	843.08	475.66	843.7	478.76	844
481.16	844.88	484.03	846	486.13	846.88	488.7	848	490.8	849.53
491.44	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	172.43	.03	205.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
172.43	205.87	16.83	68.95	14.42	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev

209.46 236.46 850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	838.08	Reach Len. (ft)	16.83	68.95	14.42
Crit W.S. (ft)	837.84	Flow Area (sq ft)		90.14	0.03
E.G. Slope (ft/ft)	0.008678	Area (sq ft)		90.14	0.03
Q Total (cfs)	783.60	Flow (cfs)		783.58	0.02
Top Width (ft)	33.58	Top Width (ft)		32.79	0.79
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	0.48
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		2.75	0.04
Conv. Total (cfs)	8411.9	Conv. (cfs)		8411.7	0.2
Length Wtd. (ft)	68.89	Wetted Per. (ft)		34.85	0.79
Min Ch El (ft)	832.85	Shear (lb/sq ft)		1.40	0.02
Alpha	1.00	Stream Power (lb/ft s)	491.44	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.00	0.38	0.00
C & E Loss (ft)	0.25	Cum SA (acres)	0.01	0.14	0.02

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: Dotson Run
REACH: Lower RS: 1059.794

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	.97	859.29	2.79	858	3.67	857.13	4.78	856
6.11	854.68	6.79	854	8.44	852.37	8.81	852	10.69	850.15
10.84	850	12.52	848.34	12.87	848	12.91	847.96	14.9	846
15.18	845.73	16.94	844	19.55	842.46	20.33	842	20.54	841.91
21.2	841.61	24.81	840	25.17	840	26.02	840.15	30.25	840.88
30.91	840.99	31.99	841.19	34.18	841.22	52.24	841.56	56.47	841.28
68.31	840.33	86.23	840	91.02	839.92	91.95	839.9	116.5	839.48
122.17	839.37	137.44	839.11	143.34	838.98	153.79	838.81	160.44	838.67
165.79	838.58	170.98	838.46	176.81	838.33	191.12	838	196.46	837.37
207.79	836	209.17	834.89	210.23	834	211.98	833.72	218.07	832.86
220.65	832.68	224.71	832.43	225.96	833.06	226.64	833.42	228.14	834.23
230.52	835.56	231.17	835.92	231.31	836	232.89	836.15	234.43	836.27
236.46	836.45	238.1	836.6	239.84	836.75	240.93	836.84	252.95	838
253.03	838	271.56	838.84	297.13	840	326.64	840	333.39	840.27

338.69	840.47	350.73	840.74	355.4	840.61	361.86	840.56	364.63	841.56
365.8	842	371.11	842.88	372.43	843.1	374.71	843.24	379.43	843.52
385.44	843.88	386.06	843.93	387.43	844	412.92	844	416.17	843.92
433.51	843.86	443.65	844	445.87	844.03	446.47	844.04	457.42	844.19
459.73	844.12	465.63	844.1	468.73	844	468.87	844	475.47	843.83
477.17	843.78	478.38	843.84	480.47	843.95	481.35	844	484.51	844.33
486.04	844.6	488.46	844.93	489.68	845.09	493.68	846	494.29	846.2
494.98	846.42	497.91	847.36	499.58	847.9	499.91	848	500.92	848.71
502.89	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	191.12	.03	252.95	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
191.12	252.95	58.98	59.59 160.17	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.94	134.225	850	272.544	295.161	850	368.64	379.248	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.36	Reach Len. (ft)	58.98	59.59	160.17
Crit W.S. (ft)		Flow Area (sq ft)	2.83	165.09	1.47
E.G. Slope (ft/ft)	0.002571	Area (sq ft)	2.83	165.09	1.47
Q Total (cfs)	783.60	Flow (cfs)	0.68	781.90	1.02
Top Width (ft)	85.59	Top Width (ft)	15.71	61.83	8.05
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	0.24	4.74	0.69
Max Chl Dpth (ft)	5.93	Hydr. Depth (ft)	0.18	2.67	0.18
Conv. Total (cfs)	15453.0	Conv. (cfs)	13.4	15419.5	20.0
Length Wtd. (ft)	59.65	Wetted Per. (ft)	15.72	63.76	8.06
Min Ch El (ft)	832.43	Shear (lb/sq ft)	0.03	0.42	0.03
Alpha	1.05	Stream Power (lb/ft s)	502.89	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.18	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.06	0.01

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: Dotson Run
REACH: Lower RS: 1000.000

INPUT
Description:
Station Elevation Data num= 110

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.19	859.53	2.89	858.89	4.84	858.14	5.21	858
6.28	856.98	6.9	856.39	7.31	856	8.77	854.5	9.26	854
10.51	852.72	11.22	852	12.31	850.89	13.19	850	14.65	848.54
15.19	848	16.15	847.04	17.19	846	19.15	844.03	21.19	842
25.44	840.04	25.54	840	37.8	840	38.94	840.15	39.68	840.27
40.66	840.43	45.13	840.48	61	841.19	63.82	840.87	64.15	840.84
64.55	840.82	70.95	840.64	73.32	840.48	75.09	840.31	77.91	840
85.92	839.79	86.56	839.79	87.34	839.78	88.34	839.77	103.53	839.43
106.19	839.41	113.64	839.32	116.82	839.27	175.72	838.28	192.57	838
193.96	838	203.34	836.32	205.17	836	207.3	834.7	207.6	834.52
208.42	834	209.16	833.78	212.27	832.88	212.99	832.67	214.96	832.11
219.01	832.12	220.62	832.16	222.62	833.26	223.93	834	226.75	835.54
227.6	836	231.04	837.8	231.42	838	257.45	838	260.01	838
267.39	838.56	274.15	839.05	277.04	839.31	278.75	839.43	283.42	839.77
283.85	839.8	286.93	840	307.85	840	309.52	839.97	322.35	839.84
324.78	839.85	334.48	840	336.12	840	338.18	840.07	345.88	840.34
348.53	840.43	349.27	840.46	359.54	840.84	359.67	840.84	359.71	840.85
359.82	840.85	368.97	841.64	370.7	841.83	372.28	842	376.71	842.48
378.18	842.65	380.78	842.95	381.52	842.98	381.59	842.99	381.61	842.99
381.66	843	389.58	843.86	390.42	843.9	392.79	844	392.89	844.03
392.98	844.07	395.81	845.13	398.31	846	398.95	846.21	399.61	846.44
402.46	847.35	404.02	848	404.14	848.05	404.23	848.09	408.66	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	192.57	.03	231.42	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.57	231.42	1	1	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
81.865	144.14	850	276.349	308.556	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	837.24	Reach Len. (ft)			
Crit W.S. (ft)	836.94	Flow Area (sq ft)		91.41	
E.G. Slope (ft/ft)	0.008011	Area (sq ft)		91.41	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	31.76	Top Width (ft)		31.76	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		2.88	

* Conv. Total (cfs)	*	8755.0	* Conv. (cfs)	*		*	8755.0	*		*	
* Length Wtd. (ft)	*		* Wetted Per. (ft)	*		*	33.99	*		*	
* Min Ch El (ft)	*	832.11	* Shear (lb/sq ft)	*		*	1.34	*		*	
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	408.66	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*		* Cum Volume (acre-ft)	*		*		*		*	
* C & E Loss (ft)	*		* Cum SA (acres)	*		*		*		*	

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1569.420

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.29	868	2.82	867.55	4.62	866	5.69	865.11
6.98	864	8.54	862.71	9.4	862	11.33	860.41	11.82	860
13.83	858.34	14.26	858	14.31	857.95	16.72	856	17.4	855.61
20.29	854	22.07	853.37	25.82	852	27.35	851.42	31.16	850
33.04	849.14	34.28	848.58	35.48	848	36.52	847.5	39.71	846
45.72	844.27	46.68	844	52.67	842.57	55.01	842	56.5	841.12
57.49	840.67	58.83	840	59.18	839.81	59.22	839.78	59.23	839.77
59.37	839.78	62.91	839.96	63.12	839.98	63.32	840	64.77	841.18
65.41	841.7	65.77	842	68.12	843.66	68.63	844	81.3	844
88.11	844.2	138.43	845.68	139.23	845.69	140.89	845.7	152.91	846
174.38	846	176.34	846.04	197.51	846.79	201.21	846.77	209.37	846.86
215.87	846.89	217.91	846.91	219.19	846.99	221.67	847	223.81	847
236.26	847.53	237.19	847.6	238.89	847.67	240.87	847.78	242.18	847.84
243.58	847.94	243.91	847.95	244.19	847.97	244.51	847.99	244.68	848
246.28	848.11	246.66	848.14	246.87	848.15	246.94	848.15	247.29	848.15
247.85	848.15	248.91	848.14	250.86	848.14	252.47	848.15	253.1	848.14
259.15	848.39	261.18	848.47	261.74	848.54	264.78	848.76	271.39	849.54
273.3	849.71	275.34	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.72	.03	68.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45.72	68.63	48.43	53.64	36.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	*	844.55	* Element	*	Left OB	*	Channel	*	Right OB	*	
* Vel Head (ft)	*	0.90	* Wt. n-Val.	*		*	0.030	*		*	
* W.S. Elev (ft)	*	843.64	* Reach Len. (ft)	*	48.43	*	53.64	*	36.38	*	
* Crit W.S. (ft)	*	843.51	* Flow Area (sq ft)	*		*	41.13	*		*	

* E.G. Slope (ft/ft)	*0.010247	*	Area (sq ft)	*		*	41.13	*		*	
* Q Total (cfs)	* 313.80	*	Flow (cfs)	*		*	313.80	*		*	
* Top Width (ft)	* 19.92	*	Top Width (ft)	*		*	19.92	*		*	
* Vel Total (ft/s)	* 7.63	*	Avg. Vel. (ft/s)	*		*	7.63	*		*	
* Max Chl Dpth (ft)	* 3.87	*	Hydr. Depth (ft)	*		*	2.06	*		*	
* Conv. Total (cfs)	* 3099.9	*	Conv. (cfs)	*		*	3099.9	*		*	
* Length Wtd. (ft)	* 53.64	*	Wetted Per. (ft)	*		*	21.91	*		*	
* Min Ch El (ft)	* 839.77	*	Shear (lb/sq ft)	*		*	1.20	*		*	
* Alpha	* 1.00	*	Stream Power (lb/ft s)	*	275.34	*	0.00	*	0.00	*	
* Frctn Loss (ft)	* 0.49	*	Cum Volume (acre-ft)	*	0.02	*	0.51	*	0.12	*	
* C & E Loss (ft)	* 0.05	*	Cum SA (acres)	*	0.03	*	0.21	*	0.16	*	

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1515.286

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.7	868	4.29	866.82	5.39	866	7.85	864.16
8.26	863.86	10.73	862	10.98	861.82	13.4	860	13.7	859.78
16.07	858	16.44	857.73	18.74	856	19.19	855.67	21.41	854
22.23	853.39	24.08	852	26.57	851.11	27.6	850.74	29.55	850
31.75	849.36	32.79	849.08	36.69	848	37.86	847.6	42.53	846
43.51	845.63	48.07	844	52.12	842.63	53.97	842	55.86	841.03
57.85	840	57.98	839.91	58.13	839.83	58.24	839.77	63.6	839.93
64.58	839.96	64.6	839.97	64.93	840	65.18	840.15	68.15	842
70.08	842.48	76.59	844	92.4	844	105.95	844	109	844.03
120.13	844.16	121.34	844.19	134.21	844.36	162.04	844.79	162.84	844.8
167.01	844.89	184.4	845.22	185.51	845.27	195.74	845.16	196.88	845.21
202.03	845.47	203.11	845.52	205.28	845.53	208.44	846	208.67	845.93
208.82	845.79	209.01	845.8	225.66	846.25	226.74	846.28	226.75	846.27
226.76	846.27	227.14	846	228.9	844.86	232.65	844.84	237.17	846
239.47	846.1	242.13	846.22	247.09	846.45	276.5	847.83	279.79	847.99
280.07	848	281.49	848	289.57	849.01	294.96	849.63	295.85	849.73
296.45	849.79	298.05	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.07	.03	76.59	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.07	76.59	15.63	15.77	15.95	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

135.997 161.893 855 241.697 263.243 855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.28	Reach Len. (ft)	15.63	15.77	15.95
Crit W.S. (ft)	843.01	Flow Area (sq ft)		46.03	
E.G. Slope (ft/ft)	0.008292	Area (sq ft)		46.03	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	23.28	Top Width (ft)		23.28	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	3446.1	Conv. (cfs)		3446.1	
Length Wtd. (ft)	15.77	Wetted Per. (ft)		24.77	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	298.05	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.02	0.45	0.12
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	0.18	0.16

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1499.515

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.77	868	3.47	867.49	5.53	866	7.04	864.89
8.25	864	10.64	862.24	10.96	862	11.81	861.37	13.71	860
14.89	859.16	16.5	858	18.71	856.43	19.31	856	19.56	855.83
22.17	854	23.47	853.08	25.01	852	28.27	850.21	28.62	850
30.14	849.56	30.29	849.52	35.54	848	38.38	847.16	42.33	846
47.24	844.38	48.46	844	52.47	842.43	53.6	842	53.98	841.82
54.58	841.55	57.99	840	58.21	839.9	58.52	839.77	61.55	839.87
65.44	839.96	65.46	839.98	65.49	840	66.04	840.31	68.49	842
80.82	843.88	81.31	843.96	81.42	843.97	81.95	844	90.87	844
123.44	844	137.09	843.98	137.15	843.98	138.15	844	138.83	844.01
150.58	844.21	155.86	844.45	158.44	844.52	159.17	844.54	159.74	844.55
160.3	844.56	160.87	844.58	161.85	844.6	163.17	844.63	164.14	844.65
177.96	845.05	178.84	845.08	179.47	845.1	192.68	845.01	193.65	845.03
200.28	845.37	206.94	845.48	209.42	845.85	209.75	845.9	210.1	845.95
210.48	846	210.74	846	210.83	846.04	210.87	846.05	210.88	846.05
210.94	846.05	211.41	846.04	216.93	846.01	218.7	846	219.16	846
227.72	846	228.71	845.98	228.78	846.04	229.01	845.93	229.62	845.53
230.02	845.25	231.73	844.03	231.76	844	233.06	844	238.2	844.96
240.76	845.44	245.28	846	275.26	847.37	279.47	847.51	282.62	847.62
290.68	848	292.69	848	294.39	848.28	302.89	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.46	.03	80.82	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.46	80.82	42.49	35.17	24.56	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
137.655	163.551	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.16	Reach Len. (ft)	42.49	35.17	24.56
Crit W.S. (ft)		Flow Area (sq ft)		46.79	
E.G. Slope (ft/ft)	0.008757	Area (sq ft)		46.79	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	3353.3	Conv. (cfs)		3353.3	
Length Wtd. (ft)	34.73	Wetted Per. (ft)		26.88	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	302.89	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.02	0.44	0.12
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	0.17	0.16

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1464.257

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.37	868	4.34	867.45	6.89	866	8.91	864.85
10.41	864	13.61	862.17	13.87	862	14.09	861.85	16.93	860
19.87	858.03	22.8	856	23.66	855.4	25.66	854	27	853
28.29	852	30.53	850.25	30.85	850	31.67	849.7	36.3	848
42.32	846	42.34	845.99	47.71	844	51.45	842.52	52.66	842
53.84	841.57	58.23	840	58.43	839.93	59.45	839.63	62.17	839.48
64.07	839.39	64.61	839.89	64.76	840	67.25	841.22	68.67	842
69.29	842.06	71.48	842.29	79.51	842.3	85.98	842.47	86.23	842.48
90.38	842.55	91.59	842.57	98.6	842.74	101.61	842.82	104.64	842.86

146.33	844	180.49	844	181.26	844.02	181.89	844.05	190.71	844.37
193.85	844.48	194.8	844.52	195.93	844.57	198.36	844.7	201.82	844.88
204.86	845.05	212.27	845.39	220.97	845.58	229.69	845.62	230.38	845.6
230.41	845.63	230.5	845.58	232.29	844.43	233	844.05	233.12	844
234.98	844	258.59	846	273.8	846.82	285.11	847.43	293.43	848
301.47	849.38	305.3	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	51.45	.03	71.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.45	71.48	39.61 55.52	66.66	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
244.051	265.678	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.93	Reach Len. (ft)	39.61	55.52	66.66
Crit W.S. (ft)	842.93	Flow Area (sq ft)	0.22	43.37	13.80
E.G. Slope (ft/ft)	*0.006947	Area (sq ft)	0.22	43.37	13.80
Q Total (cfs)	313.80	Flow (cfs)	0.09	287.89	25.82
Top Width (ft)	56.95	Top Width (ft)	1.05	20.03	35.87
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	6.64	1.87
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)	0.21	2.17	0.38
Conv. Total (cfs)	3765.0	Conv. (cfs)	1.1	3454.1	309.8
Length Wtd. (ft)	56.01	Wetted Per. (ft)	1.13	21.28	35.88
Min Ch El (ft)	839.39	Shear (lb/sq ft)	0.08	0.88	0.17
Alpha	1.36	Stream Power (lb/ft s)	305.30	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.02	0.40	0.12
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	0.16	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1406.971

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.53	858	9.03	856.04	9.12	856	9.29	855.93
14.1	854	16.34	853.16	19.41	852	23.95	850.21	24.45	850
25.22	849.7	28.3	848.48	29.53	848	29.56	847.99	35.13	846
36.59	845.34	39.3	844.24	39.9	844	41.26	843.3	43.86	842
44.28	841.92	44.46	841.88	46.89	841.41	48.18	841.11	49.71	840.82
50.96	840.53	53.07	840.02	53.1	840.01	53.15	840	54.85	839.4
57.03	838.55	58.84	838.46	60.45	838.4	61.66	839.32	62.52	840
64.74	841.72	65.12	842	77.22	842.33	84.67	842.54	91.2	842.72
113.53	843.34	115.46	843.39	122.19	843.58	138.27	844	148.44	843.69
155.6	843.66	160.98	843.64	170.68	843.84	174.81	844	204.08	844
204.64	844.13	205.36	844.29	207	844.07	207.27	844.08	208.57	844.34
208.83	844.43	209.84	844.4	220.31	844.29	227.41	844.26	227.81	844.39
228.54	843.97	237.16	844	240.75	844	245.55	844.17	256.7	844.48
264.78	844.62	268.16	844.76	273.32	844.83	275.68	844.85	277.23	844.86
280.08	844.97	282.36	845	284.56	845.07	287.16	845.13	292.69	845.4
302.58	845.98	302.64	845.99	302.87	846	308.23	847.84	308.7	848
313.06	849.51	314.49	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	43.86	.03	65.12	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
43.86 65.12 39.22 38.06 42.21 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
131.644	175.564	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.31	Reach Len. (ft)	39.22	38.06	42.21
Crit W.S. (ft)	842.01	Flow Area (sq ft)	0.10	46.44	1.76
E.G. Slope (ft/ft)	*0.007192	Area (sq ft)	0.10	46.44	1.76
Q Total (cfs)	313.80	Flow (cfs)	0.03	311.95	1.82
Top Width (ft)	33.22	Top Width (ft)	0.62	21.26	11.35
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)	0.34	6.72	1.04
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)	0.15	2.18	0.15
Conv. Total (cfs)	3700.3	Conv. (cfs)	0.4	3678.5	21.5
Length Wtd. (ft)	38.98	Wetted Per. (ft)	0.69	22.97	11.35
Min Ch El (ft)	838.40	Shear (lb/sq ft)	0.06	0.91	0.07
Alpha	1.06	Stream Power (lb/ft s)	314.49	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.02	0.34	0.10

* C & E Loss (ft)	*	0.18	* Cum SA (acres)	*	0.03	*	0.13	*	0.11	*

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: Unt to Doston
REACH: Lower RS: 1367.937

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.95	858	5.89	857.65	10.34	856	13.92	854.7
15.81	854	19.11	852.81	21.31	852	24.55	850.8	26.72	850
28.34	849.23	30.9	848	31.75	847.54	34.55	846	36.32	845.07
37.61	844.37	38.28	844	44.55	843.12	53.39	842	56.5	841.27
58.43	840.79	61.61	840	68.13	840	69.28	839.37	69.93	838.93
70.79	838.28	71.98	838.27	73.86	838.27	74.84	839.69	75.02	840
75.47	840.58	76.63	842	90.84	842	106	841.43	139.39	840.19
141.31	840.13	145.93	840.11	147.3	840.1	148.6	840.1	150.59	840.1
150.84	840.09	151.14	840.09	151.37	840.09	151.51	840.1	151.65	840.1
178.81	844.27	179.69	844.27	180.54	844.26	182.65	844.25	187.26	844.08
188.35	844.07	199.49	844.02	202.71	844	210.22	843.53	215.55	843.23
216.93	843.45	217.53	843.59	218.43	843.65	218.52	843.66	234.2	843.52
237.2	843.47	237.46	843.48	237.7	843.41	238.13	843.31	238.65	843.14
239.44	842.84	240.92	842.27	241.65	842	241.86	842	242.64	842.05
246.67	842.3	249.49	842.47	250.51	842.48	257.11	842.6	262.1	842.79
282.62	843.36	286.96	843.45	288.37	843.47	289.91	843.48	294.65	843.57
295.81	843.59	301.31	843.71	308.25	843.9	308.5	843.9	311.35	844
317.09	844.64	318.03	844.75	320.42	845.07	326.86	846	330.02	846.85
334.04	847.8	334.85	848	338.19	848.97	339.42	849.29	341.62	849.9
341.95	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	53.39	.03	76.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
53.39	76.63	9.45	8.12	5.27	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
182.65	341.95	844.25	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138.358	184.172	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.64	Reach Len. (ft)	9.45	8.12	5.27
Crit W.S. (ft)	841.60	Flow Area (sq ft)	1.61	59.82	81.64
E.G. Slope (ft/ft)	0.001148	Area (sq ft)	1.61	59.82	86.22
Q Total (cfs)	313.80	Flow (cfs)	0.38	175.53	137.90
Top Width (ft)	108.18	Top Width (ft)	5.04	23.24	79.90
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.23	2.93	1.69
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)	0.32	2.57	1.32
Conv. Total (cfs)	9260.8	Conv. (cfs)	11.1	5180.1	4069.6
Length Wtd. (ft)	7.03	Wetted Per. (ft)	5.08	25.88	64.17
Min Ch El (ft)	838.27	Shear (lb/sq ft)	0.02	0.17	0.09
Alpha	1.26	Stream Power (lb/ft s)	341.95	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02	0.30	0.06
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.11	0.07

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1359.780

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.47	858	9.11	856.68	11.06	856	12.62	855.42
16.44	854	19.02	853.07	21.9	852	27.02	850.16	27.46	850
28.05	849.74	31.96	848	35	846.33	35.61	846	36.71	845.39
38.05	844.63	39.18	844	41.89	843.66	52.62	842.45	55.81	842.09
56.64	842	62.62	840.49	64.55	840	65.66	840	69	838.65
69.54	838.27	70.52	838.27	75.66	838.21	77.27	839.63	77.64	840
78.61	840.99	79.61	842	104.56	842	107.24	841.9	142.63	840.56
144.55	842	145.1	842	150.46	843.07	151.81	844	153.06	844
158.25	844.07	163.76	842.97	166.92	842.34	179.85	844.32	180.23	844.32
180.61	844.32	181.54	844.31	187.39	844.1	187.87	844.09	192.84	844.07
194.33	844.06	199.56	844	202.38	844	202.99	843.97	204.4	843.9
208.61	843.71	210.7	843.6	215.96	843.26	217.36	843.11	217.75	843.21
221.23	843.42	221.56	843.46	234.56	843.34	239.94	843.26	240.4	843.28
240.83	843.16	241.6	842.98	242.51	842.68	243.92	842.14	244.28	842

245.2	842	246.52	842.08	246.7	842.08	247.86	842.1	254.7	842.37
282.48	843.14	286.16	843.22	288.17	843.24	290.34	843.27	294.42	843.35
296.2	843.37	300.98	843.47	307.02	843.64	307.87	843.65	314.83	843.9
317.21	844	324.73	845.06	330.47	846	331.94	846.35	332.65	846.49
335.17	847	337.92	847.58	339.8	848	344.62	849.61	345.95	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	55.81	.03	79.61	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.81	79.61	16.17	26.79	10.34	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.81	345.95	844	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
153.834	178.507	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.60	Reach Len. (ft)	16.17	26.79	10.34
Crit W.S. (ft)	841.56	Flow Area (sq ft)	1.17	65.99	69.15
E.G. Slope (ft/ft)	0.001207	Area (sq ft)	1.17	65.99	75.10
Q Total (cfs)	313.80	Flow (cfs)	0.24	211.49	102.07
Top Width (ft)	117.24	Top Width (ft)	4.54	23.80	88.90
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	0.21	3.20	1.48
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)	0.26	2.77	1.01
Conv. Total (cfs)	9032.3	Conv. (cfs)	7.0	6087.4	2938.0
Length Wtd. (ft)	23.69	Wetted Per. (ft)	4.57	25.96	69.08
Min Ch El (ft)	838.21	Shear (lb/sq ft)	0.02	0.19	0.08
Alpha	1.44	Stream Power (lb/ft s)	345.95	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02	0.28	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	0.11	0.06

Warning: Divided flow computed for this cross-section.
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: Unt to Doston
REACH: Lower RS: 1332.978

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.88	858.14	6.27	858	6.71	857.84	12.18	856
15.58	854.87	18.17	854	21.93	852.65	23.72	852	25.64	851.29
29.24	850	32.16	848.87	34.54	848	38.36	846.65	40.67	845.75
43.75	844.74	45.45	844.19	46.04	844	46.91	843.92	52.17	843.46
53.75	843.38	68.11	842.12	68.55	842.08	68.78	842.06	68.89	842.06
69.33	842	75.99	840.14	76.64	840	77.74	839.66	82.19	838.19
85.65	838.19	86.76	838.17	87.61	838.7	88.56	839.22	90.01	840
92.07	841.46	92.83	842	119.09	842	143.01	842	151.56	842.72
162.98	843.81	164.04	843.9	164.46	843.94	165.05	844	170.56	844
187.25	844.26	189.41	844.27	189.76	844.27	190.25	844.27	191.13	844.26
193.13	844.22	201.67	844.08	202.76	844.05	204.4	844	207.8	843.89
209.87	843.81	212.33	843.72	218.23	843.42	219.04	843.39	226.47	842.92
227.32	842.85	228.08	842.78	229.95	842.68	231.11	842.69	232.69	842.79
233.69	842.9	239.21	842.86	251.28	842.69	252.28	842.75	253.24	842.49
254.89	842.1	255.19	842	265.84	842	286.65	842.6	288.68	842.65
292.29	842.7	296.15	842.75	298.64	842.8	302.02	842.84	305.08	842.92
309.02	843.03	311.43	843.07	316.18	843.24	322.02	843.5	325.11	843.53
330.81	843.86	331.16	843.86	333.54	844	339.66	845.13	343.55	846
344.26	846.17	351.49	848	360.88	850				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.11	.03	92.83	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.11	92.83	85.9	44.96	12.86	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
162.98	360.88	844	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
165.052	188.765	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.29	Reach Len. (ft)	85.90	44.96	12.86
Crit W.S. (ft)	841.39	Flow Area (sq ft)	0.17	60.26	15.11
E.G. Slope (ft/ft)	*0.003315	Area (sq ft)	0.17	60.26	19.82
Q Total (cfs)	313.80	Flow (cfs)	0.03	297.91	15.86
Top Width (ft)	102.16	Top Width (ft)	1.95	24.72	75.49
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	0.17	4.94	1.05
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)	0.09	2.44	0.28

Conv. Total (cfs)	5450.1	Conv. (cfs)	0.5	5174.1	275.5
Length Wtd. (ft)	44.15	Wetted Per. (ft)	1.96	26.40	53.65
Min Ch El (ft)	838.17	Shear (lb/sq ft)	0.02	0.47	0.06
Alpha	1.35	Stream Power (lb/ft s)	360.88	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.02	0.25	0.04
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	0.09	0.04

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: Unt to Doston
REACH: Lower RS: 1284.508

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	3.93	857.83	7.25	856	11.06	854.12
11.3	854	12.65	853.35	15.47	852	16.35	851.59	19.69	850
22.43	848.73	23.97	848	29.25	846.11	29.55	846	30.08	845.86
36.99	844	39.56	842.93	40.61	842.46	41.62	842	43.05	842
49.48	843.91	49.76	844	50.89	844	55.47	843.33	64	842
67.71	841.11	72.37	840	75.4	838.24	75.83	838	76.31	837.7
76.49	837.59	80.82	837.77	81.02	837.92	81.15	838	83.96	839.96
84.01	840	84.13	840.08	85.83	841.26	86.9	842	114.44	842
145.88	842	172.17	841.71	172.55	841.71	178.78	841.75	184.41	841.79
187.13	841.76	190.83	841.79	194.9	841.83	197.36	841.88	199.46	841.89
205.5	841.95	208.94	842	227.49	842	229.55	842.05	230.89	842.08
231.29	842.09	231.42	842.09	231.62	842.09	232.38	842.08	234.47	842.07
242.26	842.01	243.03	842	243.28	842	248.65	841.9	249.87	841.98
250.49	841.81	257.23	841.99	257.37	842	286.25	842	291.25	842.08
291.59	842.09	292.04	842.11	297.25	842.21	298.29	842.25	299.65	842.31
311.22	842.51	313.41	842.64	317.12	842.72	320.12	842.9	323.88	843.12
327.55	843.34	329.73	843.45	332.07	843.61	333.74	843.71	334.47	843.76
337.8	843.93	337.89	843.94	338.07	843.95	339.16	844	342.78	844.7
347.37	845.89	347.68	845.96	347.83	846	354.69	847.59	355.24	847.71
356.52	848	359.68	848.56	361.85	848.89	364.43	849.3	369.16	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0 .1 64 .03 86.9 .035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64	86.9	145.32 153.75	10.92	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.33	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.03	Wt. n-Val.		0.030		
W.S. Elev (ft)	841.30	Reach Len. (ft)	145.32	153.75	10.92	
Crit W.S. (ft)	841.30	Flow Area (sq ft)		38.49		
E.G. Slope (ft/ft)	*0.012003	Area (sq ft)		38.49		
Q Total (cfs)	313.80	Flow (cfs)		313.80		
Top Width (ft)	18.98	Top Width (ft)		18.98		
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15		
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.03		
Conv. Total (cfs)	2864.2	Conv. (cfs)		2864.2		
Length Wtd. (ft)	107.38	Wetted Per. (ft)		20.90		
Min Ch El (ft)	837.59	Shear (lb/sq ft)		1.38		
Alpha	1.00	Stream Power (lb/ft s)	369.16	0.00	0.00	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.02	0.19	0.04	
C & E Loss (ft)	0.30	Cum SA (acres)	0.02	0.07	0.03	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1128.537

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.82	858	5.15	857.34	7.87	856	9.02	855.43
11.91	854	13.96	852.98	15.94	852	18.64	850.66	19.97	850
23.16	848.41	23.99	848	24.8	847.64	28.53	846	29.16	845.73

33.19	844	33.3	843.99	34.17	843.88	39.82	843.23	49.17	842.15
50.56	842	63.79	840.54	68.71	840	71.35	838.02	71.38	838
71.46	837.97	73.22	837.28	74.18	836.91	74.98	836.73	76.21	836.57
81.66	837.47	84.51	838	85.03	838.2	86.13	838.86	87.33	839.52
88	840	116.55	840	143.04	840	149.01	839.95	149.24	839.95
151.71	839.97	151.87	839.97	155.1	839.98	155.15	839.98	160.09	840
174.23	840	177.87	839.95	177.92	839.95	184.19	839.86	189.92	839.76
193.68	839.85	199.64	839.8	215.13	839.79	221.66	839.9	224.62	839.9
228.2	839.89	239.11	839.96	240.05	840.12	240.52	840.08	258.33	840.57
261.05	840.65	261.99	840.68	262.65	840.7	262.7	840.7	262.71	840.7
262.72	840.7	262.74	840.7	262.77	840.7	262.82	840.69	262.88	840.69
262.95	840.69	263.01	840.69	263.32	840.68	271.64	840.43	299.17	840.97
312.76	841.23	350.43	842	350.64	842	376.13	843.15	384.46	843.55
393.91	844	398.12	845.53	399.43	846	406	848	410.95	848.95
416.25	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.71	.03	88	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.71	88	269.61 129.01	6.27	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
311.403	367.363	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.49	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)	10.09	71.64	296.14
E.G. Slope (ft/ft)	0.000181	Area (sq ft)	10.09	71.64	296.14
Q Total (cfs)	313.80	Flow (cfs)	1.65	108.52	203.63
Top Width (ft)	256.22	Top Width (ft)	13.52	19.29	223.40
Vel Total (ft/s)	0.83	Avg. Vel. (ft/s)	0.16	1.51	0.69
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)	0.75	3.71	1.33
Conv. Total (cfs)	23356.5	Conv. (cfs)	122.7	8077.0	15156.8
Length Wtd. (ft)	0.00	Wetted Per. (ft)	13.61	20.86	223.73
Min Ch El (ft)	836.57	Shear (lb/sq ft)	0.01	0.04	0.01
Alpha	1.60	Stream Power (lb/ft s)	416.25	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			
C & E Loss (ft)	0.04	Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Dotson Run

Reach	River Sta.	n1	n2	n3
Upper	3183.868	.035	.03	.1
Upper	3053.784	.035	.03	.1
Upper	2888.080	.035	.03	.1
Upper	2799.727	.035	.03	.1
Upper	2775.485	.035	.03	.1
Upper	2761.408	.035	.03	.1
Upper	2759.869	.035	.03	.1
Upper	2705.342	.035	.03	.1
Upper	2656.729	.035	.03	.1
Upper	2587.689	.035	.03	.1
Upper	2586.252	.035	.03	.1
Upper	2570.250	.035	.03	.1
Upper	2569.491	.035	.03	.1
Upper	2539.448	.035	.03	.1
Upper	2481.906	.035	.03	.1
Upper	2412.823	.035	.03	.1
Upper	2410.917	.035	.03	.1
Upper	2333.304	.035	.03	.1
Upper	2270.249	.035	.03	.1
Upper	2193.833	.035	.03	.1
Upper	2151.343	.035	.03	.035
Upper	2088.858	.035	.03	.035
Upper	2019.079	.035	.03	.035
Upper	1943.117	.035	.03	.035
Upper	1929.28	Culvert		
Upper	1915.038	.035	.03	.035
Upper	1878.276	.035	.03	.035
Upper	1683.45	Culvert		
Upper	1487.336	.1	.03	.1
Upper	1440.621	.1	.03	.035
Lower	1400.977	.1	.03	.035
Lower	1370.77	Bridge		
Lower	1344.212	.1	.03	.035
Lower	1289.476	.1	.03	.035
Lower	1271.523	.1	.03	.035
Lower	1182.267	.1	.03	.035
Lower	1143.687	.1	.03	.035
Lower	1130.779	.1	.03	.035
Lower	1059.794	.1	.03	.035
Lower	1000.000	.1	.03	.035

River:Unt to Doston

Reach	River Sta.	n1	n2	n3
Lower	1569.420	.1	.03	.035
Lower	1515.286	.1	.03	.035
Lower	1499.515	.1	.03	.035

```
*Lower          *    1464.257    *       .1*      .03*     .035*
*Lower          *    1406.971    *       .1*      .03*     .035*
*Lower          *    1367.937    *       .1*      .03*     .035*
*Lower          *    1359.780    *       .1*      .03*     .035*
*Lower          *    1332.978    *       .1*      .03*     .035*
*Lower          *    1284.508    *       .1*      .03*     .035*
*Lower          *    1128.537    *       .1*      .03*     .035*
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ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Ex

River: Dotson Run  Reach: Upper     RS: 3183.868     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may
indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.
 The
             program defaulted to critical depth.
River: Dotson Run  Reach: Upper     RS: 3053.784     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may
indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.
 The
             program defaulted to critical depth.
River: Dotson Run  Reach: Upper     RS: 2888.080     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
             for the water surface and continued on with the calculations.
     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.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may
indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
```

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2761.408 Profile: PF 1
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: Dotson Run Reach: Upper RS: 2759.869 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2705.342 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2656.729 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2569.491 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2410.917 Profile: PF 1
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: Dotson Run Reach: Upper RS: 2333.304 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may

indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2270.249 Profile: PF 1
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: Dotson Run Reach: Upper RS: 2088.858 Profile: PF 1
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: Dotson Run Reach: Upper RS: 1683.45 Profile: PF 1 Culv: Culvert #1
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
River: Dotson Run Reach: Upper RS: 1487.336 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1400.977 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Dotson Run Reach: Lower RS: 1344.212 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1289.476 Profile: PF 1
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.
River: Dotson Run Reach: Lower RS: 1271.523 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Lower RS: 1182.267 Profile: PF 1
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

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than 1.4.
          This may indicate the need for additional cross sections.
River: Dotson Run  Reach: Lower     RS: 1143.687     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
          for the water surface and continued on with the calculations.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
          water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.
 The
          program defaulted to critical depth.
River: Dotson Run  Reach: Lower     RS: 1130.779     Profile: PF 1
     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: Dotson Run  Reach: Lower     RS: 1059.794     Profile: PF 1
     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: Unt to Doston  Reach: Lower     RS: 1464.257     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
          for the water surface and continued on with the calculations.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
          water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.
 The
          program defaulted to critical depth.
River: Unt to Doston  Reach: Lower     RS: 1406.971     Profile: PF 1
     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: Unt to Doston  Reach: Lower     RS: 1367.937     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy
was used.
River: Unt to Doston  Reach: Lower     RS: 1359.780     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     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: Unt to Doston  Reach: Lower     RS: 1332.978     Profile: PF 1
     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.
River: Unt to Doston Reach: Lower RS: 1284.508 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.

Supplement 3

HEC-RAS Analysis –Proposed Conditions Summary w/ Cross Sections

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

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

PROJECT DATA
Project Title: Dotson Holland SC
Project File : AlvadoreSC.prj
Run Date and Time: 9/30/2013 3:16:43 PM

Project in English units

****

PLAN DATA

Plan Title: Proposed 6x8 Culverts
Plan File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.p05

Geometry Title: Proposed 6x8 Culverts
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.g05

Flow Title : Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.f01

Plan Summary Information:

Number of:	Cross Sections	= 47	Multiple Openings	=	0
	Culverts	= 3	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: Existing
Flow File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Dotson Run	Upper	3183.868	505.7
Dotson Run	Upper	1440.621	783.6
Dotson Run	Lower	1400.977	783.6
Unt to Doston	Lower	1569.420	313.8

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Dotson Run	Lower	PF 1		Normal S = 0.008

****

GEOMETRY DATA

Geometry Title: Proposed 6x8 Culverts
Geometry File : x:\Navitus Jobfiles\Antero Resources\ANT024-Alvadore\Engineering\Drainage Comp\Floodplain\AlvadoreSC.g05

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Dotson Run	Upper		1
Dotson Run	Lower	1	
Unt to Doston	Lower		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

Length across Junction River	Reach		Tributary River	Reach	Length	Angle
Dotson Run	Upper	to	Dotson Run	Lower	38.69	0
Unt to Doston	Lower	to	Dotson Run	Lower	0	0

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 3183.868

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.94	3.39	870.03	3.5	870	4.02	869.82	5.08	869.43
7.69	868.48	8.28	868.26	8.94	868	9.35	867.83	13.36	866
14.07	865.7	17.82	864	22.76	862.47	23.91	862	29.87	861.65
43.53	860.85	49.77	860.52	59.69	860	78.51	858.78	90.5	858
104.73	857.6	125.59	857.11	135.27	856.92	139.09	856.86	141.91	856.83
147.03	856.66	150.64	856.61	157.64	856.32	165.53	856	165.63	856
166.21	855.78	166.86	855.55	169.9	854.49	171.29	854	171.33	853.99
174.63	853.28	181.68	853.16	184.76	853.07	185.09	853.33	185.54	853.69
185.95	854	186.28	854.28	188.75	856	190.49	857.32	191.42	858
193.73	859.79	194.01	860	194.2	860.16	196.56	862	198.3	863.11
199.67	864	201.55	865.07	203.22	866	205.41	867.25	206.23	867.72
206.72	868	208.54	868.82	211.17	870	212.81	870.53	217.49	872
220.61	873	223.77	874	226.98	875.14	229.42	876	232.77	877.45
234.07	878	238.84	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	165.53	.03	188.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
165.53	188.75	137.71	129.12	122.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	857.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	856.48	Reach Len. (ft)	137.71	129.12	122.82
Crit W.S. (ft)	856.48	Flow Area (sq ft)	2.88	58.96	0.15
E.G. Slope (ft/ft)	0.009180	Area (sq ft)	2.88	58.96	0.15
Q Total (cfs)	505.70	Flow (cfs)	4.55	501.08	0.07
Top Width (ft)	35.69	Top Width (ft)	11.84	23.22	0.64
Vel Total (ft/s)	8.16	Avg. Vel. (ft/s)	1.58	8.50	0.47
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)	0.24	2.54	0.24
Conv. Total (cfs)	5278.1	Conv. (cfs)	47.5	5229.8	0.8

* Length Wtd. (ft)	*	129.58	* Wetted Per. (ft)	*	11.85	*	24.61	*	0.80	*
* Min Ch El (ft)	*	853.07	* Shear (lb/sq ft)	*	0.14	*	1.37	*	0.11	*
* Alpha	*	1.08	* Stream Power (lb/ft s)	*	238.84	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	1.04	* Cum Volume (acre-ft)	*	0.20	*	2.82	*	3.17	*
* C & E Loss (ft)	*	0.05	* Cum SA (acres)	*	0.41	*	1.02	*	1.65	*

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 3053.784

INPUT
Description:
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.91	11.74	864.13	11.92	864	12.19	863.79	14.39	862
16.8	860.6	17.83	860	30.38	858.46	38.03	858	38.99	857.98
56.06	857.78	63.03	857.74	66.8	857.7	73.25	857.58	78.67	857.44
84.53	857.3	117.17	856	123.08	856	130.84	855.62	141.38	855.1
146.8	854.77	159.88	854	165.16	852.16	165.64	852.01	165.78	852.21
171.69	851.89	174.3	851.73	174.43	851.97	174.97	852.23	178.57	854
181.54	855.73	182.03	856	183.37	856.85	184.59	857.66	185.06	858
186.95	859.26	187.96	860	188.72	860.57	190.81	862	192.67	863.24
192.9	863.39	193.73	864	194.65	864.68	196.65	866	199.02	867.56
199.73	868	201.84	869.23	203.15	870	205.65	871.48	206.52	872
207.3	872.29	211.65	874	211.87	874.07	217.76	876	220.06	876.8
223.57	878	225.42	878.64	229.37	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	159.88	.03	178.57	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
159.88	178.57	175.37	163.58	152.04	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	856.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	855.45	Reach Len. (ft)	175.37	163.58	152.04
Crit W.S. (ft)	855.45	Flow Area (sq ft)	18.03	54.92	1.81
E.G. Slope (ft/ft)	*0.007099	Area (sq ft)	18.03	54.92	1.81
Q Total (cfs)	505.70	Flow (cfs)	50.92	453.12	1.66
Top Width (ft)	46.83	Top Width (ft)	25.64	18.69	2.49
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)	2.82	8.25	0.92
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	0.70	2.94	0.73
Conv. Total (cfs)	6002.1	Conv. (cfs)	604.4	5378.0	19.7
Length Wtd. (ft)	164.27	Wetted Per. (ft)	25.69	19.76	2.89
Min Ch El (ft)	851.73	Shear (lb/sq ft)	0.31	1.23	0.28
Alpha	1.35	Stream Power (lb/ft s)	229.37	0.00	0.00
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	0.16	2.65	3.16
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.96	1.64

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2888.080

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.88	6.02	866.79	6.1	866.79	7.29	866.67	7.42	866.65
8.14	866.54	11.84	866	12.27	866	13.57	865.81	16.86	865.46
19.28	865.2	24.25	864.66	28.51	864.3	32.27	864	33.44	863.87
36.41	863.6	39.16	863.44	41.98	863.32	47.64	862.57	49.07	862.49
51.26	862.22	51.76	862.19	53.3	862	53.4	861.99	53.43	861.98
55.04	861.67	56.18	861.53	57.63	861.54	58.23	861.36	58.86	861.33
61.67	860.59	63.7	860	67.31	858	69.41	856	70.92	855.59
91.84	855.33	111.12	855.09	120.56	854.68	124.92	854.6	126	854.56
126.58	854.54	136.38	854	136.65	853.96	146.77	852.53	149.08	852.2
150.3	852	150.7	851.73	153.26	850	153.35	849.91	154.42	849.01
159.34	849.33	160.42	849.43	161.56	849.81	161.93	850	163.58	850.48

168.7	852	172.6	852.84	177.23	854	179.35	854.32	182.36	854.77
189.85	856	191.95	857.34	193.05	858	194.81	858.99	196.49	860
197.2	860.46	199.93	862	202.41	863.86	202.6	864	202.94	864.26
205.09	865.9	205.22	866	205.29	866.05	205.56	866.26	207.84	868
208.09	868.1	213.52	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	150.3	.03	168.7	.1

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
150.3	168.7	81.7	84.16	75.97	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
22.2	94.176	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	854.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	853.19	Reach Len. (ft)	81.70	84.16	75.97
Crit W.S. (ft)	853.19	Flow Area (sq ft)	4.75	54.73	3.23
E.G. Slope (ft/ft)	*0.008412	Area (sq ft)	4.75	54.73	3.23
Q Total (cfs)	505.70	Flow (cfs)	12.77	489.81	3.12
Top Width (ft)	31.86	Top Width (ft)	8.17	18.40	5.28
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)	2.69	8.95	0.97
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	0.58	2.97	0.61
Conv. Total (cfs)	5513.6	Conv. (cfs)	139.3	5340.3	34.0
Length Wtd. (ft)	83.97	Wetted Per. (ft)	8.26	19.79	5.41
Min Ch El (ft)	849.01	Shear (lb/sq ft)	0.30	1.45	0.31
Alpha	1.20	Stream Power (lb/ft s)	213.52	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.12	2.45	3.15
C & E Loss (ft)	0.20	Cum SA (acres)	0.28	0.89	1.63

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2799.727

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	866.92	1.71	866.54	3.7	866.08	4.04	866	4.89	865.82
7.32	865.51	15.26	864.33	20.48	864	21.81	863.91	22.44	863.85
26.79	863.44	30.46	863.02	38.41	862	53.51	860	55.88	859.58
58.71	859.06	65.42	858	67.07	857.54	69.92	856.69	73.2	856.15
74.3	856	76.92	854.7	77.79	853.95	77.81	853.94	77.85	853.95
77.89	854	78.33	854	80.18	854.17	80.84	854.24	84.42	854.52
87.66	854.68	88.78	854.69	91.66	854.66	94.89	854.46	95.9	854.3
99.55	854.08	100.69	854	102.96	853.74	109.23	853	109.29	853.01
109.32	853.01	109.33	853	119.33	852.55	119.49	852.54	119.85	852.49
119.87	852.49	124.29	852.62	124.74	852.62	125.38	852.57	127.1	852.88
128.36	852.85	129.49	853.03	133.16	853.18	134.16	853.32	134.99	853.45
135.7	853.57	137.02	853.49	138.36	853.6	139.62	853.61	141.06	853.49
141.7	853.48	142.35	853.46	143.09	853.43	143.99	853.38	144.93	853.32
145.74	853.27	147.72	853.12	149.67	852.97	151.88	852.82	153.4	852.67
157.34	852.45	162.4	852.18	165.34	852	166.48	852	166.53	851.99
168.01	851.75	168.66	851.66	170.44	851.33	171.53	851.17	172.89	850.85
175.23	850.48	177.82	850	179.06	849.68	180.54	849.2	181.17	848.9
182.41	848.36	194.25	848.85	195.56	848.93	196.47	849.07	196.92	849.16
200.17	850	200.73	850.17	206.47	852	208.38	852.59	210.52	853.57
211.43	854	211.86	854.16	213.44	854.71	217.1	856	218.71	857.46
219.35	858	221.34	859.82	221.55	860	223.65	861.93	223.73	862
223.85	862.08	224.13	862.35	225.46	863.58	225.89	864	227.14	864.93
228.69	866	230.61	867.32	231.59	868	234.54	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	177.82	.03	200.73	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
177.82 200.73 62.16 24.24 28.56 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
26.211	98.77	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 852.82	* Element	* Left OB	* Channel	* Right OB *

* Vel Head (ft)	*	0.54	* Wt. n-Val.	*	0.035	*	0.030	*	0.100	*
* W.S. Elev (ft)	*	852.28	* Reach Len. (ft)	*	62.16	*	24.24	*	28.56	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*	15.33	*	76.23	*	7.01	*
* E.G. Slope (ft/ft)	*	0.003155	* Area (sq ft)	*	15.33	*	76.23	*	7.01	*
* Q Total (cfs)	*	505.70	* Flow (cfs)	*	33.42	*	466.42	*	5.86	*
* Top Width (ft)	*	46.92	* Top Width (ft)	*	17.35	*	22.91	*	6.66	*
* Vel Total (ft/s)	*	5.13	* Avg. Vel. (ft/s)	*	2.18	*	6.12	*	0.84	*
* Max Chl Dpth (ft)	*	3.92	* Hydr. Depth (ft)	*	0.88	*	3.33	*	1.05	*
* Conv. Total (cfs)	*	9002.6	* Conv. (cfs)	*	594.9	*	8303.4	*	104.3	*
* Length Wtd. (ft)	*	25.53	* Wetted Per. (ft)	*	17.54	*	23.37	*	6.98	*
* Min Ch El (ft)	*	848.36	* Shear (lb/sq ft)	*	0.17	*	0.64	*	0.20	*
* Alpha	*	1.32	* Stream Power (lb/ft s)	*	234.54	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.09	* Cum Volume (acre-ft)	*	0.10	*	2.32	*	3.15	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.26	*	0.85	*	1.62	*

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2775.485

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.1	.3	867.06	.56	867.02	1.24	866.94	3.89	866.68
5.58	866.45	7.65	866.21	8.24	866.14	9.41	866	9.96	866
17.45	864.41	19.81	864	20.63	864	23.9	863.56	24.45	863.48
27.08	863.08	29.82	862.76	33.42	862	36.03	862	36.44	861.97
44.32	860.46	46.67	860	48.74	860	50.15	859.89	50.47	859.89
53.7	859.68	54.15	859.68	59.39	859.46	82.23	858	93.95	857.07
107.25	856	109.01	855.88	123.01	854.91	136.3	854	144.49	853.66
152	853.34	168.93	852.64	174.31	852.42	176.91	852.32	177.31	852.3
182.92	852	184.97	851.57	194.73	850	196.29	849	197.6	848.36
201.08	848.62	207.34	848.72	214.15	849.75	215.1	850	215.96	850
216.7	850.25	217.36	850.55	220.42	852	223.09	853.46	224.1	854
225.7	854.87	226.56	855.36	227.66	856	228.78	857.01	229.9	858
232.45	859.96	232.5	860	232.52	860.02	232.69	860.15	234.98	862
236.14	862.98	237.35	864	239.68	865.95	239.75	866	241.46	867.38
242.24	868	246.26	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	182.92	.03	220.42	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
182.92	220.42	13.77	14.01	9.73	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev

****
62.261 80.895 865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.72	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.50	Wt. n-Val.	0.035	0.030	0.100	
W.S. Elev (ft)	852.22	Reach Len. (ft)	13.77	14.01	9.73	
Crit W.S. (ft)		Flow Area (sq ft)	0.44	89.01	0.04	
E.G. Slope (ft/ft)	0.004323	Area (sq ft)	0.44	89.01	0.04	
Q Total (cfs)	505.70	Flow (cfs)	0.28	505.41	0.01	
Top Width (ft)	41.97	Top Width (ft)	4.07	37.50	0.40	
Vel Total (ft/s)	5.65	Avg. Vel. (ft/s)	0.64	5.68	0.20	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)	0.11	2.37	0.11	
Conv. Total (cfs)	7691.2	Conv. (cfs)	4.3	7686.7	0.1	
Length Wtd. (ft)	14.01	Wetted Per. (ft)	4.08	38.66	0.45	
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.03	0.62	0.03	
Alpha	1.01	Stream Power (lb/ft s)	246.26	0.00	0.00	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.09	2.28	3.14	
C & E Loss (ft)	0.01	Cum SA (acres)	0.24	0.83	1.62	

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2761.408

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.93	.06	867.93	.58	867.9	7.74	867.05	8.86	866.95
10.57	866.66	12.49	866.2	13.37	866	14.47	865.74	20.66	864.42
22.7	864	25.52	863.45	26.73	863.21	31.9	862.43	32.89	862.34
35.64	862	36.98	861.82	43.59	861.05	46.55	861.05	48.21	860.89
56.87	860	64.94	859.34	83.55	858	84.96	858	105.55	856.12
107.02	856	125.11	854.75	135.98	854	174.96	852.45	184.89	852.08
186.9	852	197.76	850.25	199.36	850	199.45	849.94	203.58	848.36
211.31	848.37	214.75	848.43	215.9	848.61	217.1	848.92	217.79	849.32
218.77	850	220.54	851.28	221.77	852	222.53	852.46	224.42	853.59
224.87	853.87	225.06	854	227.09	855.28	227.84	855.78	228.16	856
229.11	856.61	231.56	858	232.48	858.52	234.87	859.97	234.91	860
236.74	861.51	237.39	862	239.31	863.74	239.62	864	241.64	865.86
241.8	866	242.1	866.22	242.38	866.39	245.22	868	249.86	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	186.9	.03	221.77	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
186.9 221.77 14.86 1.54 2.17 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
65.216	83.85	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.035	0.030	0.000
W.S. Elev (ft)	852.04	Reach Len. (ft)	14.86	1.54	2.17
Crit W.S. (ft)	851.45	Flow Area (sq ft)	0.02	81.40	0.00
E.G. Slope (ft/ft)	*0.005365	Area (sq ft)	0.02	81.40	0.00
Q Total (cfs)	505.70	Flow (cfs)	0.01	505.69	0.00
Top Width (ft)	35.98	Top Width (ft)	1.04	34.87	0.07
Vel Total (ft/s)	6.21	Avg. Vel. (ft/s)	0.23	6.21	0.07
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)	0.02	2.33	0.02
Conv. Total (cfs)	6904.1	Conv. (cfs)	0.1	6904.1	0.0
Length Wtd. (ft)	1.54	Wetted Per. (ft)	1.04	36.32	0.08
Min Ch El (ft)	848.36	Shear (lb/sq ft)	0.01	0.75	
Alpha	1.00	Stream Power (lb/ft s)	249.86	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	2.25	3.14
C & E Loss (ft)	0.04	Cum SA (acres)	0.24	0.82	1.62

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: Dotson Run
REACH: Upper RS: 2759.869

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	868.05	1.36	868	3.74	867.31	8.73	866	12.08	864.95
16.68	864	24.51	862.84	26.14	862.61	27.07	862.45	28.86	862.22
29.99	862	31.62	861.88	32.34	861.83	50.22	860.54	57.14	860.06
57.98	860	58.96	860	85.13	858	102.05	856.64	108.94	856
126.68	854.78	138.08	854	141.23	853.89	145.81	853.72	183.71	852.28
187.39	852.14	191.18	852	192.54	851.78	203.05	850	205.22	849.36
207.77	848.36	217.41	848.37	218.83	848.39	219.29	848.46	219.76	848.59
220.03	848.74	220.48	849.05	221.53	850	223.2	851.19	224.4	852
225.64	852.71	226.73	853.4	227.38	853.79	227.72	854	229.46	855.01
231.49	856	231.51	856	232.88	856.81	234.98	858	236.75	859.01
238.04	859.79	238.38	860	240.61	861.84	240.8	862	240.93	862.12

243.02	864	243.42	864.35	243.99	864.89	245.21	866	247.92	867.55
248.71	868	249.4	868.3	251.69	869.27	253.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	191.18	.03	224.4	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
191.18	224.4	54.03	53.26	36.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
48.283	90.702	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	852.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	851.54	Reach Len. (ft)	54.03	53.26	36.68
Crit W.S. (ft)	851.54	Flow Area (sq ft)		61.55	
E.G. Slope (ft/ft)	0.011112	Area (sq ft)		61.55	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	29.76	Top Width (ft)		29.76	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	3.18	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	4797.4	Conv. (cfs)		4797.4	
Length Wtd. (ft)	53.26	Wetted Per. (ft)		31.18	
Min Ch El (ft)	848.36	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	253.23	0.00	0.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.09	2.25	3.14
C & E Loss (ft)	0.00	Cum SA (acres)	0.24	0.82	1.62

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2705.342

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.8	3.16	869.54	14.31	868.41	15.21	868.39	16.74	868.28
20.63	868	22.62	867.21	25.65	866	27.2	865.28	29.71	864.12
29.87	864.05	29.98	864	30.45	863.82	35.8	862	42.28	862
54.7	860.2	57.24	860	76.85	860	95.81	858.47	98.48	858.41
99.1	858.39	99.63	858.35	101.48	858.15	104.98	858.1	106	858
107.86	857.84	112.43	857.42	117.75	856.62	119.6	856.39	120.92	856.27
122.8	856	129.81	855.46	134.78	855.15	142.68	854	145.41	854
146.4	853.92	153.02	853.7	158.99	853.54	185.73	852.35	187.06	852.33
188.4	852.31	191.41	852	191.43	852	194.49	852	199.97	851.01
205.99	850	210.22	848.14	210.53	848	210.63	847.95	211.34	847.62
211.57	847.52	217.01	847.3	222.24	847.42	223.03	847.9	223.21	848
224.35	848.43	225.37	848.98	227.41	850	229.53	850.47	235.93	852
236.43	852.09	239.9	852.67	242.9	853.25	246.76	854	250.47	855.73
251.17	856	252.52	856.74	254.39	858	256.28	859.28	257.78	860
259.64	860.82	262.28	862	263.1	862.47	264.12	863.12	265.36	864
266.71	864.69	268.38	865.34	269.97	866	271.85	866.78	274.52	868
277.75	869.36	279.2	870						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	194.49	.03	235.93	.1

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
194.49	235.93	27.35	47.59	60.55	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
69.324	100.13	865	177.199	198.178	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	850.79	Reach Len. (ft)	27.35	47.59	60.55
Crit W.S. (ft)	850.79	Flow Area (sq ft)		61.42	
E.G. Slope (ft/ft)	*0.011030	Area (sq ft)		61.42	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	29.54	Top Width (ft)		29.54	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		2.08	
Conv. Total (cfs)	4815.0	Conv. (cfs)		4815.0	
Length Wtd. (ft)	47.59	Wetted Per. (ft)		30.85	
Min Ch El (ft)	847.30	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	279.20	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.09	2.17	3.14
C & E Loss (ft)	0.01	Cum SA (acres)	0.24	0.78	1.62

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical

depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2656.729

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870.23	7.65	869.96	7.97	869.94	8.3	869.92	11.84	869.92
12.14	869.91	12.46	869.89	23.56	869.07	32.05	869.78	32.41	870
32.91	870	34.89	869.85	40.03	869.49	40.94	869.32	50.35	868
50.44	868	59.03	866.24	60.14	866	62.05	865.54	68.88	864
74.5	862.68	76.78	862.15	77.46	862	85.23	860	87.89	859.3
90.43	858.69	93.28	858	104.91	856	116.45	855.08	122.11	854.67
123.09	854.62	128.58	854.1	128.7	854.09	129.52	854	133.88	853.6
153.28	853.19	155.19	853.04	155.25	853.04	156.16	853.07	156.19	853.08
156.31	853.07	157.61	853.02	169.34	852.58	169.58	852.58	169.86	852.56
170.88	852.36	171.71	852.34	178.23	852	206.08	850.73	208.01	850.64
214.45	850.4	219.38	850	224.2	848.07	224.36	848	225.47	847.42
232.25	847.25	235.27	847.15	237.09	847.13	239.3	847.05	239.85	847.3
240.37	847.42	241.43	847.72	242.31	848	243.49	848.6	244.76	849.28
246.02	850	248.24	851.63	248.78	852	251.47	852.87	255.14	854
257.21	854.91	259.59	856	260.79	857.1	261.03	857.31	261.81	858
262.86	858.94	264.03	860	265.56	861.35	266.29	862	268.21	863.69
268.55	864	270.44	865.6	270.84	866	271.23	866.41	272.71	868
274.77	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.38	.03	246.02	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.38	246.02	67.88	66.8	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
99.665	124.429	870	178.349	204.346	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	851.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	850.09	Reach Len. (ft)	67.88	66.80	62.50
Crit W.S. (ft)	850.09	Flow Area (sq ft)	0.05	59.37	0.01
E.G. Slope (ft/ft)	*0.010767	Area (sq ft)	0.05	59.37	0.01
Q Total (cfs)	505.70	Flow (cfs)	0.03	505.67	0.00
Top Width (ft)	27.93	Top Width (ft)	1.16	26.64	0.13
Vel Total (ft/s)	8.51	Avg. Vel. (ft/s)	0.57	8.52	0.17
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	0.05	2.23	0.05
Conv. Total (cfs)	4873.6	Conv. (cfs)	0.3	4873.3	0.0
Length Wtd. (ft)	66.84	Wetted Per. (ft)	1.17	27.83	0.16
Min Ch El (ft)	847.05	Shear (lb/sq ft)	0.03	1.43	0.03
Alpha	1.00	Stream Power (lb/ft s)	274.77	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.09	2.10	3.14
C & E Loss (ft)	0.10	Cum SA (acres)	0.24	0.75	1.62

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2587.689

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	874.22	.99	874.17	1.86	874	5.41	873.24	10.44	872
13.05	870.57	14.06	870	15.39	869.09	17.07	868	19.86	866.04
19.9	866.02	19.93	866	19.97	865.98	20.02	865.96	20.12	865.93
22.65	865.03	23.69	864.87	24.98	864.5	25.64	864.34	26.05	864.26
29.25	864.27	29.85	864.21	30.41	864.19	32.54	864.22	32.9	864.22
33.17	864.23	33.56	864.25	36.05	864.35	37.34	864.42	40.15	864.59
40.96	864.64	46.3	864.49	51.54	864.56	51.57	864.56	51.85	864.64
52.55	864.62	68.09	865.18	71.1	865.13	72.43	864.73	78.36	864.04
79.87	864	83.09	863.15	86.39	862	86.89	861.83	92.3	860
96.2	858.7	98.24	858	99.04	857.83	100.98	857.59	107.11	856.64
111.76	856	112.99	856	139.53	854	146.97	853.31	152.16	852.79
159.21	852.21	161.89	852	162.3	852	175.26	851.49	208.25	850
216.63	849.56	217	849.54	221.66	849.17	236.36	848	236.5	847.93
241.12	846.33	246	846	248.72	845.91	249.6	845.86	253.31	846.88
257.37	848	257.75	848.34	259.62	850	261.23	851.5	263.81	853.67

264.06	853.87	264.23	854	264.8	854.38	267.33	856	269.3	857.1
270.94	858	272.09	858.74	273.9	860	274.39	860.35	274.85	860.68
276.71	862	279.07	863.6	279.62	864	281.51	865.24	282.73	866
285.11	867.56	285.82	868	287.04	868.78	288.84	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	236.36	.03	257.75	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
236.36	257.75	24.12	1.44	2.62	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
116.56	144.303	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.56	Reach Len. (ft)	24.12	1.44	2.62
Crit W.S. (ft)	849.33	Flow Area (sq ft)	15.24	61.98	0.83
E.G. Slope (ft/ft)	*0.005775	Area (sq ft)	15.24	61.98	0.83
Q Total (cfs)	505.70	Flow (cfs)	41.39	463.76	0.56
Top Width (ft)	42.45	Top Width (ft)	19.68	21.39	1.37
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)	2.71	7.48	0.67
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)	0.77	2.90	0.61
Conv. Total (cfs)	6654.7	Conv. (cfs)	544.6	6102.7	7.3
Length Wtd. (ft)	2.72	Wetted Per. (ft)	19.75	22.11	1.83
Min Ch El (ft)	845.86	Shear (lb/sq ft)	0.28	1.01	0.16
Alpha	1.24	Stream Power (lb/ft s)	288.84	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	2.01	3.14
C & E Loss (ft)	0.05	Cum SA (acres)	0.22	0.71	1.62

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2586.252

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	875.18	.94	875.01	7.34	874	14.24	872.22	15.06	872
17.23	871.05	19.61	870	20.6	868.85	21.11	868.23	21.35	868
21.76	867.55	22.5	866.7	23.01	866	23.85	865.55	27.32	864
27.82	863.79	29.24	863.18	32.07	862	33.49	862	34.84	862.14
49.65	863.14	49.87	863.11	50.91	863.49	51.61	864	54.7	864

56.07	864.04	61.14	864.06	64.87	864.03	68.62	864.03	72.78	864.02
74.16	864	74.52	863.94	74.98	863.84	78.55	863.07	79.73	862.8
83.32	862	83.5	861.94	86.72	860.85	89.57	860	89.85	859.9
94.09	858.36	95.01	858.03	95.08	858	95.86	857.85	105.95	856
108.17	855.88	109.56	855.8	124.79	854.98	133.75	854.34	136.12	854.21
136.61	854.19	137.63	854.09	137.68	854.09	138.12	854.06	139	854
143.53	854	148.16	853.7	150.83	853.51	152.1	853.42	154.24	853.27
159.09	852.9	170.6	852	172.4	851.88	174.75	851.76	176.41	851.67
188.77	850.96	192.92	850.72	195.03	850.59	209.29	850	220.54	849.46
227.17	849.14	234.28	848.57	241.49	848	242.28	847.64	246.2	846.3
251.61	845.94	254.62	845.84	254.79	845.83	262.62	848	263.33	848.63
264.86	850	266.95	851.96	267.23	852.2	269.32	854	270.15	854.53
272.43	856	273.7	856.72	276.03	858	276.96	858.59	278.96	860
279.36	860.29	280.01	860.76	281.75	862	284.35	863.77	284.66	864
285.7	864.69	287.8	866	289.16	866.9	290.93	868	294.06	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	234.28	.03	263.33	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
234.28	263.33	16.45	15.93	22.83	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
157.809	174.363	860

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.66	Reach Len. (ft)	16.45	15.93	22.83
Crit W.S. (ft)		Flow Area (sq ft)	8.60	75.63	0.60
E.G. Slope (ft/ft)	0.004963	Area (sq ft)	8.60	75.63	0.60
Q Total (cfs)	505.70	Flow (cfs)	15.71	489.66	0.33
Top Width (ft)	48.20	Top Width (ft)	17.99	29.05	1.15
Vel Total (ft/s)	5.96	Avg. Vel. (ft/s)	1.83	6.47	0.55
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)	0.48	2.60	0.52
Conv. Total (cfs)	7178.4	Conv. (cfs)	222.9	6950.8	4.7
Length Wtd. (ft)	15.97	Wetted Per. (ft)	18.03	29.92	1.55
Min Ch El (ft)	845.83	Shear (lb/sq ft)	0.15	0.78	0.12
Alpha	1.15	Stream Power (lb/ft s)	294.06	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.07	2.01	3.14
C & E Loss (ft)	0.01	Cum SA (acres)	0.21	0.71	1.62

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2570.250

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	876.41	.1	876.4	.47	876.32	1.94	876	2.73	875.83
10.84	874	17.73	872.24	19.02	872	20.53	871.22	21.84	870.45
22.58	870	22.7	869.86	24.44	868	24.96	867.4	26.33	866
29.5	864.07	29.61	864	32.58	862.71	33.97	862	43.76	862
45.56	862.06	48.28	862.12	53.32	862.09	54.99	862.09	57.23	862.08
60.65	862.08	61.93	862.07	63.02	862.07	66.98	862.08	67.23	862.1
67.4	862.09	69.46	862.14	74.01	862	75.19	861.67	80.24	860
84.42	858.37	85.44	858	92.83	857.31	94.17	857.13	95.01	857.02
103.59	856	103.76	856	123.06	855.09	145.1	854	172.62	852
188.19	850.86	189.63	850.75	190.86	850.66	202.29	850	215.17	849.48
217.36	849.37	220.54	849.22	222.2	849.13	224.01	849.04	229.04	848.77
234.78	848.51	242.58	848.07	242.72	848.06	243.78	848	247.55	846.3
247.97	846.1	248.32	846.09	256.82	845.65	260.26	846.87	265.11	848
267.73	849.91	268.16	850.24	270.5	852	272.99	853.98	273.01	854
274.94	855.39	275.77	856	277.02	856.8	278.73	858	279.96	858.91
281.45	859.98	281.48	860	283.51	861.49	284.21	862	285.47	862.88
287.12	864	288.59	864.92	292.36	867.42	293.26	868	295.86	869.74
296.27	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	242.58	.03	265.11	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
242.58 265.11 4.97 .76 1.41 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
153.571	170.132	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	850.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	849.50	Reach Len. (ft)	4.97	0.76	1.41
Crit W.S. (ft)	849.22	Flow Area (sq ft)	19.57	65.28	1.55
E.G. Slope (ft/ft)	*0.005076	Area (sq ft)	19.57	65.28	1.55
Q Total (cfs)	505.70	Flow (cfs)	46.58	457.94	1.18
Top Width (ft)	52.57	Top Width (ft)	27.98	22.53	2.06
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)	2.38	7.01	0.76
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)	0.70	2.90	0.75
Conv. Total (cfs)	7097.7	Conv. (cfs)	653.8	6427.4	16.5
Length Wtd. (ft)	1.11	Wetted Per. (ft)	28.02	23.29	2.55
Min Ch El (ft)	845.65	Shear (lb/sq ft)	0.22	0.89	0.19
Alpha	1.32	Stream Power (lb/ft s)	296.27	0.00	0.00

* Frctn Loss (ft) * 0.01	* Cum Volume (acre-ft) * 0.06	* 1.98	* 3.14 *
* C & E Loss (ft) * 0.03	* Cum SA (acres) * 0.21	* 0.70	* 1.61 *

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2569.491

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	876.62	3.15	876.04	3.38	876	3.7	875.92	6.61	875.19
11.9	874	16.93	872.72	19.13	872	21.58	870.62	22.8	870
25.29	868.27	25.58	868	26.54	867.18	27.69	866	28.86	865.29
30.96	864	31.47	863.78	34.94	862	44.91	862	45	862
48.39	861.85	51.48	861.83	54.33	861.8	56.12	861.79	58.19	861.78
61.54	861.77	63.3	861.76	66.74	861.77	69.58	861.91	71.48	862.01
71.96	862	73.44	861.56	76.02	860.85	78.61	860	82.26	858.6
83.83	858	87.96	857.66	91.73	857.27	99.08	856.59	101.72	856.23
103.36	856.02	103.53	856	104.05	856	139.62	854.34	143.16	854.17
147.36	854	173.48	852	182.98	851.3	192.83	850.58	193.78	850.51
194.6	850.45	202.54	850	218.37	849.36	220.95	849.24	223.1	849.14
224.67	849.06	228.64	848.86	234.3	848.56	238.31	848.37	244.96	848
248.85	846.25	249.01	846.18	249.23	846.1	249.36	846.1	258.15	845.65
261.87	846.96	266.32	848	268.91	849.89	269.07	850	270.14	850.79
271.75	852	272.91	852.92	274.3	854	275.64	854.97	277.05	856
278.11	856.68	280	858	281.36	859.01	282.59	859.89	282.74	860
284.82	861.53	285.46	862	286.62	862.8	288.37	864	289.56	864.74
293.97	867.67	294.48	868	297.47	870				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	244.96	.03	266.32	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
244.96 266.32 31.26 30.04 32.01 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
109.625	173.268	870

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft) * 850.17	* Element *	Left OB *	Channel *	Right OB *
* Vel Head (ft) * 0.95	* Wt. n-Val. *	0.035 *	0.030 *	0.100 *
* W.S. Elev (ft) * 849.22	* Reach Len. (ft) *	31.26 *	30.04 *	32.01 *
* Crit W.S. (ft) * 849.22	* Flow Area (sq ft) *	14.16 *	57.77 *	1.03 *

* E.G. Slope (ft/ft)	*0.007440	* Area (sq ft)	* 14.16	* 57.77	* 1.03	*	
* Q Total (cfs)	* 505.70	* Flow (cfs)	* 36.81	* 468.07	* 0.82	*	
* Top Width (ft)	* 46.68	* Top Width (ft)	* 23.65	* 21.36	* 1.68	*	
* Vel Total (ft/s)	* 6.93	* Avg. Vel. (ft/s)	* 2.60	* 8.10	* 0.80	*	
* Max Chl Dpth (ft)	* 3.57	* Hydr. Depth (ft)	* 0.60	* 2.70	* 0.61	*	
* Conv. Total (cfs)	* 5862.8	* Conv. (cfs)	* 426.7	* 5426.6	* 9.5	*	
* Length Wtd. (ft)	* 30.11	* Wetted Per. (ft)	* 23.68	* 22.12	* 2.07	*	
* Min Ch El (ft)	* 845.65	* Shear (lb/sq ft)	* 0.28	* 1.21	* 0.23	*	
* Alpha	* 1.27	* Stream Power (lb/ft s)	* 297.47	* 0.00	* 0.00	*	
* Frctn Loss (ft)	* 0.23	* Cum Volume (acre-ft)	* 0.06	* 1.98	* 3.14	*	
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.20	* 0.70	* 1.61	*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2539.448

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.37	3.52	878.5	5.19	878	9.98	876.6	12.01	876
24.51	876	24.59	875.96	27.56	874	30.58	872.05	30.65	872
30.71	871.94	30.75	871.9	30.82	871.82	32.09	870	32.17	869.89
34.35	866.49	34.59	866	35.65	864.08	35.69	864	35.98	863.83
39.35	862	39.76	861.86	44.59	860	48.68	860	49.15	859.99
58.98	859.72	69.03	859.64	69.29	859.76	72.88	860.29	74.14	860.08
80.84	859.71	81.74	859.84	81.88	859.79	82.46	859.97	82.52	860
83.73	859.89	84.23	859.84	88.15	858.14	90.33	858	93.99	858
100.28	857.14	101.04	856.72	102.49	856.04	102.59	856	108.52	856
124.3	855.08	129.93	854.86	130.38	854.85	130.59	854.84	140.5	854.38
156.27	854.39	164.55	854.44	165.61	854.45	168.69	854.36	180.46	854.18
180.5	854.18	180.59	854.14	180.9	854	183.76	852.7	185.33	852
194.57	850.2	195.84	850	199.04	850	232.19	848.66	243.29	848.22
248.45	848	250.73	847.38	255.51	846	255.59	846.04	256.05	845.9
260.5	845.66	266.68	845.18	267.41	845.75	267.64	846	268.31	846.43
271.32	848	272.72	849.09	273.94	850	276.12	851.69	277.1	852.47
279.16	854	280.54	854.81	282.68	856	283.61	856.53	285.76	857.7
285.92	857.8	286.2	858	286.53	858.25	289.06	860	289.48	860.31
291.92	862	292.5	862.51	293.66	863.53	294.25	864	295.46	865

296.62	866	298.44	867.48	299.05	868	301.54	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.45	.03	271.32	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.45	271.32	37.06	57.38	52.68	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
111.785	193.476	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.91	Reach Len. (ft)	37.06	57.38	52.68
Crit W.S. (ft)	848.89	Flow Area (sq ft)	10.16	60.63	0.53
E.G. Slope (ft/ft)	0.007536	Area (sq ft)	10.16	60.63	0.53
Q Total (cfs)	505.70	Flow (cfs)	22.03	483.33	0.35
Top Width (ft)	46.53	Top Width (ft)	22.49	22.87	1.17
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)	2.17	7.97	0.65
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	0.45	2.65	0.46
Conv. Total (cfs)	5825.5	Conv. (cfs)	253.7	5567.8	4.0
Length Wtd. (ft)	56.87	Wetted Per. (ft)	22.51	24.02	1.48
Min Ch El (ft)	845.18	Shear (lb/sq ft)	0.21	1.19	0.17
Alpha	1.21	Stream Power (lb/ft s)	301.54	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.05	1.94	3.14
C & E Loss (ft)	0.04	Cum SA (acres)	0.19	0.69	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2481.906

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.33	879.3	4.2	878	5.73	877.27	8.32	876
10.69	874.82	11.95	874.18	12.26	874	12.39	873.83	12.83	873.18
13.5	872	14.19	870.99	14.79	870	15.73	868.65	16.13	868
17.3	866.36	17.53	866	18.89	864.11	18.95	864	19.02	863.93
20.69	862	22.08	861.53	26.18	860	30.36	859.38	33.21	859.39
42.26	859.15	59.7	859.16	61.85	858.9	61.89	858.9	62.04	858.87
62.99	858.7	66.59	858	67.28	857.85	67.7	857.79	74.72	856.57
76.33	856.36	77.68	856.24	79.05	856	84.18	854.7	85.22	854.42

87.93	854	88.41	853.98	94.1	853.78	103.56	853.15	105.57	853.06
118.81	852.75	118.97	852.74	119.5	852.75	134.17	852.4	136.62	852.42
137.67	852.42	139.77	852.4	141.64	852.36	152.25	852.1	154.87	852.03
155.51	852	155.77	852	160.72	851.87	165.32	851.68	166.09	851.65
174.44	851.13	178.35	850.93	182.87	850.8	184.71	850.71	186.94	850.66
190.85	850.51	193.06	850.3	195.33	850.15	196.55	850	203.31	849.66
204.16	849.6	210.26	849.28	212.68	849.16	214.18	849.07	226.98	848
231.68	846.23	232.28	846	233.74	845.44	234.45	845.16	243.88	844.82
244.85	844.8	245	844.87	245.36	845.02	247.78	846	248.87	846.56
251.6	848	253.15	848.93	254.92	850	256.79	851.18	258.15	852
259.9	853.08	261.42	854	264.44	855.72	264.91	856	267.09	857.16
267.28	857.27	268.5	858	269.12	858.43	271.49	860	272.21	860.51
274.42	862	274.93	862.45	277.59	864.66	279.12	865.9	279.23	866
279.37	866.11	281.68	868	282.01	868.27	284.14	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	226.98	.03	251.6	.1

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
226.98	251.6	68.83	69.08	67.61	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.453	119.546	870	127.365	138.768	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.62	Reach Len. (ft)	68.83	69.08	67.61
Crit W.S. (ft)	848.18	Flow Area (sq ft)	2.27	68.62	0.32
E.G. Slope (ft/ft)	*0.005947	Area (sq ft)	2.27	68.62	0.32
Q Total (cfs)	505.70	Flow (cfs)	3.38	502.17	0.15
Top Width (ft)	33.02	Top Width (ft)	7.37	24.62	1.03
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)	1.49	7.32	0.47
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	0.31	2.79	0.31
Conv. Total (cfs)	6557.8	Conv. (cfs)	43.8	6512.0	1.9
Length Wtd. (ft)	69.08	Wetted Per. (ft)	7.39	25.88	1.20
Min Ch El (ft)	844.80	Shear (lb/sq ft)	0.11	0.98	0.10
Alpha	1.05	Stream Power (lb/ft s)	284.14	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.05	1.86	3.14
C & E Loss (ft)	0.09	Cum SA (acres)	0.17	0.65	1.61

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2412.823

INPUT
Description:
Station Elevation Data num= 127

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.48	878.38	3.09	878	3.74	877.59	6.28	876
7.12	875.16	8.13	874	8.6	873.38	9.65	872.22	9.87	872
10.13	871.77	11.99	870	13.3	868.88	14.26	868	15.55	867.04
16.95	866	18.99	864.66	21.02	863.16	22.85	862	24.14	861.29
26.66	860	27.35	858.28	27.81	857.47	28.09	857	28.53	857.24
29.26	857.64	30.51	858	31.08	857.27	35.17	857.02	37.17	856.58
37.64	857.05	38.92	858	40.77	857.65	40.88	857.41	41.1	857.62
43.88	857.66	49.32	857.6	50.41	857.64	51.16	857.66	51.6	857.67
52.88	857.73	57.41	857.61	58.46	858	63.6	857.41	63.66	857.4
63.69	857.4	63.7	857.4	67.43	856	68.35	855.53	71.52	854
77.36	853.36	85.25	852	97.67	851.59	100.04	851.52	115.8	851
119.13	850.92	122.83	850.82	124.98	850.75	143.17	850.35	143.46	850.35
149.37	850.29	150.13	850.28	159.54	850.24	172.27	850.21	179.42	850.05
183.69	850.02	192.18	850.02	196.11	850	199.68	850	206.43	849.79
209.72	849.68	211.18	849.64	212.25	849.62	213.07	849.61	214.2	849.59
215.18	849.5	230.79	848.07	231.57	848	235.09	846.67	235.87	846.38
236.87	846	237.84	845.43	238.66	844.97	238.84	844.89	239.42	844.86
250.88	844.41	256.15	845.88	256.54	846	256.99	846.2	259.68	847.54
260.59	848	260.82	848.17	264.35	850.64	266.04	852	268.53	853.7
268.98	854	270.05	854.68	270.99	855.32	271.88	856	273.02	856.59
274.58	857.39	275.71	858	275.8	858.04	277.66	858.92	279.94	860
281.4	861.3	281.94	861.79	282.23	862	282.33	862.09	284.23	864
284.58	864.34	286.15	866	286.22	866.07	288.11	868	288.15	868.04
290.07	870	290.07	870.01	290.2	870.14	291.99	872	292.17	872.2
293.87	874	294.84	874.8	296.18	875.69	296.67	876	297.65	876.65
299.79	878	303.07	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.79	.03	260.59	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230.79	260.59	18.34	1.91	2.49	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
89.754	119.847	870	127.32	138.72	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.49	Reach Len. (ft)	18.34	1.91	2.49
Crit W.S. (ft)		Flow Area (sq ft)	0.98	85.37	0.17
E.G. Slope (ft/ft)	0.003717	Area (sq ft)	0.98	85.37	0.17
Q Total (cfs)	505.70	Flow (cfs)	0.90	504.75	0.05

Top Width (ft)	35.11	Top Width (ft)	4.62	29.80	0.69		
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)	0.92	5.91	0.31		
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)	0.21	2.86	0.24		
Conv. Total (cfs)	8295.0	Conv. (cfs)	14.7	8279.4	0.9		
Length Wtd. (ft)	1.95	Wetted Per. (ft)	4.64	31.16	0.85		
Min Ch El (ft)	844.41	Shear (lb/sq ft)	0.05	0.64	0.05		
Alpha	1.02	Stream Power (lb/ft s)	303.07	0.00	0.00		
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	1.73	3.14		
C & E Loss (ft)	0.00	Cum SA (acres)	0.16	0.61	1.61		

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2410.917

INPUT
Description:
Station Elevation Data num= 123

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.1	878.15	3.35	878	4.35	877.45	5.72	876
6.51	874.96	7.35	874	8.26	872.79	8.84	872	10.09	870.42
10.4	870	11.83	868.18	11.97	868	12.6	867.32	13.33	866.64
13.75	866.25	14.08	866	14.55	865.72	17.87	864	18.99	863.44
21.6	862	24	860.71	25.4	860	26.99	857.6	27.58	856.59
28.74	857.79	29.02	858	30.31	857.71	36.91	856.17	39.64	857.82
39.88	858	40.04	857.97	40.44	857.06	41.27	857.85	51.38	857.97
51.83	857.97	53.07	858	59.64	857.52	59.73	857.51	59.83	857.5
59.89	857.48	65.64	856	67.34	855.34	70.04	854	72.23	852.94
74.91	852	76.06	852	84.43	851.7	94.56	851.39	100.04	851.21
110.69	850.88	116.53	850.71	123.51	850.49	128.22	850.39	133.32	850.26
133.96	850.24	142.62	850.07	142.68	850.07	149.53	850.01	153.5	850
158.66	850	160.71	849.99	174.5	849.99	180.98	850	187.1	850
187.38	850	196.83	850	211.27	849.57	212.67	849.52	212.98	849.51
213.12	849.51	213.23	849.51	213.44	849.51	214.55	849.4	215.86	849.28
218.41	849.06	230.78	848	231.59	847.7	236.04	846	237.27	845.27
237.65	845.07	238.09	844.87	249.94	844.41	254.41	845.66	255.52	846
256.84	846.59	259.68	848	261.32	849.05	264.18	851.05	265.36	852
268.21	853.94	268.3	854	268.51	854.14	269.83	855.04	271.09	856
272.7	856.83	274.93	857.97	274.97	858	274.99	858.01	275.05	858.04
279.21	860	280.63	861.26	281.45	862	281.96	862.53	283.43	864
283.6	864.17	284.58	865.2	285.37	866	286.62	867.28	287.33	868
288.63	869.33	289.29	870	289.9	870.69	291.17	872	292.03	873
292.98	874	293.51	874.44	294.25	874.93	295.97	876	298.74	877.84
298.98	878	299.42	878.29	302.19	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	230.78	.03	259.68	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
230.78 259.68 77.37 77.23 80.15 .1 .3
Blocked Obstructions num= 1

Sta L	Sta R	Elev
160.79	183.695	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	849.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	848.47	Reach Len. (ft)	77.37	77.23	80.15
Crit W.S. (ft)		Flow Area (sq ft)	1.28	83.80	0.17
E.G. Slope (ft/ft)	*0.003794	Area (sq ft)	1.28	83.80	0.17
Q Total (cfs)	505.70	Flow (cfs)	1.26	504.38	0.05
Top Width (ft)	35.09	Top Width (ft)	5.46	28.90	0.73
Vel Total (ft/s)	5.93	Avg. Vel. (ft/s)	0.99	6.02	0.31
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	0.23	2.90	0.23
Conv. Total (cfs)	8209.5	Conv. (cfs)	20.5	8188.2	0.9
Length Wtd. (ft)	77.23	Wetted Per. (ft)	5.48	30.25	0.87
Min Ch El (ft)	844.41	Shear (lb/sq ft)	0.06	0.66	0.05
Alpha	1.03	Stream Power (lb/ft s)	302.19	0.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.04	1.73	3.14
C & E Loss (ft)	0.04	Cum SA (acres)	0.16	0.61	1.61

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: Dotson Run
REACH: Upper RS: 2333.304

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	1.3	879.1	3.46	877.71	6.28	876	8.95	874.28
9.39	874	9.5	873.92	11.97	872	13.71	870.56	15.5	868.84
16.28	868	16.59	867.66	18.24	866	19.08	865.31	20.75	864
22.68	862.83	24	862	25.9	860.84	27.23	860	30.16	858.37
30.8	858	31.84	856.45	32.19	855.96	33.11	854.69	33.37	854.32
33.81	854.63	34.58	856	35.96	854.55	37.39	853.28	37.95	854.09
38.19	854.08	41.13	854.16	41.94	854.09	43.96	855.16	44.74	856
45.25	855.29	45.97	855.23	51.44	855.59	53.34	856	57.94	855.55
66.09	854.16	66.95	854	72.95	852.08	73.07	852.04	73.2	852
73.45	851.97	91.51	850	98.4	849.81	99.1	849.8	107.15	849.6

114.56	849.44	121.67	849.3	185.19	848.95	187.32	848.96	188.56	848.97
202.93	848.82	206.38	848.69	206.87	848.7	212.37	848.48	218.94	848.17
219.92	848.12	222.06	848	237.89	846	239.79	845.54	245.29	844
245.74	843.89	246.08	843.78	250.45	843.8	252.11	843.76	252.36	843.9
252.55	844	254.15	845.19	255.37	846	257.98	847.95	258.06	848
258.42	848.29	260.48	849.89	260.62	850	260.89	850.12	263.35	852
267.76	853.58	269.22	854	271.07	854.76	274.47	856	274.52	856.04
277.24	858	278.01	858.59	278.57	859	280.51	860.44	282.66	862
284.98	863.75	285.32	864	287.54	865.73	287.9	866	289.04	866.86
290.13	867.67	290.56	868	290.96	868.31	293.23	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	222.06	.03	257.98	.1

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
222.06	257.98	67.01	62.63	55.78	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
156.144	188.341	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	848.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	847.51	Reach Len. (ft)	67.01	62.63	55.78
Crit W.S. (ft)	847.51	Flow Area (sq ft)		62.90	
E.G. Slope (ft/ft)	0.011180	Area (sq ft)		62.90	
Q Total (cfs)	505.70	Flow (cfs)		505.70	
Top Width (ft)	31.48	Top Width (ft)		31.48	
Vel Total (ft/s)	8.04	Avg. Vel. (ft/s)		8.04	
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	4782.8	Conv. (cfs)		4782.8	
Length Wtd. (ft)	62.68	Wetted Per. (ft)		33.07	
Min Ch El (ft)	843.76	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)	293.23	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.04	1.60	3.14
C & E Loss (ft)	0.16	Cum SA (acres)	0.16	0.56	1.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water

surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2270.249

INPUT
Description:
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.42	878.24	3.9	878	4	877.94	7.49	876
9.48	874.36	12.39	872.26	12.8	872	15.95	870	18.64	868.18
18.9	868	20.26	867.1	21.98	866	23.01	865.34	25.21	864
26.46	863.29	28.39	862	31.62	860.1	31.78	860	31.93	859.91
35.23	858	37.03	856.79	38.35	856	39.5	853.58	40.24	852.43
40.95	853.34	41.65	854	45.4	853.12	48.03	852.49	48.33	852.67
49.12	853.16	49.75	854	51.55	853.86	51.6	853.56	51.71	853.85
57	853.82	58.71	853.81	58.87	853.59	59.86	853.81	63.24	853.86
69.44	854	76.99	852.09	77.39	852	81.16	850.11	81.4	850
83.81	849.92	86.87	849.82	117.51	848.78	130.16	848.39	136.37	848.2
136.66	848.19	142.63	848.02	142.7	848.01	143.25	848	207.42	848
216.93	847.28	233.71	846	236.61	844.94	239.08	844	239.47	843.82
240.27	843.41	250.07	842.67	250.72	842.62	250.91	842.69	256.2	844
259.59	845.69	260.14	846	262.74	847.46	263.45	848	263.9	848.31
267.69	850	270.8	851.02	273.88	852	274.78	852.33	278.49	853.69
279.94	854	280.85	854.6	281.79	855.18	283.19	856	285.11	857.24
285.84	857.7	286.28	858	286.53	858.18	289.24	860		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	233.71	.03	259.59	.1

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
233.71 259.59 73.07 75.65 77.19 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
107.731	172.984	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	847.14	Reach Len. (ft)	73.07	75.65	77.19
Crit W.S. (ft)		Flow Area (sq ft)	8.58	87.43	1.88
E.G. Slope (ft/ft)	0.002687	Area (sq ft)	8.58	87.43	1.88

Q Total (cfs)	505.70	Flow (cfs)	12.99	491.64	1.07
Top Width (ft)	43.47	Top Width (ft)	15.00	25.88	2.59
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)	1.51	5.62	0.57
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)	0.57	3.38	0.73
Conv. Total (cfs)	9755.0	Conv. (cfs)	250.5	9483.9	20.6
Length Wtd. (ft)	75.59	Wetted Per. (ft)	15.04	26.98	2.97
Min Ch El (ft)	842.62	Shear (lb/sq ft)	0.10	0.54	0.11
Alpha	1.15	Stream Power (lb/ft s)	289.24	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.04	1.49	3.14
C & E Loss (ft)	0.07	Cum SA (acres)	0.15	0.52	1.61

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: Dotson Run
REACH: Upper RS: 2193.833

INPUT
Description:
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	.96	879.31	2.65	878	3.79	877.2	5.33	876
7.74	874.21	8.01	874	8.26	873.79	9.32	872.99	10.73	872
11.24	871.41	12.53	870	13.6	868.79	14.28	868	15.46	866.67
16.73	865.18	17.84	864	18.18	863.7	19.69	862	21.8	860.19
22.12	860	23.89	858.49	24.52	858	26.52	856.29	26.88	856
27.95	855.36	29.84	854	32.97	852.76	34.8	852	37.45	850.93
38.14	850.56	38.73	850.39	39.48	850.16	39.73	850.07	39.8	850.03
39.84	849.98	39.84	850	39.85	849.93	40.89	849.74	41.96	850
42.06	850	42.77	850.16	45.14	850.63	48.25	851.89	48.53	852
48.6	851.99	56.94	851.7	66.68	852.06	68.61	852	69.86	851.54
74.83	850	105.59	848.9	125.04	848.24	132.09	848	133.25	847.98
133.64	847.98	136.93	847.94	138.55	847.92	139.52	847.91	140.5	847.92
148.4	847.99	149.64	847.96	166.22	847.95	167.27	847.96	168.89	847.91
169.97	847.91	171.62	847.86	196.87	846.67	199.2	846.52	203.14	846.27
203.49	846.27	207.26	846	212.23	845.52	213.8	845.37	213.88	845.35
214.75	845.15	219.68	844	220.66	841.17	220.82	840.67	220.86	840.55
223.48	840.64	224.76	840.67	226.76	840.74	229.98	840.81	230.01	840.81
230.08	840.81	233.72	842.52	234.86	843.05	235.38	843.29	235.66	843.43
236.21	843.71	236.74	844	237.01	844.21	238.98	846	240.25	846.97
241.54	848	251.83	849.96	252.07	850	254.49	850	259.56	850.38
273.11	851.4	274.49	852	278.65	854	282.71	856	286.81	858
290.89	860	301.81	860						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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**********************************************
       0    .035  207.26     .03  238.98      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        207.26  238.98             13.66   40.54  101.71             .1       .3
Blocked Obstructions     num=        1
   Sta L    Sta R    Elev
************************
 109.211 171.366     865
```

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.035	0.030	0.100
W.S. Elev (ft)	847.19	Reach Len. (ft)	13.66	40.54	101.71
Crit W.S. (ft)		Flow Area (sq ft)	11.74	127.33	0.93
E.G. Slope (ft/ft)	0.001134	Area (sq ft)	11.74	127.33	0.93
Q Total (cfs)	505.70	Flow (cfs)	11.20	494.21	0.28
Top Width (ft)	54.74	Top Width (ft)	21.47	31.72	1.55
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	0.95	3.88	0.30
Max Chl Dpth (ft)	6.64	Hydr. Depth (ft)	0.55	4.01	0.60
Conv. Total (cfs)	15017.3	Conv. (cfs)	332.7	14676.2	8.4
Length Wtd. (ft)	40.26	Wetted Per. (ft)	21.51	35.87	1.95
Min Ch El (ft)	840.55	Shear (lb/sq ft)	0.04	0.25	0.03
Alpha	1.13	Stream Power (lb/ft s)	301.81	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02	1.31	3.14
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	0.47	1.60

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2151.343

INPUT
Description:
Station Elevation Data num= 136

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.98	878	6.13	876.03	6.17	876	6.29	875.93
9.47	874	11.44	872.52	12.11	872	12.65	871.35	13.77	870
14.65	868.93	15.42	868	16.5	866.69	17.46	865.53	18.69	864
19.47	863.17	20.51	862	21.67	861	22.75	860	23.82	859
24.99	858	26.24	856.82	27.2	856	28.48	854.83	29.34	854
32.05	852.92	34.47	852	37.17	851.02	39	850.34	39.72	850.06
39.82	849.92	39.83	850	39.87	849.78	41.86	849.41	42.13	849.32
42.28	849.27	42.78	849.11	43.88	849.36	44.47	849.73	45.06	850
46.41	850.12	46.91	850.14	50.72	850.98	51.64	851.3	52.3	852
56.07	851.52	58.47	851.24	58.9	851.2	59.45	851.18	60.26	851.2
61.24	851.3	67.44	852	67.95	851.18	72.95	850.27	74.79	850
75.62	849.95	90.36	849.07	93.1	849.03	120.88	848	139.59	848

140.42	848.02	140.77	848	146.69	847.7	146.81	847.7	148.43	847.64
148.64	847.63	148.99	847.61	150.1	847.57	151.01	847.51	151.2	847.49
158.79	847.45	173.96	846.85	174.92	846.82	192.39	846	193.92	845.46
194.18	845.38	194.55	845.26	195.1	845.08	195.92	844.81	197.19	844.4
197.4	844.33	198.45	844.21	198.86	844.17	199.24	844.14	199.49	844.12
200.25	844	204.13	840.57	213.18	840.09	213.46	840.5	214.28	842
217.36	843.27	218.3	843.62	219.13	844	221.78	845.92	221.99	846.05
222.3	846.27	222.38	846	222.63	846.39	222.69	846.43	222.84	846.46
223.62	846.6	231.44	848	244.97	848.72	249.45	848.96	250.31	850
254.42	852	258.39	854	260.23	854.34	270.53	854.56	280.82	854.22
281.55	854	285.74	852	286.6	851.86	290.45	852	298.12	854
304.93	856	312.04	858	313.81	858.31	314.77	858.46	317	858.78
319.94	859.2	321.46	859.46	325.19	860	325.91	860.12	327.12	860.28
330.37	860.83	332.6	861.14	338.18	862	343.1	863.36	345.01	864
346.94	865.27	348.17	866	349.47	866.8	351.28	868	353.05	868.99
355.03	870								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	192.39	.03	221.78	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.39	221.78	15.11	62.46	31.51	.1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
165.206	189.27	865	315.303	323.621	865

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	847.16	Reach Len. (ft)	15.11	62.46	31.51
Crit W.S. (ft)		Flow Area (sq ft)	3.38	132.02	2.38
E.G. Slope (ft/ft)	0.000926	Area (sq ft)	3.38	132.02	2.38
Q Total (cfs)	505.70	Flow (cfs)	3.82	500.13	1.75
Top Width (ft)	37.46	Top Width (ft)	3.12	29.39	4.95
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)	1.13	3.79	0.74
Max Chl Dpth (ft)	7.07	Hydr. Depth (ft)	1.08	4.49	0.48
Conv. Total (cfs)	16622.5	Conv. (cfs)	125.6	16439.3	57.7
Length Wtd. (ft)	61.81	Wetted Per. (ft)	4.13	33.12	5.55
Min Ch El (ft)	840.09	Shear (lb/sq ft)	0.05	0.23	0.02
Alpha	1.05	Stream Power (lb/ft s)	355.03	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.02	1.19	3.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	0.44	1.60

CROSS SECTION

RIVER: Dotson Run

REACH: Upper RS: 2088.858

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	2.83	878.16	3.08	878	5.81	876.22	6.15	876
6.62	875.72	9.31	874	9.76	873.59	11.38	872	12.39	870.91
13.34	870	15.3	868.07	15.45	867.92	17.37	866	19.09	864.27
19.37	864	21.35	862.09	21.44	862	21.68	861.77	25.21	858.31
25.53	858	25.94	857.61	27.58	856	29.14	854.47	29.62	854
30.58	853.37	33.26	852	36.37	851.08	39.95	850	40.31	849.37
40.48	849.17	40.58	849.14	43.71	848.17	47.53	848.99	48.77	849.22
49.52	849.37	51.13	849.95	51.26	850	51.3	850	56.09	850.47
57.06	850.96	58.98	850.98	62.88	850.98	65.11	850.96	69.51	850.8
71.38	850.78	73.12	850.25	76.65	849.95	77.22	850	94.27	848.74
104.74	848	120.36	847.88	126.07	847.83	129.76	847.81	132.43	847.72
132.74	847.7	140.2	847.42	145.63	847.55	149.1	847.66	151.54	847.58
154.51	847.48	157.14	847.42	159.38	847.19	161.31	846.95	169.55	846
174.79	845.55	175.25	845.5	175.69	845.32	179.16	844	181.88	839.61
181.92	839.54	187.56	839.54	188.6	840.06	189.95	840.78	190.5	840.98
192.8	842	197.45	843.35	199.54	844	202.02	844.59	204.69	845.2
205.05	845.28	205.37	845.47	205.44	845.52	205.54	845.58	205.64	845.64
205.75	845.7	205.8	846	205.85	845.75	207.93	846.19	208.09	846.2
208.3	846.2	208.54	846.2	208.8	846.2	223.15	848	227.79	850
231.92	852	232.88	852.38	248.84	853.06	263.4	852.59	264.92	852
267.36	850.94	278.82	852	283.05	852.45	296.75	854	299.18	854.41
308.41	856	315.47	857.18	320.33	858	325.42	858.76	334.82	860
340.4	860.49	341.5	860.59	345.67	860.88	348.3	861.06	349.17	861.1
350.26	861.16	360.81	862						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	169.55	.03	205.37	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
169.55	205.37	32.84	69.71	47.03	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
144.3	163.344	865	309.043	336.842	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	847.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	847.15	Reach Len. (ft)	32.84	69.71	47.03
Crit W.S. (ft)		Flow Area (sq ft)	4.89	150.58	7.55
E.G. Slope (ft/ft)	0.000742	Area (sq ft)	4.89	150.58	7.55
Q Total (cfs)	505.70	Flow (cfs)	4.59	494.55	6.56

* Top Width (ft)	*	52.99	* Top Width (ft)	*	6.21	*	35.82	*	10.97	*
* Vel Total (ft/s)	*	3.10	* Avg. Vel. (ft/s)	*	0.94	*	3.28	*	0.87	*
* Max Chl Dpth (ft)	*	7.61	* Hydr. Depth (ft)	*	0.79	*	4.20	*	0.69	*
* Conv. Total (cfs)	*	18565.4	* Conv. (cfs)	*	168.6	*	18155.9	*	240.8	*
* Length Wtd. (ft)	*	68.60	* Wetted Per. (ft)	*	6.68	*	39.65	*	11.60	*
* Min Ch El (ft)	*	839.54	* Shear (lb/sq ft)	*	0.03	*	0.18	*	0.03	*
* Alpha	*	1.10	* Stream Power (lb/ft s)	*	360.81	*	0.00	*	0.00	*
* Frctn Loss (ft)	*	0.04	* Cum Volume (acre-ft)	*	0.02	*	0.98	*	3.13	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.11	*	0.39	*	1.59	*

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 2019.079

INPUT
Description:
Station Elevation Data num= 120

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	3.19	878	4.73	877.08	6.47	876	7.95	875.06
9.49	874	12.03	872.16	12.25	872	13.62	871	14.96	870
15.46	869.61	17.58	868	19.24	866.67	20.11	866	21.8	864.54
22.45	864	24.43	862.17	24.61	862	26.7	860.08	26.78	860
28.31	858.59	28.95	858	28.98	857.97	31.11	856	31.29	855.84
33.28	854	33.75	853.59	35.44	852	40.66	850.24	41.22	850
46.1	848.17	46.96	847.83	47.02	847.81	48.12	847.52	51.67	847.46
51.74	847.45	51.84	846.84	57.38	847.73	59.47	848.09	59.98	848.18
62.96	848.84	66.46	849.61	68.28	850	87.86	850	91.25	849.64
92.19	849.58	100.48	848.64	114.19	848.21	119.21	848	121.69	847.89
122.47	847.87	122.59	847.84	129.22	846.83	135.19	846.43	141.56	846
148.12	846	152.29	845.8	155.48	845.64	157.15	844.33	157.4	844.14
157.46	844.09	157.49	844.06	157.5	844.05	157.51	844.04	157.52	844
157.68	843.95	163.46	842	166.92	841.09	167.96	840.76	168.12	840.71
168.44	840.54	169.45	840.02	175.42	840	177.3	839.97	179.85	839.92
180.2	840.37	180.73	841.04	181.71	842	184.16	843.42	186.57	844.72
186.58	844	186.74	844.76	186.96	844.82	187.08	844.85	190.89	845.01
201.01	845.43	202.22	845.48	203.14	846	208.38	848	213.68	850
215.62	850.3	233.96	851.65	251.89	850.72	255.04	850	256.24	849.44
262.8	850	284.93	851.94	285.34	851.98	285.7	852	289.23	852.29
310.22	854	314.98	854.42	327.32	855.64	330.39	855.93	330.97	856
331.23	856.03	331.3	856.04	331.48	856.06	332.21	856.15	340.56	857.14
347.46	858	365.87	859.3	375.94	860	388.84	861.01	396.95	861.64
401.1	862	403.75	862	407.65	862.38	408.87	862.51	409.68	862.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	155.48	.03	186.57	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        155.48  186.57           139.23    74.9   44.83             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  153.05     855       T
     198  409.68     855       T
Blocked Obstructions     num=       1
   Sta L   Sta R    Elev
************************
   361.7 401.511     870

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         *  847.26  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.            *   0.035  *   0.030  *   0.035  *
* W.S. Elev (ft)         *  847.15  * Reach Len. (ft)       *  139.23  *   74.90  *   44.83  *
* Crit W.S. (ft)         *  843.41  * Flow Area (sq ft)     *    3.51  *  169.27  *   23.84  *
* E.G. Slope (ft/ft)     *0.000373  * Area (sq ft)          *   26.87  *  169.27  *   34.24  *
* Q Total (cfs)          *  505.70  * Flow (cfs)            *    3.67  *  472.39  *   29.63  *
* Top Width (ft)         *   80.94  * Top Width (ft)        *   30.28  *   31.09  *   19.57  *
* Vel Total (ft/s)       *    2.57  * Avg. Vel. (ft/s)      *    1.05  *    2.79  *    1.24  *
* Max Chl Dpth (ft)      *    7.23  * Hydr. Depth (ft)      *    1.44  *    5.44  *    2.09  *
* Conv. Total (cfs)      * 26171.3  * Conv. (cfs)           *   190.2  * 24447.6  *  1533.5  *
* Length Wtd. (ft)       *   74.90  * Wetted Per. (ft)      *    2.43  *   34.00  *   12.78  *
* Min Ch El (ft)         *  839.92  * Shear (lb/sq ft)      *    0.03  *    0.12  *    0.04  *
* Alpha                  *    1.11  * Stream Power (lb/ft s) *  409.68  *    0.00  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)  *    0.00  *    0.73  *    3.11  *
* C & E Loss (ft)        *          * Cum SA (acres)        *    0.10  *    0.34  *    1.57  *
*********************************************************************************************

CULVERT


RIVER: Dotson Run
REACH: Upper               RS: 1977.49

INPUT
Description:
Distance from Upstream XS =       27
Deck/Roadway Width        =       30
Weir Coefficient          =      2.6
Upstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
  121.69  847.89        0  175.42     849        0   262.8     850        0

Upstream Bridge Cross Section Data
Station Elevation Data    num=     120
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
       0     880    3.19     878    4.73  877.08    6.47     876    7.95  875.06
```

9.49	874	12.03	872.16	12.25	872	13.62	871	14.96	870
15.46	869.61	17.58	868	19.24	866.67	20.11	866	21.8	864.54
22.45	864	24.43	862.17	24.61	862	26.7	860.08	26.78	860
28.31	858.59	28.95	858	28.98	857.97	31.11	856	31.29	855.84
33.28	854	33.75	853.59	35.44	852	40.66	850.24	41.22	850
46.1	848.17	46.96	847.83	47.02	847.81	48.12	847.52	51.67	847.46
51.74	847.45	51.84	846.84	57.38	847.73	59.47	848.09	59.98	848.18
62.96	848.84	66.46	849.61	68.28	850	87.86	850	91.25	849.64
92.19	849.58	100.48	848.64	114.19	848.21	119.21	848	121.69	847.89
122.47	847.87	122.59	847.84	129.22	846.83	135.19	846.43	141.56	846
148.12	846	152.29	845.8	155.48	845.64	157.15	844.33	157.4	844.14
157.46	844.09	157.49	844.06	157.5	844.05	157.51	844.04	157.52	844
157.68	843.95	163.46	842	166.92	841.09	167.96	840.76	168.12	840.71
168.44	840.54	169.45	840.02	175.42	840	177.3	839.97	179.85	839.92
180.2	840.37	180.73	841.04	181.71	842	184.16	843.42	186.57	844.72
186.58	844	186.74	844.76	186.96	844.82	187.08	844.85	190.89	845.01
201.01	845.43	202.22	845.48	203.14	846	208.38	848	213.68	850
215.62	850.3	233.96	851.65	251.89	850.72	255.04	850	256.24	849.44
262.8	850	284.93	851.94	285.34	851.98	285.7	852	289.23	852.29
310.22	854	314.98	854.42	327.32	855.64	330.39	855.93	330.97	856
331.23	856.03	331.3	856.04	331.48	856.06	332.21	856.15	340.56	857.14
347.46	858	365.87	859.3	375.94	860	388.84	861.01	396.95	861.64
401.1	862	403.75	862	407.65	862.38	408.87	862.51	409.68	862.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	155.48	.03	186.57	.035

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
155.48	186.57	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	153.05	855	T
198	409.68	855	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
361.7	401.511	870

Downstream Deck/Roadway Coordinates num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
80.88	847.76	0	132	849	0	263.47	850	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862

13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	117.19	845.98
118.89	845.93	121.54	844.84	123.62	844	124.23	843.09	125.03	842
126.81	838.22	126.88	838.44	126.88	840	126.89	838.5	137.29	838.81
137.35	838.75	137.51	838.88	138.74	839.92	139.27	840.36	140.24	842.68
142.43	844	147.34	844.65	147.78	844.71	148.2	844.74	149.03	844.8
149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08	155.06	845.18
156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54	172.84	845.78
178.29	846	192.52	846	193.1	846.03	196.43	846.12	209.8	846.59
215.12	846.8	227.61	847.34	230.54	847.44	235.22	848	243.59	848
244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39	257.36	849.34
260.09	849.66	263.47	850	268.64	850.5	281.3	851.62	282.63	851.73
283.51	851.8	284.52	851.89	286.06	852	286.83	851.76	289.02	851.29
293.04	851.72	294.55	851.98	296.13	852.18	308.02	854	311.02	854
314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72	320.59	854.94
323.89	855.28	328.04	855.84	330.54	856	331.73	856.08	333.65	856.19
334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35	350.41	858
351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65	370.33	859.95
378.74	861.6	382.38	862.13	392.13	864	393.43	864.24	394.87	864.54
401.82	866	401.96	866.03						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.

116.12	147.34	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	850	T
141.38	401.96	850	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

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

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	8	6

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 3 - Wingwall flared 0 deg. (sides extended straight)
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	16.5	50	.011	.03	1.5	.2	1

Number of Barrels = 2
Upstream Elevation = 839.2
Centerline Stations

Sta.	Sta.
172.05	179

Downstream Elevation = 838.4
Centerline Stations

Sta.	Sta.
129.86	137.4

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	505.70	Culv Full Len (ft)			
# Barrels	2	Culv Vel US (ft/s)	7.74		
Q Barrel (cfs)	252.85	Culv Vel DS (ft/s)	6.66		
E.G. US. (ft)	847.26	Culv Inv El Up (ft)	839.20		
W.S. US. (ft)	847.15	Culv Inv El Dn (ft)	838.40		
E.G. DS (ft)	846.50	Culv Frctn Ls (ft)	0.16		
W.S. DS (ft)	846.23	Culv Exit Loss (ft)	0.41		
Delta EG (ft)	0.76	Culv Entr Loss (ft)	0.19		
Delta WS (ft)	0.92	Q Weir (cfs)			
E.G. IC (ft)	847.16	Weir Sta Lft (ft)			
E.G. OC (ft)	847.26	Weir Sta Rgt (ft)			
Culvert Control	Outlet	Weir Submerg			
Culv WS Inlet (ft)	846.15	Weir Max Depth (ft)			
Culv WS Outlet (ft)	846.23	Weir Avg Depth (ft)			
Culv Nml Depth (ft)	4.94	Weir Flow Area (sq ft)			
Culv Crt Depth (ft)	5.31	Min El Weir Flow (ft)	848.76		

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1943.117

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66

9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	117.19	845.98
118.89	845.93	121.54	844.84	123.62	844	124.23	843.09	125.03	842
126.81	838.22	126.88	838.44	126.88	840	126.89	838.5	137.29	838.81
137.35	838.75	137.51	838.88	138.74	839.92	139.27	840.36	140.24	842.68
142.43	844	147.34	844.65	147.78	844.71	148.2	844.74	149.03	844.8
149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08	155.06	845.18
156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54	172.84	845.78
178.29	846	192.52	846	193.1	846.03	196.43	846.12	209.8	846.59
215.12	846.8	227.61	847.34	230.54	847.44	235.22	848	243.59	848
244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39	257.36	849.34
260.09	849.66	263.47	850	268.64	850.5	281.3	851.62	282.63	851.73
283.51	851.8	284.52	851.89	286.06	852	286.83	851.76	289.02	851.29
293.04	851.72	294.55	851.98	296.13	852.18	308.02	854	311.02	854
314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72	320.59	854.94
323.89	855.28	328.04	855.84	330.54	856	331.73	856.08	333.65	856.19
334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35	350.41	858
351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65	370.33	859.95
378.74	861.6	382.38	862.13	392.13	864	393.43	864.24	394.87	864.54
401.82	866	401.96	866.03						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

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

Left	Right	Left	Channel	Right	Coeff	Contr.	Expan.
116.12	147.34	42.64	28.07	46.4		.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	850	T
141.38	401.96	850	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	846.50	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.28	Wt. n-Val.		0.030		
W.S. Elev (ft)	846.23	Reach Len. (ft)	42.64	28.07	46.40	
Crit W.S. (ft)	842.37	Flow Area (sq ft)		119.73		

E.G. Slope (ft/ft)	*0.001086	Area (sq ft)	8.02	134.98	29.62	
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	105.25	Top Width (ft)	21.94	31.22	52.09	
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)		4.22		
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)		6.10		
Conv. Total (cfs)	15345.3	Conv. (cfs)		15345.3		
Length Wtd. (ft)	28.07	Wetted Per. (ft)		28.76		
Min Ch El (ft)	838.22	Shear (lb/sq ft)		0.28		
Alpha	1.00	Stream Power (lb/ft s)	401.96	0.00	0.00	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	0.59	3.11	
C & E Loss (ft)		Cum SA (acres)	0.01	0.28	1.54	

CULVERT

RIVER: Dotson Run
REACH: Upper RS: 1929.28

INPUT
Description:
Distance from Upstream XS = 8.7
Deck/Roadway Width = 8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
107.17	845.95	178.29	846
0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.68	868	4.07	867.74	6.48	866	6.98	865.66
9.27	864	9.45	863.87	10.88	862.83	11.5	862.36	11.96	862
13.22	861.03	14.55	860	15.17	859.51	17.13	858	19.89	856.16
20.13	856	20.39	855.9	20.53	855.83	21.05	855.57	23.94	854
25.14	853.4	27.75	852	28.85	851.68	29.57	851.53	32.99	850.74
34.83	850.28	36.18	850	42.96	848.76	46.64	848	47.54	847.38
48.23	846.82	49.47	846.24	50.51	845.77	53.52	844.97	56.7	846.09
57.57	846.64	57.69	846.71	63.9	847.16	69.34	847.44	72.35	847.63
73.54	847.69	74.28	847.73	74.83	847.75	75.48	847.77	76.01	847.79
78.33	847.85	78.63	847.84	80.88	847.76	88.78	847.09	89.35	847.05
92.45	846.8	93.9	846.69	94.57	846.64	94.87	846.62	96.65	846.47
107.17	845.95	115.23	846	116.12	846	116.35	846	117.19	845.98
118.89	845.93	121.54	844.84	123.62	844	124.23	843.09	125.03	842
126.81	838.22	126.88	838.44	126.88	840	126.89	838.5	137.29	838.81
137.35	838.75	137.51	838.88	138.74	839.92	139.27	840.36	140.24	842.68
142.43	844	147.34	844.65	147.78	844.71	148.2	844.74	149.03	844.8
149.51	844.85	150.27	844.95	152.51	844.97	153.87	845.08	155.06	845.18
156.05	845.27	158.96	845.31	165.01	845.39	167.05	845.54	172.84	845.78

178.29	846	192.52	846	193.1	846.03	196.43	846.12	209.8	846.59
215.12	846.8	227.61	847.34	230.54	847.44	235.22	848	243.59	848
244.5	848.05	247.15	848.15	248.93	848.25	251.06	848.39	257.36	849.34
260.09	849.66	263.47	850	268.64	850.5	281.3	851.62	282.63	851.73
283.51	851.8	284.52	851.89	286.06	852	286.83	851.76	289.02	851.29
293.04	851.72	294.55	851.98	296.13	852.18	308.02	854	311.02	854
314.56	853.87	315.47	853.83	316.99	853.77	318.6	854.72	320.59	854.94
323.89	855.28	328.04	855.84	330.54	856	331.73	856.08	333.65	856.19
334.67	856.27	335.47	856.37	341.76	857.05	344.5	857.35	350.41	858
351.53	858.1	353.64	858.29	366.88	859.52	368.42	859.65	370.33	859.95
378.74	861.6	382.38	862.13	392.13	864	393.43	864.24	394.87	864.54
401.82	866	401.96	866.03						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	116.12	.03	147.34	.035

Bank Sta: Left Right Coeff Contr. Expan.

116.12	147.34	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	121.76	850	T
141.38	401.96	850	T

Blocked Obstructions num= 1

Sta L	Sta R	Elev
359.43	401.972	870

Downstream Deck/Roadway Coordinates

num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
99.07	846	0	160.33	846	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	4.33	857.12	6.34	856	10.88	854.07
11.05	854	11.72	853.79	14.23	853.05	17.72	852	17.84	851.96
18.29	851.71	20.68	850	23.07	848.55	24.07	848.44	25.61	848.36
27.89	848.22	30.77	848	31.15	847.94	31.4	847.88	36.21	846.9
40.16	845.81	41.72	845.84	42.82	846	47.38	845.46	48.73	845.32
49.07	845.46	49.87	845.68	50.55	845.84	51.09	846	53.54	845.97
59.84	845.88	63.96	845.82	64.34	845.82	64.52	845.82	65.51	845.81
65.78	845.81	72.86	846.02	73.6	846.02	76.93	845.95	80.7	845.86
81.88	845.86	82.39	845.86	82.82	845.86	83.18	845.87	83.46	845.87
84.3	845.88	92.57	845.95	97.31	845.99	99.07	846	99.87	844.7
100.07	844.49	100.42	844.39	100.78	844.29	103.17	843.65	103.89	843.78
104.25	843.86	104.73	844	104.93	843.74	106.07	842	106.87	838.56
106.94	838.45	118.38	838.54	118.53	840	119.53	840.69	119.96	841.98

119.98	842.05	120.06	842.17	120.2	842.35	120.39	842.59	120.96	843.28
121.02	843.36	121.12	843.24	121.17	842	121.21	843.15	122.41	843.76
122.65	843.83	122.77	843.88	122.88	843.93	123.46	844	123.66	844.37
124.03	844.58	124.14	844.61	124.83	845.3	126	845.08	127.24	845.6
127.32	845.62	130.04	845.51	130.19	845.53	132.02	845.69	132.76	845.73
138.87	845.65	139.26	845.68	146.86	845.67	147.42	845.67	157.94	845.77
160.33	846	176.12	846	180.44	846.02	192.63	846.06	197.45	846.15
203.15	846.24	206.97	846.38	209.3	846.51	224.6	847.41	234.95	848
236.16	848.05	237.79	848.21	247.29	848.91	261.26	850	263.21	850.09
284.62	851.72	285.01	852	285.42	851.83	291.59	852.68	295.6	853.17
296.6	853.27	302.89	854	313.59	855.36	317.83	856	332.38	857.67
334.32	857.89	334.71	857.93	334.89	857.95	335.26	858	335.3	858
349.67	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.07	.03	127.24	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
99.07	127.24	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	850	T
121.67	349.67	850	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 Culverts = 2

Culvert Name	Shape	Rise	Span
Culvert #1	Ellipse	5.1	6.7

FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	3.2	20.4	.024	.024	0	.4	1

Upstream Elevation = 838.6
Centerline Station = 129.11
Downstream Elevation = 838.3
Centerline Station = 110.88

Culvert Name	Shape	Rise	Span
Culvert #2	Ellipse	6.7	5.1

FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 3 - Grooved end projecting

Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	3.2	20.4	.024	.024	0	.4	1

Upstream Elevation = 838.5
Centerline Station = 134.83
Downstream Elevation = 838.1
Centerline Station = 117.12

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	244.15	Culv Full Len (ft)	20.40	
# Barrels	1	Culv Vel US (ft/s)	9.10	
Q Barrel (cfs)	244.15	Culv Vel DS (ft/s)	9.10	
E.G. US. (ft)	846.51	Culv Inv El Up (ft)	838.60	
W.S. US. (ft)	846.23	Culv Inv El Dn (ft)	838.30	
E.G. DS (ft)	845.03	Culv Frctn Ls (ft)	0.28	
W.S. DS (ft)	844.43	Culv Exit Loss (ft)	0.69	
Delta EG (ft)	1.48	Culv Entr Loss (ft)	0.51	
Delta WS (ft)	1.80	Q Weir (cfs)	20.50	
E.G. IC (ft)	844.71	Weir Sta Lft (ft)	121.76	
E.G. OC (ft)	846.50	Weir Sta Rgt (ft)	141.38	
Culvert Control	Outlet	Weir Submerg	0.00	
Culv WS Inlet (ft)	843.70	Weir Max Depth (ft)	0.55	
Culv WS Outlet (ft)	843.40	Weir Avg Depth (ft)	0.54	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	10.68	
Culv Crt Depth (ft)	3.89	Min El Weir Flow (ft)	846.01	

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #2

Q Culv Group (cfs)	241.05	Culv Full Len (ft)		
# Barrels	1	Culv Vel US (ft/s)	9.39	
Q Barrel (cfs)	241.05	Culv Vel DS (ft/s)	9.18	
E.G. US. (ft)	846.51	Culv Inv El Up (ft)	838.50	
W.S. US. (ft)	846.23	Culv Inv El Dn (ft)	838.10	
E.G. DS (ft)	845.03	Culv Frctn Ls (ft)	0.24	
W.S. DS (ft)	844.43	Culv Exit Loss (ft)	0.71	
Delta EG (ft)	1.48	Culv Entr Loss (ft)	0.55	
Delta WS (ft)	1.80	Q Weir (cfs)	20.50	
E.G. IC (ft)	845.73	Weir Sta Lft (ft)	121.76	
E.G. OC (ft)	846.52	Weir Sta Rgt (ft)	141.38	
Culvert Control	Outlet	Weir Submerg	0.00	
Culv WS Inlet (ft)	844.60	Weir Max Depth (ft)	0.55	
Culv WS Outlet (ft)	844.43	Weir Avg Depth (ft)	0.54	
Culv Nml Depth (ft)	4.63	Weir Flow Area (sq ft)	10.68	
Culv Crt Depth (ft)	4.74	Min El Weir Flow (ft)	846.01	

CROSS SECTION

RIVER: Dotson Run

REACH: Upper RS: 1915.038

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.14	858	4.33	857.12	6.34	856	10.88	854.07
11.05	854	11.72	853.79	14.23	853.05	17.72	852	17.84	851.96
18.29	851.71	20.68	850	23.07	848.55	24.07	848.44	25.61	848.36
27.89	848.22	30.77	848	31.15	847.94	31.4	847.88	36.21	846.9
40.16	845.81	41.72	845.84	42.82	846	47.38	845.46	48.73	845.32
49.07	845.46	49.87	845.68	50.55	845.84	51.09	846	53.54	845.97
59.84	845.88	63.96	845.82	64.34	845.82	64.52	845.82	65.51	845.81
65.78	845.81	72.86	846.02	73.6	846.02	76.93	845.95	80.7	845.86
81.88	845.86	82.39	845.86	82.82	845.86	83.18	845.87	83.46	845.87
84.3	845.88	92.57	845.95	97.31	845.99	99.07	846	99.87	844.7
100.07	844.49	100.42	844.39	100.78	844.29	103.17	843.65	103.89	843.78
104.25	843.86	104.73	844	104.93	843.74	106.07	842	106.87	838.56
106.94	838.45	118.38	838.54	118.53	840	119.53	840.69	119.96	841.98
119.98	842.05	120.06	842.17	120.2	842.35	120.39	842.59	120.96	843.28
121.02	843.36	121.12	843.24	121.17	842	121.21	843.15	122.41	843.76
122.65	843.83	122.77	843.88	122.88	843.93	123.46	844	123.66	844.37
124.03	844.58	124.14	844.61	124.83	845.3	126	845.08	127.24	845.6
127.32	845.62	130.04	845.51	130.19	845.53	132.02	845.69	132.76	845.73
138.87	845.65	139.26	845.68	146.86	845.67	147.42	845.67	157.94	845.77
160.33	846	176.12	846	180.44	846.02	192.63	846.06	197.45	846.15
203.15	846.24	206.97	846.38	209.3	846.51	224.6	847.41	234.95	848
236.16	848.05	237.79	848.21	247.29	848.91	261.26	850	263.21	850.09
284.62	851.72	285.01	852	285.42	851.83	291.59	852.68	295.6	853.17
296.6	853.27	302.89	854	313.59	855.36	317.83	856	332.38	857.67
334.32	857.89	334.71	857.93	334.89	857.95	335.26	858	335.3	858
349.67	860								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.07	.03	127.24	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
99.07 127.24 51.87 36.65 46.43 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.53	850	T
121.67	349.67	850	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	845.03	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.60	Wt. n-Val.		0.030		
W.S. Elev (ft)	844.43	Reach Len. (ft)	51.87	36.65	46.43	
Crit W.S. (ft)		Flow Area (sq ft)		81.55		

* E.G. Slope (ft/ft)	*0.003230	*	Area (sq ft)	*		*	85.69	*		*	
* Q Total (cfs)	* 505.70	*	Flow (cfs)	*		*	505.70	*		*	
* Top Width (ft)	* 23.49	*	Top Width (ft)	*		*	23.49	*		*	
* Vel Total (ft/s)	* 6.20	*	Avg. Vel. (ft/s)	*		*	6.20	*		*	
* Max Chl Dpth (ft)	* 5.98	*	Hydr. Depth (ft)	*		*	5.05	*		*	
* Conv. Total (cfs)	* 8898.4	*	Conv. (cfs)	*		*	8898.4	*		*	
* Length Wtd. (ft)	* 36.65	*	Wetted Per. (ft)	*		*	24.94	*		*	
* Min Ch El (ft)	* 838.45	*	Shear (lb/sq ft)	*		*	0.66	*		*	
* Alpha	* 1.00	*	Stream Power (lb/ft s)	*	349.67	*	0.00	*	0.00	*	
* Frctn Loss (ft)	* 0.14	*	Cum Volume (acre-ft)	*	0.00	*	0.54	*	3.11	*	
* C & E Loss (ft)	* 0.00	*	Cum SA (acres)	*	0.00	*	0.27	*	1.51	*	

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1878.276

INPUT
Description:
Station Elevation Data num= 115

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.11	858	4.95	856.68	5.89	856	9.3	854.39
10.2	854	11.69	853.38	14.94	852	16.31	851.43	19.65	850
25.57	848.1	25.73	848.09	25.98	848	29.04	848	31.77	847.74
36.3	847.63	38.27	847.46	39.8	847.42	42.31	847.41	42.95	847.33
43.66	847.26	47.92	847.27	49.11	847.21	54.05	847.24	55.2	847.21
56.56	847.17	57.15	847.15	61.24	847.22	63.55	847.24	64.56	847.26
68.9	847.35	70.34	847.3	72.45	847.09	73.51	847.08	74.42	846.99
81.73	846	82.96	845.83	83.2	845.79	85.71	845.4	87.28	845.03
89.12	844.62	90.14	844.34	91.2	843.84	91.53	843.95	91.56	842.03
91.87	843.18	92.02	843.24	93.61	840.81	93.64	840	103.48	839.45
108.45	839.48	108.57	839.37	108.63	839.32	109.75	841.79	109.78	842
109.84	842.54	110.39	844.27	112.58	844.66	114.63	845.11	115.33	845.28
115.97	845.5	119.22	845.78	119.56	845.86	119.71	845.9	122.93	845.85
123.19	845.87	123.33	845.88	126.78	845.77	127.26	845.8	130.17	845.71
133.36	845.7	135.87	845.78	136.29	845.81	136.37	845.81	142.18	845.9
142.28	845.91	153.25	845.98	153.46	846	154.92	846	165.37	846.17
166.07	846.16	174.43	846.47	176.45	846.47	185.48	846.91	199.44	846.92
206.73	847.11	211.37	847.17	214.75	847.28	216.46	847.34	225.68	847.65
235.89	848	238.73	848.21	239.83	848.22	241.05	848.24	248.43	848.65
250.9	848.71	253.31	848.82	257.07	849.01	265.19	849.44	268.26	849.64
274.18	850	275.43	850	278.91	850.23	282.86	850.4	290.09	850.86
299.01	851.41	307.65	852	323.98	853.7	326.97	854	330.84	854.65
338.48	856	340.6	856.34	345.81	857.22	350.39	858	358.66	860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	82.96	.03	119.22	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         82.96  119.22           393.44  390.79  364.49          .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    87.9     850       T
  111.31  358.66     850       T

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)         *  844.88  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.65  * Wt. n-Val.             *          *    0.030  *          *
* W.S. Elev (ft)         *  844.24  * Reach Len. (ft)        *  393.44  *  390.79  *  364.49  *
* Crit W.S. (ft)         *  842.83  * Flow Area (sq ft)      *          *   78.38  *          *
* E.G. Slope (ft/ft)     *0.004420  * Area (sq ft)           *          *   78.38  *          *
* Q Total (cfs)          *  505.70  * Flow (cfs)             *          *  505.70  *          *
* Top Width (ft)         *   20.02  * Top Width (ft)         *          *   20.02  *          *
* Vel Total (ft/s)       *    6.45  * Avg. Vel. (ft/s)       *          *    6.45  *          *
* Max Chl Dpth (ft)      *    4.92  * Hydr. Depth (ft)       *          *    3.91  *          *
* Conv. Total (cfs)      *  7606.3  * Conv. (cfs)            *          *  7606.3  *          *
* Length Wtd. (ft)       *  390.79  * Wetted Per. (ft)       *          *   28.58  *          *
* Min Ch El (ft)         *  839.32  * Shear (lb/sq ft)       *          *    0.76  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *  358.66  *    0.00  *    0.00  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)   *    0.00  *    0.47  *    3.11  *
* C & E Loss (ft)        *          * Cum SA (acres)         *    0.00  *    0.25  *    1.51  *
*************************************************************************************************

CULVERT


RIVER: Dotson Run
REACH: Upper               RS: 1683.45

INPUT
Description:
Distance from Upstream XS =     155
Deck/Roadway Width        =      98
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
       0     912        0  358.66     906        0

Upstream Bridge Cross Section Data
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0     860    3.11     858    4.95  856.68    5.89     856     9.3  854.39
    10.2     854   11.69  853.38   14.94     852   16.31  851.43   19.65     850
   25.57   848.1   25.73  848.09   25.98     848   29.04     848   31.77  847.74
    36.3  847.63   38.27  847.46    39.8  847.42   42.31  847.41   42.95  847.33
```

43.66	847.26	47.92	847.27	49.11	847.21	54.05	847.24	55.2	847.21
56.56	847.17	57.15	847.15	61.24	847.22	63.55	847.24	64.56	847.26
68.9	847.35	70.34	847.3	72.45	847.09	73.51	847.08	74.42	846.99
81.73	846	82.96	845.83	83.2	845.79	85.71	845.4	87.28	845.03
89.12	844.62	90.14	844.34	91.2	843.84	91.53	843.95	91.56	842.03
91.87	843.18	92.02	843.24	93.61	840.81	93.64	840	103.48	839.45
108.45	839.48	108.57	839.37	108.63	839.32	109.75	841.79	109.78	842
109.84	842.54	110.39	844.27	112.58	844.66	114.63	845.11	115.33	845.28
115.97	845.5	119.22	845.78	119.56	845.86	119.71	845.9	122.93	845.85
123.19	845.87	123.33	845.88	126.78	845.77	127.26	845.8	130.17	845.71
133.36	845.7	135.87	845.78	136.29	845.81	136.37	845.81	142.18	845.9
142.28	845.91	153.25	845.98	153.46	846	154.92	846	165.37	846.17
166.07	846.16	174.43	846.47	176.45	846.47	185.48	846.91	199.44	846.92
206.73	847.11	211.37	847.17	214.75	847.28	216.46	847.34	225.68	847.65
235.89	848	238.73	848.21	239.83	848.22	241.05	848.24	248.43	848.65
250.9	848.71	253.31	848.82	257.07	849.01	265.19	849.44	268.26	849.64
274.18	850	275.43	850	278.91	850.23	282.86	850.4	290.09	850.86
299.01	851.41	307.65	852	323.98	853.7	326.97	854	330.84	854.65
338.48	856	340.6	856.34	345.81	857.22	350.39	858	358.66	860

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	82.96	.03	119.22	.035

Bank Sta: Left Right Coeff Contr. Expan.

82.96 119.22 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	87.9	850	T
111.31	358.66	850	T

Downstream Deck/Roadway Coordinates

num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	912	0	217.84	908	0

Downstream Bridge Cross Section Data

Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.37	858.93	4.44	858	5.54	857.51	8.88	856
9.13	855.89	10.34	855.35	12.63	854.27	13.2	854	19.52	852.05
19.68	852	19.71	851.99	19.8	851.97	25.39	850.8	27.23	850.42
29.39	850	32.05	849.42	33.45	849.21	34.33	849.06	34.84	848.98
35.33	848.9	36.71	848.66	38.64	848.3	40.47	848	41.58	847.54
46.31	846	46.43	845.96	46.76	845.86	51.3	844.51	53.31	844
83.64	844	84.46	843.75	85.37	843.37	86.95	842.77	87.44	842.53
88.65	842	91.49	842	92.88	842	96.25	840.54	96.48	840.54
96.57	840.54	96.6	840.54	96.66	840.53	96.98	840.52	97.6	840.5
98.27	840.47	99.57	840.44	100.92	840.29	102.43	840.02	102.52	840

104.08	839.26	104.87	838.81	105.36	838.56	105.48	838.49	106.22	838
106.88	837.66	109.21	836.06	114.92	836.06	120.34	836.06	121.41	837.74
121.54	838	121.66	839.04	122.65	842	122.91	842.08	123.16	842.14
126.11	842.9	128.19	843.42	129.09	843.66	130.39	844	131.49	844.28
131.86	844.33	132.22	844.4	132.63	844.48	135.06	844.97	135.23	845.01
136.56	845.28	137.67	845.5	140.32	846	141.03	846.16	144.31	846.77
151.49	847.94	151.7	847.97	151.78	847.98	151.87	848	157.85	850
162.54	851.57	163.83	852	165.22	852.46	169.77	854	174.58	855.64
175.62	856	177.07	856.51	181.33	858	182.83	858.53	185.78	859.57
187.02	860	187.98	860.32	192.98	862	194.99	862.67	199	864
199.55	864.18	201.14	864.71	203.83	865.58	205.17	866	208.29	867
211.47	868	212.99	868.48	217.84	870				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	92.88	.03	122.65	.1

Bank Sta: Left Right Coeff Contr. Expan.
92.88 122.65 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	T
124.17	217.84	850	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 Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Box	5	6

FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	4.76	380	.011	.011	0	.4	1

Number of Barrels = 2
Upstream Elevation = 838.4
Centerline Stations

Sta.	Sta.
95.9	103.31

Downstream Elevation = 835.6
Centerline Stations

Sta.	Sta.
110.05	119.17

CULVERT OUTPUT Profile #PF 1 Culv Group: Culvert #1

Q Culv Group (cfs)	505.70	Culv Full Len (ft)	113.13
# Barrels	2	Culv Vel US (ft/s)	11.07
Q Barrel (cfs)	252.85	Culv Vel DS (ft/s)	8.43
E.G. US. (ft)	844.89	Culv Inv El Up (ft)	838.40
W.S. US. (ft)	844.24	Culv Inv El Dn (ft)	835.60
E.G. DS (ft)	841.80	Culv Frctn Ls (ft)	1.86
W.S. DS (ft)	841.14	Culv Exit Loss (ft)	0.45
Delta EG (ft)	3.09	Culv Entr Loss (ft)	0.78
Delta WS (ft)	3.10	Q Weir (cfs)	
E.G. IC (ft)	844.89	Weir Sta Lft (ft)	
E.G. OC (ft)	844.87	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	842.21	Weir Max Depth (ft)	
Culv WS Outlet (ft)	840.60	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.83	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.81	Min El Weir Flow (ft)	908.01

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION

RIVER: Dotson Run
REACH: Upper RS: 1487.336

INPUT
Description:
Station Elevation Data num= 108

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.37	858.93	4.44	858	5.54	857.51	8.88	856
9.13	855.89	10.34	855.35	12.63	854.27	13.2	854	19.52	852.05
19.68	852	19.71	851.99	19.8	851.97	25.39	850.8	27.23	850.42
29.39	850	32.05	849.42	33.45	849.21	34.33	849.06	34.84	848.98
35.33	848.9	36.71	848.66	38.64	848.3	40.47	848	41.58	847.54
46.31	846	46.43	845.96	46.76	845.86	51.3	844.51	53.31	844
83.64	844	84.46	843.75	85.37	843.37	86.95	842.77	87.44	842.53
88.65	842	91.49	842	92.88	842	96.25	840.54	96.48	840.54
96.57	840.54	96.6	840.54	96.66	840.53	96.98	840.52	97.6	840.5
98.27	840.47	99.57	840.44	100.92	840.29	102.43	840.02	102.52	840
104.08	839.26	104.87	838.81	105.36	838.56	105.48	838.49	106.22	838
106.88	837.66	109.21	836.06	114.92	836.06	120.34	836.06	121.41	837.74
121.54	838	121.66	839.04	122.65	842	122.91	842.08	123.16	842.14
126.11	842.9	128.19	843.42	129.09	843.66	130.39	844	131.49	844.28
131.86	844.33	132.22	844.4	132.63	844.48	135.06	844.97	135.23	845.01
136.56	845.28	137.67	845.5	140.32	846	141.03	846.16	144.31	846.77
151.49	847.94	151.7	847.97	151.78	847.98	151.87	848	157.85	850
162.54	851.57	163.83	852	165.22	852.46	169.77	854	174.58	855.64
175.62	856	177.07	856.51	181.33	858	182.83	858.53	185.78	859.57

187.02	860	187.98	860.32	192.98	862	194.99	862.67	199	864
199.55	864.18	201.14	864.71	203.83	865.58	205.17	866	208.29	867
211.47	868	212.99	868.48	217.84	870				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	92.88	.03	122.65	.1

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

92.88	122.65	20.42	46.43	442.24	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	105.05	850	T
124.17	217.84	850	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.80	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.65	Wt. n-Val.		0.030		
W.S. Elev (ft)	841.14	Reach Len. (ft)	20.42	46.43	442.24	
Crit W.S. (ft)		Flow Area (sq ft)		77.98		
E.G. Slope (ft/ft)	0.003099	Area (sq ft)		87.67		
Q Total (cfs)	505.70	Flow (cfs)		505.70		
Top Width (ft)	27.50	Top Width (ft)		27.50		
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)		6.48		
Max Chl Dpth (ft)	5.08	Hydr. Depth (ft)		4.50		
Conv. Total (cfs)	9084.5	Conv. (cfs)		9084.5		
Length Wtd. (ft)	197.89	Wetted Per. (ft)		21.62		
Min Ch El (ft)	836.06	Shear (lb/sq ft)		0.70		
Alpha	1.00	Stream Power (lb/ft s)	217.84	0.00	0.00	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	0.26	3.11	
C & E Loss (ft)	0.19	Cum SA (acres)	0.00	0.03	1.51	

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: Dotson Run
REACH: Upper RS: 1440.621

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	860	3.55	858.23	3.99	858	4.85	857.55	7.94	856
11.16	854.46	12.09	854	16.36	852.02	16.41	852	20.33	850.21
20.85	850	24.39	848.41	25.46	848	28.22	846.74	28.71	846.53
30.17	846.01	30.2	846	32.26	845.54	33.45	845.2	35.34	844.74
37.7	844	68.57	844	78.77	844	87	842.65	90.09	842
94.97	840.5	95.98	840.21	96.26	840.14	96.89	840	99.67	839.25
100.96	838.9	103.79	838	104.67	837.82	105.12	837.75	108.19	837.17
109.92	836.9	111.26	836.67	113.61	836.29	115.24	836	116.94	835.63
121	835.6	123.23	835.55	124.09	835.53	124.57	835.53	124.64	835.58
124.95	835.72	125.68	836	127.17	836.95	128.61	837.68	129.33	838
130	838.3	131.26	838.86	133.75	840	163.83	840	164.35	839.97
164.48	839.97	168.68	839.8	174.05	839.58	174.27	839.57	176.56	839.52
182.89	839.29	186.08	839.23	191.53	839.04	194.31	838.99	196.69	838.96
201.38	838.8	204.4	838.76	227.25	838.89	233.73	838.97	233.83	838.97
234.41	838.99	237.11	839.07	253.39	839.58	265.89	839.44	267.32	839.4
277.29	839.1	277.42	839.09	277.46	839.09	286.46	839.07	286.57	839.07
287.43	839.05	291.65	838.88	303.19	839.12	307.14	839.26	314.67	839.39
315.67	839.4	316.25	839.39	321.44	839.4	325.04	839.58	334.56	840
337.67	840	348.71	839.54	358.99	840	366.37	840	379	840.52
402.86	840.65	465.15	842	465.71	842	506.38	843.95	507.71	844
509.93	844.97	512.41	846	515.54	847.03	518.51	848	527.43	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	96.89	.03	133.75	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
96.89	133.75	20.92	38.69	9.9	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
431.204	486.167	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.50	Reach Len. (ft)	38.69	38.69	38.69
Crit W.S. (ft)		Flow Area (sq ft)	4.04	156.99	537.98
E.G. Slope (ft/ft)	0.000212	Area (sq ft)	4.04	156.99	537.98
Q Total (cfs)	783.60	Flow (cfs)	0.72	289.48	493.40
Top Width (ft)	339.48	Top Width (ft)	5.16	36.86	297.45
Vel Total (ft/s)	1.12	Avg. Vel. (ft/s)	0.18	1.84	0.92
Max Chl Dpth (ft)	5.97	Hydr. Depth (ft)	0.78	4.26	1.81
Conv. Total (cfs)	53807.0	Conv. (cfs)	49.6	19877.7	33879.7
Length Wtd. (ft)	38.69	Wetted Per. (ft)	5.38	38.41	297.79
Min Ch El (ft)	835.53	Shear (lb/sq ft)	0.01	0.05	0.02
Alpha	1.42	Stream Power (lb/ft s)	527.43	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.00	0.13	0.38
C & E Loss (ft)	0.04	Cum SA (acres)			

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1400.977

INPUT
Description:
Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.67	858	5.24	857.14	7.32	856	8.86	855.16
10.97	854	12.78	853	14.61	852	17.39	850.46	18.24	850
22.02	848.03	22.06	848	26.1	846	26.36	845.87	30.17	844
40.79	844	55.28	843.27	56.38	843.27	56.96	843.27	61.35	843.41
62.39	843.41	63.22	843.41	65.05	843.43	65.61	843.43	66.13	843.43
67.97	843.46	69.55	843.49	70.2	843.48	81.27	842.04	81.58	842
81.8	842	81.88	841.96	82.75	841.61	83.03	841.52	83.62	841.34
84.95	840.74	86.13	840.52	86.71	840.26	88.35	840	90.08	840
91.16	839.59	92.75	838.89	94.6	838	97.52	836.48	98.46	836
98.82	835.81	99.25	835.58	103.46	835.56	111.34	835.53	112.13	835.85
112.4	836	114.15	836.86	116.5	837.99	119.05	839.09	119.93	839.27
120.47	839.28	120.63	839.3	121.24	839.41	121.51	839.4	123.2	839.74
123.31	839.75	123.46	839.78	124.49	840	136.24	840	136.34	839.97
136.38	839.97	138.21	839.28	140.5	839.09	141.96	838.74	142.52	838.6
148.06	838.27	148.24	838.24	152.24	838	158.88	838	161.58	838
164.35	838.62	167.83	839.4	170.6	840	174.95	840.39	177.12	840.59
177.85	840.66	180.74	840.72	181.18	840.72	185.06	840.49	193.96	840
199.83	839.92	216.61	839.45	229.32	839.58	246	839.53	263.57	839.46
283.05	839.41	286.53	839.35	289.11	839.37	289.97	839.36	299.75	839.28
303.86	839.27	308.43	839.55	315.22	839.95	316.18	840	324.23	840
328.99	839.8	333.6	840	346.6	840	367.82	840.86	404.74	841.02
449.89	842	450.67	842	483.53	843.58	490.35	843.84	494.66	844
497.1	845.05	499.46	846	502.16	846.91	505.4	848	507.24	848.47
512.5	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	88.35	.03	124.49	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
88.35 124.49 46.71 56.17 4.15 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	62.27	845	T
144	512.5	845	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
406.569	474.192	850	233.987	261.785	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.06	Reach Len. (ft)	24.40	24.40	24.40
Crit W.S. (ft)	839.74	Flow Area (sq ft)	2.54	134.52	27.71
E.G. Slope (ft/ft)	*0.002132	Area (sq ft)	2.54	134.52	308.72
Q Total (cfs)	783.60	Flow (cfs)	1.23	714.19	68.18
Top Width (ft)	294.53	Top Width (ft)	4.11	36.14	254.28
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)	0.48	5.31	2.46
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)	0.62	3.72	1.42
Conv. Total (cfs)	16969.3	Conv. (cfs)	26.6	15466.3	1476.4
Length Wtd. (ft)	24.40	Wetted Per. (ft)	4.28	38.03	19.71
Min Ch El (ft)	835.53	Shear (lb/sq ft)	0.08	0.47	0.19
Alpha	1.16	Stream Power (lb/ft s)	512.50	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	1.07	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	0.39	0.15

Warning: Divided flow computed for this cross-section.

BRIDGE

RIVER: Dotson Run
REACH: Lower RS: 1370.77

INPUT
Description:
Distance from Upstream XS = 24.4
Deck/Roadway Width = 12
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
81.27	842.04	841	125	842	841
180.74	840.72	0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 116

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.67	858	5.24	857.14	7.32	856	8.86	855.16
10.97	854	12.78	853	14.61	852	17.39	850.46	18.24	850
22.02	848.03	22.06	848	26.1	846	26.36	845.87	30.17	844
40.79	844	55.28	843.27	56.38	843.27	56.96	843.27	61.35	843.41
62.39	843.41	63.22	843.41	65.05	843.43	65.61	843.43	66.13	843.43
67.97	843.46	69.55	843.49	70.2	843.48	81.27	842.04	81.58	842
81.8	842	81.88	841.96	82.75	841.61	83.03	841.52	83.62	841.34
84.95	840.74	86.13	840.52	86.71	840.26	88.35	840	90.08	840
91.16	839.59	92.75	838.89	94.6	838	97.52	836.48	98.46	836

98.82	835.81	99.25	835.58	103.46	835.56	111.34	835.53	112.13	835.85
112.4	836	114.15	836.86	116.5	837.99	119.05	839.09	119.93	839.27
120.47	839.28	120.63	839.3	121.24	839.41	121.51	839.4	123.2	839.74
123.31	839.75	123.46	839.78	124.49	840	136.24	840	136.34	839.97
136.38	839.97	138.21	839.28	140.5	839.09	141.96	838.74	142.52	838.6
148.06	838.27	148.24	838.24	152.24	838	158.88	838	161.58	838
164.35	838.62	167.83	839.4	170.6	840	174.95	840.39	177.12	840.59
177.85	840.66	180.74	840.72	181.18	840.72	185.06	840.49	193.96	840
199.83	839.92	216.61	839.45	229.32	839.58	246	839.53	263.57	839.46
283.05	839.41	286.53	839.35	289.11	839.37	289.97	839.36	299.75	839.28
303.86	839.27	308.43	839.55	315.22	839.95	316.18	840	324.23	840
328.99	839.8	333.6	840	346.6	840	367.82	840.86	404.74	841.02
449.89	842	450.67	842	483.53	843.58	490.35	843.84	494.66	844
497.1	845.05	499.46	846	502.16	846.91	505.4	848	507.24	848.47
512.5	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	88.35	.03	124.49	.035

Bank Sta: Left Right Coeff Contr. Expan.

88.35	124.49	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	62.27	845	T
144	512.5	845	T

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
406.569	474.192	850	233.987	261.785	850

Downstream Deck/Roadway Coordinates
num= 3

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
79.47	842	841	125	842	841	262.03	839.34	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27

```
  256.68  839.26  262.03  839.34  269.77  839.19  276.63  838.73  277.09   838.7
  291.19  839.58   291.4  839.58  291.51  839.59  291.53  839.59  291.62  839.59
  291.87   839.6  300.73     840  311.12     840  342.16  841.22  389.55  841.33
  420.86     842  421.82     842  449.24  843.31  455.55  843.55  464.93  843.91
  465.03  843.91  467.44     844  470.65  845.33  472.29     846  475.42  847.06
  478.17     848  484.72     850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0      .1   87.05     .03  117.07    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         87.05  117.07            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0   75.47     845       T
     129  484.72     845       T
Blocked Obstructions     num=       4
   Sta L   Sta R    Elev   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************************************
  65.818  89.644     850 145.578 186.446     850 211.358 239.365     850
 348.471   447.8     850

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

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1
*******************************************************************************************
* E.G. US. (ft)          *     841.47  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *     841.06  * E.G. Elev (ft)        *     841.38  *     841.31  *
```

Q Total (cfs)	783.60	W.S. Elev (ft)	840.76	840.47
Q Bridge (cfs)	783.60	Crit W.S. (ft)	839.65	839.51
Q Weir (cfs)		Max Chl Dpth (ft)	5.23	4.95
Weir Sta Lft (ft)		Vel Total (ft/s)	6.25	7.18
Weir Sta Rgt (ft)		Flow Area (sq ft)	125.45	109.15
Weir Submerg		Froude # Chl	0.49	0.58
Weir Max Depth (ft)		Specif Force (cu ft)	417.59	410.07
Min El Weir Flow (ft)	841.93	Hydr Depth (ft)	3.13	3.08
Min El Prs (ft)	841.00	W.P. Total (ft)	42.91	40.24
Delta EG (ft)	0.27	Conv. Total (cfs)	13456.0	11722.0
Delta WS (ft)	0.83	Top Width (ft)	40.11	35.44
BR Open Area (sq ft)	127.89	Frctn Loss (ft)	0.05	0.10
BR Open Vel (ft/s)	7.18	C & E Loss (ft)	0.02	0.01
Coef of Q		Shear Total (lb/sq ft)	0.62	0.76
Br Sel Method	*Energy only	Power Total (lb/ft s)	0.00	0.00

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1344.212

INPUT
Description:
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.88	859.52	8.11	858	12.67	856.65	14.88	856
15.56	855.49	17.5	854	18.26	853.42	20.11	852	22.33	850.3
22.71	850	22.93	849.78	24.64	848	26.21	846.41	26.61	846
27.74	844.83	28.55	844	28.81	843.72	30.47	842	33.21	841.97
36.57	841.86	42.4	841.99	42.77	842	42.84	842	49.83	842.11
53.32	842.17	59.55	842.27	61.57	842.31	79.47	842	87.05	840
90.3	838	91.29	837.32	93.31	836	93.48	835.88	93.97	835.58
106.3	835.53	108.61	835.52	108.71	835.64	108.94	835.86	109.09	836
109.55	836.38	111.16	838	113.65	838.82	117.07	840	150.26	840
161.01	840	169.64	839.87	204.36	839.72	236.47	839.32	249.81	839.27
256.68	839.26	262.03	839.34	269.77	839.19	276.63	838.73	277.09	838.7
291.19	839.58	291.4	839.58	291.51	839.59	291.53	839.59	291.62	839.59
291.87	839.6	300.73	840	311.12	840	342.16	841.22	389.55	841.33
420.86	842	421.82	842	449.24	843.31	455.55	843.55	464.93	843.91
465.03	843.91	467.44	844	470.65	845.33	472.29	846	475.42	847.06
478.17	848	484.72	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	87.05	.03	117.07	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
87.05	117.07	52.02	54.01	8.98	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	75.47	845	T
129	484.72	845	T

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
65.818	89.644	850	145.578	186.446	850	211.358	239.365	850
348.471	447.8	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	840.23	Reach Len. (ft)	52.02	54.01	8.98
Crit W.S. (ft)	839.49	Flow Area (sq ft)		98.89	2.80
E.G. Slope (ft/ft)	0.005505	Area (sq ft)		98.89	80.50
Q Total (cfs)	783.60	Flow (cfs)		780.24	3.36
Top Width (ft)	158.58	Top Width (ft)		27.43	131.15
Vel Total (ft/s)	7.71	Avg. Vel. (ft/s)		7.89	1.20
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.61	0.23
Conv. Total (cfs)	10561.4	Conv. (cfs)		10516.1	45.3
Length Wtd. (ft)	51.27	Wetted Per. (ft)		31.44	11.93
Min Ch El (ft)	835.52	Shear (lb/sq ft)		1.08	0.08
Alpha	1.04	Stream Power (lb/ft s)	484.72	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.00	0.92	0.02
C & E Loss (ft)	0.18	Cum SA (acres)	0.01	0.35	0.05

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: Dotson Run
REACH: Lower RS: 1289.476

INPUT
Description:
Station Elevation Data num= 107

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.95	859.42	6.86	858	7.55	857.57	10.23	856
11.69	855.08	13.44	854	15	853.02	16.65	852	18.34	850.94
19.86	850	20.95	849.14	22.34	848	23.28	847.18	24.61	846
25.6	845.11	26.86	844	27.94	843.03	29.11	842	34.74	841.24
34.84	841.23	34.88	841.22	35.13	841.2	35.56	841.21	35.82	841.22
54.34	842	65.25	842	66.38	841.97	68.85	841.89	69.07	841.89
69.1	841.89	69.25	841.89	69.84	841.91	72.1	841.98	72.63	842
78.78	842	96.94	840.39	100.79	840	102.08	839.34	104.82	838

107.86	836.2	108.19	836	108.51	836	111.07	835.72	113.49	835.5
115.9	835.12	117.69	835.12	121.07	834.96	121.71	835.45	122.31	836
123.88	837.07	125.48	838	130.37	838.47	131.43	838.49	135.91	838.85
137.38	838.97	138.94	839.09	139.73	839.15	141.09	839.11	153.61	840
168.24	840	189.33	840	210.06	839.9	233.1	839.59	235.5	839.6
237.43	839.6	240.51	839.61	246.99	839.61	248.87	839.62	250.7	839.63
253.25	839.68	253.73	839.72	254.81	839.72	258.24	839.75	262.74	839.77
269.81	839.83	273.73	839.8	277.69	839.81	280.93	839.8	283.25	839.76
286.07	839.68	292.52	839.54	298.91	839.72	303.23	839.9	304.08	839.93
305.73	839.98	306.15	840	306.99	840.07	310.63	840.37	312.92	840.57
315.55	840.78	337.94	841.62	396.92	841.65	413.49	842	414.73	842
431.79	842.8	436.17	842.97	443.03	843.23	443.94	843.24	451.1	843.52
458.38	843.8	463.61	844	465.45	844.75	468.49	846	473.28	847.62
474.42	848	480.68	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	100.79	.03	153.61	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
100.79	153.61	20.02	17.74	5.38	.1	.3

Blocked Obstructions num= 4

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
72.455	103.347	850	152.674	194.298	850	222.966	253.434	850
329.672	444.58	850						

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	840.45	Reach Len. (ft)	20.02	17.74	5.38
Crit W.S. (ft)	839.78	Flow Area (sq ft)		135.78	54.31
E.G. Slope (ft/ft)	*0.003046	Area (sq ft)		135.78	54.31
Q Total (cfs)	783.60	Flow (cfs)		691.57	92.03
Top Width (ft)	136.11	Top Width (ft)		49.33	86.78
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		5.09	1.69
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		2.75	0.63
Conv. Total (cfs)	14197.7	Conv. (cfs)		12530.3	1667.4
Length Wtd. (ft)	17.01	Wetted Per. (ft)		53.39	88.77
Min Ch El (ft)	834.96	Shear (lb/sq ft)		0.48	0.12
Alpha	1.37	Stream Power (lb/ft s)	480.68	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	0.77	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.01	0.30	0.02

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.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1271.523

INPUT
Description:
Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.2	858.79	6.85	858	8.62	856.91	10.07	856
11.14	855.34	13.3	854	15.18	852.83	16.52	852	19.06	850.43
19.74	850	20.84	849.3	22.92	848	23.33	847.66	25.25	846
26.08	845.26	27.49	844	28.58	843.03	29.73	842	30.96	841.05
33.13	840.27	34.02	840.41	36.07	841.23	51.19	841.68	59.37	841.97
67.89	841.82	71.96	841.82	72.2	841.82	75.27	841.92	75.35	841.92
106.53	840.01	106.67	840	106.74	839.98	106.81	839.96	106.95	839.92
113.82	838	113.91	837.93	116.56	836	116.78	835.84	118.21	834.83
122.48	834.88	126.82	834.92	127.57	835.32	128.85	836	129.53	836.37
129.97	836.61	132.41	838	133.47	838.08	133.56	838.08	160.47	840
168.47	840	207.09	840	213.92	839.97	222.03	839.85	226.17	839.87
226.81	839.87	232.62	839.89	234.55	839.89	240.78	839.91	246.74	839.94
249.78	840	251.67	840	254.9	840.14	256.12	840.2	256.34	840.22
256.61	840.22	257.14	840.22	261.73	840.24	282.88	840.16	283.84	840.11
286.22	840	287.43	839.99	291.41	839.95	303.23	839.78	303.71	839.77
303.8	839.77	303.86	839.77	310	840	317.63	840.62	321.95	840.97
323.81	841.13	324.99	841.23	326.36	841.34	338.44	841.79	402.41	841.79
412.64	842	414.01	842	424.99	842.51	427.91	842.62	432.58	842.8
434.09	842.82	439.15	843.02	444.45	843.22	452.34	843.53	464.52	844
469.1	845.85	469.48	846	469.86	846.13	475.36	848	476.73	848.45
481.34	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	106.53	.03	160.47	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
106.53	160.47	89.77	87.43	7.72	.1 .3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
73.623	99.238	850	155.774	197.012	850	333.886	478.052	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	840.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.63	Reach Len. (ft)	89.77	87.43	7.72

* Crit W.S. (ft)	*	839.63	* Flow Area (sq ft)	*		*	96.36	*		*	
* E.G. Slope (ft/ft)	*	0.011058	* Area (sq ft)	*		*	96.36	*		*	
* Q Total (cfs)	*	783.60	* Flow (cfs)	*		*	783.60	*		*	
* Top Width (ft)	*	47.30	* Top Width (ft)	*		*	47.30	*		*	
* Vel Total (ft/s)	*	8.13	* Avg. Vel. (ft/s)	*		*	8.13	*		*	
* Max Chl Dpth (ft)	*	4.80	* Hydr. Depth (ft)	*		*	2.04	*		*	
* Conv. Total (cfs)	*	7451.8	* Conv. (cfs)	*		*	7451.8	*		*	
* Length Wtd. (ft)	*	87.43	* Wetted Per. (ft)	*		*	49.40	*		*	
* Min Ch El (ft)	*	834.83	* Shear (lb/sq ft)	*		*	1.35	*		*	
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	481.34	*	0.00	*	0.00	*	
* Frctn Loss (ft)	*	0.57	* Cum Volume (acre-ft)	*	0.00	*	0.72	*	0.00	*	
* C & E Loss (ft)	*	0.14	* Cum SA (acres)	*	0.01	*	0.28	*	0.02	*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1182.267

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.53	859.26	4.25	858	7.58	856.34	8.26	856
8.93	855.64	11.94	854	15.22	852.06	15.32	852	18.63	850
19.44	849.51	21.9	848	23.73	846.89	25.18	846	27.4	844.66
28.55	844	29.18	843.66	32.14	842	34.95	841.21	38.98	840
44.86	840	45.79	840.33	50.01	841.54	72.63	841.57	73.64	841.56
111.32	840.77	116.31	840.61	116.76	840.6	141.61	840	143.71	840
145.77	839.73	156.51	838.35	159.9	838	162.73	836.14	162.93	836
163.08	835.83	164.88	834	165.07	834.09	165.4	834.17	168	833.99
171.79	833.46	173.18	833.82	173.8	834	178.39	835.04	178.93	835.16
179.85	835.36	182.6	836	185.37	836.74	190.28	838	196.06	838.95
202.48	840	202.73	840	218.29	840.32	237.94	840.72	242.98	840.62
244.59	840.62	248.08	840.63	250.67	840.62	255.29	840.67	258.49	840.67
268.68	840.4	271.78	840.4	320.91	840.02	322.57	840	325.8	840
326.99	840.04	327.88	840.05	328	840.05	328.19	840.05	330.03	840.05
335.01	840.03	340.97	840.15	341.51	840	345.29	840	358.95	841.94

359.36	842	359.42	842	421.64	842.02	432.76	842.1	433.45	842.08
434.3	842.06	435.22	842.04	436.25	842.03	437.45	842.04	437.77	842.05
438.11	842.05	442.91	842.06	458.59	842.04	483.58	843.01	489.59	843.86
490.56	844	491.1	844.2	491.76	844.46	495.81	846	500.13	847.48
501.69	848	507.66	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	141.61	.03	202.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.61	202.48	34.47	38.39	78.71	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
95.931	134.383	850	210.589	303.804	850	368.039	447.687	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.030	
W.S. Elev (ft)	839.24	Reach Len. (ft)	34.47	38.39	78.71
Crit W.S. (ft)		Flow Area (sq ft)		129.21	
E.G. Slope (ft/ft)	0.004291	Area (sq ft)		129.21	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	48.31	Top Width (ft)		48.31	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	11962.9	Conv. (cfs)		11962.9	
Length Wtd. (ft)	38.39	Wetted Per. (ft)		50.56	
Min Ch El (ft)	833.46	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	507.66	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.50	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.18	0.02

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: Dotson Run
REACH: Lower RS: 1143.687

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.45	858	4.28	857.27	5.76	856	6.61	855.3
8.1	854	8.96	853.29	11.8	850.81	12.78	850	14.14	848.81
15.12	848	16.48	846.81	17.46	846	18.83	844.81	19.8	844
21.95	842.81	23.45	842	28.42	840.61	30.52	840	32.33	840
32.58	840.05	35.89	840.73	36.41	840.84	36.78	840.91	38.35	841.19
47.92	841.31	60.64	841.49	83.47	840.71	94.68	840.25	99.89	840.23
102.3	840.21	109.08	840.15	119.16	840.08	127.82	840	136.11	839.68
138.7	839.55	156.23	838.68	169.97	838	171.29	837.34	173.92	836
177.49	834.22	177.93	834	177.97	833.98	178.63	833.66	182.66	833.12
184.85	832.85	186	833.52	186.76	834	190.53	835.56	191.61	836
194.98	836.84	196.79	837.24	199.7	838	204.44	838.89	205.4	839.06
207.95	839.53	208.54	839.64	208.78	839.68	208.99	839.71	211.57	840
225.39	840.47	232.67	840.72	232.94	840.73	236.56	840.99	241.95	840.91
248.27	840.99	251.14	841.01	255.1	840.93	258.88	840.83	266.36	840.63
266.59	840.63	270.41	840.6	271.16	840.59	306.87	840.41	307.14	840.41
307.55	840.4	308.6	840.37	313.38	840.81	315.17	840.66	317.56	840.47
319.43	840.32	322.86	840.28	323.36	840.18	323.4	840.17	323.98	840.1
324.34	840.07	324.52	840.04	324.65	840.03	324.92	840.02	325.39	840
326.03	840.01	326.14	840.01	327.04	840.05	327.62	840.09	327.86	840.11
327.92	840.12	327.93	840.11	329.81	840.06	330.64	840.01	341.16	840.67
344.19	840.01	344.25	840	345.51	840	351.85	841.59	355.49	842
355.51	842	355.59	842	360.78	842.13	371.13	842.1	430.88	842.07
433.44	842.11								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	169.97	.03	199.7	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
169.97	199.7	19.24	12.91	64.41	.1 .3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
209.527	306.69	850	369.765	433.44	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.07	Reach Len. (ft)	19.24	12.91	64.41
Crit W.S. (ft)	838.07	Flow Area (sq ft)	0.05	82.05	0.01
E.G. Slope (ft/ft)	*0.010492	Area (sq ft)	0.05	82.05	0.01
Q Total (cfs)	783.60	Flow (cfs)	0.01	783.58	0.01
Top Width (ft)	31.57	Top Width (ft)	1.46	29.73	0.38
Vel Total (ft/s)	9.54	Avg. Vel. (ft/s)	0.17	9.55	0.47
Max Chl Dpth (ft)	5.22	Hydr. Depth (ft)	0.04	2.76	0.04
Conv. Total (cfs)	7650.2	Conv. (cfs)	0.1	7650.1	0.1
Length Wtd. (ft)	12.91	Wetted Per. (ft)	1.46	31.77	0.39
Min Ch El (ft)	832.85	Shear (lb/sq ft)	0.02	1.69	0.02

* Alpha	* 1.00	* Stream Power (lb/ft s) * 433.44	* 0.00	* 0.00 *
* Frctn Loss (ft)	* 0.12	* Cum Volume (acre-ft) * 0.00	* 0.40	* 0.00 *
* C & E Loss (ft)	* 0.07	* Cum SA (acres) * 0.01	* 0.15	* 0.02 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Dotson Run
REACH: Lower RS: 1130.779

INPUT
Description:
Station Elevation Data num= 126

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	2.62	858	3.02	857.61	4.62	856	5.34	855.3
6.64	854	7.61	853.07	8.68	852	9.84	850.89	10.73	850
12.05	848.74	12.8	848	14.23	846.62	14.87	846	16.41	844.52
16.94	844	19	842.97	20.88	842	25.46	840.42	26.61	840
26.7	840	26.75	840.01	33.51	841.19	49.84	841.4	55.31	841.49
62.52	841.03	82.74	840.18	83.89	840.17	85.35	840.16	86.11	840.16
88.1	840.15	108.01	840.06	115.16	840	129.22	839.59	133.63	839.44
137.6	839.3	162.48	838.44	172.43	838.11	175.15	838	175.84	837.63
178.69	836	179.32	835.63	181.85	834	182.48	833.66	182.72	833.52
183.58	833.41	186.4	833.14	188.86	832.88	189.22	832.85	189.49	832.95
189.72	833.03	191.02	833.52	192.3	834	192.97	834.24	195.46	835.07
197.58	835.79	198.31	836	203.53	837.4	205.87	838	205.88	838
224.41	840	225.22	840.01	226.11	840.07	232.46	840.39	234.83	840.55
235.89	840.61	236.1	840.63	237.22	840.67	246.45	840.9	253.28	840.94
253.57	840.93	253.92	840.92	254.53	840.91	286.91	840.81	292.62	840.78
309.51	840.62	310.46	840.71	314.14	840.6	317.67	840.41	320.4	840.18
320.8	840.17	321.14	840.18	323.6	840.13	323.85	840.13	326.72	840.16
326.82	840.16	327.7	840.19	329.65	840.25	331.26	840.37	331.42	840.39
341.07	840.67	341.65	840.64	342.78	840.71	343.1	840.64	343.24	840.62
343.33	840.61	345.81	841.1	348.8	841.54	351.84	842	355.69	842.95
356.81	843.23	357.01	843.28	357.19	843.32	358.21	843.23	358.99	843.24
371.74	842.73	372	842.73	393.49	842.68	394.31	842.67	395.73	842.65
396.86	842.63	399.4	842.64	401.67	842.68	430.25	842.74	433.11	842.83
435.02	842.87	453.86	842.89	468.41	843.08	475.66	843.7	478.76	844
481.16	844.88	484.03	846	486.13	846.88	488.7	848	490.8	849.53
491.44	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	172.43	.03	205.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
172.43	205.87	16.83	68.95	14.42	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
209.46	236.46	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	839.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	838.08	Reach Len. (ft)	16.83	68.95	14.42
Crit W.S. (ft)	837.84	Flow Area (sq ft)		90.14	0.03
E.G. Slope (ft/ft)	0.008678	Area (sq ft)		90.14	0.03
Q Total (cfs)	783.60	Flow (cfs)		783.58	0.02
Top Width (ft)	33.58	Top Width (ft)		32.79	0.79
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	0.48
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		2.75	0.04
Conv. Total (cfs)	8411.9	Conv. (cfs)		8411.7	0.2
Length Wtd. (ft)	68.89	Wetted Per. (ft)		34.85	0.79
Min Ch El (ft)	832.85	Shear (lb/sq ft)		1.40	0.02
Alpha	1.00	Stream Power (lb/ft s)	491.44	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.00	0.38	0.00
C & E Loss (ft)	0.25	Cum SA (acres)	0.01	0.14	0.02

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: Dotson Run
REACH: Lower RS: 1059.794

INPUT
Description:
Station Elevation Data num= 111

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	.97	859.29	2.79	858	3.67	857.13	4.78	856
6.11	854.68	6.79	854	8.44	852.37	8.81	852	10.69	850.15
10.84	850	12.52	848.34	12.87	848	12.91	847.96	14.9	846
15.18	845.73	16.94	844	19.55	842.46	20.33	842	20.54	841.91

21.2	841.61	24.81	840	25.17	840	26.02	840.15	30.25	840.88
30.91	840.99	31.99	841.19	34.18	841.22	52.24	841.56	56.47	841.28
68.31	840.33	86.23	840	91.02	839.92	91.95	839.9	116.5	839.48
122.17	839.37	137.44	839.11	143.34	838.98	153.79	838.81	160.44	838.67
165.79	838.58	170.98	838.46	176.81	838.33	191.12	838	196.46	837.37
207.79	836	209.17	834.89	210.23	834	211.98	833.72	218.07	832.86
220.65	832.68	224.71	832.43	225.96	833.06	226.64	833.42	228.14	834.23
230.52	835.56	231.17	835.92	231.31	836	232.89	836.15	234.43	836.27
236.46	836.45	238.1	836.6	239.84	836.75	240.93	836.84	252.95	838
253.03	838	271.56	838.84	297.13	840	326.64	840	333.39	840.27
338.69	840.47	350.73	840.74	355.4	840.61	361.86	840.56	364.63	841.56
365.8	842	371.11	842.88	372.43	843.1	374.71	843.24	379.43	843.52
385.44	843.88	386.06	843.93	387.43	844	412.92	844	416.17	843.92
433.51	843.86	443.65	844	445.87	844.03	446.47	844.04	457.42	844.19
459.73	844.12	465.63	844.1	468.73	844	468.87	844	475.47	843.83
477.17	843.78	478.38	843.84	480.47	843.95	481.35	844	484.51	844.33
486.04	844.6	488.46	844.93	489.68	845.09	493.68	846	494.29	846.2
494.98	846.42	497.91	847.36	499.58	847.9	499.91	848	500.92	848.71
502.89	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	191.12	.03	252.95	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
191.12	252.95	58.98	59.59	160.17	.1	.3

Blocked Obstructions num= 3

Sta L	Sta R	Elev	Sta L	Sta R	Elev	Sta L	Sta R	Elev
74.94	134.225	850	272.544	295.161	850	368.64	379.248	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	838.36	Reach Len. (ft)	58.98	59.59	160.17
Crit W.S. (ft)		Flow Area (sq ft)	2.83	165.09	1.47
E.G. Slope (ft/ft)	0.002571	Area (sq ft)	2.83	165.09	1.47
Q Total (cfs)	783.60	Flow (cfs)	0.68	781.90	1.02
Top Width (ft)	85.59	Top Width (ft)	15.71	61.83	8.05
Vel Total (ft/s)	4.63	Avg. Vel. (ft/s)	0.24	4.74	0.69
Max Chl Dpth (ft)	5.93	Hydr. Depth (ft)	0.18	2.67	0.18
Conv. Total (cfs)	15453.0	Conv. (cfs)	13.4	15419.5	20.0
Length Wtd. (ft)	59.65	Wetted Per. (ft)	15.72	63.76	8.06
Min Ch El (ft)	832.43	Shear (lb/sq ft)	0.03	0.42	0.03
Alpha	1.05	Stream Power (lb/ft s)	502.89	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	0.18	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.01	0.06	0.01

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: Dotson Run
REACH: Lower RS: 1000.000

INPUT
Description:
Station Elevation Data num= 110

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	1.19	859.53	2.89	858.89	4.84	858.14	5.21	858
6.28	856.98	6.9	856.39	7.31	856	8.77	854.5	9.26	854
10.51	852.72	11.22	852	12.31	850.89	13.19	850	14.65	848.54
15.19	848	16.15	847.04	17.19	846	19.15	844.03	21.19	842
25.44	840.04	25.54	840	37.8	840	38.94	840.15	39.68	840.27
40.66	840.43	45.13	840.48	61	841.19	63.82	840.87	64.15	840.84
64.55	840.82	70.95	840.64	73.32	840.48	75.09	840.31	77.91	840
85.92	839.79	86.56	839.79	87.34	839.78	88.34	839.77	103.53	839.43
106.19	839.41	113.64	839.32	116.82	839.27	175.72	838.28	192.57	838
193.96	838	203.34	836.32	205.17	836	207.3	834.7	207.6	834.52
208.42	834	209.16	833.78	212.27	832.88	212.99	832.67	214.96	832.11
219.01	832.12	220.62	832.16	222.62	833.26	223.93	834	226.75	835.54
227.6	836	231.04	837.8	231.42	838	257.45	838	260.01	838
267.39	838.56	274.15	839.05	277.04	839.31	278.75	839.43	283.42	839.77
283.85	839.8	286.93	840	307.85	840	309.52	839.97	322.35	839.84
324.78	839.85	334.48	840	336.12	840	338.18	840.07	345.88	840.34
348.53	840.43	349.27	840.46	359.54	840.84	359.67	840.84	359.71	840.85
359.82	840.85	368.97	841.64	370.7	841.83	372.28	842	376.71	842.48
378.18	842.65	380.78	842.95	381.52	842.98	381.59	842.99	381.61	842.99
381.66	843	389.58	843.86	390.42	843.9	392.79	844	392.89	844.03
392.98	844.07	395.81	845.13	398.31	846	398.95	846.21	399.61	846.44
402.46	847.35	404.02	848	404.14	848.05	404.23	848.09	408.66	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	192.57	.03	231.42	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
192.57	231.42	1	1	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
81.865	144.14	850	276.349	308.556	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	838.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	837.24	Reach Len. (ft)			
Crit W.S. (ft)	836.94	Flow Area (sq ft)		91.41	
E.G. Slope (ft/ft)	0.008011	Area (sq ft)		91.41	
Q Total (cfs)	783.60	Flow (cfs)		783.60	
Top Width (ft)	31.76	Top Width (ft)		31.76	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		2.88	
Conv. Total (cfs)	8755.0	Conv. (cfs)		8755.0	
Length Wtd. (ft)		Wetted Per. (ft)		33.99	
Min Ch El (ft)	832.11	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	408.66	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1569.420

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.29	868	2.82	867.55	4.62	866	5.69	865.11
6.98	864	8.54	862.71	9.4	862	11.33	860.41	11.82	860
13.83	858.34	14.26	858	14.31	857.95	16.72	856	17.4	855.61
20.29	854	22.07	853.37	25.82	852	27.35	851.42	31.16	850
33.04	849.14	34.28	848.58	35.48	848	36.52	847.5	39.71	846
45.72	844.27	46.68	844	52.67	842.57	55.01	842	56.5	841.12
57.49	840.67	58.83	840	59.18	839.81	59.22	839.78	59.23	839.77
59.37	839.78	62.91	839.96	63.12	839.98	63.32	840	64.77	841.18
65.41	841.7	65.77	842	68.12	843.66	68.63	844	81.3	844
88.11	844.2	138.43	845.68	139.23	845.69	140.89	845.7	152.91	846
174.38	846	176.34	846.04	197.51	846.79	201.21	846.77	209.37	846.86
215.87	846.89	217.91	846.91	219.19	846.99	221.67	847	223.81	847
236.26	847.53	237.19	847.6	238.89	847.67	240.87	847.78	242.18	847.84
243.58	847.94	243.91	847.95	244.19	847.97	244.51	847.99	244.68	848
246.28	848.11	246.66	848.14	246.87	848.15	246.94	848.15	247.29	848.15
247.85	848.15	248.91	848.14	250.86	848.14	252.47	848.15	253.1	848.14
259.15	848.39	261.18	848.47	261.74	848.54	264.78	848.76	271.39	849.54
273.3	849.71	275.34	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	45.72	.03	68.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
45.72	68.63	48.43	53.64	36.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.64	Reach Len. (ft)	48.43	53.64	36.38
Crit W.S. (ft)	843.51	Flow Area (sq ft)		41.13	
E.G. Slope (ft/ft)	*0.010247	Area (sq ft)		41.13	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	19.92	Top Width (ft)		19.92	
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	3099.9	Conv. (cfs)		3099.9	
Length Wtd. (ft)	53.64	Wetted Per. (ft)		21.91	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	275.34	0.00	0.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.02	0.51	0.12
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	0.21	0.16

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1515.286

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.7	868	4.29	866.82	5.39	866	7.85	864.16
8.26	863.86	10.73	862	10.98	861.82	13.4	860	13.7	859.78
16.07	858	16.44	857.73	18.74	856	19.19	855.67	21.41	854
22.23	853.39	24.08	852	26.57	851.11	27.6	850.74	29.55	850
31.75	849.36	32.79	849.08	36.69	848	37.86	847.6	42.53	846
43.51	845.63	48.07	844	52.12	842.63	53.97	842	55.86	841.03
57.85	840	57.98	839.91	58.13	839.83	58.24	839.77	63.6	839.93
64.58	839.96	64.6	839.97	64.93	840	65.18	840.15	68.15	842
70.08	842.48	76.59	844	92.4	844	105.95	844	109	844.03
120.13	844.16	121.34	844.19	134.21	844.36	162.04	844.79	162.84	844.8
167.01	844.89	184.4	845.22	185.51	845.27	195.74	845.16	196.88	845.21
202.03	845.47	203.11	845.52	205.28	845.53	208.44	846	208.67	845.93
208.82	845.79	209.01	845.8	225.66	846.25	226.74	846.28	226.75	846.27
226.76	846.27	227.14	846	228.9	844.86	232.65	844.84	237.17	846
239.47	846.1	242.13	846.22	247.09	846.45	276.5	847.83	279.79	847.99
280.07	848	281.49	848	289.57	849.01	294.96	849.63	295.85	849.73
296.45	849.79	298.05	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.07	.03	76.59	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
48.07	76.59	15.63	15.77	15.95	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
135.997	161.893	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	844.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.28	Reach Len. (ft)	15.63	15.77	15.95
Crit W.S. (ft)	843.01	Flow Area (sq ft)		46.03	
E.G. Slope (ft/ft)	*0.008292	Area (sq ft)		46.03	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	23.28	Top Width (ft)		23.28	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)		6.82	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	3446.1	Conv. (cfs)		3446.1	
Length Wtd. (ft)	15.77	Wetted Per. (ft)		24.77	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	298.05	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.02	0.45	0.12
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	0.18	0.16

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1499.515

INPUT
Description:
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	2.77	868	3.47	867.49	5.53	866	7.04	864.89
8.25	864	10.64	862.24	10.96	862	11.81	861.37	13.71	860
14.89	859.16	16.5	858	18.71	856.43	19.31	856	19.56	855.83
22.17	854	23.47	853.08	25.01	852	28.27	850.21	28.62	850
30.14	849.56	30.29	849.52	35.54	848	38.38	847.16	42.33	846
47.24	844.38	48.46	844	52.47	842.43	53.6	842	53.98	841.82
54.58	841.55	57.99	840	58.21	839.9	58.52	839.77	61.55	839.87
65.44	839.96	65.46	839.98	65.49	840	66.04	840.31	68.49	842
80.82	843.88	81.31	843.96	81.42	843.97	81.95	844	90.87	844
123.44	844	137.09	843.98	137.15	843.98	138.15	844	138.83	844.01

150.58	844.21	155.86	844.45	158.44	844.52	159.17	844.54	159.74	844.55
160.3	844.56	160.87	844.58	161.85	844.6	163.17	844.63	164.14	844.65
177.96	845.05	178.84	845.08	179.47	845.1	192.68	845.01	193.65	845.03
200.28	845.37	206.94	845.48	209.42	845.85	209.75	845.9	210.1	845.95
210.48	846	210.74	846	210.83	846.04	210.87	846.05	210.88	846.05
210.94	846.05	211.41	846.04	216.93	846.01	218.7	846	219.16	846
227.72	846	228.71	845.98	228.78	846.04	229.01	845.93	229.62	845.53
230.02	845.25	231.73	844.03	231.76	844	233.06	844	238.2	844.96
240.76	845.44	245.28	846	275.26	847.37	279.47	847.51	282.62	847.62
290.68	848	292.69	848	294.39	848.28	302.89	850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	48.46	.03	80.82	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
48.46	80.82	42.49	35.17	24.56	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
137.655	163.551	855	241.697	263.243	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	843.16	Reach Len. (ft)	42.49	35.17	24.56
Crit W.S. (ft)		Flow Area (sq ft)		46.79	
E.G. Slope (ft/ft)	0.008757	Area (sq ft)		46.79	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	3353.3	Conv. (cfs)		3353.3	
Length Wtd. (ft)	34.73	Wetted Per. (ft)		26.88	
Min Ch El (ft)	839.77	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	302.89	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.02	0.44	0.12
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	0.17	0.16

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1464.257

INPUT
Description:
Station Elevation Data num= 72

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	870	3.37	868	4.34	867.45	6.89	866	8.91	864.85
10.41	864	13.61	862.17	13.87	862	14.09	861.85	16.93	860
19.87	858.03	22.8	856	23.66	855.4	25.66	854	27	853
28.29	852	30.53	850.25	30.85	850	31.67	849.7	36.3	848
42.32	846	42.34	845.99	47.71	844	51.45	842.52	52.66	842
53.84	841.57	58.23	840	58.43	839.93	59.45	839.63	62.17	839.48
64.07	839.39	64.61	839.89	64.76	840	67.25	841.22	68.67	842
69.29	842.06	71.48	842.29	79.51	842.3	85.98	842.47	86.23	842.48
90.38	842.55	91.59	842.57	98.6	842.74	101.61	842.82	104.64	842.86
146.33	844	180.49	844	181.26	844.02	181.89	844.05	190.71	844.37
193.85	844.48	194.8	844.52	195.93	844.57	198.36	844.7	201.82	844.88
204.86	845.05	212.27	845.39	220.97	845.58	229.69	845.62	230.38	845.6
230.41	845.63	230.5	845.58	232.29	844.43	233	844.05	233.12	844
234.98	844	258.59	846	273.8	846.82	285.11	847.43	293.43	848
301.47	849.38	305.3	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	51.45	.03	71.48	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
51.45	71.48	39.61	55.52	66.66	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
244.051	265.678	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.93	Reach Len. (ft)	39.61	55.52	66.66
Crit W.S. (ft)	842.93	Flow Area (sq ft)	0.22	43.37	13.80
E.G. Slope (ft/ft)	0.006947	Area (sq ft)	0.22	43.37	13.80
Q Total (cfs)	313.80	Flow (cfs)	0.09	287.89	25.82
Top Width (ft)	56.95	Top Width (ft)	1.05	20.03	35.87
Vel Total (ft/s)	5.47	Avg. Vel. (ft/s)	0.41	6.64	1.87
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)	0.21	2.17	0.38
Conv. Total (cfs)	3765.0	Conv. (cfs)	1.1	3454.1	309.8
Length Wtd. (ft)	56.01	Wetted Per. (ft)	1.13	21.28	35.88
Min Ch El (ft)	839.39	Shear (lb/sq ft)	0.08	0.88	0.17
Alpha	1.36	Stream Power (lb/ft s)	305.30	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.02	0.40	0.12
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	0.16	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the

calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1406.971

INPUT
Description:
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.53	858	9.03	856.04	9.12	856	9.29	855.93
14.1	854	16.34	853.16	19.41	852	23.95	850.21	24.45	850
25.22	849.7	28.3	848.48	29.53	848	29.56	847.99	35.13	846
36.59	845.34	39.3	844.24	39.9	844	41.26	843.3	43.86	842
44.28	841.92	44.46	841.88	46.89	841.41	48.18	841.11	49.71	840.82
50.96	840.53	53.07	840.02	53.1	840.01	53.15	840	54.85	839.4
57.03	838.55	58.84	838.46	60.45	838.4	61.66	839.32	62.52	840
64.74	841.72	65.12	842	77.22	842.33	84.67	842.54	91.2	842.72
113.53	843.34	115.46	843.39	122.19	843.58	138.27	844	148.44	843.69
155.6	843.66	160.98	843.64	170.68	843.84	174.81	844	204.08	844
204.64	844.13	205.36	844.29	207	844.07	207.27	844.08	208.57	844.34
208.83	844.43	209.84	844.4	220.31	844.29	227.41	844.26	227.81	844.39
228.54	843.97	237.16	844	240.75	844	245.55	844.17	256.7	844.48
264.78	844.62	268.16	844.76	273.32	844.83	275.68	844.85	277.23	844.86
280.08	844.97	282.36	845	284.56	845.07	287.16	845.13	292.69	845.4
302.58	845.98	302.64	845.99	302.87	846	308.23	847.84	308.7	848
313.06	849.51	314.49	850						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	43.86	.03	65.12	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
43.86	65.12	39.22	38.06	42.21	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
131.644	175.564	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	843.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.31	Reach Len. (ft)	39.22	38.06	42.21
Crit W.S. (ft)	842.01	Flow Area (sq ft)	0.10	46.44	1.76

E.G. Slope (ft/ft)	*0.007192	Area (sq ft)	0.10	46.44	1.76		
Q Total (cfs)	313.80	Flow (cfs)	0.03	311.95	1.82		
Top Width (ft)	33.22	Top Width (ft)	0.62	21.26	11.35		
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)	0.34	6.72	1.04		
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)	0.15	2.18	0.15		
Conv. Total (cfs)	3700.3	Conv. (cfs)	0.4	3678.5	21.5		
Length Wtd. (ft)	38.98	Wetted Per. (ft)	0.69	22.97	11.35		
Min Ch El (ft)	838.40	Shear (lb/sq ft)	0.06	0.91	0.07		
Alpha	1.06	Stream Power (lb/ft s)	314.49	0.00	0.00		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.02	0.34	0.10		
C & E Loss (ft)	0.18	Cum SA (acres)	0.03	0.13	0.11		

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: Unt to Doston
REACH: Lower RS: 1367.937

INPUT
Description:
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	4.95	858	5.89	857.65	10.34	856	13.92	854.7
15.81	854	19.11	852.81	21.31	852	24.55	850.8	26.72	850
28.34	849.23	30.9	848	31.75	847.54	34.55	846	36.32	845.07
37.61	844.37	38.28	844	44.55	843.12	53.39	842	56.5	841.27
58.43	840.79	61.61	840	68.13	840	69.28	839.37	69.93	838.93
70.79	838.28	71.98	838.27	73.86	838.27	74.84	839.69	75.02	840
75.47	840.58	76.63	842	90.84	842	106	841.43	139.39	840.19
141.31	840.13	145.93	840.11	147.3	840.1	148.6	840.1	150.59	840.1
150.84	840.09	151.14	840.09	151.37	840.09	151.51	840.1	151.65	840.1
178.81	844.27	179.69	844.27	180.54	844.26	182.65	844.25	187.26	844.08
188.35	844.07	199.49	844.02	202.71	844	210.22	843.53	215.55	843.23
216.93	843.45	217.53	843.59	218.43	843.65	218.52	843.66	234.2	843.52
237.2	843.47	237.46	843.48	237.7	843.41	238.13	843.31	238.65	843.14
239.44	842.84	240.92	842.27	241.65	842	241.86	842	242.64	842.05
246.67	842.3	249.49	842.47	250.51	842.48	257.11	842.6	262.1	842.79
282.62	843.36	286.96	843.45	288.37	843.47	289.91	843.48	294.65	843.57
295.81	843.59	301.31	843.71	308.25	843.9	308.5	843.9	311.35	844
317.09	844.64	318.03	844.75	320.42	845.07	326.86	846	330.02	846.85
334.04	847.8	334.85	848	338.19	848.97	339.42	849.29	341.62	849.9
341.95	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	53.39	.03	76.63	.035

Bank Sta: Left 53.39 Right 76.63 Lengths: Left Channel Right 9.45 8.12 5.27 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
182.65	341.95	844	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
138.358	184.172	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.64	Reach Len. (ft)	9.45	8.12	5.27
Crit W.S. (ft)	841.59	Flow Area (sq ft)	1.61	59.82	81.64
E.G. Slope (ft/ft)	*0.001148	Area (sq ft)	1.61	59.82	86.22
Q Total (cfs)	313.80	Flow (cfs)	0.38	175.53	137.90
Top Width (ft)	108.18	Top Width (ft)	5.04	23.24	79.90
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)	0.23	2.93	1.69
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)	0.32	2.57	1.32
Conv. Total (cfs)	9260.8	Conv. (cfs)	11.1	5180.1	4069.6
Length Wtd. (ft)	7.03	Wetted Per. (ft)	5.08	25.88	64.17
Min Ch El (ft)	838.27	Shear (lb/sq ft)	0.02	0.17	0.09
Alpha	1.26	Stream Power (lb/ft s)	341.95	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.02	0.30	0.06
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	0.11	0.07

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Unt to Doston
REACH: Lower RS: 1359.780

INPUT
Description:
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.47	858	9.11	856.68	11.06	856	12.62	855.42
16.44	854	19.02	853.07	21.9	852	27.02	850.16	27.46	850
28.05	849.74	31.96	848	35	846.33	35.61	846	36.71	845.39
38.05	844.63	39.18	844	41.89	843.66	52.62	842.45	55.81	842.09

56.64	842	62.62	840.49	64.55	840	65.66	840	69	838.65
69.54	838.27	70.52	838.27	75.66	838.21	77.27	839.63	77.64	840
78.61	840.99	79.61	842	104.56	842	107.24	841.9	142.63	840.56
144.55	842	145.1	842	150.46	843.07	151.81	844	153.06	844
158.25	844.07	163.76	842.97	166.92	842.34	179.85	844.32	180.23	844.32
180.61	844.32	181.54	844.31	187.39	844.1	187.87	844.09	192.84	844.07
194.33	844.06	199.56	844	202.38	844	202.99	843.97	204.4	843.9
208.61	843.71	210.7	843.6	215.96	843.26	217.36	843.11	217.75	843.21
221.23	843.42	221.56	843.46	234.56	843.34	239.94	843.26	240.4	843.28
240.83	843.16	241.6	842.98	242.51	842.68	243.92	842.14	244.28	842
245.2	842	246.52	842.08	246.7	842.08	247.86	842.1	254.7	842.37
282.48	843.14	286.16	843.22	288.17	843.24	290.34	843.27	294.42	843.35
296.2	843.37	300.98	843.47	307.02	843.64	307.87	843.65	314.83	843.9
317.21	844	324.73	845.06	330.47	846	331.94	846.35	332.65	846.49
335.17	847	337.92	847.58	339.8	848	344.62	849.61	345.95	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	55.81	.03	79.61	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.81	79.61	16.17	26.79	10.34	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
151.81	345.95	844	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
153.834	178.507	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.60	Reach Len. (ft)	16.17	26.79	10.34
Crit W.S. (ft)	841.56	Flow Area (sq ft)	1.17	65.99	69.15
E.G. Slope (ft/ft)	0.001207	Area (sq ft)	1.17	65.99	75.10
Q Total (cfs)	313.80	Flow (cfs)	0.24	211.49	102.07
Top Width (ft)	117.24	Top Width (ft)	4.54	23.80	88.90
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)	0.21	3.20	1.48
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)	0.26	2.77	1.01
Conv. Total (cfs)	9032.3	Conv. (cfs)	7.0	6087.4	2938.0
Length Wtd. (ft)	23.69	Wetted Per. (ft)	4.57	25.96	69.08
Min Ch El (ft)	838.21	Shear (lb/sq ft)	0.02	0.19	0.08
Alpha	1.44	Stream Power (lb/ft s)	345.95	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.02	0.28	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	0.11	0.06

Warning: Divided flow computed for this cross-section.
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: Unt to Doston
REACH: Lower RS: 1332.978

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	5.88	858.14	6.27	858	6.71	857.84	12.18	856
15.58	854.87	18.17	854	21.93	852.65	23.72	852	25.64	851.29
29.24	850	32.16	848.87	34.54	848	38.36	846.65	40.67	845.75
43.75	844.74	45.45	844.19	46.04	844	46.91	843.92	52.17	843.46
53.75	843.38	68.11	842.12	68.55	842.08	68.78	842.06	68.89	842.06
69.33	842	75.99	840.14	76.64	840	77.74	839.66	82.19	838.19
85.65	838.19	86.76	838.17	87.61	838.7	88.56	839.22	90.01	840
92.07	841.46	92.83	842	119.09	842	143.01	842	151.56	842.72
162.98	843.81	164.04	843.9	164.46	843.94	165.05	844	170.56	844
187.25	844.26	189.41	844.27	189.76	844.27	190.25	844.27	191.13	844.26
193.13	844.22	201.67	844.08	202.76	844.05	204.4	844	207.8	843.89
209.87	843.81	212.33	843.72	218.23	843.42	219.04	843.39	226.47	842.92
227.32	842.85	228.08	842.78	229.95	842.68	231.11	842.69	232.69	842.79
233.69	842.9	239.21	842.86	251.28	842.69	252.28	842.75	253.24	842.49
254.89	842.1	255.19	842	265.84	842	286.65	842.6	288.68	842.65
292.29	842.7	296.15	842.75	298.64	842.8	302.02	842.84	305.08	842.92
309.02	843.03	311.43	843.07	316.18	843.24	322.02	843.5	325.11	843.53
330.81	843.86	331.16	843.86	333.54	844	339.66	845.13	343.55	846
344.26	846.17	351.49	848	360.88	850				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.11	.03	92.83	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
68.11 92.83 85.9 44.96 12.86 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
162.98	360.88	844	F

Blocked Obstructions num= 1

Sta L	Sta R	Elev
165.052	188.765	855

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	842.29	Reach Len. (ft)	85.90	44.96	12.86
Crit W.S. (ft)	841.39	Flow Area (sq ft)	0.17	60.26	15.11
E.G. Slope (ft/ft)	*0.003315	Area (sq ft)	0.17	60.26	19.82
Q Total (cfs)	313.80	Flow (cfs)	0.03	297.91	15.86
Top Width (ft)	102.16	Top Width (ft)	1.95	24.72	75.49
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	0.17	4.94	1.05
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)	0.09	2.44	0.28
Conv. Total (cfs)	5450.1	Conv. (cfs)	0.5	5174.1	275.5
Length Wtd. (ft)	44.15	Wetted Per. (ft)	1.96	26.40	53.65
Min Ch El (ft)	838.17	Shear (lb/sq ft)	0.02	0.47	0.06
Alpha	1.35	Stream Power (lb/ft s)	360.88	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.02	0.25	0.04
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	0.09	0.04

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: Unt to Doston
REACH: Lower RS: 1284.508

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.63	858	3.93	857.83	7.25	856	11.06	854.12
11.3	854	12.65	853.35	15.47	852	16.35	851.59	19.69	850
22.43	848.73	23.97	848	29.25	846.11	29.55	846	30.08	845.86
36.99	844	39.56	842.93	40.61	842.46	41.62	842	43.05	842
49.48	843.91	49.76	844	50.89	844	55.47	843.33	64	842
67.71	841.11	72.37	840	75.4	838.24	75.83	838	76.31	837.7
76.49	837.59	80.82	837.77	81.02	837.92	81.15	838	83.96	839.96
84.01	840	84.13	840.08	85.83	841.26	86.9	842	114.44	842
145.88	842	172.17	841.71	172.55	841.71	178.78	841.75	184.41	841.79
187.13	841.76	190.83	841.79	194.9	841.83	197.36	841.88	199.46	841.89
205.5	841.95	208.94	842	227.49	842	229.55	842.05	230.89	842.08
231.29	842.09	231.42	842.09	231.62	842.09	232.38	842.08	234.47	842.07
242.26	842.01	243.03	842	243.28	842	248.65	841.9	249.87	841.98
250.49	841.81	257.23	841.99	257.37	842	286.25	842	291.25	842.08

291.59	842.09	292.04	842.11	297.25	842.21	298.29	842.25	299.65	842.31
311.22	842.51	313.41	842.64	317.12	842.72	320.12	842.9	323.88	843.12
327.55	843.34	329.73	843.45	332.07	843.61	333.74	843.71	334.47	843.76
337.8	843.93	337.89	843.94	338.07	843.95	339.16	844	342.78	844.7
347.37	845.89	347.68	845.96	347.83	846	354.69	847.59	355.24	847.71
356.52	848	359.68	848.56	361.85	848.89	364.43	849.3	369.16	850

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	64	.03	86.9	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64	86.9	145.32 153.75	10.92	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	842.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	841.30	Reach Len. (ft)	145.32	153.75	10.92
Crit W.S. (ft)	841.30	Flow Area (sq ft)		38.49	
E.G. Slope (ft/ft)	*0.012003	Area (sq ft)		38.49	
Q Total (cfs)	313.80	Flow (cfs)		313.80	
Top Width (ft)	18.98	Top Width (ft)		18.98	
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	2864.2	Conv. (cfs)		2864.2	
Length Wtd. (ft)	107.38	Wetted Per. (ft)		20.90	
Min Ch El (ft)	837.59	Shear (lb/sq ft)		1.38	
Alpha	1.00	Stream Power (lb/ft s)	369.16	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.02	0.19	0.04
C & E Loss (ft)	0.30	Cum SA (acres)	0.02	0.07	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water
surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Unt to Doston

REACH: Lower RS: 1128.537

INPUT
Description:
Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	3.82	858	5.15	857.34	7.87	856	9.02	855.43
11.91	854	13.96	852.98	15.94	852	18.64	850.66	19.97	850
23.16	848.41	23.99	848	24.8	847.64	28.53	846	29.16	845.73
33.19	844	33.3	843.99	34.17	843.88	39.82	843.23	49.17	842.15
50.56	842	63.79	840.54	68.71	840	71.35	838.02	71.38	838
71.46	837.97	73.22	837.28	74.18	836.91	74.98	836.73	76.21	836.57
81.66	837.47	84.51	838	85.03	838.2	86.13	838.86	87.33	839.52
88	840	116.55	840	143.04	840	149.01	839.95	149.24	839.95
151.71	839.97	151.87	839.97	155.1	839.98	155.15	839.98	160.09	840
174.23	840	177.87	839.95	177.92	839.95	184.19	839.86	189.92	839.76
193.68	839.85	199.64	839.8	215.13	839.79	221.66	839.9	224.62	839.9
228.2	839.89	239.11	839.96	240.05	840.12	240.52	840.08	258.33	840.57
261.05	840.65	261.99	840.68	262.65	840.7	262.7	840.7	262.71	840.7
262.72	840.7	262.74	840.7	262.77	840.7	262.82	840.69	262.88	840.69
262.95	840.69	263.01	840.69	263.32	840.68	271.64	840.43	299.17	840.97
312.76	841.23	350.43	842	350.64	842	376.13	843.15	384.46	843.55
393.91	844	398.12	845.53	399.43	846	406	848	410.95	848.95
416.25	850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	68.71	.03	88	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
68.71	88	269.61	129.01	6.27	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
311.403	367.363	850

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	841.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.100	0.030	0.035
W.S. Elev (ft)	841.49	Reach Len. (ft)	0.00	0.00	0.00
Crit W.S. (ft)		Flow Area (sq ft)	10.09	71.64	296.14
E.G. Slope (ft/ft)	0.000181	Area (sq ft)	10.09	71.64	296.14
Q Total (cfs)	313.80	Flow (cfs)	1.65	108.52	203.63
Top Width (ft)	256.22	Top Width (ft)	13.52	19.29	223.40
Vel Total (ft/s)	0.83	Avg. Vel. (ft/s)	0.16	1.51	0.69
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)	0.75	3.71	1.33
Conv. Total (cfs)	23356.5	Conv. (cfs)	122.7	8077.0	15156.8
Length Wtd. (ft)	0.00	Wetted Per. (ft)	13.61	20.86	223.73
Min Ch El (ft)	836.57	Shear (lb/sq ft)	0.01	0.04	0.01

* Alpha	1.60	* Stream Power (lb/ft s)	416.25	0.00	0.00
* Frctn Loss (ft)	0.00	* Cum Volume (acre-ft)			
* C & E Loss (ft)	0.04	* Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:Dotson Run

Reach	River Sta.	n1	n2	n3
Upper	3183.868	.035	.03	.1
Upper	3053.784	.035	.03	.1
Upper	2888.080	.035	.03	.1
Upper	2799.727	.035	.03	.1
Upper	2775.485	.035	.03	.1
Upper	2761.408	.035	.03	.1
Upper	2759.869	.035	.03	.1
Upper	2705.342	.035	.03	.1
Upper	2656.729	.035	.03	.1
Upper	2587.689	.035	.03	.1
Upper	2586.252	.035	.03	.1
Upper	2570.250	.035	.03	.1
Upper	2569.491	.035	.03	.1
Upper	2539.448	.035	.03	.1
Upper	2481.906	.035	.03	.1
Upper	2412.823	.035	.03	.1
Upper	2410.917	.035	.03	.1
Upper	2333.304	.035	.03	.1
Upper	2270.249	.035	.03	.1
Upper	2193.833	.035	.03	.1
Upper	2151.343	.035	.03	.035
Upper	2088.858	.035	.03	.035
Upper	2019.079	.035	.03	.035
Upper	1977.49	Culvert		
Upper	1943.117	.035	.03	.035
Upper	1929.28	Culvert		
Upper	1915.038	.035	.03	.035
Upper	1878.276	.035	.03	.035
Upper	1683.45	Culvert		
Upper	1487.336	.1	.03	.1
Upper	1440.621	.1	.03	.035
Lower	1400.977	.1	.03	.035
Lower	1370.77	Bridge		
Lower	1344.212	.1	.03	.035
Lower	1289.476	.1	.03	.035
Lower	1271.523	.1	.03	.035
Lower	1182.267	.1	.03	.035
Lower	1143.687	.1	.03	.035
Lower	1130.779	.1	.03	.035

*Lower	*	1059.794	* .1*	.03*	.035*
*Lower	*	1000.000	* .1*	.03*	.035*

River:Unt to Doston

Reach	River Sta.	n1	n2	n3
*Lower	1569.420	.1*	.03*	.035*
*Lower	1515.286	.1*	.03*	.035*
*Lower	1499.515	.1*	.03*	.035*
*Lower	1464.257	.1*	.03*	.035*
*Lower	1406.971	.1*	.03*	.035*
*Lower	1367.937	.1*	.03*	.035*
*Lower	1359.780	.1*	.03*	.035*
*Lower	1332.978	.1*	.03*	.035*
*Lower	1284.508	.1*	.03*	.035*
*Lower	1128.537	.1*	.03*	.035*

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Proposed 6x8

River: Dotson Run Reach: Upper RS: 3183.868 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 3053.784 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2888.080 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.
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.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2761.408 Profile: PF 1
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: Dotson Run Reach: Upper RS: 2759.869 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2705.342 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2656.729 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Upper RS: 2569.491 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer.

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 The
            program defaulted to critical depth.
River: Dotson Run  Reach: Upper     RS: 2410.917     Profile: PF 1
     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: Dotson Run  Reach: Upper     RS: 2333.304     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
            for the water surface and continued on with the calculations.
     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.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the
calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.
 The
            program defaulted to critical depth.
River: Dotson Run  Reach: Upper     RS: 2270.249     Profile: PF 1
     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: Dotson Run  Reach: Upper     RS: 1683.45     Profile: PF 1     Culv: Culvert #1
     Note:   During the supercritical calculations a hydraulic jump occurred inside of the culvert.
River: Dotson Run  Reach: Upper     RS: 1487.336     Profile: PF 1
     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: Dotson Run  Reach: Lower     RS: 1400.977     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Dotson Run  Reach: Lower     RS: 1344.212     Profile: PF 1
     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: Dotson Run  Reach: Lower     RS: 1289.476     Profile: PF 1
     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.
River: Dotson Run  Reach: Lower     RS: 1271.523     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used
critical depth
            for the water surface and continued on with the calculations.
     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.
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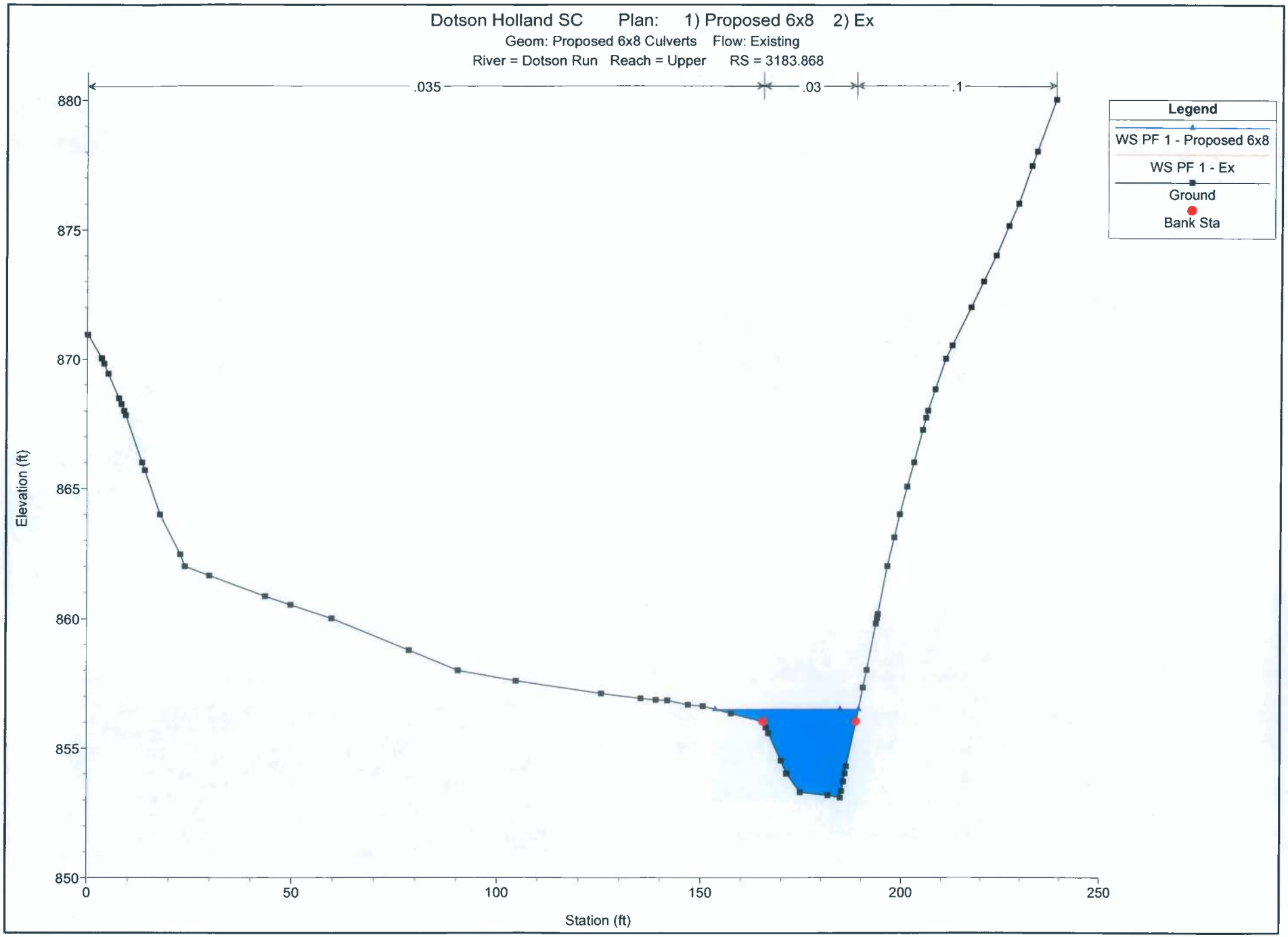
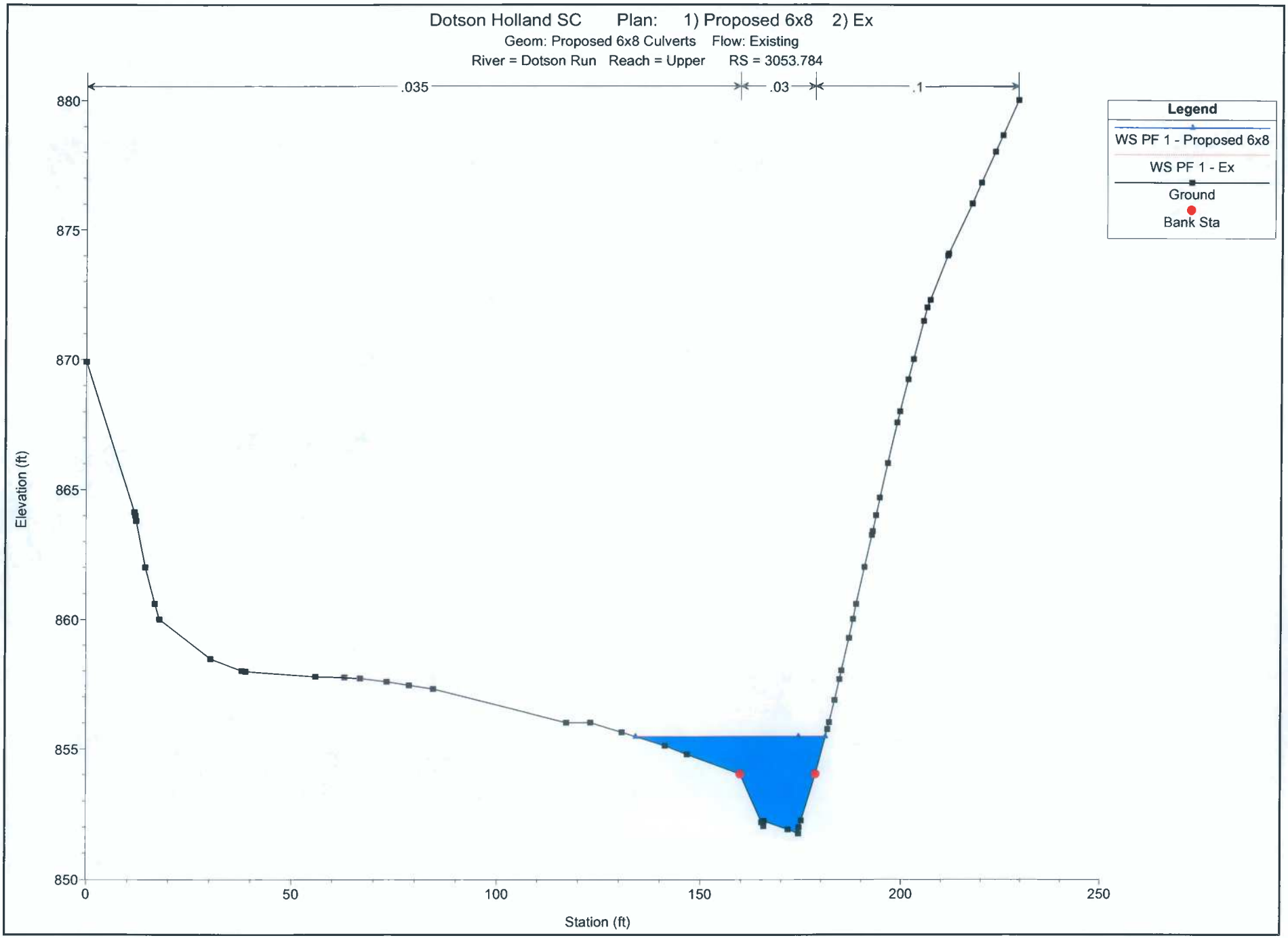
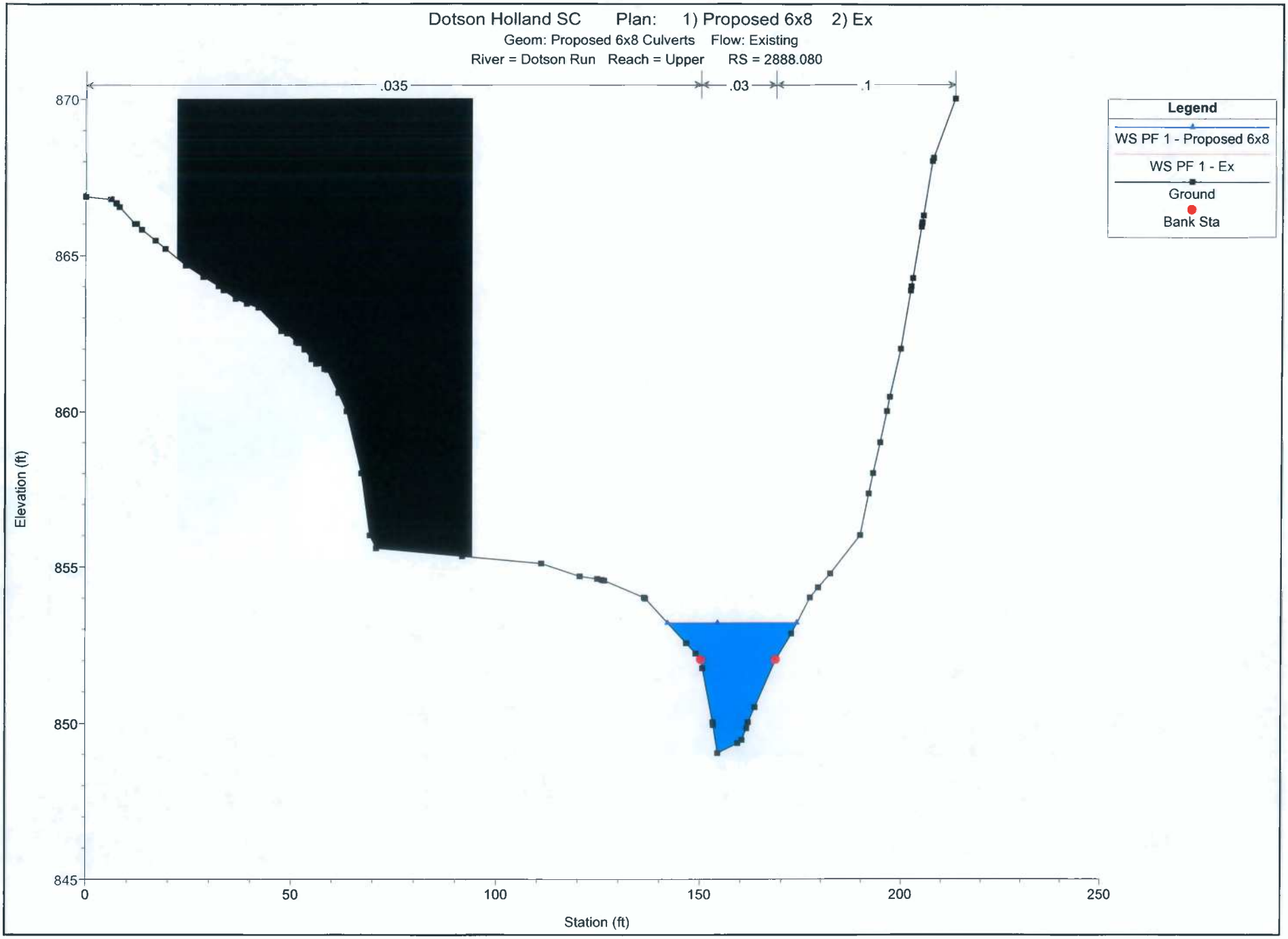
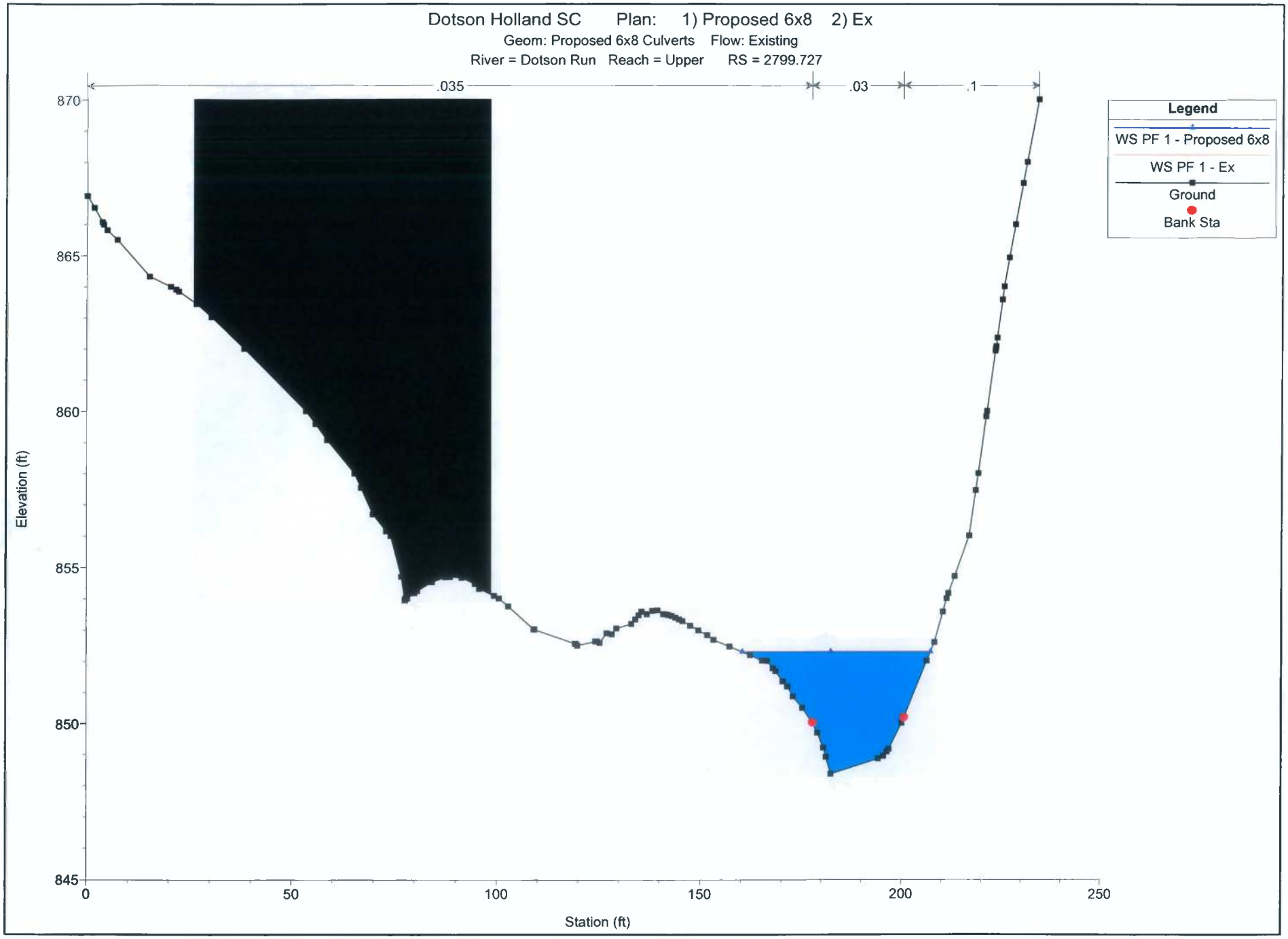
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Lower RS: 1182.267 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1143.687 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Dotson Run Reach: Lower RS: 1130.779 Profile: PF 1
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: Dotson Run Reach: Lower RS: 1059.794 Profile: PF 1
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: Unt to Doston Reach: Lower RS: 1464.257 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Unt to Doston Reach: Lower RS: 1406.971 Profile: PF 1
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: Unt to Doston Reach: Lower RS: 1367.937 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Doston Reach: Lower RS: 1359.780 Profile: PF 1

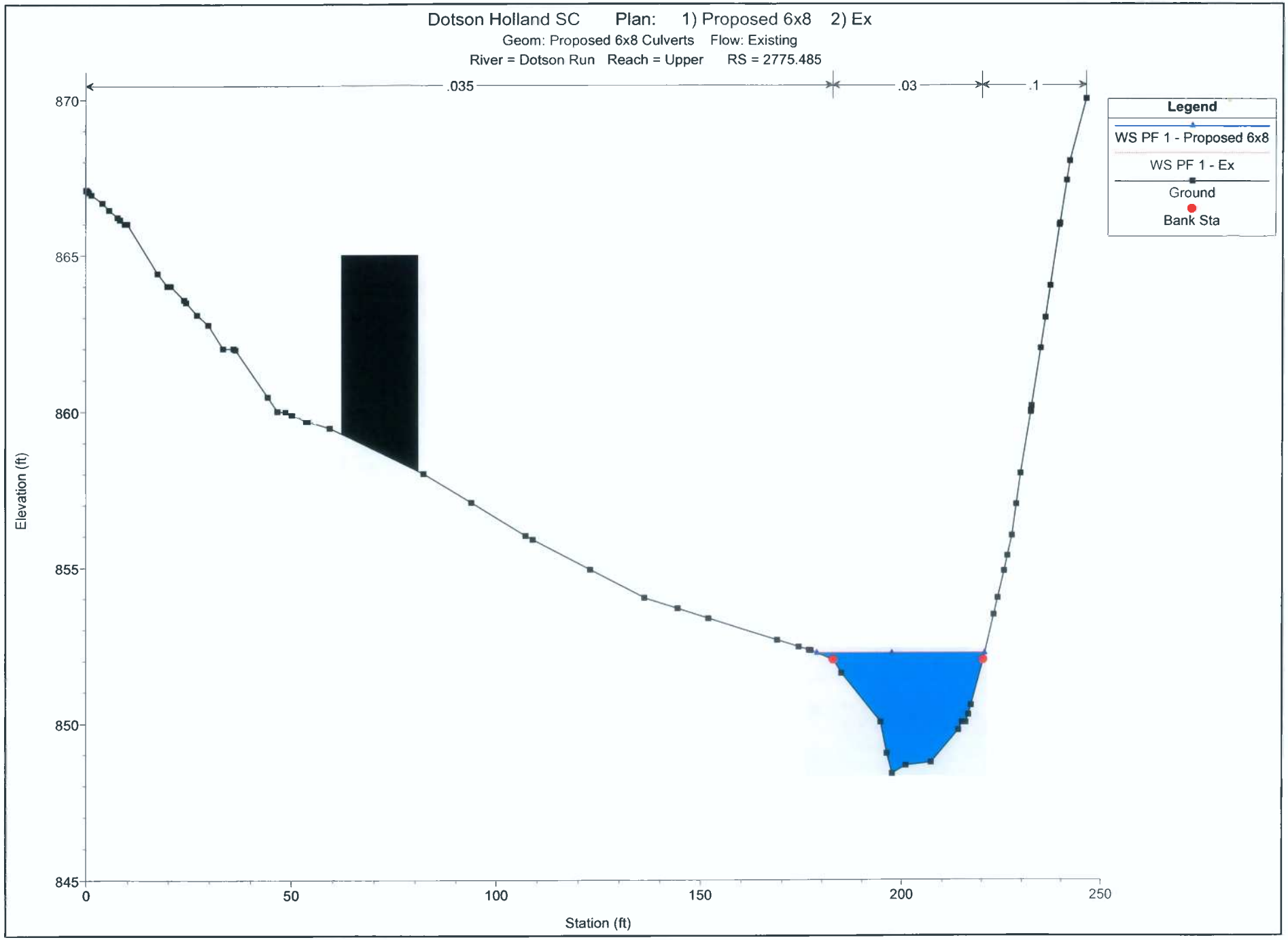
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Unt to Doston Reach: Lower RS: 1332.978 Profile: PF 1
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.
River: Unt to Doston Reach: Lower RS: 1284.508 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
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.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 3183.868
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 3053.784
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2888.080
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2799.727
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2775.485
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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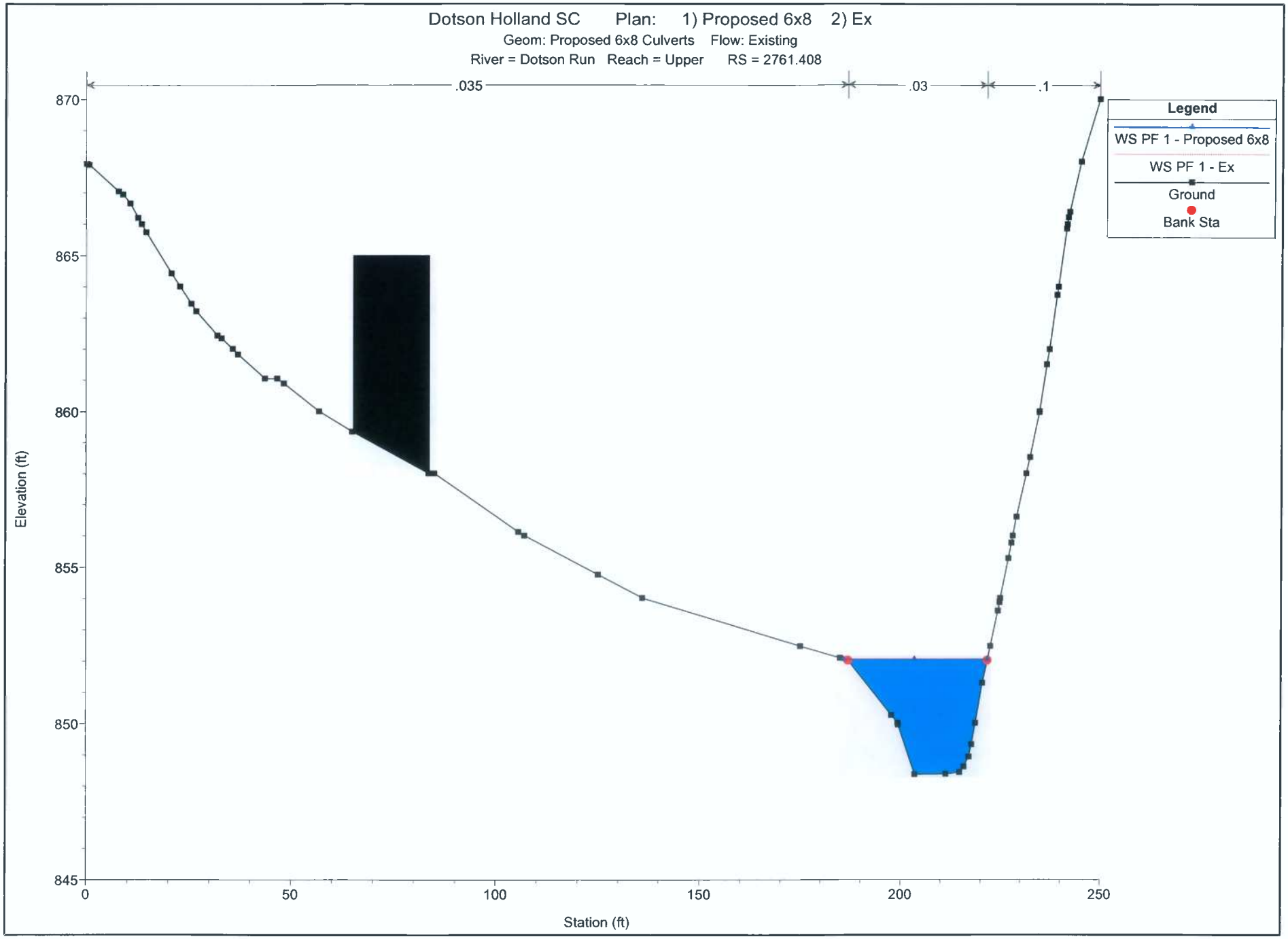
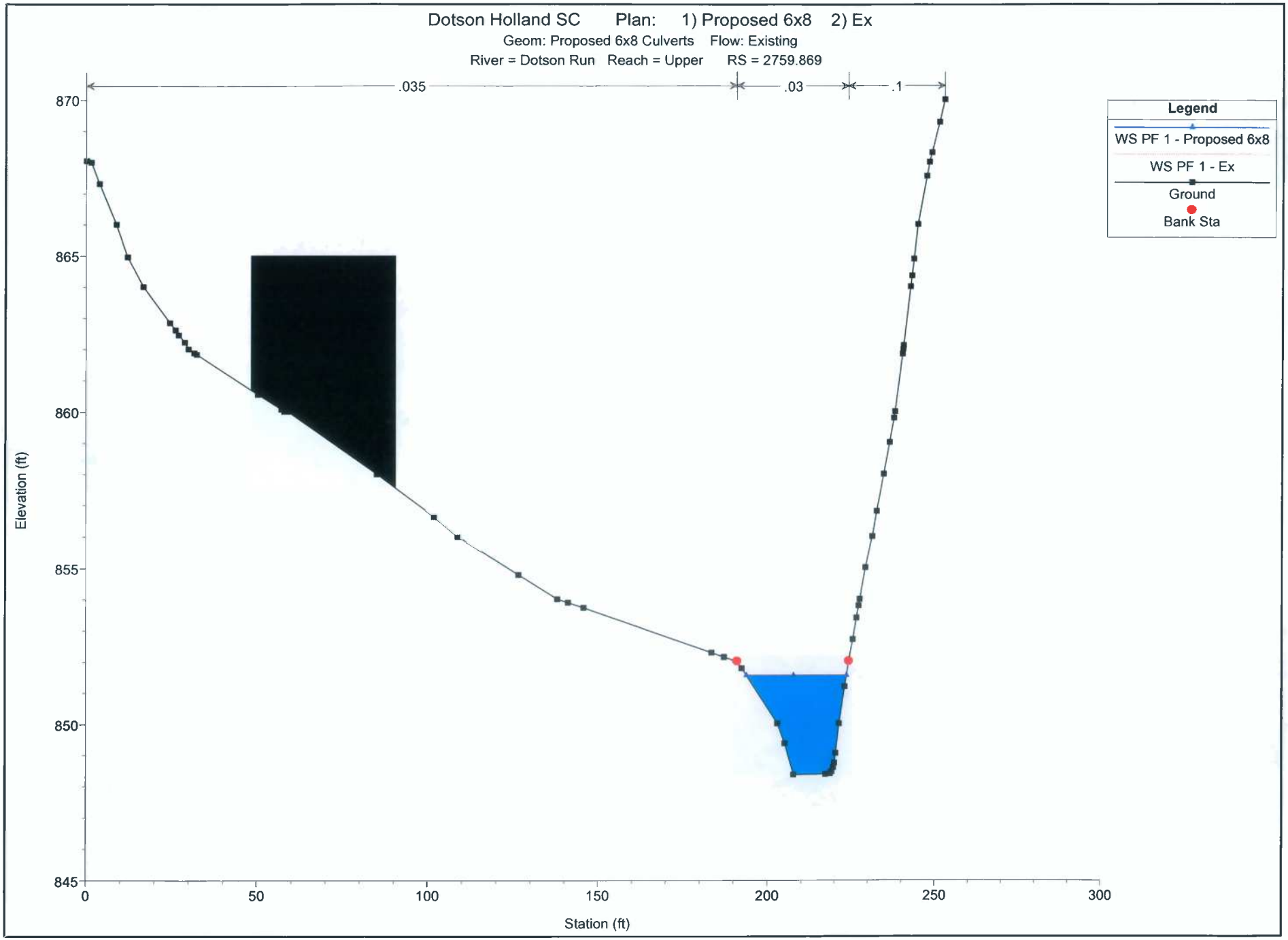
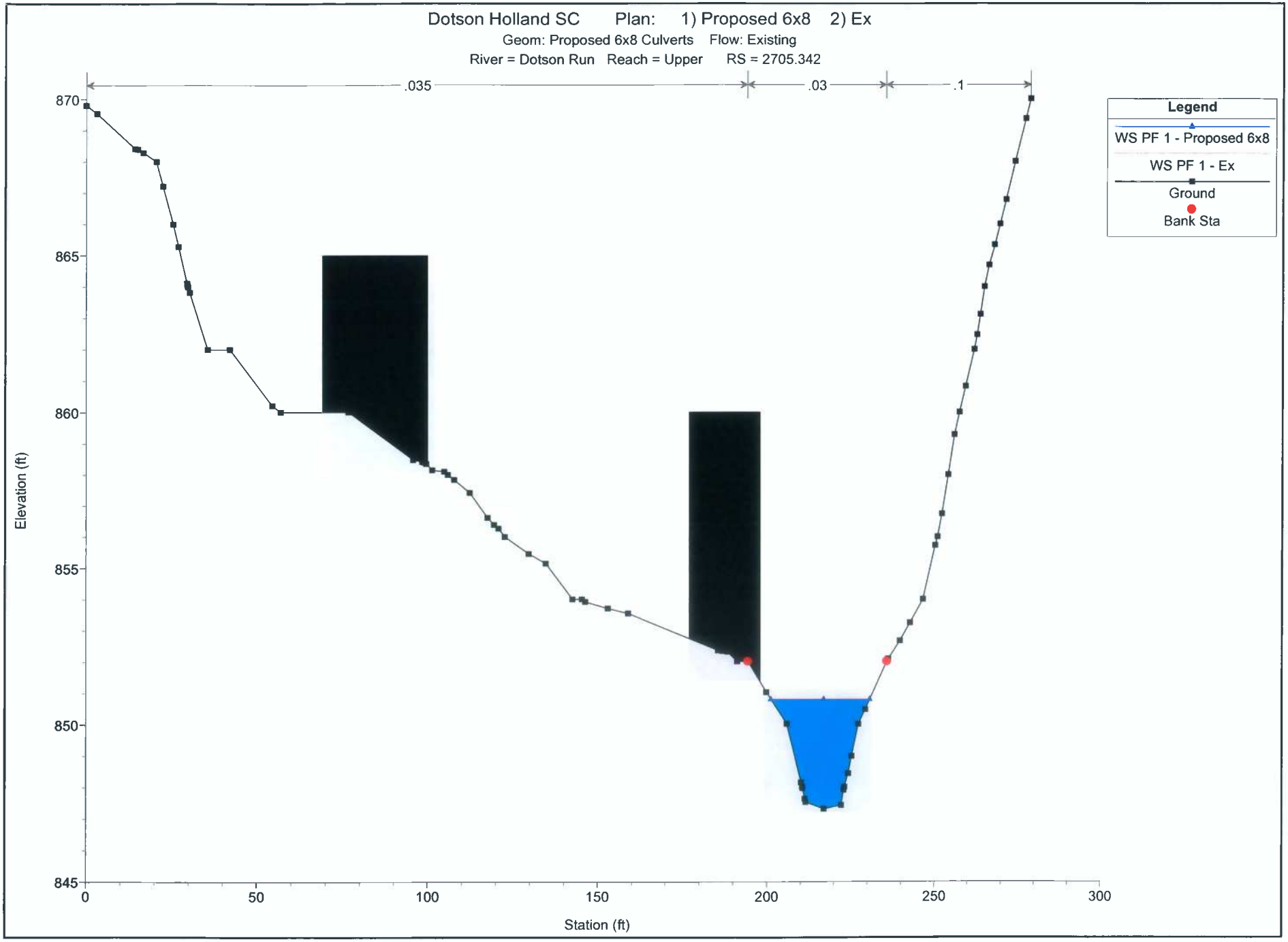
865
860
855
850
845
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2761.408
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2759.869
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2705.342
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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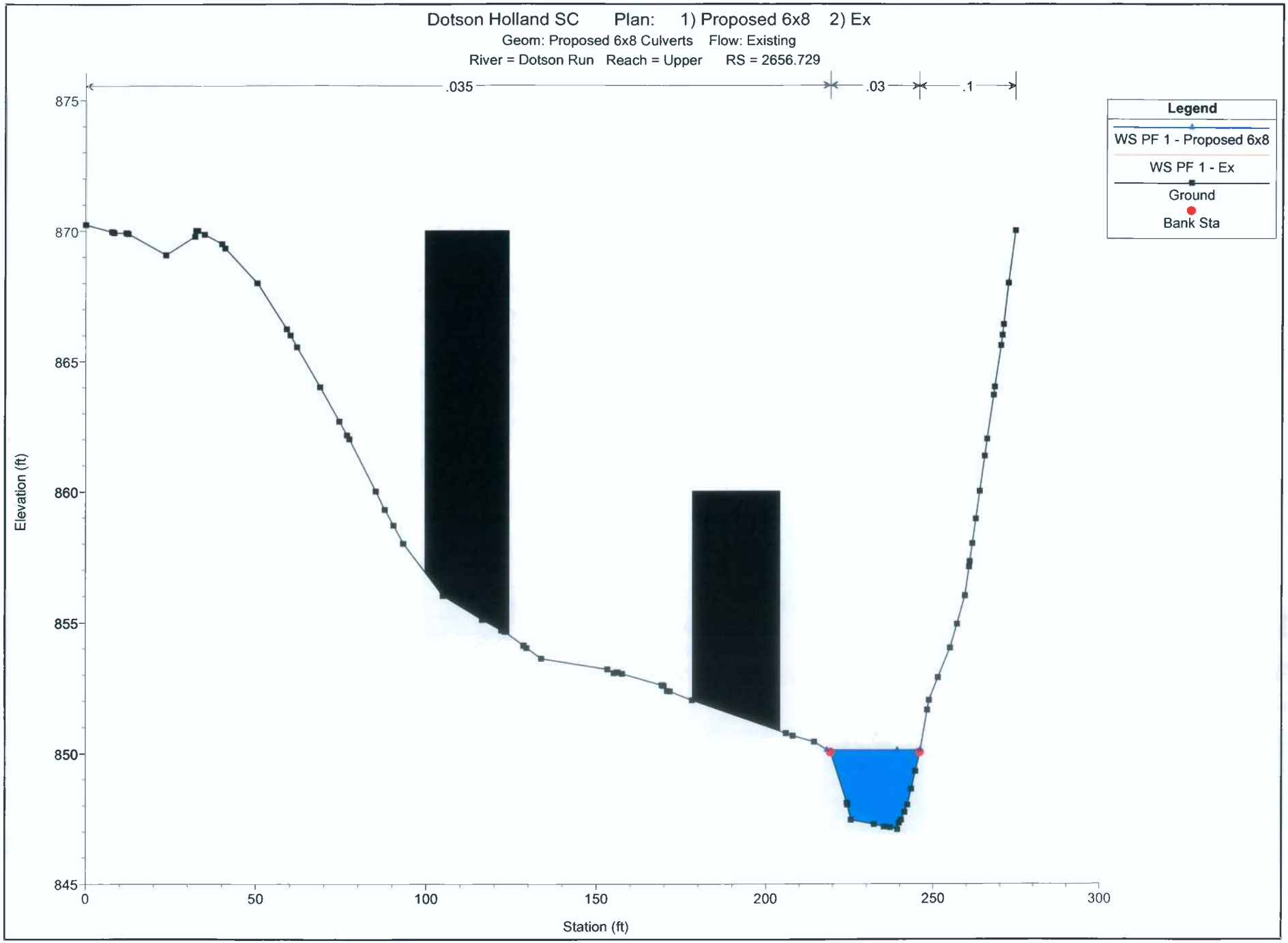
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2656.729
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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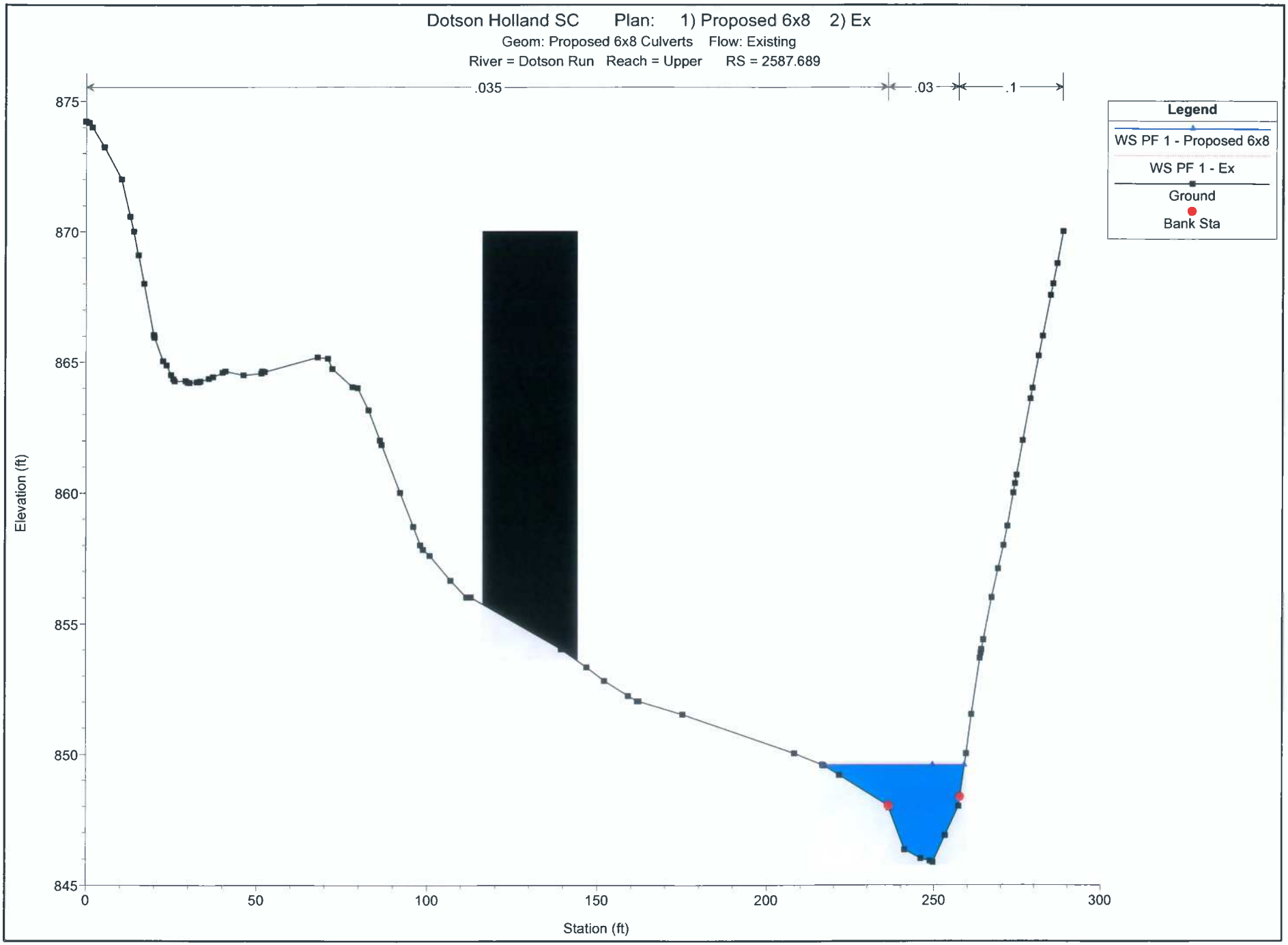
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2587.689
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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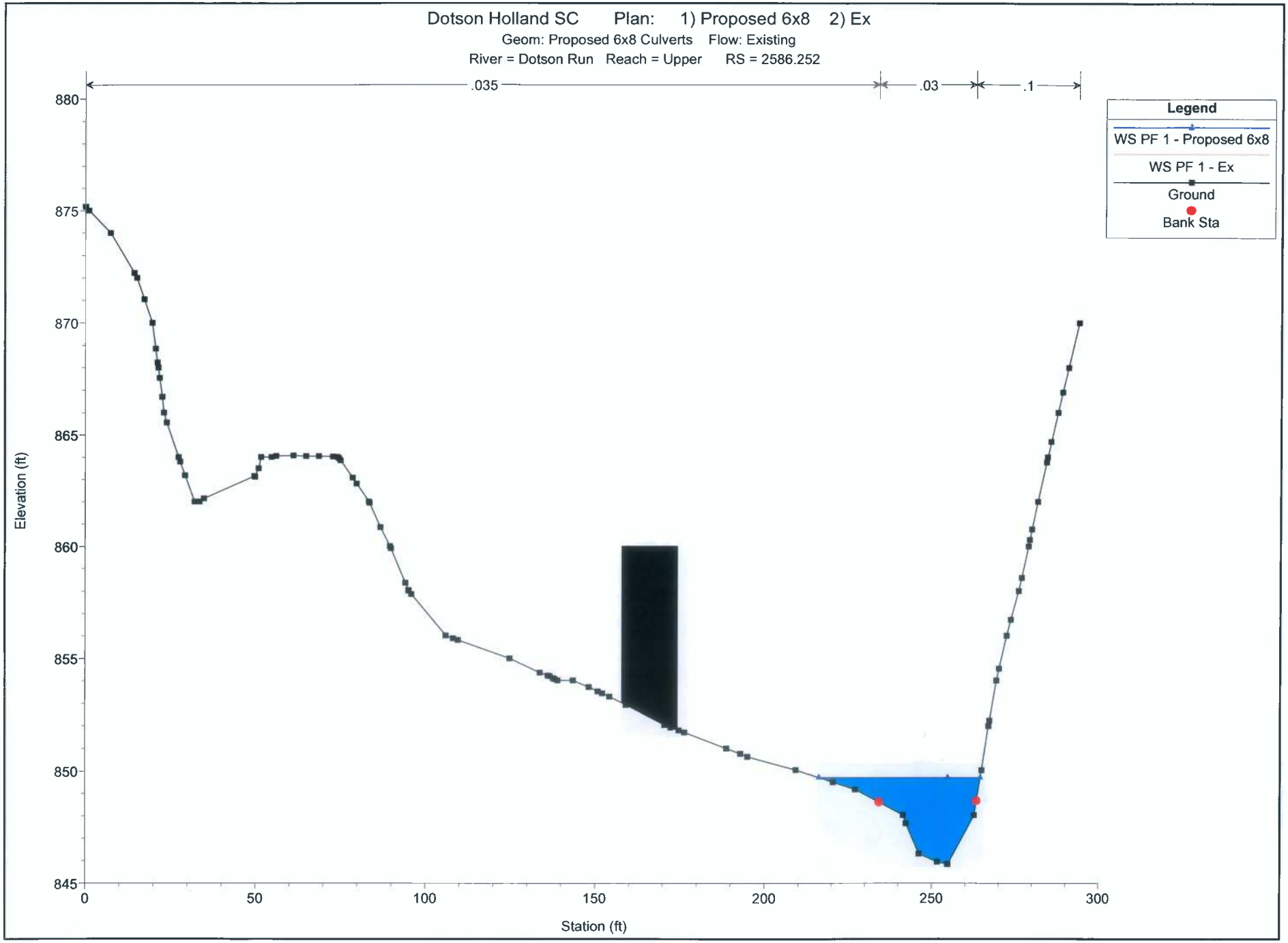
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2586.252
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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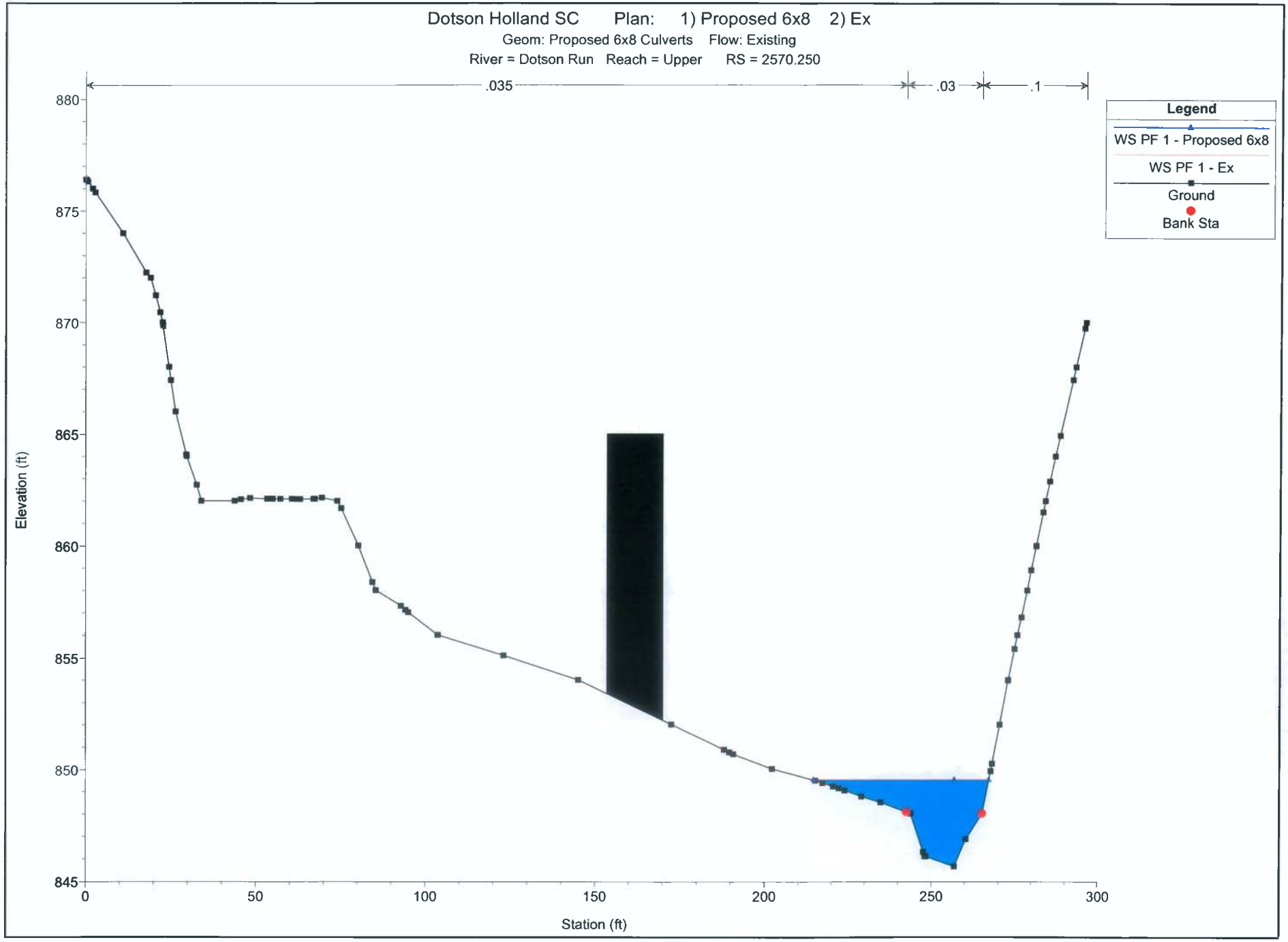
875
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2570.250
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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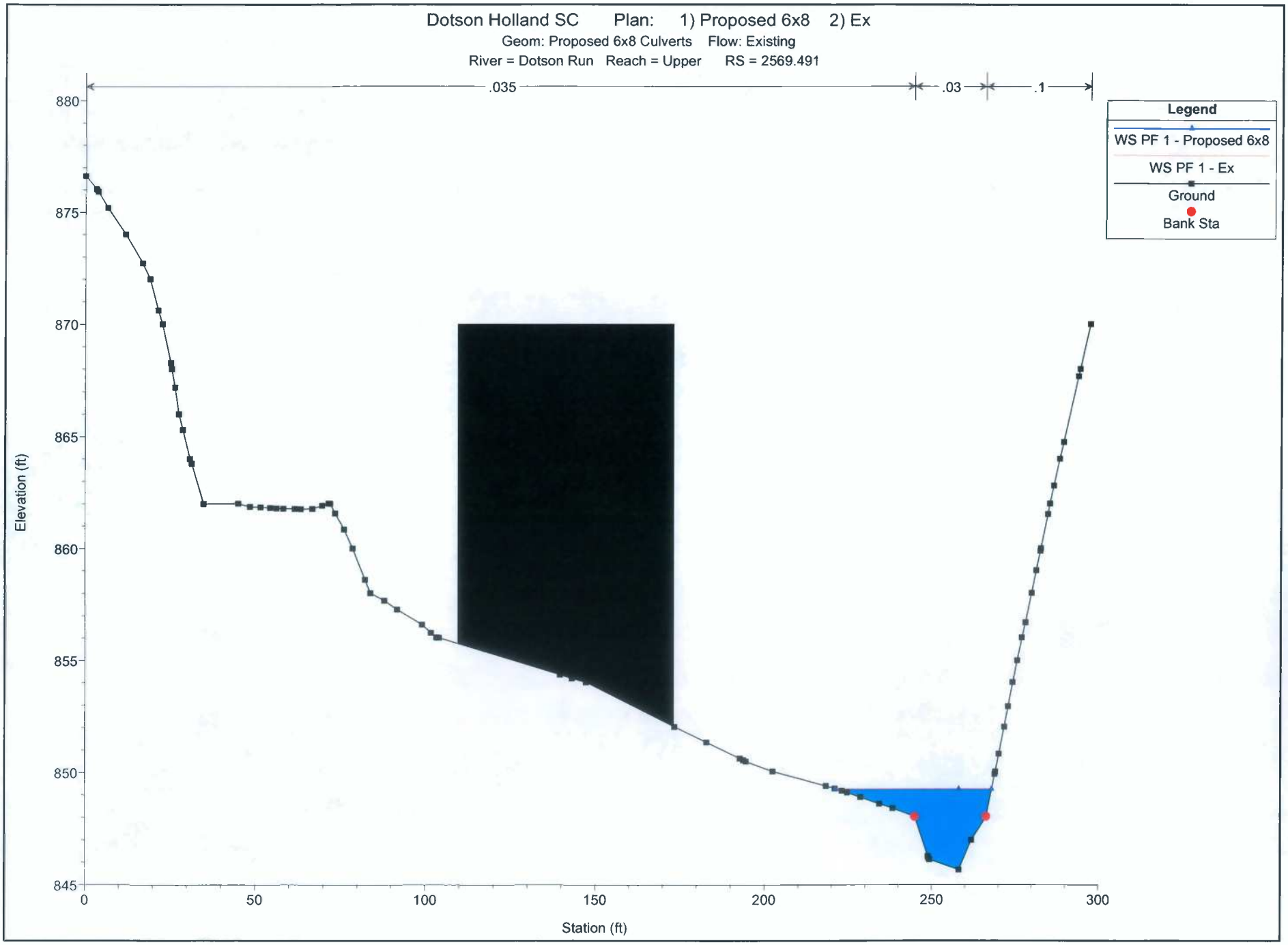
875
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2569.491
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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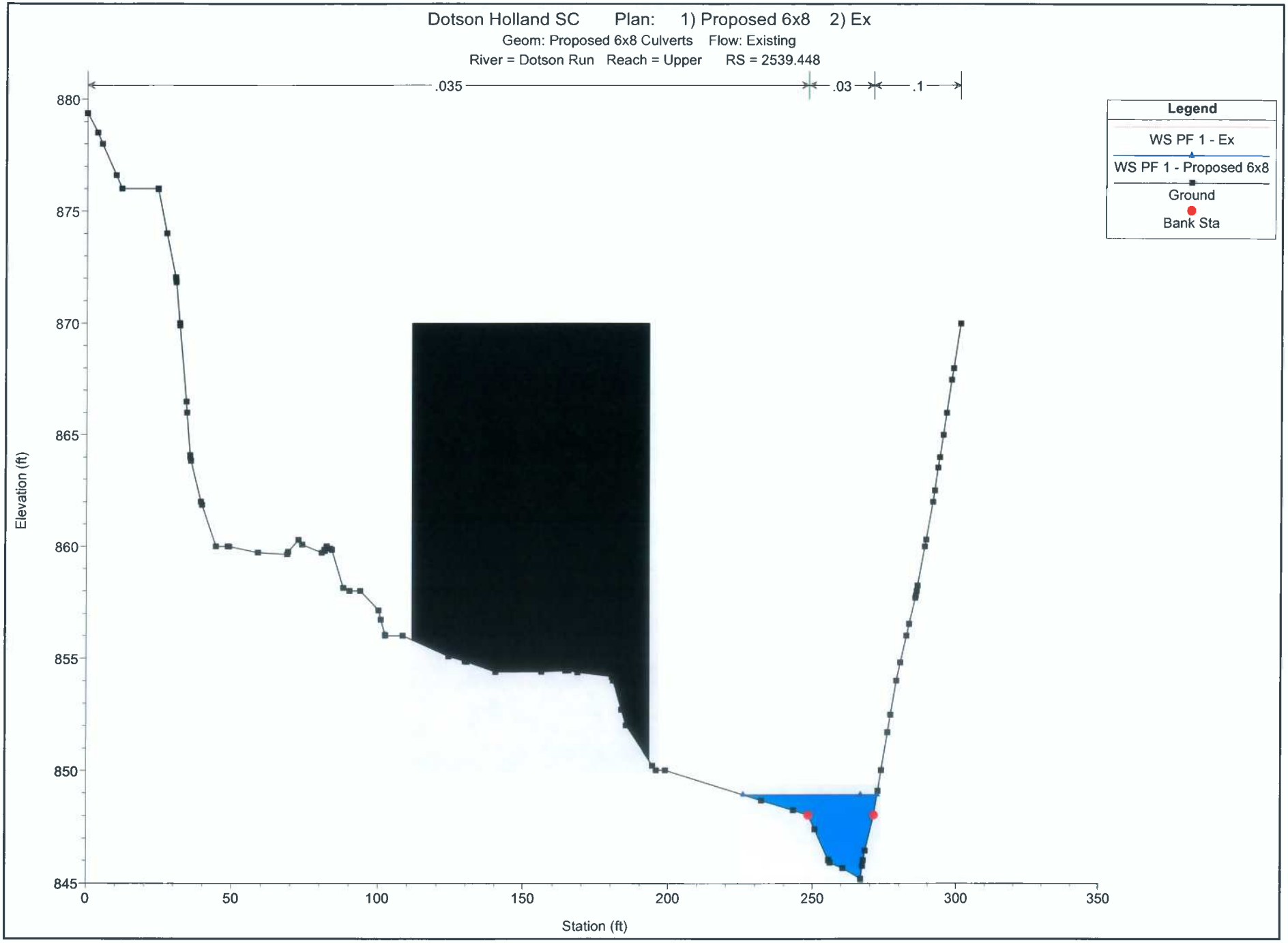
875
870
865
860
855
850
845
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2539.448
.035
.03
.1
Legend
WS PF 1 - Ex
WS PF 1 - Proposed 6x8
Ground
Bank Sta
Elevation (ft)
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875
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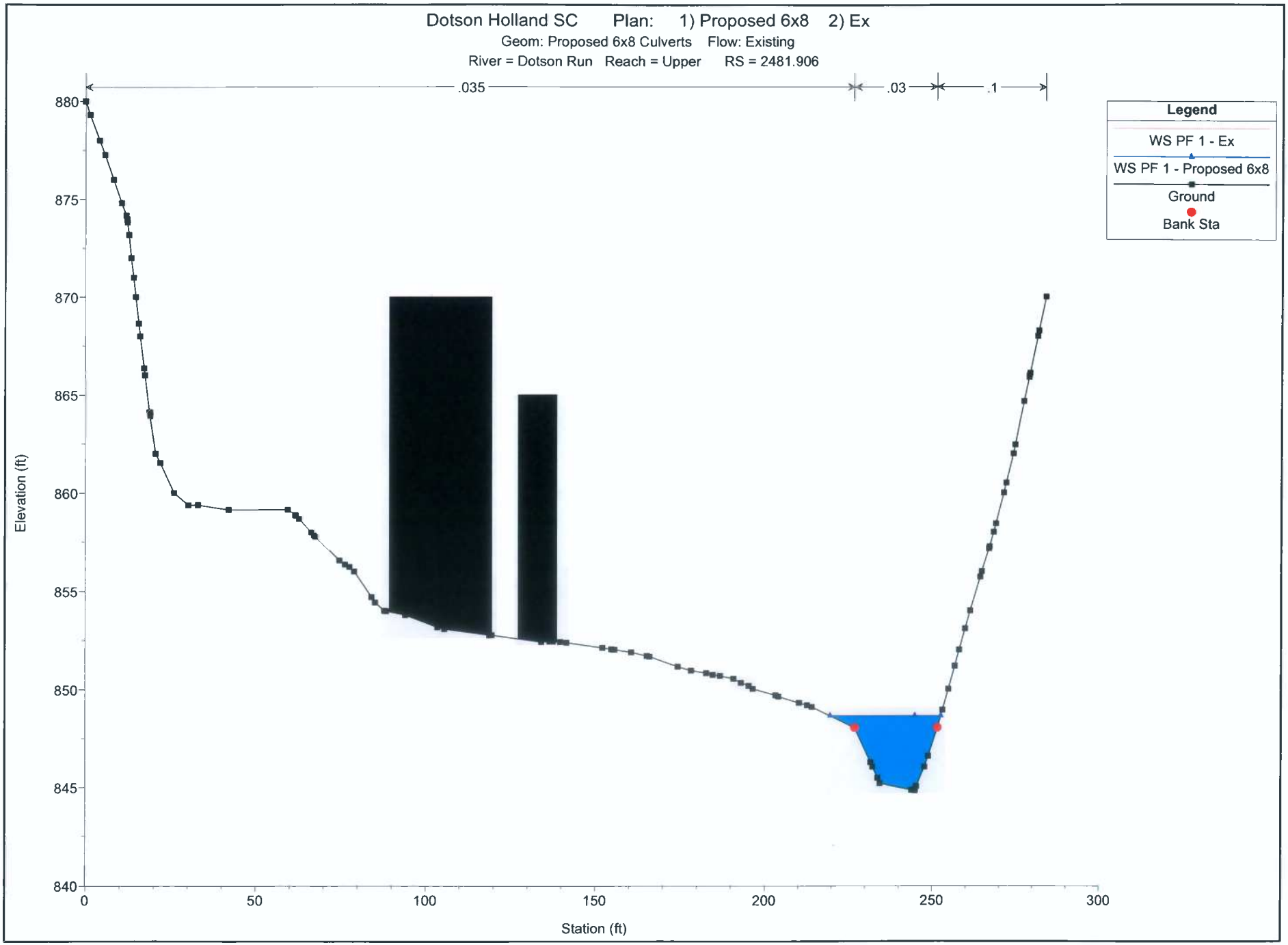
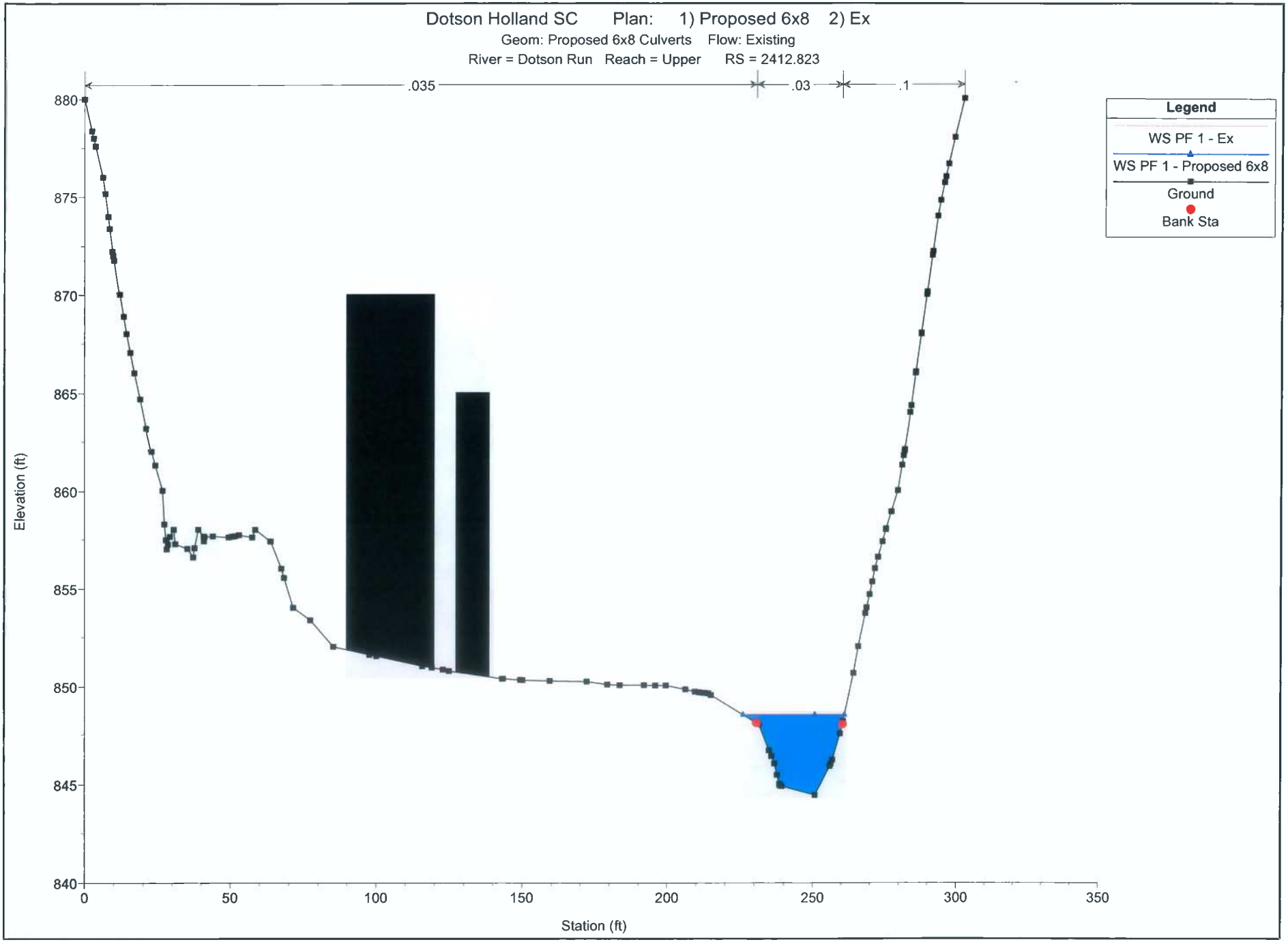
865
860
855
850
845
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2481.906
.035
.03
.1
Legend
WS PF 1 - Ex
WS PF 1 - Proposed 6x8
Ground
Bank Sta
Elevation (ft)
880
875
870
865
860
855
850
845
840
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2412.823
.035
.03
.1
Legend
WS PF 1 - Ex
WS PF 1 - Proposed 6x8
Ground
Bank Sta
Elevation (ft)
880
875
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860
855
850
845
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0
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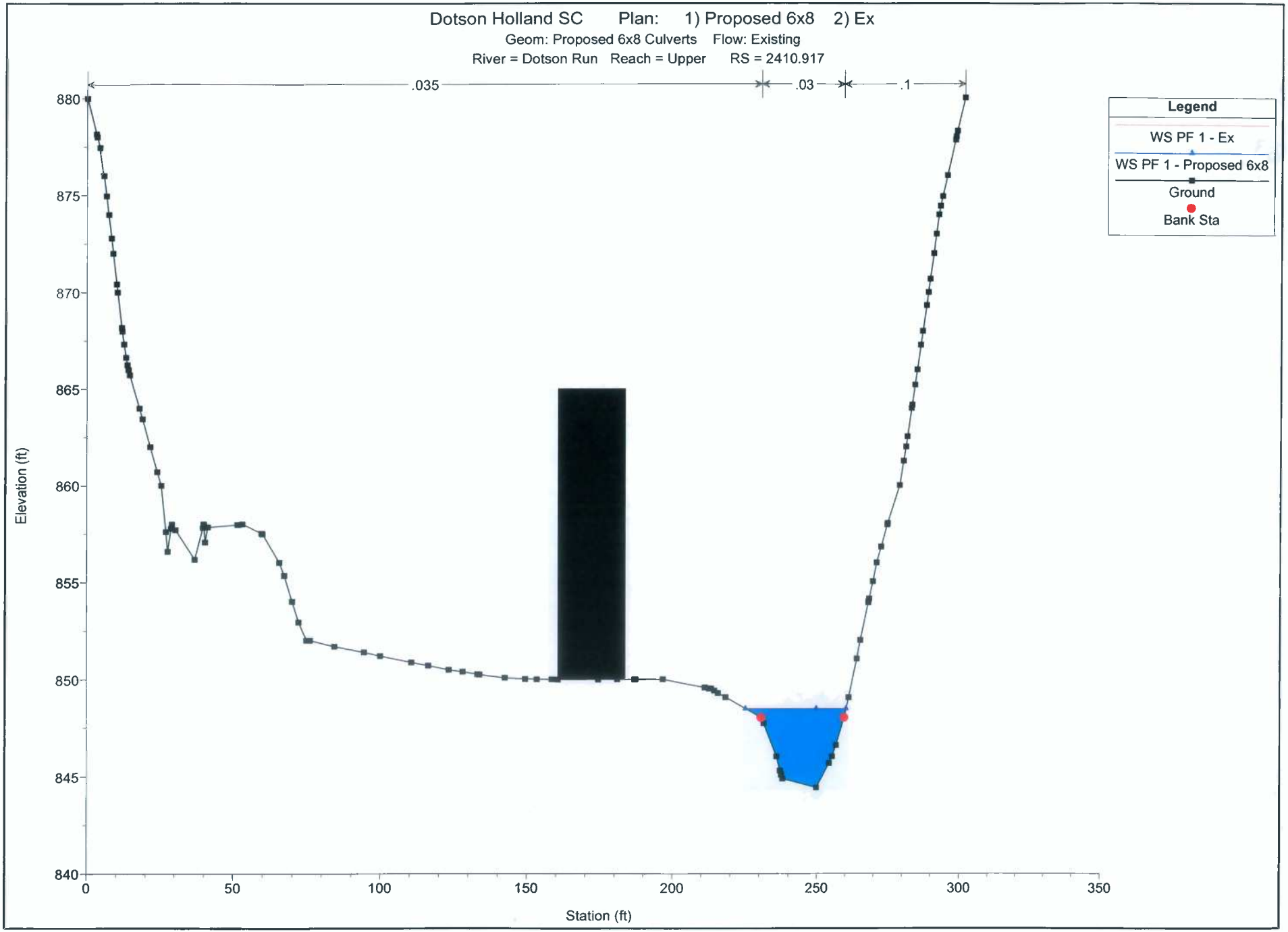
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2410.917
.035
.03
.1
Legend
WS PF 1 - Ex
WS PF 1 - Proposed 6x8
Ground
Bank Sta
Elevation (ft)
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875
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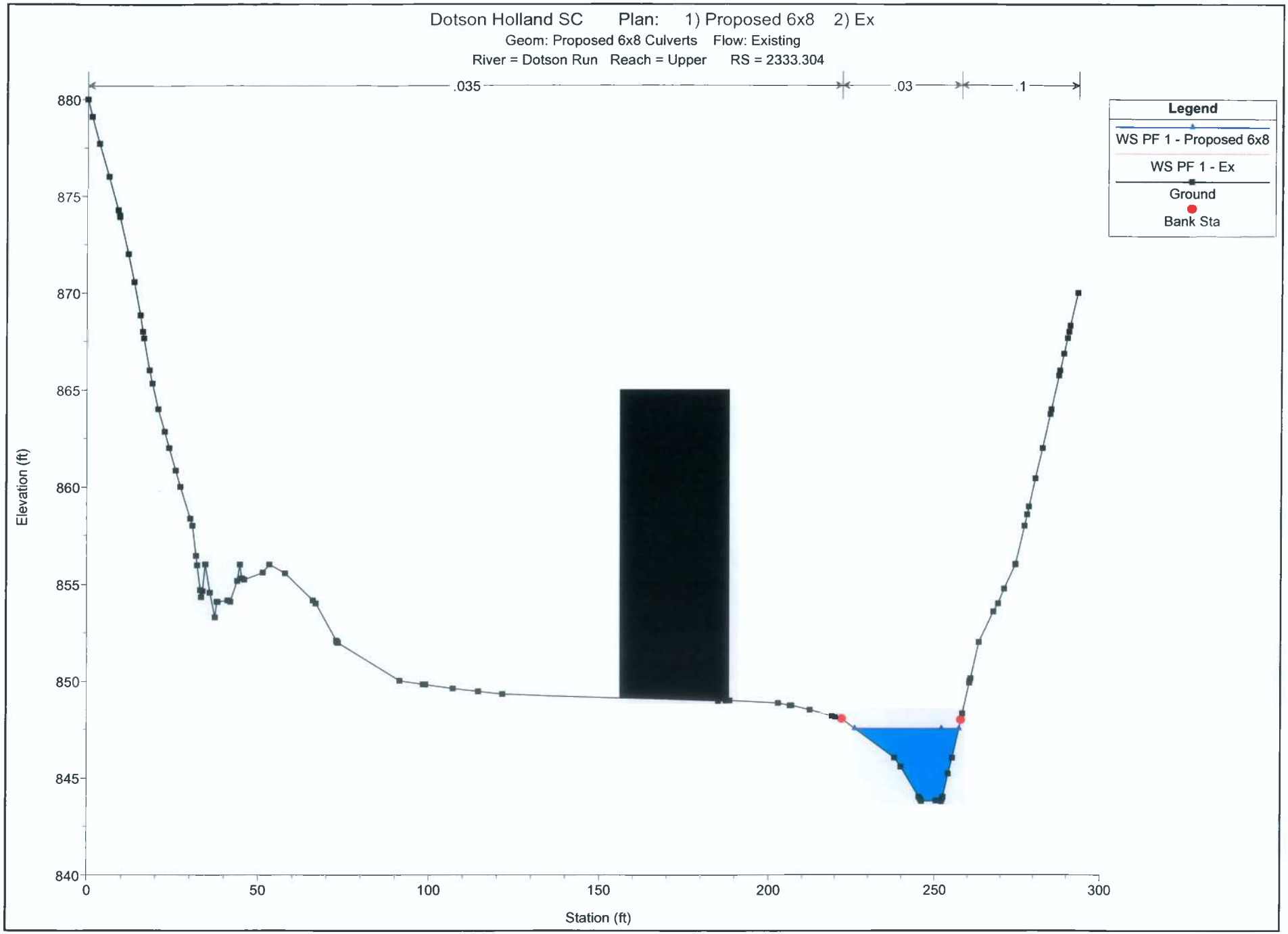
865
860
855
850
845
840
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2333.304
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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860
855
850
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840
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50
100
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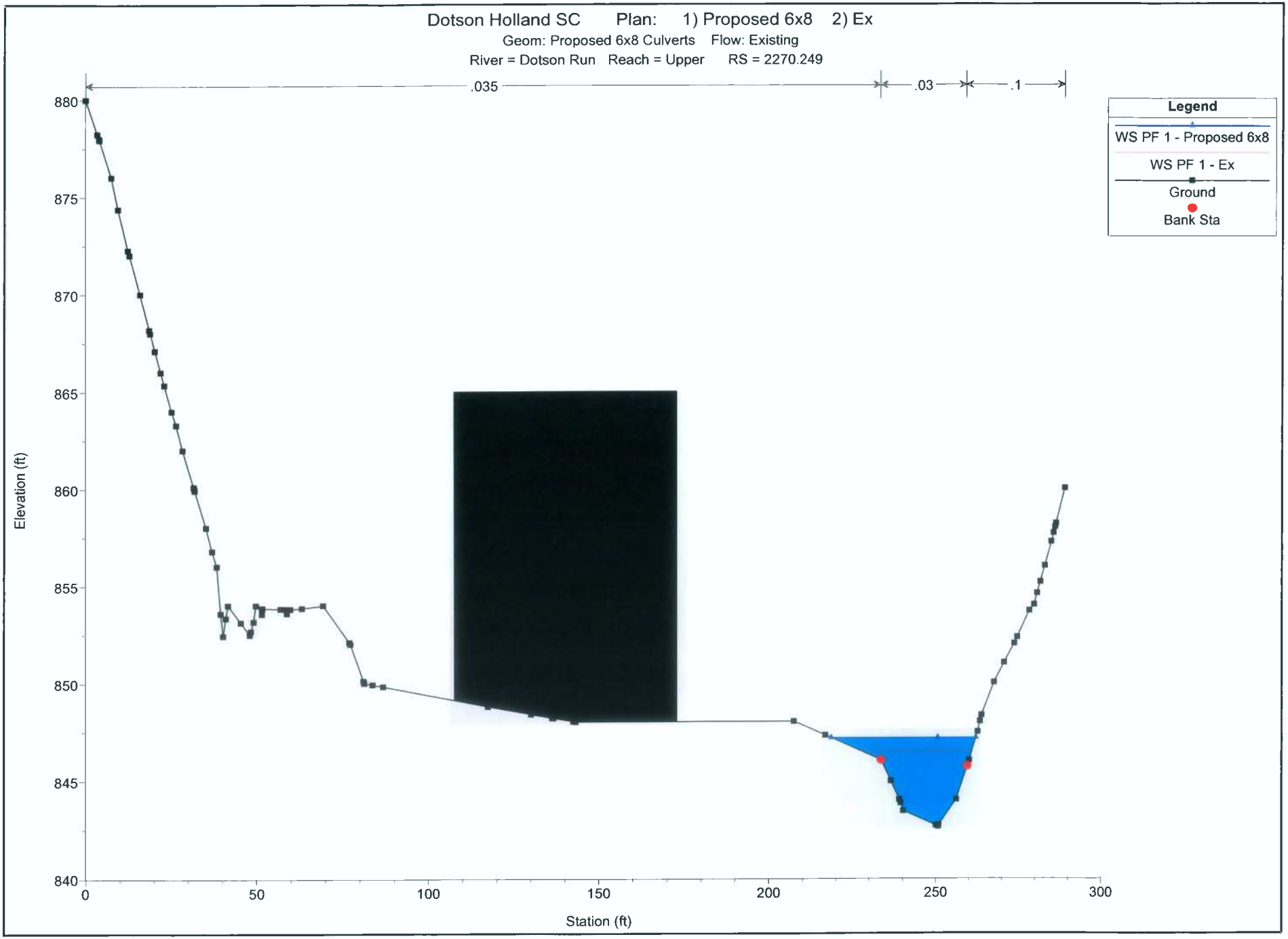
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2270.249
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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875
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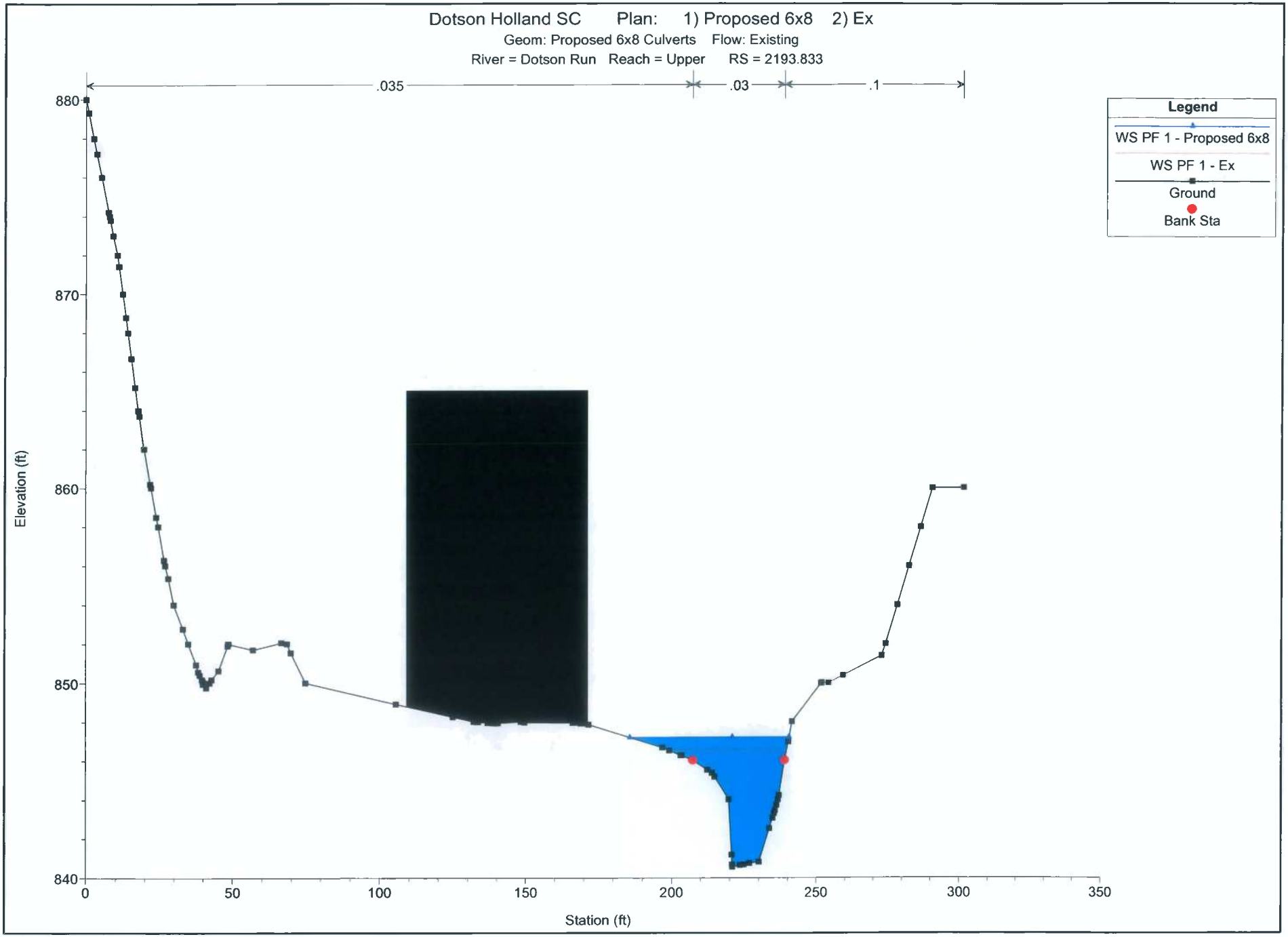
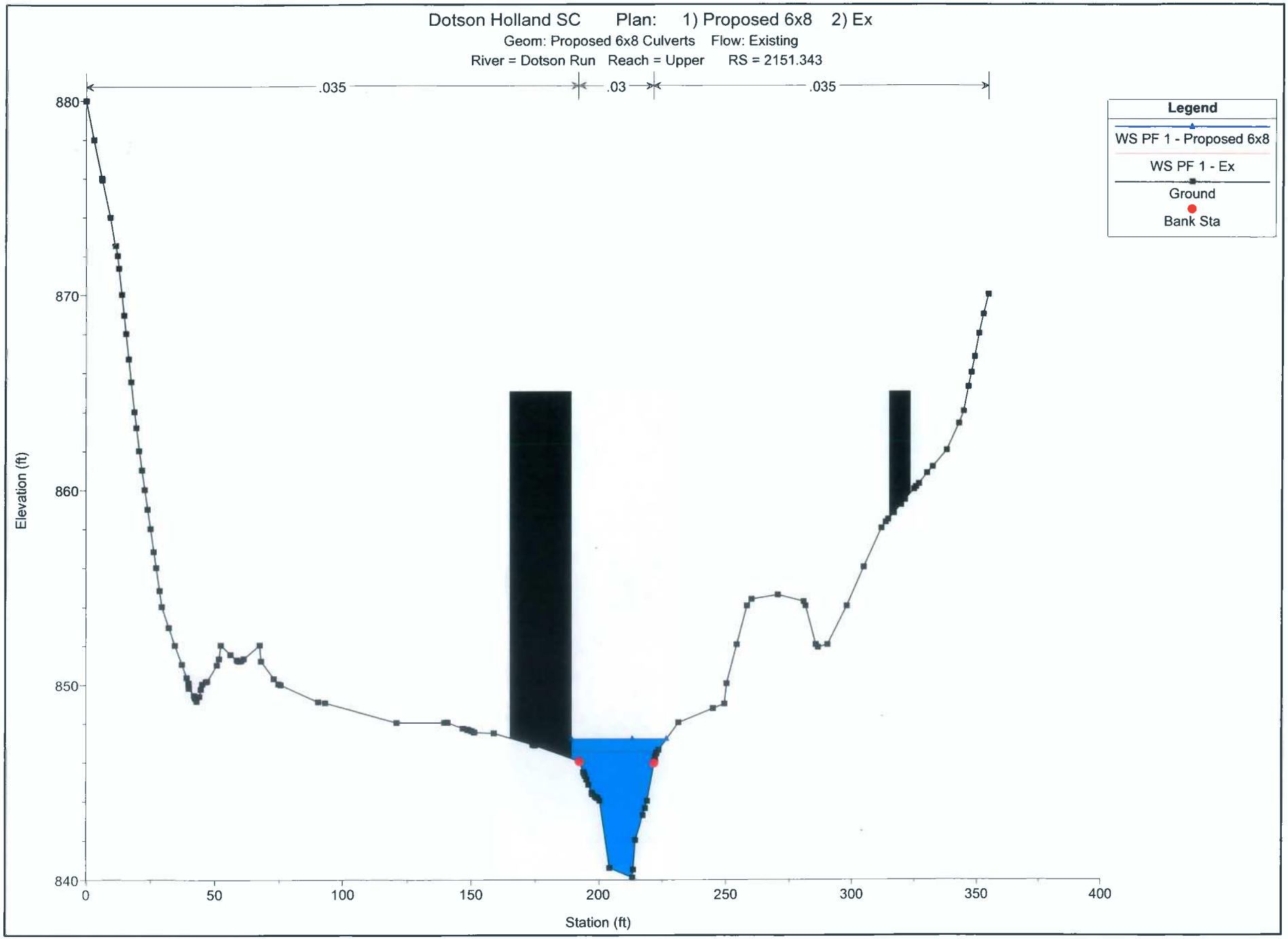
865
860
855
850
845
840
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2193.833
.035
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
880
870
860
850
840
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2151.343
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
880
870
860
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840
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150
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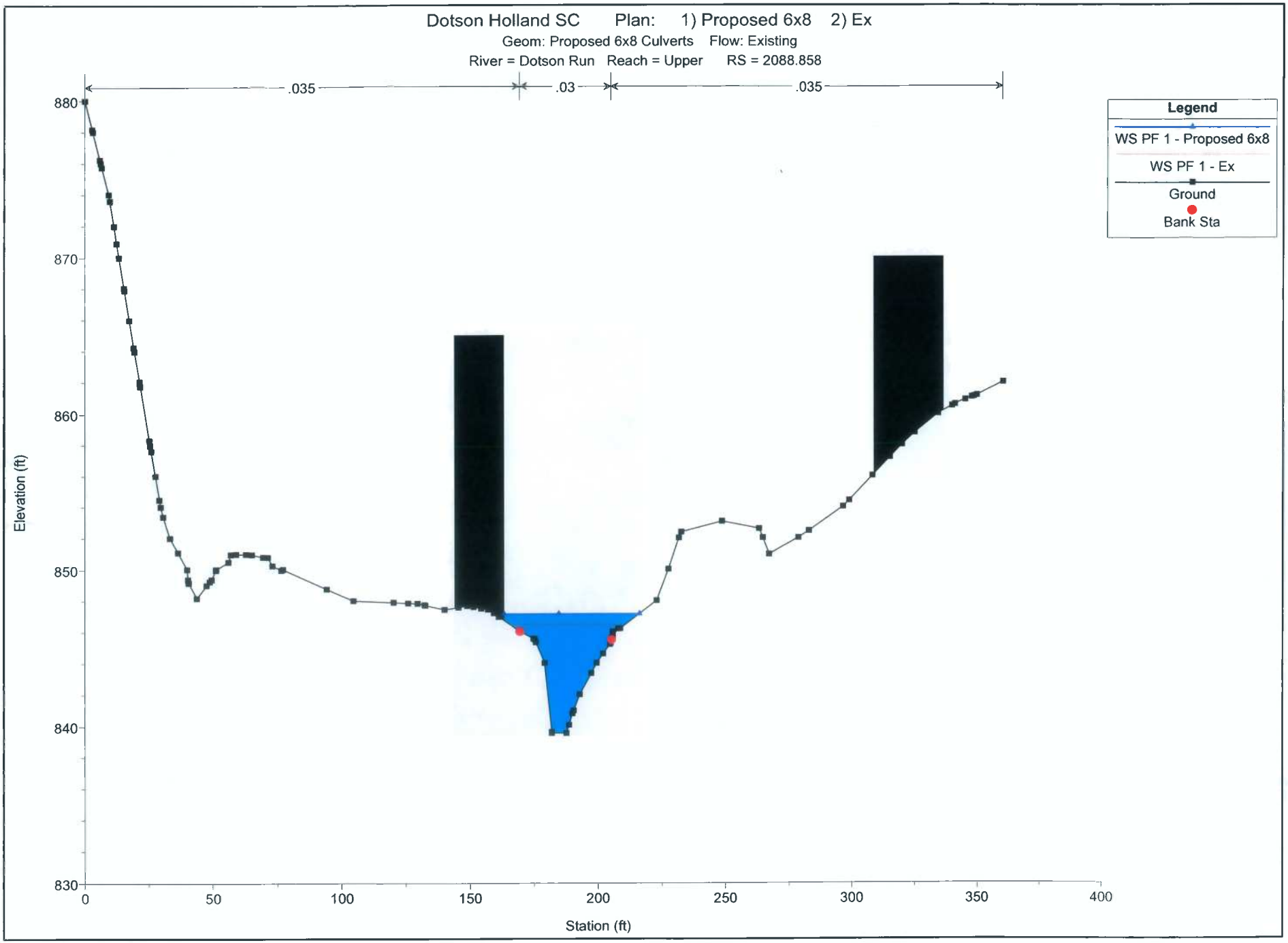
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2088.858
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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870
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850
840
830
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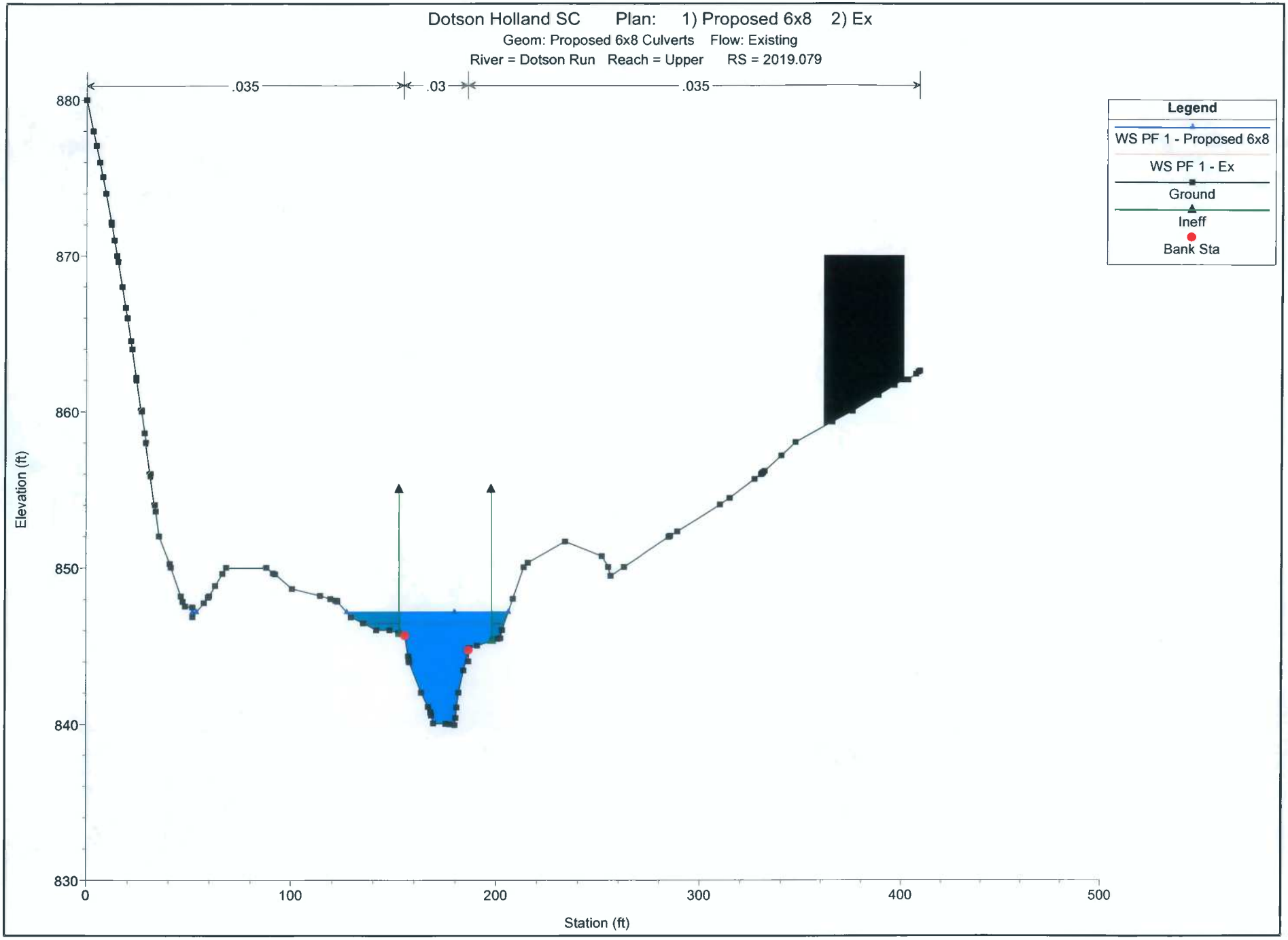
50
100
150
200
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 2019.079
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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850
840
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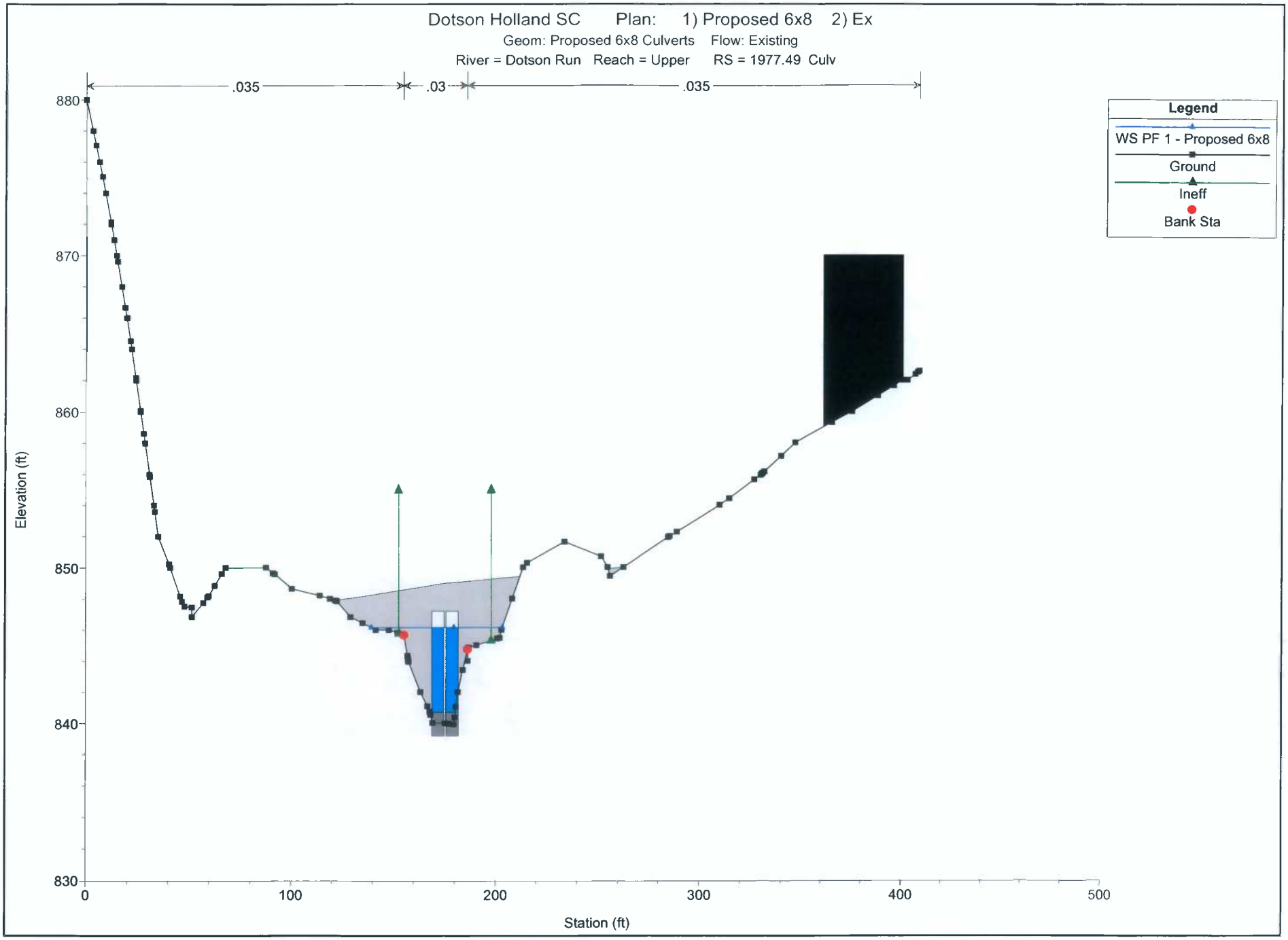
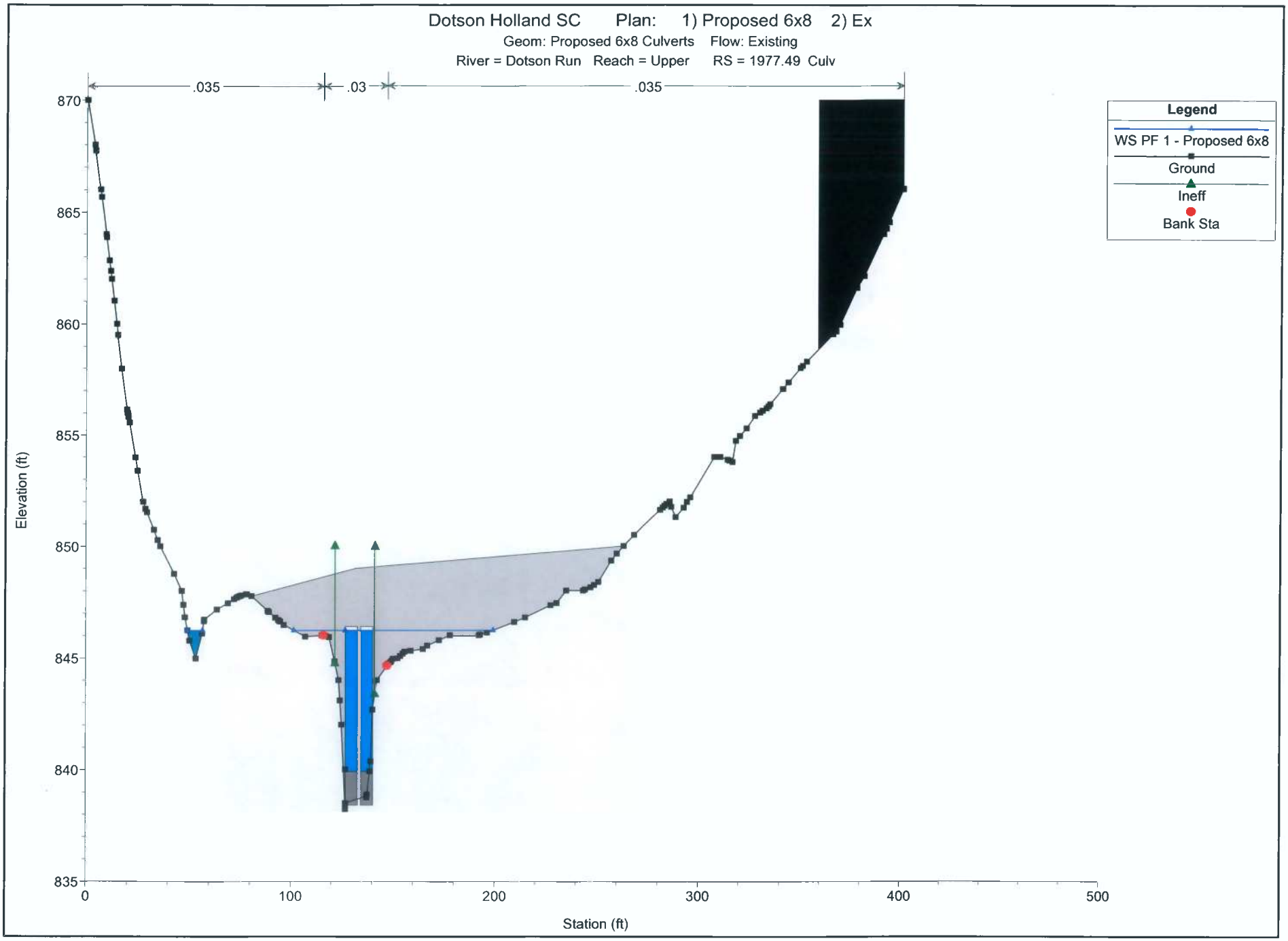
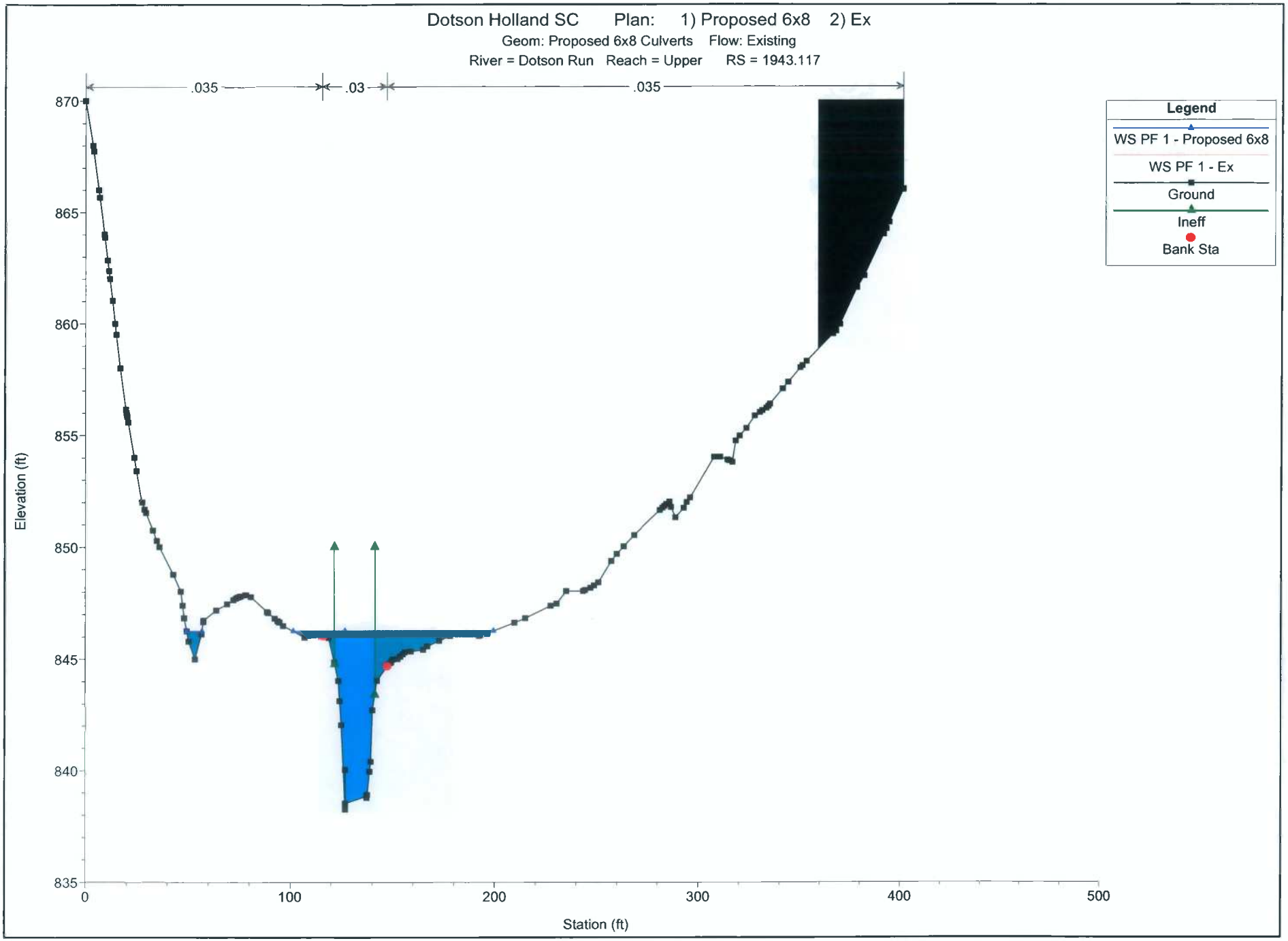
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1977.49 Culv
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
Ground
Ineff
Bank Sta
Elevation (ft)
880
870
860
850
840
830
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1977.49 Culv
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1943.117
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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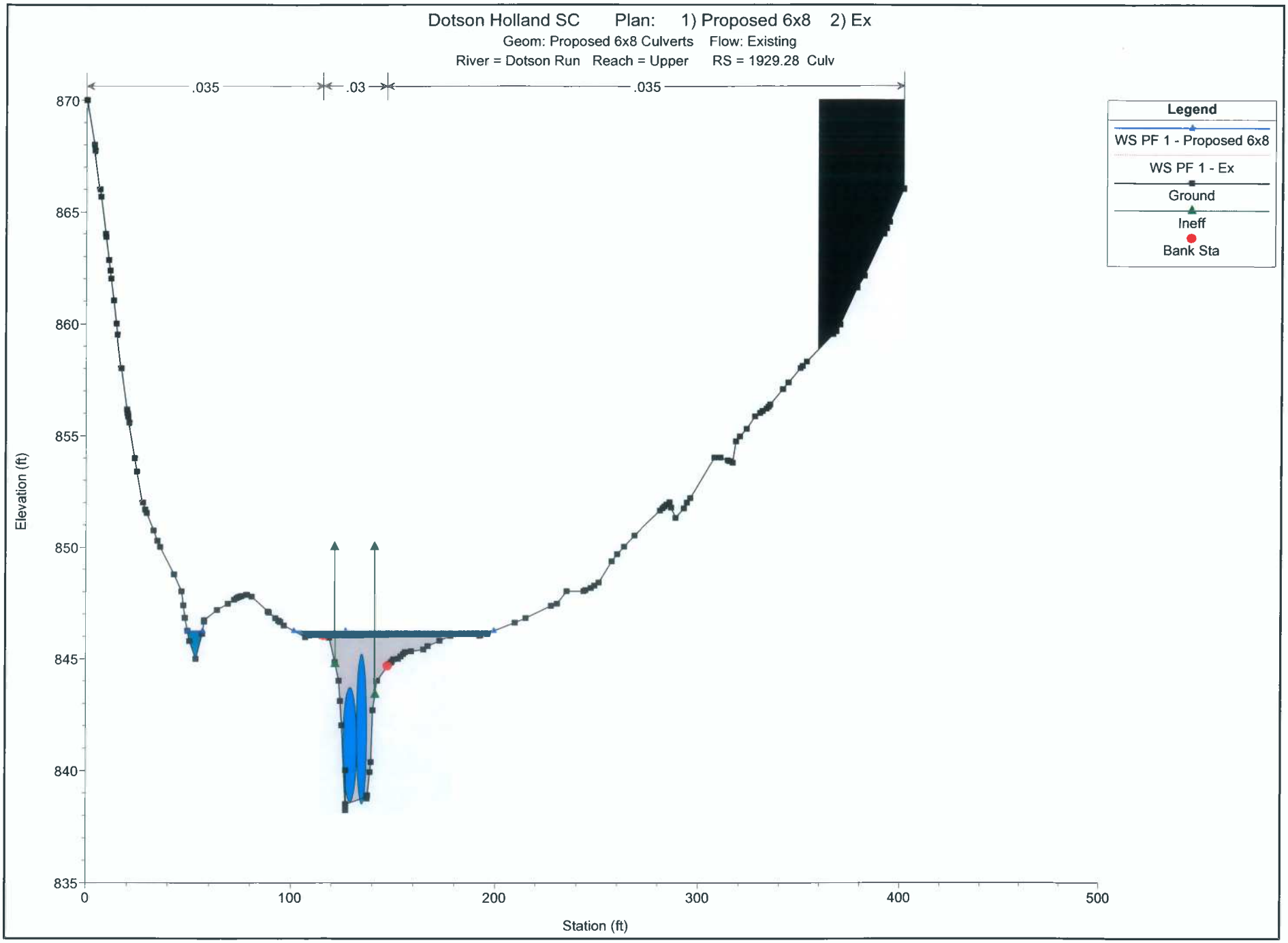
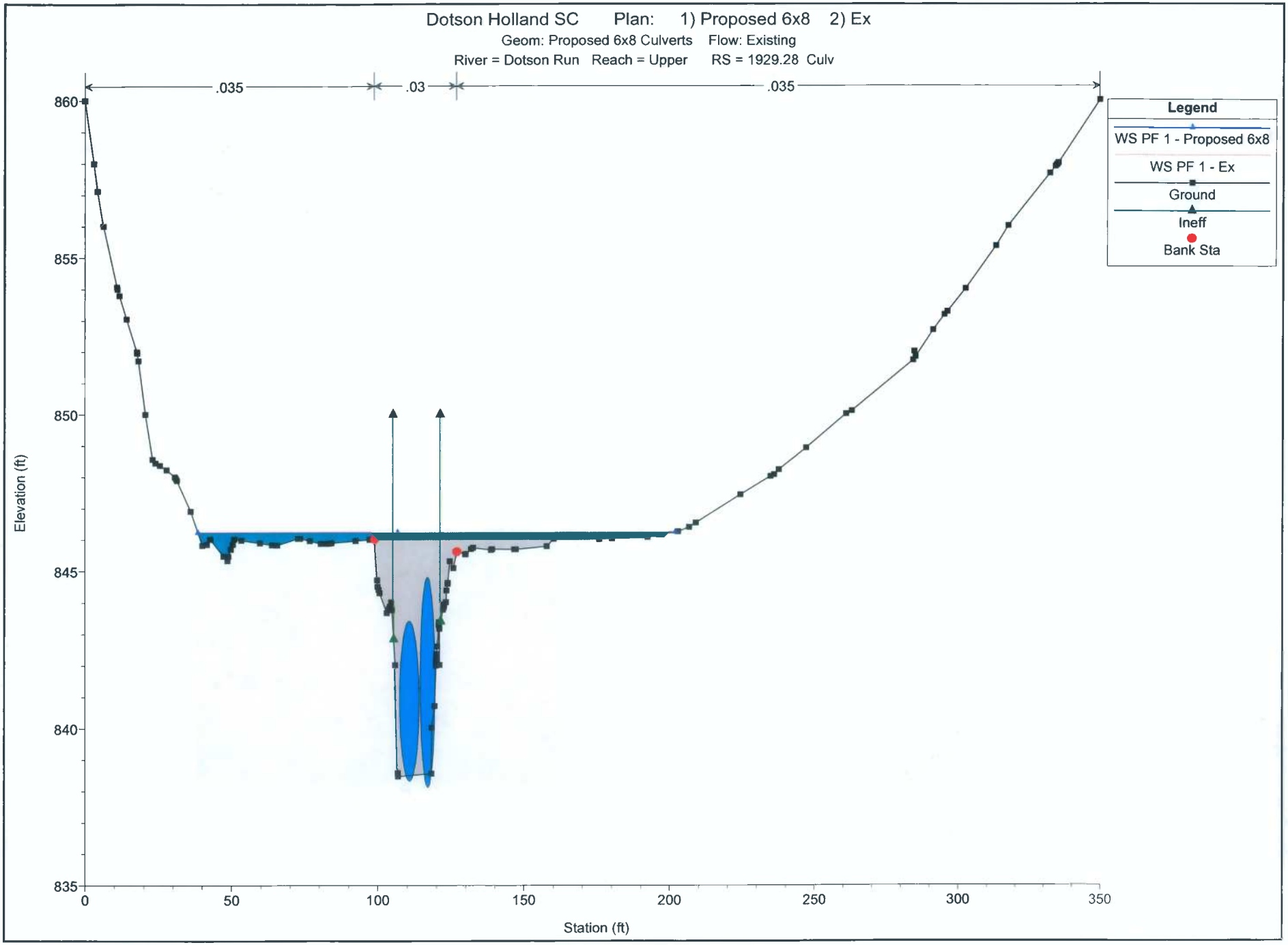
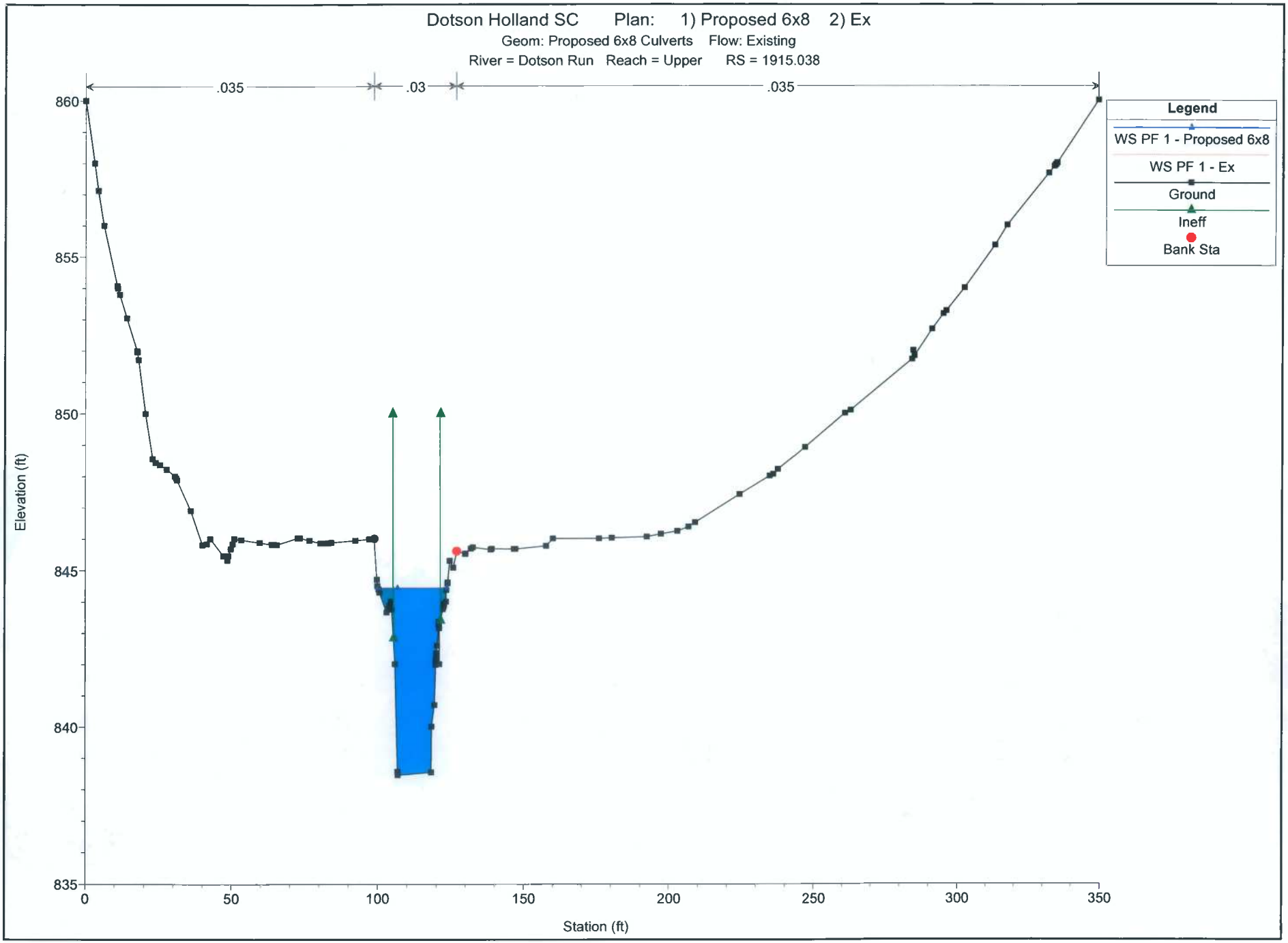
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1929.28 Culv
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1929.28 Culv
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1915.038
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
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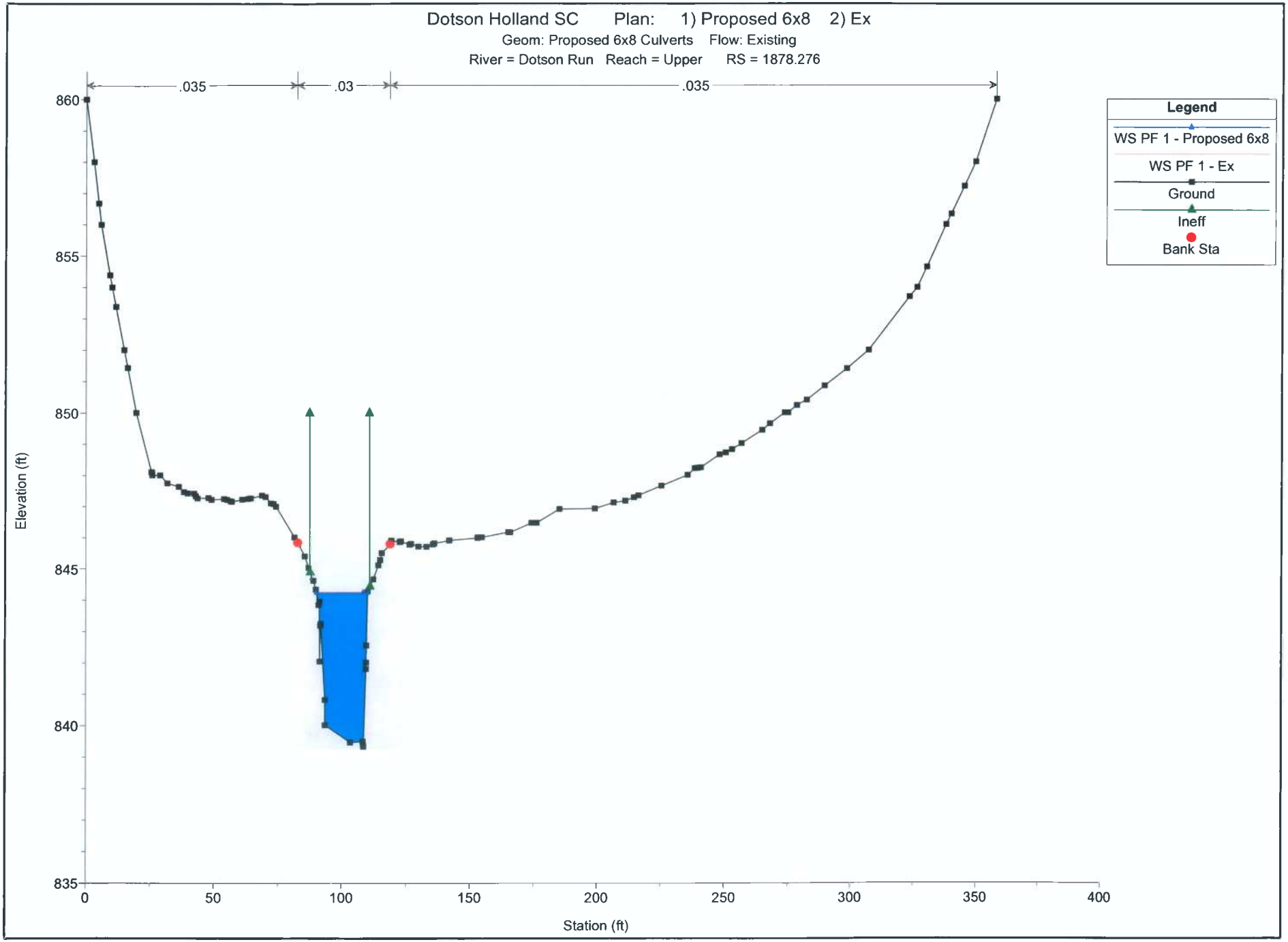
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1878.276
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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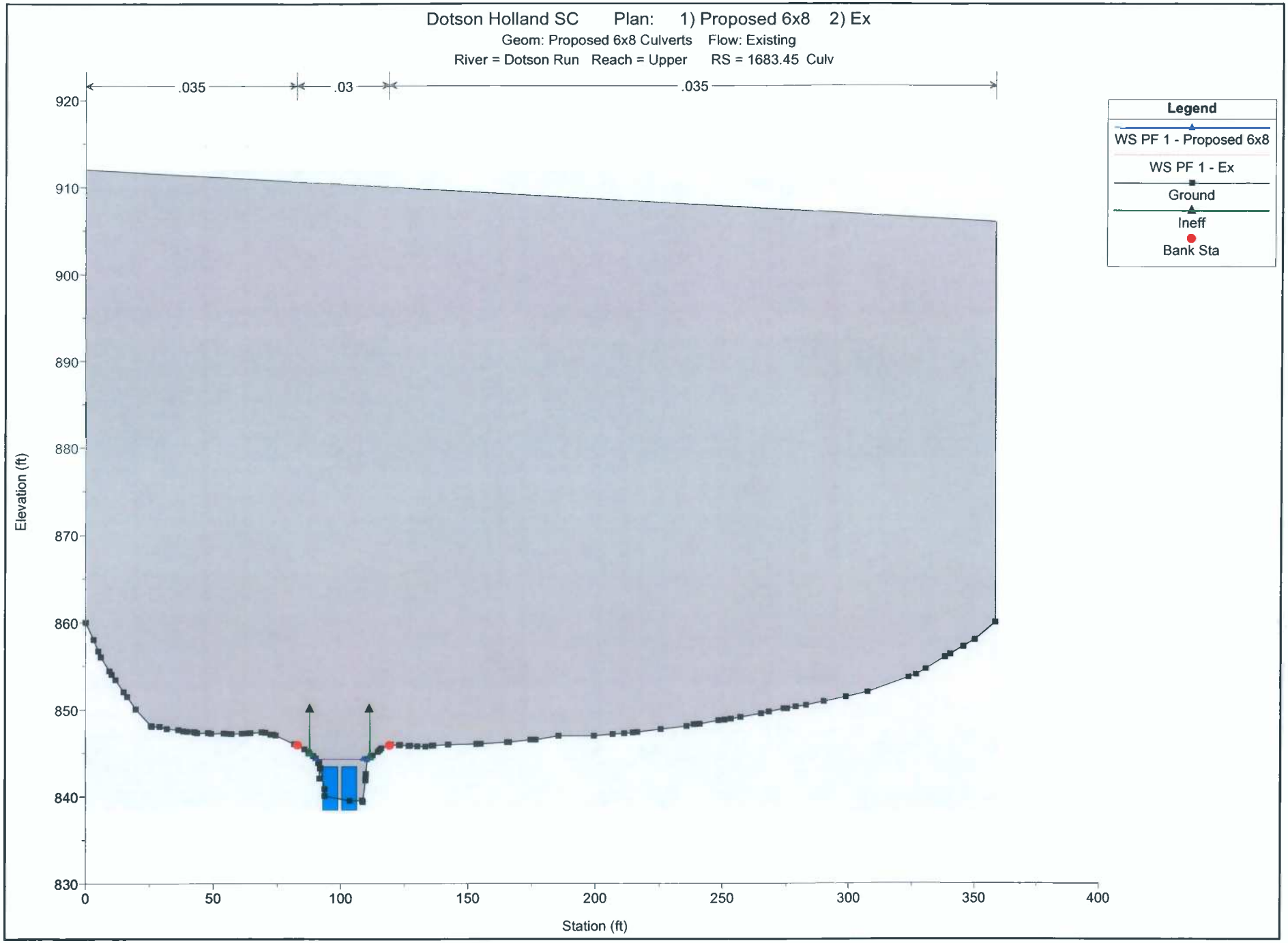
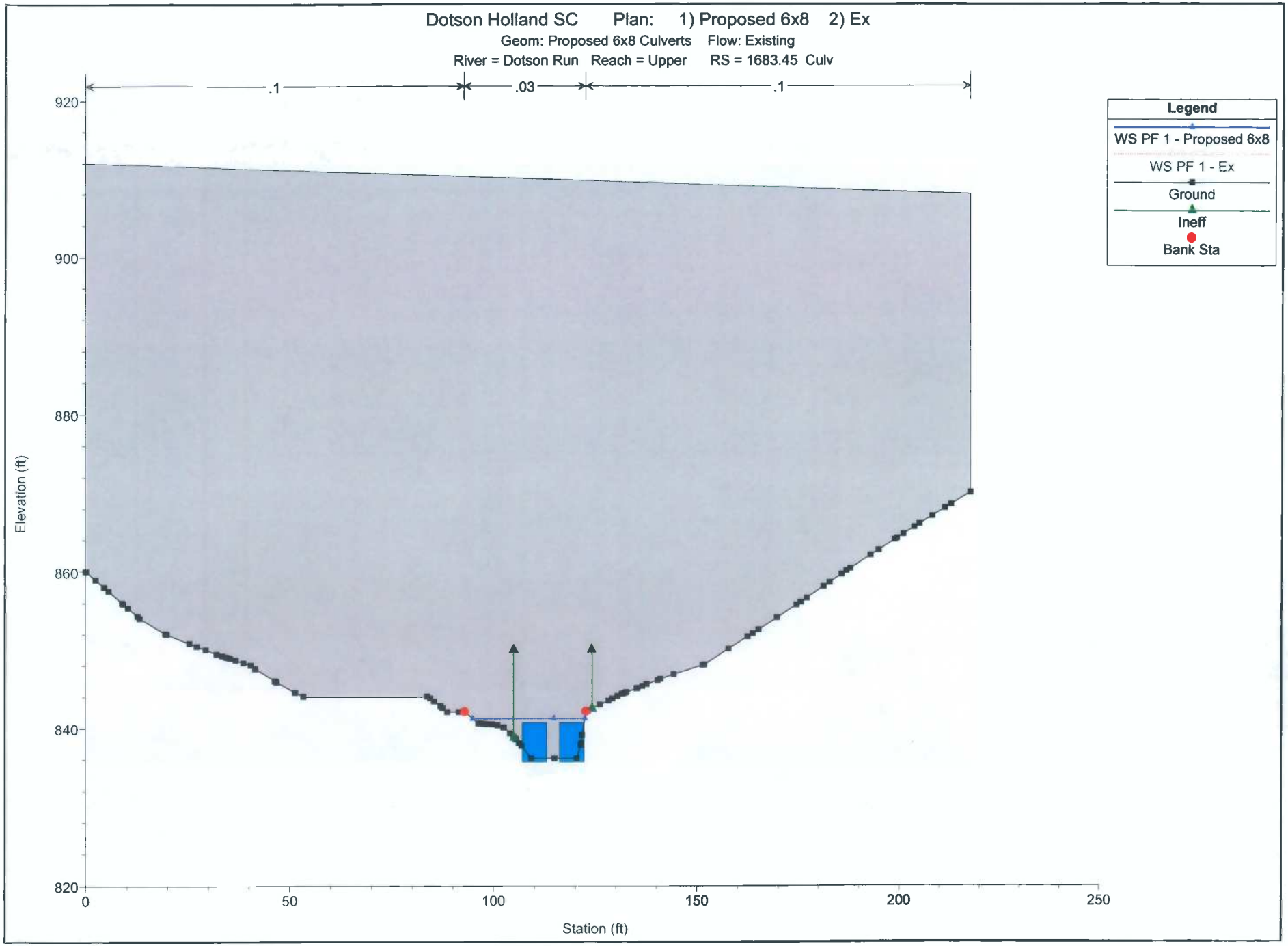
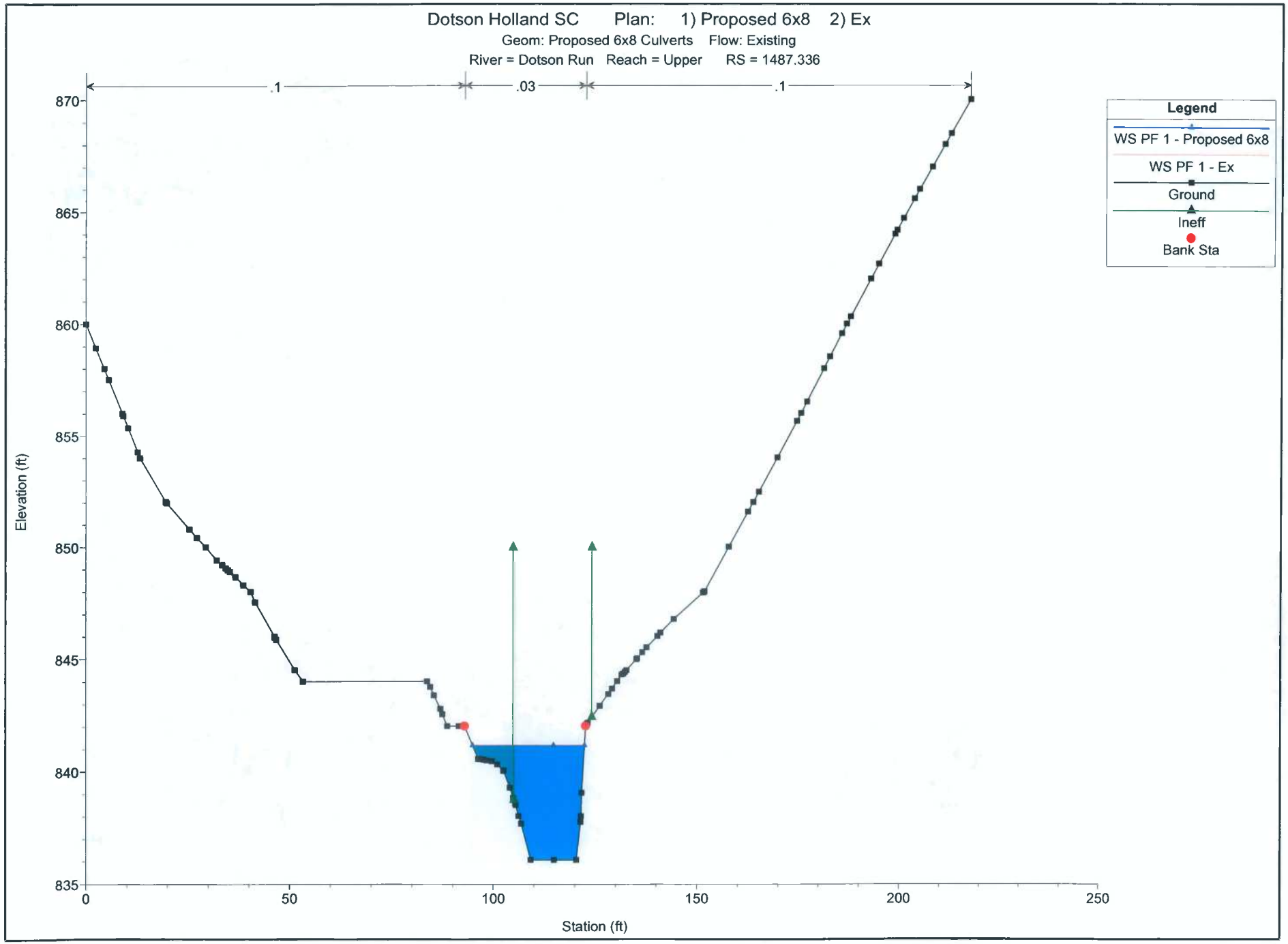
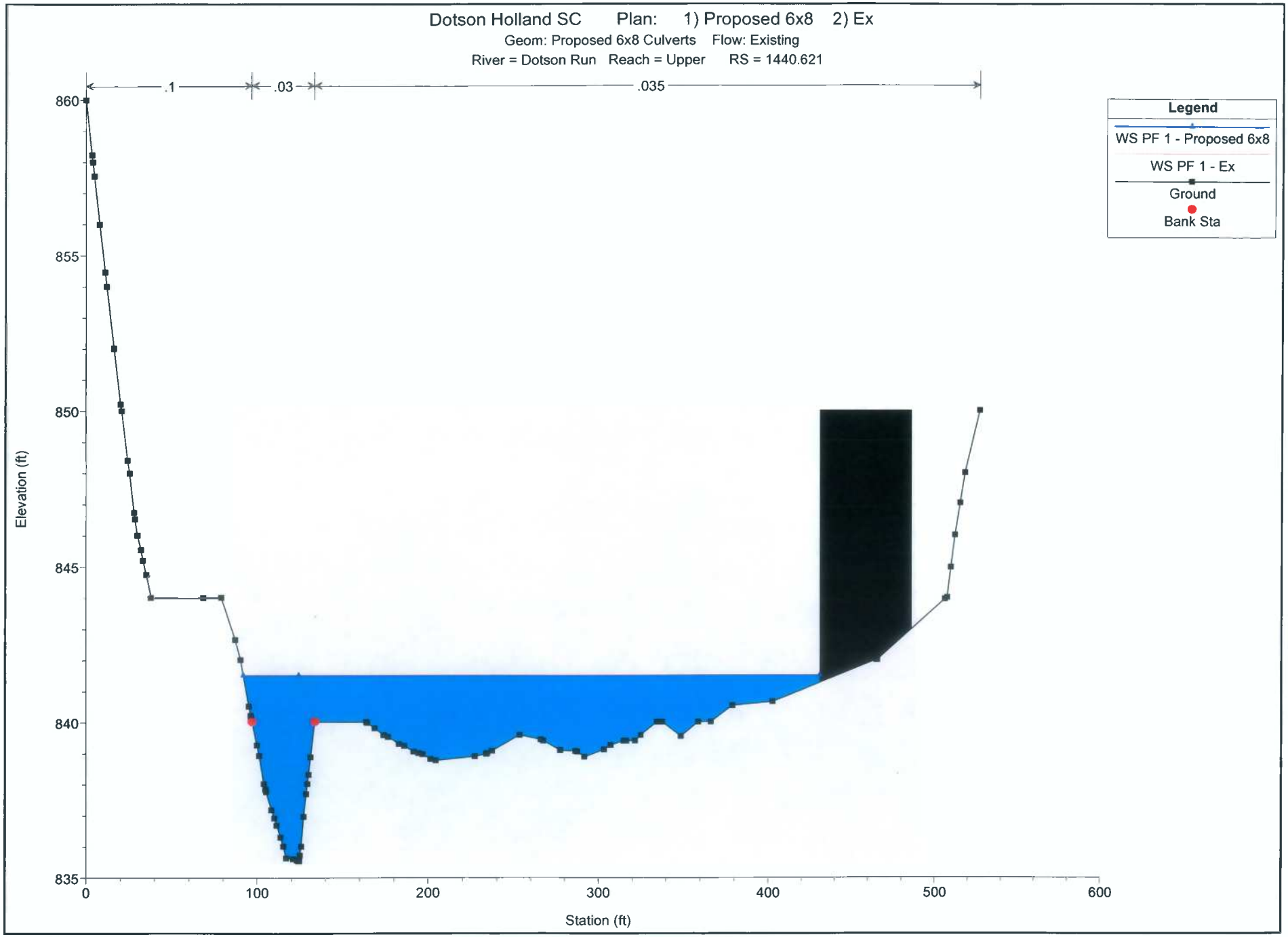
855
850
845
840
835
0
50
100
150
200
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1683.45 Culv
.035
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
920
910
900
890
880
870
860
850
840
830
0
50
100
150
200
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1683.45 Culv
.1
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
920
900
880
860
840
820
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1487.336
.1
.03
.1
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Upper RS = 1440.621
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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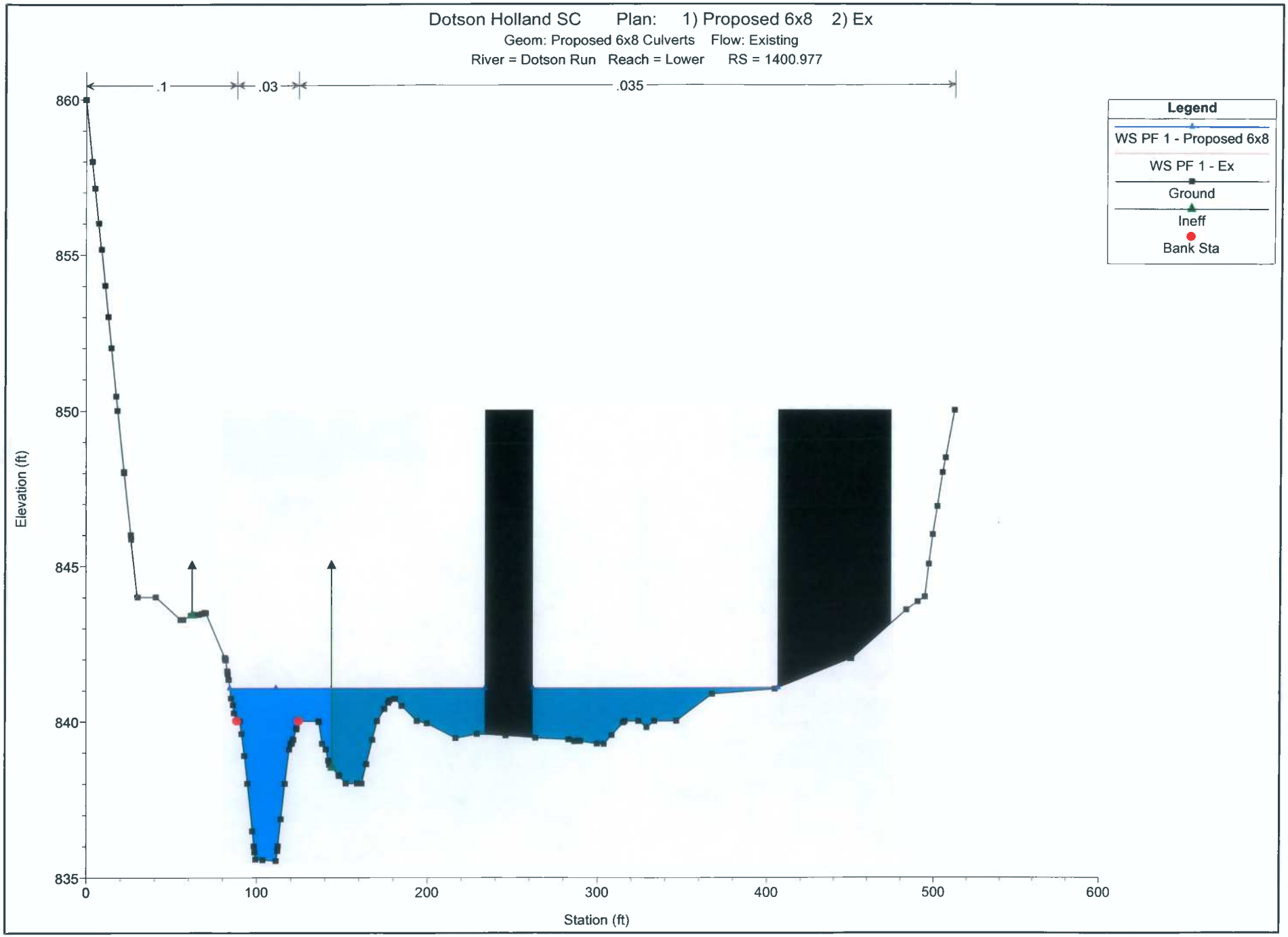
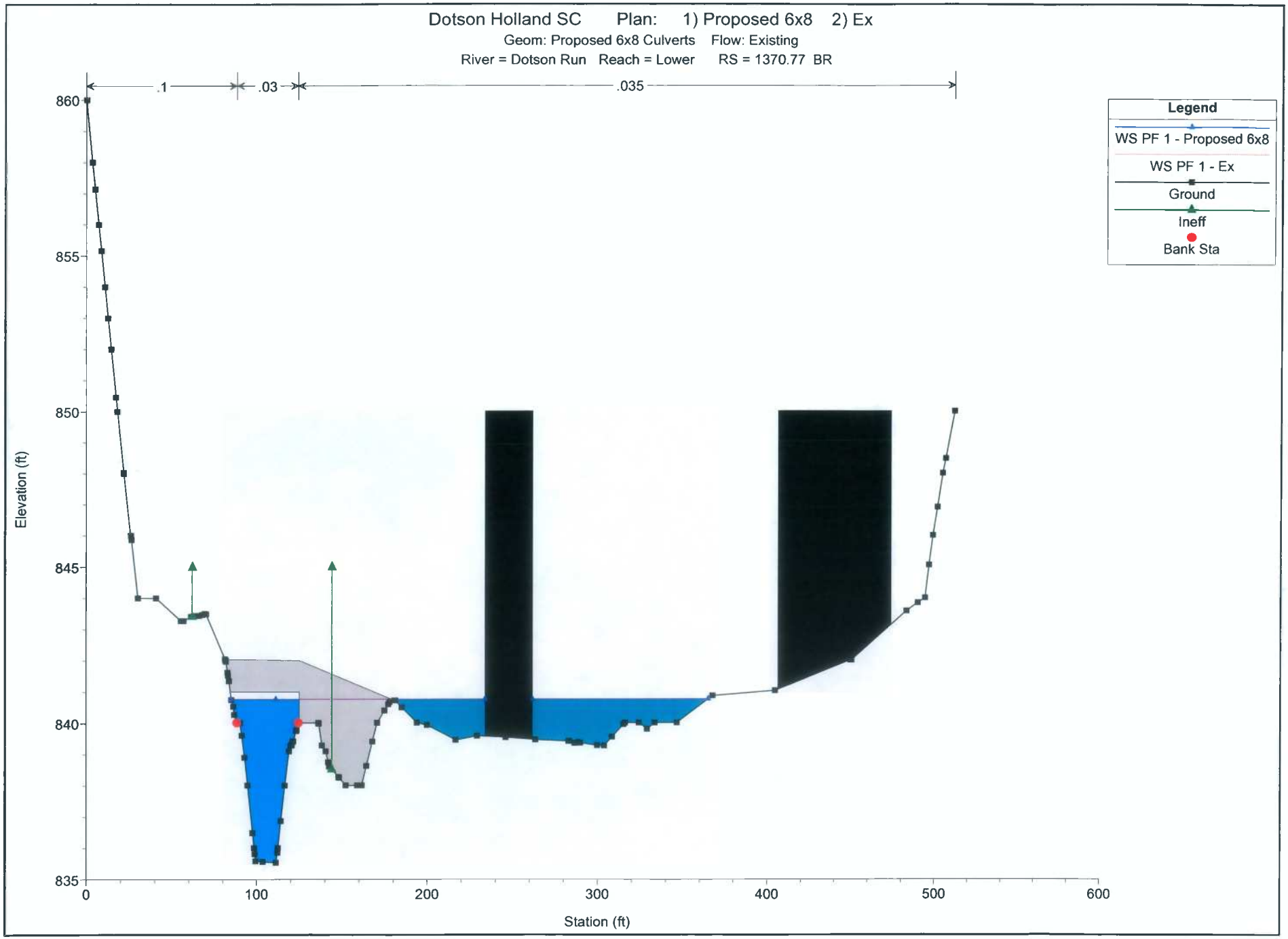
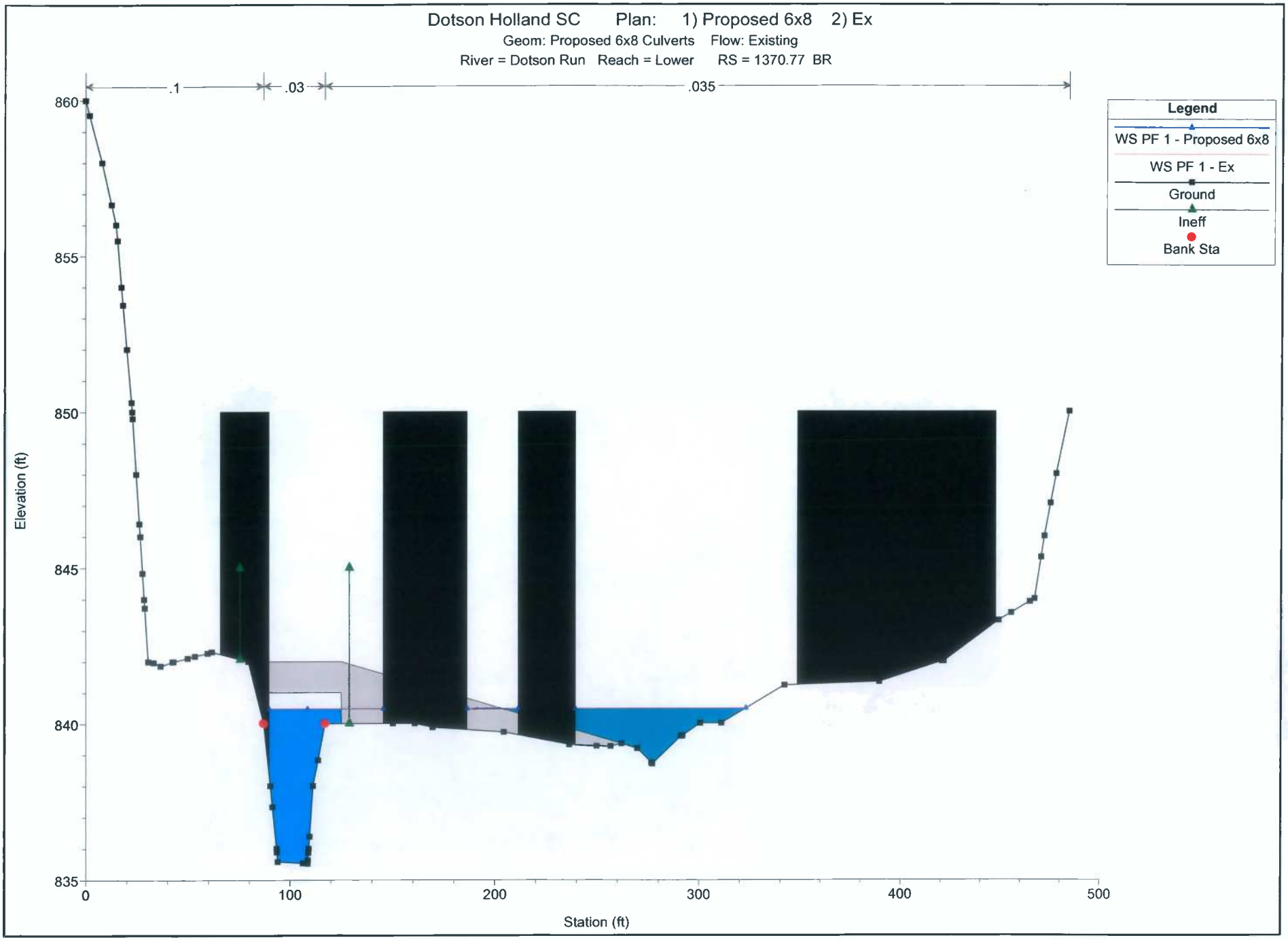
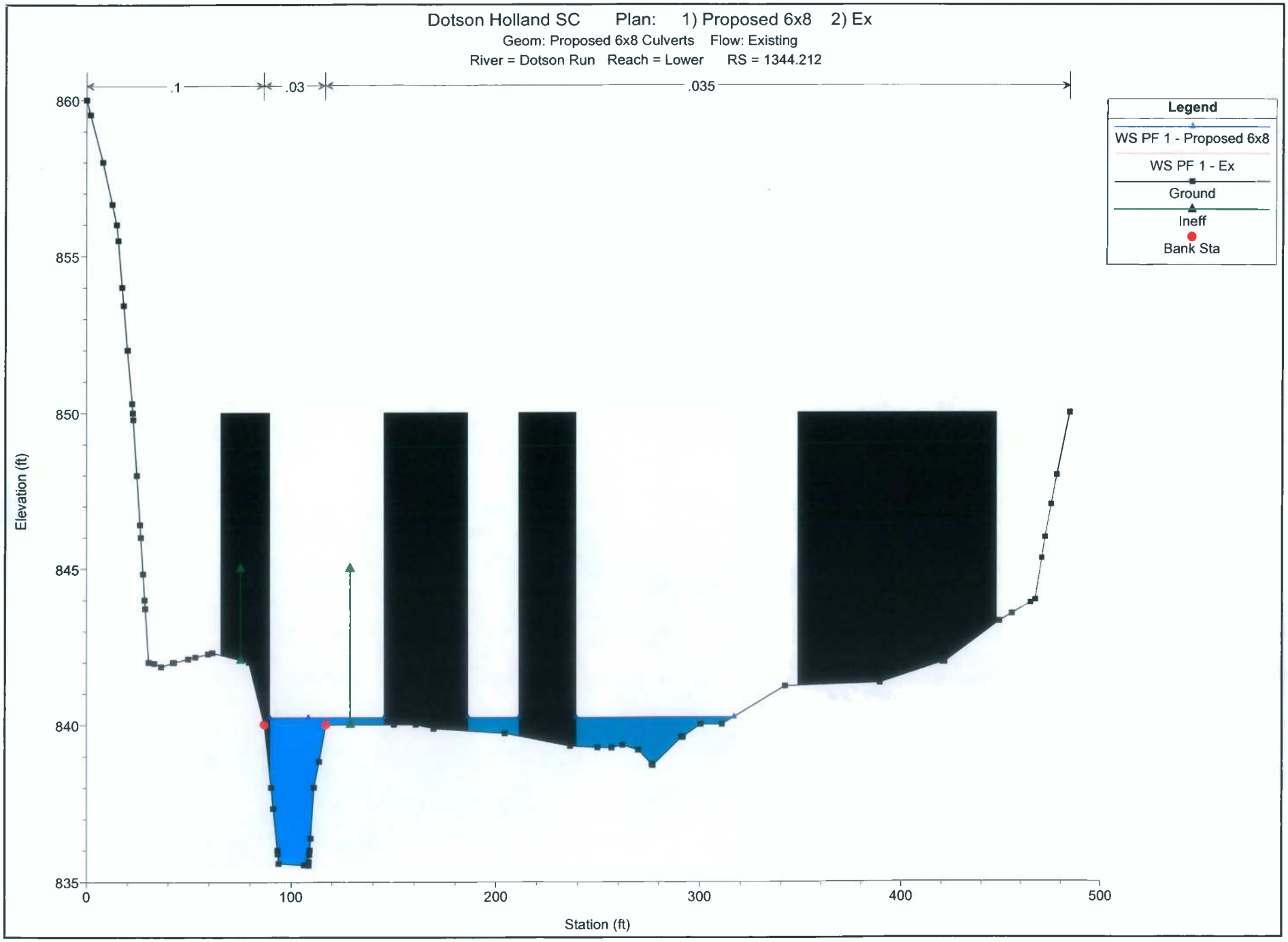
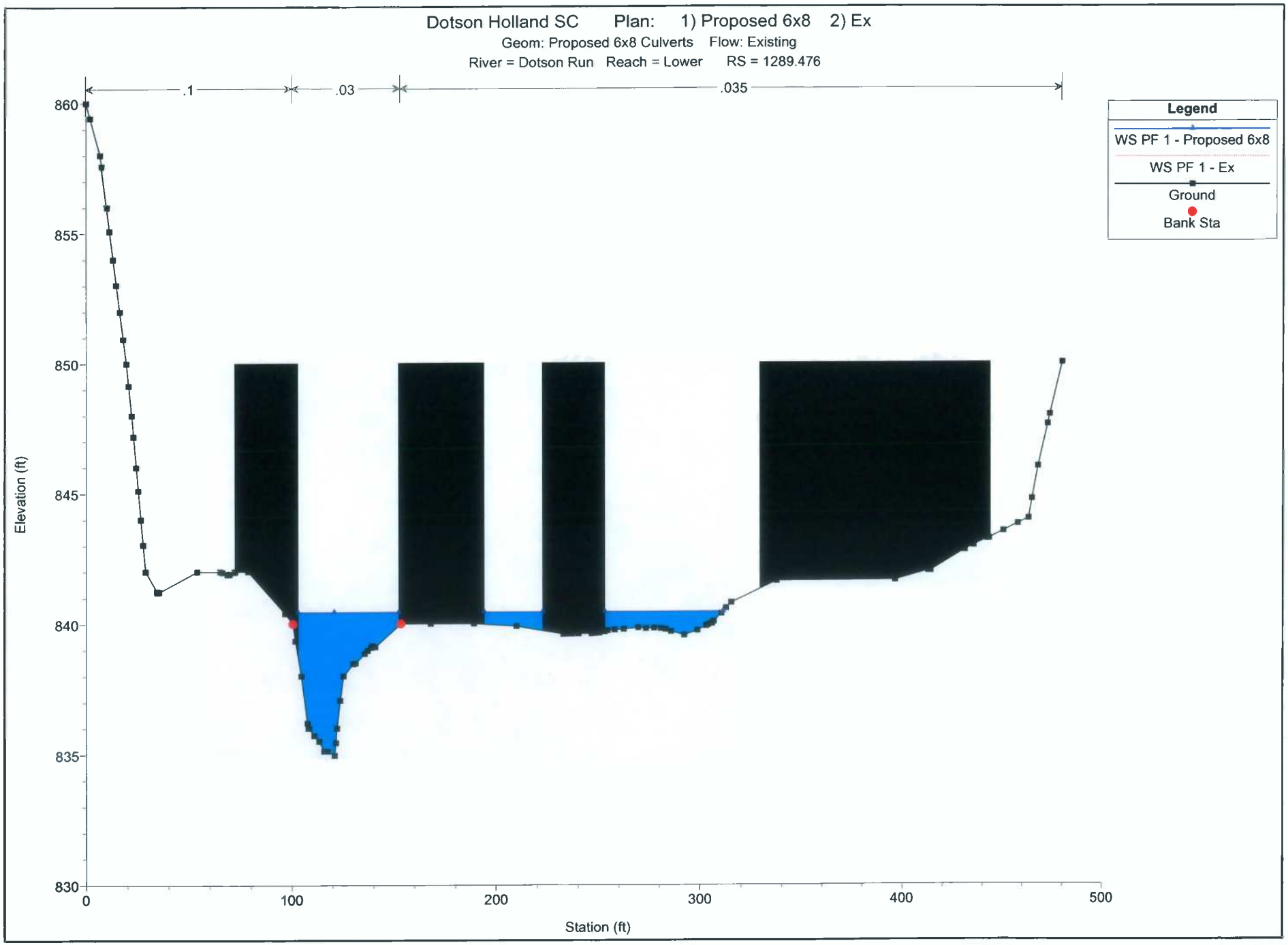
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)

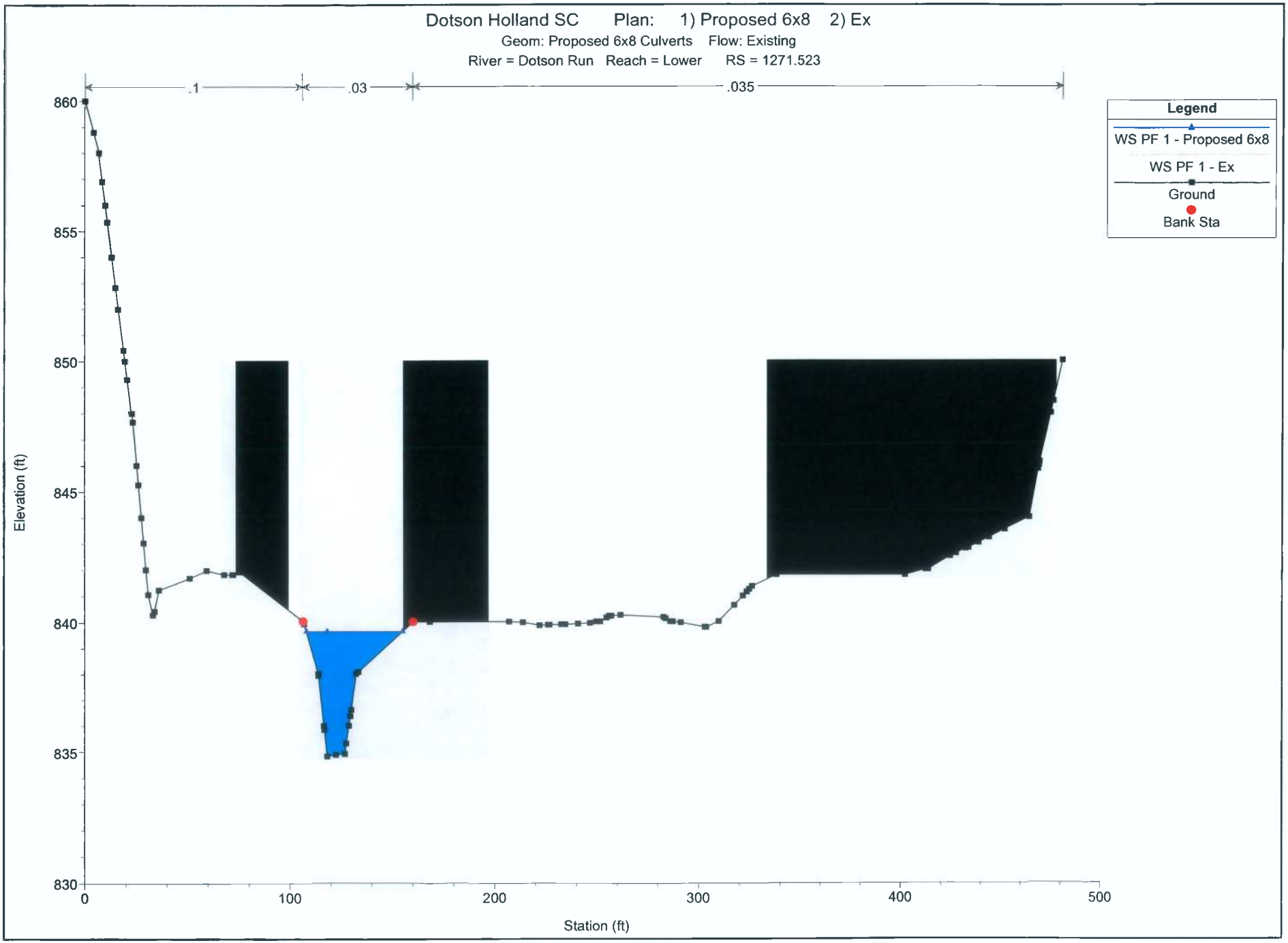

Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1400.977
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1370.77 BR
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
600
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1370.77 BR
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1344.212
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1289.476
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1271.523
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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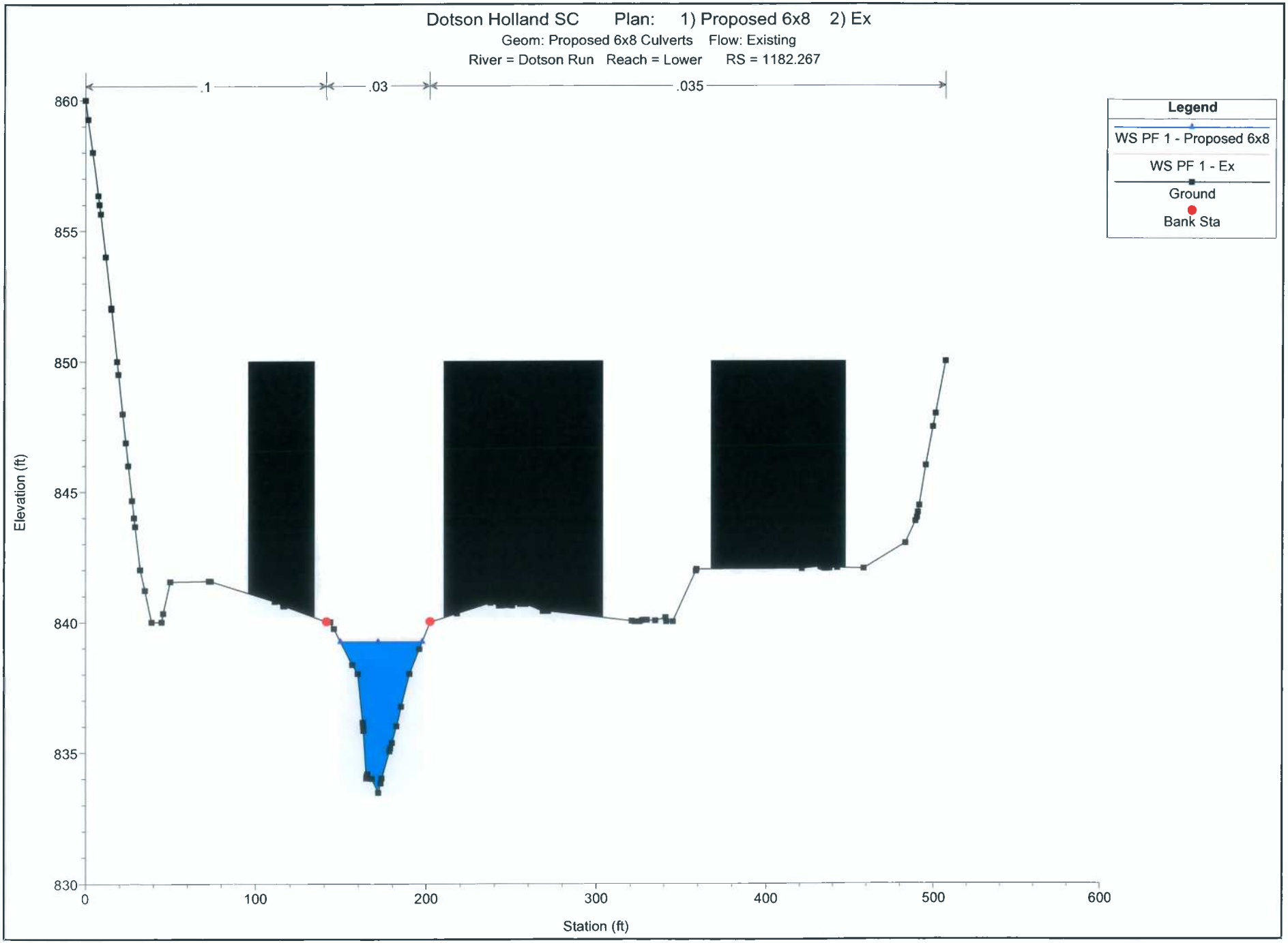
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1182.267
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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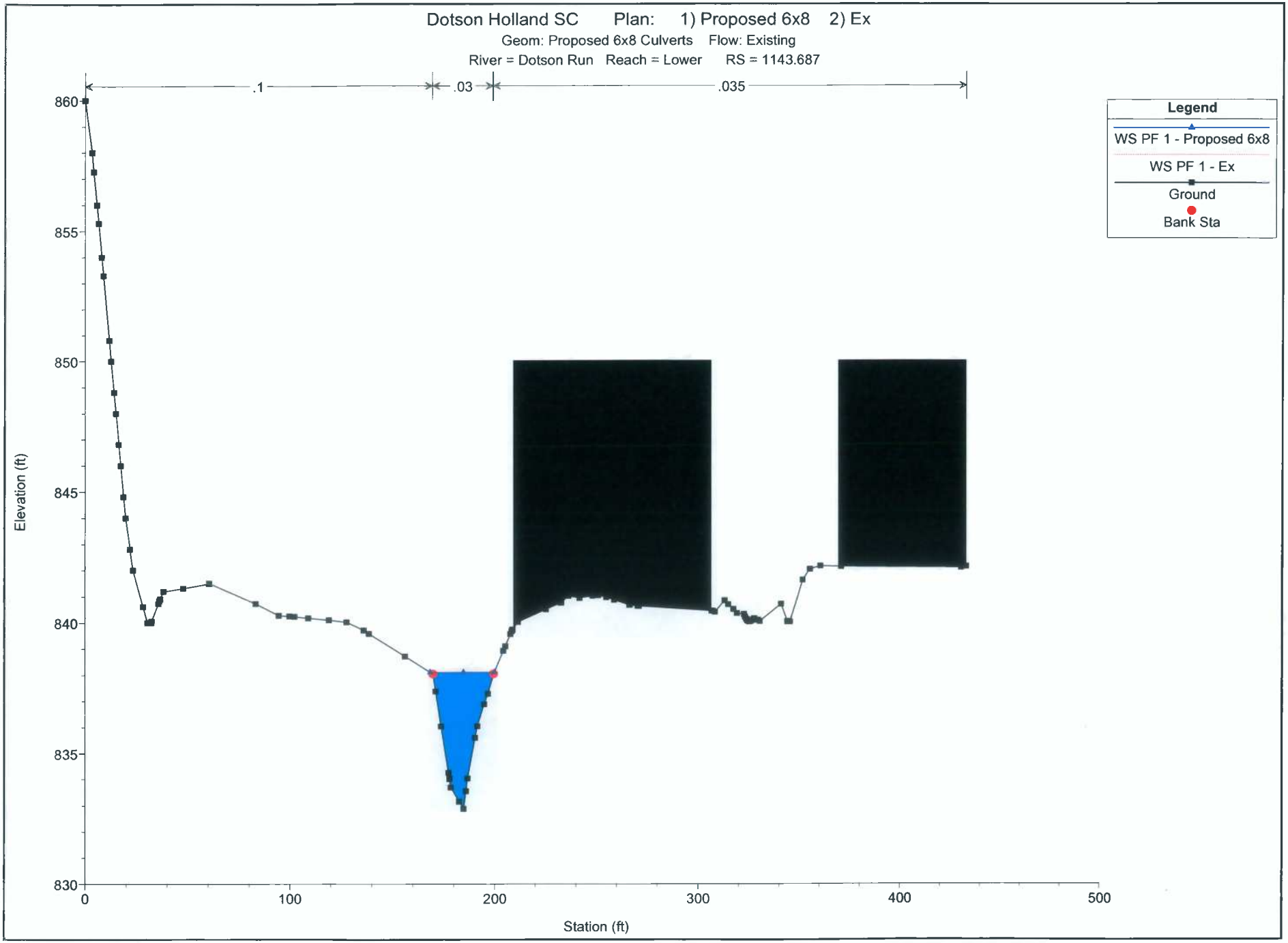
855
850
845
840
835
830
0
100
200
300
400
500
600
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1143.687
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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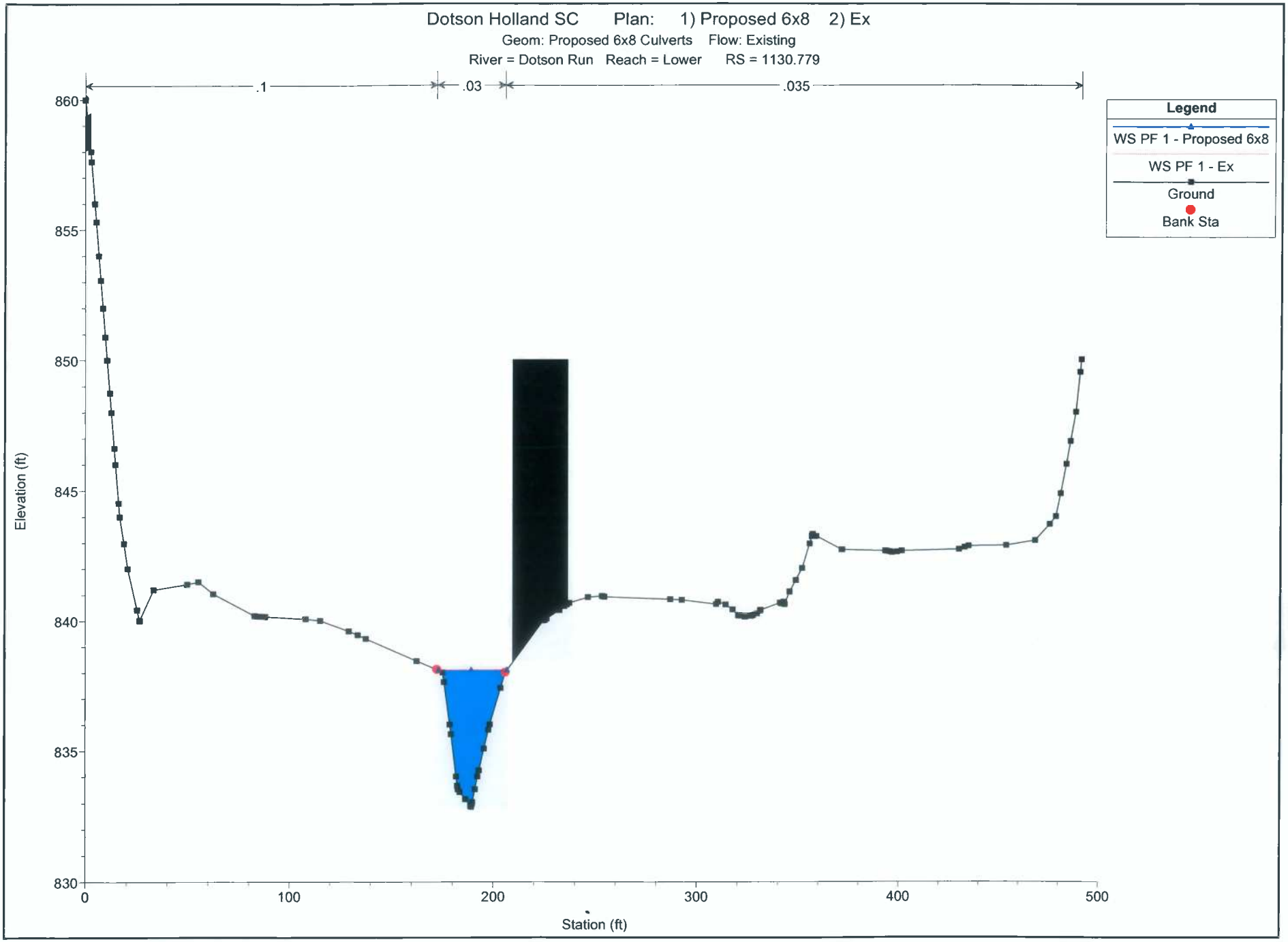
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1130.779
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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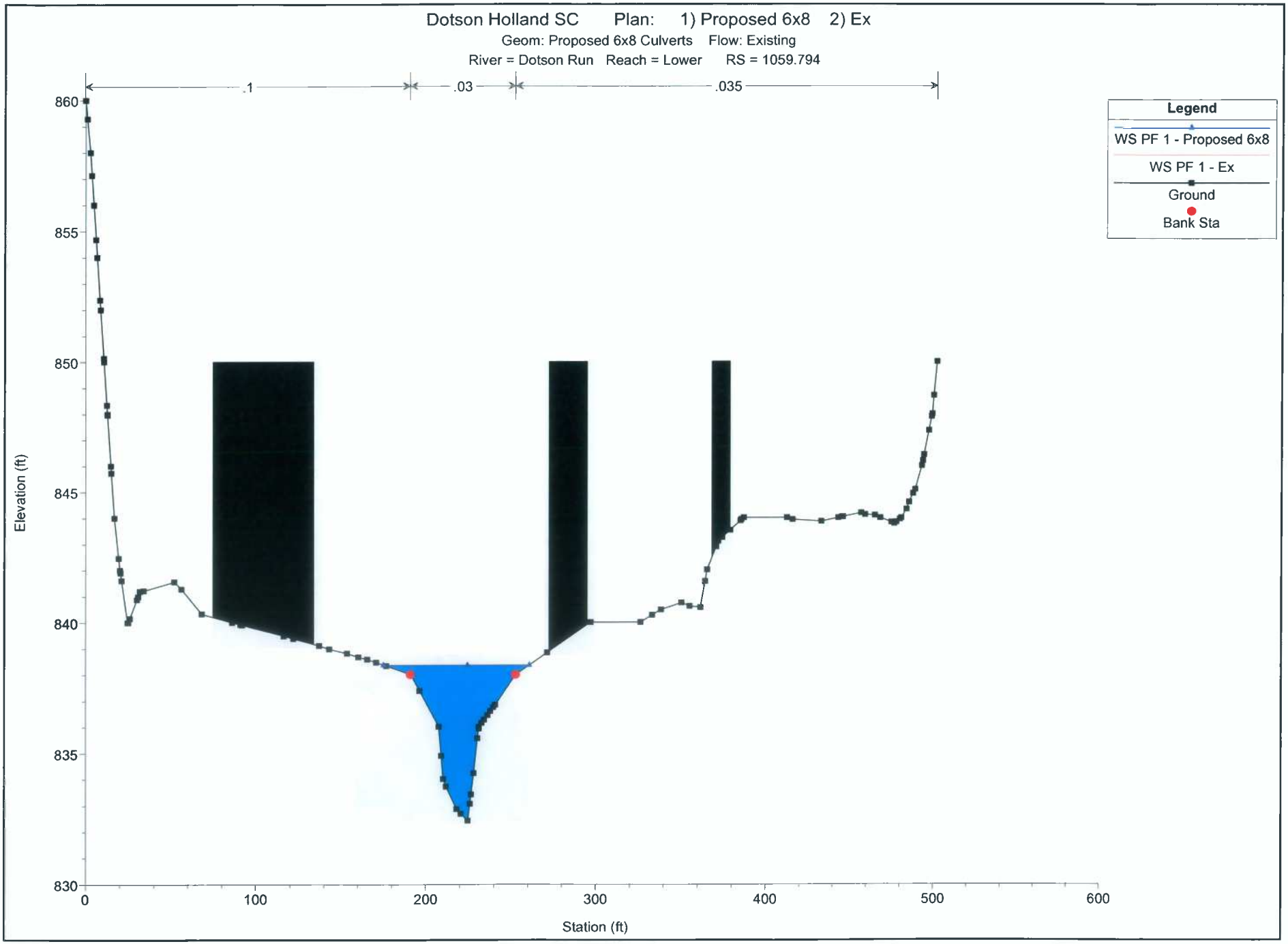
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1059.794
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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850
845
840
835
830
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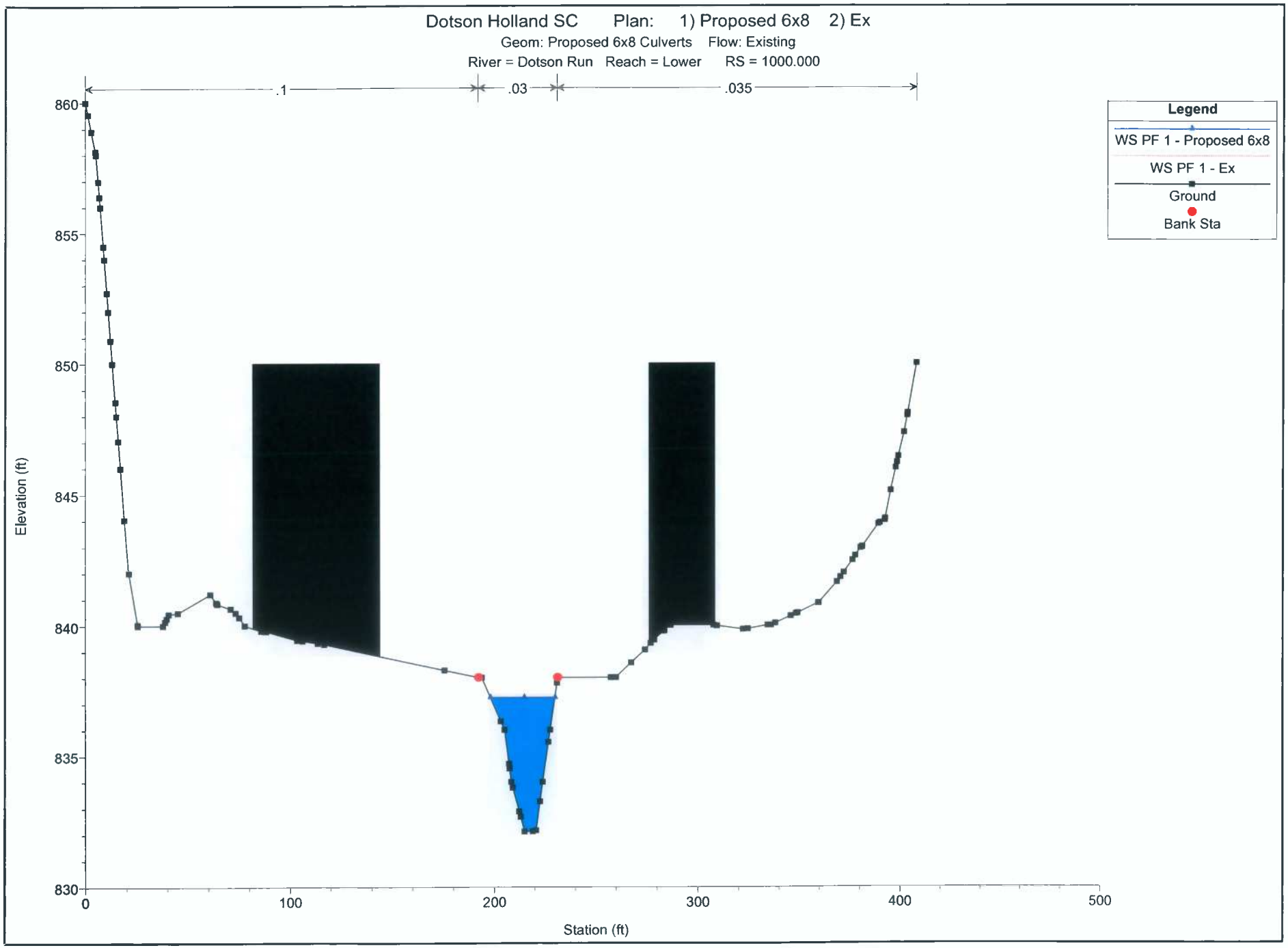
100
200
300
400
500
600
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Dotson Run Reach = Lower RS = 1000.000
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
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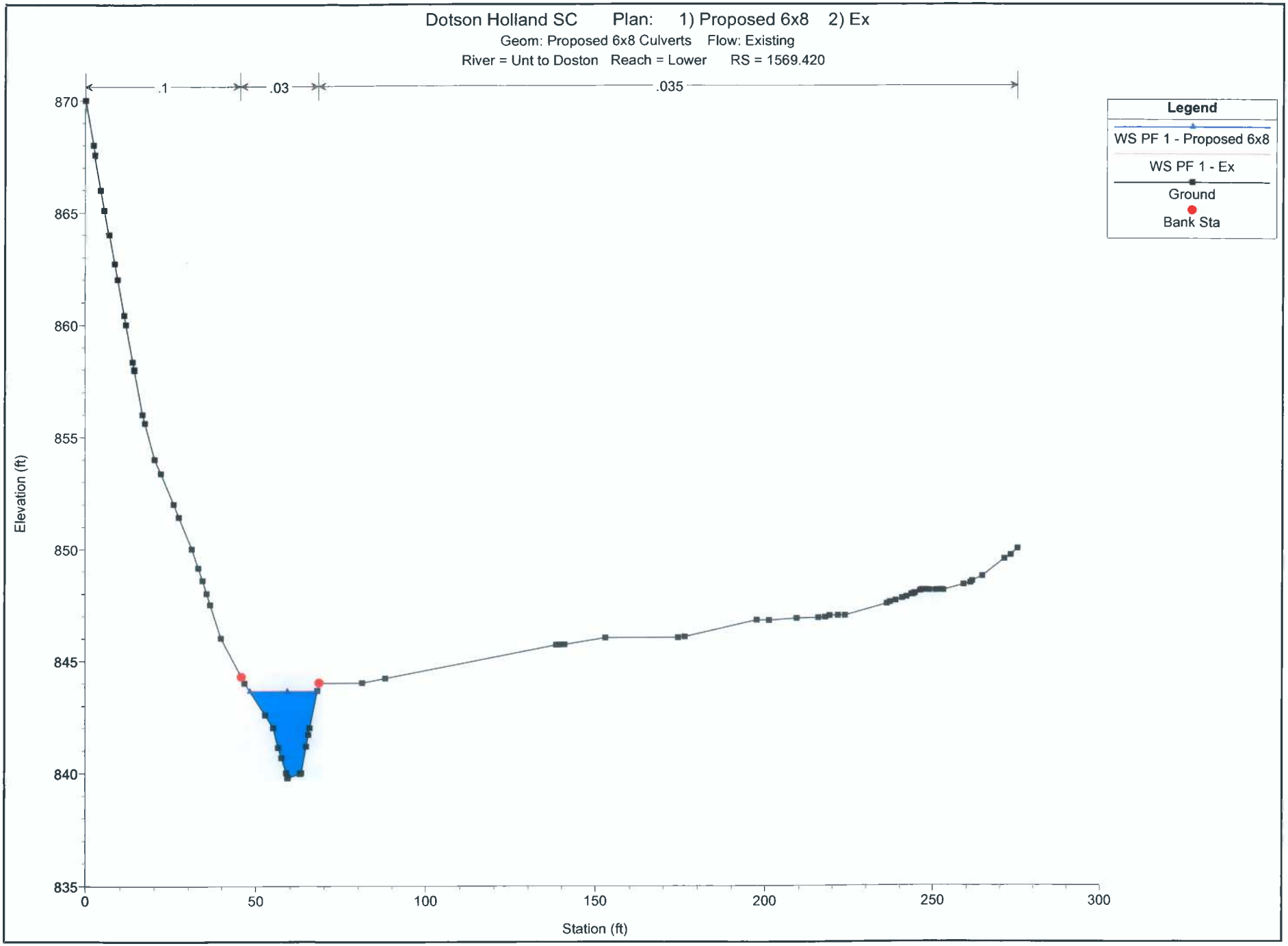
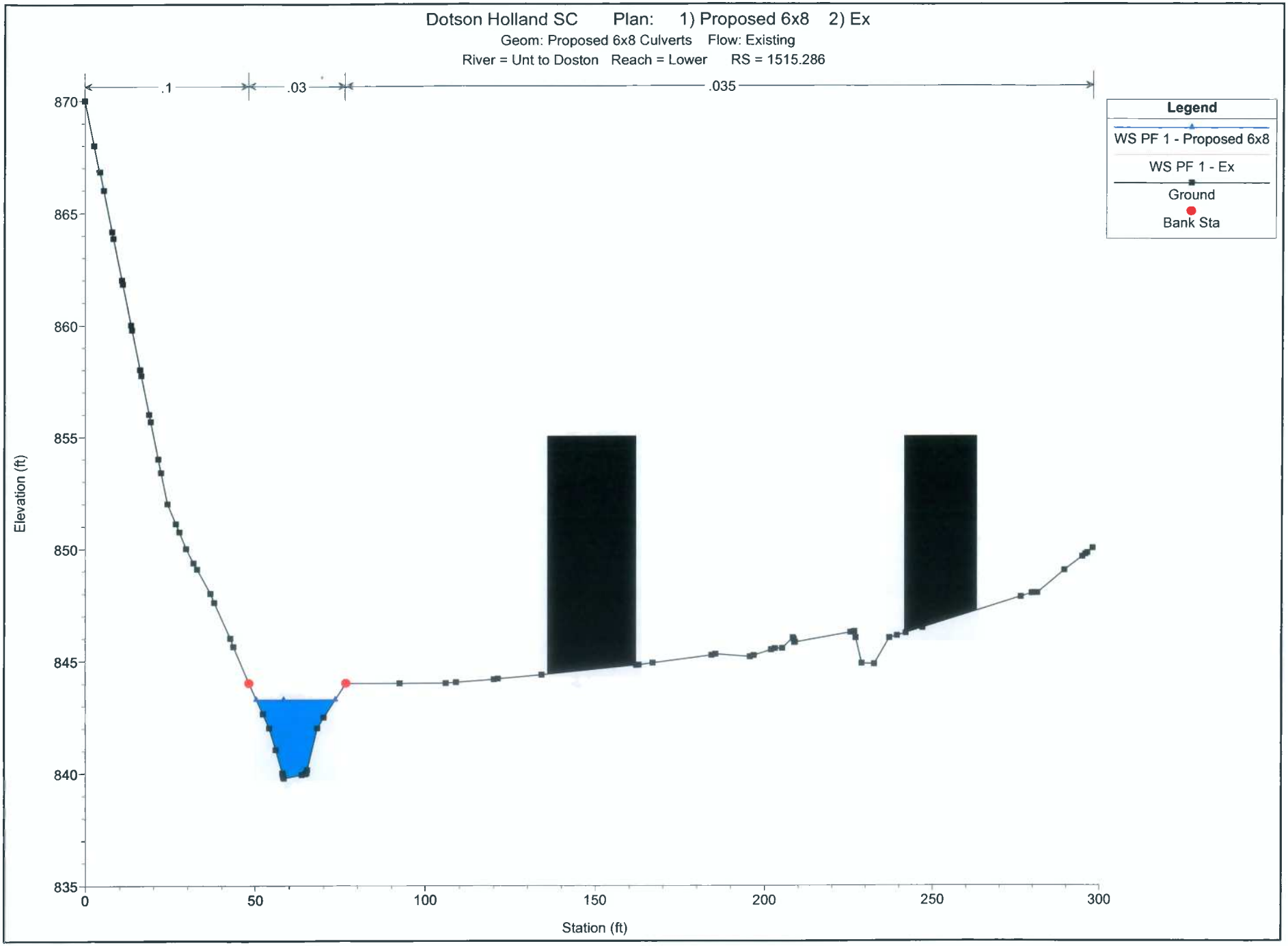
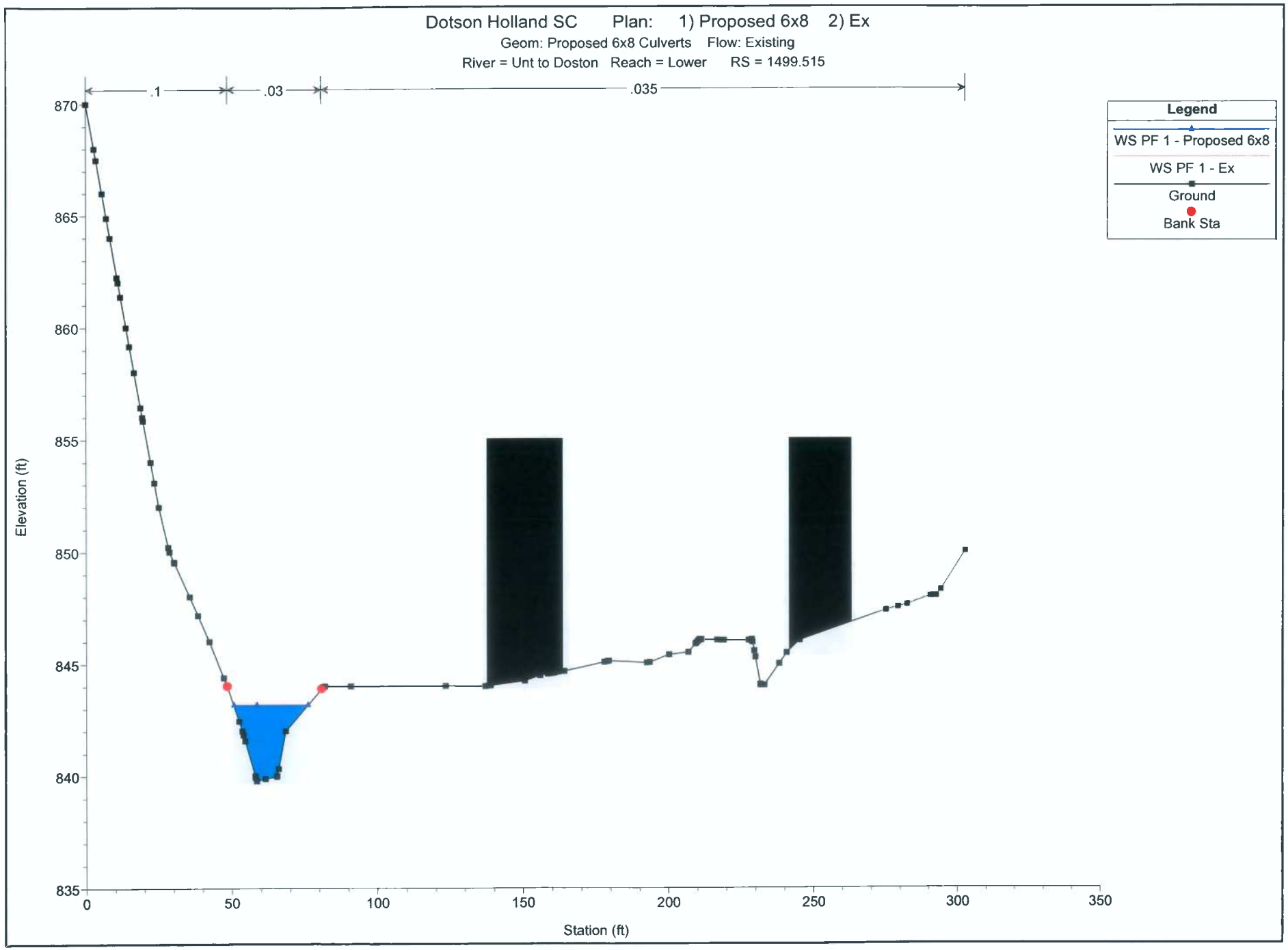
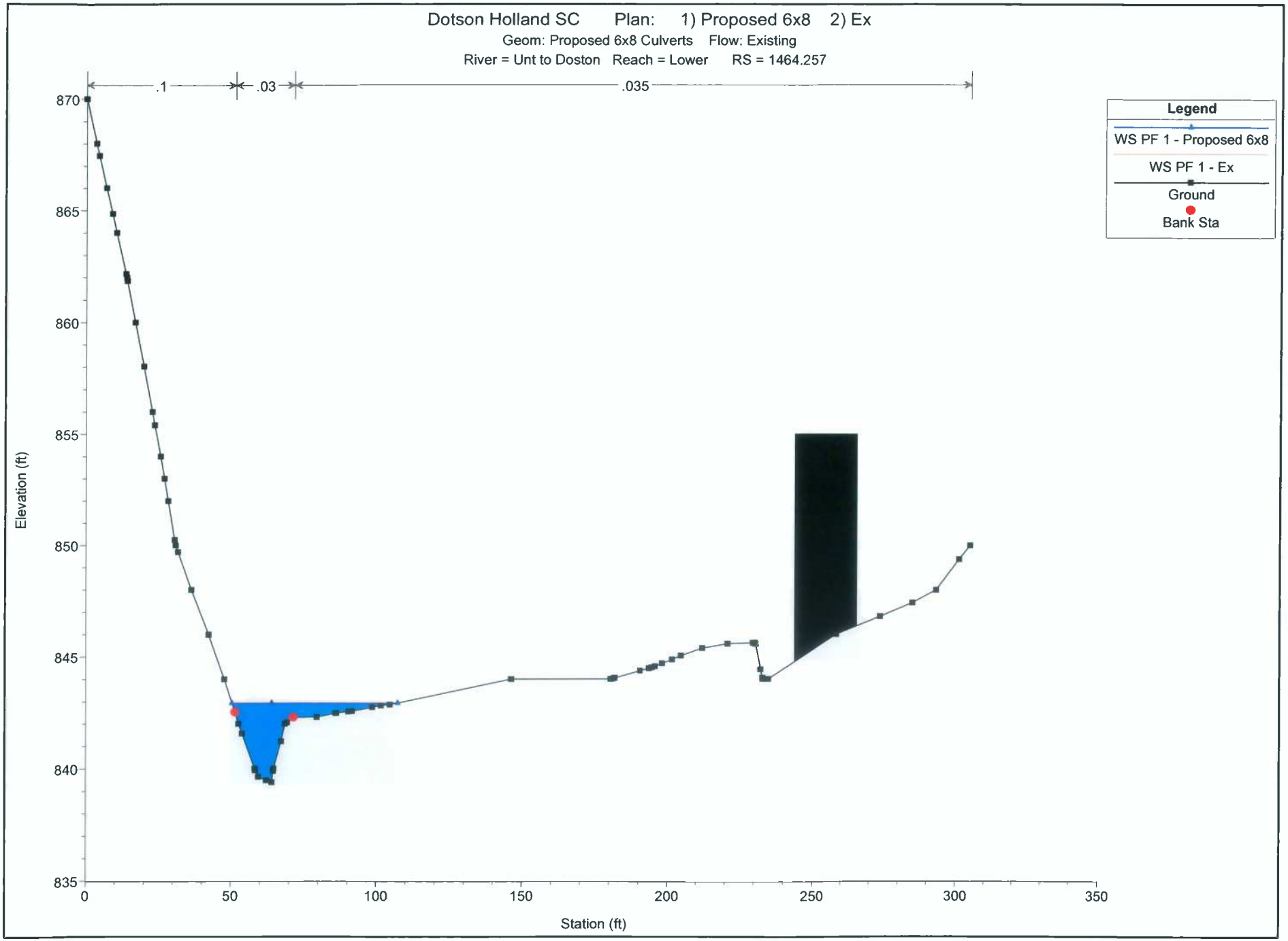
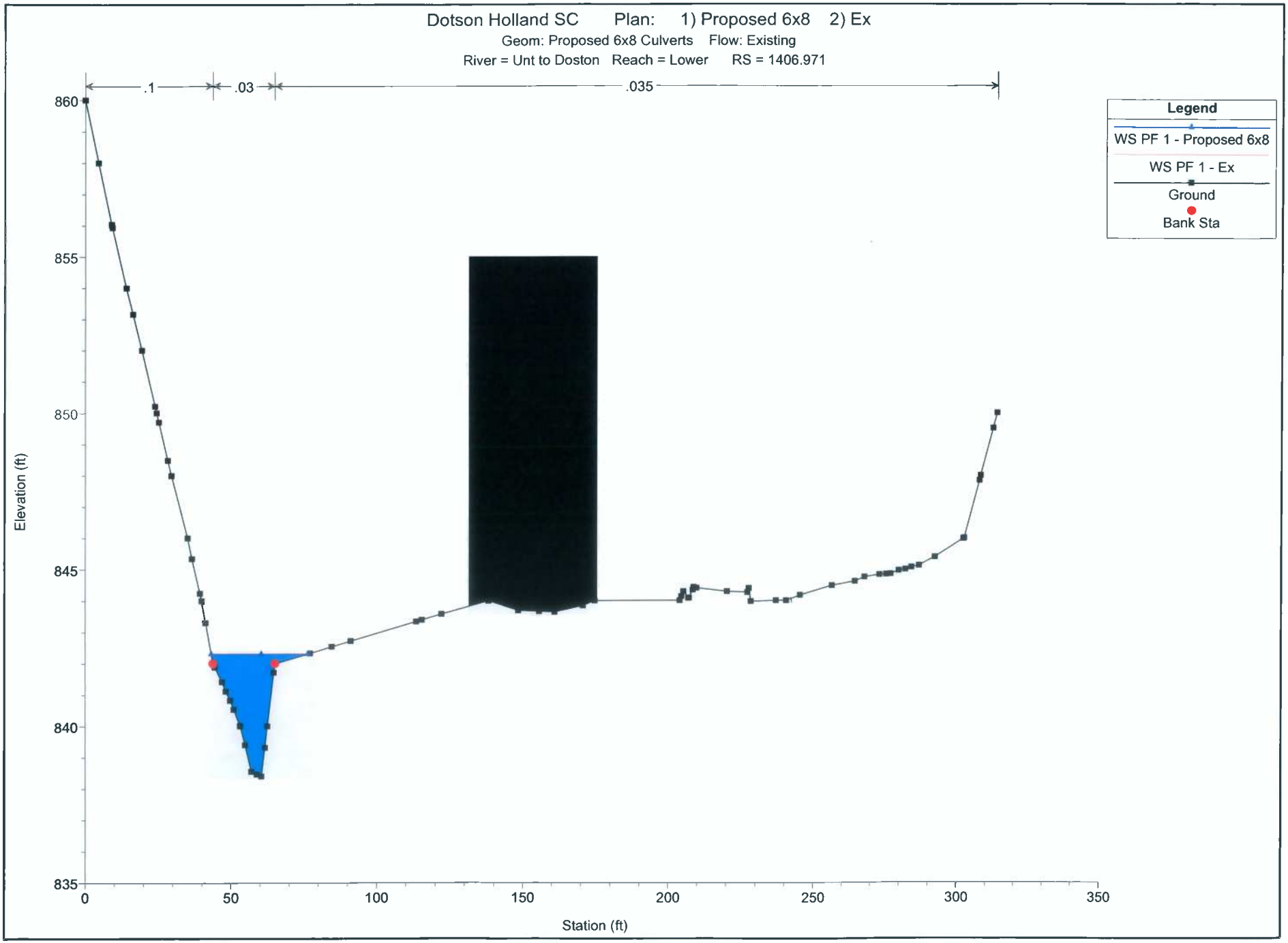
855
850
845
840
835
830
0
100
200
300
400
500
Station (ft)

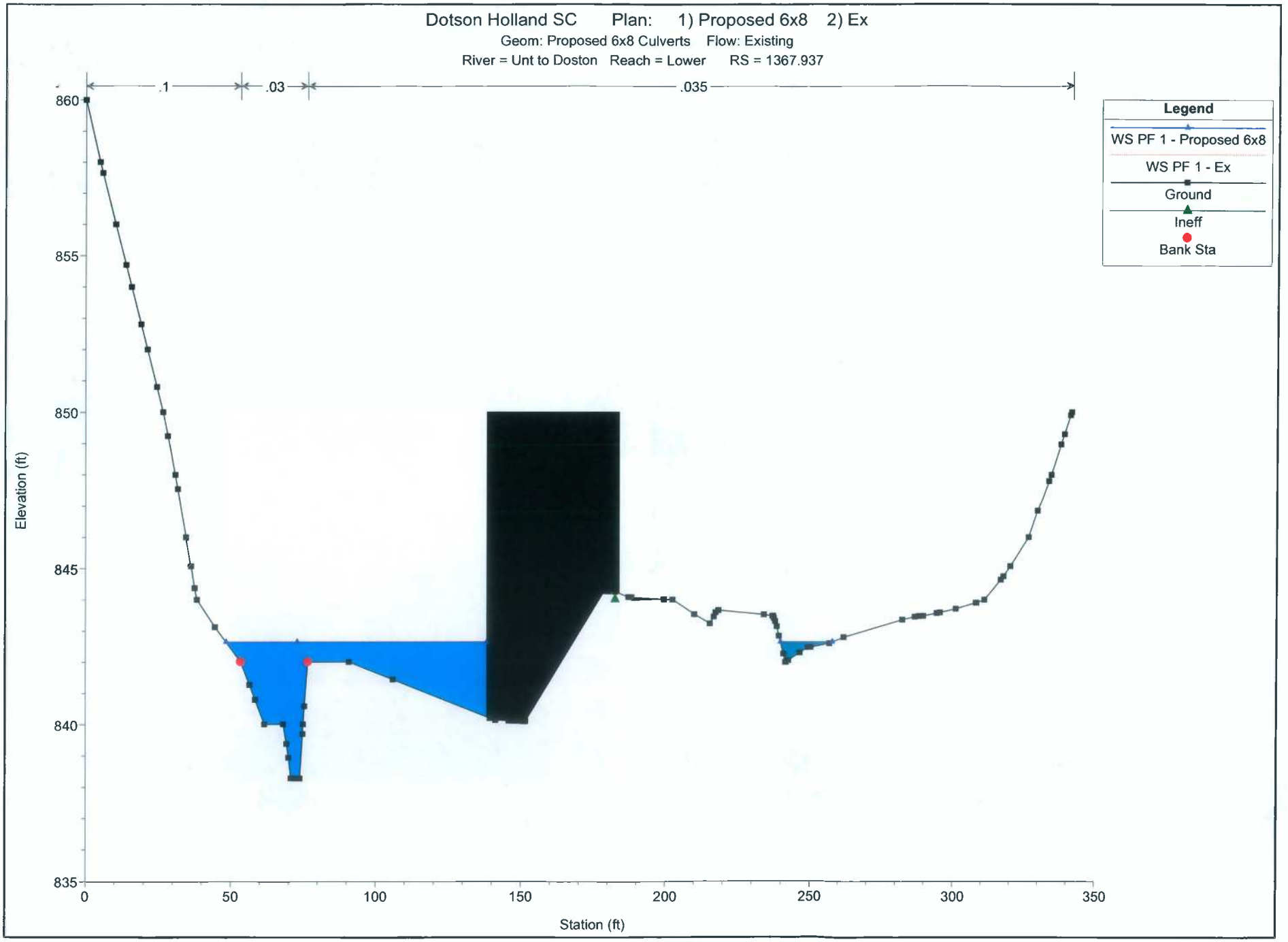

Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1569.420
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1515.286
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1499.515
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1464.257
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
870
865
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1406.971
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1367.937
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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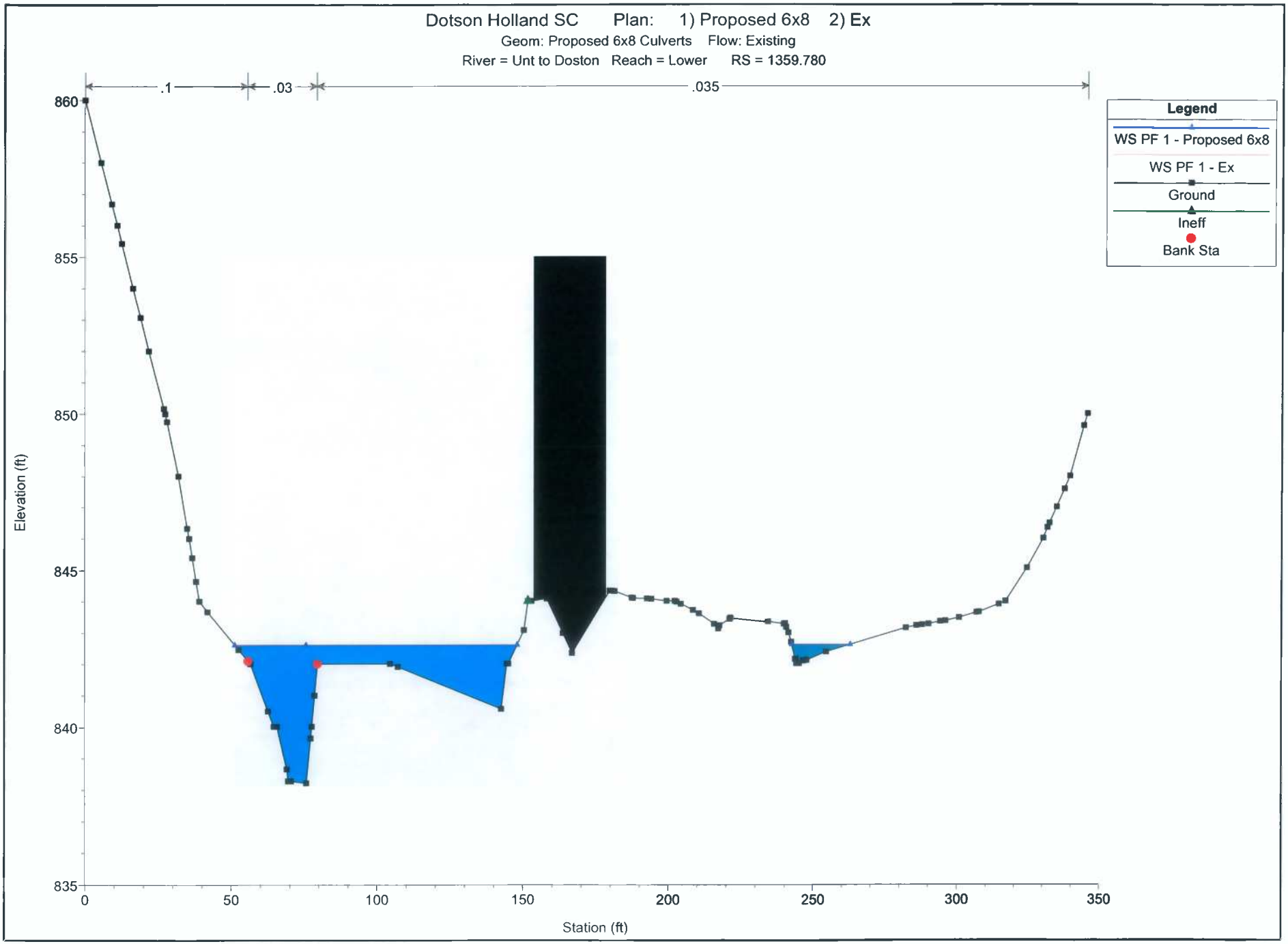
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1359.780
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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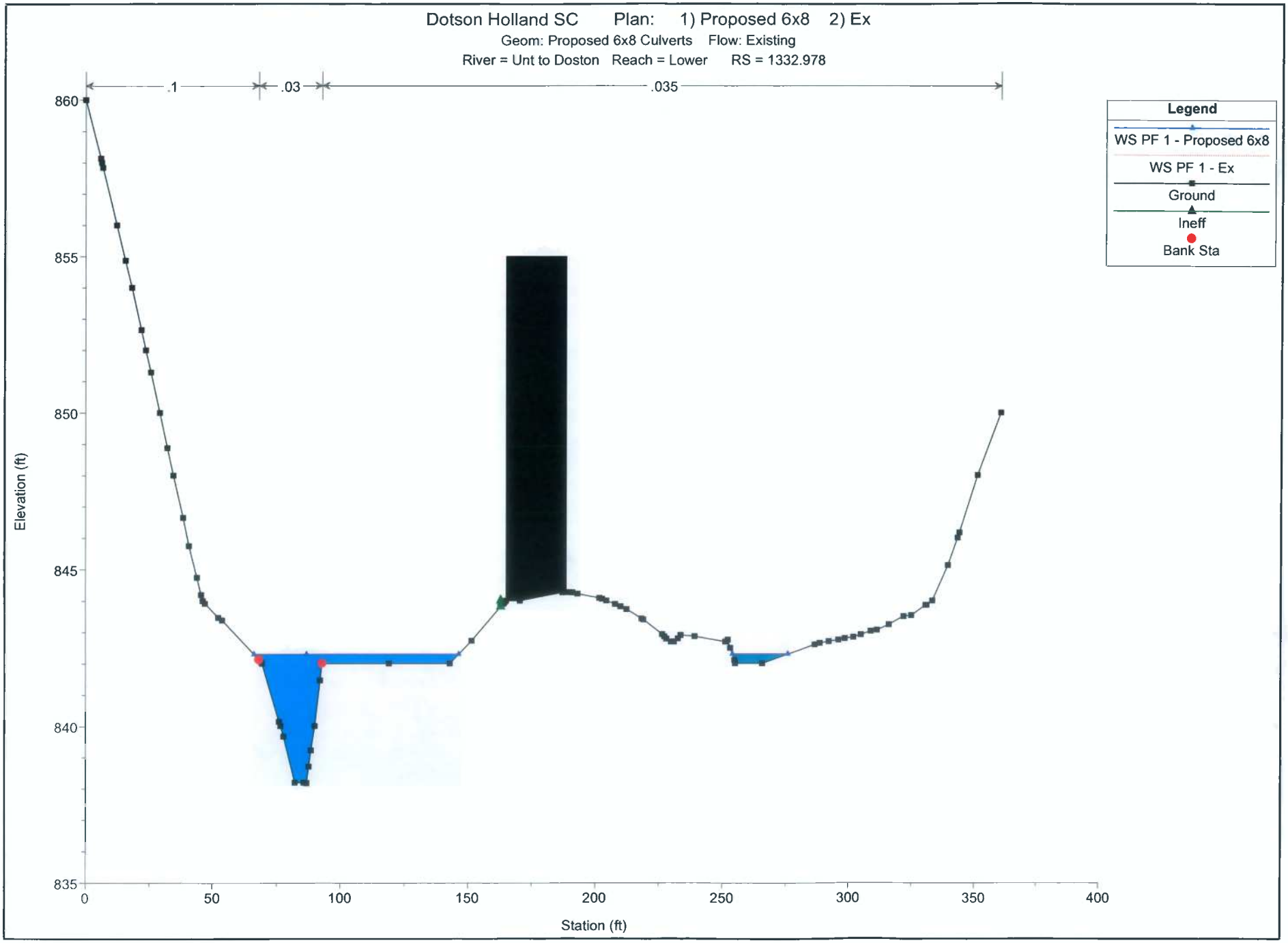
855
850
845
840
835
0
50
100
150
200
250
300
350
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1332.978
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Ineff
Bank Sta
Elevation (ft)
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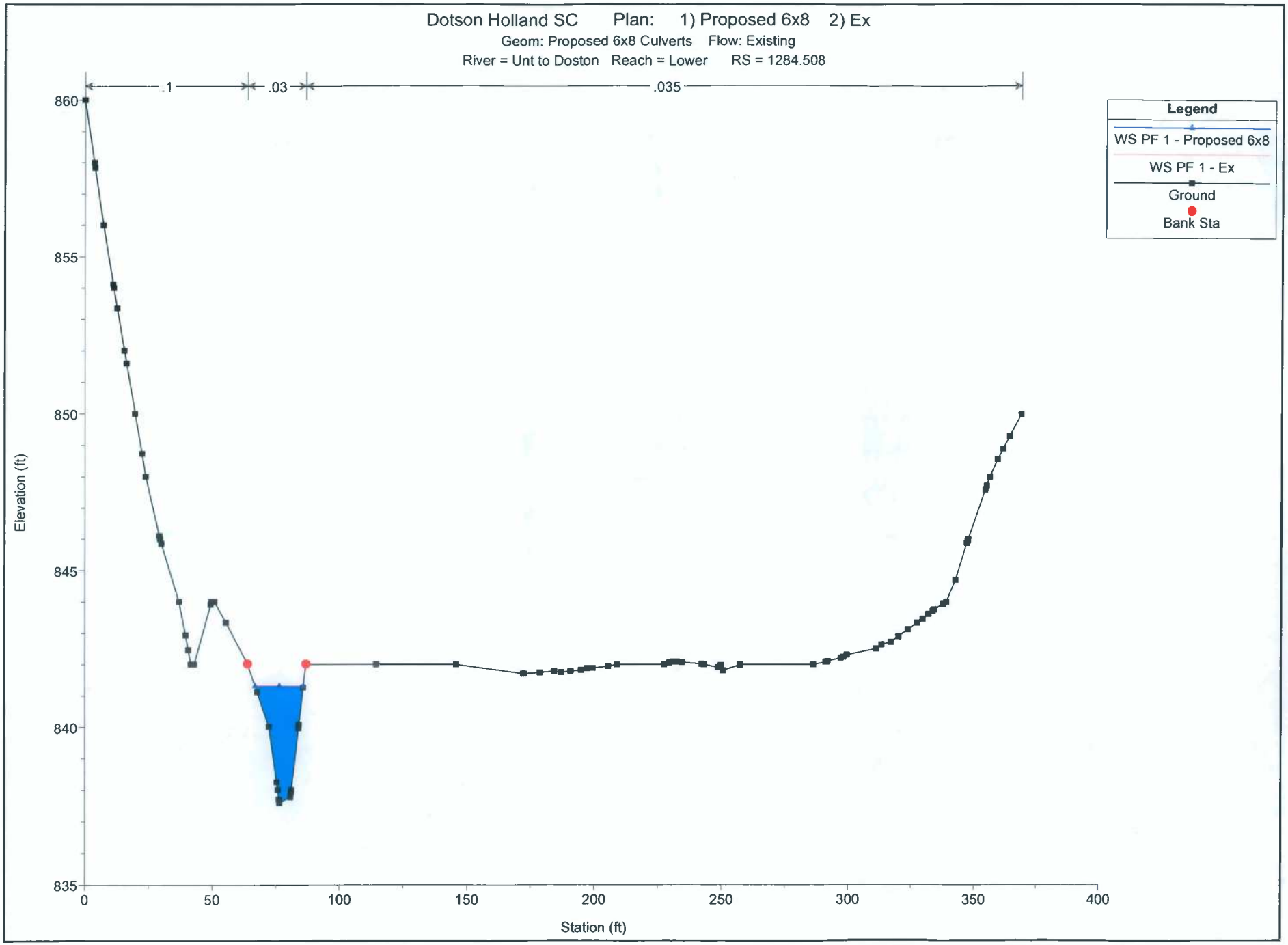
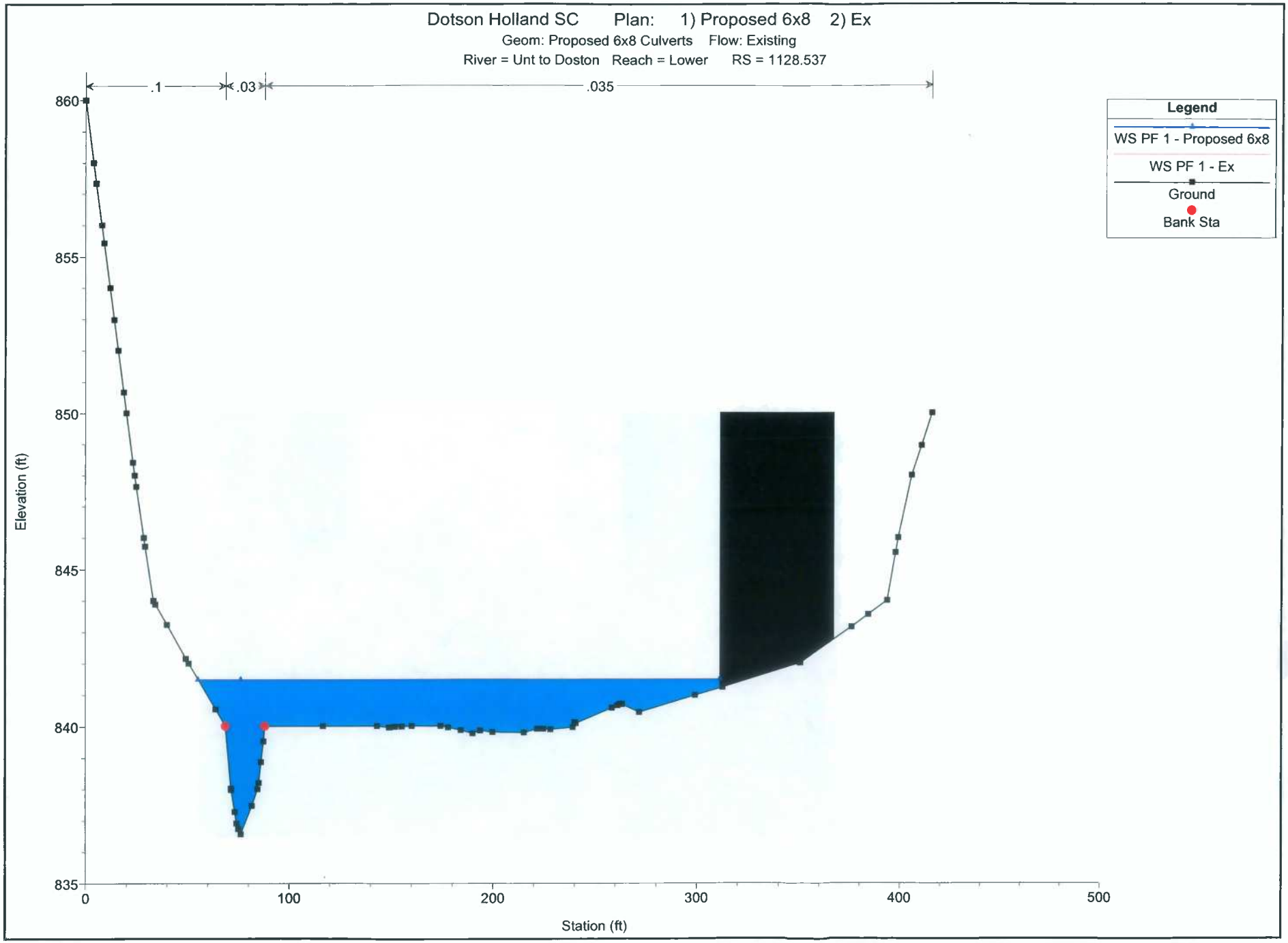
850
845
840
835
0
50
100
150
200
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1284.508
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
50
100
150
200
250
300
350
400
Station (ft)


Dotson Holland SC Plan: 1) Proposed 6x8 2) Ex
Geom: Proposed 6x8 Culverts Flow: Existing
River = Unt to Doston Reach = Lower RS = 1128.537
.1
.03
.035
Legend
WS PF 1 - Proposed 6x8
WS PF 1 - Ex
Ground
Bank Sta
Elevation (ft)
860
855
850
845
840
835
0
100
200
300
400
500
Station (ft)

STATE OF WEST VIRGINIA,
COUNTY OF DODDRIDGE, TO WIT

I, Virginia Nicholson, Editor of THE HERALD RECORD, a weekly newspaper published regularly, in Doddridge County, West Virginia, Do Hereby Certify Upon Oath That the Accompanying Legal Notice Entitled:

Floodplain Permit Applicatio
#13-082

was published in said paper for 1

successive weeks beginning with the issue

of October 22 2013 and

ending with the issue of

October 22 2013 and

that said notice contains 189

WORD SPACE at .115 cents a word

amounts to the sum of $ 21.74

FOR FIRST PUBLICATION, SECOND PUBLICATION IS 75% OF THE FIRST PUBLICATION

$ 0

and each publication thereafter

$ 21.74 TOTAL

EDITOR

Virginia Nicholson

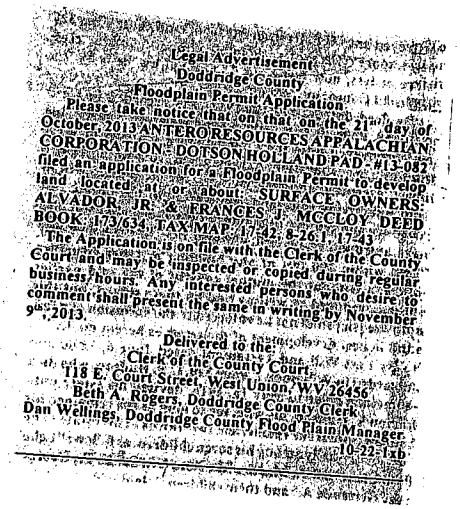
SWORN TO AND SUBSCRIBED

BEFORE ME THIS THE 24 DAY

OF October 2013

NOTARY PUBLIC

Laura J Adams



Legal Advertisement
Doddridge County
Floodplain Permit Application

Please take notice that on that on the 21st day of October, 2013 ANTERO RESOURCES APPALACHIAN CORPORATION DOTSON HOLLAND PAD #13-082 filed an application for a Floodplain Permit to develop land located at or about SURFACE OWNERS: ALVADOR JR. & FRANCES MCCLOY DEED BOOK 173/634, TAX MAP 17-42, 8-26.1, 17-43

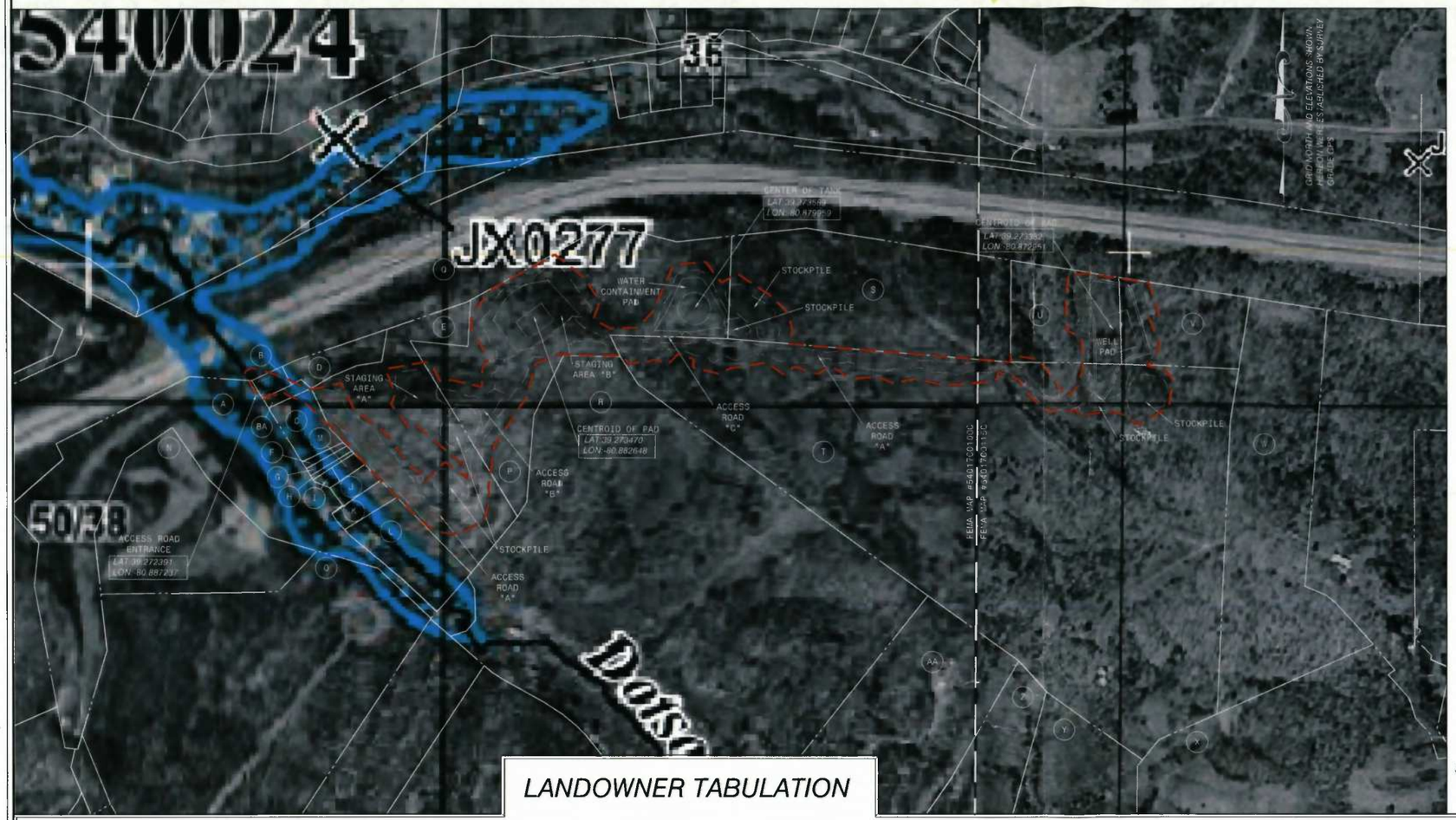
The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by November 9th, 2013.

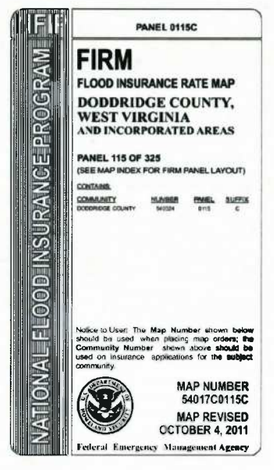
Delivered to the:
Clerk of the County Court
118 E. Court Street, West Union, WV 26456
Beth A. Rogers, Doddridge County Clerk
Dan Wellings, Doddridge County Flood Plain Manager
10-22-1xb

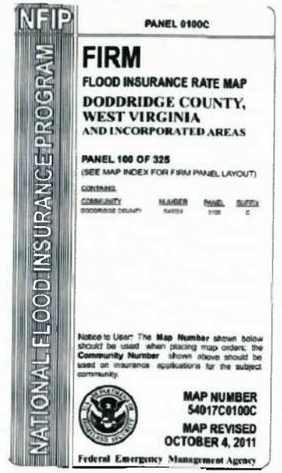
OFFICIAL SEAL
Notary Public, State Of West Virginia
LAURA J ADAMS
212 Edmond Street
West Union, WV 26456
My Commission Expires June 14, 2023

13-082

FIRM MAP EXHIBIT







300 0 300
GRAPHIC SCALE (IN FEET)

FLOODPLAIN NOTE

THE PROPOSED SITE IS LOCATED IN FLOODZONE "X" PER FEMA FLOOD MAPS #54017C0100C & #54017C0115C. THE PROPOSED SITE ENTRANCE IS LOCATED IN FLOODZONE "A" PER FEMA FLOOD MAP #54017C0100C.

LANDOWNER TABULATION

A — COUNTY ROUTE 50/38
VARIABLE WIDTH
RIGHT-OF-WAY
NO ADDRESS

B — TM 17-42
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
.35 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

C — TM 8-26.1
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
1.5 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

D — TM 8-31.2
CHESTER S. & BERNA K. ANKROM
DB 154 PG 268
WB 34 PG 532
1.5 ACRE
RT 1 BOX 312
GREENWOOD, WV 26415

E — TM 8-31
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
13.11 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

F — TM 8-27.1
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
0.18 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

G — TM 8-27
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
0.28 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

H — TM 8-28
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
0.06 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

I — TM 8-26
HARLEY & WANDA M. WEAVER
DB 154 PG 473
0.15 ACRE
RT 1 BOX 9A
GREENWOOD, WV 26415

J — TM 8-30.1
CHERYL ANN ANKROM TUCKER
DB 257 PG 81
0.12 ACRE
RT 1 BOX 300
GREENWOOD, WV 26415

K — TM 8-30
TONY L. & STELLA M. NICHOLS
DB 241 PG 119
0.69 ACRE
194 FETTY HOLLOW
SPENCER, WV 25276

L — P/O TM 8-39
DALE F. & PAULETT PIERCE
DB 229 PG 356
47.3 ACRE
RT 1 BOX 299
PENNSBORO, WV 26415

M — TM 8-29
ALICE E. GREEN, ET AL
WB 43 PG 715
0.23 ACRE
26 ROCKET DRIVE
GREENWOOD, WV 26415

N — TM 8-25
VICKI ROBINSON
2822 OAKTON MANOR CT.
OAKTON, VA 22124
VALI SMITH
9319 SUMNER LAKE BLVD.
MANASSAS, VA 20110
ROSEMARY SHANNON
511 TAPAWINGO RD.
VIENNA, VA 22180
GALE J. SMITH
RT BOX 354
GREENWOOD, WV 26415
STEPHEN M. SMITH
113 ISLAND AVENUE
BUCKHANNON, WV 26201
MARGERY TALKINGTON
636 MOUNTAIN DRIVE
PENNSBORO, WV 26415
DB 252 PG 241
WB 30 PG 516
11.03 ACRE
RT 2 BOX 294 A-1
WEST UNION, WV 26456

O — TM 8-39
DALE F. & PAULETTE PIERCE
DB 229 PG 356
47.3 ACRE
RT 1 BOX 299
PENNSBORO, WV 26415

P — TM 9-22
ALVADORE, JR. &
FRANCES J. McCLOY
DB 193 PG 275
17.98 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

Q — U.S ROUTE 50
VARIABLE WIDTH
RIGHT-OF-WAY
NO ADDRESS

R — TM 9-32.3
MICHAEL O. & JOYCE A. MARSH
DB 267 PG 631
63.36 ACRE
RT 1 BOX 289
GREENWOOD, WV 26145

S — TM 9-23
ALLEN F. DOTSON, ET AL
WB 31 PG 640
17.19 ACRE
6789 PIKE ST.
MINERAL WELLS, WV 26150

T — TM 9-24
ROBERT HOLLAND HEIRS
DB 167 PG 348
75 ACRE
225 WATCHUNG FORK
WESTFIELD, NJ 07090

U — TM 9-24.1
ROBERT HOLLAND HEIRS
DB 167 PG 348
4.26 ACRE
225 WATCHUNG FORK
WESTFIELD, NJ 07090

V — TM 9-25.1
ROBERT L. HOLLAND, JR.
DB 247 PG 376
6.6 ACRE
PO BOX 425
WEST UNION, WV 26456

W — TM 9-26.1
ROBERT L. HOLLAND, JR.
DB 247 PG 376
17.09 ACRE
PO BOX 425
WEST UNION, WV 26456

X — TM 9-37
WILLIAM S. CALHOUN
DB 222 PG 693
39.09 ACRE
RT 1 BOX 508
GREENWOOD, WV 26415

Y — TM 9-36
WILLIAM S. CALHOUN
WB 23 PG 272
9 ACRE
RT 1 BOX 508
GREENWOOD, WV 26415

Z — TM 9-34
WILLAM S. CALHOUN
WB 23 PG 272
13.3 ACRE
RT 1 BOX 508
GREENWOOD, WV 26415

AA — TM 9-33.3
TRAVIS L. & MELISSA RAE RONALD
DB 237 PG 176
21.59 ACRE
RT 1 BOX 284
GREENWOOD, WV 26415

BA — TM 17-43
ALVADORE, JR. &
FRANCES J. McCLOY
DB 173 PG 634
.26 ACRE
RT 1 BOX 310
GREENWOOD, WV 26415

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
151 Windy Hill Lane
Winchester, Virginia 22602
Tel: 540.662.4185 Fax: 540.662.4186
www.navituseng.com

DATE | REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

FIRM MAP EXHIBIT

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHAD B. KNIGHT REGISTERED 17676 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" =300'
SHEET 29 OF 29

DOTSON HOLLAND WELL PAD & WATER CONTAINMENT PAD

SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS

CENTRAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA
DOTSON RUN WATERSHED

LOCATION COORDINATES

ACCESS ROAD ENTRANCE
LATITUDE: 39.272391 LONGITUDE: -80.887237 (NAD 83)
N 4347010.86 E 509726.79 (UTM NAD83, ZONE 17 METERS)

CENTROID OF STAGING AREA "B"
LATITUDE: 39.273470 LONGITUDE: -80.882648 (NAD 83)
N 4347131.15 E 510122.50 (UTM NAD83, ZONE 17 METERS)

CENTER OF WATER CONTAINMENT TANK
LATITUDE: 39.273589 LONGITUDE: -80.879959 (NAD 83)
N 4347144.59 E 510354.40 (UTM NAD83, ZONE 17 METERS)

CENTROID OF WELL PAD
LATITUDE: 39.273382 LONGITUDE: -80.872951 (NAD 83)
N 4347122.44 E 510958.93 (UTM NAD83, ZONE 17 METERS)

GENERAL DESCRIPTION

THE WELL PAD, WATER CONTAINMENT PAD(S), AND ACCESS ROAD(S) AND ARE BEING CONSTRUCTED TO AID IN THE DEVELOPMENT OF INDIVIDUAL MARCELLUS SHALE GAS WELLS.

FLOODPLAIN NOTE

THE PROPOSED SITE IS LOCATED IN FLOODZONE "X" PER FEMA FLOOD MAPS #54017C0100C & #54017C0115C.
THE PROPOSED SITE ENTRANCE IS LOCATED IN FLOODZONE "A" PER FEMA FLOOD MAP #54017C0100C.

MISS UTILITY STATEMENT

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN; TICKET #1310825138.
IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

ENTRANCE PERMIT

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

GEOTECHNICAL NOTE

THE PROPOSED ACCESS ROAD CUT SLOPE (1.5:1) SHALL BE FIELD VERIFIED BY A CERTIFIED GEOTECHNICAL ENGINEER TO ENSURE THE PROPOSED SLOPES ARE ADEQUATE PRIOR TO CONSTRUCTION. ACCESS ROAD CONSTRUCTION SHALL BE MONITORED BY A GEOTECHNICAL ENGINEER DURING CONSTRUCTION. A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY KLEINFELDER JUNE 27 - JULY 10, 2013. THE REPORTS PREPARED BY KLEINFELDER, DATED AUGUST 16, 2013 & SEPTEMBER 11, 2013, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WAS USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY KLEINFELDER FOR ADDITIONAL INFORMATION, AS NEEDED.

ENVIRONMENTAL NOTES

WETLAND DELINEATIONS WERE PERFORMED NOVEMBER, 2012, FEBRUARY, 2013, JULY, 2013, & SEPTEMBER, 2013 BY POTESTA ENGINEERS AND ENVIRONMENTAL CONSULTANTS TO REVIEW THE SITE FOR WATERS AND WETLANDS THAT ARE MOST LIKELY WITHIN THE REGULATORY PURVIEW OF THE U.S. ARMY CORPS OF ENGINEERS (USACE) AND/OR THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP). THE SEPTEMBER 19, 2013 JURISDICTIONAL AQUATIC FEATURES MAP WAS PREPARED BY POTESTA ENGINEERS AND ENVIRONMENTAL CONSULTANTS AND SUMMARIZES THE RESULTS OF THE FIELD DELINEATION. THE MAP DOES NOT, IN ANY WAY, REPRESENT A JURISDICTIONAL DETERMINATION OF THE LANDWARD LIMITS OF WATERS AND WETLANDS WHICH MAY BE REGULATED BY THE USACE OR THE WVDEP. IT IS STRONGLY RECOMMENDED THAT THE AFOREMENTIONED AGENCIES BE CONSULTED IN AN EFFORT TO GAIN WRITTEN CONFIRMATION OF THE DELINEATION SHOWN ON THIS EXHIBIT PRIOR TO ENGAGING CONSTRUCTION ON THE PROPERTY DESCRIBED HEREIN. THE DEVELOPER SHALL OBTAIN THE APPROPRIATE PERMITS FROM THE FEDERAL AND/OR STATE REGULATORY AGENCIES PRIOR TO ANY PROPOSED IMPACTS TO WATERS OF THE U.S., INCLUDING WETLAND FILLS AND STREAM CROSSINGS.

PROJECT CONTACTS

OPERATOR:
ANTERO RESOURCES CORPORATION
535 WHITE OAKS BLVD.
BRIDGEPORT, WV 26330
PHONE: (304) 842-4100
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER
OFFICE: (304) 842-4068 CELL: (304) 476-9770

JOHN KAWCAK - OPERATIONS SUPERINTENDENT
CELL: (817) 368-1553

AARON KUNZLER - CONSTRUCTION SUPERVISOR
CELL: (405) 227-8344

ANTHONY SMITH - FIELD ENGINEER
OFFICE: (304) 842-4208 CELL: (304) 673-6196

ROGER DUNLAP - SURVEYING COORDINATOR
CELL: (304) 651-5588

MARK HUTSON - LAND AGENT
CELL: (304) 669-8315

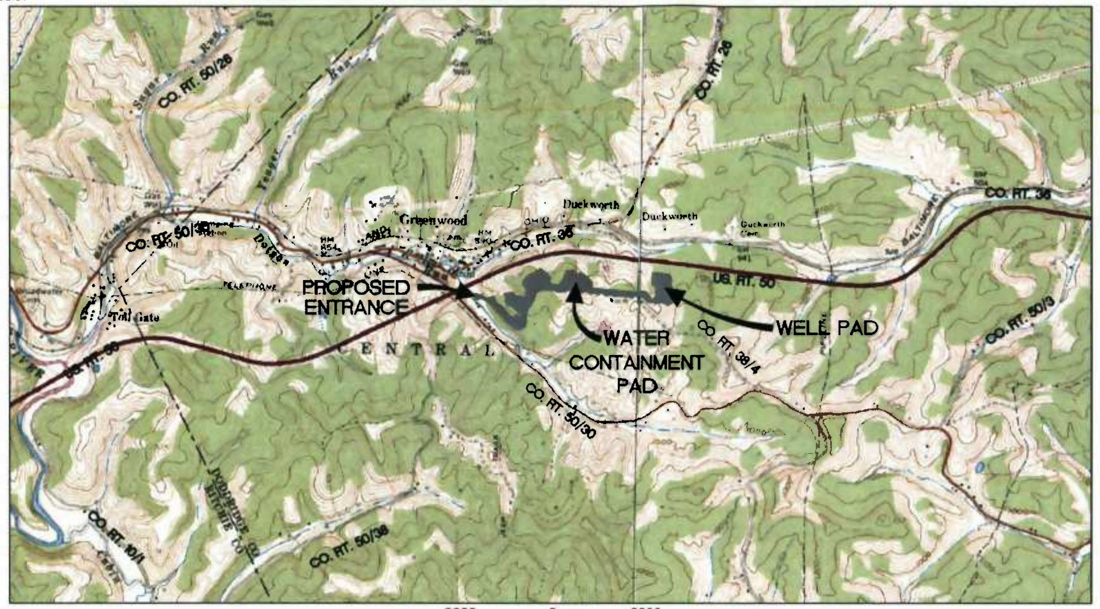
ENGINEER/SURVEYOR:
NAVITUS ENGINEERING, INC.
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER
OFFICE: (888) 662-4185 CELL: (540) 686-6747

ENVIRONMENTAL:
POTESTA ENGINEERS AND ENVIRONMENTAL CONSULTANTS
TIMOTHY R. FERGUSON M.S. - STAFF SCIENTIST I
OFFICE: (304) 342-1400 CELL: (304) 382-8217

RESTRICTIONS NOTES:

1. THERE ARE NO PERENNIAL STREAMS, WETLANDS, LAKES, PONDS, OR RESERVOIRS WITHIN 100 FEET OF THE WELL PAD AND LOD.
2. THERE ARE NO NATURALLY PRODUCING TROUT STREAMS WITHIN 300 FEET OF THE WELL PAD AND LOD.
3. THERE ARE NO GROUNDWATER INTAKE OR PUBLIC WATER SUPPLY FACILITIES WITHIN 1000 FEET OF THE WELL PAD AND LOD.
4. THERE ARE NO APPARENT EXISTING WATER WELLS OR DEVELOPED SPRINGS WITHIN 250 FEET OF THE WELL(S) BEING DRILLED.
5. THERE ARE NO OCCUPIED DWELLING STRUCTURES WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.
6. THERE ARE NO AGRICULTURAL BUILDINGS LARGER THAN 2,500 SQUARE FEET WITHIN 625 FEET OF THE CENTER OF THE WELL PAD.

USGS 7.5 PENNSBORO AND WEST UNION QUAD MAPS

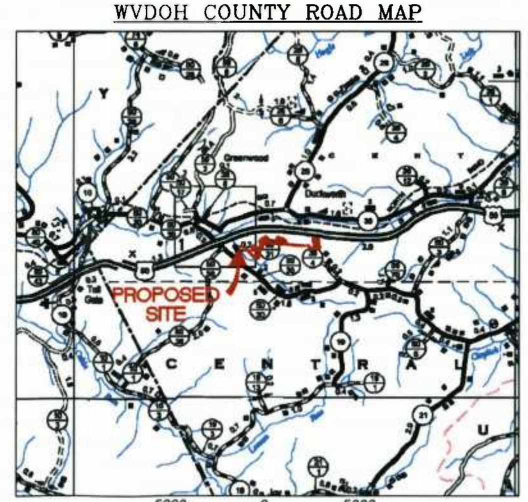


2000 0 2000
SCALE: 1" = 2000'

WEST VIRGINIA COUNTY MAP

(NOT TO SCALE)

WVDOH COUNTY ROAD MAP



5000 0 5000
SCALE: 1" = 5000'

DESIGN CERTIFICATION

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS CRS 35-8.

SITE PLAN/CONSTRUCTION STAGING NOTE

STAGING AREA "B" AS SHOWN IN THIS SITE PLAN IS THE FUTURE ALVADORE WELL PAD SITE. STAGING AREA "B" SHALL BE CONSTRUCTED AS SHOWN IN THESE PLANS TO SERVE AS A MULTI-PURPOSE PAD TO BE UTILIZED FOR TEMPORARY EQUIPMENT AND MATERIAL STORAGE. A SEPARATE ALVADORE WELL PAD SITE PLAN WILL BE SUBMITTED IN THE FUTURE FOR THE PERMITTING OF ALL FUTURE WELLS ON THE ALVADORE WELL PAD SITE.

MISS Utility of West Virginia
1-800-245-4848
West Virginia State Law
(Section XIV: Chapter 24-C)
Requires that you call two business days before you dig in the state of West Virginia.
IT'S THE LAW!!

WEST VIRGINIA STATE PLANE COORDINATE SYSTEM
NORTH ZONE, NAD83
ELEVATION BASED ON NAVD88
ESTABLISHED BY SURVEY GRADE GPS & OPUS
POST-PROCESSING

SHEET INDEX

01 - COVER SHEET
02 - CONSTRUCTION AND E&S CONTROL NOTES
03 - MATERIAL QUANTITIES
04 - EXISTING CONDITIONS
05 - OVERALL PLAN SHEET INDEX & VOLUMES
06 - ACCESS ROAD & STAGING AREA "A" PLAN
07 - ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD PLAN
08 - ACCESS ROAD PLAN
09 - ACCESS ROAD & WELL PAD PLAN
10-11 - ACCESS ROAD PROFILES
12-14 - ACCESS ROAD SECTIONS
15 - WELL PAD, STAGING AREA "B", & WATER CONTAINMENT PAD SECTIONS
16 - WELL PAD SECTIONS
17-18 - STREAM CROSSING DETAILS
19-24 - CONSTRUCTION DETAILS
25 - ACCESS ROAD & STAGING AREA "A" RECLAMATION PLAN
26 - ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD RECLAMATION PLAN
27 - ACCESS ROAD RECLAMATION PLAN
28 - ACCESS ROAD & WELL PAD RECLAMATION PLAN
29 - FIRM EXHIBIT

Dotson Holland LIMITS OF DISTURBANCE AREA (AC)	
Total Site	
Access Road "A" (4,902.36')	13.66
Access Road "B" (296.45')	0.84
Access Road "C" (66.78')	0.24
Staging Area "A"	1.52
Well Pad	4.49
Staging Area "B"	4.12
Water Containment Pad	2.39
Excess/Topsoil Material Stockpiles	4.80
Total Affected Area	**32.06**
Total Wooded Acres Disturbed	22.80
Impacts to WV DOH R/W	
Access Road "A" (13.86')	0.12
Total Affected Area	**0.12**
Total Wooded Acres Disturbed	0.00
Impacts to Alvadore, JR. & Frances J. McCloy TM 17-42	
Access Road "A" (170.85')	0.30
Total Affected Area	**0.30**
Total Wooded Acres Disturbed	0.00
Impacts to Alvadore, JR. & Frances J. McCloy TM 17-43	
Access Road "A" (70.69')	0.12
Total Affected Area	**0.12**
Total Wooded Acres Disturbed	0.00
Impacts to Chester S. & Berna K. Ankrom TM 8-31.2	
Access Road "A" (0.00')	0.01
Total Affected Area	**0.01**
Total Wooded Acres Disturbed	0.00
Impacts to Alvadore, JR. & Frances J. McCloy TM 8-26.1	
Access Road "A" (62.44')	0.18
Total Affected Area	**0.18**
Total Wooded Acres Disturbed	0.06

Impacts to Alvadore, JR. & Frances J. McCloy TM 8-31	
Access Road "A" (1,247.62')	3.85
Access Road "B" (36.75')	0.05
Staging Area "A"	1.45
Excess/Topsoil Material Stockpiles	1.35
Total Affected Area	**6.70**
Total Wooded Acres Disturbed	4.44
Impacts to Alvadore, JR. & Frances J. McCloy TM 9-22	
Access Road "A" (984.32')	2.89
Access Road "B" (259.70')	0.79
Access Road "C" (26.29')	0.09
Staging Area "A"	0.07
Staging Area "B"	4.12
Water Containment Pad	2.39
Excess/Topsoil Material Stockpiles	0.43
Total Affected Area	**10.78**
Total Wooded Acres Disturbed	10.01
Impacts to Allen F. Dotson, ET AL TM 9-23	
Excess/Topsoil Material Stockpiles	1.60
Total Affected Area	**1.60**
Total Wooded Acres Disturbed	1.60
Impacts to Robert Holland Heirs TM 9-24	
Access Road "A" (2,352.58')	6.11
Access Road "C" (40.49')	0.15
Well Pad	0.84
Excess/Topsoil Material Stockpiles	1.42
Total Affected Area	**8.52**
Total Wooded Acres Disturbed	4.66
Impacts to Robert Holland Heirs TM 9-24.1	
Access Road "A" (0.00')	0.08
Well Pad	2.19
Total Affected Area	**2.27**
Total Wooded Acres Disturbed	1.13
Impacts to Robert Holland Heirs TM 9-25.1	
Well Pad	1.46
Total Affected Area	**1.46**
Total Wooded Acres Disturbed	0.90

Proposed Well Name	WV North NAD 27	WV North NAD 83	UTM (METERS) Zone 17	NAD 83 Lat & Long
Amanda	N 284660.14	N 284694.76	N 4347134.15	LAT 39-16-24.5532
Unit 2H	E 1611302.84	E 1579861.72	E 510966.93	LONG -80-52-22.2894
Amanda	N 284650.54	N 284685.15	N 4347131.23	LAT 39-16-24.4587
Unit 1H	E 1611305.63	E 1579864.51	E 510967.83	LONG -80-52-22.2520
Zellerback	N 284640.94	N 284675.55	N 4347128.32	LAT 39-16-24.3642
Unit 1H	E 1611308.42	E 1579867.30	E 510968.73	LONG -80-52-22.2147
Zellerback	N 284631.33	N 284665.95	N 4347125.41	LAT 39-16-24.2697
Unit 2H	E 1611311.21	E 1579870.09	E 510969.63	LONG -80-52-22.1773
Murphy	N 284621.73	N 284656.35	N 4347122.50	LAT 39-16-24.1753
Unit 1H	E 1611314.00	E 1579872.89	E 510970.53	LONG -80-52-22.1399
Murphy	N 284612.13	N 284646.74	N 4347119.59	LAT 39-16-24.0808
Unit 2H	E 1611316.80	E 1579875.68	E 510971.43	LONG -80-52-22.1026
Alder	N 284602.53	N 284637.14	N 4347116.68	LAT 39-16-23.9863
Unit 1H	E 1611319.59	E 1579878.47	E 510972.32	LONG -80-52-22.0652
Doak	N 284592.92	N 284627.54	N 4347113.77	LAT 39-16-23.8918
Unit 2H	E 1611322.38	E 1579881.26	E 510973.22	LONG -80-52-22.0279
Doak	N 284583.32	N 284617.94	N 4347110.86	LAT 39-16-23.7974
Unit 1H	E 1611325.17	E 1579884.05	E 510974.12	LONG -80-52-21.9905
Murphy	N 284653.33	N 284687.95	N 4347132.13	LAT 39-16-24.4877
Unit 4H	E 1611315.23	E 1579874.11	E 510970.74	LONG -80-52-22.1305
Well Pad Elevation	989.0			

Dotson Holland Ephemeral Stream Impact (Linear Feet)			
Stream and Impact Cause	**Culvert (LF)**	**Inlets/Outlets Structures (LF)**	**Total Fill (LF)**
Stream Crossing "C" Stream 23 (Access Road "A")	82	6	88
Dotson Holland Intermittent Stream Impact (Linear Feet)			
Stream and Impact Cause	**Culvert (LF)**	**Inlets/Outlets Structures (LF)**	**Total Fill (LF)**
Stream Crossing "B" Stream 12 (Access Road "A")	49	9	58
Dotson Holland Perennial Stream Impact (Linear Feet)			
Stream and Impact Cause	**Culvert (LF)**	**Inlets/Outlets Structures (LF)**	**Total Fill (LF)**
Stream Crossing "A" Dotson Run (Access Road "A")	48	0	48

Engineering • Survey • Environmental • GIS
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REVISION | DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

COVER SHEET
DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS S. KUMP REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: AS SHOWN
SHEET 1 OF 29

CONSTRUCTION AND E&S CONTROL NOTES

CONSTRUCTION NOTES:

1. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND WILL NOTIFY NAVITUS ENGINEERING AT (888) 662-4185 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN. ANY WORK PERFORMED BY THE CONTRACTOR AFTER THE FINDING OF SUCH DISCREPANCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
2. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS. SHOULD A CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, AND PLANS OCCUR, THE MOST STRINGENT REQUIREMENT WILL APPLY. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
3. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO, A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES.
5. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPE LINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS TO THE EXISTING RIGHT-OF-WAY.
8. WHEN GRADING IS PROPOSED WITHIN EASEMENTS OF UTILITIES, LETTERS OF PERMISSION FROM ALL INVOLVED COMPANIES MUST BE OBTAINED PRIOR TO GRADING AND/OR SITE DEVELOPMENT.
9. THE DEVELOPER WILL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITIES WHICH IS REQUIRED AS A RESULT OF HIS PROJECT. THE RELOCATION SHOULD BE DONE PRIOR TO CONSTRUCTION.
10. THESE PLANS IDENTIFY THE LOCATION OF ALL KNOWN GRAVESITES. GRAVESITES SHOWN ON THIS PLAN WILL BE PROTECTED IN ACCORDANCE WITH STATE LAW. IN THE EVENT GRAVESITES ARE DISCOVERED DURING CONSTRUCTION, THE OWNER AND ENGINEER MUST BE NOTIFIED IMMEDIATELY.
11. THE CONTRACTOR(S) SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
12. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR 2 DAYS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR IS RESPONSIBLE FOR ALL FILL MATERIAL TESTING REQUIRED DURING THE CONSTRUCTION OF THIS PROJECT. ALL MATERIAL TESTS SHALL BE CONDUCTED BY A CERTIFIED MATERIALS TESTING LABORATORY AND A CERTIFICATION OF THE MATERIALS TESTED SHALL BE PROVIDED BY A LICENSED PROFESSIONAL ENGINEER REPRESENTING THE LABORATORY. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THE CONSTRUCTED FACILITY. FAILURE TO CONDUCT THE DENSITY TEST SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE CONSTRUCTED FACILITY.
15. SATISFACTORY MATERIALS FOR USE AS FILL FOR PAD AREAS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS GW, GP, GM, GC, SW, SP, SM, SC, ML, AND CL GROUPS. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS. GENERALLY, UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH, AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER. SOILS SHALL HAVE A MINIMUM DRY DENSITY OF 92LB/CF PER ASTM D-698 AND SHALL HAVE A PLASTICITY INDEX LESS THAN 17.
16. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SITE IN ACCORDANCE WITH THE DESIGN PLANS AND CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK SHALL CONFORM WITH THE GRADES, BERMS, DEPTHS, DIMENSIONS, ETC. SHOWN HEREON.
17. SUPER SILT FENCE CAN BE USED IN PLACE OF ANY COMPOST FILTER SOCK.

SITE CLEANUP & RECYCLE PROGRAM

1. GARBAGE, FUELS OR ANY SUBSTANCE HARMFUL TO HUMAN, AQUATIC OR FISH LIFE, WILL BE PREVENTED FROM ENTERING SPRINGS, STREAMS, PONDS, LAKES, WETLANDS OR ANY WATER COURSE OR WATER BODY.
2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.
3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.
4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.
5. ALL POLLUTION AND EMERGENCY SPILLS SHALL BE IMMEDIATELY REPORTED TO THE WVDEP OFFICE OF OIL AND GAS. (EMERGENCY #1-800-642-3074)

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT A GAS WELL DRILLING PAD, WATER CONTAINMENT PAD(S), & ACCESS ROAD(S) TO AID IN THE DEVELOPMENT OF INDIVIDUAL GAS WELLS. THE ACCESS ROAD ENTRANCE TO THE PROPOSED SITE IS LOCATED ON THE EAST SIDE OF CO. RT. 50/31, 0.13 MILES NORTHWEST OF THE INTERSECTION OF CO RT. 50/30 & CO RT. 50/31 IN CENTRAL DISTRICT, DODDRIDGE COUNTY, WEST VIRGINIA. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 32.06 ACRES.

EXISTING SITE CONDITIONS: THE EXISTING SITE IS APPROXIMATELY 71.1% WOODED. THE TOPOGRAPHY RANGES FROM MODERATE TO STEEP TERRAIN (2% TO 60% SLOPES). PRESENT ON SITE ARE TWO EXISTING GAS PIPELINES AND TWO EXISTING GAS WELLS. ALSO PRESENT ARE ACCESS ROADS, STRUCTURES, OVERHEAD UTILITIES, ONE POND, ONE PERENNIAL STREAM, SIX INTERMITTENT STREAMS, AND 33 EPHEMERAL STREAMS. THE SITE IS LOCATED ON A RIDGE AND DRAINS TO DOTSON RUN AND UNNAMED TRIBUTARIES OF DOTSON RUN. NO EROSION WAS NOTICED ON SITE.

ADJACENT PROPERTY: THE SITE IS BORDERED BY FORESTED LANDS ON ALL SIDES, AND HWY. 50 TO THE NORTH.

CRITICAL AREAS: THE AREA(S) SHOWN ALONG THE FIELD DELINEATED STREAMS, WETLANDS, AND PONDS, AS SHOWN ON THE PLANS, ARE DESIGNATED AS CRITICAL AREA(S), IF PRESENT. ALL 3:1 SLOPES AND STEEPER, DITCHES, AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED AND MAINTAINED DAILY DURING CONSTRUCTION AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER. COMPOST FILTER SOCKS ARE TO BE USED TO PROTECT THESE FIELD DELINEATED AREA(S) FROM SEDIMENT LEAVING THE SITE. ADDITIONALLY, ORANGE SAFETY FENCE IS RECOMMENDED TO BE INSTALLED ABOVE/AROUND THESE AREA(S), TO SERVE AS A PHYSICAL BARRIER, ENSURING THE AREA(S) ARE NOT DISTURBED. THE LOCAL GOVERNING AUTHORITY WILL HAVE THE AUTHORITY TO RECOMMEND THE PLACEMENT OF ADDITIONAL EROSION CONTROL MEASURES IN THESE AREAS IF IT BECOMES EVIDENT DURING CONSTRUCTION THAT THE ONES IN PLACE ARE NOT FUNCTIONING SUFFICIENTLY.

SOILS: THE PROPOSED ACCESS ROAD CUT SLOPE (1.5:1) SHALL BE FIELD VERIFIED BY A CERTIFIED GEOTECHNICAL ENGINEER TO ENSURE THE PROPOSED SLOPES ARE ADEQUATE PRIOR TO CONSTRUCTION. ACCESS ROAD CONSTRUCTION SHALL BE MONITORED BY A GEOTECHNICAL ENGINEER DURING CONSTRUCTION.

A SUBSURFACE INVESTIGATION OF THE PROPOSED SITE WAS PERFORMED BY KLEINFELDER JULY 3-9, 2013. THE REPORT PREPARED BY KLEINFELDER DATED AUGUST 16, 2013, REFLECTS THE RESULTS OF THE SUBSURFACE INVESTIGATION. THE INFORMATION AND RECOMMENDATIONS CONTAINED IN THIS REPORT WAS USED IN THE PREPARATION OF THESE PLANS. PLEASE REFER TO THE SUBSURFACE INVESTIGATION REPORT BY KLEINFELDER FOR ADDITIONAL INFORMATION, AS NEEDED.

OFF SITE AREAS: THERE ARE NO BORROW AREA(S) OR EXPORT STOCKPILE AREA(S) OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT.

EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

STRUCTURAL PRACTICES:

1. INSTALL ORANGE SAFETY FENCE TO ENSURE NO DISTURBANCE TO THE DELINEATED AREA(S).
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
3. INSTALL COMPOST FILTER SOCKS AS SHOWN ON THE PLANS TO REMOVE SEDIMENT FROM RUNOFF. SELECTIVELY REMOVE TREES REQUIRED TO INSTALL COMPOST FILTER SOCK IN WOODED AREAS. CLEARING AND GRUBBING SHALL BE KEPT AT A MINIMUM TO INSTALL E&S CONTROLS.
4. EROSION CONTROL BLANKETS (JUTE MATTING) SHALL BE PLACED ON ALL CRITICAL SLOPES (3:1 OR GREATER) AND AS NEEDED TO STABILIZE DISTURBED AREAS.
5. FILL SLOPE SURFACE SHALL BE LEFT IN A ROUGHENED CONDITION TO REDUCE EROSION. CONTRACTOR SHALL REDIRECT RUNOFF AWAY FROM THE FILL SLOPE BY INSTALLING EARTHEN DIVERSION BERMS AND DIVERTING THE RUNOFF TO SEDIMENT TRAPPING DEVICES.
6. INSTALL V-DITCHES, DITCH RELIEF CULVERTS, AND OUTLET PROTECTION (RIP-RAP APRONS) AS SHOWN ON THE PLANS.

DEVICES LISTED ABOVE ARE CONSIDERED MINIMUM EROSION AND SEDIMENT CONTROLS. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY DUE TO CONTRACTOR PHASING OR OTHER UNFORESEEN CONDITIONS. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMP'S TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION. ALL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN SEVEN (7) DAYS. AT NO TIME SHALL LAND LAY DORMANT LONGER THAN TWENTY-ONE (21) DAYS.

MAINTENANCE PROGRAM: DURING CONSTRUCTION ACTIVITIES, ALL CONTROL MEASURES SHALL BE INSPECTED DAILY BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY SIGNIFICANT RAIN EVENT, WHICH SHALL BE DEFINED AS RAINFALL OF TWO (2) INCHES OR MORE IN A SIX (6) HOUR PERIOD. ONCE CONSTRUCTION ACTIVITIES HAVE CONCLUDED, THE SITE SHALL BE INSPECTED EVERY TWO (2) WEEKS FOR THE LIFE OF THE FACILITY AND WITHIN TWENTY-FOUR (24) HOURS OF A SIGNIFICANT RAIN EVENT AS DEFINED ABOVE. ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED, BY THE END OF THE DAY, OR AT THE EARLIEST TIME IN WHICH IT IS SAFE TO DO SO. SEEDED AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. ALL AREAS SHALL BE FERTILIZED AND RESEEDED AS NEEDED UNTIL GRASS IS ESTABLISHED.

TRAPPED SEDIMENT IS TO BE REMOVED AS REQUIRED TO MAINTAIN 50% TRAP AND/OR SOCK EFFICIENCY AND DISPOSED OF BY SPREADING ON THE STOCKPILE.

INLET OF DITCH RELIEF CULVERTS SHALL BE CHECKED REGULARLY FOR SEDIMENT BUILD-UP. IF THE GRAVEL OUTLET IS CLOGGED BY SEDIMENT, IT SHALL BE REMOVED AND CLEANED OR REPLACED IMMEDIATELY.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED OR SWEPT INTO ANY ROADSIDE DITCH, CULVERT OR SURFACE WATER.

ANY DISTURBED AREAS ALONG THE ACCESS ROAD SHALL BE STABILIZED PRIOR TO THE END OF EACH DAY WITH EITHER ROCK STABILIZATION OR SEEDING AND MULCHING METHODS.

NOTE: THE WV DEP RETAINS THE RIGHT TO ADD AND/OR MODIFY THESE EROSION AND SEDIMENT CONTROL MEASURES DURING THE CONSTRUCTION PROCESS, WITHIN REASON, TO ENSURE ADEQUATE PROTECTION TO THE PUBLIC AND THE ENVIRONMENT.

SEEDING (SOIL STABILIZATION):
1. CONTRACTOR SHALL APPLY SEED AND STABILIZATION IN ACCORDANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL, BASED UPON SITE SPECIFIC SOIL CHARACTERISTICS.
2. WHEREVER SEEDING IS TO BE APPLIED TO STEEP SLOPES (≥ 3H:1V), SEED MIXTURES SHOULD BE SELECTED THAT ARE APPROPRIATE FOR STEEP SLOPES.

DUST CONTROL:
1. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS SUBJECT TO LITTLE OR NO CONSTRUCTION TRAFFIC.
2. ALL HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET AND REPEATED AS NEEDED TO CONTROL DUST.

CONSTRUCTION SEQUENCE

THE DEVELOPMENT OF THIS SITE SHALL BE CONSISTENT WITH THE FOLLOWING GENERAL SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL IMPLEMENT, MAINTAIN, AND OPERATE ALL PROPOSED EROSION AND SEDIMENT CONTROL MEASURES TO EFFECTIVELY MITIGATE THE HAZARD OF ACCELERATED EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S SUPERINTENDENT AS NEEDED TO ELIMINATE ANY POTENTIAL EROSIVE CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WV DEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

1. A PRE-CONSTRUCTION CONFERENCE WITH THE CONTRACTOR AND THE APPROPRIATE EROSION AND SEDIMENT CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.
2. STAKE THE LIMITS OF CONSTRUCTION AND MARK ALL IDENTIFIED WETLANDS, STREAMS, AND OTHER AREAS OF CONCERN FOR CONSTRUCTION ACTIVITIES. INSTALL SIGNS TO DESIGNATE THE AREAS AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT ATTRIBUTES SUCH AS APPROVED ACCESS ROADS, NO REFUELING ZONES, WETLANDS/STREAM BOUNDS, ETC.
3. CONSTRUCT THE ROCK CONSTRUCTION ENTRANCE. ALL VEHICLES ENTERING AND EXITING THE SITE SHALL DO SO VIA THE ROCK CONSTRUCTION ENTRANCE.
4. CONSTRUCT ALL BMP'S AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. DIVERSIONS AND SEDIMENT TRAP(S)/BASIN(S) SHALL BE SEEDED AND MULCHED IMMEDIATELY.
5. IF APPLICABLE, CONVEY UPSLOPE DRAINAGE AROUND THE ACCESS ROAD, WELL PAD, AND WATER CONTAINMENT PAD AREAS BY CONSTRUCTING ALL DIVERSION BERM(S) AND/OR COMPOST FILTER SOCK DIVERSION(S) AS SHOWN ON THE PLANS.
6. CLEAR AND GRUB THE SITE. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, BOULDERS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY SEDIMENT CONTROLS. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGS STACKED. SMALLER TREES, BRUSH, AND STUMPS SHALL BE CUT AND/OR GRUBBED AND WINDROWED IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE OUTLETS (AS SHOWN ON THE PLANS), WINDROWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY OTHER METHODS APPROVED BY WV DEP.
7. IF APPLICABLE, INSTALL ALL WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.
8. STRIP THE TOPSOIL FROM THE ACCESS ROAD. PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.
9. CONSTRUCT THE ACCESS ROAD. ALL FILL AREAS, INCLUDING EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE OF LESS THAN 6". ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D698). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS. IT IS ALSO RECOMMENDED THAT EACH LIFT BE PROOF ROLLED WITH A LOADED HAUL TRUCK WHERE APPLICABLE. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-8% TO MINIMIZE OUTLET VELOCITIES TO THE EXTENT POSSIBLE. INSTALL OUTLET PROTECTION ONCE DITCH RELIEF CULVERTS ARE INSTALLED, AS SHOWN ON PLANS. STABILIZE THE ROAD WITH GEOTEXTILE FABRIC & STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. EXCESS MATERIAL SHALL BE STOCKPILED (IF NECESSARY) IN AREAS SHOWN IN THE PLANS AND IMMEDIATELY STABILIZED. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTION STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED, TOPSOIL IS TO BE REAPPLIED AT A DEPTH OF 6". SLOPES SHALL BE TRACKED BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. ALL DITCH LINES SHALL BE CLEANED PRIOR TO INSTALLATION OF LINED PROTECTION.
10. STRIP THE TOPSOIL FROM THE WELL PAD AND WATER CONTAINMENT PAD. PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.
11. GRADE THE WELL PAD AND WATER CONTAINMENT PAD AREAS AS SHOWN ON THE PLANS. INSTALL PAD SUMPS (WITH 4" PVC DRAIN PIPE AND OUTLET PROTECTION) AND CONTAINMENT BERM LINER SYSTEM. IMMEDIATELY STABILIZE THE OUTER AREAS OF THE WELL PAD AND WATER CONTAINMENT PAD. THE WELL PAD AND WATER CONTAINMENT PAD AREAS SHALL BE STABILIZED WITH GEOTEXTILE FABRIC & STONE AND THE SIDE SLOPES WITH EROSION CONTROL BLANKETING WHEN SLOPES ARE 3:1 OR GREATER. APPLY SEED AND MULCH TO ALL DISTURBED AREAS. THIS SHALL INCLUDE ALL AREAS THAT WILL NOT BE SUBJECT TO REGULAR TRAFFIC ACTIVITY (TO BE STABILIZED WITH STONE), OR ANY DISTURBED AREA THAT WILL NOT BE RE-DISTURBED BEFORE SITE RECLAMATION BEGINS.
12. COMMENCE WELL DRILLING ACTIVITY.
13. ALL BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF DISTURBANCE ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN EXCESS OF 0.5" AND ON A BIWEEKLY BASIS.
14. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.
15. ALL PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP.
16. ANY AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.

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REVISION | DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

CONSTRUCTION AND E&S CONTROL NOTES

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KLUS — REGISTERED — 9578 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: N/A
SHEET 2 OF 29

MATERIAL QUANTITIES

MATERIAL QUANTITIES WELL PAD & WATER CONTAINMENT PAD SITE: Dotson Holland							
	Item Description			Quantity	Unit	Unit Cost	Item Total
1.0	Mobilization						
	(Limited to 10% of Total Base Bid)			1.0	LS	$	$
2.0	Erosion & Sediment Control						
	2.1	Clearing and Grubbing					
		2.1.1	Wooded	22.80	AC	$	$
		2.1.2	Open Field	9.26	AC	$	$
	2.2	Super Silt Fence		2210.9	LF	$	$
	2.3	24" Compost Filter Sock		6,588.7	LF	$	$
	2.4	32" Compost Filter Sock		783.0	LF	$	$
	2.5	24" Compost Sock Diversion		672.1	LF	$	$
	2.6	Jute Matting - Slope Matting		540,581.9	SF	$	$
	2.7	Ditch Lining - Synthetic Matting (TRM)		5,190.1	SF	$	$
3.0	Unclassified Earthwork						
	3.1	Access Road "A"					
		3.1.1	Topsoil Removal to Stockpile (Assume 6" Depth)	5,693.9	CY	$	$
		3.1.2	Excavation (Cut to Compact Fill)	28,116.9	CY	$	$
		3.1.3	Excavation (Import from Stockpile)	9,458.7	CY	$	$
	3.2	Access Road "B"					
		3.2.1	Topsoil Removal to Stockpile (Assume 6" Depth)	422.5	CY	$	$
		3.2.2	Excavation (Cut to Compact Fill)	233.4	CY	$	$
		3.2.3	Excavation (Import from Stockpile)	2,829.4	CY	$	$
	3.3	Access Road "C"					
		3.3.1	Topsoil Removal to Stockpile (Assume 6" Depth)	167.0	CY	$	$
		3.3.2	Excavation (Cut to Compact Fill)	115.6	CY	$	$
		3.3.3	Excavation (Export to Stockpile)	448.5	CY	$	$
	3.4	Staging Area "A"					
		3.4.1	Topsoil Removal to Stockpile (Assume 6" Depth)	798.2	CY	$	$
		3.4.2	Excavation (Cut to Compact Fill)	7,410.0	CY	$	$
		3.4.3	Excavation (Export to Stockpile)	1,338.0	CY	$	$
	3.5	Well Pad					
		3.5.1	Topsoil Removal to Stockpile (Assume 6" Depth)	2,748.9	CY	$	$
		3.5.2	Excavation (Cut to Compact Fill)	9,215.6	CY	$	$
		3.5.3	Excavation (Export to Stockpile)	1,913.6	CY	$	$
	3.6	Staging Area "B"					
		3.6.1	Topsoil Removal to Stockpile (Assume 6" Depth)	2,426.5	CY	$	$
		3.6.2	Excavation (Cut to Compact Fill)	24,036.3	CY	$	$
		3.6.3	Excavation (Export to Stockpile)	16,231.5	CY	$	$
	3.7	Water Containment Pad					
		3.7.1	Topsoil Removal to Stockpile (Assume 6" Depth)	1,395.4	CY	$	$
		3.7.2	Excavation (Cut to Compact Fill)	5,555.7	CY	$	$
		3.7.3	Excavation (Export to Stockpile)	796.0	CY	$	$
	3.8	Excavation/Undiggable Material (Hammering)			CY	$	$
	3.9	Excavation/Undiggable Material (Blasting)			CY	$	$
4.0	Stone and Aggregate Surfacing						
	4.1	Construction Entrance					
		4.1.1	6"-4" Crusher Run (10" Depth)	127.8	TONS	$	$
		4.1.2	Geotextile Fabric (US 200 or Equal)	2,766.6	SF	$	$
	4.2	Access Road "A"					
		4.2.1	6"-4" Crusher Run (8" Depth)	3,920.7	TONS	$	$
		4.2.2	3/4"-1 1/2" Crusher Run (2" Depth)	981.6	TONS	$	$
		4.2.3	Geotextile Fabric (US 200 or Equal)	105,332.2	SF	$	$
		4.2.4	Clean Rock Fill (2"-4" Coarse Aggregate)	1,418.9	TONS	$	$
	4.3	Access Road "B"					
		4.3.1	6"-4" Crusher Run (8" Depth)	406.1	TONS	$	$
		4.3.2	3/4"-1 1/2" Crusher Run (2" Depth)	101.7	TONS	$	$
		4.3.3	Geotextile Fabric (US 200 or Equal)	10,908.8	SF	$	$
	4.4	Access Road "C"					
		4.4.1	6"-4" Crusher Run (8" Depth)	290.1	TONS	$	$
		4.4.2	3/4"-1 1/2" Crusher Run (2" Depth)	72.6	TONS	$	$
		4.4.3	Geotextile Fabric (US 200 or Equal)	7,793.7	SF	$	$
	4.5	Staging Area "A"					
		4.5.1	6"-4" Crusher Run (8" Depth)	590.7	TONS	$	$
		4.5.2	3/4"-1 1/2" Crusher Run (2" Depth)	147.9	TONS	$	$
		4.5.3	Geotextile Fabric (US 200 or Equal)	15,869.6	SF	$	$
	4.6	Well Pad					
		4.6.1	6"-4" Crusher Run (6" Depth)	2,506.1	TONS	$	$
		4.6.2	3/4"-1 1/2" Crusher Run (2" Depth)	837.0	TONS	$	$
		4.6.3	Geotextile Fabric (US 200 or Equal)	90,217.8	SF	$	$
	4.7	Staging Area "B"					
		4.7.1	6"-4" Crusher Run (6" Depth)	2,027.7	TONS	$	$
		4.7.2	3/4"-1 1/2" Crusher Run (2" Depth)	677.3	TONS	$	$
		4.7.3	Geotextile Fabric (US 200 or Equal)	72,997.2	SF	$	$
	4.8	Water Containment Pad					
		4.8.1	6"-4" Crusher Run (8" Depth)	2,024.4	TONS	$	$
		4.8.2	3/4"-1 1/2" Crusher Run (2" Depth)	506.9	TONS	$	$
		4.8.3	Geotextile Fabric (US 200 or Equal)	54,386.9	SF	$	$
	4.9	4" Rip Rap (Outlets/Level Spreaders) 18" Depth		1,373.6	TONS	$	$
	4.10	4" Rip Rap (Rock-Lined Ditches) 6" Depth		319.5	TONS	$	$
	4.11	Rock Fill Check Dams (#1 Stone)		21.2	TONS	$	$
5.0	Ditch Relief and Drainage Culverts						
	5.1	15" HDPE (total)		785.5	LF	$	$
	5.2	30" HDPE (total)		131.0	LF	$	$
	5.3	6'x8' Concrete Box Culvert w/ Gabion Headwalls (total)		96.0	LF	$	$
6.0	Well Pad & Staging Area "B" Dewatering System						
	6.1	102"x78"x54" Pre-Cast Low Profile Tank Catch Basins		8.0	EA	$	$
	6.2	HDPE Pipe Riser (8" Minimum Dia., 60" Length) and 4" PVC Valve		8.0	EA	$	$
	6.3	4" PVC Discharge Pipe		231.2	LF	$	$
	6.4	Catch Basin Base (1-1/2" or 3/4" Crusher Run Stone) 12" Depth		52.9	TONS	$	$
	6.5	4" Rip Rap (Discharge Pipe Outlets) 18" Depth		161.4	TONS	$	$
7.0	Liner System						
	7.1	Well Pad Containment Berm					
		7.1.1	Primary Liner (60 Mil Textured)	19,578.4	SF	$	$
		7.1.2	Non-woven Geotextile Fabric Cushion (16 oz.)	19,578.4	SF	$	$
8.0	Miscellaneous						
	8.1	Seeding and Mulching					
		8.1.1	Temporary Seeding (Vegetation & Mulch)		AC	$	$
		8.1.2	Permanent Seeding (Vegetation & Mulch / Fertilizer/ Lime)	23.9	AC	$	$
		8.1.3	Lime, Fertilizer, Seeding, and Hydro-Mulch w/tack (HYC2 or Equal)		AC	$	$
	8.2	3'x3'x6' Gabion Cages with Stone		38.0	EA	$	$

NOTE:

1. THE SQUARE FOOTAGE FOR THE GEOTEXTILE FABRIC AND THE LINER SYSTEM DOES NOT ACCOUNT FOR MATERIAL OVERLAP AND WASTE.

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
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Weirton, West Virginia 26062
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REVISION

DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

MATERIAL QUANTITIES

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS S. KIMES
REGISTERED
9578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

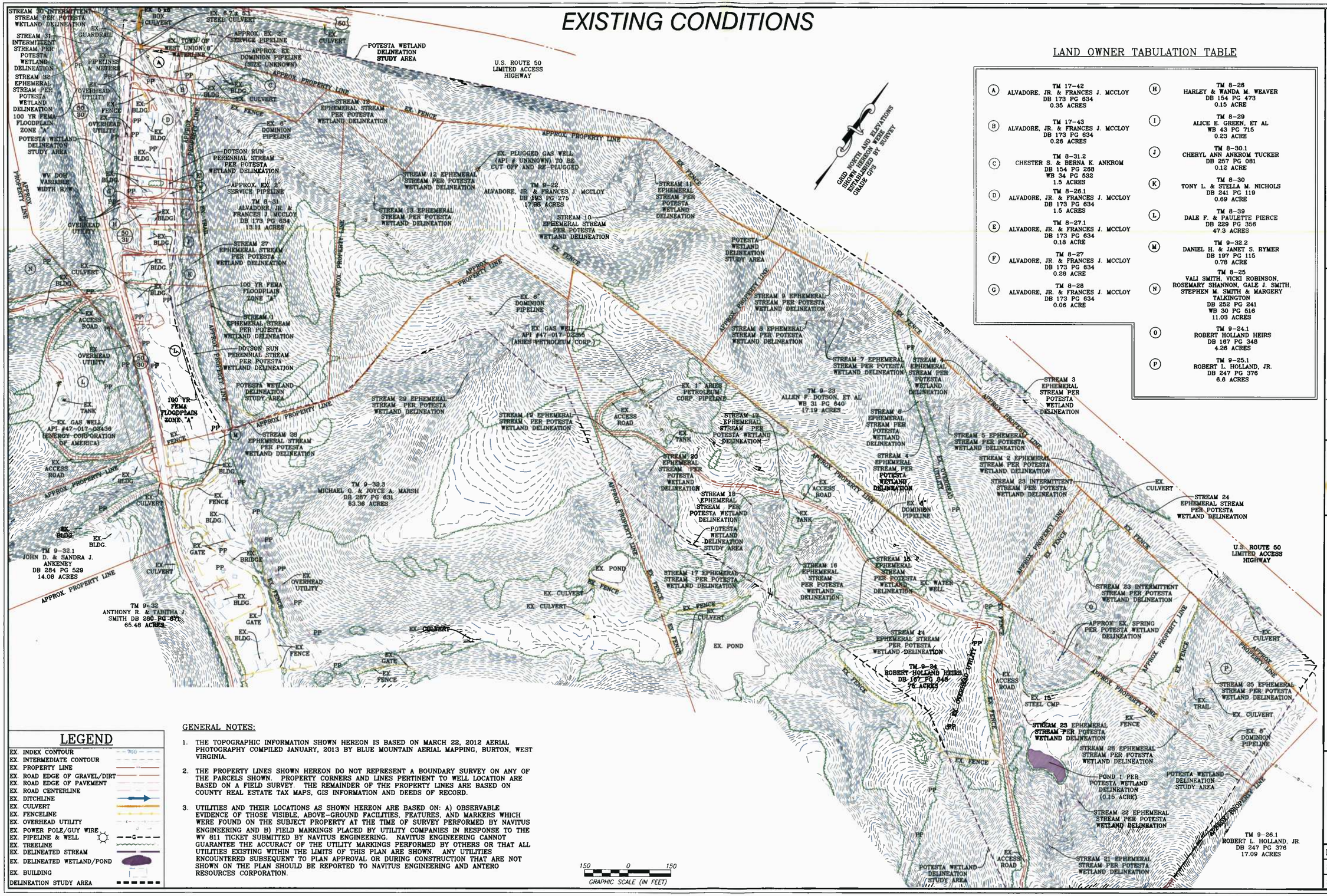
DATE: 10/17/2013

SCALE: N/A

SHEET 3 OF 29

13-082

EXISTING CONDITIONS



LAND OWNER TABULATION TABLE

(A)	TM 17-42 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 0.35 ACRE	(H) TM 8-26 HARLEY & WANDA M. WEAVER DB 154 PG 473 0.15 ACRE
(B)	TM 17-43 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 0.26 ACRES	(I) TM 8-29 ALICE E. GREEN, ET AL WB 43 PG 715 0.23 ACRE
(C)	TM 8-31.2 CHESTER S. & BERNA K. ANKROM DB 154 PG 268 WB 34 PG 532 1.5 ACRES	(J) TM 8-30.1 CHERYL ANN ANKROM TUCKER DB 257 PG 081 0.12 ACRE
(D)	TM 8-26.1 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 1.5 ACRES	(K) TM 8-30 TONY L. & STELLA M. NICHOLS DB 241 PG 119 0.69 ACRE
(E)	TM 8-27.1 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 0.18 ACRE	(L) TM 8-39 DALE F. & PAULETTE PIERCE DB 229 PG 356 47.3 ACRES
(F)	TM 8-27 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 0.28 ACRE	(M) TM 9-32.2 DANIEL H. & JANET S. RYMER DB 197 PG 115 0.78 ACRE
(G)	TM 8-28 ALVADORE, JR. & FRANCES J. MCCLOY DB 173 PG 634 0.06 ACRE	(N) TM 8-25 VALI SMITH, VICKI ROBINSON, ROSEMARY SHANNON, GALE J. SMITH, STEPHEN M. SMITH & MARGERY TALKINGTON DB 252 PG 241 WB 30 PG 516 11.03 ACRES
		(O) TM 9-24.1 ROBERT HOLLAND HEIRS DB 167 PG 348 4.26 ACRES
		(P) TM 9-25.1 ROBERT L. HOLLAND, JR. DB 247 PG 376 6.6 ACRES

LEGEND

- EX. INDEX CONTOUR
- EX. INTERMEDIATE CONTOUR
- EX. PROPERTY LINE
- EX. ROAD EDGE OF GRAVEL/DIRT
- EX. ROAD EDGE OF PAVEMENT
- EX. ROAD CENTERLINE
- EX. DITCHLINE
- EX. CULVERT
- EX. FENCELINE
- EX. OVERHEAD UTILITY
- EX. POWER POLE/GUY WIRE
- EX. PIPELINE & WELL
- EX. TREELINE
- EX. DELINEATED STREAM
- EX. DELINEATED WETLAND/POND
- EX. BUILDING
- DELINEATION STUDY AREA

GENERAL NOTES:

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON MARCH 22, 2012 AERIAL PHOTOGRAPHY COMPILED JANUARY, 2013 BY BLUE MOUNTAIN AERIAL MAPPING, BURTON, WEST VIRGINIA.
2. THE PROPERTY LINES SHOWN HEREON DO NOT REPRESENT A BOUNDARY SURVEY ON ANY OF THE PARCELS SHOWN. PROPERTY CORNERS AND LINES PERTINENT TO WELL LOCATION ARE BASED ON A FIELD SURVEY. THE REMAINDER OF THE PROPERTY LINES ARE BASED ON COUNTY REAL ESTATE TAX MAPS, GIS INFORMATION AND DEEDS OF RECORD.
3. UTILITIES AND THEIR LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH WERE FOUND ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY NAVITUS ENGINEERING AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO THE WV 811 TICKET SUBMITTED BY NAVITUS ENGINEERING. NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR THAT ALL UTILITIES EXISTING WITHIN THE LIMITS OF THIS PLAN ARE SHOWN. ANY UTILITIES ENCOUNTERED SUBSEQUENT TO PLAN APPROVAL OR DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLAN SHOULD BE REPORTED TO NAVITUS ENGINEERING AND ANTERO RESOURCES CORPORATION.

150 0 150
GRAPHIC SCALE (IN FEET)

Engineering • Survey • Environmental • GIS
NAVITUS ENGINEERING INC.
151 Windy Hill Lane
West Union, WV 26456
Telephone: (888) 662-4185
www.navituseng.com

REVISION
DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

EXISTING CONDITIONS

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KIMBLE — REGISTERED — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 150'
SHEET 4 OF 29

OVERALL PLAN SHEET
INDEX & VOLUMES

THE EARTHWORK QUANTITIES PROVIDED ARE AN ESTIMATE FOR CONSIDERATION. THE QUANTITIES SHOWN ARE CALCULATED USING A 1:1 CUT/SWELL & FILL SHRINK FACTOR. THE QUANTITIES SHOWN MAY BE GREATER OR LESSER THAN ACTUALLY EXCAVATED. THE ENGINEER IS NOT RESPONSIBLE FOR VARIANCES FROM THE ESTIMATED QUANTITIES AND DOES NOT CERTIFY TO THEIR ACCURACY.

Dotson Holland WELL PAD & WATER CONTAINMENT PAD

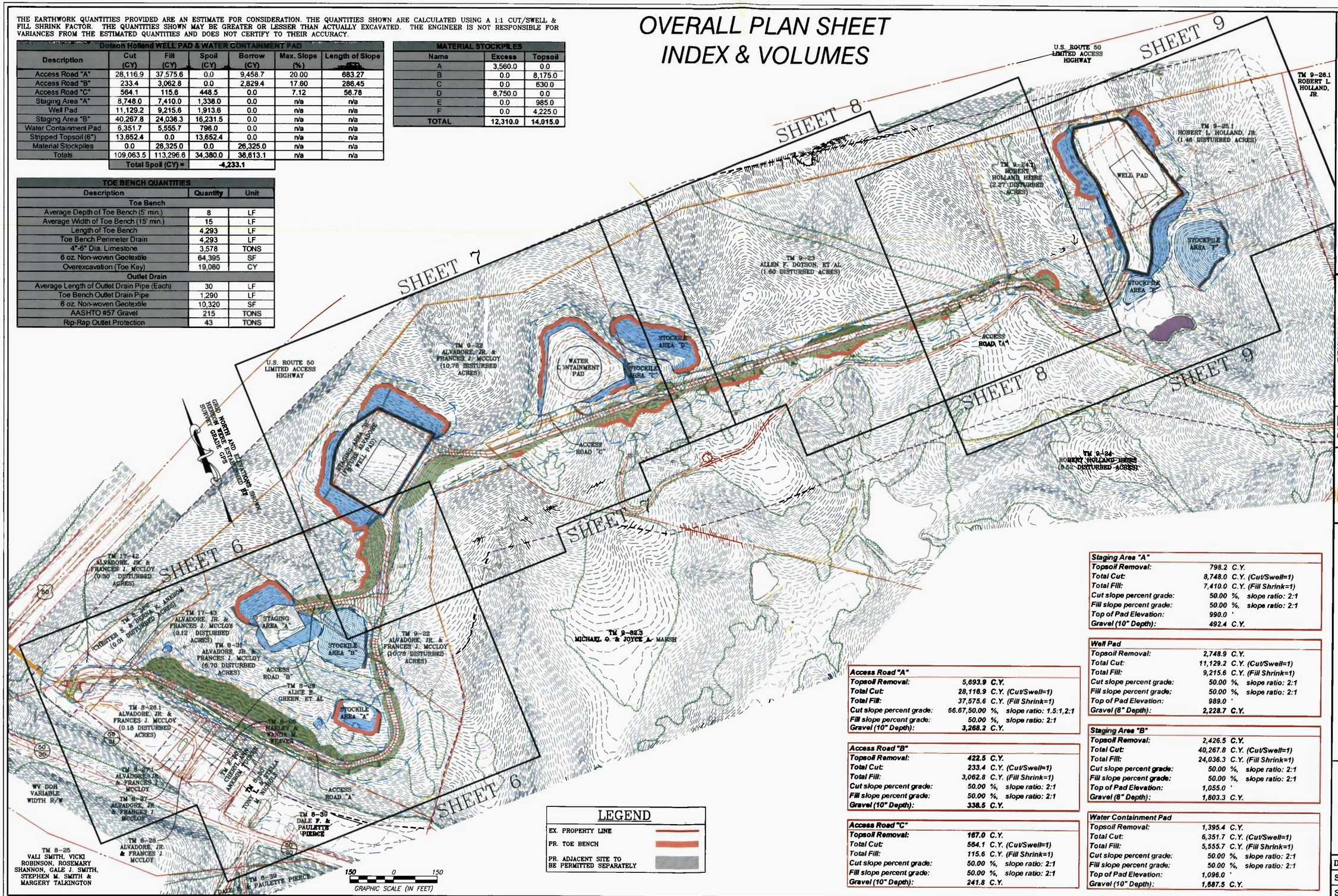
Description	Cut (CY)	Fill (CY)	Spoil (CY)	Borrow (CY)	Max. Slope (%)	Length of Slope
Access Road "A"	28,116.9	37,575.6	0.0	9,458.7	20.00	683.27
Access Road "B"	233.4	3,062.8	0.0	2,829.4	17.60	286.45
Access Road "C"	564.1	115.6	448.5	0.0	7.12	56.78
Staging Area "A"	8,748.0	7,410.0	1,338.0	0.0	n/a	n/a
Well Pad	11,129.2	9,215.6	1,913.6	0.0	n/a	n/a
Staging Area "B"	40,267.8	24,036.3	16,231.5	0.0	n/a	n/a
Water Containment Pad	6,351.7	5,555.7	796.0	0.0	n/a	n/a
Stripped Topsoil (6")	13,652.4	0.0	13,652.4	0.0	n/a	n/a
Material Stockpiles	0.0	26,325.0	0.0	26,325.0	n/a	n/a
Totals	109,063.5	113,296.6	34,380.0	38,813.1	n/a	n/a
	Total Spoil (CY) =		-4,233.1			

MATERIAL STOCKPILES

Name	Excess	Topsoil
A	3,560.0	0.0
B	0.0	8,175.0
C	0.0	630.0
D	8,750.0	0.0
E	0.0	985.0
F	0.0	4,225.0
TOTAL	12,310.0	14,015.0

TOE BENCH QUANTITIES

Description	Quantity	Unit
Toe Bench		
Average Depth of Toe Bench (5' min.)	8	LF
Average Width of Toe Bench (15' min.)	15	LF
Length of Toe Bench	4,293	LF
Toe Bench Perimeter Drain	4,293	LF
4"-6" Dia. Limestone	3,578	TONS
6 oz. Non-woven Geotextile	64,395	SF
Overexcavation (Toe Key)	19,060	CY
Outlet Drain		
Average Length of Outlet Drain Pipe (Each)	30	LF
Toe Bench Outlet Drain Pipe	1,290	LF
6 oz. Non-woven Geotextile	10,320	SF
AASHTO #57 Gravel	215	TONS
Rip-Rap Outlet Protection	43	TONS



LEGEND

- EX. PROPERTY LINE
- PR. TOE BENCH
- PR. ADJACENT SITE TO BE PERMITTED SEPARATELY

Staging Area "A"

Topsoil Removal:	***798.2***	***C.Y.***
Total Cut:	***8,748.0***	***C.Y. (Cut/Swell=1)***
Total Fill:	***7,410.0***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Top of Pad Elevation:	***990.0***	***'***
Gravel (10" Depth):	***492.4***	***C.Y.***

Well Pad

Topsoil Removal:	***2,748.9***	***C.Y.***
Total Cut:	***11,129.2***	***C.Y. (Cut/Swell=1)***
Total Fill:	***9,215.6***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Top of Pad Elevation:	***989.0***	***'***
Gravel (6" Depth):	***2,228.7***	***C.Y.***

Staging Area "B"

Topsoil Removal:	***2,426.5***	***C.Y.***
Total Cut:	***40,267.8***	***C.Y. (Cut/Swell=1)***
Total Fill:	***24,036.3***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Top of Pad Elevation:	***1,055.0***	***'***
Gravel (6" Depth):	***1,803.3***	***C.Y.***

Access Road "A"

Topsoil Removal:	***5,693.9***	***C.Y.***
Total Cut:	***28,116.9***	***C.Y. (Cut/Swell=1)***
Total Fill:	***37,575.6***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***66.67,50.00***	***%, slope ratio: 1.5:1,2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Gravel (10" Depth):	***3,268.2***	***C.Y.***

Access Road "B"

Topsoil Removal:	***422.5***	***C.Y.***
Total Cut:	***233.4***	***C.Y. (Cut/Swell=1)***
Total Fill:	***3,062.8***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Gravel (10" Depth):	***338.5***	***C.Y.***

Access Road "C"

Topsoil Removal:	***167.0***	***C.Y.***
Total Cut:	***564.1***	***C.Y. (Cut/Swell=1)***
Total Fill:	***115.6***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Gravel (10" Depth):	***241.8***	***C.Y.***

Water Containment Pad

Topsoil Removal:	***1,395.4***	***C.Y.***
Total Cut:	***6,351.7***	***C.Y. (Cut/Swell=1)***
Total Fill:	***5,555.7***	***C.Y. (Fill Shrink=1)***
Cut slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Fill slope percent grade:	***50.00***	***%, slope ratio: 2:1***
Top of Pad Elevation:	***1,096.0***	***'***
Gravel (10" Depth):	***1,687.5***	***C.Y.***

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REVISION | DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

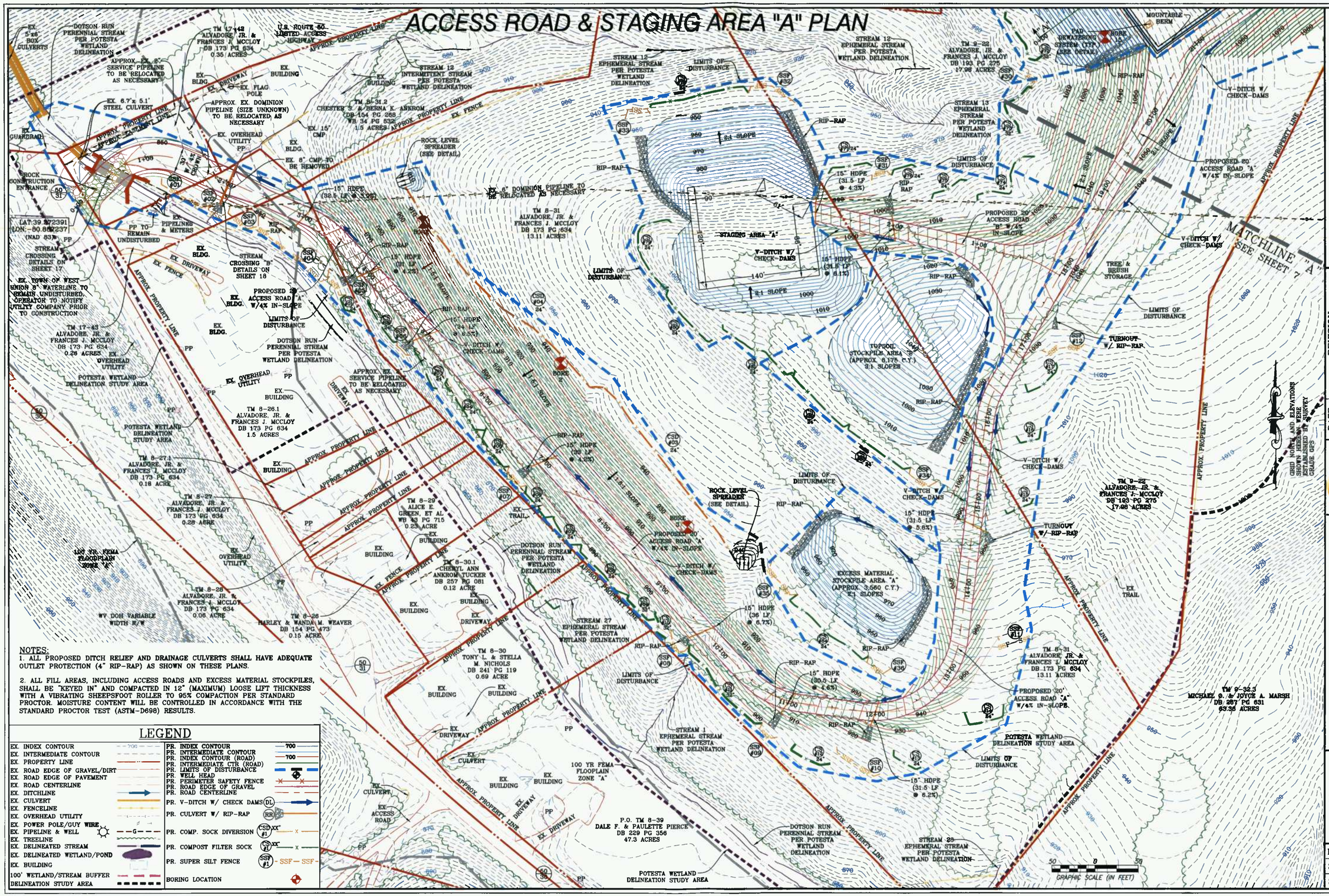
OVERALL PLAN SHEET INDEX & VOLUMES

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHAD B. KING REGISTERED 19578 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 150'
SHEET 5 OF 29

ACCESS ROAD & STAGING AREA "A" PLAN



NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

LEGEND

EX. INDEX CONTOUR	PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE	PR. INDEX CONTOUR (ROAD)
EX. ROAD EDGE OF GRAVEL/DIRT	PR. INTERMEDIATE CTR (ROAD)
EX. ROAD EDGE OF PAVEMENT	PR. LIMITS OF DISTURBANCE
EX. ROAD CENTERLINE	PR. WELL HEAD
EX. DITCHLINE	PR. PERIMETER SAFETY FENCE
EX. CULVERT	PR. ROAD EDGE OF GRAVEL
EX. FENCELINE	PR. ROAD CENTERLINE
EX. OVERHEAD UTILITY	PR. V-DITCH W/ CHECK DAMS (DL)
EX. POWER POLE/GUY WIRE	PR. CULVERT W/ RIP-RAP (RR)
EX. PIPELINE & WELL	PR. COMP. SOCK DIVERSION (CSD #1 XX")
EX. TREELINE	PR. COMPOST FILTER SOCK (CSF #1 XX")
EX. DELINEATED STREAM	PR. SUPER SILT FENCE (SSF #1 - SSF - SSF -)
EX. DELINEATED WETLAND/POND	BORING LOCATION
EX. BUILDING	
100' WETLAND/STREAM BUFFER	
DELINEATION STUDY AREA	

GRAPHIC SCALE (IN FEET) 50 0 50

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NAVITUS ENGINEERING INC.
151 Windy Hill Lane
Winchester, Virginia 22602
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ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR
ANTERO RESOURCES CORPORATION

ACCESS ROAD & STAGING AREA "A" PLAN

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS B. KING — REGISTERED — 9578 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 6 OF 29

ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD PLAN

GRID NORTH AND ELEVATIONS SHOWN HEREON WERE DETERMINED BY SURVEY GRADE GPS

POTESTA WETLAND DELINEATION STUDY AREA

STREAM 10 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION

STREAM 11 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION

STREAM 9 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION

STREAM 8 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION

U.S. ROUTE 50 LIMITED ACCESS HIGHWAY

APPROX. PROPERTY LINE

EX. FENCE

TM 9-22 ALVADORE, JR. & FRANCES J. MCCLOY DB 193 PG 275 17.98 ACRES

TM 9-36 ALLEN F. DOTSON, ET AL WB 91 PG 640 17.19 ACRES

TM 9-24 ROBERT HOLLAND HEIRS DB 167 PG 348 75 ACRES

TM 9-32.3 MICHAEL D. & JOYCE A. MARSH DB 267 PG 631 83.36 ACRES

TM 9-31 ALVADORE JR. & FRANCES J. MCCLOY DB 193 PG 275 13.11 ACRES

LIMITS OF DISTURBANCE

EX PLUGGED GAS WELL (API # UNKNOWN) TO BE CUT OFF AND RE-PLUGGED

PAD DEWATERING SYSTEM (TYP.) (SEE DETAIL)

CONTAINMENT BERM (SEE DETAIL)

STAGING AREA "B" ELEV. 1055.0 CENTER OF PAD

200'x300' PAD FOOTPRINT

(NAD 83) LAT:39.273470 LON:-80.880648 CENTROID OF PAD

MOUNTABLE BERM

BORE 10 BORE 11 BORE 12 BORE 13 BORE 14 BORE 15 BORE 16

SSP #29 SSP #28 SSP #30 SSP #12 SSP #27 SSP #13 SSP #14 SSP #15

CSD #24

RIP-RAP

15" HDPE (33 LF @ 3.5%)

EX. FENCE TO BE RELOCATED AS NECESSARY

PROPOSED 20' ACCESS ROAD "A" W/4% OUT-SLOPE

PROPOSED 20' ACCESS ROAD "A" W/4% IN-SLOPE

PROPOSED 115' ACCESS ROAD "C" W/4% NORMAL CROWN

V-DITCH W/ CHECK-DAMS

2:1 SLOPE

ABOVE GROUND WATER CONTAINMENT TANK (EPIC 360 - 40,000 BBL.)

CENTER OF TANK LAT:39.273589 LON:-80.879959 (NAD 83)

30' ACCESS

EXCESS MATERIAL STOCKPILE AREA (APPROX. 8,730 C.Y.) 2:1 SLOPES

TOPSOIL STOCKPILE AREA (APPROX. 630 C.Y.) 3:1 SLOPES

15" HDPE (35.5 LF @ 7.5%)

15" HDPE (31 LF @ 4.5%)

15" HDPE (32 LF @ 5.9%)

PROPOSED 20' ACCESS ROAD "A" W/4% IN-SLOPE

EX. 1" ARIES PETROLEUM CORP. PIPELINE

EX. GAS WELL API #47-017-02255 (ARIES PETROLEUM CORP.)

EX. ACCESS ROAD

EX. 6" DOMINION PIPELINE TO BE RELOCATED AS NECESSARY

STREAM 29 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION

TREE & BRUSH STORAGE

TURNOUT W/ RIP-RAP

MATCHLINE "A" SEE SHEET 8

MATCHLINE "B" SEE SHEET 8

"A" 0+00 1+00 2+00 3+00

"B" 0+00 1+00 2+00 3+00

"C" 0+00 1+00

GRAPHIC SCALE (IN FEET) 0 50 100

LEGEND

EX. INDEX CONTOUR	PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE	PR. INDEX CONTOUR (ROAD)
EX. ROAD EDGE OF GRAVEL/DIRT	PR. INTERMEDIATE CTR (ROAD)
EX. ROAD EDGE OF PAVEMENT	PR. LIMITS OF DISTURBANCE
EX. ROAD CENTERLINE	PR. WELL HEAD
EX. DITCHLINE	PR. PERIMETER SAFETY FENCE
EX. CULVERT	PR. ROAD EDGE OF GRAVEL
EX. FENCELINE	PR. ROAD CENTERLINE
EX. OVERHEAD UTILITY	PR. V-DITCH W/ CHECK DAMS (DL)
EX. POWER POLE/GUY WIRE	PR. CULVERT W/ RIP-RAP (RR)
EX. PIPELINE & WELL	PR. COMP. SOCK DIVERSION (CSD XX #1)
EX. TREELINE	PR. COMPOST FILTER SOCK (SSP XX #1)
EX. DELINEATED STREAM	PR. SUPER SILT FENCE (SSP #1 - SSF - SSF)
EX. DELINEATED WETLAND/POND	BORING LOCATION
EX. BUILDING	
100' WETLAND/STREAM BUFFER	
DELINEATION STUDY AREA	

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
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www.navitusengr.com

REVISION

DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR:
ANTERO RESOURCES CORPORATION

ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD PLAN

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KING REGISTERED 2576 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 7 OF 29

ACCESS ROAD PLAN

NOTES:
1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

STREAM 7 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
EX. 30" CMP
EX. OVERHEAD UTILITY
U.S. ROUTE 50 LIMITED ACCESS HIGHWAY
EX. FENCE
APPROX. PROPERTY LINE
STREAM 9 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
MATCHLINE "B" SEE SHEET 7
BEGIN NORTH ARC BEARINGS SHOWN HEREON ARE ESTABLISHED BY SURVEY GRADE GPS
STREAM 3 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
POTESTA WETLAND DELINEATION STUDY AREA
STREAM 28 INTERMITTENT STREAM PER POTESTA WETLAND DELINEATION
STREAM 24 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 2 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 4 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 6 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 5 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 8 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 7 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 4 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
BORE
EX. OVERHEAD UTILITY
TM 9-23 ALLEN F. DOTSON, ET AL WB 31 PG. 640 17.19 ACRES
STREAM 23 INTERMITTENT STREAM PER POTESTA WETLAND DELINEATION
LIMITS OF DISTURBANCE
EXCESS MATERIAL STOCKPILE AREA (APPROX. 6.75 AC. 24' SLOPE)
TM 9-24.1 ROBERT HOLLAND HEIRS DB 167 PG 348 4.26 ACRES
MATCHLINE "C" SEE SHEET 9
15" HDPE (34 LF @ 3.5%)
15" HDPE (40 LF @ 3.3%)
V-DITCH W/ CHECK-DAMS
APPROX. PROPERTY LINE
15" HDPE (76.5 LF @ 2.6%)
15" HDPE (81 LF @ 1.2%)
LIMITS OF DISTURBANCE
PROPOSED 20' ACCESS ROAD "A" W/4% IN-SLOPE
TURNOUT W/ RIP-RAP
15" HDPE (42 LF @ 3.6%)
EX. FENCE TO BE RELOCATED AS NECESSARY
STREAM 23 INTERMITTENT STREAM PER POTESTA WETLAND DELINEATION
RIP-RAP
15" HDPE (31 LF @ 4.5%)
15" HDPE (32 LF @ 5.9%)
2:1 SLOPE
15" HDPE (52.5 LF @ 3.8%)
EX. 6" DOMINION PIPELINE TO BE RELOCATED AS NECESSARY
EX. WATER WELL TO REMAIN UNDISTURBED
PP TO REMAIN UNDISTURBED
EX. ACCESS ROAD
MEET & MATCH EX. ACCESS ROAD
EX. TRAIL
APPROX. EX SPRING PER POTESTA WETLAND DELINEATION
STREAM 23 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
EX. TANK
STREAM 17 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 16 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
TM 9-24 ROBERT HOLLAND HEIRS DB 167 PG 348 76 ACRES
STREAM 15 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
STREAM 14 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
EX. 15" STEEL CMP TO BE REMOVED
STREAM CROSSING "C" DETAILS ON SHEET 18
STREAM 23 EPHEMERAL STREAM PER POTESTA WETLAND DELINEATION
GRAPHIC SCALE (IN FEET) 50 0 50

LEGEND

EX. INDEX CONTOUR	PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE	PR. INDEX CONTOUR (ROAD)
EX. ROAD EDGE OF GRAVEL/DIRT	PR. INTERMEDIATE CTR (ROAD)
EX. ROAD EDGE OF PAVEMENT	PR. LIMITS OF DISTURBANCE
EX. ROAD CENTERLINE	PR. WELL HEAD
EX. DITCHLINE	PR. PERIMETER SAFETY FENCE
EX. CULVERT	PR. ROAD EDGE OF GRAVEL
EX. FENCELINE	PR. ROAD CENTERLINE
EX. OVERHEAD UTILITY	PR. V-DITCH W/ CHECK DAMS
EX. POWER POLE/GUY WIRE	PR. CULVERT W/ RIP-RAP
EX. PIPELINE & WELL	PR. COMP. SOCK DIVERSION
EX. TREELINE	PR. COMPOST FILTER SOCK
EX. DELINEATED STREAM	PR. SUPER SILT FENCE
EX. DELINEATED WETLAND/POND	
EX. BUILDING	
100' WETLAND/STREAM BUFFER	
DELINEATION STUDY AREA	BORING LOCATION

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
141 Windy Hill Lane
Westover, West Virginia 26502
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www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

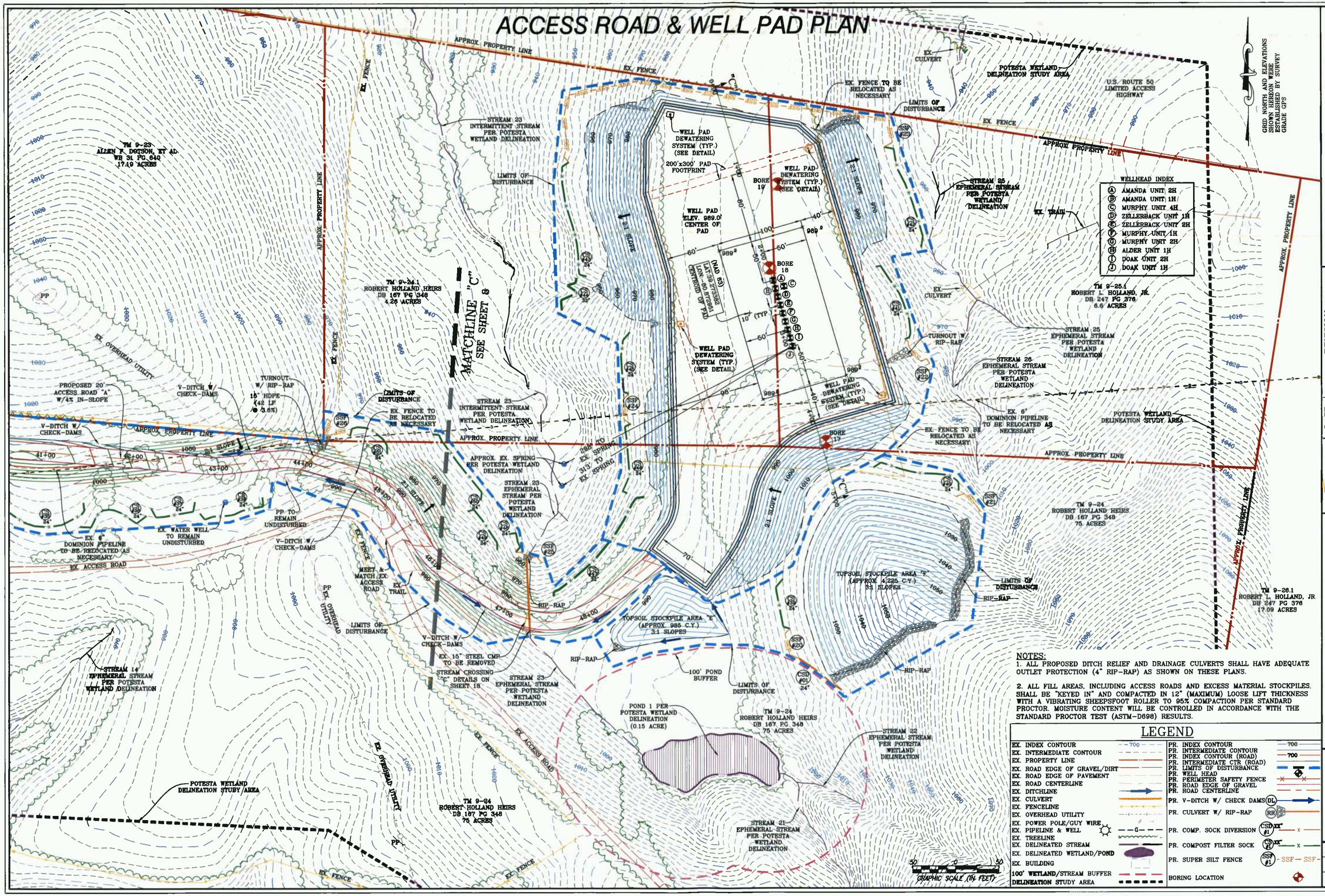
ACCESS ROAD PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER — REGISTERED — 19578 — JUSTIN S. — 10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 8 OF 29

ACCESS ROAD & WELL PAD PLAN



NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

LEGEND

EX. INDEX CONTOUR	PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE	PR. INDEX CONTOUR (ROAD)
EX. ROAD EDGE OF GRAVEL/DIRT	PR. INTERMEDIATE CTR (ROAD)
EX. ROAD EDGE OF PAVEMENT	PR. LIMITS OF DISTURBANCE
EX. ROAD CENTERLINE	PR. WELL HEAD
EX. DITCHLINE	PR. PERIMETER SAFETY FENCE
EX. CULVERT	PR. ROAD EDGE OF GRAVEL
EX. FENCELINE	PR. ROAD CENTERLINE
EX. OVERHEAD UTILITY	PR. V-DITCH W/ CHECK DAMS (DL)
EX. POWER POLE/GUY WIRE	PR. CULVERT W/ RIP-RAP (RR)
EX. PIPELINE & WELL	PR. COMP. SOCK DIVERSION (CSD XX #1)
EX. TREELINE	PR. COMPOST FILTER SOCK (CSF XX #1)
EX. DELINEATED STREAM	PR. SUPER SILT FENCE (SSF #1) - SSF -
EX. DELINEATED WETLAND/POND	BORING LOCATION
EX. BUILDING	
100' WETLAND/STREAM BUFFER	
DELINEATION STUDY AREA	

NAVITUS ENGINEERING INC.
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www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

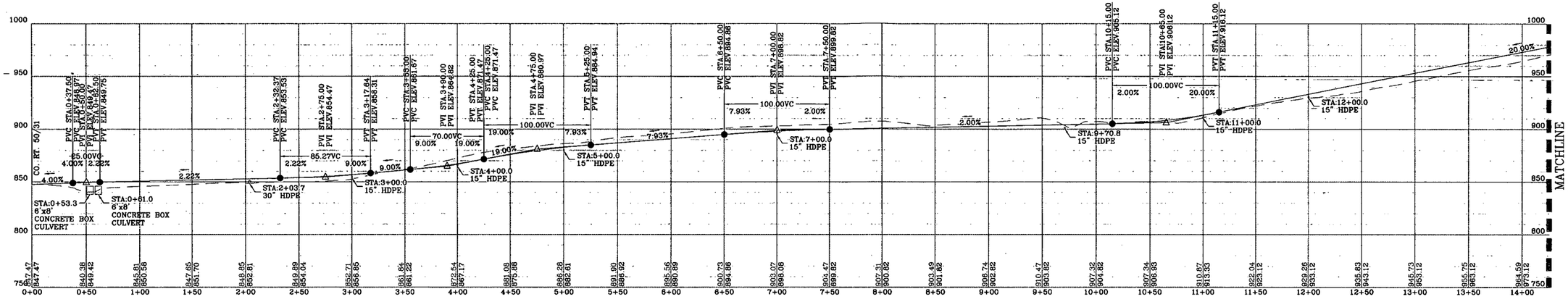
ACCESS ROAD & WELL PAD PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KLUG
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

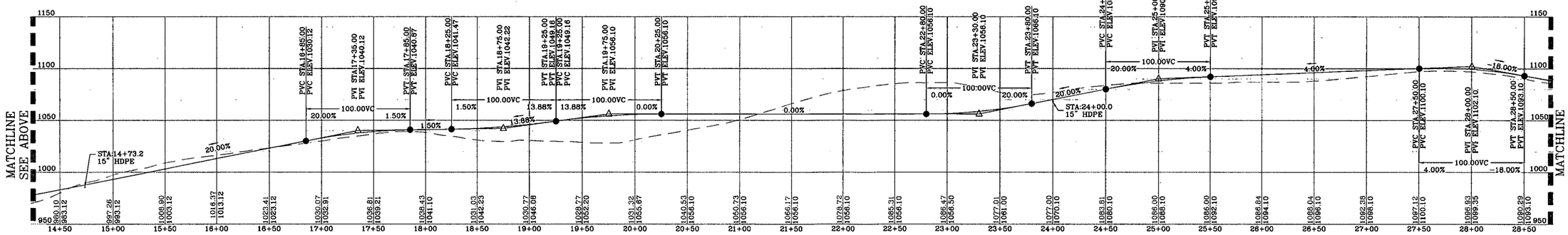
DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 9 OF 29

ACCESS ROAD PROFILES



ACCESS ROAD "A" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



ACCESS ROAD "A" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

Engineering
Survey
Environmental
GIS

NAVITUS ENGINEERING INC.

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www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD PROFILES

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

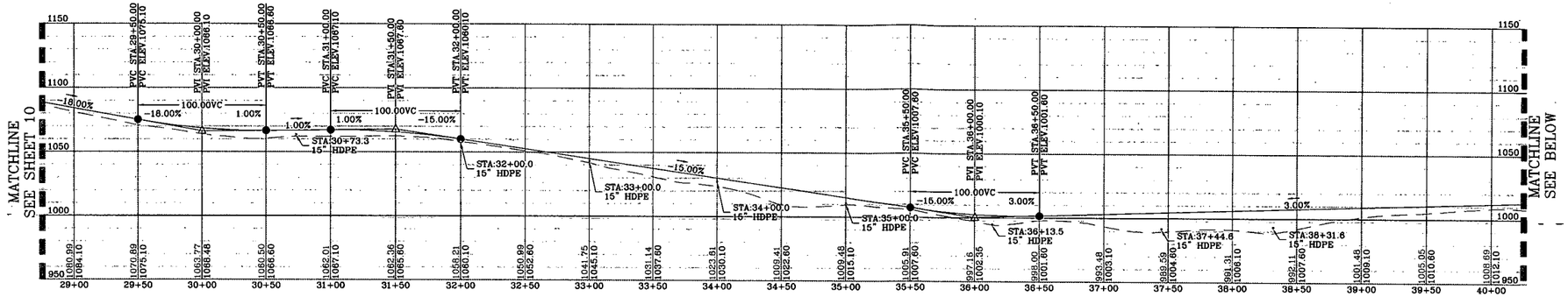
CHRIS S. KING
REGISTERED
9678
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013

SCALE: AS SHOWN

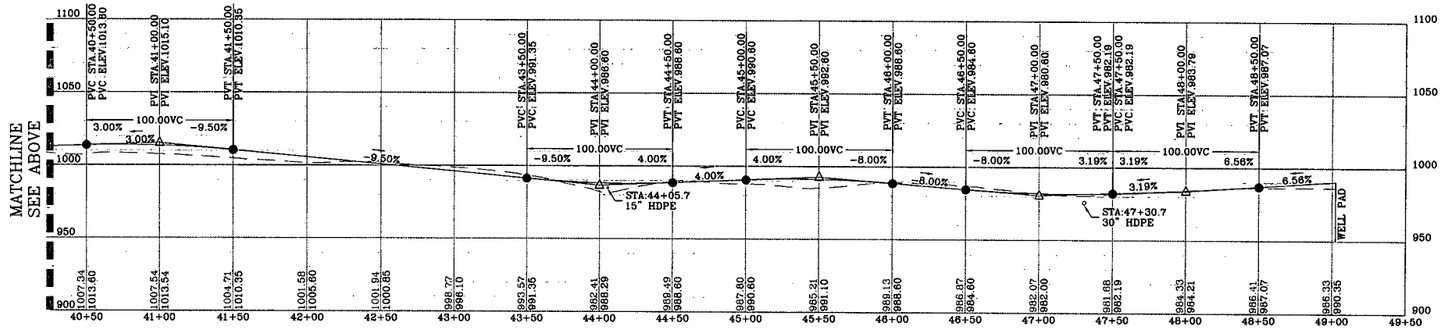
SHEET 10 OF 29

ACCESS ROAD PROFILES



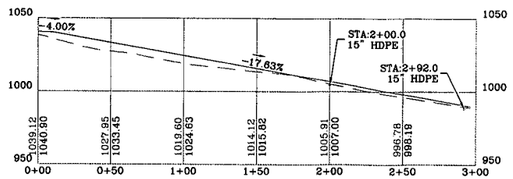
ACCESS ROAD "A" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



ACCESS ROAD "A" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'



ACCESS ROAD "B" PROFILE

SCALE: HORIZ. 1" = 50' VERT. 1" = 50'

LEGEND

- X-SECTION GRID INDEX
- X-SECTION GRID INTERMEDIATE
- X-SECTION PROPOSED GRADE
- X-SECTION EXISTING GRADE
- X-SECTION WATER SURFACE
- MATCHLINE

NAVITUS ENGINEERING INC.
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www.navituseng.com

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ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD PROFILES

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KEMP — REGISTERED — 9578 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

10/17/2013

DATE: 10/17/2013

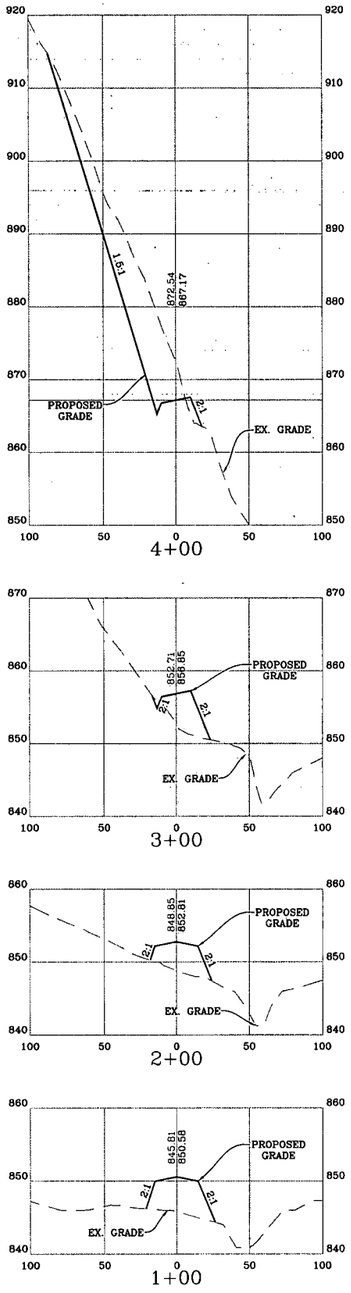
SCALE: AS SHOWN

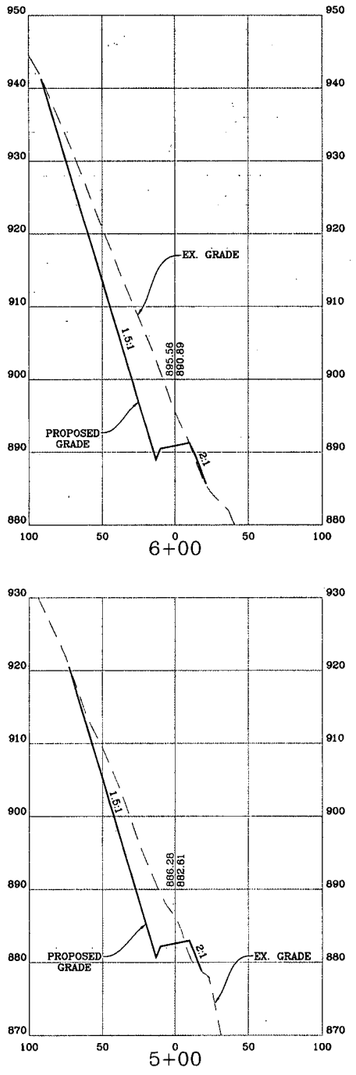
SHEET 11 OF 29

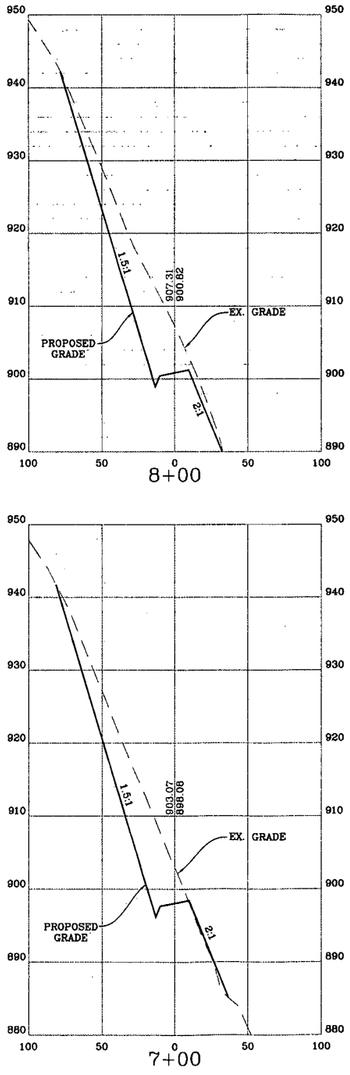
ACCESS ROAD SECTIONS

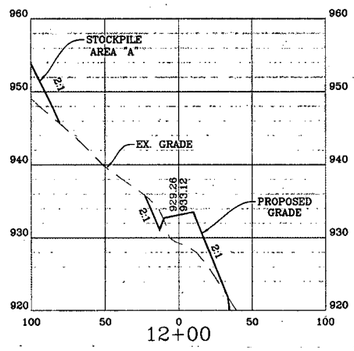
ACCESS ROAD "A" CROSS-SECTIONS

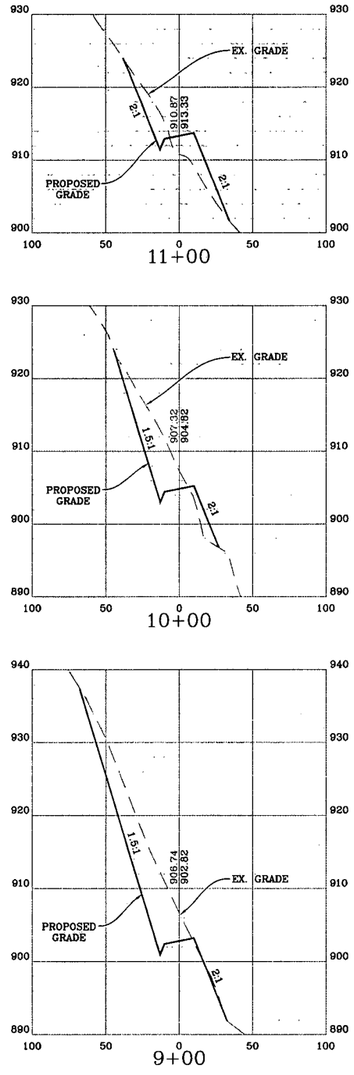
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

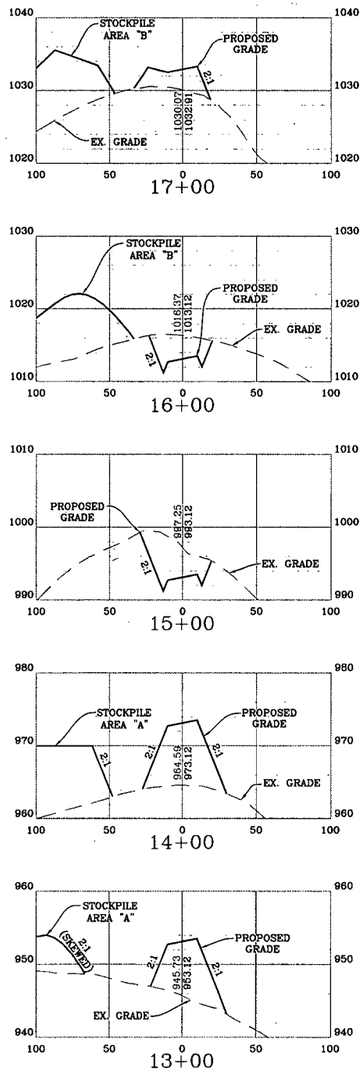












LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

Engineering · Survey · Environmental · GIS

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REVISION

DATE

ANTERO RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD SECTIONS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KING — REGISTERED — 19578 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER

10/17/2013

DATE: 10/17/2013

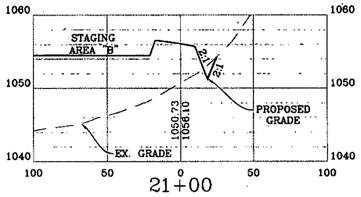
SCALE: AS SHOWN

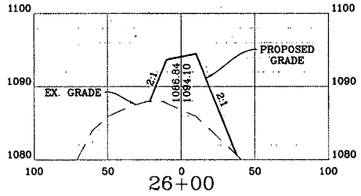
SHEET 12 OF 29

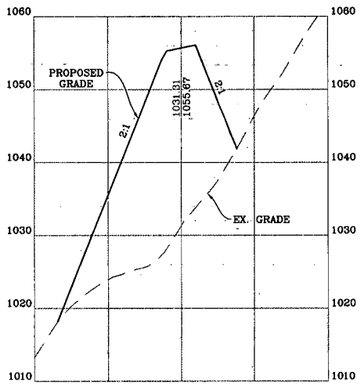
ACCESS ROAD SECTIONS

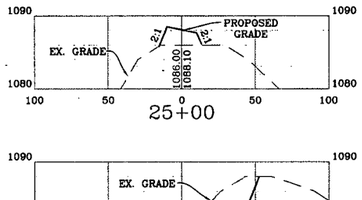
ACCESS ROAD "A" CROSS-SECTIONS

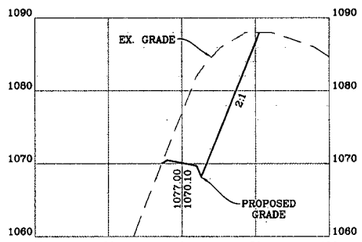
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

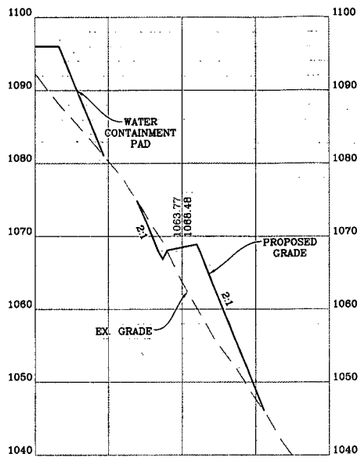


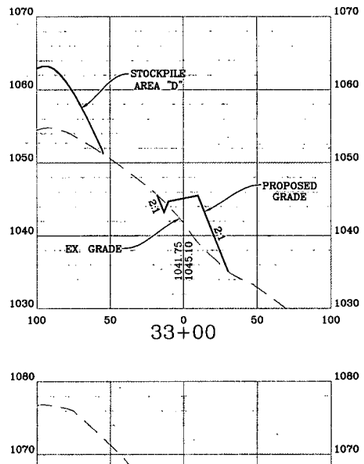


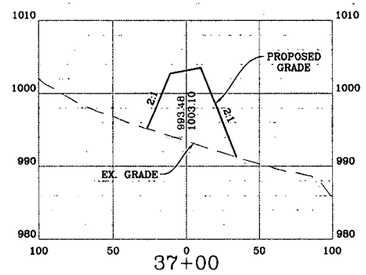


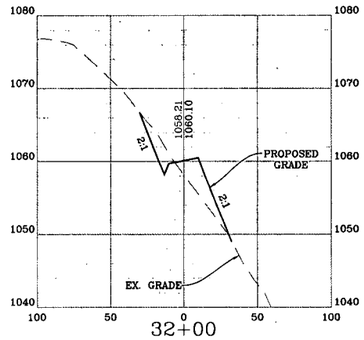


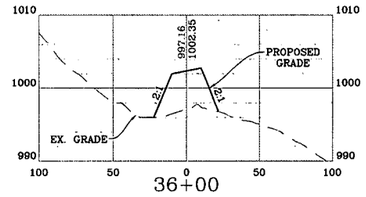


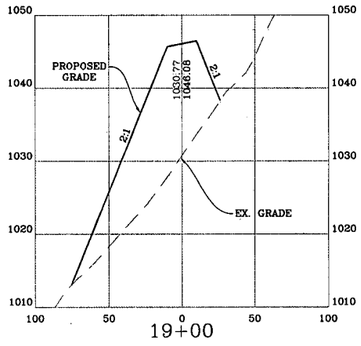


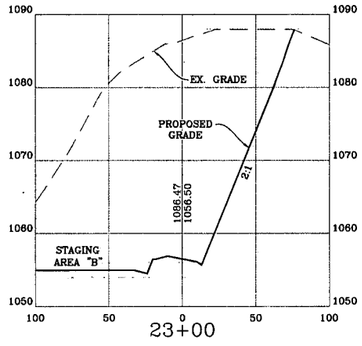


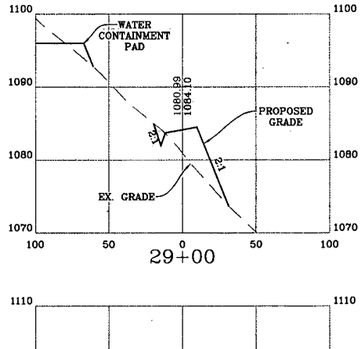


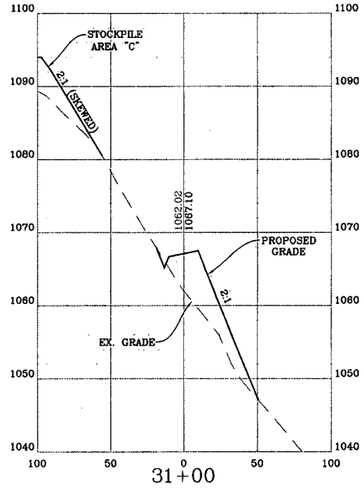


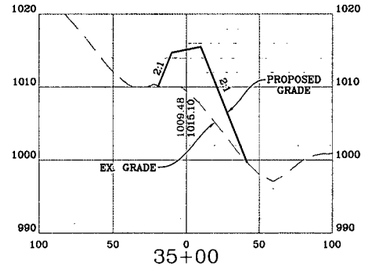


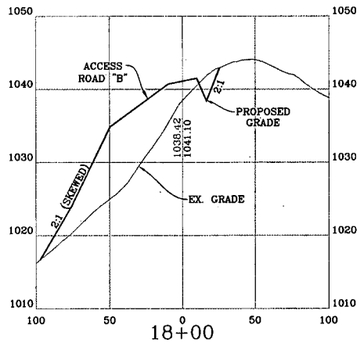


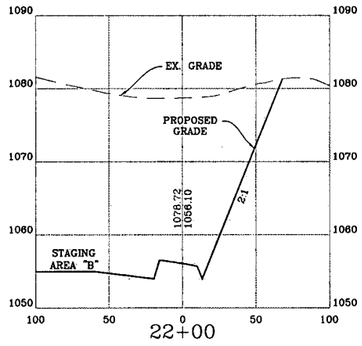


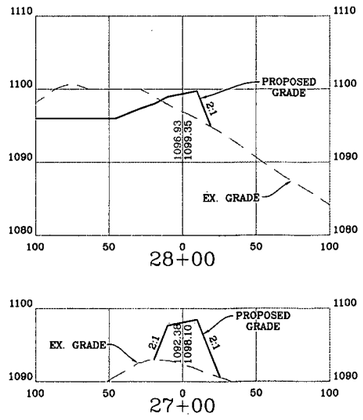


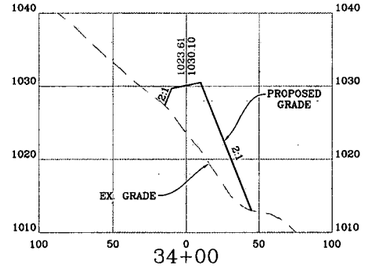












LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

Engineering Survey Environmental GIS

NAVITUS ENGINEERING INC.

151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185
www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR:
ANTERO RESOURCES CORPORATION

ACCESS ROAD SECTIONS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

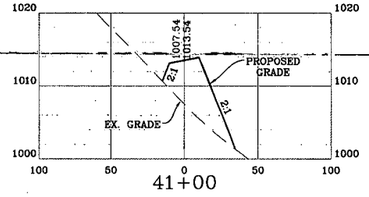
CYRUS S. LUCAS
REGISTERED
9676
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

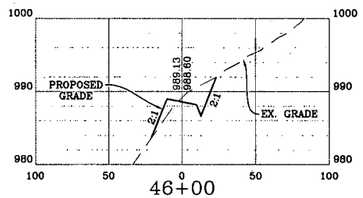
DATE: 10/17/2013

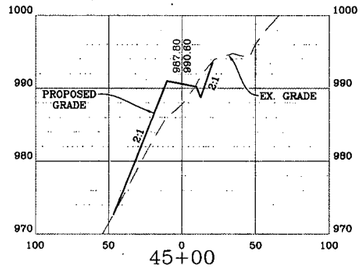
SCALE: AS SHOWN

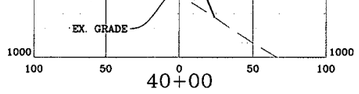
SHEET 13 OF 29

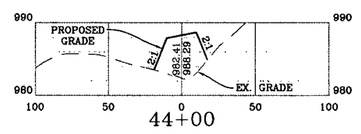
ACCESS ROAD SECTIONS

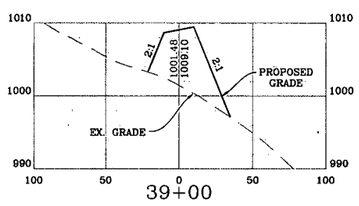


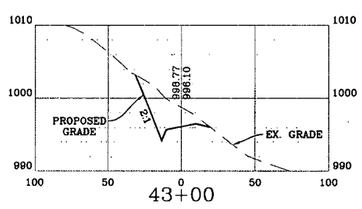


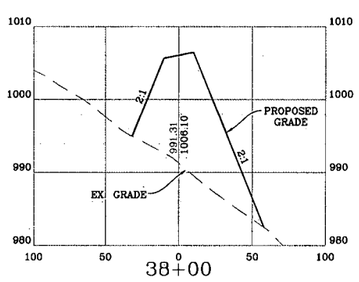


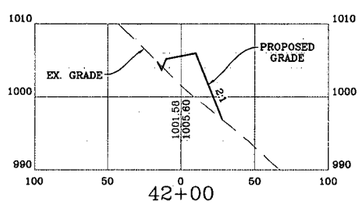


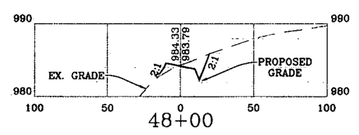


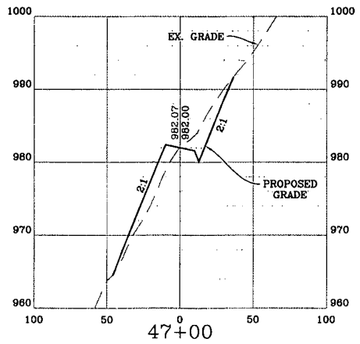






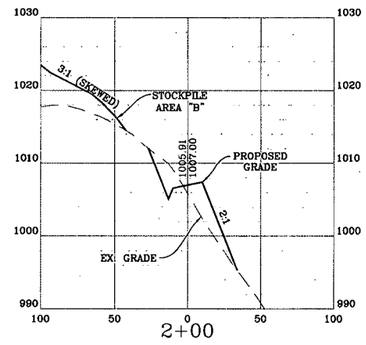


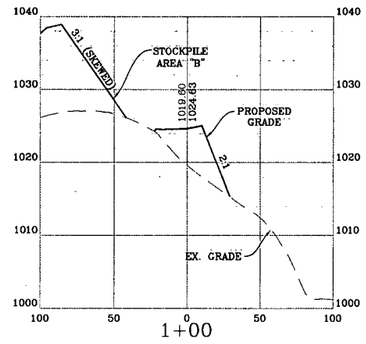




ACCESS ROAD "A" CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'





ACCESS ROAD "B" CROSS-SECTIONS

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

Engineering Survey Environmental GIS

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151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185
www.navituseng.com

DATE	REVISION

ANTERO RESOURCES

THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD SECTIONS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KLINE
REGISTERED
9578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013

SCALE: AS SHOWN

SHEET 14 OF 29

WELL PAD, STAGING AREA "B", & WATER CONTAINMENT PAD SECTIONS

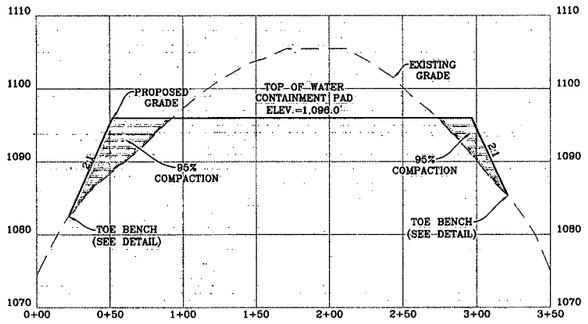
LEGEND

X-SECTION GRID INDEX	———
X-SECTION GRID INTERMEDIATE	———
X-SECTION PROPOSED GRADE	———
X-SECTION EXISTING GRADE	— — —
X-SECTION WATER SURFACE	— — —
MATCHLINE	■■■

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.



WATER CONTAINTMENT PAD CROSS-SECTION "B-B"

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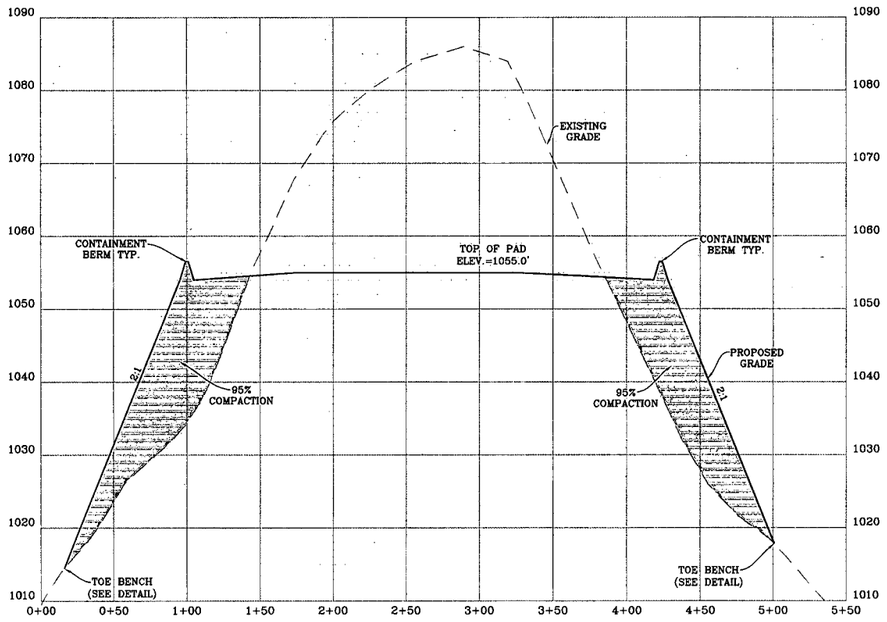
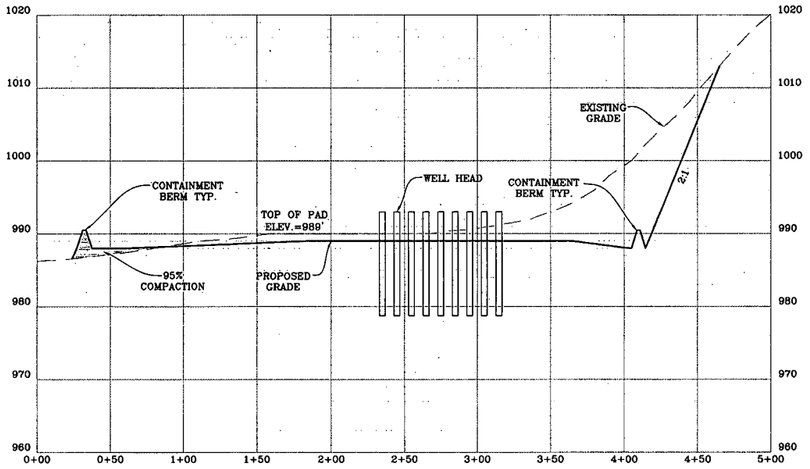


STAGING AREA "B" CROSS-SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



WELL PAD CROSS-SECTION "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185
www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

WELL PAD, STAGING AREA "B", & WATER CONTAINMENT PAD SECTIONS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

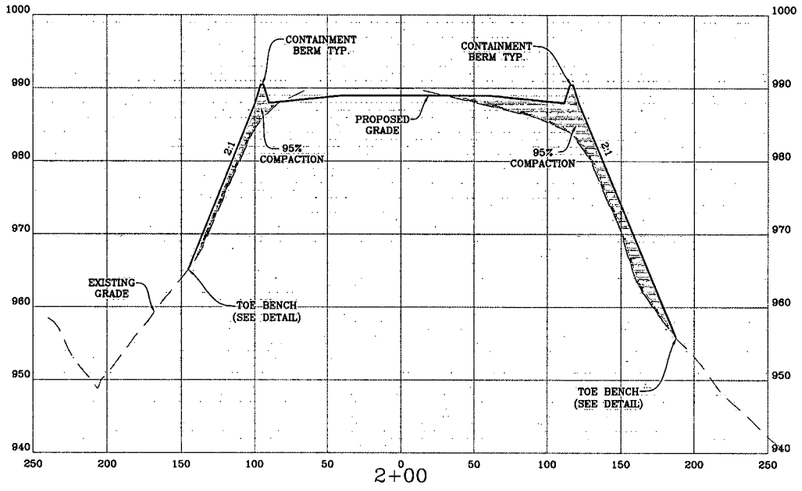
CHRIS S. KING
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013

SCALE: AS SHOWN

SHEET 15 OF 29

WELL PAD SECTIONS



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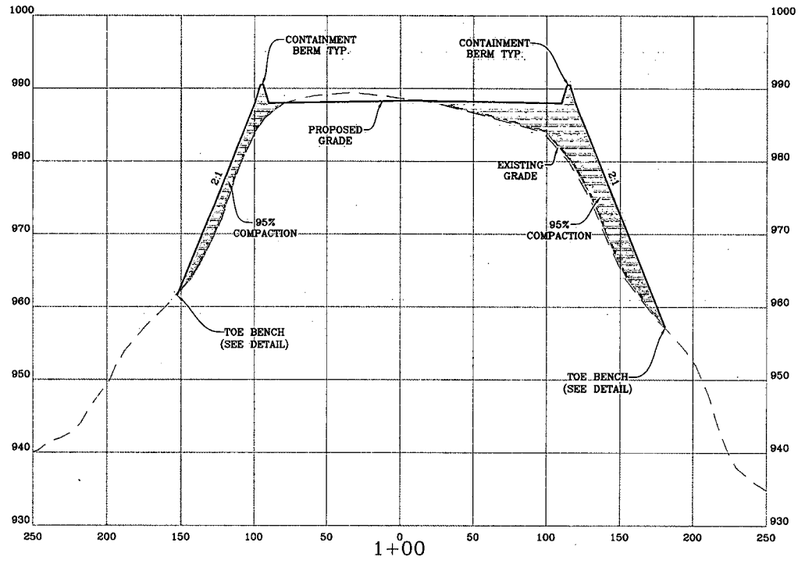

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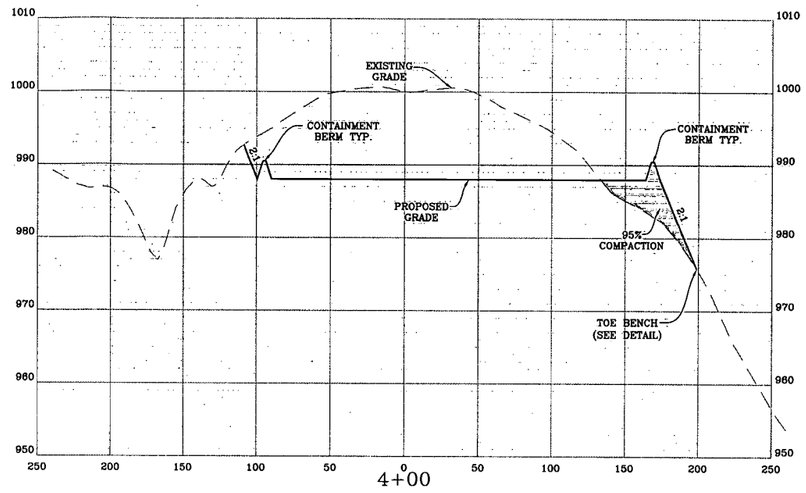

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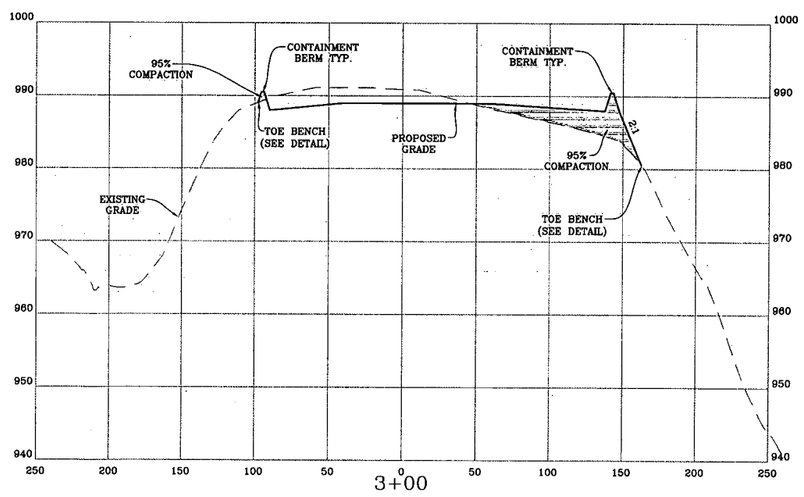

3+00

WELL PAD CROSS-SECTIONS ALONG BASELINE "C-C"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTES:

1. ALL PROPOSED DITCH RELIEF AND DRAINAGE CULVERTS SHALL HAVE ADEQUATE OUTLET PROTECTION (4" RIP-RAP) AS SHOWN ON THESE PLANS.

2. ALL FILL AREAS, INCLUDING ACCESS ROADS AND EXCESS MATERIAL STOCKPILES SHALL BE "KEYED IN" AND COMPACTED IN 12" (MAXIMUM) LOOSE LIFT THICKNESS WITH A VIBRATING SHEEPSFOOT ROLLER TO 95% COMPACTION PER STANDARD PROCTOR. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

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Engineering
Survey
Environmental
GIS

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

WELL PAD SECTIONS

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS B. KUHN
REGISTERED
19678
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: AS SHOWN
SHEET 16 OF 29

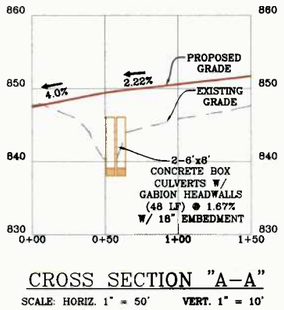
GENERAL STREAM CROSSING NOTES:

1) 2" TO 4" COARSE AGGREGATE OR LARGER SHALL BE USED TO FORM THE FIRST 6" OF FILL FOR THE CROSSING, THE REMAINDER OF MATERIAL SHALL BE ONLY LARGE ANGULAR DURABLE ROCK. "DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING."
2) DEPTH OF STONE COVER OVER THE CULVERTS SHALL BE EQUAL TO ONE-HALF THE CULVERT DIAMETER OR 12 INCHES, WHICHEVER IS GREATER.
3) IF MULTIPLE CULVERTS ARE USED, THEY SHALL BE SEPARATED BY AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL.
4) CLEARING AND EXCAVATION OF THE STREAMBED AND BANKS SHALL BE KEPT TO A MINIMUM.
5) FILTER CLOTH SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACEMENT OF THE PIPE CULVERTS AND AGGREGATE. THE FILTER CLOTH SHALL COVER THE STREAMBED AND EXTEND A MINIMUM OF SIX INCHES AND A MAXIMUM OF ONE FOOT BEYOND THE END OF THE CULVERTS AND BEDDING MATERIAL.
6) A WATER DIVERTING SWALE OR PUMP AROUND SYSTEM SHALL BE CONSTRUCTED ACROSS THE ROADWAY ON EITHER SIDE OF THE STREAM CROSSING AS DIRECTED.
7) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
8) GABION WALLS ON THE UPSTREAM AND DOWNSTREAM SIDE OF THE CULVERT INSTALLATION SHALL BE INSTALLED TO REDUCE STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
9) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
10) GREEN CONCRETE SHALL NOT BE PLACED IN CONTACT WITH FLOWING WATER.
11) WHEN THE CROSSING HAS SERVED ITS PURPOSE, ALL STRUCTURES INCLUDING CULVERTS, BEDDING, AND FILTER CLOTH SHALL BE REMOVED. REMOVAL OF THE STRUCTURE AND CLEAN UP OF THE AREA SHOULD BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. UPON REMOVAL OF THE STRUCTURE, THE STREAM BANK SHALL IMMEDIATELY BE STABILIZED.
12) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
13) THE CROSSING MUST BE INSPECTED AFTER EVERY RAIN EVENT OF 0.5 INCHES OR MORE AND ONCE A WEEK TO ENSURE THAT THE CULVERTS, STREAMBED, AND STREAM BANKS ARE MAINTAINED AND NOT DAMAGED. NEVER ALLOW THE CULVERTS TO BECOME CLOGGED WITH DEBRIS AND REMOVE ANY OBSTRUCTIONS IMMEDIATELY.
14) FLUSHING IS NOT AN APPROVED METHOD TO BE UTILIZED FOR CULVERT CLEANOUT.

PUMP AROUND NOTES:

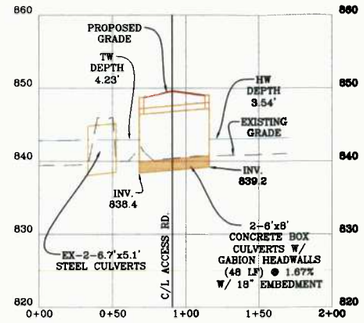
1) CONSTRUCTION SHOULD BE PERFORMED DURING LOW FLOW PERIODS.
2) PUMP(S) SHOULD BE SUFFICIENTLY LARGE TO PUMP THE ENTIRE STREAM FLOW AROUND THE SITE.
3) THE COFFERDAM CONSTRUCTED MUST BE IMPERVIOUS TO WATER.
4) THE INLET OF THE PUMP(S) IS TO BE SUSPENDED ABOVE THE STREAMBED IN ORDER TO PREVENT SUCKING MUD AND SEDIMENT.
5) THE DISCHARGE POINT MUST BE STABILIZED WITH ROCK TO DISPERSE THE ENERGY AND PREVENT EROSION.

STREAM CROSSING "A" SECTIONS



CROSS SECTION "A-A"

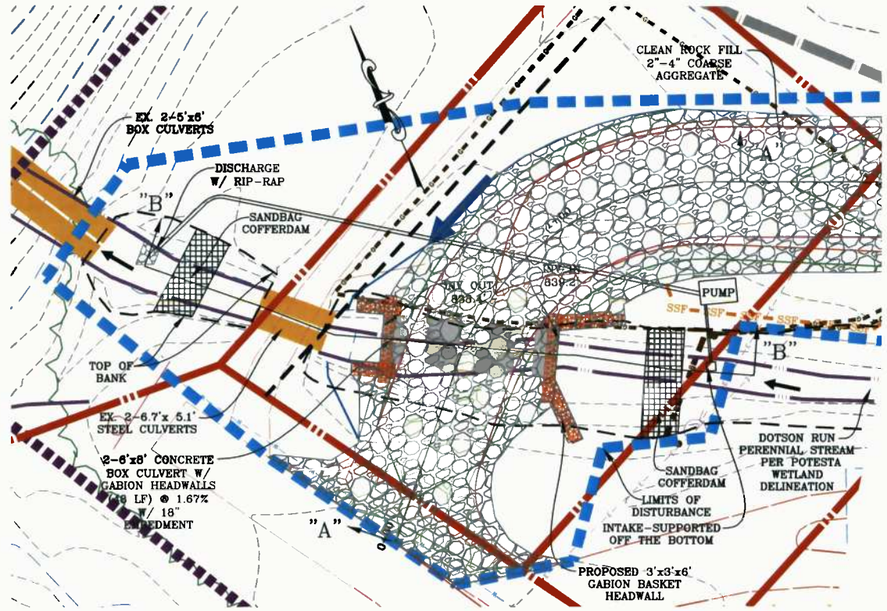
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

STREAM CROSSING "A" DETAILS



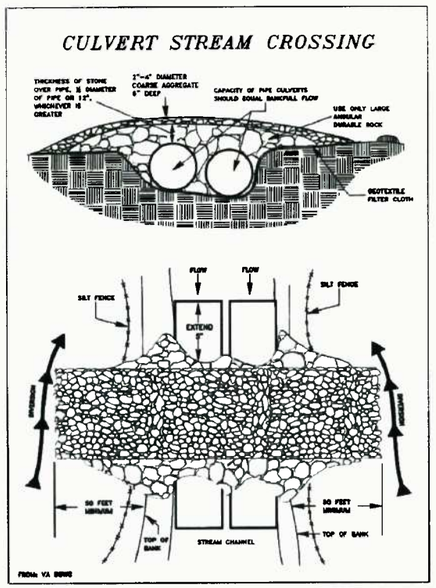
20 0 20

GRAPHIC SCALE (IN FEET)

NOTES:

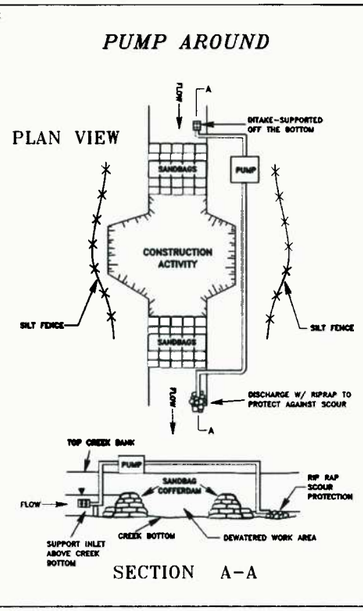
1) SEE STREAM CROSSING REPORT BY NAVITUS ENGINEERING FOR CULVERT AND DRAINAGE COMPUTATIONS.
2) ANTERO RESOURCES SHALL OBTAIN A STREAM ACTIVITY PERMIT THROUGH THE PUBLIC LAND CORPORATION OFFICE OF LAND AND STREAMS FOR STREAM CROSSING "A".

CULVERT STREAM CROSSING



FIGURE

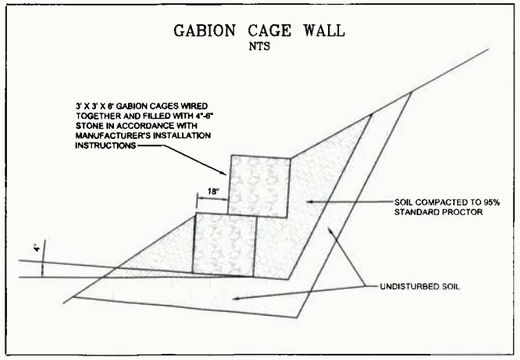
PUMP AROUND



SECTION A-A

GABION CAGE WALL

NTS



LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
X-SECTION EXISTING GRADE	
X-SECTION WATER SURFACE	
MATCHLINE	

LEGEND

EX. INDEX CONTOUR	700	PR. INDEX CONTOUR	700
EX. INTERMEDIATE CONTOUR		PR. INTERMEDIATE CONTOUR	
EX. PROPERTY LINE		PR. INDEX CONTOUR (ROAD)	700
EX. ROAD EDGE OF GRAVEL/DIRT		PR. INTERMEDIATE CTR (ROAD)	
EX. ROAD EDGE OF PAVEMENT		PR. LIMITS OF DISTURBANCE	
EX. ROAD CENTERLINE		PR. WELL HEAD	
EX. DITCHLINE		PR. PERIMETER SAFETY FENCE	
EX. CULVERT		PR. ROAD EDGE OF GRAVEL	
EX. FENCELINE		PR. ROAD CENTERLINE	
EX. OVERHEAD UTILITY		PR. V-DITCH W/ CHECK DAMS	DL
EX. POWER POLE/GUY WIRE		PR. CULVERT W/ RIP-RAP	RR
EX. PIPELINE & WELL	G	PR. COMP. SOCK DIVERSION	CSD #1 XX
EX. TREELINE		PR. COMPOST FILTER SOCK	CSF #2 XX
EX. DELINEATED STREAM		PR. SUPER SILT FENCE	SSF #1 SSF
EX. DELINEATED WETLAND/POND		BORING LOCATION	
EX. BUILDING			
100' WETLAND/STREAM BUFFER			
DELINEATION STUDY AREA			

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ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR ANTERO RESOURCES CORPORATION

STREAM CROSSING "A" DETAILS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD

CENTRAL DISTRICT

DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KLAUS — 19578 — PROFESSIONAL ENGINEER — STATE OF WEST VIRGINIA

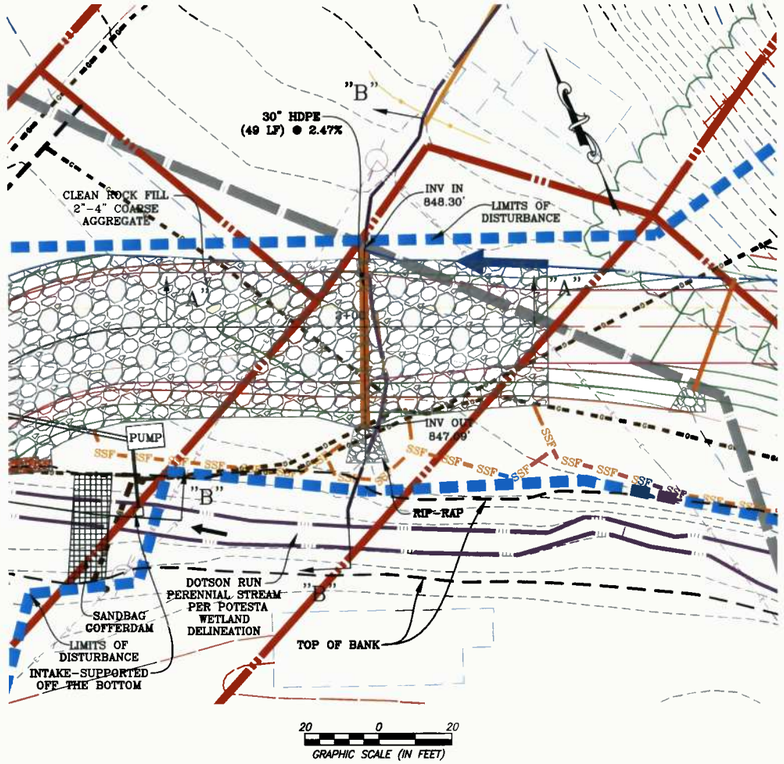
10/17/2013

DATE: 10/17/2013

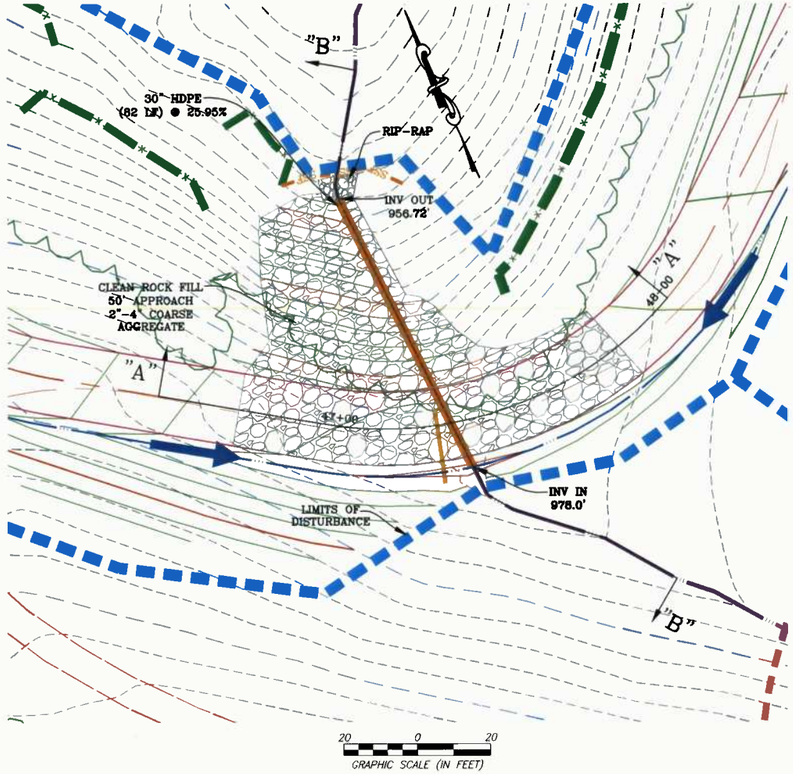
SCALE: AS SHOWN

SHEET 17 OF 29

STREAM CROSSING "B" DETAILS



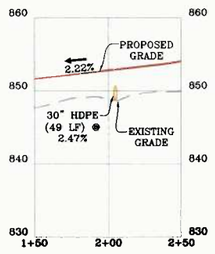
STREAM CROSSING "C" DETAILS



GENERAL STREAM CROSSING NOTES:

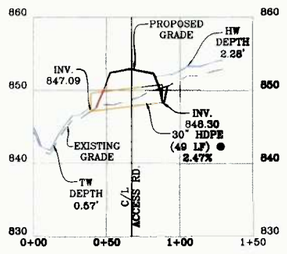
1) 2" TO 4" COARSE AGGREGATE OR LARGER SHALL BE USED TO FORM THE FIRST 6" OF FILL FOR THE CROSSING, THE REMAINDER OF MATERIAL SHALL BE ONLY LARGE ANGULAR DURABLE ROCK. "DO NOT USE ERODIBLE MATERIAL FOR CONSTRUCTION OF THE CROSSING."
2) DEPTH OF STONE COVER OVER THE CULVERTS SHALL BE EQUAL TO ONE-HALF THE CULVERT DIAMETER OR 12 INCHES, WHICHEVER IS GREATER.
3) IF MULTIPLE CULVERTS ARE USED, THEY SHALL BE SEPARATED BY AT LEAST 12 INCHES OF COMPACTED AGGREGATE FILL.
4) CLEARING AND EXCAVATION OF THE STREAMBED AND BANKS SHALL BE KEPT TO A MINIMUM.
5) FILTER CLOTH SHALL BE PLACED ON THE STREAMBED AND STREAMBANKS PRIOR TO PLACEMENT OF THE PIPE CULVERTS AND AGGREGATE. THE FILTER CLOTH SHALL COVER THE STREAMBED AND EXTEND A MINIMUM OF SIX INCHES AND A MAXIMUM OF ONE FOOT BEYOND THE END OF THE CULVERTS AND BEDDING MATERIAL.
6) A WATER DIVERTING SWALE SHALL BE CONSTRUCTED ACROSS THE ROADWAY ON EITHER SIDE OF THE STREAM CROSSING.
7) APPROPRIATE PERIMETER CONTROLS SUCH AS COMPOST FILTER SOCK, SUPER SILT FENCE AND/OR SEDIMENT TRAPS SHALL BE EMPLOYED ALONG THE BANKS AND PARALLEL TO THE STREAMBED.
8) CROSS CRIBBING OF THE DOWNSTREAM SIDE OF THE CULVERT INSTALLATIONS MAY BE NEEDED TO AID IN REDUCING STRUCTURAL DAMAGE DURING HIGH VELOCITY WATER OVERFLOW PERIODS.
9) STREAMBED MATERIAL IS NOT TO BE USED AS FILL.
10) GREEN CONCRETE SHALL NOT BE PLACED IN CONTACT WITH FLOWING WATER.
11) WHEN THE CROSSING HAS SERVED ITS PURPOSE, ALL STRUCTURES INCLUDING CULVERTS, BEDDING, AND FILTER CLOTH SHALL BE REMOVED. REMOVAL OF THE STRUCTURE AND CLEAN UP OF THE AREA SHOULD BE ACCOMPLISHED WITHOUT CONSTRUCTION EQUIPMENT WORKING IN THE WATERWAY CHANNEL. UPON REMOVAL OF THE STRUCTURE, THE STREAM BANK SHALL IMMEDIATELY BE STABILIZED.
12) DURING ROUTINE MAINTENANCE DO NOT GRADE MUD AND DEBRIS OVER THE SIDES OF THE CROSSING INTO THE STREAM.
13) THE CROSSING MUST BE INSPECTED AFTER EVERY RAIN EVENT OF 0.5 INCHES OR MORE AND ONCE A WEEK TO ENSURE THAT THE CULVERTS, STREAMBED, AND STREAM BANKS ARE MAINTAINED AND NOT DAMAGED. NEVER ALLOW THE CULVERTS TO BECOME CLOGGED WITH DEBRIS AND REMOVE ANY OBSTRUCTIONS IMMEDIATELY.
14) FLUSHING IS NOT AN APPROVED METHOD TO BE UTILIZED FOR CULVERT CLEANOUT.

STREAM CROSSING "B" SECTIONS



CROSS SECTION "A-A"

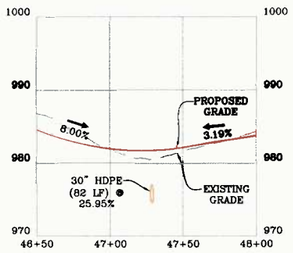
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

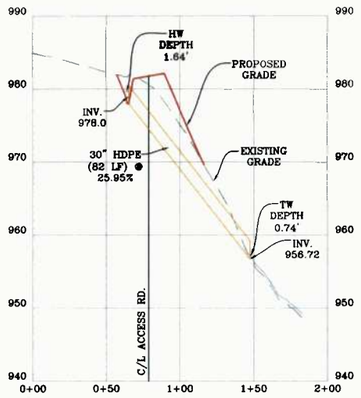
SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

STREAM CROSSING "C" SECTIONS



CROSS SECTION "A-A"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'



CROSS SECTION "B-B"

SCALE: HORIZ. 1" = 50' VERT. 1" = 10'

NOTES:

1) SEE STREAM CROSSING REPORT BY NAVITUS ENGINEERING FOR CULVERT AND DRAINAGE COMPUTATIONS.
2) ANTERO RESOURCES SHALL OBTAIN A STREAM ACTIVITY PERMIT THROUGH THE PUBLIC LAND CORPORATION OFFICE OF LAND AND STREAMS FOR STREAM CROSSING "B" & "C".

LEGEND

X-SECTION GRID INDEX	
X-SECTION GRID INTERMEDIATE	
X-SECTION PROPOSED GRADE	
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X-SECTION WATER SURFACE	
MATCHLINE	

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EX. CULVERT		PR. ROAD EDGE OF GRAVEL	
EX. FENCELINE		PR. ROAD CENTERLINE	
EX. OVERHEAD UTILITY		PR. V-DITCH W/ CHECK DAMS	DL
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EX. PIPELINE & WELL	G	PR. COMP. SOCK DIVERSION	CSDXX #1
EX. TREELINE		PR. COMPOST FILTER SOCK	CSXX #1
EX. DELINEATED STREAM		PR. SUPER SILT FENCE	SSF #1
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DATE

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STREAM CROSSING "B" & "C" DETAILS

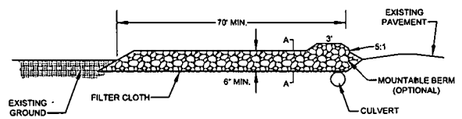
DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KIRK
REGISTERED
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

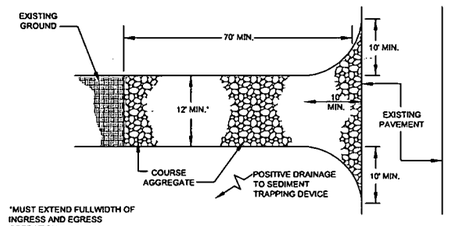
DATE: 10/17/2013
SCALE: AS SHOWN
SHEET 18 OF 29

FIGURE 3.02.1

STONE CONSTRUCTION ENTRANCE

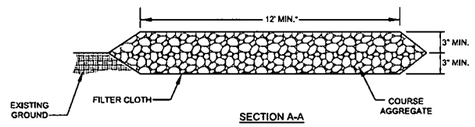


SIDE ELEVATION



*MUST EXTEND FULLWIDTH OF INGRESS AND EGRESS OPERATION

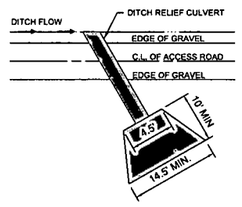
PLAN VIEW



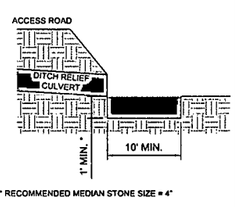
SECTION A-A

SOURCE: ADAPTED from the 1983 Maryland Standards for Soil Erosion and Sediment Control and Va. DSWC

TYPICAL DITCH RELIEF CULVERT OUTLET TREATMENT



PLAN VIEW
NTS



* RECOMMENDED MEDIAN STONE SIZE = 4"

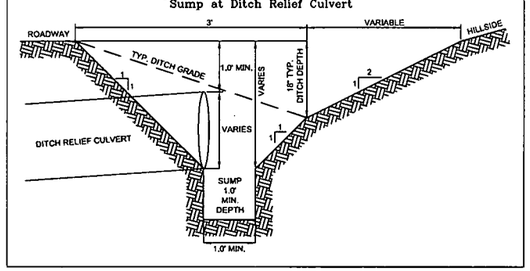
SECTION VIEW
NTS

NOTE:
ALL DITCH LINE PROTECTION SHALL BE INSTALLED AS RECOMMENDED IN THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL. DITCH LINE PROTECTION SHALL BE BASED ON THE FOLLOWING GRADES:

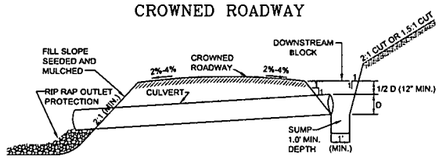
1. LESS THAN 3% – GRASSED
2. 3–8% – GRASS WITH ROLLED EROSION CONTROL PRODUCTS (RECP)
3. GREATER THAN 9% – RIPRAP OR EQUIVALENT GEOTEXTILE

IF HIGH EROSIVE SOILS ARE ENCOUNTERED DURING CONSTRUCTION, THE ENGINEER SHOULD BE CONTACTED FOR FURTHER EVALUATION.

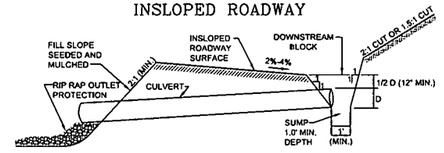
Modified Figure 3.1 – Typical Roadside Ditch Section
Sump at Ditch Relief Culvert



CROWNED ROADWAY



INSLOPED ROADWAY



Cut and fill slopes shall be stabilized immediately upon completion of roadway grading. These areas shall be blanketed wherever they are located within 50 feet of a surface water or within 100 feet of a surface water where a suitable vegetative filter strip does not exist.

A durable top dressing shall be provided for soils having low strength.

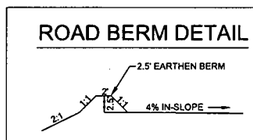
Roadside ditches shall be provided with adequate protective lining.

Adequately sized culverts or other suitable cross drains shall be provided at all seeps, springs, and drainageways.

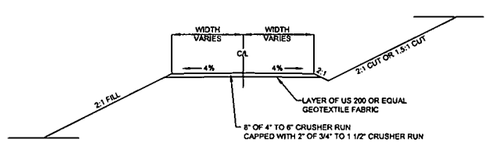
Roadway shall be inspected weekly and after each runoff event. Damaged roadways, ditches, or cross drains shall be repaired immediately.

SOURCE: PA DEPARTMENT OF ENVIRONMENTAL PROTECTION, BUREAU OF OIL AND GAS MANAGEMENT 8000-PM-OG0111 APPENDIX A BMP CONSTRUCTION DETAILS (MODIFIED)

ROAD BERM DETAIL



TYPICAL ROAD CROSS SECTION DETAIL



TURNOUT

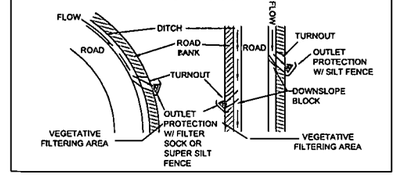
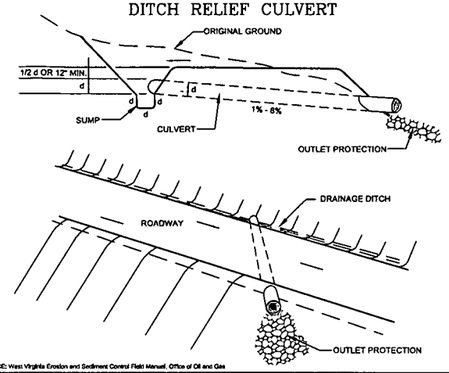


FIGURE II-4

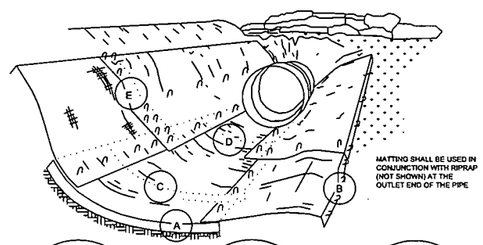
DITCH RELIEF CULVERT



SOURCE: West Virginia Erosion and Sediment Control Field Manual, Office of Oil and Gas

FIGURE 3.13.1

TYPICAL RECP CHANNEL INSTALLATION



SOURCE: VA DCR-DSWC AND NORTH AMERICAN GREEN

Table II-6

Spacing of Culverts	
Road Grade %	Distance (Ft)
2-5	500-300
6-10	300-200
11-15	200-100
16-20	100

Table II-5

Pipe Sizes for Culverts Across Roads		
Drainage Area (Ac)	Pipe Diameter (In)	Pipe Capacity (Cfs)
10	15	5
20	18	9
30	21	12
50	24	18
80	27	24
100	30	29
300	36	60
500	42	85

FIGURE 3.05.1

ROCK CHECK DAM

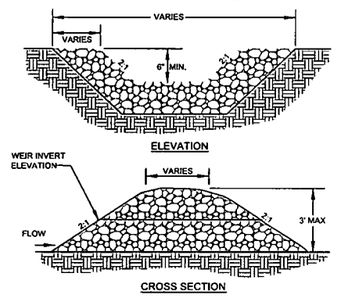
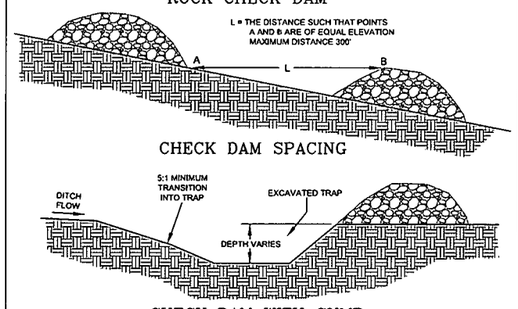


FIGURE 3.05.2

ROCK CHECK DAM



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CONSTRUCTION DETAILS

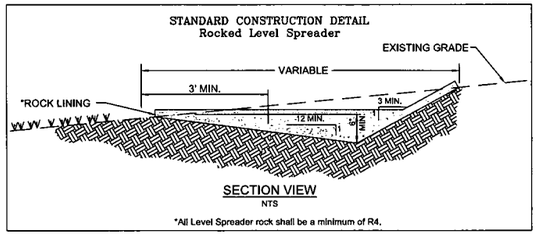
DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

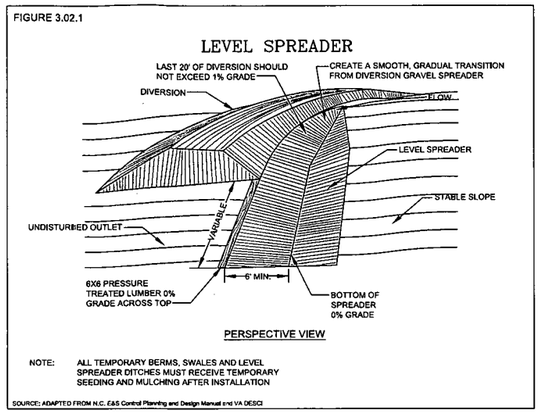
JUSTIN B. KING
REGISTERED
19578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

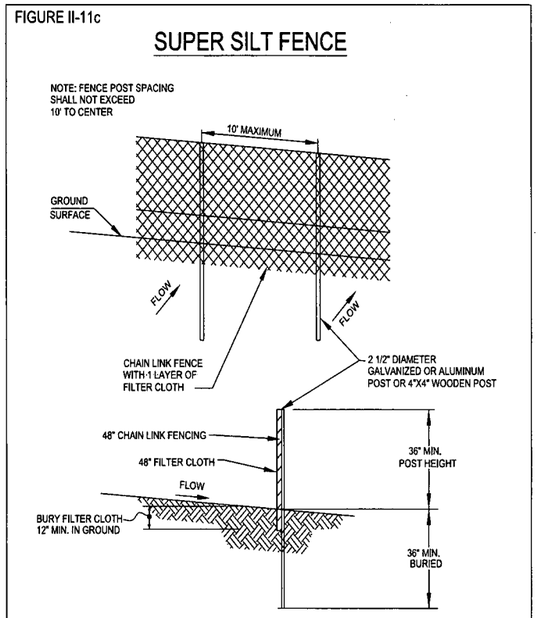
DATE: 10/17/2013
SCALE: N/A
SHEET 19 OF 29

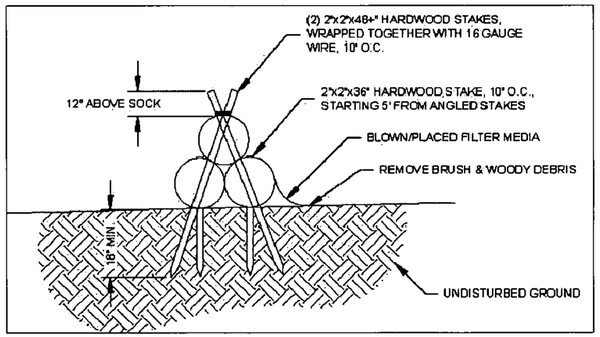
Table 4.1
Compost Sock Fabric Minimum Specifications

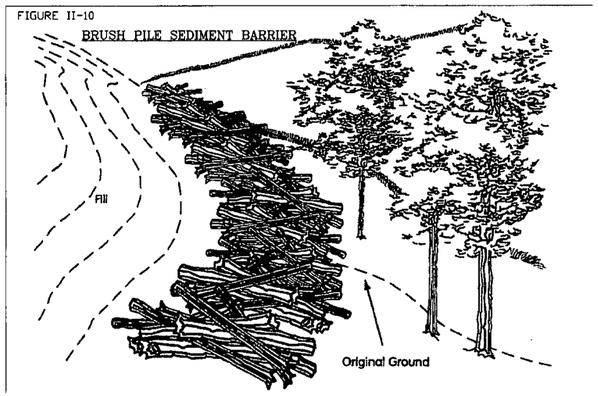
Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Textile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting	HDPE biaxial net				
	Continuously wound				
	Fusion-welded junctures				
	3/4" x 3/4" Max. aperture size				
Outer Filtration Mesh	Composite Polypropylene Fabric (Woven layer & non-woven fleece mechanically fused via needle punch)				
	3/16" Max. aperture size				
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

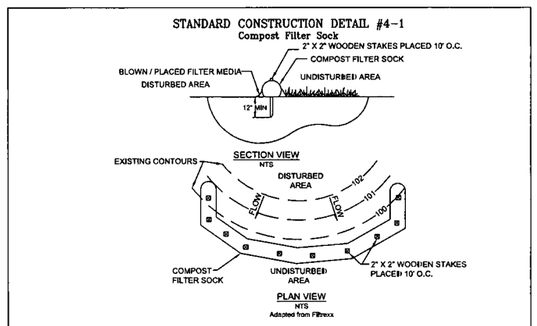












Sock fabric shall meet standards of Table 4.1. Compost shall meet the following standards:

Organic Matter Content	80% -100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5-8.0
Moisture Content	35%-55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS Maximum

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up the slope at 45 degrees to the main sock alignment. Maximum slope length above any sock shall not exceed manufacturer's maximum permissible slope length.

Traffic shall not be permitted to cross filter socks.

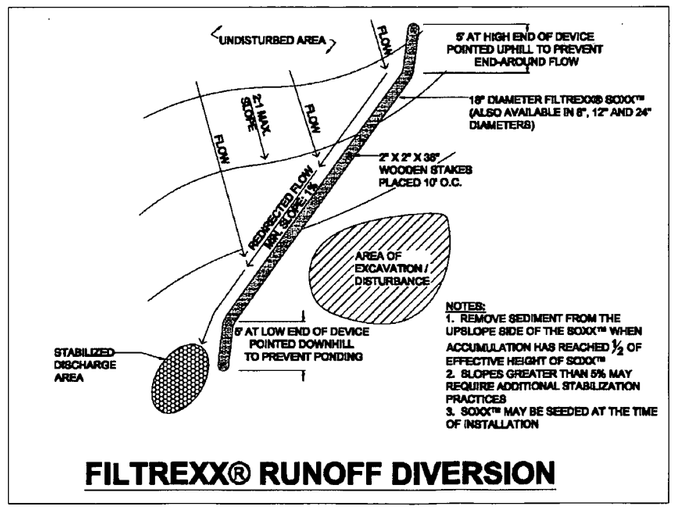
Accumulated Sediment shall be removed when it reaches 1/2 the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

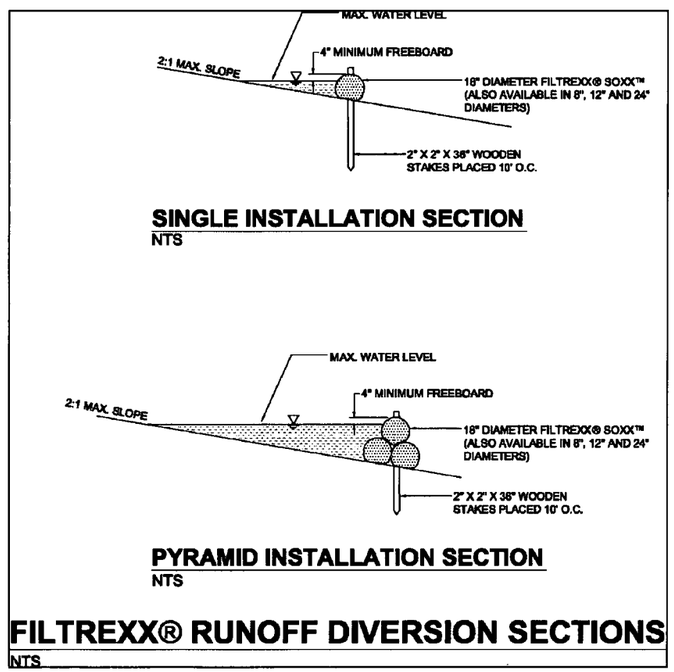
Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

In the event the ground is frozen, #5 rebar with safety caps shall be used instead of wooden stakes to anchor the filter sock. Once the ground thaws the rebar anchors shall be removed and replaced with 2" x 2" wooden stakes and installed as shown in the detail above.



FILTREXX® RUNOFF DIVERSION



FILTREXX® RUNOFF DIVERSION SECTIONS

NTS

NAVITUS ENGINEERING INC.
Engineering Survey Environmental GIS
151 Windy Hill Lane
Weirton, West Virginia 26062
Telephone: (888) 662-4185
www.navitusenp.com

REVISION | DATE

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

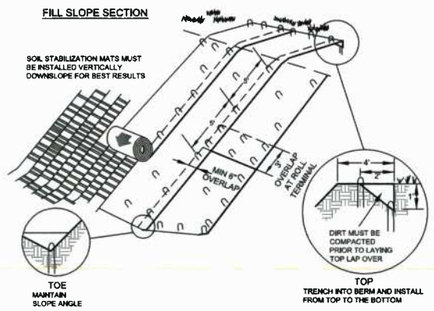
CONSTRUCTION DETAILS
DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS B. KING — REGISTERED — 9578 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

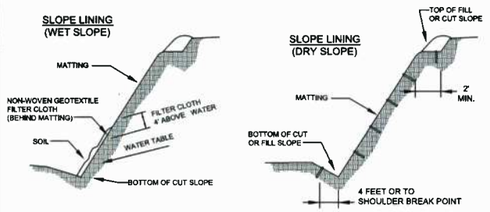
DATE: 10/17/2013
SCALE: N/A
SHEET 20 OF 29

FIGURE 3.13.2

ROLLED EROSION CONTROL PRODUCTS



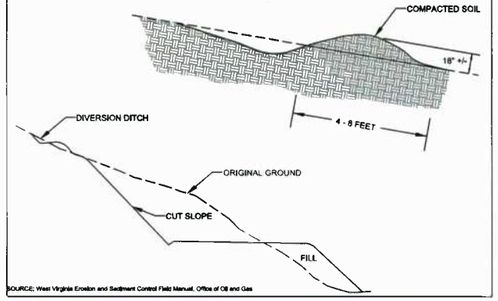
NOTE: SLOPE SURFACE MUST BE SMOOTH AND FREE OF ROCKS, LUMPS, GRASS AND STICKS. MATS MUST BE PLACED FLAT ON SURFACE FOR PROPER SOIL CONTACT.



SOURCE: VDOT STANDARDS AND VA DCR-DSWC

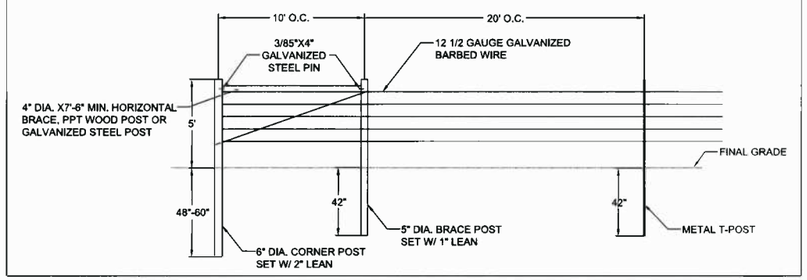
FIGURE II-3

DIVERSION DITCH – TEMPORARY

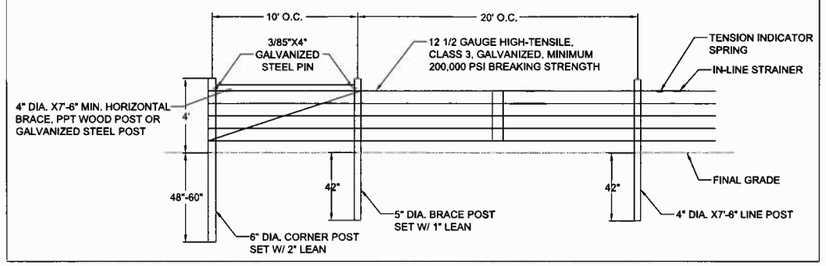


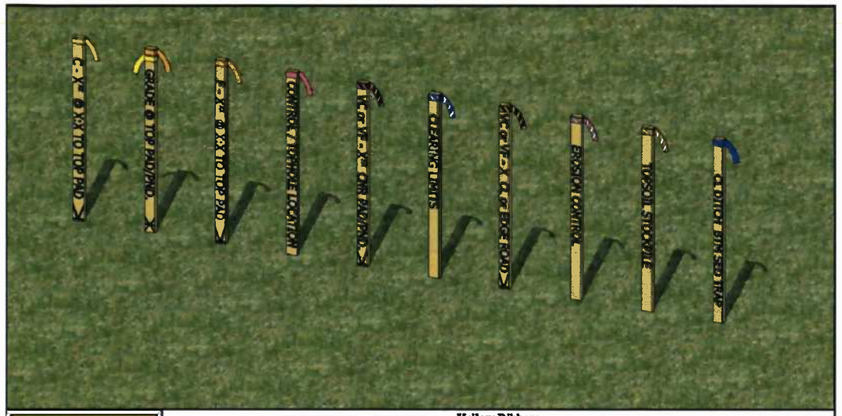
SOURCE: West Virginia Erosion and Sediment Control Field Manual, Office of Oil and Gas

5 STRAND BARBED WIRE FENCE DETAIL



4' FARM FENCE DETAIL





	Yellow Ribbon: Yellow Ribbon used to indicate top of Cuts (C) Cut to be determined at time of stakeout Slope determined by site design
	Yellow & Orange Ribbon: Yellow and Orange Ribbon used to indicate Grade at Top of Pad/Pond/Pit
	Orange Ribbon: Orange Ribbon used to indicate toes of Fills (F) Fill to be determined at time of stakeout Slope determined by site design
	Pink Ribbon: Pink Ribbon used to indicate Top Hole Location Pink Ribbon used to indicate Survey Control Location
	Pink & Black Stripe Ribbon: Pink & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Pad/Pond/Pit corner or edge Pink & Black Stripe Ribbon used to indicate Vertical Fill (VF) at Pad/Pond/Pit corner or edge Vertical Cut/Vertical Fill to be determined at time of stakeout
	Blue & White Stripe Ribbon: Blue & White Stripe Ribbon used to indicate clearing limits/construction limits
	Orange & Black Stripe Ribbon: Orange & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Centerline or edge of access road Orange & Black Stripe Ribbon used to indicate Vertical Fill (VF) at centerline or edge of access road
	Pink & White Stripe Ribbon: Pink & White Stripe Ribbon used to indicate Erosion and Sediment Control Structures Silt Fence (SF) Reinforced Filter Fence (RFF) Super Silt Fence (SSF) Filter Sock (FS)
	Orange & White Stripe Ribbon: Orange & White Stripe Ribbon used to indicate Topsoil Stockpile Locations
	Blue Ribbon: Blue Ribbon used to indicate Centerline (℄) Ditch Blue Ribbon used to indicate Bottom (BTM) Sediment Traps

ANTERO RESOURCES CORPORATION STANDARD RIBBON COLOR SCHEME
PROVIDED BY ANTERO RESOURCES CORPORATION

Engineering · Survey · Environmental · GIS
NAVITUS ENGINEERING INC.
151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (540) 662-4185
www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

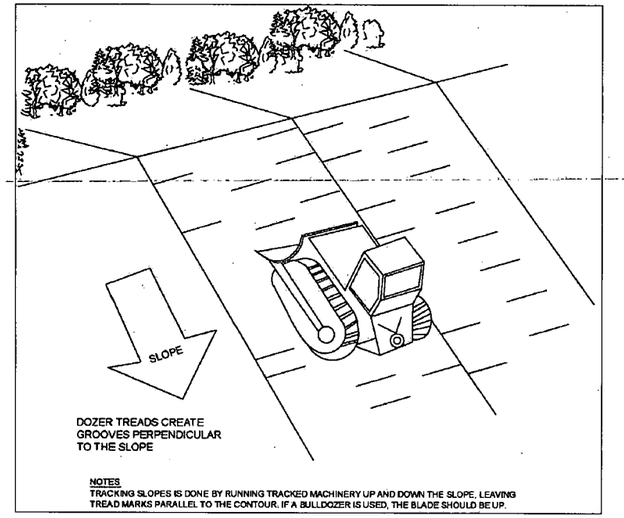
CONSTRUCTION DETAILS

DOTSON HOLLAND

WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

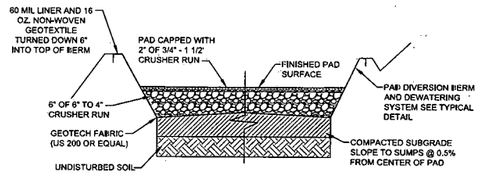
CERTIFICATE OF AUTHORIZATION
CERTIFIED
STATUS S. ELLIS
REGISTERED
No. 978
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: N/A
SHEET 21 OF 29

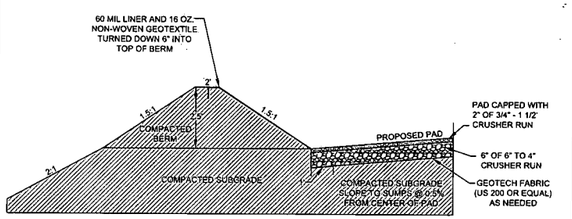


NOTES
TRACKING SLOPES IS DONE BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. IF A BULLDOZER IS USED, THE BLADE SHOULD BE UP.

TYPICAL PAD CROSS-SECTION



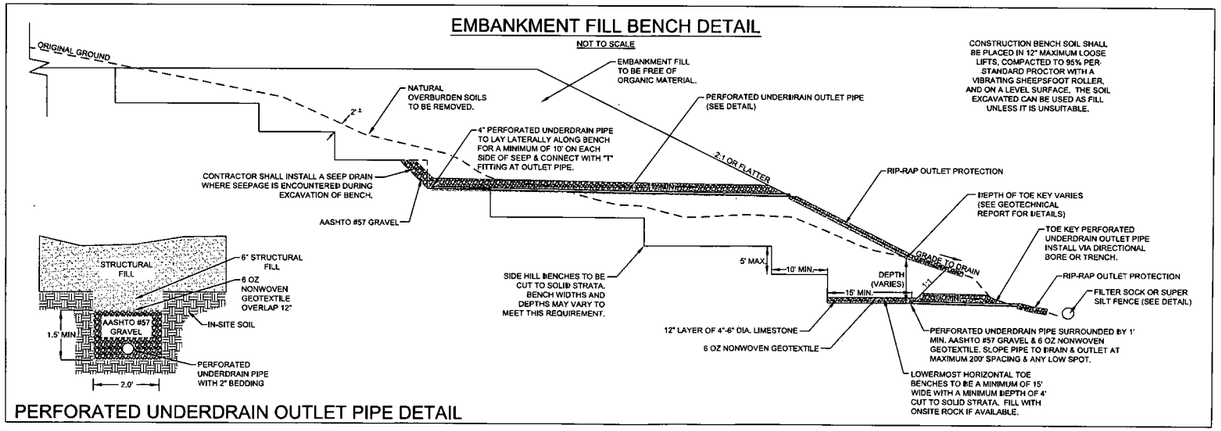
PAD DIVERSION BERM DETAIL



NOTES:
1. THE COMPACTED BERM SHALL BE LINED TO PREVENT FILTRATION THROUGH THE CONTAINMENT BERM.

EMBANKMENT FILL BENCH DETAIL

NOT TO SCALE



PERFORATED UNDERDRAIN OUTLET PIPE DETAIL

NAVITUS ENGINEERING INC.
Engineering · Survey · Environmental · GIS
151 Windy Hill Lane
Winchester, Virginia 22602
Telephone: (888) 662-4185
www.navituseng.com

DATE	REVISION

ANTERO RESOURCES
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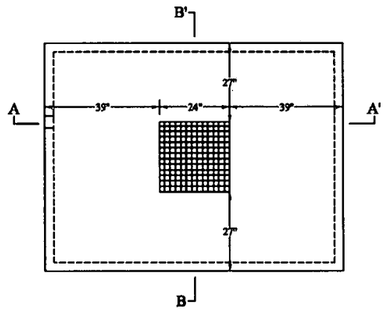
CONSTRUCTION DETAILS

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CHRIS S. KUHL
REGISTERED
9578
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

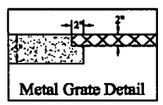
DATE: 10/17/2013
SCALE: N/A
SHEET 22 OF 29

WELL PAD DEWATERING SYSTEM SPECIFICATIONS

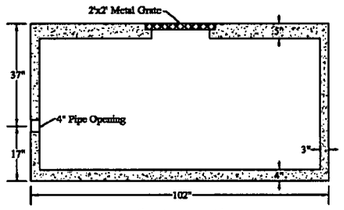


Plan View
Low Profile Tank Catch Basin

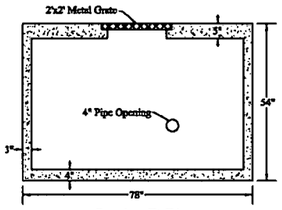
Ritchie Concrete
Low Profile Tank
Catch Basin
1,000 Gallon Capacity



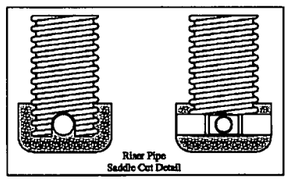
Metal Grate Detail



Section A-A'
Low Profile Tank Catch Basin



Section B-B'
Low Profile Tank Catch Basin



Size of Tank
$6\frac{1}{2}$' Wide
$8\frac{1}{2}$' Long
$4\frac{1}{2}$' Tall
Hole Size
$7\frac{1}{2}$' Wide
$9\frac{1}{2}$' Long
5'-2" Tall

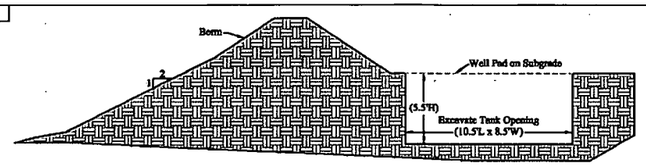
Mix Design 4000 psi	
lbs. yd.	Ab. vol.
563	2.86
270	4.33
5%+1	1.35
1222	7.42
1770	11.04
	27.00cf

Outlet Lines
Outlet 17" from bottom of tank
Polylock Seals adaptable for 2, 3, & 4"

Thickness
Walls 3"
6x6x10 gauge wire mesh
$\frac{3}{8}$" Rebar on 18" Centers
Bottom 4"
Tops with $\frac{1}{2}$" Rebar on 14" Centers

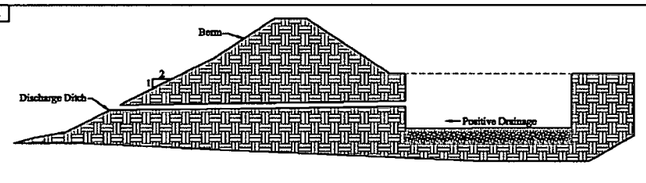
All tanks are of durable construction and are state approved

Step 1



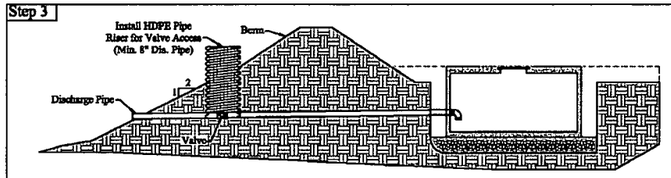
1.) Construct Well Pad to subgrade.
2.) Excavate sump hole 1' larger than the length, width, and height of tank.

Step 2



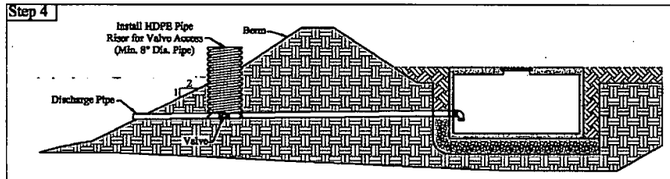
3.) Use crusher run stone to prepare the bottom of the excavation. Make sure to level the tank from side to side and have positive flow toward the outlet (approximately 1-2").
4.) Make certain the outlet on the tank lines up with the discharge ditch for installing the discharge pipe and valve

Step 3



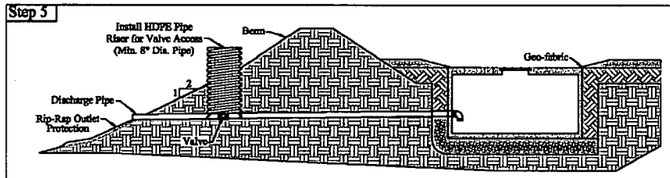
5.) Set the tank in the excavation and level.
6.) Install pipe section, (approximately 1-2' piece) into the outlet fitting on the tank. Use hydraulic cement around the connection to insure positive seal.
7.) Install 4" valve onto short section of the pipe with glue (make certain to clean and prime both valve and pipe before gluing connection).
8.) Install sections of pipe onto the outlet side of the valve until the pipe extends through the berm and slope approximately 1'. Leave the end of the pipe exposed (make certain to clean and prime the pipe and joints before gluing the connections).
9.) Make certain that the pipe is supported and maintains positive flow away from the valve. Use excavated soil from the discharge ditch to support the pipe.
10.) Install the riser for the valve. Use a section of HDPE pipe with a larger diameter than the valve (minimum 8" diameter HDPE pipe). Cut a "saddle" on the bottom of the riser pipe so that the riser pipe will rest on the discharge pipe, surrounding the valve and keeping dirt away from the operation of the valve.
11.) Fill around the valve with crusher run stone and 1' on the riser pipe to keep soil out.

Step 4



12.) Stabilize the riser pipe so that it remains perpendicular to the valve (Riser pipe needs to be perpendicular to allow smooth operation of handle and valve). Make sure to remove the factory handle on the valve and to fit "T" handle (alternate handle) onto the exposed lug on the top of the valve.
13.) Begin backfilling the tank excavation and discharge ditch, use the soil excavated from the tank hole to backfill the tank and discharge ditch. Do NOT backfill with any large rocks against the tank and be certain NOT to over-compact around the tank. Improper backfilling and over-compaction around the tank will lead to the tank collapsing. It is recommended that finer soils are used to backfill around the tank and discharge pipe to reduce voids and excessive settling.
14.) Once backfilling is complete, the top of the tank should be flush with the sub-grade.
15.) Cut the riser pipe off 2' above sub-grade to allow for the riser pipe to extend 1' above the final grade and keep surface water from entering the pipe.

Step 5



16.) Repair the pad berm and fill slope.
17.) Install Rip-Rap spillway from the discharge pipe outlet to the bottom of the slope. Depending on site conditions, the spillway will discharge through a level spreader to vegetation or E&S controls or discharge from the spillway into an access road ditch.
18.) With tank installation complete, the well pad can then be stoned. When using Geo-fabric (Typar), be sure to lap the fabric over the edge of the lid on the tank. This lap will help run-off to flow into the tank. Taper stone down from the pad to the tank, so there is not a "lip" or trip hazard on the edge of stone.
19.) Be sure NOT to run a smooth drum or sheeps-footed roller over the tank lid or vibrate too close to the sides of the tank. Compacting or operating heavy equipment near the tank may cause the walls on the tank to fail. Keep traffic off of the tank. It is recommended that barriers be installed to prevent traffic from driving over or parking on or near the tank.

OPERATIONAL NOTE:
1. THE DEWATERING VALVE WILL REMAIN CLOSED DURING DRILLING AND COMPLETION OPERATIONS. ANY WATER CAPTURED DURING THE DRILLING AND COMPLETION OPERATIONS WILL BE PUMPED BY A COMMERCIAL VENDOR. AFTER DRILLING AND COMPLETION OPERATIONS ARE COMPLETE, THE VALVE WILL BE OPENED BY A DESIGNATED RESPONSIBLE PERSON ONLY.

NOTE:
1. THE WELL PAD DEWATERING SYSTEM DETAILS AND SPECIFICATIONS SHOWN ON THIS SHEET WERE PROVIDED BY ANTERO RESOURCES CORPORATION AND REFLECT THEIR CURRENT STANDARD, FOR ALL WELL PAD SITES, TO CONTROL POTENTIAL SPILLS DURING DRILLING AND COMPLETION OPERATIONS.

Engineering Survey Environmental GIS
NAVITUS ENGINEERING INC.
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www.navitusenp.com

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ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

CONSTRUCTION DETAILS
DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

DENNIS E. KING
REGISTERED
19678
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: N/A
SHEET 23 OF 29

REVEGETATION

Taken from the
West Virginia Erosion and Sediment Control Field Manual
West Virginia Division of Environmental Protection Office of Oil and Gas
Charleston, W.Va.
Section IV

Temporary Seeding

a. General Conditions Where Practice Applies
Where exposed soil surfaces are not to be fine-graded or worked for periods longer than 21 days. Temporary vegetative cover with sediment controls must be established where runoff will go directly into a stream. Immediately upon construction of the site (site includes road and location), vegetation must be established on road bank and location slopes. A permanent vegetative cover shall be applied to areas that will be left un-worked for a period of more than six months.

b. Seed Mixtures and Planting Dates
Refer to Tables 2 through 4 for recommended dates to establish vegetative cover and the approved lists of temporary and permanent plant species, and planting rates. Table 3 gives recommended types of temporary vegetation, rates of application, and optimum seeding dates. In situations where another cover is desired, contact the local soil conservation district for seeding recommendations.

c. Seed Application
Apply seed by broadcasting, drilling, or by hydroseed according to the rates indicates in Table IV-3. Perform all planting operations at right angles to the slope. Necessary site preparation and roughening of the soil surface should be done just prior to seeding. Seedbed preparation may not be required on newly disturbed areas.

Permanent Seeding

a. General
Permanent vegetative cover will be established where no further soil disturbance is anticipated or needed. Soil fertility and pH level should be tested and adjusted according to seed species planted. Planting of permanent vegetative covers must be performed on all disturbed areas after completion of the drilling process. Any site that contains significant amounts of topsoil shall have the topsoil removed and stockpiled when feasible. Topsoil should not be added to slopes steeper than 2:1 unless a good bonding to the sub-layer can be achieved. After proper grading and seedbed preparation, the vegetation will reestablish ground cover for the control of surface water runoff erosion.
All required seedbed preparation and loosening of soil by disking or dozer tracking should be performed just prior to seeding. If seedbed preparation is not feasible, 50% more seed shall be added to the recommended rates shown in Tables IV-3 and IV-4.
When hydroseeding, seedbed preparation may not be necessary if adequate site preparation was performed. Incorporate the appropriate amount of lime and/or fertilizer in the slurry mix when hydroseeding.
When hydroseeding, first mix the lime, fertilizer, and hydro-mulch in the recommended amount of water. Mix the seed and inoculants together within one hour prior to planting, and add to the slurry just before seeding. Apply the slurry uniformly over the prepared site. Assure that agitation is continuous throughout the seeding operation and the mix is applied within one hour of initial mixing.

b. Lime and Fertilizer
1. Lime shall be applied to all permanent seedings. The pH of the soil is to be determined and lime applied accordingly. Once the pH is known, select the amount of lime to be applied from Table IV-5.
2. Fertilizer shall be applied in all permanent seedings. Apply the equivalent for 500 lbs. minimum 10-20-20 fertilizer per acre or use the amount of fertilizer and lime recommended by a certified soil test.
3. Application: For best results and maximum benefits, the lime and fertilizer are to be applied at the time of seedbed preparation.

c. Permanent Seed Mixtures
Planners should take into consideration the species makeup of the existing pasture and the landowner's future pasture management plans when recommending seed mixtures. Selection: From Tables IV 4a and b, Permanent Seeding Mixtures Suitable for Establishment in West Virginia.
Notes:
1. All legumes must be planted with the proper inoculants prior to seeding.
2. 'Lathco' Flatpea is potentially poisonous to some livestock.
3. Only endophyte free varieties of Tall Fescue should be used. Tall Fescue and Crownvetch are also very invasive species, non-native to WV.
4. For unprepared seedbeds or seeding outside the optimum timeframes, add 50% more seed to the specified rate. Mixtures in Table 4b are more wildlife and farm friendly; those listed in bold are suitable for use in shaded woodland settings. Mixtures in italic are suitable for use in filter strips.

d. Seeding for Wildlife Habitat
Consider the use of the native plants or locally adapted plants when selecting cover types and species for wildlife habitat. Wildlife friendly species or mixes that have multiple values should be considered. See wildlife friendly species/mixtures in Table IV-4b. Consider selecting no or low maintenance long-lived plants adaptable to sites which may be difficult to maintain with equipment.

NOTE:
1. NO FESCUE OR TIMOTHY GRASS SHALL BE USED.

Mulching

a. General Organic Mulches
The application of straw, hay or other suitable materials to the soil surface to prevent erosion. Straw made from wheat or oats is the preferred mulch, the use of hay is permissible, but not encouraged due to the risk of spreading invasive species. Mulch must be applied to all temporary and permanent seeding on all disturbed areas. Depending on site conditions, in critical areas such as waterways or steep slopes, additional or substitute soil protective measures may be used if deemed necessary. Examples include jute mesh and soil stabilization blankets or erosion control matting.
Areas that have been temporarily or permanently seeded should be mulched immediately following seeding. Mulches conserve desirable soil properties, reduce soil moisture loss, prevent crusting and sealing of the soil surface and provide a suitable microclimate for seed germination.
Areas that cannot be seeded because of the season should be mulched to provide some protection to the soil surface. An organic mulch, straw or hay should be used and the area then seeded as soon as weather or seasonal conditions permit. Do not use fiber mulch (cellulose-hydroseed) alone for this practice; at normal application rates it will not give the soil protection of other types of mulch.
Wood cellulose fiber mulch is used in hydroseeding operations and applied as part of the slurry. It creates the best seed-soil contact when applied over the top of (as a separate operation) newly seeded areas. Fiber mulch does not alone provide sufficient protection on highly erodible soils, or during less than favorable growing conditions. Fiber mulch should not be used alone during the dry summer months or when used for late fall mulch cover. Use straw mulch during these periods and fiber mulch may be used to tack (anchor) the straw mulch. Fiber mulch is well suited for steep slopes, critical areas and areas susceptible to wind.

b. Chemical Mulches, Soil Binders and Tackifiers
A wide range of synthetic spray on materials are marketed to stabilize and protect the soil surface. These are mixed with water and sprayed over the mulch and to the soil. They may be used alone in some cases as temporary stabilizers, or in conjunction with fiber mulch, straw or hay.
When used alone most chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have.

c. Specifications
From Table IV-6 select the type of mulch and rate of application that will best suit the conditions at the site.

d. Anchoring
Depending on the field situation, mulch may not stay in place because of wind action or rapid water runoff. In such cases, mulch is to be anchored mechanically or with mulch netting.
1. Mechanical Anchoring
Apply mulch and pull mulch anchoring tool over the mulch. When a disk is used set the disk straight and pull across slope. Mulch material should be tucked into the soil about three inches.
2. Mulch netting
Follow manufacturer's recommendation when positioning and stapling the mulch netting in the soil.

Table IV-1
Recommended Seeding Dates

Planting Dates	Suitability
March 1 - April 15 and August 1 - October 1	Best Seeding Periods
April 15 - August 1	HIGH RISK - moisture stress likely
October 1 - December 1	HIGH RISK - freeze damage to young seedlings
December 1 - March 1	Good seeding period. Dormant seeding

Table 2
Acceptable Fertilization Recommendation

Species	N (lbs/ac)	P2O5 (lbs/ac)	Example Rec. (per acre)
Cool Season Grass	40	80	400 lbs. 10-20-20
CS Grass & Legume	30	60	300 lbs. 10-20-20
Temporary Cover	40	40	200 lbs. 19-19-19

Table 3
Temporary Cover

Species	Seeding Rate (lbs/acre)	Optimum Seeding Dates	Drainage	pH Range
Annual Ryegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Poorly	5.5 - 7.5
Field Bromegrass	40	3/1 - 6/15 or 8/15 - 9/15	Well - Mod. Well	6.0 - 7.0
Spring Oats	96	3/1 - 6/15	Well - Poorly	5.5 - 7.0
Sundangrass	40	5/15 - 8/15	Well - Poorly	5.5 - 7.5
Winter Rye	168	8/15 - 10/15	Well - Poorly	5.5 - 7.5
Winter Wheat	180	8/15 - 11/15	Well - Mod. Well	5.5 - 7.0
Japanese Millet	30	6/15 - 8/15	Well	4.5 - 7.0
Redtop	5	3/1 - 6/15	Well	4.0 - 7.5
Annual Ryegrass	26	3/1 - 6/15	Well - Poorly	5.5 - 7.5
Spring Oats	64	3/1 - 6/15	Well - Poorly	5.5 - 7.5

NOTE: *These rates should be increased by 50% if planted April 15 - August 1 and October 1 - March 1.*

Tables IV 1-4 taken from Natural Resources Conservation Service Manual 'Critical Area Planting'

Table 4a
Permanent Seeding Mixture

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
Crownvetch /	10 - 15		
Tall Fescue	30	Well - Mod. Well	5.0 - 7.5
Crownvetch /	10 - 15		
Perennial Ryegrass	20	Well - Mod. Well	5.0 - 7.5
Flatpea or Perennial Pea /	**20**		
Tall Fescue	**15**	**Well - Mod. Well**	**4.0 - 8.0**
Ladino Clover /	30		
Serecia Lespedeza /	25	Well - Mod. Well	4.5 - 7.5
Tall Fescue	2		
Tall Fescue /	*40*		
Ladino Clover /	*3*	*Well - Mod. Well*	*5.0 - 7.5*
Redtop	*3*		
Crownvetch /	10		
Tall Fescue /	20	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Tall Fescue /	40		
Birdsfoot Trefoil /	10	Well - Mod. Well	5.0 - 7.5
Redtop	3		
Serecia Lespedeza /	25		
Tall Fescue /	30	Well - Mod. Well	4.5 - 7.5
Redtop	3		
Redtop /	30		
Tall Fescue /	3	Well - Mod. Well	5.0 - 7.5
Creeping Red	50		
Tall Fescue	*50*	*Well - Poorly*	*4.5 - 7.5*
Perennial Ryegrass /	**10**		
Tall Fescue /	**15**	**Well -Poorly**	**5.8 - 8.0**
Lathco Flatpea *	**20**		

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table 4b
Wildlife and Farm Friendly Seed Mixtures

Species/Mixture	Seeding Rate (lbs/acre)	Soil Drainage preference	pH Range
KY Bluegrass /	20		
Redtop /	3	Well - Mod. Well	5.5 - 7.5
Ladino Clover or Birdsfoot Trefoil	2 / 10		
Timothy /	5	Well - Mod. Well	6.5 - 8.0
Alfalfa	12		
Timothy /	5	Well - Poorly	5.5 - 7.5
Birdsfoot Trefoil	8		
Orchardgrass /	*10*		
Ladino Clover /	*2*	*Well - Mod. Well*	*5.5 - 7.5*
Redtop	*3*		
Orchardgrass /	*10*	*Well - Mod. Well*	*5.5 - 7.5*
Ladino Clover	*2*		
Orchardgrass /	*20*	*Well - Mod. Well*	*5.5 - 7.5*
Perennial Ryegrass	*10*		
Creeping Red Fescue /	**30**	*Well - Mod. Well*	**5.5 - 7.5**
Perennial Ryegrass	**10**		
Orchardgrass or KY Bluegrass	20	Well - Mod. Well	6.0 - 7.5
Birdsfoot Trefoil /	10		
Redtop /	5	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		
Lathco Flatpea */	**30**	**Well - Mod. Well**	**5.5 - 7.5**
Perennial Ryegrass	**20**		
Lathco Flatpea */	30	Well - Mod. Well	5.5 - 7.5
Orchardgrass	20		

** 'Lathco' Flatpea is potentially poisonous to some livestock. All legumes should be planted with proper inoculants prior to seeding. For unprepared seedbeds or seeding outside the optimum timeframe, add 50% more seed to the specified rate.*

Mixtures listed in bold are suitable for use in shaded woodland settings; those in italics are suitable for use in filter strips.

Table IV-5
Lime and Fertilizer Application Table

pH of Soil	Lime in Tons per Acre	Fertilizer, Lbs., per Acre (10-20-20 or Equivalent)
Above 6.0	2	500
5.0 to 6.0	3	500
Below 5.0	4	500

The pH can be determined with a portable pH testing kit or by sending the soil samples to a soil testing laboratory. When 4 tons of lime per acre are applied it must be incorporated into the soil by disking, backblading or tracking up and down the slope.

Table IV-6
Mulch Materials Rates and Uses

Material	Minimum Rates per acre	Coverage	Remarks
Hay or Straw	2 to 3 Tons	Cover 75% to 90%	Subject to wind blowing or washing unless
	100 to 150 bales	of Surface	tied down
Wood Fiber	1000 to 1500 lbs	Cover all	For hydroseeding
Pulp Fiber		Disturbed Areas	
Wood - Cellulose			
Recirculated Paper			

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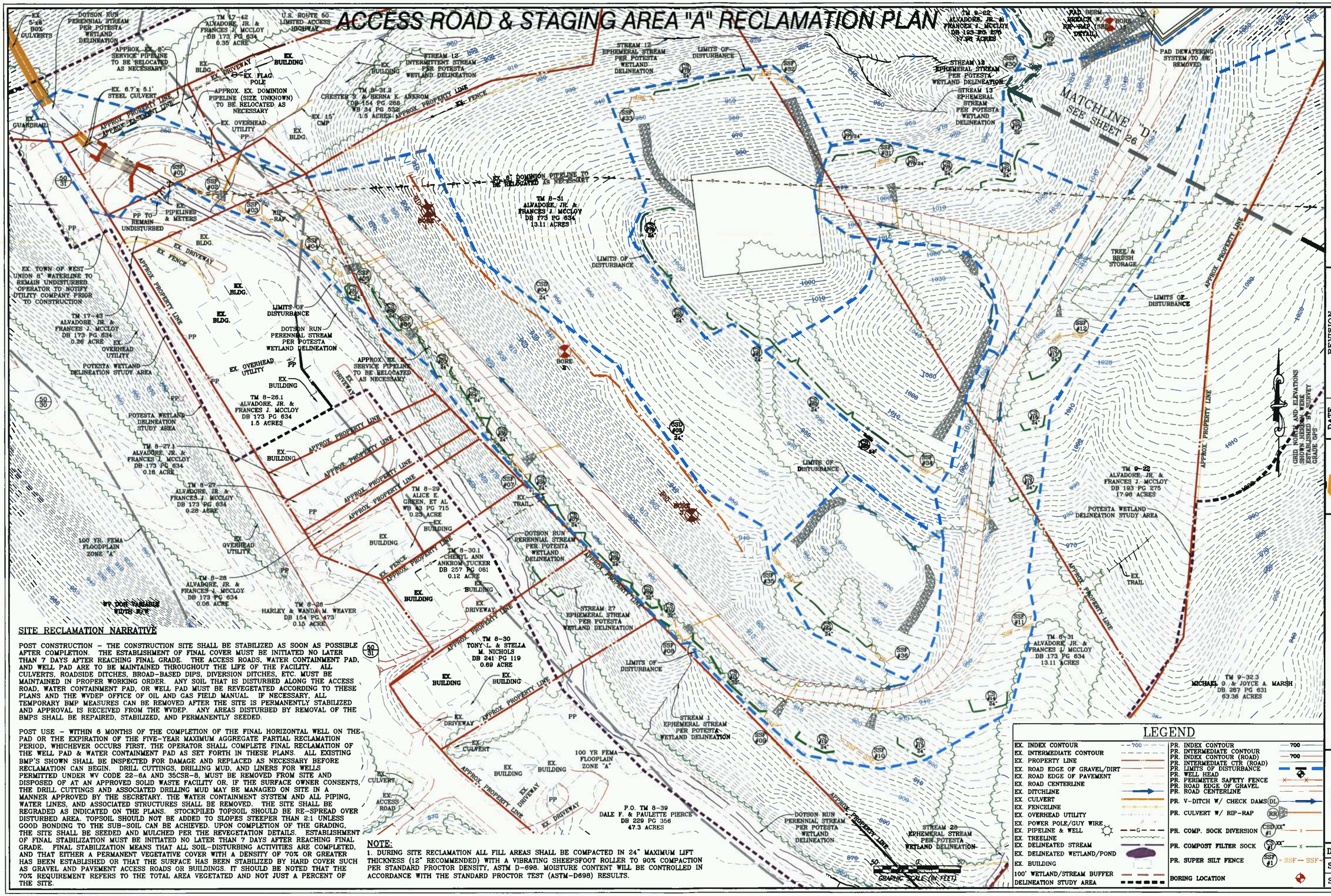
CONSTRUCTION DETAILS

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CRAIG B. KING — REGISTERED — 19578 — STATE OF — WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: N/A
SHEET 24 OF 29

ACCESS ROAD & STAGING AREA "A" RECLAMATION PLAN



SITE RECLAMATION NARRATIVE

POST CONSTRUCTION – THE CONSTRUCTION SITE SHALL BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. THE ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. THE ACCESS ROADS, WATER CONTAINMENT PAD, AND WELL PAD ARE TO BE MAINTAINED THROUGHOUT THE LIFE OF THE FACILITY. ALL CULVERTS, ROADSIDE DITCHES, BROAD-BASED DIPS, DIVERSION DITCHES, ETC. MUST BE MAINTAINED IN PROPER WORKING ORDER. ANY SOIL THAT IS DISTURBED ALONG THE ACCESS ROAD, WATER CONTAINMENT PAD, OR WELL PAD MUST BE REVEGETATED ACCORDING TO THESE PLANS AND THE WVDEP OFFICE OF OIL AND GAS FIELD MANUAL. IF NECESSARY, ALL TEMPORARY BMP MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP. ANY AREAS DISTURBED BY REMOVAL OF THE BMPS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.

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NOTE:

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LEGEND

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ANTERO RESOURCES
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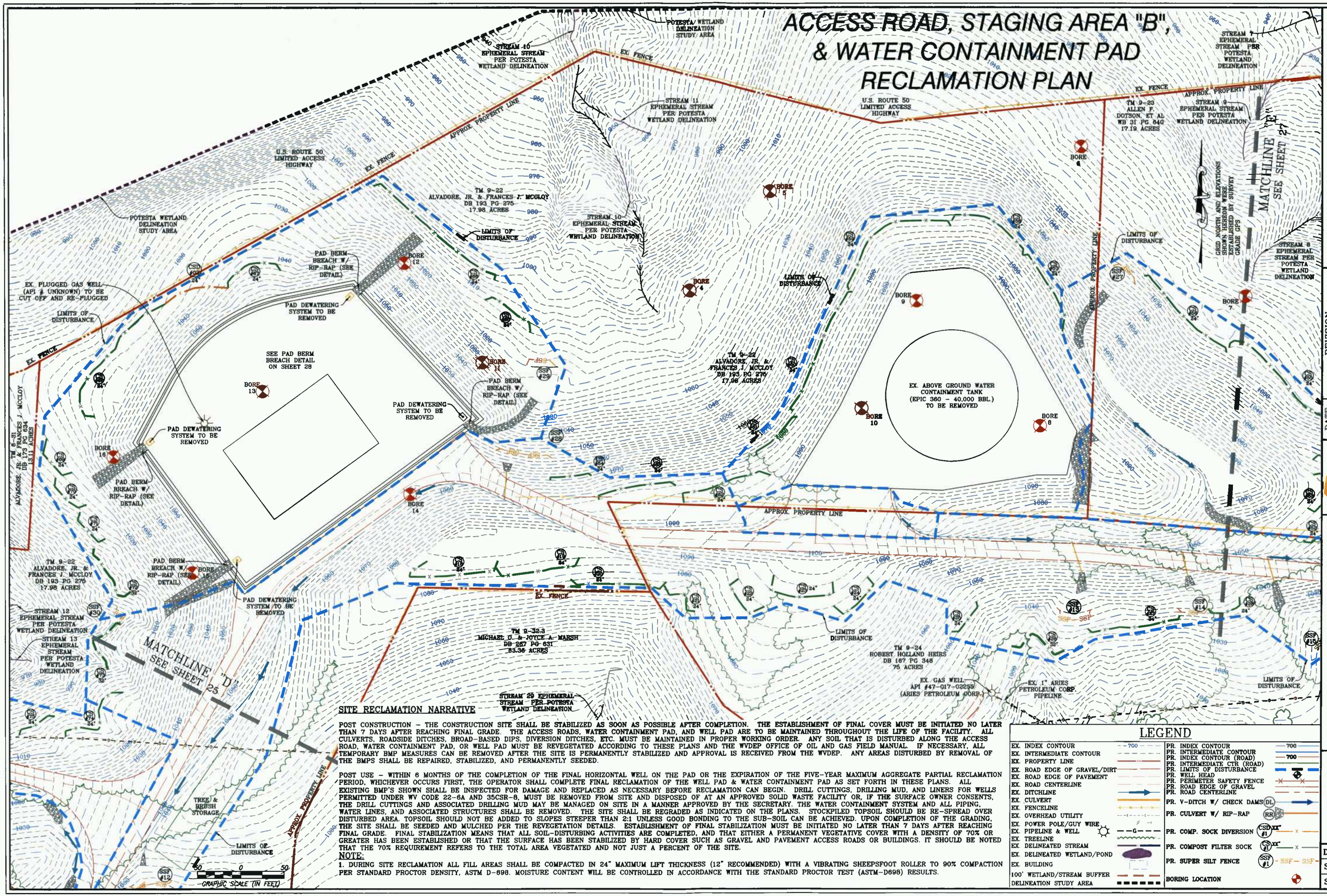
ACCESS ROAD & STAGING AREA "A" RECLAMATION PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

JUSTUS K. KLINE — 21000 — REGISTERED — PROFESSIONAL ENGINEER — STATE OF WEST VIRGINIA
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 25 OF 29

ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD RECLAMATION PLAN



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ANTERO RESOURCES
THIS DOCUMENT WAS PREPARED FOR: ANTERO RESOURCES CORPORATION

ACCESS ROAD, STAGING AREA "B", & WATER CONTAINMENT PAD RECLAMATION PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

CYRUS B. TOMPKINS — 21678 — REGISTERED — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 26 OF 29

ACCESS ROAD RECLAMATION PLAN

SITE RECLAMATION NARRATIVE

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ACCESS ROAD RECLAMATION PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

JUSTIN B. KING — REGISTERED — 15576 — STATE OF WEST VIRGINIA — PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
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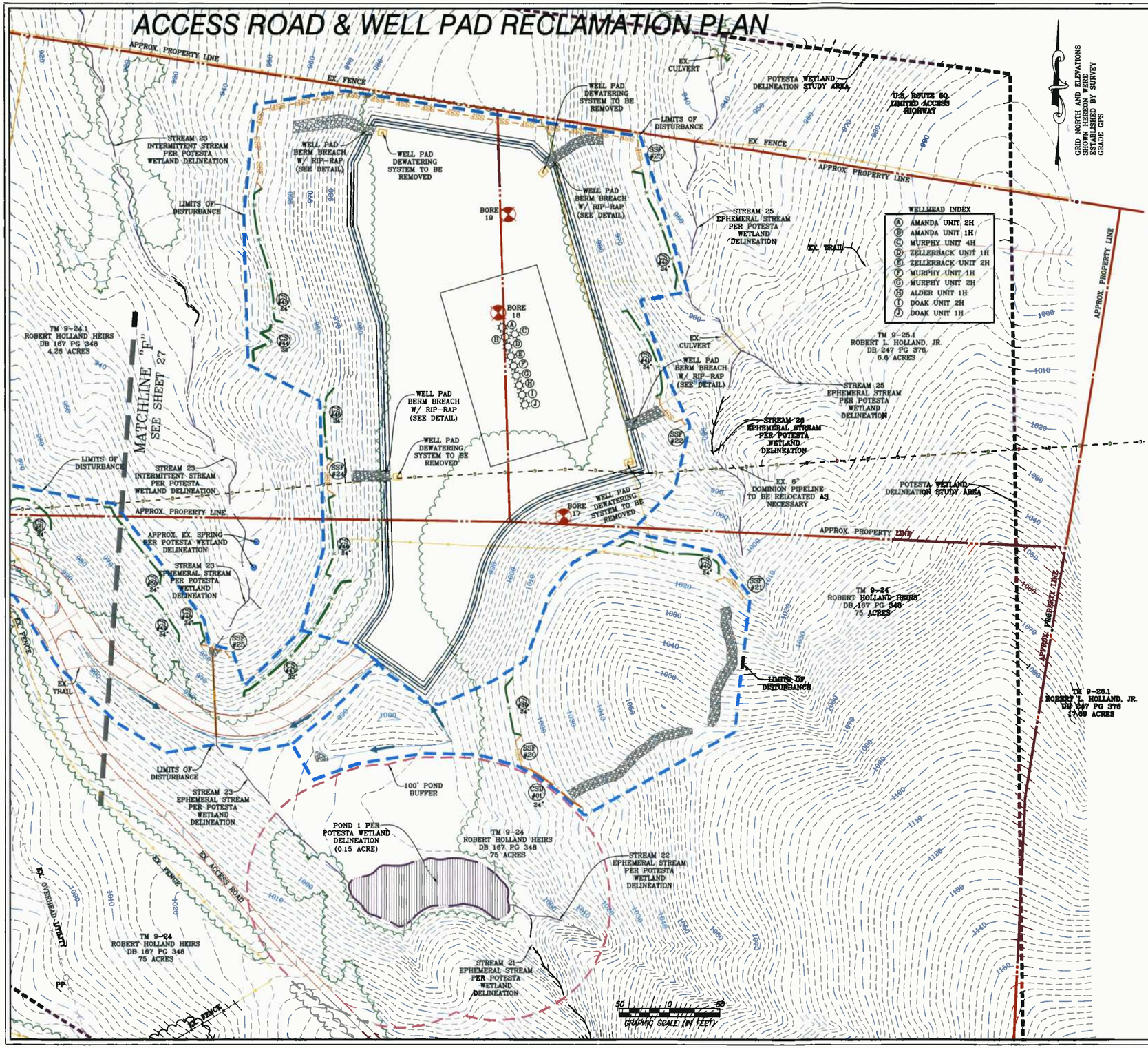
GRAPHIC SCALE (IN FEET) 50 0 50

ACCESS ROAD & WELL PAD RECLAMATION PLAN



SITE RECLAMATION NARRATIVE

POST CONSTRUCTION – THE CONSTRUCTION SITE SHALL BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. THE ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. THE ACCESS ROADS, WATER CONTAINMENT PAD, AND WELL PAD ARE TO BE MAINTAINED THROUGHOUT THE LIFE OF THE FACILITY. ALL CULVERTS, ROADSIDE DITCHES, BROAD-BASED DIPS, DIVERSION DITCHES, ETC. MUST BE MAINTAINED IN PROPER WORKING ORDER. ANY SOIL THAT IS DISTURBED ALONG THE ACCESS ROAD, WATER CONTAINMENT PAD, OR WELL PAD MUST BE REVEGETATED ACCORDING TO THESE PLANS AND THE WVDEP OFFICE OF OIL AND GAS FIELD MANUAL. IF NECESSARY, ALL TEMPORARY BMP MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WVDEP. ANY AREAS DISTURBED BY REMOVAL OF THE BMPS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDED.

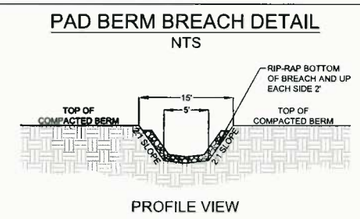
POST USE – WITHIN 6 MONTHS OF THE COMPLETION OF THE FINAL HORIZONTAL WELL ON THE PAD OR THE EXPIRATION OF THE FIVE-YEAR MAXIMUM AGGREGATE PARTIAL RECLAMATION PERIOD, WHICHEVER OCCURS FIRST, THE OPERATOR SHALL COMPLETE FINAL RECLAMATION OF THE WELL PAD & WATER CONTAINMENT PAD AS SET FORTH IN THESE PLANS. ALL EXISTING BMP'S SHOWN SHALL BE INSPECTED FOR DAMAGE AND REPLACED AS NECESSARY BEFORE RECLAMATION CAN BEGIN. DRILL CUTTINGS, DRILLING MUD, AND LINERS FOR WELLS PERMITTED UNDER WV CODE 22-6A AND 35CSR-8, MUST BE REMOVED FROM SITE AND DISPOSED OF AT AN APPROVED SOLID WASTE FACILITY OR, IF THE SURFACE OWNER CONSENTS, THE DRILL CUTTINGS AND ASSOCIATED DRILLING MUD MAY BE MANAGED ON SITE IN A MANNER APPROVED BY THE SECRETARY. THE WATER CONTAINMENT SYSTEM AND ALL PIPING, WATER LINES, AND ASSOCIATED STRUCTURES SHALL BE REMOVED. THE SITE SHALL BE REGRADED AS INDICATED ON THE PLANS. STOCKPILED TOPSOIL SHOULD BE RE-SPREAD OVER DISTURBED AREA. TOPSOIL SHOULD NOT BE ADDED TO SLOPES STEEPER THAN 2:1 UNLESS GOOD BONDING TO THE SUB-SOIL CAN BE ACHIEVED. UPON COMPLETION OF THE GRADING, THE SITE SHALL BE SEEDED AND MULCHED PER THE REVEGETATION DETAILS. ESTABLISHMENT OF FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 70% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY HARD COVER SUCH AS GRAVEL AND PAVEMENT ACCESS ROADS OR BUILDINGS. IT SHOULD BE NOTED THAT THE 70% REQUIREMENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE SITE.

NOTE:

1. DURING SITE RECLAMATION ALL FILL AREAS SHALL BE COMPACTED IN 24" MAXIMUM LIFT THICKNESS (12" RECOMMENDED) WITH A VIBRATING SHEEPSFOOT ROLLER TO 90% COMPACTION PER STANDARD PROCTOR DENSITY, ASTM D-698. MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D698) RESULTS.

PAD BERM BREACH DETAIL

NTS



LEGEND

EX. INDEX CONTOUR	PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR	PR. INTERMEDIATE CONTOUR
EX. PROPERTY LINE	PR. INDEX CONTOUR (ROAD)
EX. ROAD EDGE OF GRAVEL/DIRT	PR. INTERMEDIATE CTR (ROAD)
EX. ROAD EDGE OF PAVEMENT	PR. LIMITS OF DISTURBANCE
EX. ROAD CENTERLINE	PR. WELL HEAD
EX. DITCHLINE	PR. PERIMETER SAFETY FENCE
EX. CULVERT	PR. ROAD EDGE OF GRAVEL
EX. FENCELINE	PR. ROAD CENTERLINE
EX. OVERHEAD UTILITY	PR. V-DITCH W/ CHECK DAMS (DL)
EX. POWER POLE/GUY WIRE	PR. CULVERT W/ RIP-RAP (RR)
EX. PIPELINE & WELL	PR. COMP. SOCK DIVERSION (CSD #1 XX')
EX. TREELINE	PR. COMPOST FILTER SOCK (CS #1 XX')
EX. DELINEATED STREAM	PR. SUPER SILT FENCE (SSF #1)
EX. DELINEATED WETLAND/POND	BORING LOCATION
EX. BUILDING	
100' WETLAND/STREAM BUFFER	
DELINEATION STUDY AREA	

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ANTERO RESOURCES
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ACCESS ROAD & WELL PAD RECLAMATION PLAN

DOTSON HOLLAND
WELL PAD & WATER CONTAINMENT PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY, WEST VIRGINIA

STEPHEN S. TRUMBO — 15678 — STATE OF WEST VIRGINIA — REGISTERED PROFESSIONAL ENGINEER
10/17/2013

DATE: 10/17/2013
SCALE: 1" = 50'
SHEET 28 OF 29