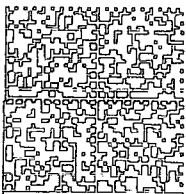


Doddridge Co. Floodplain MGT  
118 E Court St. Room 102  
West Union, WV 26456

**CERTIFIED MAIL™**



7014 0150 0001 7356 9591



015H14161808  
**HASLER**  
**\$6.74**  
07/15/15  
Mailed From 26456

**US POSTAGE**

*PTS*

Equitrans, Inc. #15-369  
100 Allegheny Center Mall  
Pittsburgh, PA 15212

NIXIE 152 DE 1009 0007/23/15

RETURN TO SENDER  
NOT DELIVERABLE AS ADDRESSED  
UNABLE TO FORWARD

BC: 26456126227 \*2271-06055-15-43

152 26456 0126227



PLACE STICKER AT TOP OF ENVELOPE TO THE RIGHT  
OF THE RETURN ADDRESS, FOLD AT DOTTED LINE

**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:

Equitrans, Inc. #15-369  
100 Allegheny Center Mall  
Pittsburgh, PA 15212

2. Article Number

(Transfer from service label)

7014 0150 0001 7356 9591

PS Form 3811, February 2004

Domestic Return Receipt

102595-02-M-1540

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X

- Agent  
 Addressee

B. Received by (*Printed Name*)

C. Date of Delivery

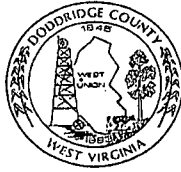
D. Is delivery address different from item 1?  Yes  
If YES, enter delivery address below:  No

3. Service Type

- Certified Mail  Express Mail  
 Registered  Return Receipt for Merchandise  
 Insured Mail  C.O.D.

4. Restricted Delivery? (*Extra Fee*)

Yes



Doddridge County FPM  
118 East Court Street, Suite 102  
West Union, WV 26456

Dear Sir or Ma'am,

You are receiving this letter because you have been identified as a land surface and/or mineral rights owner for property or adjacent property related to the proposed development project identified by the following page.

No action is required of you. This letter is simply to inform you of the proposed development.

If you would like to comment on this proposed project, or would like additional information, you may contact the Doddridge County Floodplain Manager at the above address.

Respectfully yours,

Doddridge County Floodplain Manager  
304.873.2631  
[doddridgecountyfpm@gmail.com](mailto:doddridgecountyfpm@gmail.com)

# Permit Application # 15-369

15-369 – Antero – Central Station Bridge Replacement

Location: Central District/Central Station

39.295935N/80.821517W – Panel 0115C

Received: 07/01/2015

Announced: 07/21/2015

Publication Date: Week of 07/13/2015

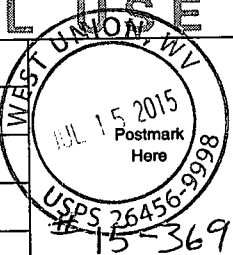
Project Description: Bridge Replacement

7014 0150 0001 7356 9584

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)  
**OFFICIAL USE**

Postage	\$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
<b>Total Postage &amp; Fees</b>	<b>\$ 6.74</b>



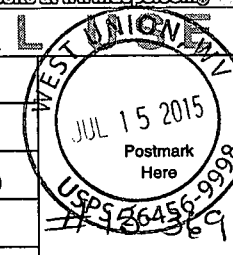
Sent To  
 Lilly Sanders #15-369  
 Street, Apt. No.; or PO Box No. Rt. 1, Box 270A  
 City, State, ZIP+4 West Union, WV 26456  
 PS Form 3800, August 2006 See Reverse for Instructions

7014 0150 0001 7356 9607

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)  
**OFFICIAL USE**

Postage	\$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
<b>Total Postage &amp; Fees</b>	<b>\$ 6.74</b>



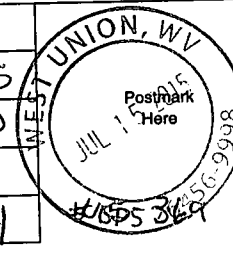
Sent To  
 Terry K & Jo Ann Ross #15-369  
 Street, Apt. No.; or PO Box No. P.O. Box 141  
 City, State, ZIP+4 West Union, WV 26456  
 PS Form 3800, August 2006 See Reverse for Instructions

7014 0150 0001 7356 9621

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)  
**OFFICIAL USE**

Postage	\$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
<b>Total Postage &amp; Fees</b>	<b>\$ 6.74</b>



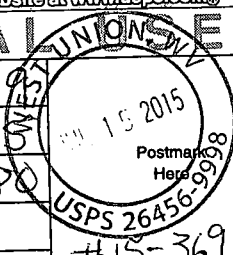
Sent To  
 Ricky A & Albert R Richards #15-369  
 Street, Apt. No.; or PO Box No. Rt. 1, Box 325  
 City, State, ZIP+4 West Union, WV 26456  
 PS Form 3800, August 2006 See Reverse for Instructions

7014 0150 0001 7356 9591

U.S. Postal Service™  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)  
**OFFICIAL USE**

Postage	\$ .49
Certified Fee	3.45
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
<b>Total Postage &amp; Fees</b>	<b>\$ 6.74</b>



Sent To  
 Equitrans, Inc. #15-369  
 Street, Apt. No.; or PO Box No. 100 Allegheny Center Mall  
 City, State, ZIP+4 Pittsburgh, PA 15212  
 PS Form 3800, August 2006 See Reverse for Instructions

**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:

WV Railroad Maintenance #15-369  
 P.O. Box 470  
 Moorefield, WV 26836

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature  
 X *Jammy Cooper*  Agent  Addressee

B. Received by (Printed Name) \_\_\_\_\_ C. Date of Delivery  
 7.22.15

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

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) **7014 0150 0001 7356 8884**

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

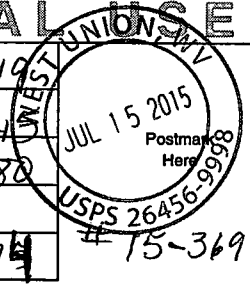
7014 0150 0001 7356 8884

**U.S. Postal Service™**  
**CERTIFIED MAIL™ RECEIPT**  
 (Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at [www.usps.com](http://www.usps.com)®

**OFFICIAL USE**

Postage	\$ .49
Certified Fee	3.40
Return Receipt Fee (Endorsement Required)	2.80
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	\$ 6.79



Sent To WV Railroad Maintenance #15-369  
 Street, Apt. No.; or PO Box No. P.O. Box 470  
 City, State, ZIP+ Moorefield, WV 26836

**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:

Ricky A & Albert R Richards #15-369  
 Rt. 1, Box 325  
 West Union, WV 26456

2. Article Number

*(Transfer from service label)*

7014 0150 0001 7356 9621

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

x *Aresa Longe* Agent AddresseeB. Received by (*Printed Name*)

C. Date of Delivery

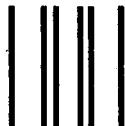
7-16-15

D. Is delivery address different from item 1?  YesIf 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

UNITED STATES POSTAL SERVICE



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

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

Doddridge Co. Floodplain MGT  
118 E Court St. Room 102  
West Union, WV 26456

H.A. ROBERTS  
COUNTY CLERK  
BOE COUNTY, WV

2015 JUL 17 AM 11:10

FILED

**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:

Lilly Sanders #15-369  
 Rt. 1, Box 270A  
 West Union, WV 26456

2. Article Number

*(Transfer from service label)*

7014 0150 0001 7356 9584

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X

A J Sanders

 Agent AddresseeB. Received by (*Printed Name*)

C. Date of Delivery

7-26-15

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



UNITED STATES POSTAL SERVICE



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

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

Doddridge Co. Floodplain MGT  
118 E Court St. Room 102  
West Union, WV 26456

5TH A. M. 2015  
COUNTY CLERK  
DODDRIDGE COUNTY, W.

2015 JUL 17 AM 11:10

FILED

**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:

Terry K & Jo Ann Ross #15-369  
 P.O. Box 141  
 West Union, WV 26456

2. Article Number

*(Transfer from service label)*

7014 0150 0001 7356 9607

**COMPLETE THIS SECTION ON DELIVERY**

A. Signature

X

 Agent AddresseeB. Received by (*Printed Name*)~~J. Ross~~ JO ANN ROSS

C. Date of Delivery

7-21-5

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

UNITED STATES POSTAL SERVICE



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

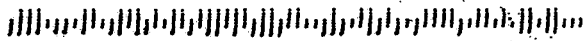
• Sender: Please print your name, address, and ZIP+4 in this box. •

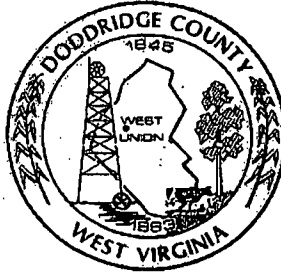
Doddridge Co. Floodplain MGT  
118 E Court St. Room 102  
West Union, WV 26456

70668  
CLERY  
COUNTY, WV

2015 JUL 23 AM 10:54

FILED





# Commercial/Industrial Floodplain Development Permit

## Doddridge County, WV Floodplain Management

This permit has been issued to ANTERO RESOURCES, and is for the approved commercial and/or industrial development project associated with this permit that impacts the FEMA-designated floodplain and/or floodway of Doddridge County, WV, pursuant to the rules and regulations established by all applicable Federal, State and local laws and ordinances, including the Doddridge County Floodplain Ordinance. This permit must be posted at the site of work as to be clearly visible, and must remain posted during entirety of development.

**Permit #: 15-369**

**Date Approved: 8/10/2015**

**Expires: 8/10/2016**

**Issued to: ANTERO RESOURCES**

**POC: RACHEL GRZYBEK  
(304)842-4008**

**Company Address: 1615 Wynkoop Street Denver, CO 80202**

**Project Address: CENTRAL STATION AT ARNOLD CREEK, West Union, WV 26456**

**Firm: 54017C0115C**

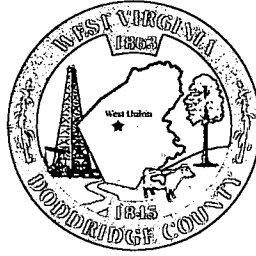
**Lat/Long: 39.295935N/80.821517W**

**Purpose of development: CENTRAL STATION BRIDGE REPLACEMENT**

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

**Date: August 10, 2015**

For additional information regarding this permit, please contact  
Doddridge County Floodplain Manager at 304.873.2631, or via email at  
doddridgecountyfpm@gmail.com  
118 East Court Street; West Union, WV 26456



Doddridge County Office of Emergency Management

March 29, 2016

Antero Resources

535 White Oaks Blvd

Bridgeport, WV 26330

ATTN: Rachel Gryzbek

In reference to your request for an extension for construction of the Central Station Bridge Replacement (permit #15-369) in Doddridge County, WV. Based on the Doddridge County Floodplain Ordinance **Section 7.6 Start of Construction**. It has been proven that there was a "Justifiable Delay" in construction based on your letter dated March 29, 2016. An extension for start of construction has been approved for 180 days from this date, March 29, 2016.

If you have any questions please do not hesitate to contact our office

Thank You,

George Eidel

Emergency Manager/Floodplain Manager

Doddridge County, WV.



Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jul-15-2015	105197	\$500.00

INV #	INV DATE	DESCRIPTION	AMOUNT	DISCOUNTS	NET AMOUNT
KAD7142015CSB	07/14/15	PERMIT FEE - CENTRAL STATION BRIDGE	500.00	0.00	500.00

## Doddridge County, West Virginia

RECEIPT NO: 5157

DATE: 2015/07/23

FROM: ANTEREO RESOURCES

AMOUNT: \$ 500.00

FIVE HUNDRED DOLLARS AND 00 CENTS

**FOR: #15-369 CENTRAL STATION BRIDGE**

00000105197 FP-BUILDING PERMITS

020-318

**TOTAL: \$500.00**

MICHAEL HEADLEY

**SHERIFF & TREASURER**

MEC

**CLERK**

Customer Copy

*# 15-369*

TOTAL INVOICES PAID =====>

500.00

0.00

500.00

DETACH AND RETAIN FOR TAX PURPOSES



**ANTERO RESOURCES CORPORATION**  
 1615 WYNKOOP STREET  
 DENVER, COLORADO 80202

Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jun-30-2015	104113	\$1,927.65

INV #	INV DATE	DESCRIPTION	AMOUNT	DISCOUNTS	NET AMOUNT
KAD6242015C	06/24/15	CENTRAL STATION BRIDGE REPLACEMENT	1,927.65	0.00	1,927.65

## Doddridge County, West Virginia

RECEIPT NO: 5144

DATE: 2015/07/21

FROM: ANTERO RESOURCES CORPORATION AMOUNT: \$ 1,927.65

ONE THOUSAND NINE HUNDRED TWENTY SEVEN DOLLARS AND 65 CENTS

FOR: #15-369 CENTRAL STATION BRIDGE REPLACEMENT

00000104113 FP-BUILDING PERMITS

020-318

TOTAL: \$1,927.65

MICHAEL HEADLEY

SHERIFF & TREASURER

MEC

CLERK

Customer Copy

TOTAL INVOICES PAID ==>

1,927.65

0.00

1,927.65

DETACH AND RETAIN FOR TAX PURPOSES

**Doddridge County Flood Plain Application Fee Calculator (if in Flood Plain)****Central Station Bridge Replacement**

Estimated Construction Costs	\$385,530.00
Amount over \$100,000	\$285,530.00
Drilling Oil and Gas Well Fee	\$500.00
\$5 per \$1,000 over \$100,000	\$1,427.65
Amount Due with application	\$1,927.65



**ANTICIPATED PAYMENT SUMMARY**

<b>CENTRAL STATION ANTERO</b>						
WORK/MONTH	prior to work	2 weeks	4 weeks	6 weeks	8 weeks	10 weeks
MOBILIZATION	\$35,600.00	\$17,800.00	\$17,800.00			
CLEAR AND GRUBB	\$8,430.00	\$ 8,430.00				
TRAFFIC CONT	\$5,460.00	\$1,092.00	\$1,092.00	\$1,092.00	\$1,092.00	\$1,092.00
BOX BEAM FAB	\$150,600.00					
ABUT 1	\$43,145.00		\$21,572.00	\$21,573.00		
ABUT 2	\$43,145.00		\$21,572.00	\$21,573.00		
SET BOX BEAMS	\$40,517.00				\$40,517.00	
SELECT BACKFILL	\$4,805.00				\$4,805.00	
GUARDRAIL	\$9,820.00				\$4,910.00	\$4,910.00
DEMOLITION	\$15,400.00	\$15,400.00				
ROADWAY	\$16,329.00					\$16,329.00
E&S AND SEED	\$4,187.00	\$838.00	\$838.00	\$838.00	\$838.00	\$835.00
LAYOUT	\$3,682.00	\$735.00	\$735.00	\$735.00	\$735.00	\$742.00
ROCK BORROW	\$4,410.00			\$ 4,410.00		
<b>MONTHLY TOTALS</b>	<b>\$385,530.00</b>					
<b>TWO WEEK PAYMENTS</b>		<b>\$44,295.00</b>	<b>\$63,609.00</b>	<b>\$50,221.00</b>	<b>\$52,897.00</b>	<b>\$23,908.00</b>
<b>PRIOR TO START</b>	<b>\$ 150,600.00</b>					<b>\$385,530.00</b>



**Antero Resources**  
535 White Oaks Blvd.  
Bridgeport, WV 26330  
Office 304.842.4100  
Fax 304.842.4102

March 29, 2016

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

Mr. Eidel:

Antero Resources Corporation would like to request an **extension** for the *Central Station Bridge Replacement* (#15-369) in Doddridge County, West Union District. Due to the wait time for ACOE approval, the project's 180 day construction deadline expired as of approximately 2/10/2016. Now that we received all necessary permits, we are ready to proceed with construction.

Enclosures:

- ❖ Central Station Bridge Replacement Permit #15-369
- ❖ ACOE Verification Letter

If you have any questions please feel free to contact me at (304) 842-4008.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "Rachel Grzybek".

Rachel Grzybek  
Environmental Specialist II  
Antero Resources Corporation



DEPARTMENT OF THE ARMY  
HUNTINGTON DISTRICT, CORPS OF ENGINEERS  
502 EIGHTH STREET  
HUNTINGTON, WEST VIRGINIA 25701-2070

March 29, 2016

REPLY TO  
ATTENTION OF

Regulatory Division  
Energy Resource Branch  
LRH-2015-00960-OHR-Arnold Creek

Mr. Cole Kilstrom  
Antero Resource Corporation  
1615 Wynkoop Street  
Denver, Colorado 80202

Dear Mr. Kilstrom:

I refer to the pre-construction notification (PCN), submitted on your behalf by Allstar Ecology LLC., regarding the Central Station Bridge Replacement Project. You have requested a Department of the Army (DA) authorization to discharge dredged and/or fill material into waters of the United States in association with the Central Station Bridge Replacement Project. The project is located along Arnold Creek Road (County Road 1/10), in Central Station, Doddridge County, West Virginia (39.295906°N, 80.821324°W). Arnold Creek is a tributary of the Ohio River, a traditional navigable water (TNW) of the United States. This PCN has been assigned the following file number: LRH-2015-00960-OHR-Arnold Creek. Please reference this file number on all future correspondence related to this project.

The United States Army Corps of Engineers (Corps) authority to regulate waters of the United States is based, in part, on the definitions and limits of jurisdiction contained in 33 CFR 328 and 33 CFR 329. Section 404 of the Clean Water Act (Section 404) requires that a DA permit be obtained prior to the discharge of dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 (Section 10) requires that a DA permit be obtained for any work in, on, over or under a navigable water.

Based on a review of the aquatic resources in the PCN, one (1) stream (Stream 1: Arnold Creek), totaling 343 linear feet (lf), and one (1) Wetland (Wetland 1), totaling 0.27 acre, are located within the preliminary jurisdictional delineation (JD) boundary, as described in the enclosed preliminary JD Form. These on-site aquatic resources **may** be waters of the United States in accordance with the Regulatory Guidance Letter for JDs issued by the Corps on June 26, 2008 (Regulatory Guidance Letter No. 08-02). As indicated in the guidance, this preliminary JD is non-binding and cannot be appealed (33 CFR 331.2) and only provides a written indication that waters of the United States may be present on-site.

You have declined to exercise the option to obtain an approved JD in this instance and at this time. However, for the purposes of the determination of impacts, compensatory mitigation, and

other resource protection measures for activities that require authorization from this office, the stream and wetland referenced above will be evaluated as if they are waters of the United States.

Enclosed please find two (2) copies of the preliminary JD form. If you agree with the findings of this preliminary JD and understand your options regarding the same, please sign and date one copy of the preliminary JD form and return it to this office within 30 days of receipt of this letter. You should submit the signed copy to via email to [Audrey.M.Richter@usace.army.mil](mailto:Audrey.M.Richter@usace.army.mil) or to the following address:

United States Army Corps of Engineers  
Huntington District, Regulatory Division  
Attn: Ms. Audrey Richter (LRH-2015-00960)  
502 8th Street  
Huntington, West Virginia 25701

The proposed project, as described in the submitted information, has been reviewed in accordance with Section 404 and Section 10 o. Based on your description of the proposed work, and other information available to us, it has been determined that this project will not involve activities subject to the requirements of Section 10. However, this project will include the discharge of dredged or fill material into waters of the United States subject to the requirements of Section 404.

As described in the PCN, the proposed project will include the discharge of dredged and/or fill material into 40 lf of Arnold Creek (0.002 acre) in association with the Central Station Bridge Replacement Project. The proposed bridge structure will consist of an 84-foot long by 27-foot wide steel and concrete single-span deck, abutments, and a superstructure that will include 4-foot walls. According to the submitted information, the existing bridge abutments will be left in place to provide erosion protection. The existing center pier will be removed as the proposed bridge will span the stream. The proposed bridge abutments will be constructed along the stream bank and behind (landward) the existing bridge abutments. Approximately 12 cubic yards of fill material will be discharged below the ordinary high water mark of Arnold Creek as a result of the bridge abutment construction. You has also indicated that project construction will be conducted from existing staging areas and a temporary construction pad will not be required.

Based on your description of the proposed work, it has been determined the proposed discharge of dredged and/or fill material into waters of the United States for the construction of the Central Station Bridge Replacement Project meets the criteria for authorization under Nationwide Permit (NWP) #3 (enclosed) under the February 21, 2012 Federal Register, Notice of Reissuance of NWPs (77 FR 10184), provided you comply with all terms and conditions of the enclosed material, the enclosed special conditions, and the 401 Water Quality Certification (WQC) issued by the West Virginia Department of Environmental Protection (WVDEP). A copy of this NWP can be found on our website at <http://www.lrh.usace.army.mil/Missions/Regulatory.aspx>.

In view of the above, your bridge replacement project is authorized subject to the terms and conditions of the enclosed material and the enclosed special conditions. It is your responsibility to ensure that your work conforms to all of the environmental management conditions listed within the enclosed material. Please be aware this NWP verification does not obviate the requirement to obtain any state or local assent required by law for the activities.

This verification is valid until the expiration date of the NWPs, unless the NWP authorization is modified, suspended, or revoked. The verification will remain valid if the NWP authorization is reissued without modification or the activity complies with any subsequent modification of the NWP authorization. All of the existing NWPs are scheduled to be modified, reissued, or revoked on March 18, 2017. Prior to this date, it is not necessary to contact this office for re-verification of your project unless the plans for the proposed activity are modified. Furthermore, if you commence or under contract to commence this activity before March 18, 2017, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

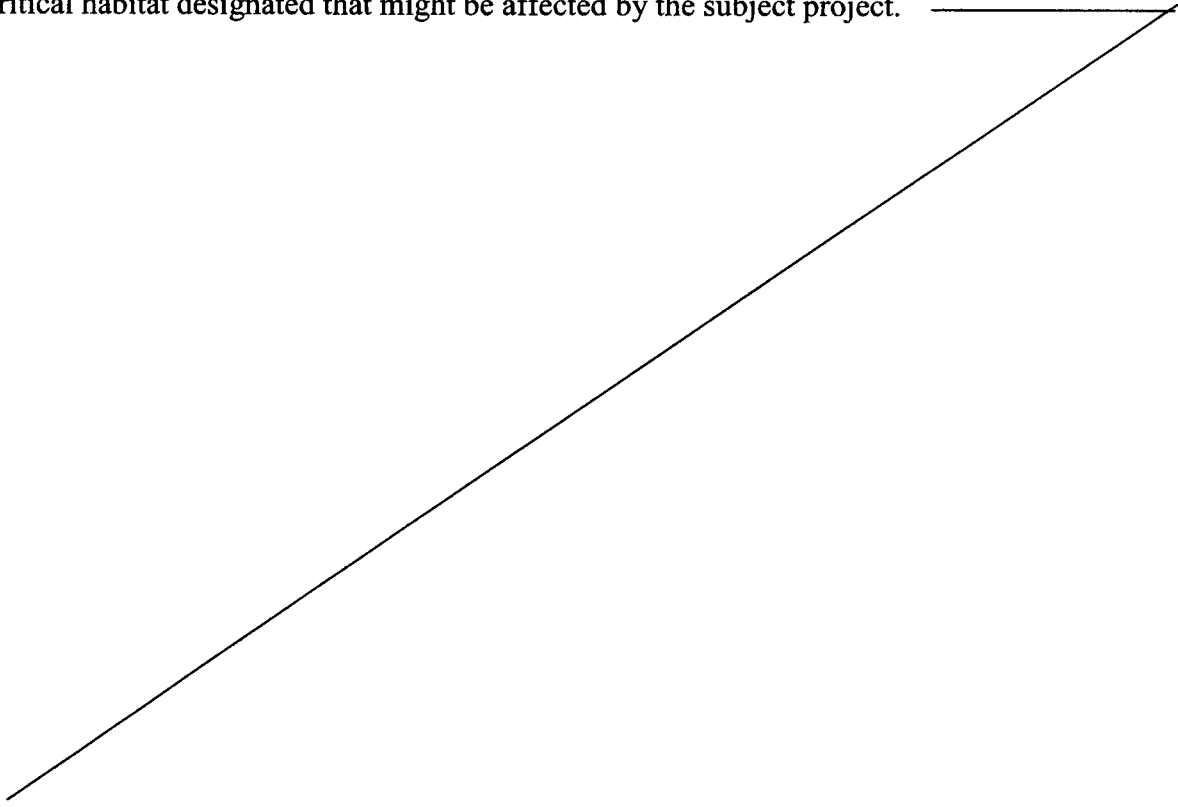
A copy of this NWP verification letter and the NWP must be supplied to your project engineer responsible for construction activities and kept at the site during construction. Upon completion of the work, the enclosed certification must be signed and returned to this office. If you have any questions concerning the above, please contact Ms. Audrey Richter at (304) 399-5257 or by email at [Audrey.M.Richter@usace.army.mil](mailto:Audrey.M.Richter@usace.army.mil).

Sincerely,

Teresa Spagna  
Chief, North Branch

Enclosures

**Nationwide Permit 3 Verification Special Conditions**  
**Antero Resources Corporation**  
**Central Station Bridge Replacement Project**  
**LRH-2015-00960-OHR-Arnold Creek**  
**Page 1 of 1**

1. This nationwide permit verification authorizes the discharge of dredged and/or fill material into approximately 40 linear feet (0.002 acre) of Arnold Creek associated with the Central Station Bridge Replacement Project. All work will be done in accordance with the drawings submitted with the permittee's Pre-Construction Notification.
  2. To mitigate for adverse effects to historic properties, you must comply with all stipulations set forth in the Memorandum of Agreement (MOA) Among The United States Army Corps of Engineers, Huntington District (Corps), The West Virginia State Historic Preservation Office (SHPO), and The Antero Resources Corporation (Applicant), dated 22 March 2016.
  3. Should new information regarding the scope and/or impacts of the project become available that was not submitted to this office during our review of the proposal, the permittee must submit written information concerning proposed modification(s) to this office for review and evaluation, as soon as practicable.
  4. Section 7 obligations under Endangered Species Act must be reconsidered if new information reveals impacts of the project that may affect federally listed species or critical habitat in a manner not previously considered or new species are listed or critical habitat designated that might be affected by the subject project.
- 



George Eidel &lt;doddridgecountyfpm@gmail.com&gt;

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**Fw: Public Notice 1-West Virginia**

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m b &lt;miri\_beram@yahoo.com&gt;

Tue, Jan 26, 2016 at 5:47 PM

Reply-To: m b &lt;miri\_beram@yahoo.com&gt;

To: George Eidel &lt;doddridgecountyfpm@gmail.com&gt;

Cc: Ralph Sandora &lt;ralphsandora@gmail.com&gt;, Travis Ronnie &lt;ronleetravis@gmail.com&gt;, Gregory Robinson &lt;wvrobby@hughes.net&gt;, "Anthony L. Lopez" &lt;anthony.l.lopez@wv.gov&gt;

Mr. Eidel,

Has Antero applied for a flood plain permit for this project?

It IS in the floodplain.

Thank you,  
Mirijana Beram

— Forwarded Message —

**From:** "Roberts, Stormie LRH" <Stormie.Roberts@usace.army.mil>**To:** DLL-CELRH-Public Notice <DLLCELRHPublicNotice@usace.army.mil>; DLL-CELRH-Public Notices West Virginia <publicnoticeswestVA@usace.army.mil>**Sent:** Tuesday, January 26, 2016 3:26 PM**Subject:** Public Notice 1-West Virginia

Please use the following link to view the latest public notice for West Virginia

LRH 2015-0960-OHR

Antero Resources Corporation

<http://www.lrh.usace.army.mil/Missions/Regulatory/PublicNotices/tabid/4125/Article/644488/lrh-2015-0960-ohr.aspx>

## FIELD OBSERVATIONS:

Arnold Creek is misaligned with the existing bridge as the stream flows into the pier and abutment 1. Due to this misalignment, a gravel bar has been deposited upstream of the bridge. The pier catches debris during periods of flooding. Scouring has occurred under the structure, but not at the substructure units. Large stone rip rap has been placed around the upstream abutment and wingwalls to protect against scour. Substructure units are founded on rock and there is no indication of scour beneath the footings.

Located approximately 70 feet downstream of the existing bridge is a railroad bridge now a part of the rails to trails system. The substructure units of this bridge project into the stream and restrict flow.

The Manning's "n" values were selected from the WVDOH Drainage Manual Table 7-3 for the channel and banks based on field observation. Values ranged from 0.03 to 0.045 for the left and right overbank and a value of 0.035 for the channel. It was observed that some of the stream banks both upstream and downstream exhibit signs of erosion but appear to be stable. The remaining stream banks are covered in vegetation and trees.

The DS-34 dated September 16, 1993 indicated the bridge has scour potential, but is low risk. Visual observation of the abutments verifies the absence of scour or undercutting. There was significant debris build up on the pier during our visit.

## PHOTOGRAPHS:



**Central Station Bridge, facing west**





**Arnold Creek, downstream view**



**Central Station Bridge, Arnold Creek, upstream view**



**Central Station Bridge, facing east**





**Central Station Bridge, Arnold Creek – April 10, 2015**



**Central Station Bridge, Arnold Creek – April 10, 2015**



**Central Station Bridge, Arnold Creek – April 10, 2015**



**Central Station Bridge, Arnold Creek – April 10, 2015**



**Antero Resources**  
535 White Oaks Blvd.  
Bridgeport, WV 26330  
Office 304.842.4100  
Fax 304.842.4102

June 18, 2015

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

Mr. Wriston:

Antero Resources Corporation (Antero) would like to submit a Doddridge County floodplain permit application for our Central Station Bridge Replacement. Our project is located in Doddridge County, McClellan District where the bridge will be located at coordinates 39.295935N, 80.821517W. Per the FIRM Map #54017C0115C, this location is in the floodplain.

Attached you will find the following:

- Doddridge County Floodplain Permit Application
- H&H Study
- Property Owner Information
- WV Flood Tool Map
- FIRM Map

If you have any questions please feel free to contact me at (304) 842-4008.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "Rachel Grzybek".

Rachel Grzybek  
Floodplain Engineer  
Antero Resources Corporation

Enclosures

**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.**

APPLICANT'S SIGNATURE  \_\_\_\_\_

DATE 6/18/15

**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: Randy Kioberdanz

ADDRESS: 1615 Wynkoop Street, Denver, CO 80202

TELEPHONE NUMBER: (303) 357-7310



**BUILDER'S NAME:** Antero Resources Corporation  
**ADDRESS:** 1615 Wynkoop Street, Denver, CO 80202  
**TELEPHONE NUMBER:** (303)-357-7310

**ENGINEER'S NAME:** \_\_\_\_\_  
**ADDRESS:** \_\_\_\_\_  
**TELEPHONE NUMBER:** \_\_\_\_\_

**PROJECT LOCATION:**

**NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT)** Please see Surface Owner Table  
**ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT)** Please see Surface Owner Table  
**DISTRICT:** \_\_\_\_\_  
**DATE/FROM WHOM PROPERTY PURCHASED:** \_\_\_\_\_  
**LAND BOOK DESCRIPTION:** Please see Surface Owner Table  
**DEED BOOK REFERENCE:** Please see Surface Owner Table  
**TAX MAP REFERENCE:** Please see Surface Owner Table  
**EXISTING BUILDINGS/USES OF PROPERTY:** None  
**NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY** Please see Surface Owner Table  
**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**

- |                                     |                         |                          |                                  |
|-------------------------------------|-------------------------|--------------------------|----------------------------------|
| <input checked="" type="checkbox"/> | New Structure           | <input type="checkbox"/> | Residential (1 – 4 Family)       |
| <input type="checkbox"/>            | Addition                | <input type="checkbox"/> | Residential (more than 4 Family) |
| <input type="checkbox"/>            | Alteration              | <input type="checkbox"/> | Non-residential (floodproofing)  |
| <input type="checkbox"/>            | Relocation              | <input type="checkbox"/> | Combined Use (res. & com.)       |
| <input type="checkbox"/>            | Demolition              | <input type="checkbox"/> | Replacement                      |
| <input type="checkbox"/>            | Manufactured/Mobil Home |                          |                                  |

**B. OTHER DEVELOPMENT ACTIVITIES:**

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

**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 \$ 385,530.00**

**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 landowner  
**ADDRESS:** information  
\_\_\_\_\_

**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:** Please see attached landowner  
**ADDRESS:** information  
\_\_\_\_\_

**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.

Property Owner Table-Doddridge County Floodplain Permit  
 Antero Resources Corporation-Central Station Bridge Replacement

15-369.

Property Owner Name	Mailing Address	Parcel ID	Deed Book Reference
<b>Host Properties-Inside Floodplain</b>			
WV Railroad Maintenance	P.O. Box 470, Moorefield, WV 26836	1-7-94	Book 216, Page 166
Lipscomb Ronna J	Rt 1 Box 270A, West Union, WV 26456	1-7-62	Book 199, Page 764
<b>Properties Abutting Host Properties-Inside Floodplain</b>			
Equitrans Inc.	100 Allegheny Center Mall, Pittsburgh, PA 15212	1-7-13	Book 87, Page 92
Ross Terry K & Jo Ann	Box 141, West Union, WV 26456 <i>P.O. Box 141</i>	1-7-70	Book 264, Page 21
America Ricky A Etux & Albert R Richards Etux	Rt 1 Box 325, West Union, WV 26456	1-7-70.2	Book 238, Page 88

- (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): Randy Kloberdanz

SIGNATURE:  DATE: 6/18/15

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: \_\_\_\_\_  
 Dated: \_\_\_\_\_

- Is **NOT** located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and **NO FLOODPLAIN DEVELOPMENT PERMIT IS REQUIRED**).
- Is located in Special Flood Hazard Area.  
 FIRM zone designation \_\_\_\_\_  
 100-Year flood elevation is: \_\_\_\_\_ NGVD (MSL)
- Unavailable
- The proposed development is located in a floodway.  
 FBFM Panel No. \_\_\_\_\_ Dated \_\_\_\_\_
- See section 4 for additional instructions.

SIGNED \_\_\_\_\_

DATE \_\_\_\_\_

**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:

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**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** \_\_\_\_\_

# WV Flood Map



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

### User Notes:

Map created on June 15, 2015

### Flood Hazard Area:

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

**FEMA Issued Flood Map:** 54017C0115C

**Watershed (HUC8):** Little Musringum-Middle Island (5

**Elevation:** About 780 ft

**Location (long, lat):** (80.821522 W, 39.295909 N)

**Location (UTM 17N):** (515390, 4349629)

**Contacts:** Doddridge

**CRS Information:** N/A

**Parcel Number:**

 Flood Hazard Zone

 Flood Point of Interest

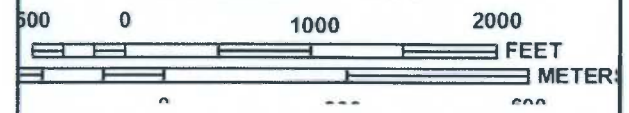
### Disclaimer:

The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at [www.msc.fema.gov](http://www.msc.fema.gov). *WV Flood Tool (<http://www.MapWV.gov/flood>) is supported by FEMA, WV NFIP Office, and WV GIS Technical Center.*





MAP SCALE 1" = 1000'



295000 FT

290000 FT

**NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0115C

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**DODDRIDGE COUNTY,**  
**WEST VIRGINIA**  
**AND INCORPORATED AREAS**

PANEL 115 OF 325  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0115	C

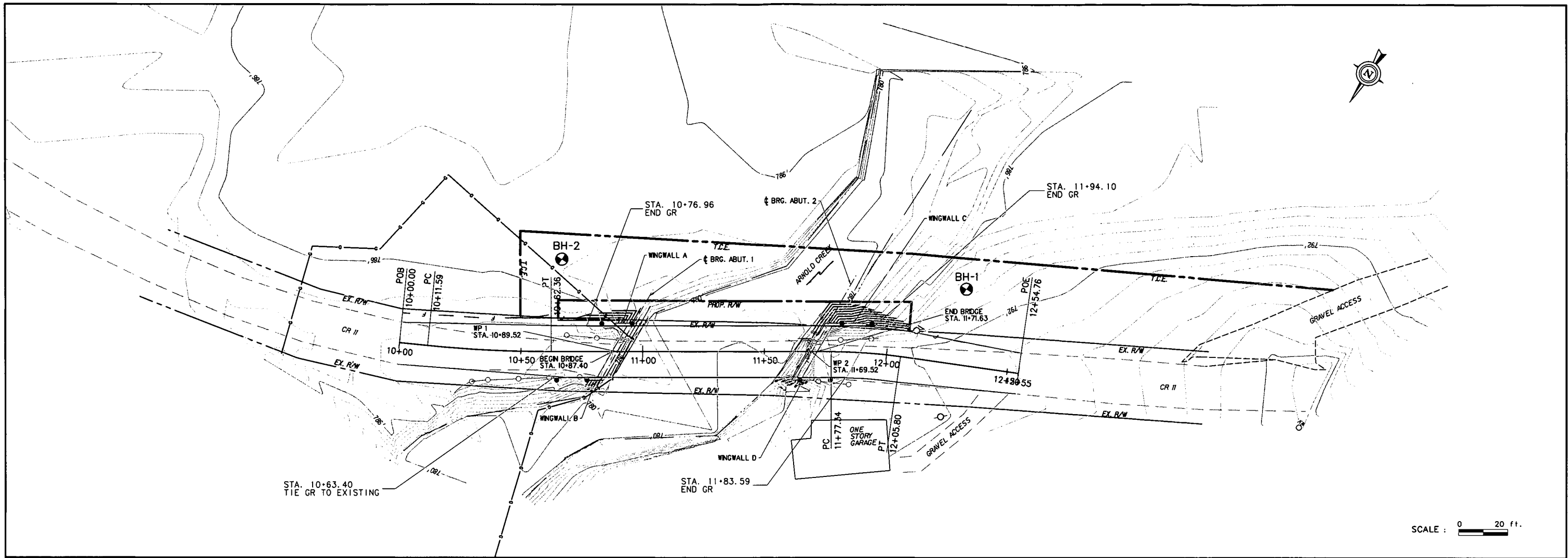
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



**MAP NUMBER**  
**54017C0115C**  
**MAP REVISED**  
**OCTOBER 4, 2011**

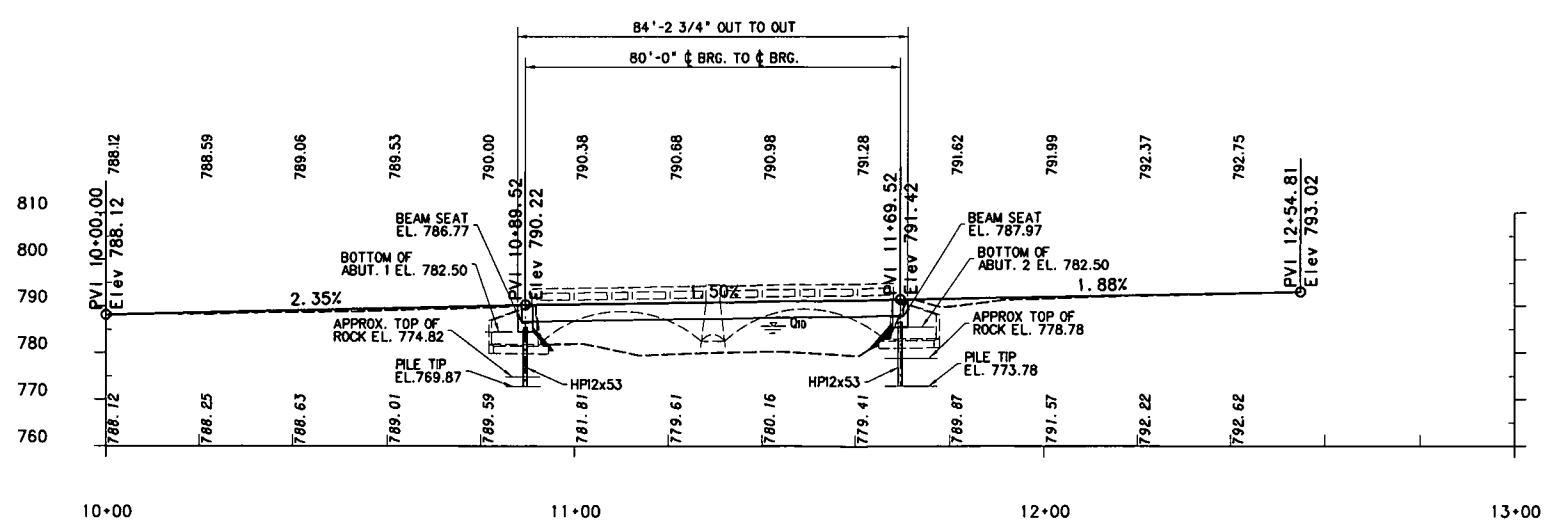
Federal Emergency Management Agency

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](http://www.msc.fema.gov)

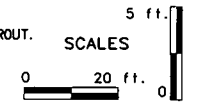


SCALE : 0 20 ft.

HYDRAULIC DATA			
DRAINAGE AREA -	20.46 SQ. MILES		
NORMAL POOL -	779.76		
OWH EL -	782.56		
STORM EVENT	FLOW (CFS)	VELOCITY (FT/S)	WSE
10X (10-YEAR)	2410	5.13	787.39
4X (25-YEAR)	3119	5.02	788.50
2X (50-YEAR)	3687	4.63	789.11
1X (100-YEAR)	4220	4.27	789.65
0.2X (500-YEAR)	5699	4.29	790.88



- NOTE:
1. HP12x53 PILES TO BE SOCKETED A MINIMUM OF 5'-0" INTO ROCK.
  2. ROCK SOCKET FOR PILES SHALL HAVE A MINIMUM DIAMETER OF 20".
  3. PILE SOCKET BACKFILL SHALL BE EITHER CLASS B CONCRETE OR GROUT.



<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <p>White Brothers Consulting, LLC</p> </div> <div style="text-align: center;"> <p>BILCO CONSTRUCTION</p> </div> <div style="text-align: center;"> <p><b>PLAN SHEET</b></p> <table border="1" style="font-size: 8px;"> <tr> <th>DRAWN</th> <th>CHECKED</th> <th>APPROVED</th> <th>DATE</th> </tr> <tr> <td>JCB</td> <td>TTW</td> <td>WGW</td> <td>5-28-15</td> </tr> </table> </div> <div style="text-align: center;"> <p>SCALE</p> <p>NTS</p> </div> <div style="text-align: center;"> <p><b>Antero</b></p> </div> <div style="text-align: center;"> <p><b>CENTRAL STATION BRIDGE OVER ARNOLD CREEK CR 11</b></p> <p>ANTERO RESOURCES DODDIDGE COUNTY</p> </div> <div style="text-align: center;"> <p><b>GENERAL PLAN AND ELEVATION</b></p> </div> <div style="text-align: center;"> <p>SHEET</p> <p>OF</p> </div> </div>										DRAWN	CHECKED	APPROVED	DATE	JCB	TTW	WGW	5-28-15
DRAWN	CHECKED	APPROVED	DATE														
JCB	TTW	WGW	5-28-15														
REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY	REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY								

**Design Build Project**

**CENTRAL STATION ARCH BRIDGE REPLACEMENT**

**over**

**ARNOLD CREEK**

**Doddridge County**

**HYDROLOGIC AND HYDRAULIC**

**REPORT**

**Prepared For:**



**Denver, Colorado**

**Prepared By:**



*White Brothers Consulting, LLC*

**Charleston, West Virginia**

**May 22, 2015**

## **PROJECT DESCRIPTION**

### **NARRATIVE:**

Antero Resources plans to replace the Central Station Arch Bridge which carries Doddridge County Route 11 over Arnold Creek, which is a part of the Middle Ohio North watershed. The design build team of Bilco Construction Company, Inc. and White Brothers Consulting, LLC. has been selected to provide design build services for the development of structure plans, documents and construction plans for the replacement of the existing structure.

The existing bridge is located in Doddridge County and is located approximately 0.07 miles south of Doddridge County Route 36. The existing structure is a two span, simple concrete deck arch (SCDA) built in 1915 by the Concrete Steel Bridge Company of Clarksburg, West Virginia. The structure is supported at each end by a concrete spread footing with wingwalls to retain the roadway fill and embankments. Intermediately the bridge is supported by a solid concrete pier. The substructure units rest on solid rock. The concrete arch ring was poured with a construction joint along the roadway centerline. It carries a stone and earthen fill and asphalt wearing surface which is retained by concrete spandrel walls. The bridge has concrete curbs and parapets. Pertinent Bridge dimensions are as follows:

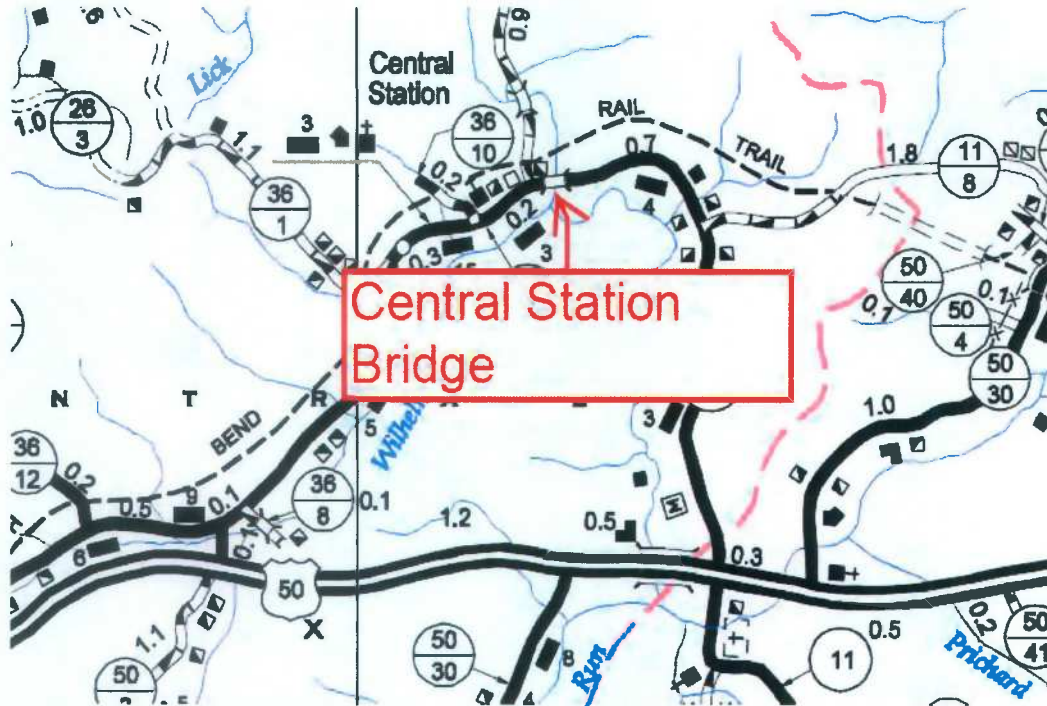
- Overall length - 77'-2" end to end of parapet, downstream side.
- Span 1 length – 35'-0" springline to springline.
- Span 2 length – 35'-0" springline to springline.
- Deck width – 16'-0" out to out.
- Curb to curb – 13'-6".
- Parapet to parapet – 14'-4" (14'1" between approach rails)

The structure is located in a tangent section of roadway and is skewed 30 degrees to the left.



The 2011 ADT for the Central Station Arch Bridge on Doddridge County Route 11 was 300 VPD. The periodic Bridge Inspection Report, dated 5-21-14, indicated that the abutment approach 1 floods occasionally.

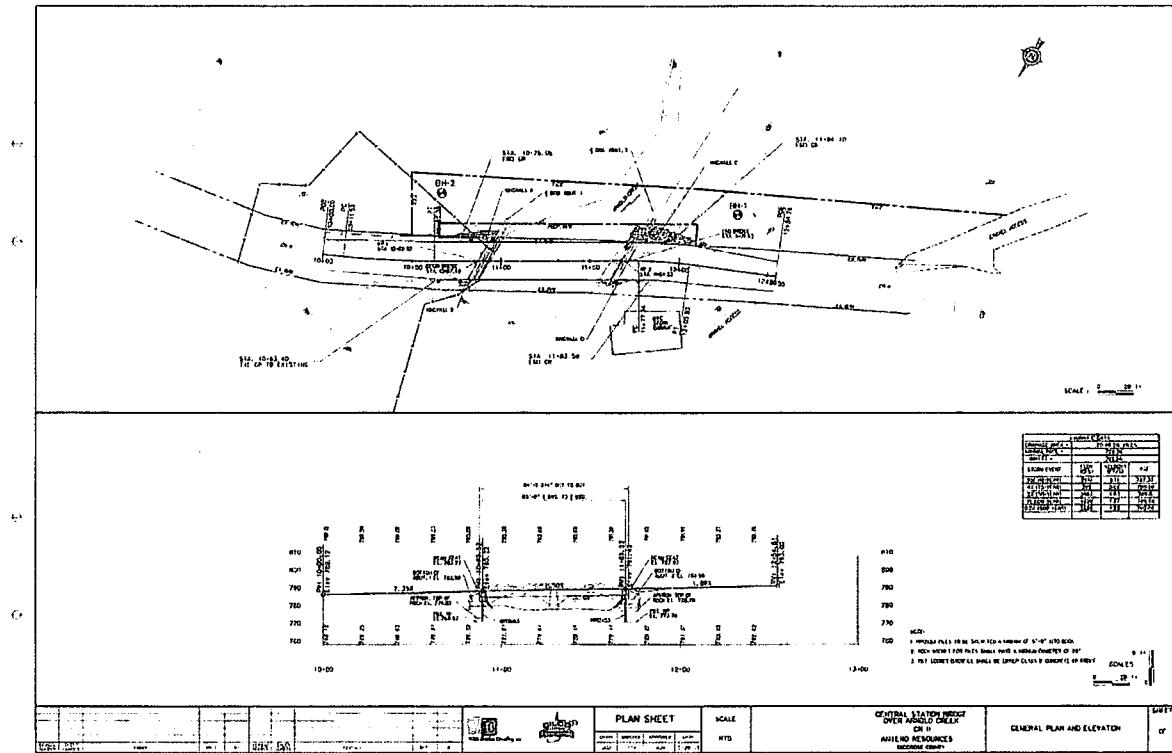
**LOCATION MAPS:**



**WVDOH DODDRIDGE County Map 1 of 2**



**USGS, West Union 7.5 minute Quadrangle, 2014**



Situation Plan, Proposed Bridge

## SUMMARY OF RESULTS:

The proposed bridge will be constructed in the same location as the existing bridge. There is a modification to the existing alignment due to the increase in the clear roadway width of the bridge which will result in the proposed centerline of the bridge being shifted upstream approximately 3.16 ft. upstream. The increase in the bridge width will be an improvement to the alignment which meets AASHTO criteria. Therefore, the entire bridge is in a tangent section of the alignment.

An 80 ft. single span structure was found to be the most economical span arrangement for this location. The superstructure will consist of 36" x 39" prestressed concrete box beams. Substructure units will consist of stub abutments founded on H-piles predrilled and socketed into 5'-0" into rock. The bridge has a clear width of 21'-3" with Oregon Thrie Beam guardrail system for an out-to-out width of 21'-4 1/2".

The following tables compare the existing and proposed water surface elevations and energy grade line elevations for various storms. The proposed bridge will lower the water surface elevation and energy grade line for the 10% (10-year), 4% (25-year), 2% (50-year), 1% (100-year) and 0.2% (500-year) storm events. It is noted that there are decreases in water surface elevation for all storm events. As a result, the proposed design is in compliance with WVDOT and FEMA hydraulic requirements. At the existing and proposed bridge location, the FIRM indicates that Arnold Creek has not been studied and there is no Base Flood Elevation. Therefore, according to the WVDOT Drainage Manual Chapter 10, Section 10.3.1, an increase in water surface elevation of less than 1 ft. is acceptable.

Backwater Table: Cross Section 1530, 430 feet upstream of the Proposed Bridge				
Storm Event	Discharge (CFS)	Existing WSEL	Proposed WSEL	Difference
10% (10-year)	2410	787.69	787.39	-0.3
4% (25-year)	3119	788.88	788.50	-0.38
2% (50-year)	3687	789.78	789.11	-0.67
1% (100-year)	4260	790.24	789.65	-0.59
0.2% (500-year)	5699	790.88	790.88	0

E.G.L. Table: Cross Section 1530, 430 feet upstream of the Proposed Bridge				
Storm Event	Discharge (CFS)	Existing EGL	Proposed EGL	Difference
10% (10-year)	2410	788.14	787.96	-0.18
4% (25-year)	3119	789.11	788.84	-0.27
2% (50-year)	3687	789.93	789.37	-0.56
1% (100-year)	4260	790.39	789.87	-0.52
0.2% (500-year)	5699	791.05	791.05	0

HYDRAULIC DATA			
Drainage Area =	20.46 Sq. Miles		
Normal Pool EL =	779.76		
OWH EL =	782.56		
STORM EVENT	FLOW (CFS)	VELOCITY (FT/S)	W.S.E.
10% (10-year)	2410	5.13	787.39
4% (25-year)	3119	5.02	788.50
2% (50-year)	3687	4.63	789.11
1% (100-year)	4220	4.27	789.65
0.2% (500-year)	5699	4.29	790.88

@ section 1530, 430' upstream of proposed bridge

Scour analysis was performed with the following results:

Combined scour was determined to be 12.13 ft. at abutment 2 and 1.15 ft. at abutment 1. The new substructure consists of steel H-piles socketed into rocks 5 feet. The existing abutment footing will be left in place as added protection. Therefore, the scour risk is low. See the attached DS-34.



Contraction Scour

	Left	Channel	Right
<b>Input Data</b>			
Average Depth (ft):	0.98	6.15	1.38
Approach Velocity (ft/s):	0.88	3.79	1.10
Br Average Depth (ft):		4.28	0.04
BR Opening Flow (cfs):		2409.98	0.02
BR Top WD (ft):		72.36	1.65
Grain Size D50 (mm):	.5374	.5374	.5374
Approach Flow (cfs):	58.97	2036.12	314.91
Approach Top WD (ft):	67.99	87.45	207.51
K1 Coefficient:	0.590	0.590	0.590
<b>Results</b>			
Scour Depth Ys (ft):		3.67	0.00
Critical Velocity (ft/s):		1.83	1.43
Equation:		Live	Clear

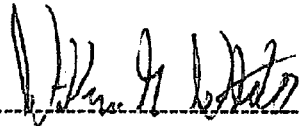
Abutment Scour

	Left	Right
<b>Input Data</b>		
Station at Toe (ft):	132.63	206.64
Toe Sta at appr (ft):	129.17	195.81
Abutment Length (ft):	90.45	207.51
Depth at Toe (ft):	1.32	0.27
K1 Shape Coef:	1.00 - Vertical abutment	
Degree of Skew (degrees):	30	30
K2 Skew Coef:	0.87	0.87
Projected Length L' (ft):	45.22	103.75
Avg Depth Obstructed Ya (ft):	2.27	1.38
Flow Obstructed Qe (cfs):	581.91	314.91
Area Obstructed Ae (sq ft):	204.97	286.33
<b>Results</b>		
Scour Depth Ys (ft):	8.46	1.15
Froude #:	1.04	0.31
Equation:	HIRE	HIRE

Combined Scour Depths

Left abutment scour + contraction scour (ft):	12.13
Right abutment scour + contraction scour (ft):	1.15

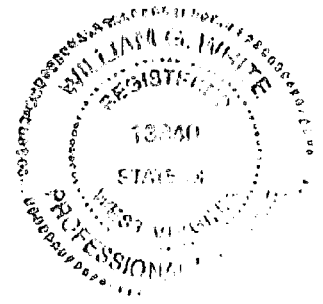
Analysis and Report prepared by:



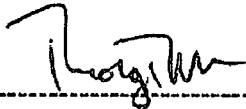
William G. White, P.E.

5-22-15

Date



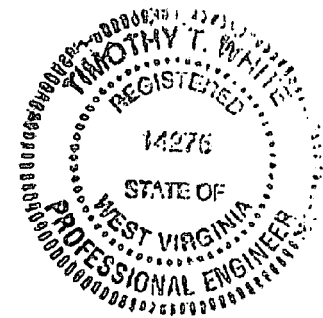
Reviewed by:



Timothy T. White, P.E.

5-22-15

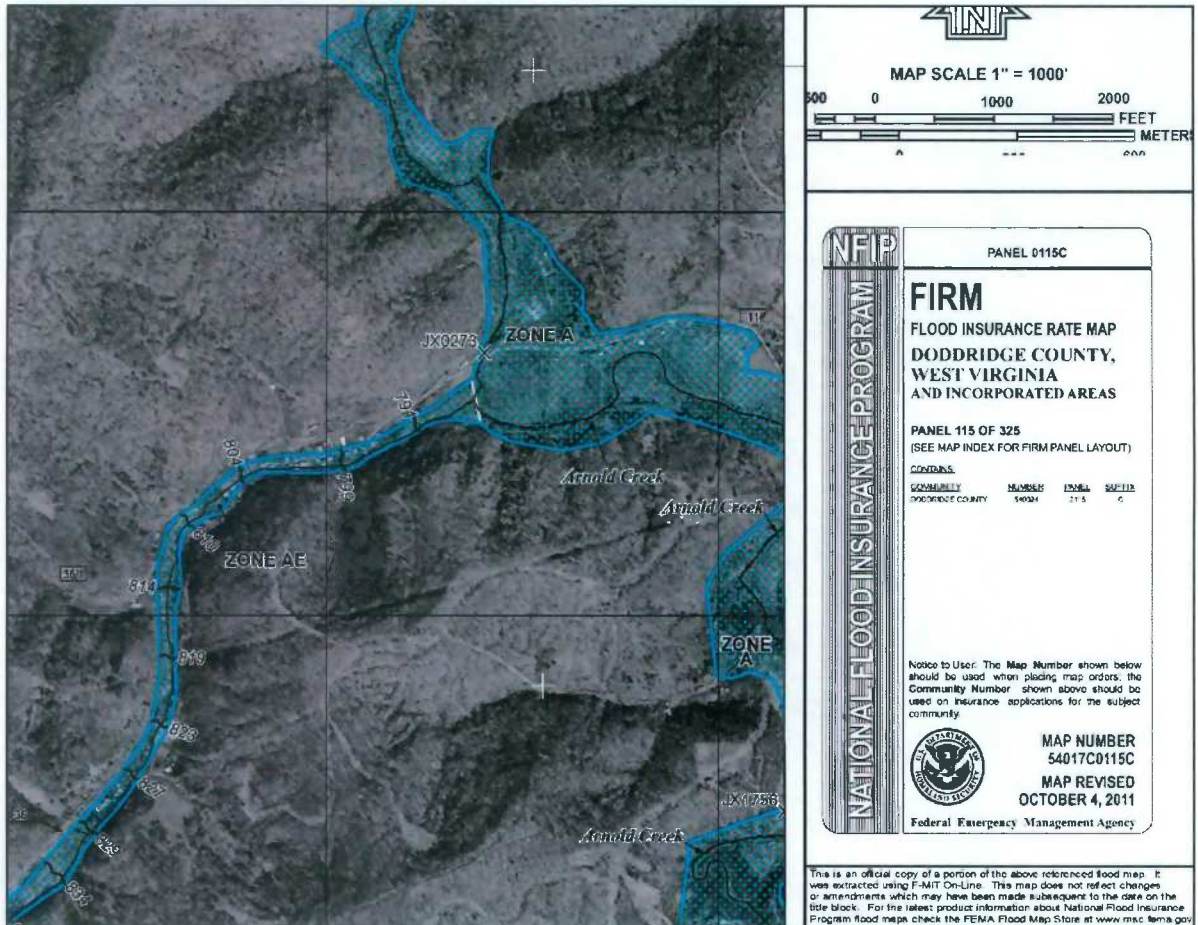
Date



**AVAILABLE DATA:**

**A. Flood Insurance Study**

Examination of the FIRM Map Number 54017C0115C for Doddridge County, West Virginia and Incorporated Areas revealed that there are no Base Flood Elevations for Arnold Creek at the project site. As shown on the attached FIRM, the section of Arnold Creek is in Zone A which indicates no base flood elevation has been determined.





**Firmette, FEMA Flood Insurance Rate Map**

## Central Station Bridge



Map Created on 4/22/2015

 Location of the mouse click  
 **Flood Hazard Zone**  
 (1% annual chance floodplain)

**User Notes:**

**Disclaimer:**  
 The online map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at [www.nrc.fema.gov](http://www.nrc.fema.gov).  
 WV Flood Tool is supported by FEMA, WV NFIP Office, and WV GIS Technical Center  
 (<http://www.MapWV.gov/flood>)

**Flood Hazard Area:** Selected site is **WITHIN** the FEMA 100-year floodplain.  
**Elevation:** About 781 feet  
**Location (long, lat):** 80.821522 W, 39.295929 N  
**Location (UTM 17N):** (515390, 4349631)  
**FEMA Issued Flood Map:** 54017C0115C  
**Contacts:** Doddridge County  
**CRS Information:** N/A  
**Parcel Number:**

### Flood Map from WVDHSEM Flood Tool Website

**B****. Bridge Inspection Reports**

The profile drawings of the existing bridge looking upstream, a cross section drawing of the existing bridge, a vicinity sketch and channel profile for the October 12, 1993 Bridge Inspection Report are included in this report on pages 16 thru 19.



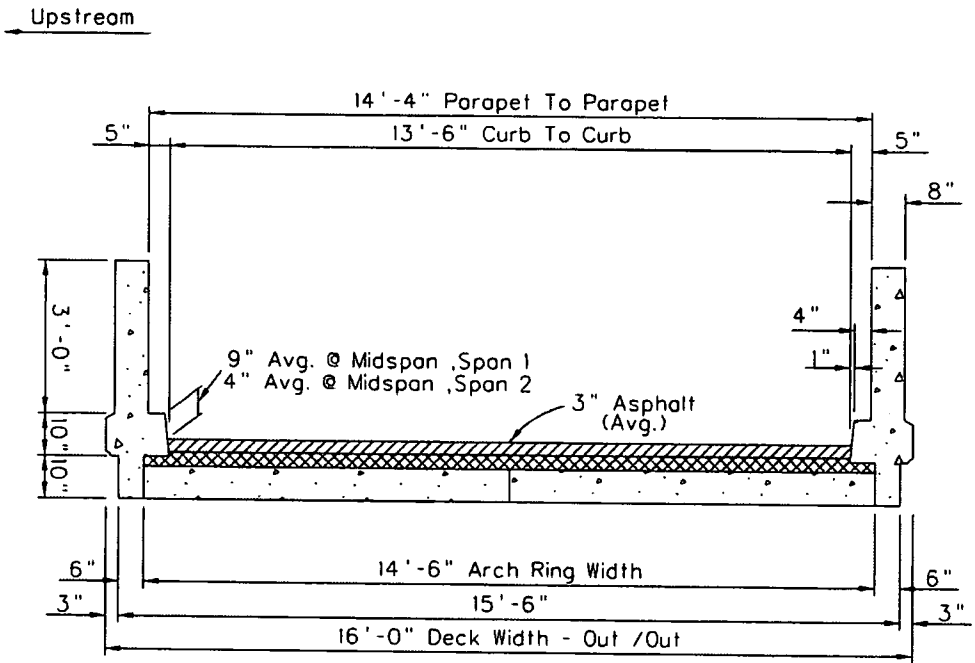
WEST VIRGINIA DIVISION OF HIGHWAYS

Form DS-27  
1-19-05

STRUCTURES DIVISION  
GENERAL SKETCH SHEET

By: RWW Date: 08-09-10 Ckd. By: *Jes* Date: *8-29-10* Bridge No.: 09-11-7.83(6511) Sheet *16* of *25*

Note: Horizontal Clearance Is Restricted To 14'-1"  
By Attached Approach Guardrail



DECK CROSS SECTION  
(Looking Forward)

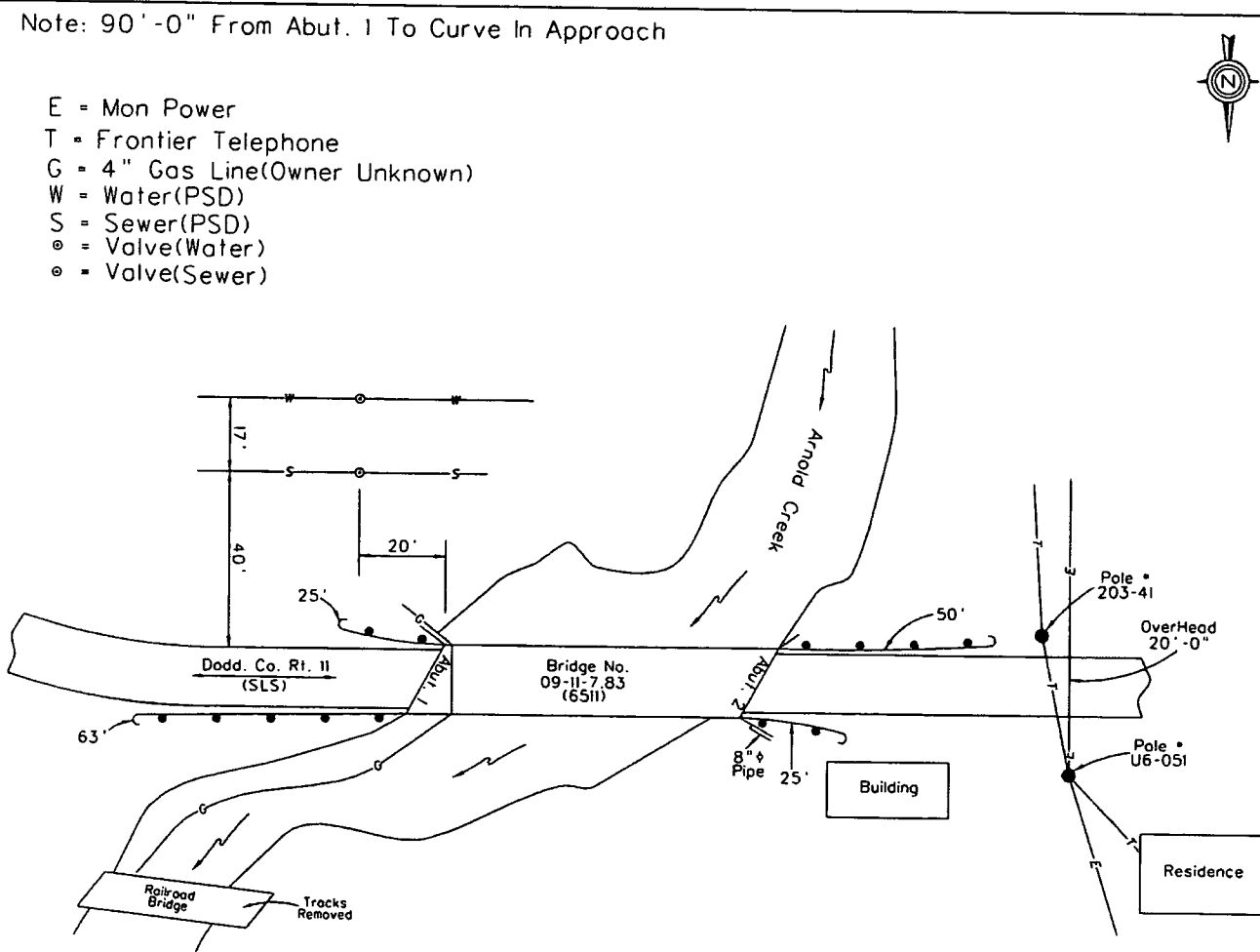
Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:
By:	By:	By:	By:	By:

WEST VIRGINIA DIVISION OF HIGHWAYS

Form DS-27  
1-19-05

STRUCTURES DIVISION  
GENERAL SKETCH SHEET

By: RWW Date: 08-16-10 Ckd. By: *FR* Date: *11-1-12* Bridge No.: 09-11-7.83(6511) Sheet *2 of 25*



Note: 90' -0" From Abut. 1 To Curve In Approach

- E = Mon Power
- T = Frontier Telephone
- G = 4" Gas Line(Owner Unknown)
- W = Water(PSD)
- S = Sewer(PSD)
- ⊙ = Valve(Water)
- ⊙ = Valve(Sewer)

Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:
By:	By:	By:	By:	By:

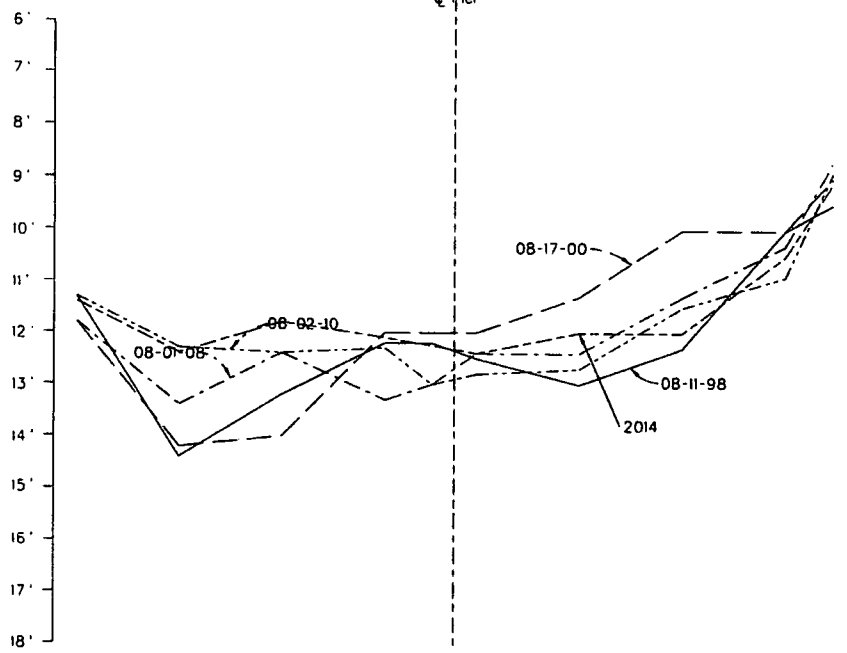
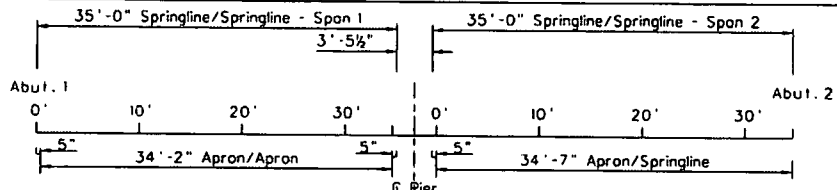
VICINITY SKETCH



Form DS-27  
1-19-05

WEST VIRGINIA DIVISION OF HIGHWAYS  
STRUCTURES DIVISION  
GENERAL SKETCH SHEET

By: **RWW** Date: **08-11-10** Ck'd By: **MA** Date: **08-28-14** Bridge No.: **09-11-7.83(6511)** Sheet **22** of **25**



08-11-98	11.3'	14.4'	13.2'	12.2'	12.2'	12.5'	13.0'	12.3'	10.0'	9.5'
08-17-00	11.8'	14.2'	14.0'	12.0'	12.0'	12.0'	11.3'	10.0'	10.0'	9.0'
08-01-08	11.8'	13.4'	12.4'	13.3'	13.0'	12.4'	12.4'	11.3'	10.3'	8.7'
08-02-10	11.3'	12.3'	12.4'	12.3'	13.0'	12.8'	12.7'	11.5'	10.9'	8.9'
05-21-14	11.4'	12.4'	11.8'	12.1'	13.0'	12.4'	12.0'	12.0'	10.5'	9.1'

Datum Taken To Top Of Downstream  
Ornamental Curb @ 10'-0" Intervals

Scale: Horizontal - 1" = 15'  
Vertical - 1" = 3'

STREAM CHANNEL PROFILE

Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:	Rev. Date:
By:	By:	By:	By:	By:

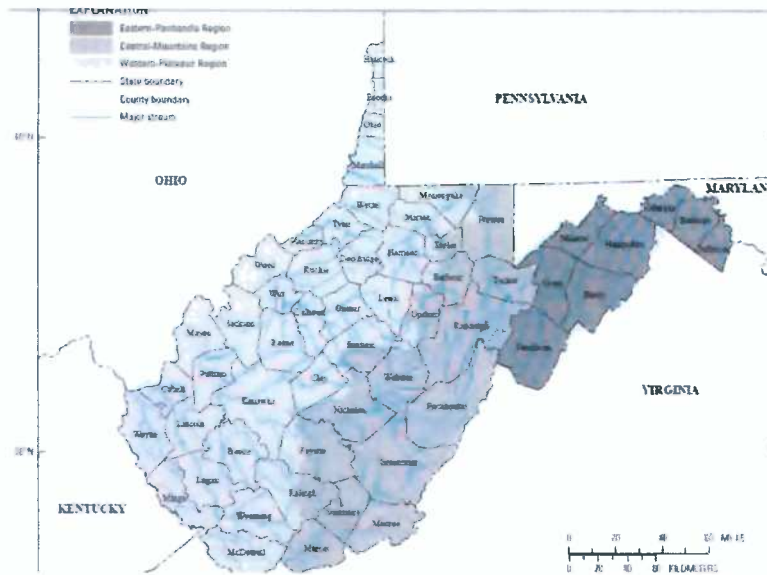
### C. Existing Hydrologic Data

No existing hydrologic data was used. Flood control reservoirs were not observed in this watershed, so none were considered in the hydrologic analysis.

The project has a drainage area of 20.46 mi<sup>2</sup>, so the USGS regression flowrate analysis method for discharge was used. The USGS regression equations are shown below. The projected average daily traffic for Doddridge County Route 11 was 300 in 2011. The 10% (10-year) flood was used as the design condition with a flow of 2408 cfs.

#### USGS FLOWRATE ANALYSIS

#### USGS FLOWRATE ANALYSIS



Type east for Eastern-Panhandle Region  
 Type central for Central-Mountain Region  
 Type west for Western-Plateau Region

Region = WEST  
 Area (mi<sup>2</sup>) = 20.46  
 Drainage Area Limits (sq mi)  
 0.13 - 1,516

Regression Equation	Regression Flowrate (Q <sub>r</sub> ), cfs	Average Prediction Error, in percent	Q <sub>r</sub> + Average Prediction Error
Q(1.1)=56.9*A <sup>0.763</sup>	569	39.1%	792
Q(1.5)=97.8*A <sup>0.741</sup>	916	34.1%	1228
Q(2)=129*A <sup>0.730</sup>	1168	32.2%	1544
Q(5)=221*A <sup>0.710</sup>	1884	30.0%	2450
Q(10)=292*A <sup>0.699</sup>	2408	29.7%	3124
Q(25)=391*A <sup>0.688</sup>	3119	30.3%	4065
Q(50)=472*A <sup>0.681</sup>	3687	31.3%	4841
Q(100)=557*A <sup>0.674</sup>	4260	32.5%	5644
Q(200)=647*A <sup>0.668</sup>	4859	33.9%	6507
Q(500)=775*A <sup>0.661</sup>	5699	36.1%	7757

$$Q_w = Q_r \times (1 + \text{Prediction Error})$$

The USGS Recommends using the flowrate directly from the regression equations. Don't add prediction error. recommended for watersheds >10 sq mi  
 do not use for watersheds < 5 sq mi

Reference:

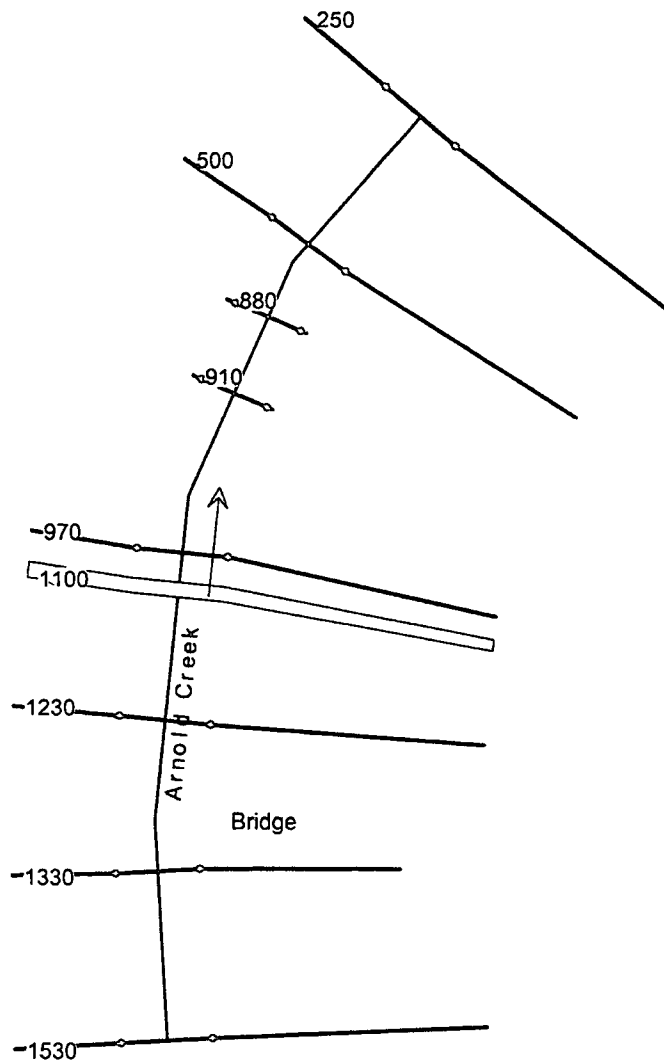
USGS, Estimation of Flood-Frequency of Peak Discharges for Rural, Unregulated Streams in West Virginia, Scientific Investigation Report 2010-5033

Normal depth was chosen as the boundary condition with a slope of 0.00169 based on the survey data and the USGS map. Normal flow elevation of Arnold Creek at the existing and proposed bridge location is based on the surveyed water surface elevation.

#### D. Existing Hydraulic Model

No existing hydraulic model was used.

The HEC-RAS model used for analysis was developed from a field survey performed by White Brothers Consulting, LLC. and Bilco Construction Company, Inc. The Plan Sheet with Cross Sections is shown below.



Manning's "n" values were selected based on site observations and referring to the *WVDOH Drainage Manual Table 7-3* for the channel and banks. Values ranged from 0.03 to 0.045 for the left and right overbank and a value of 0.035 for the channel. It was observed that most of the stream banks both upstream and downstream are covered in grasses and heavy vegetation. Trees were also observed protruding out of the stream banks. It was observed that the stream banks on one side of Poplar Fork downstream of the bridge exhibit signs of excessive erosion. Although they exhibit erosion, they appear to be stable.

The existing and proposed bridges were modeled using the energy method.

**HEC-RAS Generated Tables**

Description	Plan File	Geometry File	Flow File
Existing Bridge	CentralStationExi.p08	CentralStationExi.g02	CentralStationExi.f01
Proposed Bridge	CentralStationExi.p09	CentralStationExi.g03	CentralStationExi.f01

**HEC-RAS Generated Tables**

Profile with existing and proposed

10% (10-year) Storm	page 23
4% (25-year) Storm	page 24
2% (50-year) Storm	page 25
1% (100-year) Storm	page 26
0.2% (500-year) Storm	page 27

Bridge Output Table - 1% (100-year) storm

Existing	page 28
Proposed	page 28

HEC-RAS Generated Drawings

River Profile	page 29
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Bridge Internal Cross Sections

Existing	page 30
Proposed	page 31

HEC-RAS River: Arnold Creek Reach: Bridge Profile: Q10													
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Bridge	1530	Q10	Existing Arch	2410.00	781.19	787.69		788.14	0.000019	5.55	542.23	315.69	0.47
Bridge	1530	Q10	Plan 02	2410.00	781.19	787.39		787.96	0.000026	6.18	454.29	269.50	0.55
Bridge	1330	Q10	Existing Arch	2410.00	778.30	787.89		788.05	0.000005	3.58	961.30	363.90	0.25
Bridge	1330	Q10	Plan 02	2410.00	778.30	787.65		787.85	0.000006	3.84	875.11	362.74	0.27
Bridge	1230	Q10	Existing Arch	2410.00	781.19	787.48	785.76	788.02	0.000024	6.01	476.77	282.21	0.53
Bridge	1230	Q10	Plan 02	2410.00	781.19	787.04	785.76	787.79	0.000037	6.99	368.30	207.60	0.65
Bridge	1100		Bridge										
Bridge	970	Q10	Existing Arch	2410.00	781.19	786.96	785.76	787.76	0.000041	7.17	352.84	190.29	0.67
Bridge	970	Q10	Plan 02	2410.00	781.19	786.96	785.76	787.76	0.000041	7.17	352.84	190.29	0.67
Bridge	910	Q10	Existing Arch	2410.00	776.51	787.35		787.59	0.000004	3.88	626.73	81.95	0.24
Bridge	910	Q10	Plan 02	2410.00	776.51	787.35		787.59	0.000004	3.88	626.73	81.95	0.24
Bridge	880	Q10	Existing Arch	2410.00	776.51	787.35		787.59	0.000004	3.88	620.60	73.95	0.24
Bridge	880	Q10	Plan 02	2410.00	776.51	787.35		787.59	0.000004	3.88	620.60	73.95	0.24
Bridge	500	Q10	Existing Arch	2410.00	781.19	786.22	785.73	787.48	0.000071	9.00	267.87	82.26	0.88
Bridge	500	Q10	Plan 02	2410.00	781.19	786.22	785.73	787.48	0.000071	9.00	267.87	82.26	0.88
Bridge	250	Q10	Existing Arch	2410.00	781.19	785.73	785.73	787.43	0.000092	10.44	230.87	68.25	1.00
Bridge	250	Q10	Plan 02	2410.00	781.19	785.73	785.73	787.43	0.000092	10.44	230.87	68.25	1.00

HEC-RAS River: Arnold Creek Reach: Bridge Profile: Q25													
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crā W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Bridge	1530	Q25	Existing Arch	3119.00	781.19	788.88		789.11	0.000009	4.41	1105.04	488.67	0.33
Bridge	1530	Q25	Plan 02	3119.00	781.19	788.50		788.84	0.000013	5.16	917.26	488.67	0.40
Bridge	1330	Q25	Existing Arch	3119.00	778.30	788.95		789.08	0.000004	3.41	1349.22	369.07	0.22
Bridge	1330	Q25	Plan 02	3119.00	778.30	788.62		788.78	0.000005	3.72	1227.64	367.46	0.25
Bridge	1230	Q25	Existing Arch	3119.00	781.19	788.83	786.69	789.07	0.000009	4.51	1077.29	488.67	0.34
Bridge	1230	Q25	Plan 02	3119.00	781.19	788.37	786.69	788.76	0.000015	5.47	854.76	488.67	0.43
Bridge	1100												
Bridge	970	Q25	Existing Arch	3119.00	781.19	787.87	786.69	788.51	0.000026	6.73	612.57	454.28	0.56
Bridge	970	Q25	Plan 02	3119.00	781.19	787.87	786.69	788.51	0.000026	6.73	612.68	454.32	0.56
Bridge	910	Q25	Existing Arch	3119.00	776.51	788.08		788.41	0.000005	4.61	686.70	81.95	0.27
Bridge	910	Q25	Plan 02	3119.00	776.51	788.08		788.41	0.000005	4.61	686.71	81.95	0.27
Bridge	880	Q25	Existing Arch	3119.00	776.51	788.08		788.41	0.000005	4.62	674.52	73.95	0.27
Bridge	880	Q25	Plan 02	3119.00	776.51	788.08		788.41	0.000005	4.62	674.53	73.95	0.27
Bridge	500	Q25	Existing Arch	3119.00	781.19	787.38	786.66	788.35	0.000044	8.04	450.31	267.30	0.71
Bridge	500	Q25	Plan 02	3119.00	781.19	787.38	786.66	788.35	0.000044	8.04	450.46	267.39	0.71
Bridge	250	Q25	Existing Arch	3119.00	781.19	786.65	786.65	788.27	0.000092	10.21	305.90	108.64	1.00
Bridge	250	Q25	Plan 02	3119.00	781.19	786.65	786.65	788.27	0.000092	10.21	305.97	108.86	1.00

HEC-RAS Reach	River: Arnold Creek River Sta	Reach: Bridge Profile	Profile: Q50 Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Bridge	1530	Q50	Existing Arch	3687.00	781.19	789.78		789.93	0.000005	3.78	1540.98	488.67	0.26
Bridge	1530	Q50	Plan 02	3687.00	781.19	789.11		789.37	0.000010	4.77	1215.16	488.67	0.35
Bridge	1330	Q50	Existing Arch	3687.00	778.30	789.80		789.92	0.000003	3.28	1664.77	373.22	0.20
Bridge	1330	Q50	Plan 02	3687.00	778.30	789.17		789.34	0.000004	3.80	1432.53	370.17	0.24
Bridge	1230	Q50	Existing Arch	3687.00	781.19	789.76	787.52	789.91	0.000005	3.81	1531.60	488.67	0.27
Bridge	1230	Q50	Plan 02	3687.00	781.19	789.05	787.52	789.33	0.000010	4.88	1186.45	488.87	0.36
Bridge	1100			Bridge									
Bridge	970	Q50	Existing Arch	3687.00	781.19	788.26	787.52	788.87	0.000024	6.79	799.16	488.67	0.55
Bridge	970	Q50	Plan 02	3687.00	781.19	788.26	787.52	788.87	0.000024	6.80	797.97	488.67	0.55
Bridge	910	Q50	Existing Arch	3687.00	776.51	788.38		788.81	0.000006	5.27	711.24	81.95	0.30
Bridge	910	Q50	Plan 02	3687.00	776.51	788.38		788.81	0.000006	5.27	711.12	81.95	0.30
Bridge	880	Q50	Existing Arch	3687.00	776.51	788.38		788.81	0.000007	5.29	696.48	73.95	0.30
Bridge	880	Q50	Plan 02	3687.00	776.51	788.38		788.81	0.000007	5.29	696.37	73.95	0.30
Bridge	500	Q50	Existing Arch	3687.00	781.19	787.92	787.50	788.77	0.000035	7.78	636.42	462.50	0.65
Bridge	500	Q50	Plan 02	3687.00	781.19	787.91	787.50	788.77	0.000035	7.82	629.86	460.19	0.65
Bridge	250	Q50	Existing Arch	3687.00	781.19	787.50	787.50	788.73	0.000054	9.09	484.76	285.77	0.79
Bridge	250	Q50	Plan 02	3687.00	781.19	787.50	787.50	788.73	0.000054	9.09	484.76	285.77	0.79

HEC-RAS River: Arnold Creek Reach: Bridge Profile: Q100													
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Bridge	1530	Q100	Existing Arch	4260.00	781.19	790.24		790.39	0.000005	3.79	1767.12	488.67	0.26
Bridge	1530	Q100	Plan 02	4260.00	781.19	789.65		789.87	0.000008	4.55	1480.11	488.67	0.32
Bridge	1330	Q100	Existing Arch	4260.00	778.30	790.25		790.38	0.000003	3.44	1834.50	375.43	0.21
Bridge	1330	Q100	Plan 02	4260.00	778.30	789.69		789.86	0.000004	3.89	1623.75	372.68	0.24
Bridge	1230	Q100	Existing Arch	4260.00	781.19	790.23	788.17	790.38	0.000005	3.81	1760.84	488.67	0.26
Bridge	1230	Q100	Plan 02	4260.00	781.19	789.62	788.17	789.85	0.000008	4.60	1464.31	488.67	0.33
Bridge	1100		Bridge										
Bridge	970	Q100	Existing Arch	4260.00	781.19	788.50		789.13	0.000024	7.08	914.94	488.67	0.55
Bridge	970	Q100	Plan 02	4260.00	781.19	788.50		789.13	0.000024	7.08	914.89	488.67	0.55
Bridge	910	Q100	Existing Arch	4260.00	776.51	788.55		789.10	0.000008	5.98	724.74	81.95	0.34
Bridge	910	Q100	Plan 02	4260.00	776.51	788.55		789.10	0.000008	5.98	724.74	81.95	0.34
Bridge	880	Q100	Existing Arch	4260.00	776.51	788.54		789.10	0.000008	6.01	708.45	73.95	0.34
Bridge	880	Q100	Plan 02	4260.00	776.51	788.54		789.10	0.000008	6.01	708.44	73.95	0.34
Bridge	500	Q100	Existing Arch	4260.00	781.19	788.21	788.01	789.07	0.000034	8.01	775.56	488.67	0.65
Bridge	500	Q100	Plan 02	4260.00	781.19	788.21	788.01	789.07	0.000034	8.01	776.30	488.67	0.65
Bridge	250	Q100	Existing Arch	4260.00	781.19	788.01	788.01	789.05	0.000042	8.67	677.26	476.87	0.71
Bridge	250	Q100	Plan 02	4260.00	781.19	788.01	788.01	789.05	0.000042	8.67	677.26	476.87	0.71



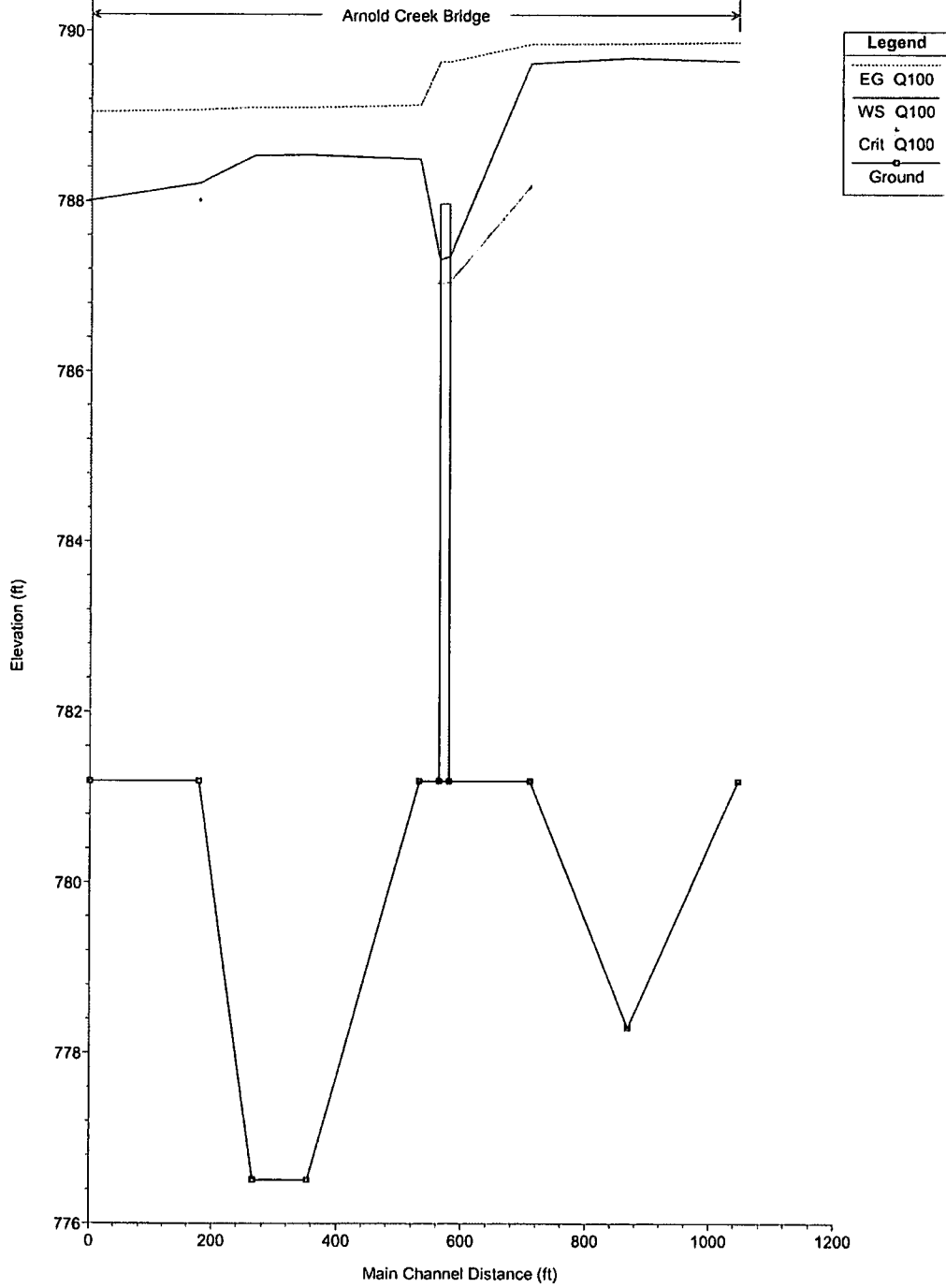
HEC-RAS River: Arnold Creek Reach: Bridge Profile: Q500													
Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Bridge	1530	Q500	Existing Arch	5699.00	781.19	790.88		791.05	0.000005	4.27	2078.12	488.67	0.28
Bridge	1530	Q500	Plan 02	5699.00	781.19	790.88		791.05	0.000005	4.27	2077.94	488.67	0.28
Bridge	1330	Q500	Existing Arch	5699.00	778.30	790.88		791.05	0.000004	4.06	2070.89	378.58	0.23
Bridge	1330	Q500	Plan 02	5699.00	778.30	790.88		791.05	0.000004	4.06	2070.73	378.58	0.23
Bridge	1230	Q500	Existing Arch	5699.00	781.19	790.87	788.64	791.05	0.000005	4.29	2074.67	488.67	0.28
Bridge	1230	Q500	Plan 02	5699.00	781.19	790.87	788.64	791.05	0.000005	4.29	2074.46	488.67	0.28
Bridge	1100			Bridge									
Bridge	970	Q500	Existing Arch	5699.00	781.19	788.91		789.66	0.000028	7.99	1115.35	488.67	0.60
Bridge	970	Q500	Plan 02	5699.00	781.19	788.90		789.66	0.000028	8.02	1111.02	488.67	0.60
Bridge	910	Q500	Existing Arch	5699.00	776.51	788.66		789.63	0.000014	7.91	733.77	81.95	0.45
Bridge	910	Q500	Plan 02	5699.00	776.51	788.66		789.62	0.000014	7.91	733.52	81.95	0.45
Bridge	880	Q500	Existing Arch	5699.00	776.51	788.64		789.62	0.000014	7.96	715.84	73.95	0.45
Bridge	880	Q500	Plan 02	5699.00	776.51	788.64		789.62	0.000014	7.96	715.62	73.95	0.45
Bridge	500	Q500	Existing Arch	5699.00	781.19	788.65	788.63	789.61	0.000037	8.85	991.91	488.67	0.68
Bridge	500	Q500	Plan 02	5699.00	781.19	788.65	788.63	789.61	0.000037	8.87	988.27	488.67	0.68
Bridge	250	Q500	Existing Arch	5699.00	781.19	788.63	788.63	789.61	0.000037	8.92	981.95	488.67	0.69
Bridge	250	Q500	Plan 02	5699.00	781.19	788.63	788.63	789.61	0.000037	8.92	981.95	488.67	0.69

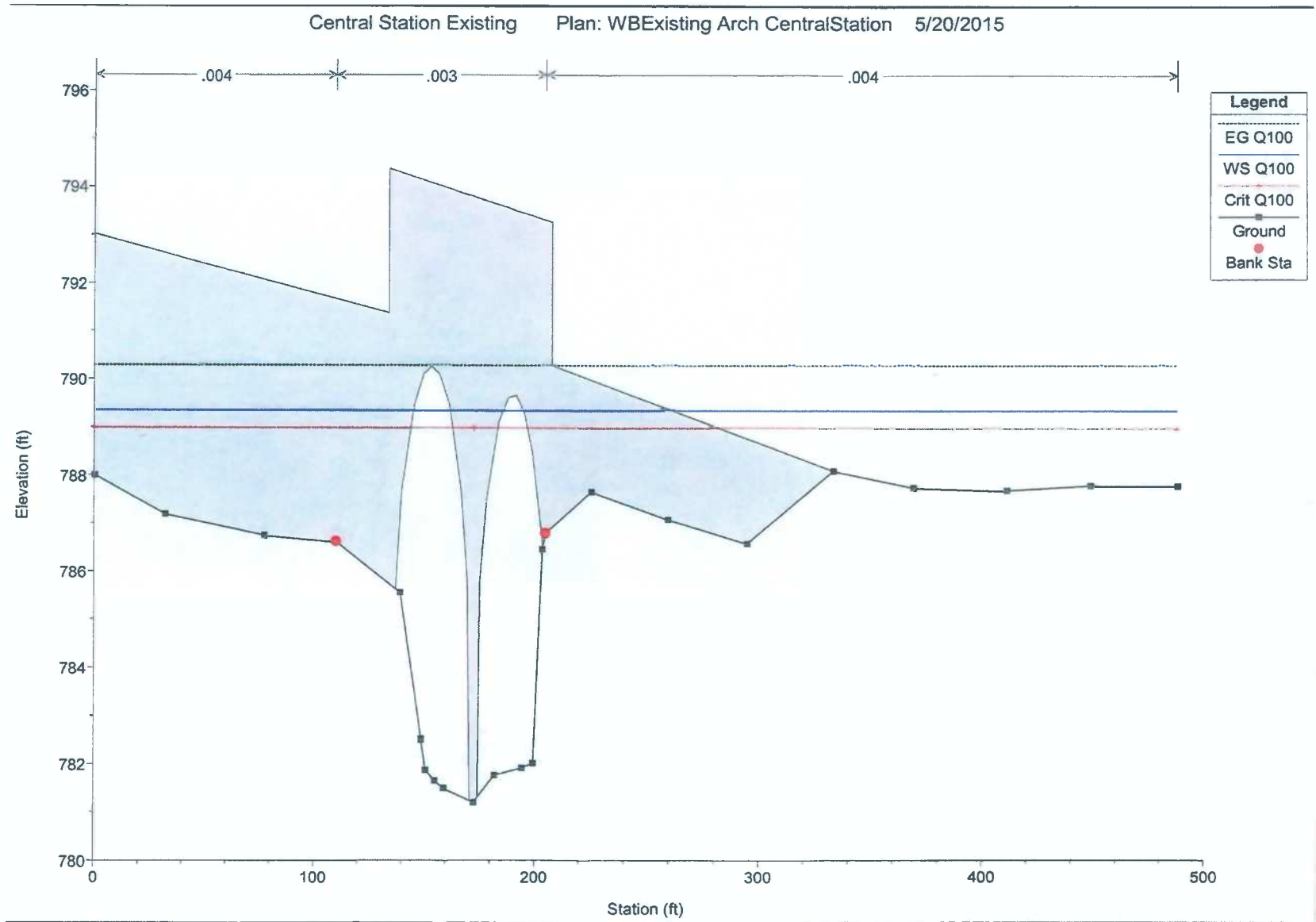
Plan: WBEArchCS Arnold Creek Bridge RS: 1530 Profile: Q100

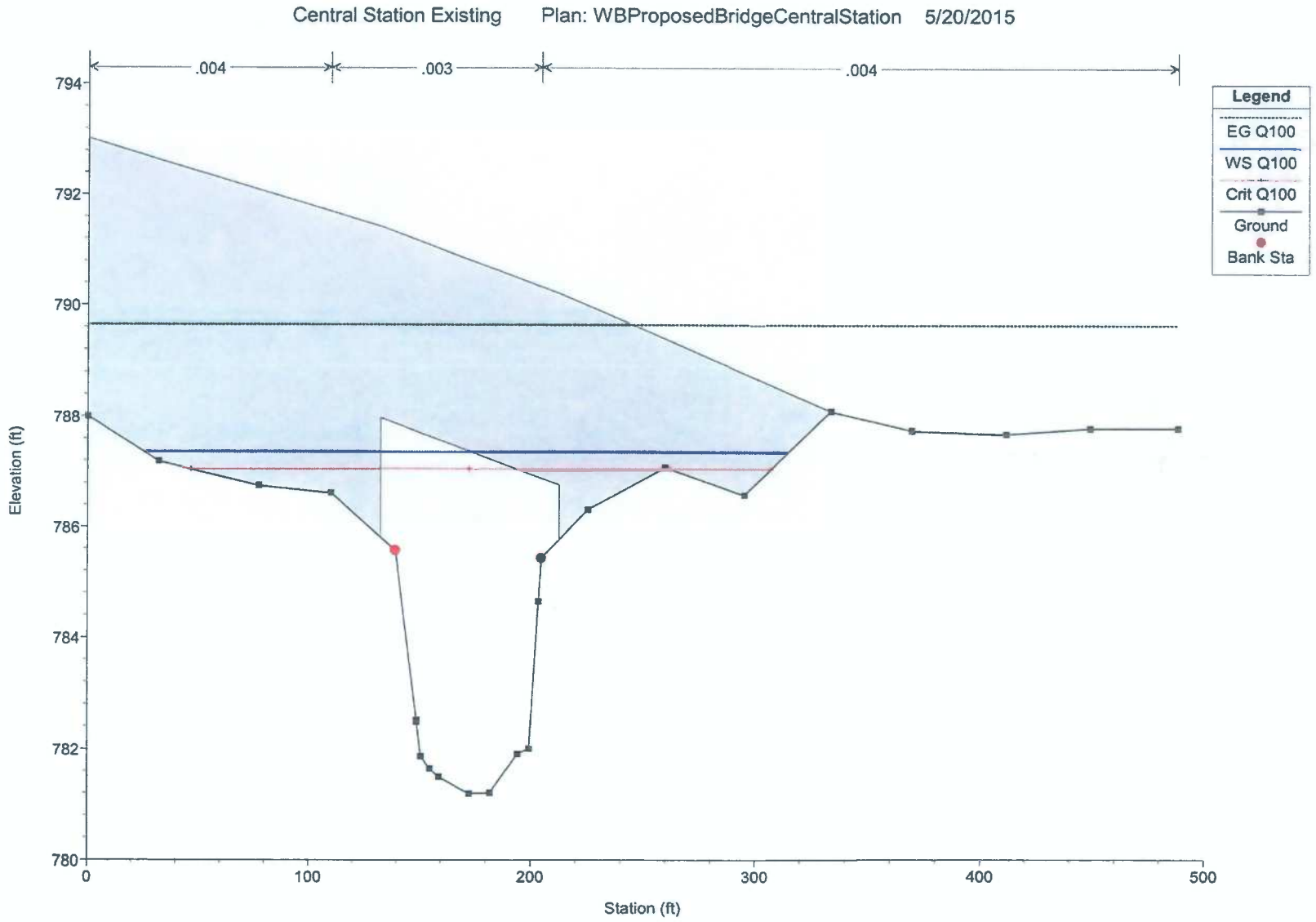
E.G. Elev (ft)	790.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.004	0.003	0.004
W.S. Elev (ft)	790.24	Reach Len. (ft)	178.00	177.86	178.02
Crit W.S. (ft)		Flow Area (sq ft)	349.26	645.78	772.08
E.G. Slope (ft/ft)	0.000005	Area (sq ft)	349.26	645.78	772.08
Q Total (cfs)	4260.00	Flow (cfs)	600.85	2450.16	1208.99
Top Width (ft)	488.67	Top Width (ft)	110.17	94.82	283.68
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.72	3.79	1.57
Max Chl Dpth (ft)	9.05	Hydr. Depth (ft)	3.17	6.81	2.72
Conv. Total (cfs)	1958521.0	Conv. (cfs)	276238.5	1126453.0	555829.1
Length Wtd. (ft)	177.92	Wetted Per. (ft)	112.42	97.71	286.19
Min Ch El (ft)	781.19	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.62	Stream Power (lb/ft s)	488.67	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.86	14.25	9.46
C & E Loss (ft)	0.01	Cum SA (acres)	1.74	1.99	4.94

Plan: WBPropBCS Arnold Creek Bridge RS: 1530 Profile: Q100

E.G. Elev (ft)	789.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.004	0.003	0.004
W.S. Elev (ft)	789.65	Reach Len. (ft)	178.00	177.86	178.02
Crit W.S. (ft)		Flow Area (sq ft)	284.55	590.09	605.47
E.G. Slope (ft/ft)	0.000008	Area (sq ft)	284.55	590.09	605.47
Q Total (cfs)	4260.00	Flow (cfs)	545.89	2685.64	1028.47
Top Width (ft)	488.67	Top Width (ft)	110.17	94.82	283.68
Vel Total (ft/s)	2.88	Avg. Vel. (ft/s)	1.92	4.55	1.70
Max Chl Dpth (ft)	8.46	Hydr. Depth (ft)	2.58	6.22	2.13
Conv. Total (cfs)	1537431.0	Conv. (cfs)	197011.0	969245.0	371175.4
Length Wtd. (ft)	177.92	Wetted Per. (ft)	111.83	97.71	285.60
Min Ch El (ft)	781.19	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.72	Stream Power (lb/ft s)	488.67	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	3.36	13.67	7.52
C & E Loss (ft)	0.02	Cum SA (acres)	1.75	2.01	4.44







From: (303) 357-7310  
Kaitlin Davis  
ANTERO  
1615 Wynkoop St  
Denver, CO 80202

Origin ID: DENA



Ship Date: 01JUL15  
ActWgt: 0.5 LB  
CAD: 106592859/MNET3610

Delivery Address Bar Code



SHIP TO: (111) 111-1111

BILL SENDER

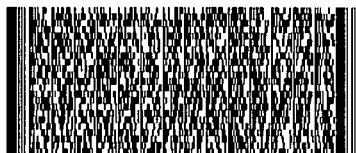
**Beth A. Rogers**  
Doddridge County Commission  
118 East Court Street  
Room 102  
WEST UNION, WV 26456

Ref #  
Invoice #  
PO #  
Dept #

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# The Doddridge Independent

## The Doddridge Independent PUBLISHER'S CERTIFICATE

I, Michael D. Zorn, Publisher of The Doddridge Independent, A newspaper of general circulation published in the town of West Union, Doddridge County, West Virginia, do hereby certify that:

**15-369 - Antero - Central Station Bridge Replacement**  
filed an application for a Floodplain Permit to develop land  
located at or about:  
**Permit Application # 15-369**  
**Central District/Central Station**  
**39.295935N/80.821517W - Panel 0115C**

was published in The Doddridge Independent  
2 times commencing on Friday, July 24, 2015 and  
Ending on Friday, July 31, 2015 at the request of:

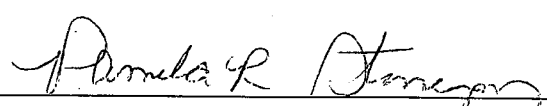
**George Eidel, Doddridge County Floodplain  
Manager**

Given under my hand this Monday, August 3, 2015

The publisher's fee for said publication is:  
**\$ 25.27 1st Run/\$ 18.95 Subsequent Runs**  
**This Legal Ad Total: \$ 44.22**

  
Michael D. Zorn  
Publisher of The Doddridge Independent

Subscribed to and sworn to before me on  
this date: 8, 3, 15

  
Notary Public in and for Doddridge County  
My Commission expires on

The 17<sup>th</sup> day of MAY 2019

Legal Advertisement:  
Doddridge County  
Floodplain Permit Application

7/24 - 7/31

Please take notice that on the 1st day of July, 2015  
**15-369 - Antero - Central Station Bridge Replacement**  
filed an application for a Floodplain Permit to develop land located at or  
about:

**Permit Application # 15-369**  
**Central District/Central Station**  
**39.295935N/80.821517W - Panel 0115C**

The Application is on file with the Clerk of the County Court and may  
be inspected or copied during regular business hours. As this project  
is outside the FEMA identified floodplain of Doddridge County,  
Doddridge County Floodplain Management has no regulatory  
authority. Any interested persons who desire to comment shall present  
the same in writing by August 10, 2015, delivered to:

Clerk of the County Court  
118 E. Court Street, West Union, WV 26456  
Beth A Rogers, Doddridge County Clerk  
George Eidel, Doddridge County Flood Plain Manager

