Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 26th day of August, 2014

EQT Production Company

filed an application for a Floodplain Permit to develop land located at or about:

Southwest District

39.155583N/80.792008W

Permit #14-264 OXF-43 Well Pad

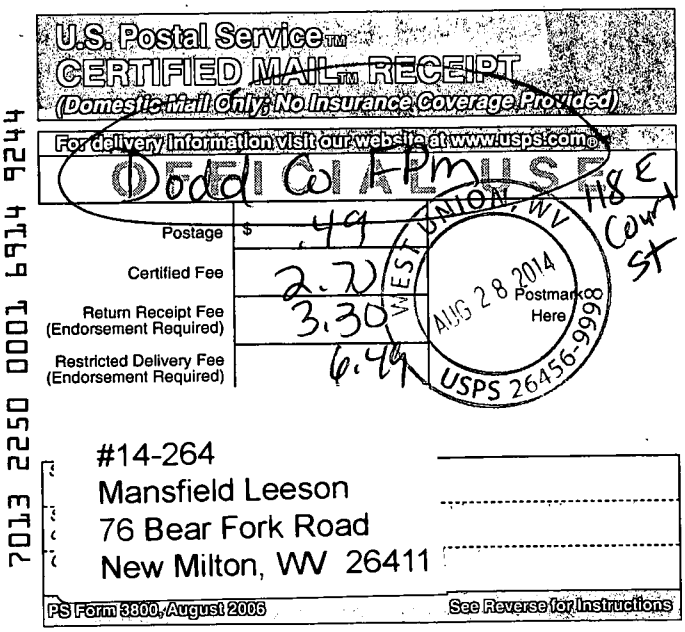
The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by **September 22, 2014,** delivered to:

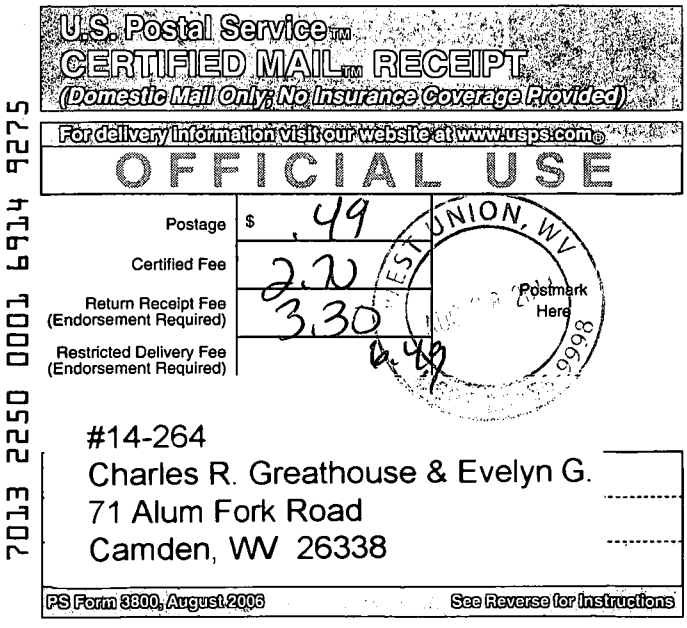
Clerk of the County Court

118 E. Court Street, West Union, WV 26456

Beth A Rogers, Doddridge County Clerk

Edwin L. "Bo" Wriston. Doddridge County Flood Plain Manager





7013 2250 0001 6914 9251

U.S. Postal Service™
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For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$ .49
Certified Fee	2.70
Return Receipt Fee (Endorsement Required)	3.30
Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
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AUG 28 2014
USPS 26456-9998

#14-264
Betty M. Ryan
4153 Grove Summers Road
New Milton, WV 26411

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9305

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Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
Postmark Here
AUG 28 2014
USPS 26456-9998

#14-264
William Lee Huff
826 Orange Ave 205
Coronado, CA 92118

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9237

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Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
Postmark Here
AUG 28 2014
USPS 26456-9998

#14-264
Wilma Lee ~~Wilson~~ LEESON
PO Box 32336
Columbus, OH 43232

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9268

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Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
Postmark Here
AUG 28 2014
USPS 26456-9998

#14-264
Cathy Jean Wetzel, et al
RT 2 Box 317
Mount Clare, WV 26408

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9299

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Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
Postmark Here
AUG 28 2014
USPS 26456-9998

#14-264
Richard F. McCullough
RT 1 Box 745
Greenwood, WV 26415

PS Form 3800, August 2006 — See Reverse for Instructions

7013 2250 0001 6914 9282

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Return Receipt Fee (Endorsement Required)	3.30
Restricted Delivery Fee (Endorsement Required)	6.49

WEST UNION, WV
Postmark Here
AUG 28 2014
USPS 26456-9998

#14-264
I.L. (Ike) Morris
PO Box 397
Glenville, WV 26351

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:

#14-264
William Lee Huff
826 Orange Ave 205
Coronado, CA 92118

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

☑ Agent
☐ Addressee

B. Received by *(Printed Name)* Debra Murad

C. Date of Delivery 9/2/14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9305

PS Form 3811, July 2013 Domestic Return Receipt

UNITED STATES POSTAL SERVICE

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

FILED

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

2014 SEP -9 AM 10: 33

KEITH A. BURDETTE
COUNTY CLERK
DODDRIDGE COUNTY, WV

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
Charles R. Greathouse & Evelyn G.
71 Alum Fork Road
Camden, WV 26338

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X C. R. Greathouse ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* C. R. Greathouse
C. Date of Delivery 9-13-14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9275

PS Form 3811, July 2013 Domestic Return Receipt

UNITED STATES POSTAL SERVICE

CHARLESTON
WV 250
13 SEP '14
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•

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
Mansfield Leeson
76 Bear Fork Road
New Milton, WV 26411

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X M. Leeson ☐ 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®
- ☐ Priority Mail Express™
- ☐ Registered
- ☐ Return Receipt for Merchandise
- ☐ Insured Mail
- ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9244

PS Form 3811, July 2013 Domestic Return Receipt

UNITED STATES POSTAL SERVICE

CHARLESTON WV 250
29 AUG '14
PM 1 L

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

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

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
Cathy Jean Wetzel, et al
RT 2 Box 317
Mount Clare, WV 26408

COMPLETE THIS SECTION ON DELIVERY

A. Signature
x Cathy Wetzel ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* CATHY WETZEL
C. Date of Delivery 8/29/14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9268

PS Form 3811, July 2013 Domestic Return Receipt

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•

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
Richard F. McCullough
RT 1 Box 745
Greenwood, WV 26415

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)*
C. Date of Delivery
8/28/14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number
(Transfer from service label) 7013 2250 0001 6914 9299

PS Form 3811, July 2013 Domestic Return Receipt

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•

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
Betty M. Ryan
4153 Grove Summers Road
New Milton, WV 26411

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X William R. Ryan ☑ Agent ☐ Addressee

B. Received by *(Printed Name)* WILLIAM R. RYAN

C. Date of Delivery 8-28-14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9251

PS Form 3811, July 2013 Domestic Return Receipt

UNITED STATES POSTAL SERVICE

WV 250
29 AUG '14
PM 1 L

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

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

#14-
Doddridge County FPM
118 East Court St STE 102
West Union, WV 26456-1262

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:

#14-264
I. L. (Ike) Morris
PO Box 397
Glenville, WV 26351

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jackie Swiger ☑ Agent ☐ Addressee

B. Received by *(Printed Name)* Jackie Swiger
C. Date of Delivery 8-29-14

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

3. Service Type
☑ Certified Mail® ☐ Priority Mail Express™
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ Collect on Delivery

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

2. Article Number *(Transfer from service label)* 7013 2250 0001 6914 9282

PS Form 3811, July 2013 Domestic Return Receipt

We answer to you.

Rettew Associates, Inc.

548360

Account Number: 003201 548360

INVOICE NUMBER	DATE		VOUCHER NO.	AMOUNT
CK RQ 8/15 BS Floodplain application fee	8/15/2014		36262	3,250.00

TOTAL: 3,250.00

Doddridge County, West Virginia

RECEIPT NO: 2949 DATE: 2014/09/18

FROM: RETTEW ASSOCIATES **AMOUNT:** $ 3,250.00

THREE THOUSAND TWO HUNDRED FIFTY DOLLARS AND 00 CENTS

FOR: #14-264 EQT OXF-43 WELL PAD

00000548360 FP-BUILDING PERMITS 020-318 **TOTAL:** $3,250.00

MICHAEL HEADLEY
SHERIFF &TREASURER

MEC
CLERK

Customer Copy

Doddridge County, West Virginia

RECEIPT NO: 4966 DATE: 2015/06/23

FROM: EQT **AMOUNT:** $ 151.98

ONE HUNDRED FIFTY ONE DOLLARS AND 98 CENTS

FOR: REIMBURSEMENT REF# 14-264

MCadr

00000436806 FP-REIMBURSEMENT 020-388 **TOTAL:** $151.98

MICHAEL HEADLEY
SHERIFF &TREASURER

MEC
CLERK

Customer Copy

14-246

EQT.

Doddridge County Sheriff
Flood Plain Ordinance Fund

1144
69-217/515

DATE 11/07/14

PAY TO THE ORDER OF CME Engineering $ 3,067.75

Three Thousand & Sixty-seven 75/100 ---------- DOLLARS

Security features included. Details on back.

CORNERSTONE BANK
West Union, WV 26456

Inv. 0037810

MEMO FP Application Review Oxford 43

Ralph Sandora Jr.
Beth A. Rogers
Sheriff

MP

⑈001144⑈ ⑆051502175⑆ 11-9649-9⑈

BLUE TRADITIONAL

CME Engineering

975 Georges Station Road
Suite 100
Greensburg, PA 15601
(724) 672-4800

Please make checks payable to:
"CME Management LLC"
And remit to the following address:
CME Management LLC
PO Box 644872
Pittsburgh, PA 15264-4872

Doddridge County
Attn: Eddwin Wriston
Flood Plain Manager
118 E. Court Street
West Union, WV 26456

INVOICE NO : 0037810
DATE : October 23, 2014
CLIENT CODE : 0000875
PROJECT CODE: W020

Ofd 43 Flood Plain App Review

For period through: 10/18/2014

For Professional Services Rendered:		Amount
Professional services performed for Flood Plain Application review for Oxford 43.		
Project Director III	14.75 Hours @ $ 139.00	2,050.25
Engineer Technician IV	13.75 Hours @ $ 74.00	1,017.50
	TOTAL FEES:	**$3,067.75**

TOTAL AMOUNT DUE: **$3,067.75**

PAYMENT DUE UPON RECEIPT
A finance charge of 1.5% per month will be assessed on all balances over 30 days.

Doddridge County Flood Plain

INVOICE 14-264

118 East Court St, Room 102
West Union WV 26456
304-873-2631

EQT PRODUCTION COMPANY
115 PROFESSIONAL PLACE
BRIDGEPORT, WV 26330

BALANCE DUE
Upon Receipt
$3,067.75

Reimbursement for the review of the OXF -43 WELL PAD, DCFPP # 14-264 by Independent Engineering Firm..

Use this space for comments to your client

Item Description	Quantity	Price Per	Total
OXF-43 Well Pad Application Review	1	$3,067.75	$3,067.75
		Subtotal	$3,067.75
		Tax - 0%	$0.00
		TOTAL	$3,067.75

#14-264

RETTEW

We answer to you.

4955 Steubenville Pke Ste 305, Pittsburgh PA 15205 • Phone: (412) 446-1728
E-mail: rettew@rettew.com • Web site: rettew.com

Engineers
Planners
Surveyors
Landscape Architects
Environmental Consultants

August 25, 2014

Mr. Edwin "Bo" Wristen
Doddridge County Commissioner / Floodplain Manager
Doddridge County Courthouse
118 East Court Street
West Union, WV 26456
304-873-2631

FILED
2014 AUG 26 PM 1:45
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

RE: OXF-43 Well Pad
Floodplain Permit Application Submission
Southwest District, Doddridge County, WV
RETTEW Project No. 092612027

Dear Mr. Wristen:

On behalf of EQT Production Company; RETTEW Associates, Inc. is pleased to submit the enclosed permit application referenced above. Included with this submission are the following:

- Floodplain Development Permit Application
- $3,250 Check (Application Fee)
- Location Map showing the site on USGS mapping
- Floodplain Study with site plans included

A gravel well pad and related infrastructure will be constructed within the Mudlick Run / Middle Fork watershed. The proposed access road will encroach within the mapped floodplain. The impact on the floodplain due to the proposed development is within acceptable limits as shown in the floodplain study included with this submission. The increase in water surface elevation was calculated to be less than one foot. Calculated change in water surface elevations are tabulated in the study, pages 2. Cross section locations are shown on the map included in the study, page 7.

Permits from the USACE will also be necessary for this Project. An application was sent to the USACE Huntington office on August 8, 2014. A copy of the approval letter will be forwarded to your office upon receipt.

If you have any questions or require clarification regarding this submission, please do not hesitate to contact me at 412-446-1728 or via email at bspray@rettew.com or Megan Landfried at 304-848-0061 or MLandfried@eqt.com.

Sincerely,

Brian D. Spray
Project Manager

Eric Hershey, P.E.
Senior Engineer

Enclosures

copy: Megan Landfried, EQT Production Company
File

\\CHOWDER\Share\Projects\09261\092612027\LD\Permits\Doddridge Floodplain\LTR-Submit-OXF43 Doddridge Floodplain.docx

OXF-43 Well Pad
Floodplain Permit Application Submission – August 25, 2014

Comments:

1. Submitted mapping needs existing and proposed features labeled (i.e. contours, roads, well pad, pond, stream names, etc.). Also please produce mapping at a larger scale of 1" = 300'.
2. Please explain the method of calculating the watershed flow to each of the streams using the USGS equation modeling. How does it take into account the site conditions and time of concentration? Add this explanation to the narrative.
3. Show calculation for the 2 year storm as referenced in the narrative. This can be shown as done for the 100 year storm using the USGS method.
4. Make sure all cross sections are perpendicular to the contours and depict an accurate representation of the runoff waters reaching the stream at the point of intersection.
5. All existing and proposed cross sections need to match between the analyses for accurate comparison of the floodplain's water surface elevations. For example, mapping shows cross section 520 for Middle Fork of Hughes Run, but this is not reflected in the Hec-Ras Analysis or Summary Tables. Please review that all analyses, reports, and mapping are consistent.
6. Does either of these streams have designated floodways? If there is a mapped floodway, the floodplain water surface elevations cannot be increased. If there is not a designated floodway, the floodplain water surface elevation cannot be increased by more than one foot. Please check state/county ordinances.
7. The narrative states there is one encroachment for the project development, two 30" pipe culvert crossing. The study shows that the placement of the pond on Middle Fork of Hughes Run raises the floodplain water surface elevation upstream by 0.5'. Does the pond encroach the floodplain, and what are the effects on the adjoining property? Where does the backwater effect end?
8. The narrative states the mapped "paved road" is Taylor Drain Road, but the additional exhibits in the report and Goggle Earth says the road name is Grove Summers Road. Please revised accordingly and be consistent throughout the report.
9. The narrative states that a topographical survey was performed for the study. Is this incorporated within the mapping or was county topography used for the floodplain study? The narrative only states it was used for "starting slopes" for normal depth calculation?
10. The existing culvert on "paved road" (County Rt. 19) is modeled with in each of the existing/ proposed studies, but the results are not clear within the narrative. Please provide more explanation.
11. Please review warning notes for Hec-Ras computations. Due to the large water surface elevation differences between cross sections, it appears that critical depth was defaulted for some of the cross sections for each stream. Additional cross sections may be needed to improve study's accuracy of the floodplain water surface elevations.
12. Include print outs of each of the cross sections depicting existing ground, proposed ground, existing water surface elevation and the proposed water surface elevation.
13. Please review manning's n values and justify the values used in this floodplain study. Reference Chow 1959 Manning's n Values.

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 Megan E Landfried

DATE 8/7/14

SECTION 2: PROPOSED 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: Megan Landfried, EQT Production Company

ADDRESS: 115 Professional Place, Bridgeport, WV 26330

TELEPHONE NUMBER: 304-848-0087

CONTRACTOR NAME: To Be Determined

ADDRESS: _____

TELEPHONE # _____

WV CONTRACTOR LICENCE # _____

ENGINEER'S NAME: Eric Hershey, RETTEW Associates Inc.

ADDRESS: 4955 Steubenville Pike, Suite 305, Pittsburgh, PA 15205

TELEHONE NUMBER: 412-446-1728

PROJECT LOCATION:

NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) _____

HUFF, RANDY E. DECEDENT'S

ADDRESS OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) _____

826 Orange Ave 205, Coronado, CA 92118

DISTRICT: SOUTHWEST

LAND BOOK DESCRIPTION: _____

DEED BOOK REFERENCE: DB: 247, Pg: 296

TAX MAP REFERENCE: 7-17-1

EXISTING BUILDINGS/USES OF PROPERTY: The subject parcel contains no buildings

NAME OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY The subject parcel contains no buildings

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY The subject parcel contains no buildings

---

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
[]	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 DEVELOPLMENT ACTIVITIES:

[] Fill [] Mining [X] Drilling [] Pipelining

[X] Grading

[] Excavation (except for STRUCTURAL DEVELOPMENT checked above)

[] Watercourse Alteration (including dredging and channel modification)

[X] Drainage Improvements (including culvert work)

[X] Road, Street, or Bridge Construction

[] Subdivision (including new expansion)

[] Individual Water or Sewer System

[X] Other (please specify)

Horizontal Well Development

C. STANDARD SITE PLAN OR SKETCH

1. **SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED (ENGINEERING PLANS MUST BE SIGNED AND SEALED).**
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/ PROPOSED CONSTRUCTION PROJECT WITHIN THE FLOODPLAIN

$ 550,000.00

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: Leeson, Wilma Lee (02-4-1)
ADDRESS: PO Box 32336
Columbus, OH 43232

NAME: Leeson, Mansfield (02-4-3)
ADDRESS: 76 Bear Fork Road
New Milton, WV 26411

NAME: Ryan, Betty M. (07-16-6)
ADDRESS: 4153 Grove Summers Road
New Milton, WV 26411

NAME: Wetzel, Cathy Jean, et al (07-16-7)
ADDRESS: RT 2 Box 317
Mount Clare, WV 26408

NAME: Greathouse, Charles R. & Evelyn G. (07-13-66)
ADDRESS: 71 Alum Fork Road
Camden, WV 26338

NAME: Morris, I. L. (Ike) (07-10-2)
ADDRESS: PO Box 397
Glenville, WV 26351

NAME: McCullough, Richard F.
ADDRESS: RT 1 Box 745
Greenwood, WV 26415

NAME: Huff, William Lee (02-1-9)
ADDRESS: 826 Orange Avenue 205
Coronado, CA 92118

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: Leeson, Wilma Lee (02-4-1)
ADDRESS: PO Box 32336
Columbus, OH 43232

NAME: Wetzel, Cathy Jean et al (07-16-7)
ADDRESS: RT 2 Box 317
Mount Clare, WV 26408

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): Megan Landfried

SIGNATURE: Megan E Landfried **DATE:** 8/7/14

After completing SECTION 2, APPLICANT should submit form and fees to Clerk of Doddridge County Court 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 FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED**).

[] Is located in Special Flood Hazard Area.

FIRM zone designation_____

100-Year flood elevation is _____NGVD .

Stream name _____.

Profile # _____.

[] Unavailable

[] The proposed development is located in a floodway.

[] See section 4 for additional instructions.

SIGNED_____ **DATE**_____

SECTION 4: ADDITIONAL INFORMATION REQUIRED FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA (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 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 proofing 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 10 lots or 2 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.
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 Flood Hazard 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 appeal.

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.

2 Actual (As Built) elevation of floodproofing is _____FT. NGVD.

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**_____

BRIAN W. ENGLE, PE
Vice President/Principal

RETTEW

(O) 717.697.3551, Ext. 3306
(M) 717.951.3530

bengle@rettew.com
rettew.com

Colorado
New York
Ohio
Pennsylvania

RETTEW SM

We answer to you.

BRIAN D. SPRAY, PE
Project Manager
Land Development Services

130 Court Street, Suite 200 • Williamsport, PA 17701
(570) 320-1708, Ext. 3622 • Mobile: (215) 534-1207
E-mail: bspray@rettew.com • Web site: rettew.com

Engineers
Planners
Surveyors
Landscape Architects
Environmental Consultants

EQT Production Company

OXF 43 Pad

Figure 2 - Aerial Basemap

Southwest Tax District, Doddridge County, WV

Project No: 092612027

Sample Point	Field Delineated Stream	Contours (20 ft Interval)	Soil Type
Photo Location	Wetland Direction	Culvert	Area of Investigation
Road Centerline	Stream Direction	Field Delineated Wetland	

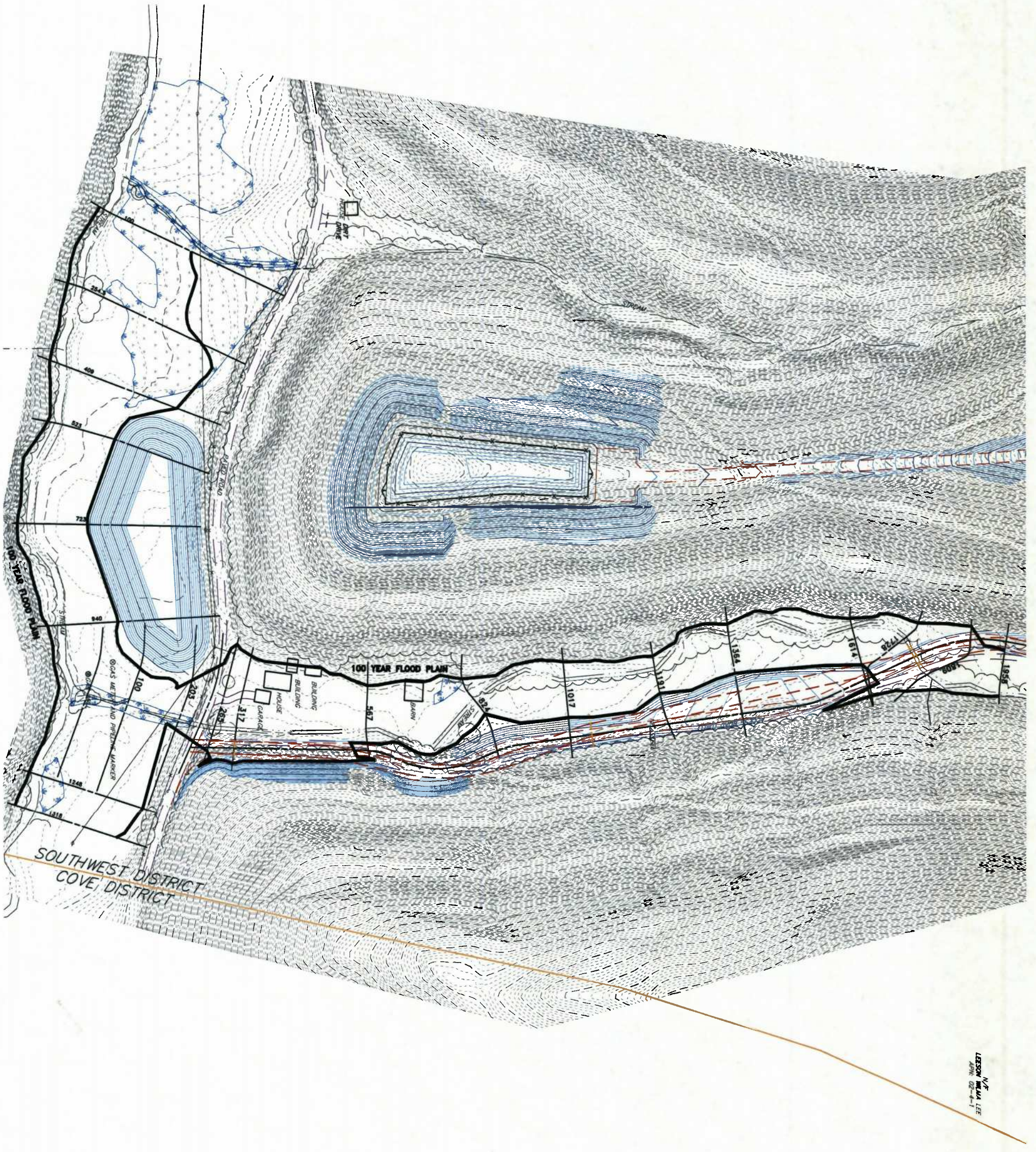
0 250 Feet

1 inch = 300 feet

EQT Where energy meets innovation. RETTEW

Drawn By: GSR | 4/15/2014

H:\Projects\09261\092612027\GIS\MapDocs\LD\092612027_OXF_43_Pad_Aerial_11X17.mxd



NOT FOR CONSTRUCTION/NOT FOR RECORDING

DWG. NO. 092612027

SHEET NO. 1 OF 1

DATE: APRIL 17, 2014

FLOOD PLAIN STUDY
SITE PLANS
FOR

OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

RETTEW

RETTEW Associates, Inc.
Twin Towers, 4955 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

Engineers • Planners • Surveyors • Landscape Architects
Environmental Consultants

CLIENT
EQT
Where energy meets innovation.
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE
1"=100'
0 50' 100' 200' 300'

MANAGER: BRIAN D. SPRAY, PE	
DESIGN BY: DAW	CHKD BY: CWW
DRAWN BY: DAW	CHKD BY: CWW
SURV. CHIEF:	FIELDBOOK NO.
DRAWING REFERENCE:	

FOR RETTEW ASSOCIATES BY:

NO.	DATE	REVISION

RETTEW

We answer to you.

FLOODPLAIN STUDY

FOR

OXF43 Well Pad

DODDRIDGE COUNTY, WEST VIRGINIA
PROJECT NO. 092612027

Prepared by:

RETTEW ASSOCIATES, INC.
4955 Steubenville Pike; Suite 305
Pittsburgh, PA 15205

August 13, 2014

TABLE OF CONTENTS

BACKGROUND

On behalf of EQT Production Company, RETTEW has prepared a Floodplain study of the area of Mudlick Run denoted as Zone 'A' on the FEMA mapping (Attachment 3) to demonstrate compliance with the Doddridge County Floodplain Ordinance. The proposed project encompasses the construction of a natural gas well pad, flowback pit, and access road. The center of the proposed well pad is at Latitude N39.55583, Longitude W80.792008. The enclosed mapping indicates the proposed project location (Attachment 2)

There is one encroachment proposed within the mapped floodplain. This encroachment consists of a permanent crossing which will serve to access the project. The crossing is designed to impact the floodplain as minimally as possible and consists of two 30 inch diameter culverts. These culverts are designed to pass a flow of 150 cfs before overtopping the road. More than the 2 year storm (110 cfs) but less than the 100 year storm flow (484 cfs). Due to the character and private nature of this proposed access road, passing the 100 year storm flow would be unreasonable and create unnecessary disturbance.

The purpose of this study is to analyze the existing and proposed conditions to provide proof that the water surface elevation difference for the 100 year flow is within allowable limits.

FLOODPLAIN STUDY

HYDROLOGY

Mudlick Run flows generally from North of the property in a South Southwest direction to County Route 19 (Taylor Drain Road) and finally into the Middle Fork of Hughes Run. The flow utilized for this flood study was computed using the equations developed in the USGS report *Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia*. A 100-year flow of 484 cfs was used for the floodplain study. A watershed map showing the drainage area from the USGS mapping is included herein. (Attachment 1)

HYDRAULICS

The Corps of Engineers' HEC-RAS computer program, version 4.1, was utilized to establish water surface elevations for the 100-year flow. The average starting slopes for normal depth calculations were obtained from the topographical survey of the area.

Mudlick Run and Middle Fork of Hughes Run have been analyzed for the existing condition and the proposed condition.The HEC-RAS cross sections and culvert (labeled as bridge in the HEC-RAS model) for the study were obtained from the 2-foot contour generated by topographical survey.

The HEC-RAS summary table is provided on the next page; however the key elements are listed below.

Mudlick Run Cross Section Water Surface Elevation Summary

Cross Section	Flow	Existing WSE	Proposed WSE	Change in WSE
1958	484.00	881.18	881.68	0.50
1809	484.00	*	881.63	-
1728	484.00	*	877.89	-
1614	484.00	877.26	877.27	0.01
1364	484.00	873.42	873.42	0
1191	484.00	870.63	870.63	0
1017	484.00	868.32	868.38	0.06
824	484.00	866.01	866.01	0
567	484.00	865.78	865.81	0.03
317	484.00	865.78	865.80	0.02
265	484.00	865.68	865.70	0.02
203	484.00	859.89	859.88	-0.01
100	484.00	858.64	858.64	0

*Cross sections 1809 and 1728 were explicitly used for the modeling of the proposed stream crossing.

Middle Fork of Hughes Run Cross Section Water Surface Elevation Summary

Cross Section	Flow	Existing WSE	Proposed WSE	Change in WSE
1318	1462.00	859.39	859.84	0.50
1248	1462.00	859.25	859.80	0.55
1171	1462.00	859.06	859.55	0.49
1094	1462.00	858.87	859.28	0.41
1017	1462.00	858.64	858.95	0.30
940	1462.00	858.13	858.13	0.00
831.5	1462.00	*	857.78	
723	1462.00	857.07	857.56	0.49
520	1462.00	*	856.54	-
409	1462.00	856.35	856.35	0.00
254.5	1462.00	856.12	856.12	0.00
100	1462.00	855.96	855.96	0.00

*Cross section 520 was explicitly used for the modeling of the proposed stockpile.

EXISTING CONDITION ANALYSIS - MUDLICK RUN

HEC-RAS Plan: Plan 30 River: Mudlick Run Reach: Main Profile: PF 1

Reach	River Sta	Profile	Q Total	Mn Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	1958	PF 1	484.00	879.95	881.18	881.18	881.73	0.021246	8.18	127.14	114.79	1.31
Main	1614	PF 1	484.00	873.91	877.26	877.26	877.84	0.005630	6.88	97.07	90.44	0.75
Main	1364	PF 1	484.00	871.71	873.42	873.42	873.91	0.010872	5.84	90.09	96.41	0.94
Main	1191	PF 1	484.00	868.33	870.63	870.63	871.26	0.009608	6.51	81.37	72.58	0.92
Main	1017	PF 1	484.00	866.49	868.32	868.32	868.83	0.008830	6.45	96.82	95.87	0.89
Main	824	PF 1	484.00	863.89	866.01	866.01	866.59	0.009495	6.26	83.00	75.48	0.91
Main	567	PF 1	484.00	861.90	865.78		865.83	0.000336	2.03	282.87	123.12	0.20
Main	317	PF 1	484.00	859.85	865.78		865.79	0.000051	1.02	575.51	173.27	0.08
Main	265	PF 1	484.00	859.46	865.68	862.32	865.78	0.000364	3.08	285.54	173.76	0.22
Main	245		Culvert									
Main	203	PF 1	484.00	858.00	859.89	859.89	860.67	0.011146	7.11	68.36	101.52	0.99
Main	100	PF 1	484.00	857.28	858.64	858.42	858.77	0.003501	3.15	191.69	256.45	0.53

PROPOSED CONDITION ANALYSIS - MUDLICK RUN

HEC-RAS Plan: Plan 21 River: Mudlick Run Reach: Main Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	1958	PF 1	484.00	879.94	881.68	881.01	881.86	0.002764	3.73	143.77	87.72	0.50
Main	1809	PF 1	484.00	877.95	881.63	879.81	881.69	0.000549	2.76	306.44	193.64	0.25
Main	1771		Culvert									
Main	1728	PF 1	484.00	875.97	877.89	877.89	878.75	0.012120	8.37	66.52	133.31	1.07
Main	1614	PF 1	484.00	873.91	877.27	877.27	877.89	0.005928	7.07	97.68	90.65	0.77
Main	1364	PF 1	484.00	871.71	873.42	873.42	873.92	0.010934	5.88	90.72	96.71	0.94
Main	1191	PF 1	484.00	868.33	870.63	870.63	871.27	0.009678	6.54	81.44	72.67	0.92
Main	1017	PF 1	484.00	866.49	868.38	868.38	868.84	0.007934	6.25	103.76	104.60	0.85
Main	824	PF 1	484.00	863.91	866.01	866.01	866.59	0.009502	6.28	84.12	77.85	0.91
Main	567	PF 1	484.00	861.90	865.81	863.91	865.87	0.000364	2.15	276.78	109.08	0.20
Main	317	PF 1	484.00	859.85	865.80	861.99	865.82	0.000054	1.12	626.77	206.19	0.08
Main	265	PF 1	484.00	859.46	865.70	862.34	865.80	0.000396	3.22	288.25	184.57	0.23
Main	245		Culvert									
Main	203	PF 1	484.00	858.00	859.88	859.88	860.67	0.011387	7.15	67.89	101.20	1.00
Main	100	PF 1	484.00	857.28	858.64	858.42	858.77	0.003501	3.15	191.69	256.45	0.53

EXISTING CONDITION ANALYSIS - MIDDLE FOR OF HUGHES RUN

HEC-RAS Plan: Hughes: Existing River: Middle Fork Hugh Reach: Main Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	1318	PF 1	1462.00	855.96	859.39		859.88	0.004457	5.64	259.25	115.86	0.66
Main	1248	PF 1	1462.00	855.88	859.25		859.60	0.002627	4.90	336.30	189.33	0.52
Main	1171.*	PF 1	1462.00	855.35	859.06		859.41	0.002207	4.94	348.76	170.83	0.49
Main	1094.*	PF 1	1462.00	854.82	858.87		859.24	0.002065	5.19	355.07	161.42	0.49
Main	1017.*	PF 1	1462.00	854.29	858.64		859.05	0.002314	5.83	345.19	152.84	0.52
Main	940	PF 1	1462.00	853.76	858.13		858.77	0.004171	7.77	286.99	135.58	0.69
Main	867.666*	PF 1	1462.00	853.17	857.78		858.48	0.004325	8.14	287.73	146.28	0.71
Main	795.333*	PF 1	1462.00	852.59	857.45	857.30	858.19	0.004198	8.37	293.58	157.21	0.71
Main	723	PF 1	1462.00	852.00	857.07	857.07	857.89	0.004286	8.81	296.03	177.79	0.72
Main	618.333*	PF 1	1462.00	851.99	856.48	856.47	857.24	0.004882	8.49	290.42	176.11	0.76
Main	513.666*	PF 1	1462.00	851.98	856.44		856.81	0.002607	6.18	384.07	189.41	0.55
Main	409	PF 1	1462.00	851.97	856.35		856.59	0.001767	5.09	488.75	257.83	0.46
Main	254.5*	PF 1	1462.00	850.98	856.12		856.36	0.001348	4.98	477.71	197.52	0.41
Main	100	PF 1	1462.00	850.00	855.96	854.34	856.19	0.001000	4.82	503.50	185.40	0.36

Asterisks (*) denote cross sections interpolated by the HEC RAS software.

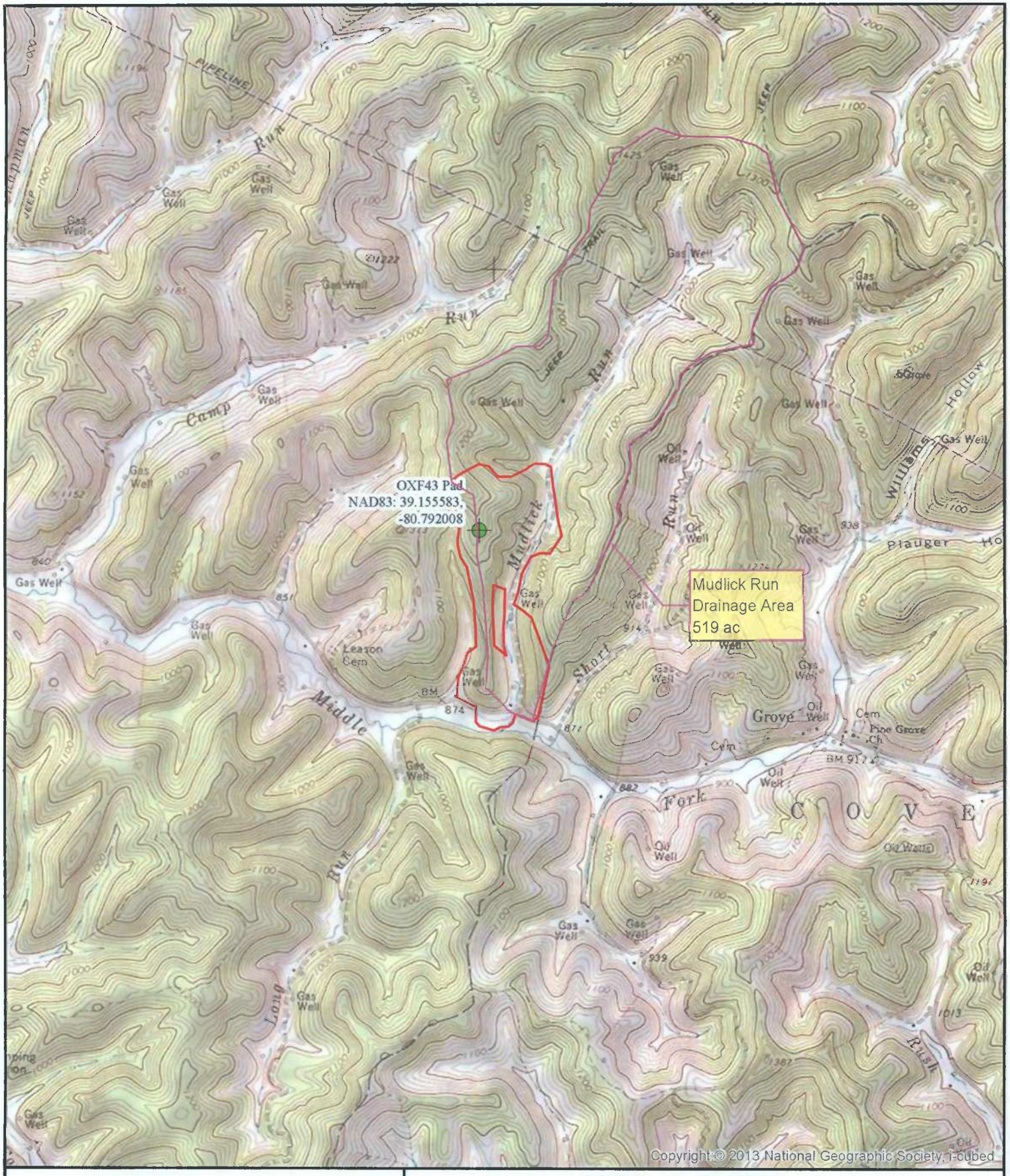
PROPOSED CONDITION ANALYSIS - MIDDLE FOR OF HUGHES

HEC-RAS Plan: Hughes Proposed River: Middle Fork Hugh Reach: Main Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main	1318	PF 1	1462.00	855.96	859.84		860.18	0.002401	4.67	319.33	150.85	0.50
Main	1248	PF 1	1462.00	855.88	859.80		860.02	0.001282	3.88	452.47	227.15	0.38
Main	1171.*	PF 1	1462.00	855.35	859.55		859.78	0.001247	4.09	421.14	158.45	0.38
Main	1094.*	PF 1	1462.00	854.82	859.28		859.54	0.001303	4.44	412.77	151.45	0.39
Main	1017.*	PF 1	1462.00	854.29	858.95		859.27	0.001624	5.14	386.94	145.60	0.44
Main	940	PF 1	1462.00	853.76	858.13		858.78	0.004153	7.75	287.48	135.67	0.69
Main	831.5*	PF 1	1462.00	852.88	857.78		858.38	0.003457	7.62	301.82	132.84	0.64
Main	723	PF 1	1462.00	852.00	857.56		858.06	0.002436	7.09	336.43	132.88	0.55
Main	520	PF 1	1462.00	852.00	856.54	856.54	857.45	0.004984	8.91	255.90	132.91	0.77
Main	409	PF 1	1462.00	851.97	856.35		856.59	0.001767	5.09	488.75	257.83	0.46
Main	254.5*	PF 1	1462.00	850.98	856.12		856.36	0.001348	4.98	477.71	197.52	0.41
Main	100	PF 1	1462.00	850.00	855.96	854.34	856.19	0.001000	4.82	503.50	185.40	0.36

Asterisks (*) denote cross sections interpolated by the HEC RAS software.

ATTACHMENTS



Area of Investigation
(107 Acres)

Southwest Tax District, Doddridge County, WV
Oxford, WV USGS 7.5' Topographic Quadrangle
4/15/2014

EQT Production Company

OXF 43 Pad

Figure 1 - Topographic Basemap

Project No: 092612027

N
W E
S

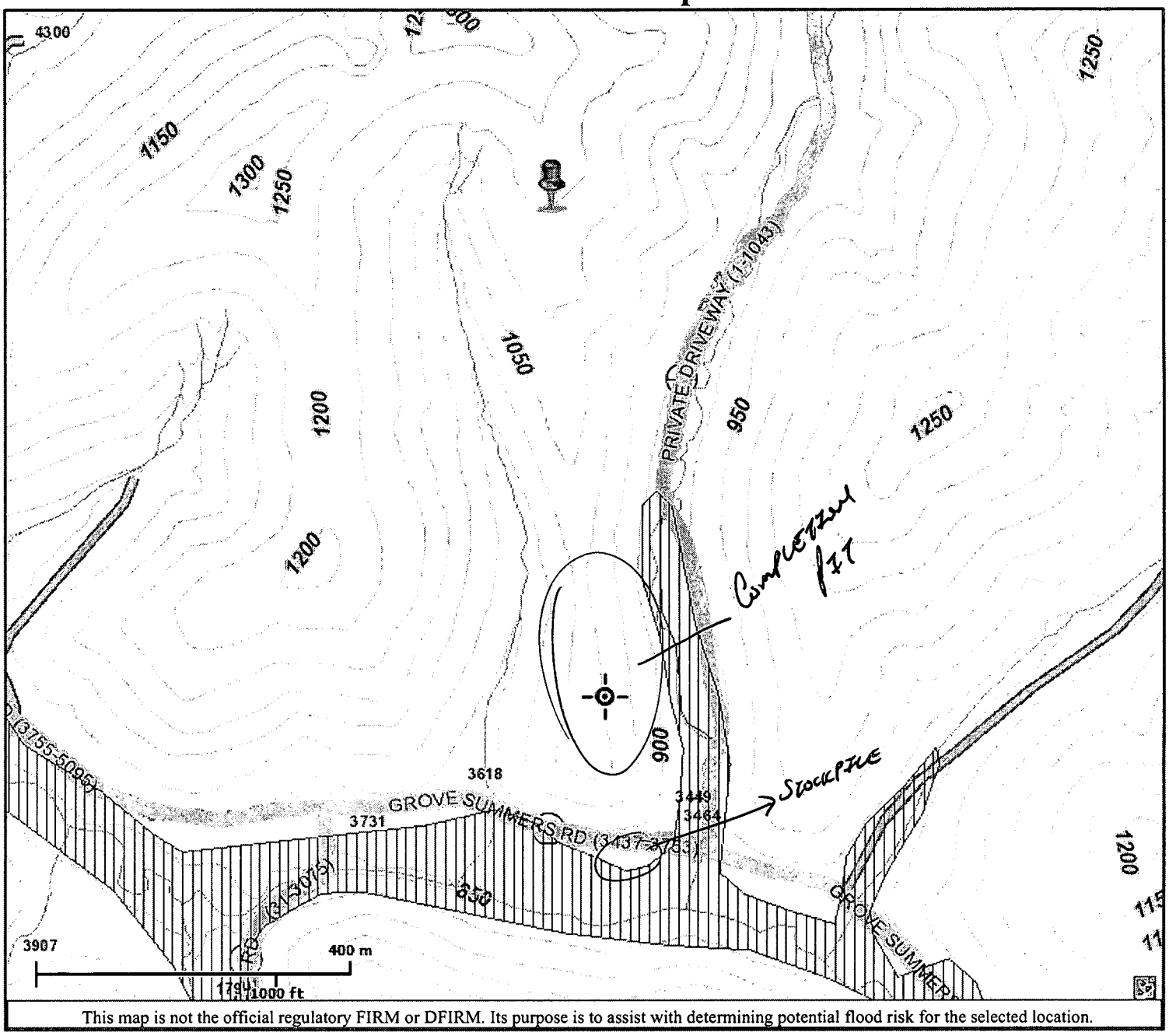
0 1,000 2,000 Feet

1 inch = 2,000 feet

EQT Where energy meets innovation. RETTEW

H:\Projects\092612027\GIS\MapDocs\LD\092612027_OXF_43_Topo_Map_8x11.mxd

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.

Map Created on 9/15/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

Cross Section Line

Base Flood Elevation Line

DFIRM Panel (Map) Index

User Notes:

14-264 ~ OXF-43 Well Pad
EQT Production Company

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.

WV Flood Tool is supported by FEMA, WV NFIP Office, and WV GIS Technical Center (http://www.MapWV.gov/flood)

Flood Hazard Area:
Advisory Flood Height: N/A
Water Depth: N/A

Elevation: About 1002 feet
Location (long, lat): 80.791229 W, 39.149700 N
Location (UTM 17N): (518040, 4333410)
FEMA Issued Flood Map: 54017C0225C
Contacts: Doddridge County
CRS Information: N/A
Flood Profile: No Profile
HEC-RAS Model: No Model
Parcel Number:

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.

Map Created on 9/15/2014

Location of the mouse click

Approximate Study (Zone A)

Detailed Study (Zone AE, AH, AO)

Floodway

Flood Water Depth (HEC-RAS)

K—K **Cross Section Line**

810 **Base Flood Elevation Line**

DFIRM Panel (Map) Index

User Notes:

14-264 ~ OXF-43 Well Pad
EQT Production Company

Disclaimer:

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Flood Hazard Area:
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Location (long, lat): 80.791229 W, 39.149700 N
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FEMA Issued Flood Map: 54017C0225C
Contacts: Doddridge County
CRS Information: N/A
Flood Profile: No Profile
HEC-RAS Model: No Model
Parcel Number:

Area of Investigation
(107 Acres)

Southwest Tax District, Doddridge County, WV
Oxford, WV USGS 7.5' Topographic Quadrangle

4/15/2014

EQT Production Company

OXF 43 Pad

Figure 1 - Topographic Basemap

Project No: 092612027

N
W E
S

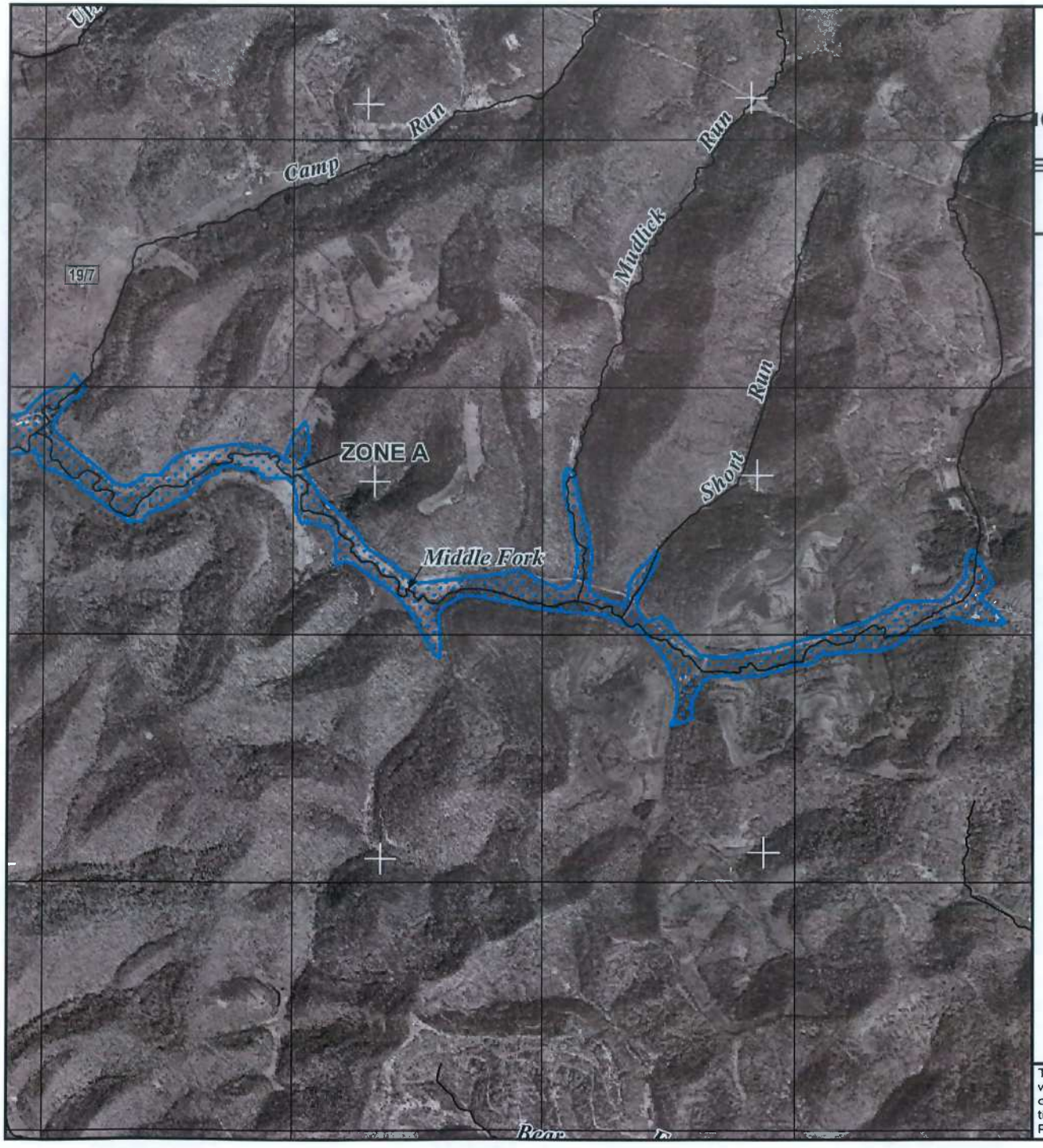
0 1,000 2,000 Feet

1 inch = 2,000 feet

EQT Where energy meets innovation.

RETTEW.

H:\Projects\092612\092612027\GIS\MapDocs\LD\092612027_OXF_43_Topo_Map_8x11.mxd



MAP SCALE 1" = 2000'

1000 0 2000 4000

FEET

METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0225C

FIRM

FLOOD INSURANCE RATE MAP

DODDRIDGE COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 225 OF 325

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DODDRIDGE COUNTY	540024	0225	C

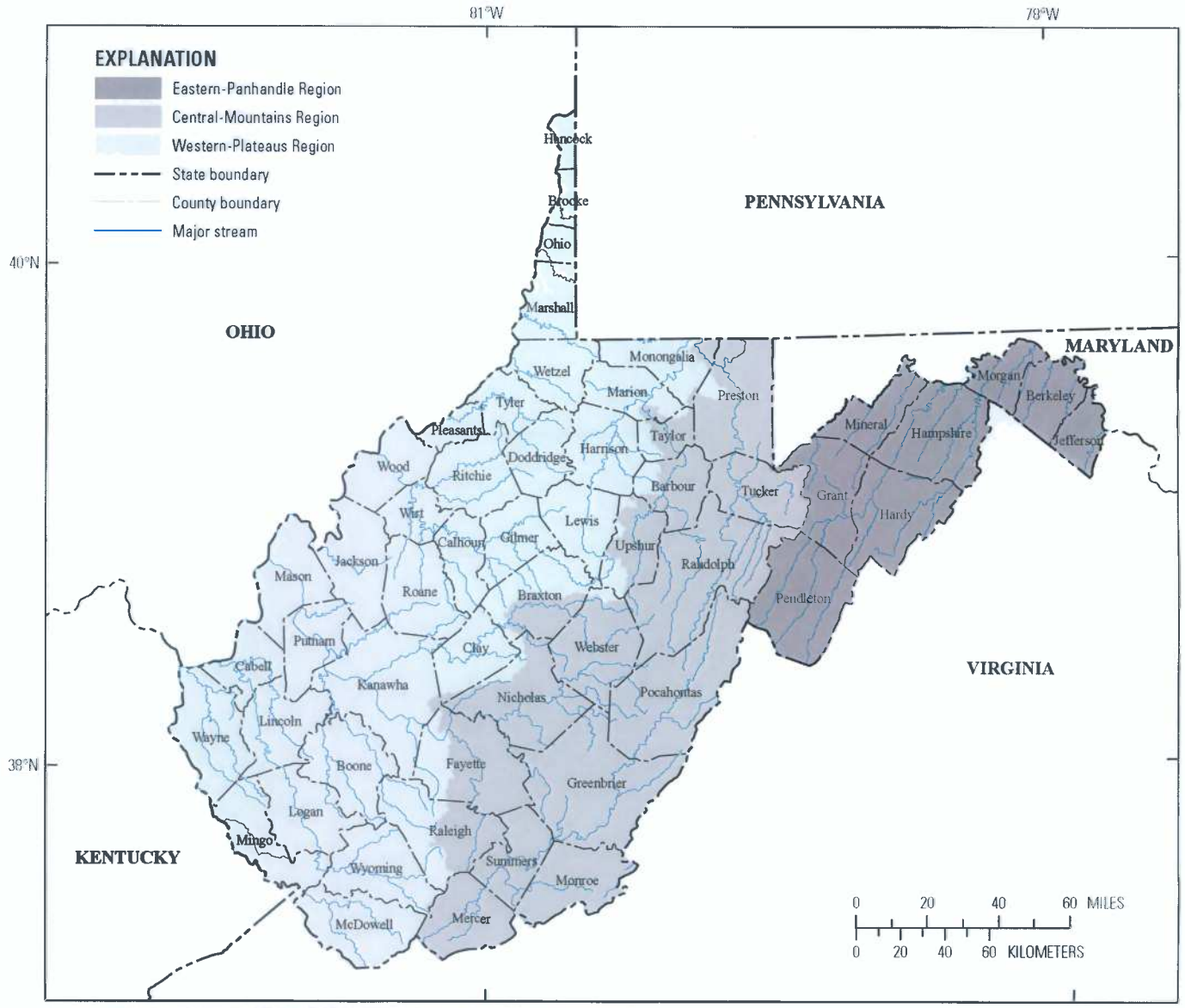
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
54017C0225C

MAP REVISED
OCTOBER 4, 2011

Federal Emergency Management Agency

FLOW CALCULATIONS



Base from U.S. Geological Survey 1:100,000 digital line graphics for state boundaries and streams and from the West Virginia Department of Environmental Protection 1:24,000 digital data for county boundaries. Universal Transverse Mercator projection, zone 17, NAD 83.

Figure 4. The Eastern Panhandle, Central Mountains, and Western Plateaus Regions of West Virginia for which equations for estimation of flood frequency discharges were developed in this study.

Table 4. Equations used to estimate selected flood-frequency discharges for streams in the Eastern Panhandle, Central Mountains, and Western Plateaus Regions of West Virginia.

[PK(n_n), peak discharge in cubic feet per second for the (n.n)-year recurrence interval; PK(n), peak discharge in cubic feet per second for the (n)-year recurrence interval; %, percent; AOP, annual-occurrence probability; DRNAREA, drainage area in square miles]

Equation	Standard error of the model, in percent	Average standard error of sampling, in percent	Average prediction error, in percent	Equivalent years of record, unitless
Eastern Panhandle Region (Range in DRNAREA from 0.21 to 1,461 for 57 streamgage stations)				
PK1_1(90%AOP) = 29.6 DRNAREA $^{0.818}$	43.4	10.3	44.8	3.4
PK1_5(67%AOP) = 46.4 DRNAREA $^{0.828}$	35.7	8.9	36.9	3.3
PK2(50%AOP) = 59.8 DRNAREA $^{0.832}$	32.1	8.6	33.4	4.1
PK5(20%AOP) = 105 DRNAREA $^{0.838}$	25.6	8.9	27.2	10.6
PK10(10%AOP) = 145 DRNAREA $^{0.842}$	22.5	9.5	24.5	19.1
PK25(4%AOP) = 204 DRNAREA $^{0.848}$	19.7	10.3	22.4	34.1
PK50(2%AOP) = 254 DRNAREA $^{0.852}$	18.6	11.1	21.7	46.1
PK100(1%AOP) = 307 DRNAREA $^{0.855}$	18.3	11.6	21.7	56.7
PK200(0.5%AOP) = 365 DRNAREA $^{0.859}$	18.4	12.4	22.4	64.7
PK500(0.2%AOP) = 447 DRNAREA $^{0.864}$	19.4	13.5	23.8	70.9
Central Mountains Region (Range in DRNAREA from 0.10 to 1,619 for 83 streamgage stations)				
PK1_1(90%AOP) = 33.4 DRNAREA $^{0.914}$	40.0	8.3	41.0	2.4
PK1_5(67%AOP) = 53.8 DRNAREA $^{0.887}$	34.6	7.3	35.4	2.0
PK2(50%AOP) = 69.4 DRNAREA $^{0.873}$	33.4	7.3	34.2	2.1
PK5(20%AOP) = 116 DRNAREA $^{0.845}$	34.1	8.0	35.1	3.2
PK10(10%AOP) = 153 DRNAREA $^{0.831}$	36.3	8.6	37.4	4.0
PK25(4%AOP) = 206 DRNAREA $^{0.816}$	39.9	9.8	41.2	4.8
PK50(2%AOP) = 250 DRNAREA $^{0.807}$	42.9	10.6	44.4	5.3
PK100(1%AOP) = 297 DRNAREA $^{0.800}$	46.2	11.3	47.9	5.6
PK200(0.5%AOP) = 347 DRNAREA $^{0.793}$	49.7	12.0	51.5	5.9
PK500(0.2%AOP) = 420 DRNAREA $^{0.785}$	54.3	13.1	56.3	6.1
Western Plateaus Region (Range in DRNAREA from 0.13 to 1,516 for 106 streamgage stations)				
PK1_1(90%AOP) = 56.9 DRNAREA $^{0.763}$	38.2	7.6	39.1	3.8
PK1_5(67%AOP) = 97.8 DRNAREA $^{0.741}$	33.4	6.5	34.1	2.8
PK2(50%AOP) = 129 DRNAREA $^{0.730}$	31.6	6.1	32.2	2.8
PK5(20%AOP) = 221 DRNAREA $^{0.710}$	29.3	6.5	30.0	4.4
PK10(10%AOP) = 292 DRNAREA $^{0.699}$	28.9	6.5	29.7	5.9
PK25(4%AOP) = 391 DRNAREA $^{0.688}$	29.4	7.3	30.3	7.9
PK50(2%AOP) = 472 DRNAREA $^{0.681}$	30.2	7.6	31.3	9.1
PK100(1%AOP) = 557 DRNAREA $^{0.674}$	31.4	8.0	32.5	10.1
PK200(0.5%AOP) = 647 DRNAREA $^{0.668}$	32.7	8.3	33.9	10.8
PK500(0.2%AOP) = 775 DRNAREA $^{0.661}$	34.8	8.9	36.1	11.4

Mudlick Run

519 ac drainage area = 0.810938sqmi
557*(0.810938)^0.674 = 484 cfs

Middle Fork of Hughes River

2,679 ac drainage area = 4.185937sqmi
557*(4.185937)^0.674 = 1,462 cfs

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Prepared in cooperation with the West Virginia Department of Transportation, Division of Highways

Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia

Scientific Investigations Report 2010–5033

U.S. Department of the Interior
U.S. Geological Survey

Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia

By Jeffrey B. Wiley and John T. Atkins, Jr.

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U.S. Department of the Interior
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U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2010

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Suggested citation:
Wiley, J.B., and Atkins, J.T., Jr., 2010, Estimation of flood-frequency discharges for rural, unregulated streams in West Virginia: U.S. Geological Survey Scientific Investigations Report 2010–5033, 78 p.

ISBN 978-1-4113-2769-6

EXISTING HEC-RAS OUTPUT

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: Oxfrd43
Project File : Oxfrd43.prj
Run Date and Time: 3/4/2014 4:39:38 PM

Project in English units

PLAN DATA

Plan Title: Plan 30
Plan File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.p30

Geometry Title: Oxford 43 mudlick Only Existing 030314
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g06

Flow Title : Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Plan Summary Information:

Number of:	Cross Sections	= 11	Multiple Openings	=	0
	Culverts	= 1	Inline Structures	=	0
	Bridges	= 0	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: Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Mudlick Run	Main	1958	484

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Mudlick Run	Main	PF 1		

Normal S = 0.0035

GEOMETRY DATA

Geometry Title: Oxford 43 mudlick Only Existing 030314
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g06

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1958

INPUT
Description: Mudlick XS11.1
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	890	17.3	880	35.05	879.93	79.71	880.01	91.15	879.982
104.35	879.95	113.84	880.01	137.56	881.72	152.64	889.69		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	91.15	.03	113.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
91.15	113.84	235	344	243	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1614

INPUT
Description: XS10
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	890	16.16	882	23.66	880.55	41.11	878	149.15	876
156.73	874	160.11	873.91	163.52	874	169.68	876.07	193.3	889.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.03	149.15	.03	169.68	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
149.15	169.68	249	249	244	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1364

INPUT
Description: Mudlick XS9
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	888.6	11.5	882	30.78	880	35.97	878	61.53	876
127.79	873.05	150	872.642	200.72	871.71	212.53	873.031	221.19	874
248.35	891.16								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	150	.03	212.53	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150	212.53	137	173	160	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1191

INPUT
Description: XS8
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	35.33	874	55.42	872	112.37	869.79	140	868.33
157.34	869.88	173.85	872	190.2	880				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	112.37	.03	157.34	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
112.37	157.34	200	173	173	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1017

INPUT
Description: XS7
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	26.59	874	29.62	871.99	37.74	870	94.83	868
135.95	867.04	147.17	866.51	153.08	866.49	158.65	866.52	167.89	867.116
180.67	867.94	208.15	880						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	135.95	.03	167.89	.05

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

135.95	167.89	141	193	193	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 824

INPUT
Description: XS6

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	42.75	870	97.84	865.428	115.04	864	120.1	863.89
124.94	864	147.59	865.28	166.17	865.94	179.58	871.15	214.85	879.93

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	97.84	.03	147.59	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
97.84	147.59	256	259	181	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 567

INPUT
Description: Mudlick XS5.1

Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	7.82	866	32.4	864	37.43	863	42.97	862
46.74	861.9	87.06	863.05	119.62	863.99	135.39	866	153.85	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	37.43	.03	87.06	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
37.43	87.06	260	250	222	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 317

INPUT
Description: XS5

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	869.96	5.19	866	20.27	864	25	861.937	29.44	860
35.45	859.85	86.2	862	172.74	864	197.49	869.98		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	25	.03	86.2	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
25	86.2	61	52	33	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 265

INPUT
Description: XS4
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	868.29	11.64	865.35	29.9	860.83	32.12	860.062	33.86	859.46
40.32	859.85	43.15	859.79	46.45	859.84	48.32	859.97	80.97	861.33
92.54	863.28	105	862.95	121.21	863.4	163.77	863.56	177.51	864.77
192.08	866.8	212.89	867.88	219.34	869.98				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.12	.03	48.32	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
32.12	48.32	147	72	84	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	26	865.58	T
53	219.34	864.64	T

CULVERT

RIVER: Mudlick Run
REACH: Main RS: 245

INPUT
Description: 60" Culvert
Distance from Upstream XS = 28
Deck/Roadway Width = 18
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	867.09		9	866.19		83	863.7	
163	865.82		210	868.9				

Upstream Bridge Cross Section Data
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	868.29	11.64	865.35	29.9	860.83	32.12	860.062	33.86	859.46
40.32	859.85	43.15	859.79	46.45	859.84	48.32	859.97	80.97	861.33
92.54	863.28	105	862.95	121.21	863.4	163.77	863.56	177.51	864.77
192.08	866.8	212.89	867.88	219.34	869.98				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	32.12	.03	48.32	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
32.12	48.32	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	26	865.58	T
53	219.34	864.64	T

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
75	868.98		106	869.48		143	866.19	
218	863.7		286	865.82		343	868.9	

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     860   58.99  860.82  111.27  860.81  124.27  860.46  142.96   860.5
  153.53  859.67  157.36     858  184.01     858  185.61  858.56  187.83  858.48
  191.09  858.92  203.14  859.41  208.93  859.48  227.43  859.29  251.77  859.86
  265.95   860.6   280.6  860.93  294.69   861.1  317.21  861.07   342.8  861.33
  355.12  861.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035  153.53     .03  203.14    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        153.53  203.14            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     146  866.43          F
     196  355.12  864.61          F

Upstream Embankment side slope                =    1.25 horiz. to 1.0 vertical
Downstream Embankment side slope              =    1.25 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins           =     864
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       5
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
              17.7      38     .024     .024        0                    .9
   1
Upstream   Elevation =  857.73
           Centerline Station =  40
Downstream Elevation =  857.67
           Centerline Station =  171

CROSS SECTION


RIVER: Mudlick Run
REACH: Main               RS: 203

INPUT
Description: XS3
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     860   58.99  860.82  111.27  860.81  124.27  860.46  142.96   860.5
  153.53  859.67  157.36     858  184.01     858  185.61  858.56  187.83  858.48
  191.09  858.92  203.14  859.41  208.93  859.48  227.43  859.29  251.77  859.86
  265.95   860.6   280.6  860.93  294.69   861.1  317.21  861.07   342.8  861.33
  355.12  861.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035  153.53     .03  203.14    .035

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

153.53	203.14		104	103	99	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	146	866.43	F
196	355.12	864.61	F

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 100

INPUT
Description: XS2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	858.39	68.23	858.06	141.57	858	179.35	857.28	234.14	857.53
244.06	858.025	267.61	859.2	333.91	860.01				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	141.57	.03	244.06	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.57	244.06	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Mudlick Run

Reach	River Sta.	n1	n2	n3
Main	1958	.1	.03	.035
Main	1614	.03	.03	.05
Main	1364	.03	.03	.05
Main	1191	.03	.03	.05
Main	1017	.03	.03	.05
Main	824	.03	.03	.03
Main	567	.03	.03	.03
Main	317	.05	.03	.03
Main	265	.05	.03	.03
Main	245	Culvert		
Main	203	.035	.03	.035
Main	100	.035	.03	.035

SUMMARY OF REACH LENGTHS

River: Mudlick Run

Reach	River Sta.	Left	Channel	Right
Main	1958	235	344	243
Main	1614	249	249	244
Main	1364	137	173	160
Main	1191	200	173	173
Main	1017	141	193	193
Main	824	256	259	181
Main	567	260	250	222
Main	317	61	52	33
Main	265	147	72	84

Main	245	Culvert		
Main	203	104	103	99
Main	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Mudlick Run

Reach	River Sta.	Contr.	Expan.
Main	1958	.1	.3
Main	1614	.1	.3
Main	1364	.1	.3
Main	1191	.1	.3
Main	1017	.1	.3
Main	824	.1	.3
Main	567	.1	.3
Main	317	.1	.3
Main	265	.1	.3
Main	245	Culvert	
Main	203	.1	.3
Main	100	.1	.3

HEC-RAS Version 4.1.0 Jan 2010
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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: Oxfrd43
Project File : Oxfrd43.prj
Run Date and Time: 4/15/2014 4:52:29 PM

Project in English units

PLAN DATA

Plan Title: Plan 33
Plan File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.p33

Geometry Title: Oxford 43 Hughes Only
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g02

Flow Title : Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Plan Summary Information:

Number of:	Cross Sections	= 14	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Middle Fork Hugh	Main	1318	1462

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Middle Fork Hugh	Main	PF 1	Normal S = 0.001	

GEOMETRY DATA

Geometry Title: Oxford 43 Hughes Only
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g02

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1318

INPUT
Description: XS7
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	16.87	859.37	19.72	858	32.02	855.96	56.42	855.99
110.39	858	132.94	859.4	179.65	860	206.04	860.32	238.12	860.02
255.6	862	279.52	869.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	16.87	.03	132.94	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
16.87	132.94	70	70	69	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1248

INPUT
Description: XS6
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	14.58	858	16.28	856	32.09	855.88	62.1	856.01
119.41	858	246.57	859.91	267.85	869.36				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	14.58	.03	119.41	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14.58	119.41	71.75	77	99.25	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1171.*

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.96	866.56	17.11	857.47	18.8	855.86	24.12	855.47
34.54	855.35	58.16	855.48	85.26	856.4	103.28	857.49	134.68	857.77
196.61	859.34	234.76	859.73	261.88	860.32	270.13	862.63	288.42	869.52

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	17.11	.03	103.28	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.11	103.28	71.75	77	99.25	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1094.*

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	4.54	865.89	19.64	856.94	21.32	855.71	26.62	854.98
37	854.82	54.23	854.94	73.99	855.6	87.14	856.97	124.77	857.16
198.99	859.56	244.69	859.88	277.19	860.73	287.08	862.41	309	869.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.64	.03	87.14	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
19.64	87.14	71.75	77	99.25	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1017.*

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	5.13	865.22	22.17	856.41	23.85	855.57	29.12	854.49
39.45	854.29	50.29	854.41	62.73	854.8	71	856.46	114.86	856.55
201.36	859.78	254.63	860.02	292.51	861.15	304.02	862.2	329.58	869.83

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	22.17	.03	71	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
22.17	71	71.75	77	99.25	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 940

INPUT
Description: XS5

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	5.71	864.55	24.7	855.88	31.62	854	41.9	853.76
51.47	854	54.87	855.95	104.95	855.94	203.73	860	264.56	860.17
320.97	861.98	350.15	869.99						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	24.7	.03	54.87	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.7	54.87	67.67	72.33	59.33	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 867.666*

INPUT
Description:

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	4.85	865.15	20.99	855.32	26.3	853.77	34.2	853.17
39.06	853.17	46.22	853.83	48.76	855.3	94.06	855.95	100.42	855.95
146.2	857.15	202.32	859.21	207.3	859.27	251.99	859.42	265.07	859.58
311.49	861.02	323.26	861.72	330.75	863.34	343.72	866.93	353.36	869.92

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	20.99	.03	48.76	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
20.99	48.76	67.67	72.33	59.33	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 795.333*

INPUT
Description:

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.99	865.75	17.27	854.77	20.99	853.55	26.5	852.59
36.22	852.59	40.97	853.66	42.66	854.66	89.34	855.96	95.9	855.96
143.07	856.53	200.91	858.42	206.04	858.52	252.09	858.71	265.57	858.99
313.41	860.42	325.54	861.46	333.26	862.7	346.63	866.43	356.56	869.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	17.27	.03	42.66	.04

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
17.27	42.66	67.67	72.33	59.33	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 723

INPUT
Description: XS4

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	13.56	854.21	18.8	852	33.38	852	36.55	854.01
84.62	855.97	139.94	855.92	204.78	857.78	252.2	858	315.34	859.83
335.78	862.07	349.54	865.94	359.77	869.78				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	13.56	.03	36.55	.04

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
13.56	36.55	114	104.67	66	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 618.333*

INPUT
Description:

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	19.18	854.16	24.25	852.75	29.45	851.99	39.17	851.99
43.57	852.73	47.25	854.01	94.18	855.31	120.83	855.29	148.18	855.34
185.28	856.15	205.11	857.06	211.47	857.19	257.76	857.36	267.7	857.57
313.79	859.11	319.39	859.68	339.34	862.79	347.18	864.93	352.77	866.23
362.76	869.19								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.18	.03	47.25	.04

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
19.18	47.25	114	104.67	66	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 513.666*

INPUT
Description:

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	24.81	854.1	32.35	852.37	40.09	851.98	44.95	851.98
52.03	852.37	57.96	854	103.73	854.65	129.74	854.64	156.41	854.76
192.61	855.3	211.96	856.53	218.16	856.6	263.31	856.73	273.02	856.84
317.97	858.55	323.44	859.52	342.9	863.51	350.55	865.54	356.01	866.52
365.75	868.59								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	24.81	.03	57.96	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.81	57.96	114	104.67	66	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 409

INPUT
Description: XS3
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	30.43	854.05	40.45	852	50.74	851.97	60.49	852.01
68.66	854	138.64	853.98	199.94	854.44	218.8	856	278.33	856.11
322.16	858	353.92	866.14	368.74	868				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	30.43	.03	68.66	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
30.43	68.66	158.5	154.5	138	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 254.5*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	27.24	853.03	32.9	851.51	38.72	850.98	47.64	850.98
55.32	851.54	61.76	852.98	138.05	853.94	149.05	854.12	204.88	855.29
225.44	856.44	257.53	857.03	290.34	857.66	338.12	859.49	364.28	863.05
372.75	865.37	388.9	868.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	27.24	.03	61.76	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.24	61.76	158.5	154.5	138	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 100

INPUT
Description: XS1
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	24.06	852	26.69	850	44.54	850	54.85	851.96
149.37	854.18	266.82	858	382.41	861.95	409.07	869.66		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	24.06	.03	54.85	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
24.06	54.85	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Middle Fork Hugh

Reach	River Sta.	n1	n2	n3
Main	1318	.1	.03	.04
Main	1248	.1	.03	.04
Main	1171.*	.1	.03	.04
Main	1094.*	.1	.03	.04
Main	1017.*	.1	.03	.04
Main	940	.1	.03	.04
Main	867.666*	.1	.03	.04
Main	795.333*	.1	.03	.04
Main	723	.1	.03	.04
Main	618.333*	.1	.03	.04
Main	513.666*	.1	.03	.04
Main	409	.1	.03	.04
Main	254.5*	.1	.03	.04
Main	100	.1	.03	.04

SUMMARY OF REACH LENGTHS

River: Middle Fork Hugh

Reach	River Sta.	Left	Channel	Right
Main	1318	70	70	69
Main	1248	71.75	77	99.25
Main	1171.*	71.75	77	99.25
Main	1094.*	71.75	77	99.25
Main	1017.*	71.75	77	99.25
Main	940	67.67	72.33	59.33
Main	867.666*	67.67	72.33	59.33
Main	795.333*	67.67	72.33	59.33
Main	723	114	104.67	66
Main	618.333*	114	104.67	66
Main	513.666*	114	104.67	66
Main	409	158.5	154.5	138
Main	254.5*	158.5	154.5	138
Main	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Middle Fork Hugh

Reach	River Sta.	Contr.	Expan.
Main	1318	.1	.3
Main	1248	.1	.3
Main	1171.*	.1	.3
Main	1094.*	.1	.3
Main	1017.*	.1	.3

Main	940	.1	.3
Main	867.666*	.1	.3
Main	795.333*	.1	.3
Main	723	.1	.3
Main	618.333*	.1	.3
Main	513.666*	.1	.3
Main	409	.1	.3
Main	254.5*	.1	.3
Main	100	.1	.3

PROPOSED HEC-RAS OUTPUT

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: Oxfrd43
Project File : Oxfrd43.prj
Run Date and Time: 3/4/2014 10:45:31 AM

Project in English units

PLAN DATA

Plan Title: Plan 29
Plan File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS files\Oxfrd43.p29

Geometry Title: Oxford 43 mudlick Only Proposed 030314.
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS files\Oxfrd43.g05

Flow Title : Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS files\Oxfrd43.f01

Plan Summary Information:

Number of:	Cross Sections	= 13	Multiple Openings	=	0
	Culverts	= 2	Inline Structures	=	0
	Bridges	= 0	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: Flow 01

Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS files\Oxfrd43.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Mudlick Run	Main	1958	484

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Mudlick Run	Main	PF 1		

Normal S = 0.0035

GEOMETRY DATA

Geometry Title: Oxford 43 mudlick Only Proposed 030314.
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS files\Oxfrd43.g05

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1958

INPUT
Description: Mudlick XS11.1

Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	890	17.29	880	34.99	879.94	58.05	879.974	75.81	880
93.69	880	98.66	879.98	107.86	884.52	118.87	884.72	129.87	884.47
137.38	881.69	144.78	884.68	153.23	890.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	17.29	.03	58.05	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.29	58.05	203	146	69	.1	.3

Right Levee Station= 118.87 Elevation= 884.72

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1809

INPUT
Description: Mudlick XS11.02

Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	889.43	17.87	883.59	40.45	879.56	51.75	878.8	60.2	879
71.91	878.33	75.04	878	82.96	877.95	92.88	878	107.09	878.03
132.62	878.02	171.82	878.9	181.87	879.09	185.65	880.98	196.76	881.25
207.87	881.07	210.64	879.71	219.61	880	225.26	883.23	235.59	889.83

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	75.04	.03	92.88	.035

Bank Sta: Left 75.04 Right 92.88 Lengths: Left Channel 40 Right 83 Coeff Contr. .1 Expan. 101 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	52	880.6	T
102	197.98	880.6	T

Right Levee Station= 196.76 Elevation= 881.25

CULVERT

RIVER: Mudlick Run
REACH: Main RS: 1771

INPUT
Description: Prop Crossing
Distance from Upstream XS = 40
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	880.6		50	880.6		100	880.6	
150	880.74		180	881.23		198	881.25	
235	881.23							

Upstream Bridge Cross Section Data
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	889.43	17.87	883.59	40.45	879.56	51.75	878.8	60.2	879
71.91	878.33	75.04	878	82.96	877.95	92.88	878	107.09	878.03
132.62	878.02	171.82	878.9	181.87	879.09	185.65	880.98	196.76	881.25
207.87	881.07	210.64	879.71	219.61	880	225.26	883.23	235.59	889.83

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	75.04	.03	92.88	.035

Bank Sta: Left 75.04 Right 92.88 Coeff Contr. .1 Expan. .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	52	880.6	T
102	197.98	880.6	T

Right Levee Station= 196.76 Elevation= 881.25

Downstream Deck/Roadway Coordinates num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	880.6		25	879.68		50	880.6	
100	880.6		150	880.6		200	880.6	
226	880.6							

Downstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	889.45	15.48	882	22.69	880.6	37.03	878.51	40.93	880.42
52.28	880.63	63.64	880.39	70.29	877.46	120.55	876.97	159.51	876.02
168.04	875.97	173.34	876	204.26	878	226.83	890.74		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
      0    .035  159.51     .03  173.34    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        159.51  173.34            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      22     143   880.6       T
     181  226.83   880.6       T
Left Levee      Station=   52.28      Elevation=  880.63

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      Circular     2.5
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
                23      42      .02       .02        .5                    .9
   1
Number of Barrels =  2
Upstream   Elevation =  877.4
Centerline Stations
    Sta.    Sta.
      75      80
Downstream Elevation =  875.5
Centerline Stations
    Sta.    Sta.
     159     164

CROSS SECTION


RIVER: Mudlick Run
REACH: Main              RS: 1728

INPUT
Description: Mudlick XS11
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  889.45   15.48     882   22.69   880.6   37.03  878.51   40.93  880.42
   52.28  880.63   63.64  880.39   70.29  877.46  120.55  876.97  159.51  876.02
  168.04  875.97  173.34     876  204.26     878  226.83  890.74

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035  159.51     .03  173.34    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        159.51  173.34                2     114     139             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      22     143   880.6       T
     181  226.83   880.6       T
Left Levee      Station=   52.28      Elevation=  880.63
```

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1614

INPUT
Description: XS10
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	890	16.16	881.98	22.93	880.7	37.36	878.69	40.85	880.47
51.95	880.67	63.11	880.44	68.98	877.49	149.15	876	156.73	874
160.11	873.91	163.52	874	169.68	876.07	193.3	889.9		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	149.15	.03	169.68	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
149.15	169.68	249	244	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1364

INPUT
Description: Mudlick XS9
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	888	11.5	882	20	881.16	31.91	887.09	42.92	887.3
53.93	887.07	77.53	875.26	127.79	873.05	150	872.642	200.72	871.71
212.53	873.031	221.19	874	248.35	891.16				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	150	.03	212.53	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
150	212.53	137	173	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1191

INPUT
Description: XS8
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	9.37	878.09	19.63	882.96	31.03	883.09	42.38	882.79
64.8	871.63	112.37	869.79	140	868.33	157.34	869.88	173.85	872
190.2	880								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	112.37	.03	157.34	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
112.37	157.34	200	173	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 1017

INPUT
Description: XS7
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	880	14.47	875.56	27.57	882.1	38.58	882.32	49.59	882.1
77.18	868.32	95.89	867.99	135.95	867.04	147.17	866.51	153.08	866.49
158.65	866.52	167.89	867.116	180.67	867.94	208.15	880		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	135.95	.03	167.89	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.95	167.89	141	193	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 824

INPUT
Description: XS6
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	877.37	4.83	879.36	15.87	879.56	26.91	879.32	46.16	869.7
50.94	869.34	65.96	868.03	98.27	865.377	115.04	864	120.1	863.91
124.94	864.01	147.69	865.28	160.41	865.69	164.69	865.77	168.41	865.99
176.43	869.96	182.33	872.01	201.88	875.96	214.85	880		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	98.27	.03	147.69	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
98.27	147.69	256	259	.1	.3

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 567

INPUT
Description: Mudlick XS5.1
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	867.02	22.15	867.16	27.77	864.36	32.4	864	38.02	862.93
42.97	862	46.74	861.9	83.29	862.93	119.94	864	135.39	866
144.15	868								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	38.02	.03	83.29	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
38.02	83.29	383	365	.1	.3

Left Levee Station= 22.15 Elevation= 867.16

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 317

INPUT
Description: XS5
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	879.73	17.74	861.99	21.74	859.99	23.75	860.02	30.3	864.23
56.41	864.69	56.92	864.44	60.22	864	64.8	862	69.38	860
75.39	859.85	101.28	860.67	126.24	862	212.68	864	237.43	870

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	64.8	.03	101.28	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64.8	101.28	58	42	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	56.41	864.69	T

Left Levee Station= 56.41 Elevation= 864.69

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 265

INPUT
Description: XS4
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	865.04	3	864.93	8.66	866.37	47.11	865.12	53.35	862.12
59.9	860.83	62.3	860	63.86	859.46	70.32	859.85	73.15	859.79
76.45	859.84	78.32	859.97	112.7	861.5	122.54	863.28	135	862.95
151.21	863.4	194.02	863.48	207.51	864.77	222.08	866.85	242.89	867.88
249.34	869.98								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	62.3	.03	78.32	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
62.3	78.32	129	70	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	55	865.5	T
83	249.34	864.68	T

Left Levee Station= 8.66 Elevation= 866.37

CULVERT

RIVER: Mudlick Run
REACH: Main RS: 245

INPUT
Description: 60" Culvert
Distance from Upstream XS = 28
Deck/Roadway Width = 18
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord

0	869.42	15	868.48	30	867.09				
39	866.19	113	863.7	193	865.82				
240	868.9	249.34	869.52						

Upstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	865.04	3	864.93	8.66	866.37	47.11	865.12	53.35	862.12
59.9	860.83	62.3	860	63.86	859.46	70.32	859.85	73.15	859.79
76.45	859.84	78.32	859.97	112.7	861.5	122.54	863.28	135	862.95
151.21	863.4	194.02	863.48	207.51	864.77	222.08	866.85	242.89	867.88
249.34	869.98								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	62.3	.03	78.32	.035

Bank Sta: Left Right Coeff Contr. Expan.
62.3 78.32 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	55	865.5	T
83	249.34	864.68	T

Left Levee Station= 8.66 Elevation= 866.37

Downstream Deck/Roadway Coordinates
num= 8

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	868.98		75	868.98		106	869.48	
143	866.19		218	863.7		286	865.82	
343	868.9		355.12	868.9				

Downstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	58.99	860.82	111.27	860.81	124.27	860.46	142.96	860.5
153.53	859.67	157.36	858	184.01	858	185.61	858.56	187.83	858.48
191.09	858.92	203.14	859.41	208.93	859.48	227.43	859.29	251.77	859.86
265.95	860.6	280.6	860.93	294.69	861.1	317.21	861.07	342.8	861.33
355.12	861.37								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	153.53	.03	203.14	.035

Bank Sta: Left Right Coeff Contr. Expan.
153.53 203.14 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	146	866.23	T
196	355.12	864.45	T

Upstream Embankment side slope = 1.25 horiz. to 1.0 vertical
Downstream Embankment side slope = 1.25 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 864
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	5	

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
1	17.7	38	.024	.024	0	.9	

Upstream Elevation = 857.73
Centerline Station = 70
Downstream Elevation = 857.67
Centerline Station = 171

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 203

INPUT
Description: XS3
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	860	58.99	860.82	111.27	860.81	124.27	860.46	142.96	860.5
153.53	859.67	157.36	858	184.01	858	185.61	858.56	187.83	858.48
191.09	858.92	203.14	859.41	208.93	859.48	227.43	859.29	251.77	859.86
265.95	860.6	280.6	860.93	294.69	861.1	317.21	861.07	342.8	861.33
355.12	861.37								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	153.53	.03	203.14	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
153.53	203.14	102	104	99	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	146	866.23	T
196	355.12	864.45	T

CROSS SECTION

RIVER: Mudlick Run
REACH: Main RS: 100

INPUT
Description: XS2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	858.39	68.23	858.06	141.57	858	179.35	857.28	234.14	857.53
244.06	858.025	267.61	859.2	333.91	860.01				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	141.57	.03	244.06	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
141.57	244.06	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Mudlick Run

Reach	River Sta.	n1	n2	n3

Main	1958	.035	.03	.035
Main	1809	.035	.03	.035
Main	1771	Culvert		
Main	1728	.035	.03	.035
Main	1614	.035	.03	.035
Main	1364	.035	.03	.035
Main	1191	.035	.03	.035
Main	1017	.035	.03	.035
Main	824	.035	.03	.035
Main	567	.035	.03	.035
Main	317	.035	.03	.035
Main	265	.035	.03	.035
Main	245	Culvert		
Main	203	.035	.03	.035
Main	100	.035	.03	.035

SUMMARY OF REACH LENGTHS

River: Mudlick Run

Reach	River Sta.	Left	Channel	Right
Main	1958	203	146	69
Main	1809	40	83	101
Main	1771	Culvert		
Main	1728	2	114	139
Main	1614	249	249	244
Main	1364	137	173	160
Main	1191	200	173	173
Main	1017	141	193	193
Main	824	256	259	181
Main	567	383	365	312
Main	317	58	42	33
Main	265	129	70	85
Main	245	Culvert		
Main	203	102	104	99
Main	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Mudlick Run

Reach	River Sta.	Contr.	Expan.
Main	1958	.1	.3
Main	1809	.1	.3
Main	1771	Culvert	
Main	1728	.1	.3
Main	1614	.1	.3
Main	1364	.1	.3
Main	1191	.1	.3
Main	1017	.1	.3
Main	824	.1	.3
Main	567	.1	.3
Main	317	.1	.3
Main	265	.1	.3
Main	245	Culvert	
Main	203	.1	.3

Oxfrd43.rep

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

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    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: Oxfrd43
Project File : Oxfrd43.prj
Run Date and Time: 4/15/2014 6:05:37 PM

Project in English units

PLAN DATA

Plan Title: Plan 37
Plan File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.p37

Geometry Title: Oxford 43 Hughes Only Proposed
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g07

Flow Title : Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Plan Summary Information:

Number of:	Cross Sections	= 12	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	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: Flow 01
Flow File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Middle Fork Hugh	Main	1318	1462

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Middle Fork Hugh	Main	PF 1	Normal S = 0.001	

GEOMETRY DATA

Geometry Title: Oxford 43 Hughes Only Proposed
Geometry File : h:\Projects\09261\092612027\LD\Floodplain\HEC RAS application files\Oxfrd43.g07

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1318

INPUT
Description: XS7
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	16.87	859.37	19.72	858	32.02	855.96	56.42	855.99
110.39	858	132.94	859.4	179.65	860	206.04	860.32	238.12	860.02
255.6	862	279.52	869.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	16.87	.03	132.94	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
16.87	132.94	70	70	69	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1248

INPUT
Description: XS6
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	14.58	858	16.28	856	32.09	855.88	62.1	856.01
119.41	858	246.57	859.91	267.85	869.36				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	14.58	.03	119.41	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14.58	119.41	173.26	185.5	188.24	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1171.*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	3.96	866.56	17.11	857.47	18.8	855.86	24.12	855.47
34.54	855.35	58.16	855.48	85.26	856.4	103.28	857.49	134.68	857.77
168.07	858.65	214.7	868.01	236.59	868.2	261.88	863.39	274.37	864.24
275.46	864.63	288.42	869.52						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	17.11	.03	103.28	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
17.11	103.28	173.26	185.5	188.24	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1094.*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	4.54	865.89	19.64	856.94	21.32	855.71	26.62	854.98
37	854.82	54.23	854.94	73.99	855.6	87.14	856.97	124.77	857.16
164.78	858.52	220.66	876.67	246.89	876.8	277.19	866.87	292.16	864.11
293.46	864.52	309	869.68						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.64	.03	87.14	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
19.64	87.14	173.26	185.5	188.24	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 1017.*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	5.13	865.22	22.17	856.41	23.85	855.57	29.12	854.49
39.45	854.29	50.29	854.41	62.73	854.8	71	856.46	114.86	856.55
161.49	858.38	226.62	885.34	257.18	885.4	292.51	870.35	309.95	863.99
311.47	864.4	329.58	869.84						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	22.17	.03	71	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
22.17	71	173.26	185.5	188.24	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 940

INPUT
Description: XS5
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	5.71	864.55	24.7	855.88	31.62	854	41.9	853.76
51.47	854	54.87	855.95	104.95	855.94	158.2	858.25	232.58	894
267.48	894	327.74	863.87	329.47	864.29	350.15	870		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	24.7	.03	54.87	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.7	54.87	101.5	108.5	89	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 831.5*

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	4.42	865.45	19.13	855.05	23.64	853.66	30.35	852.88
37.64	852.88	43.59	853.74	45.71	854.98	91.7	855.96	98.16	855.96
145.17	856.95	153.93	859.42	217.86	890.8	231.83	894	268.38	894
302.19	885.93	331.49	871.3	333.3	871.04	351.13	868.74	354.96	869.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	19.13	.03	45.71	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
19.13	45.71	101.5	108.5	89	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 723

INPUT
Description: XS4
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	13.56	854.21	18.8	852	33.38	852	36.55	854.01
84.62	855.97	140.5	856.02	216.48	894	304.62	894	355.77	868.49
359.77	869.78								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	13.56	.03	36.55	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.56	36.55	222	204	104	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 520

INPUT
Description: midfork xs 3.1
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	23.84	859.99	33.64	854	37.18	852	55.02	852
61.07	854	142.14	856	161.32	856.01	237.31	893.87	270.85	893.5
339.77	862.02	354.3	870.14						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	33.64	.03	61.07	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
33.64	61.07	120	111	96	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 409

INPUT
Description: XS3
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	30.43	854.05	40.45	852	50.74	851.97	60.49	852.01
68.66	854	138.64	853.98	199.94	854.44	218.8	856	278.33	856.11
322.16	858	353.92	866.14	368.74	868				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	30.43	.03	68.66	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
30.43	68.66	158.5	154.5	138	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 254.5*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	27.24	853.03	32.9	851.51	38.72	850.98	47.64	850.98
55.32	851.54	61.76	852.98	138.05	853.94	149.05	854.12	204.88	855.29
225.44	856.44	257.53	857.03	290.34	857.66	338.12	859.49	364.28	863.05
372.75	865.37	388.9	868.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.1	27.24	.03	61.76	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
27.24	61.76	158.5	154.5	138	.1	.3

CROSS SECTION

RIVER: Middle Fork Hugh
REACH: Main RS: 100

INPUT
Description: XS1
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	870	24.06	852	26.69	850	44.54	850	54.85	851.96
149.37	854.18	266.82	858	382.41	861.95	409.07	869.66		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	24.06	.03	54.85	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
24.06	54.85	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Middle Fork Hugh

Reach	River Sta.	n1	n2	n3
Main	1318	.1	.03	.04
Main	1248	.1	.03	.04
Main	1171.*	.1	.03	.04
Main	1094.*	.1	.03	.04
Main	1017.*	.1	.03	.04
Main	940	.1	.03	.04
Main	831.5*	.1	.03	.04
Main	723	.1	.03	.04
Main	520	.1	.03	.04
Main	409	.1	.03	.04
Main	254.5*	.1	.03	.04
Main	100	.1	.03	.04

SUMMARY OF REACH LENGTHS

River: Middle Fork Hugh

Reach	River Sta.	Left	Channel	Right
Main	1318	70	70	69
Main	1248	173.26	185.5	188.24
Main	1171.*	173.26	185.5	188.24
Main	1094.*	173.26	185.5	188.24
Main	1017.*	173.26	185.5	188.24
Main	940	101.5	108.5	89
Main	831.5*	101.5	108.5	89
Main	723	222	204	104
Main	520	120	111	96
Main	409	158.5	154.5	138

Main	254.5*	158.5	154.5	138
Main	100	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Middle Fork Hugh

Reach	River Sta.	Contr.	Expan.
Main	1318	.1	.3
Main	1248	.1	.3
Main	1171.*	.1	.3
Main	1094.*	.1	.3
Main	1017.*	.1	.3
Main	940	.1	.3
Main	831.5*	.1	.3
Main	723	.1	.3
Main	520	.1	.3
Main	409	.1	.3
Main	254.5*	.1	.3
Main	100	.1	.3

Gmail by Google

Edwin Wriston <doddridgecountyfpm@gmail.com>

Huff/Foster comment/objection letter for EQT OXF-43 floodplain application

3 messages

david richardson <dtrattorney@gmail.com> Mon, Sep 22, 2014 at 12:30 PM
To: doddcoclerk1@gmail.com, Edwin Wriston <doddridgecountyfpm@gmail.com>, Joye Huff <huffrj@yahoo.com>, david richardson <dtrattorney@gmail.com>

Dear Honorable Clerk Rogers and Floodplain Manager Wriston,

Please find attached comment letter submitted on behalf of Joye Huff, William Huff, Earlene Foster, and James Foster regarding the above-referenced floodplain project. Please note, I sent the attached to two other email accounts I had for your office, and I kept getting error messages. As such, I am sending it to this account too.

Please add this email, the attached letter, and the exhibits to the permit application file. The project name is OXF-43. The applicant is EQT Production Company. The subject property is the Huff Farm. I believe the application number is 14-264 (that is the number that was on the newspaper ad that was forwarded to me by a 3rd party).

Please note, none of my clients were mailed notice of the floodplain permit application as is required by the Ordinance (William Huff was mailed notice, but said notice was not mailed to his home....he lives in Texas, the notice was mailed to California). As such, the application should be denied without further review.

If the application is going to proceed with review, then my clients respectfully request a public hearing to discuss same.

Thank you,
David Richardson, Esq.

PS - please confirm receipt of this email.

--
David T. Richardson
Attorney at Law
(Also admitted to practice in Texas and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 569-4514
Fax: (619) 522-9260

are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the Law Office of David T. Richardson immediately by replying to this message and deleting it from your computer.

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2 attachments

Huff and Foster comment and objection letter dated 9 21 14.pdf
304K

All Exhibits.pdf
6224K

Edwin Wriston <doddridgecountyfpm@gmail.com> Wed, Sep 24, 2014 at 10:38 AM
To: david richardson <dtrattorney@gmail.com>
Cc: Beth Rogers <doddcoclerk1@gmail.com>, Joye Huff <huffrj@yahoo.com>, Jim and Earlene Foster <jefoster63@hotmail.com>, m b <miri_beram@yahoo.com>
Bcc: don@tennantlaw.com, "Ralph Sandora (ralph.sandora@gmail.com)" <ralph.sandora@gmail.com>, wvrobby@hughes.net, shirley williams <shiwi4431@gmail.com>, Mark Stanley <mark.stanley@cmemgmt.com>

Mr. Richardson,

Thank you for your email, your submitted faxes and hard copies, and for the work done on behalf of the property owners in this matter. We will be putting this matter on the agenda for the next regularly scheduled Doddridge County Commission meeting (scheduled for Tuesday, October 7, 2014), and will gladly schedule a public meeting at that time.

The time, date, and place for the public meeting will be set at the Commission meeting, and can be scheduled no less than 10 days (October 17) and no more than 45 days (November 21) from the date of the Commission meeting. Do you or your clients have any preferences? I am assuming the courthouse would be the preferred location, however if you have a larger venue you would prefer, we can certainly oblige.

Please advise to your preferences for date, time, and location. I would recommend around the last week of October as I would like to send out official notifications to all parties involved and give them time to prepare, as well as give proper time for newspaper announcement publication.

I will be reviewing all the data you submitted more in-depth, and I am sure I will have some follow-up questions for you. I know I will need from you the full names, addresses, and actual physical description of the adjacent landowners and/or direct property owners so I can provide proper notifications.

Thank you again!

Respectfully,

[Quoted text hidden]

--

Edwin L. "Bo" Wriston, Floodplain Manager
Doddridge County Commission
118 East Court Street
West Union, WV 26456
Work Phone:1-304-873-2631
Mobile Phone: 1-304-629-3735
Fax: 1-304-873-1840
doddridgecountyfpm@gmail.com
www.doddridgecounty.wv.gov

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david richardson <dtrattorney@gmail.com> Fri, Sep 26, 2014 at 3:58 PM
To: Edwin Wriston <doddridgecountyfpm@gmail.com>

Dear Floodplain Administrator Wriston,

Thank you for the reply and for the information. I am in the process of determining which date(s) work best with my clients' respective calendars and will get back to you as soon as possible. As for any information that I can provide, please do not hesitate to contact me if there is anything that you need (names, parcel info, the site plans EQT submitted to WVDEP, etc.). I am more than happy to provide you with anything you need. Note, I can be reached via this email address at any time, and I can also be reached via my cell number (619) 569-4514.

In the meantime, I am hoping you could clear up one matter that confuses me. Namely, why does your office continue to process the application at issue given that it is without dispute that neither the Huffs nor the Fosters were provided with written notice of the application as is required by the Ordinance? I can understand proceeding with processing the application if my clients' comments were limited to the other objections contained in my clients' letter (i.e., the lack of the other necessary permits, the contradictory floodplain identification by the same engineer, the false information regarding fill, etc.) because at least those objections may theoretically be disputable (obviously, neither my clients nor I think they are, but that is for another time). But, to me at least, the fact that my clients were deprived notice (and Due Process) as is required by the Ordinance (and the West Virginia Constitution) would automatically require denial of the permit application (EQT could of course reapply and make sure to put my clients' names and addresses on the permit application).

Thank you,
David
[Quoted text hidden]
(Also admitted to practice in West Virginia)
[Quoted text hidden]

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 That the Accompanying Legal Notice Entitled:

Floodplain Permit
14-264

was published in said paper for 2

successive weeks beginning with the issue of September 2nd 2014 and

ending with the issue of

September 9th 2014 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

$ 16.31

and each publication thereafter

$ 38.05 TOTAL

EDITOR

Virginia Nicholson

SWORN TO AND SUBSCRIBED

BEFORE ME THIS THE 9th DAY

OF September 2014

NOTARY PUBLIC

Laura J Adams

OFFICIAL SEAL
Notary Public, State Of West Virginia
LAURA J ADAMS
212 Edmond Street
West Union, WV 26456
My Commission Expires June 14, 2023

LEGAL ADVERTISEMENT:
Doddridge County
Floodplain Permit Application

Please take notice that on the 26th day of August, 2014 EQT Production Company filed an application for a Floodplain Permit to develop land located at or about: Southwest District 39.155583N/80.792008W Permit #14-264 OXF-43 Well Pad. 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 September 22, 2014.

Delivered to the:
Clerk of the County Court
118 E. Court Street, West Union, WV 26456
Beth A. Rogers, Doddridge County Clerk
Edwin L. "Bo" Wriston, Doddridge County Flood Plain Manager

9-2-2xb

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

September 22, 2014

Via email, facsimile, usps, and hand delivery
Doddridge County Clerk and Doddridge County Floodplain Administrator
135 Court Street, #102
West Union, WV 26456

RE: EQT Floodplain Application for OXF-43 (Permit # 14-264)
Subject Property – Huff Farm

Dear Sir and Madam,

Please allow this letter to serve as notice of amendment to the comment/objection letter previously sent by office regarding the above. I have two minor amendments to the attached letter. Please file this letter and the attached letter with the floodplain permit application file today.

Thank you very much for your time and attention with this matter.

Best regards,

/s/David Richardson/s/

David T. Richardson

Joyce Huff
432-559-1556
Call when Fax
comes in

Hand delivered 9/22/14
by Mirijana Beram

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

September 21, 2014

Via email, facsimile, usps, and hand delivery
Doddridge County Clerk and Doddridge County Floodplain Administrator
135 Court Street, #102
West Union, WV 26456

RE: EQT Floodplain Application for OXF-43 (Permit # 1~~4~~264)
Subject Property – Huff Farm

Dear Sir and Madam,

Please be advised that my office represents the following persons in regards to the above-referenced floodplain permit application: Mrs. Joye Huff, as Trustee of the Trust that owns half of the Huff Farm, Mr. William Huff, Mrs. Earlene Foster, and Mr. Jim Foster. My clients have authorized me to submit their objections and comments to the above-referenced Application. As such, please allow the following to constitute my clients' comments and objections to the above-referenced floodplain permit application (the "Application"). Please note, much of the information contained in the Application is erroneous, incorrect, and/or misleading. Additionally, the Application fails to comply with several basic and extremely important provisions of the Doddridge County Floodplain Ordinance (the "Ordinance"). Accordingly, the Application must be denied.

BACKGROUND

Note, my clients and the applicant, EQT Production Company ("EQT") were parties to a lawsuit regarding a floodplain permit that was issued and then revoked by the Doddridge County Commission (the "DCC"). The case title of that action is EQT vs. the DCC and Huff/Foster, and the case number is 12-C-17. The case was resolved in favor of the DCC, the Huffs, and the Fosters. The Honorable Judge Sweeney refused to grant EQT's request for an injunction ordering the return of EQT's floodplain permit because the Ordinance in effect at the time was unconstitutional in that it violated the due process rights of surface owners and adjacent landowners by not providing them notice of floodplain permit applications and an opportunity to be heard (i.e., a chance to comment and object) (a copy of Judge Sweeney's Order with the relevant portions highlighted is attached hereto as Exhibit "A"). Ultimately, the Court dismissed EQT's lawsuit for "want of prosecution" (EQT apparently abandoned its lawsuit, and the Court dismissed it because EQT did nothing in the case in the year after its injunction request was denied).

Prior to the Court denying EQT's request for an objection, the parties were provided an opportunity to present expert studies and reports of EQT's floodplain project to the DCC acting in its capacity as the Floodplain Appeals Board (there like here EQT sought to radically alter the Huffs' meadow, which happens to primarily located be in an Approximated Zone "A" Floodplain). On October 5, 2012, the DCC issued a Final Decision denying EQT's floodplain permit request. There were many reasons for the DCC's refusal to grant EQT a floodplain permit, but the primary reasons were as follows: (a) EQT submitted a flawed floodplain study (e.g., the study failed to use a sufficient number of cross-section, among other things), (b) EQT's floodplain study was inaccurate (e.g., it claimed the base flood elevation increase would not

exceed a foot), and (c) when accurate engineering work was done (i.e., by the Huffs' expert Seward Gilbert, P.E.), EQT's planned project would have caused a base flood elevation increase in well excess of a foot (a copy of the County's Final Decision with the relevant portions highlighted is attached hereto as Exhibit "B"). The Huffs and the Fosters urge the Floodplain Administrator to review said Final Decision, and if he does, he will notice significant similarities between the study at issue there and the study at issue here.

Following the denial of EQT's request for an injunction ordering the return of its revoked floodplain permit, the West Virginia State Board of Registration for Professional Engineers (the "Engineering Board") opened an investigation into the same floodplain study that the Appeals Board found to be flawed, the floodplain study by EQT's engineering firm, Navitus (the "Navitus Study") regarding EQT's prior proposed floodplain project at the Huff Farm. On December 6, 2013, the Engineering Board, Navitus and the engineer responsible for floodplain study, Mark Smith, P.E., entered into a Consent Order whereby Navitus and Mr. Smith effectively plead guilty to violating the Rules of Professional Engineering in regards to the floodplain study prepared on behalf of EQT. Specifically, Mr. Smith admitted that the "original floodplain analysis violated the Rules of Professional Responsibility in that the services were not in accordance with current standards of technical competence, did not conform to accepted engineering standards, may have impacted the life, health, property, and welfare of the public, did not include all relevant and pertinent information, and was founded upon an inadequate knowledge of the facts and evaluation of the subject matter" (see pgs. 3-4 of the Consent Order at # 14 and pg. 7-8 at #32 attached with Navitus email as Exhibit "C"). The Consent Order cited the Appeals Board's Final Decision finding that the "ground survey and studies performed

by" Navitus and Mr. Smith "were insufficient to support the overall opinions they espoused due to an insufficient number of cross sections and area of land and that tributaries to the main stream of the subject floodplain, had they been included, would have impacted" Navitus and Mr. Smith's "base floodplain evaluation" (Exhibit "C", pg. 2-3, paragraph 9). Mr. Smith agreed to be fined several thousand dollars by the Engineering Board because of his flawed/incompetent/inaccurate engineering work in regards to the floodplain at the Huff Farm. Many of these same flaws, mistakes, and incompetence are present in the Rettew floodplain study submitted by EQT with this Application (i.e., insufficient cross-sections, studies insufficient to support opinions, failure to model, etc.). Note, these unfortunate similarities between the Navitus Study and the Rettew Study will be discussed below, and will likely result in a complaint being filed against Rettew and its responsible engineer in regards to the floodplain study and other information/analyses attached to this Application.

I bring up the issues regarding EQT's previous attempt to build a development in the floodplain at the Huff Farm for the purpose of putting the current Application in perspective. More importantly, I bring up the EQT's previous attempt and previous application (and previous floodplain study) because, unfortunately, many of the same issues that were present there are present here with this Application. For example, as was the case with EQT's previous floodplain application, my clients have again been denied Due Process as to this Application, and the data/analyses provided by EQT's engineering firm (in this case Rettew Associates) is inaccurate, incorrect, and misleading and as will also be discussed below, mindboggling contradictory (i.e., on the one hand Rettew tells the Doddridge County Floodplain Administrator that EQT's plans for the Huff Meadow are outside of the floodplain, but on the

other hand Rettew tells WVDEP that EQT's plans for the Huff Meadow do involve the floodplain).

OBJECTIONS AND COMMENTS

A. The Huffs and Fosters were denied the Notice mandated by the Ordinance, and as a result, they were denied Due Process.

Perhaps the most egregious and troubling violations of the Ordinance was EQT's failure to comply with the mandatory requirement of identifying the surface owners and/or adjacent landowners who are entitled to notice of the Application via certified mail, and the subsequent failure to provide my clients with notice of the Application as mandated by the Ordinance ("Notice"). EQT violated the Ordinance by providing false and/or incorrect information as to the identities and addresses of the surface owners and adjacent landowners. Specifically, EQT failed (or refused) to identify my clients as surface owners and/or adjacent landowners who are entitled to notice (and Due Process) in regards to this Application. In turn, the County has denied my clients the mandatory Notice required by the Ordinance, and as such, the County has denied my clients the Due Process afforded to them by the Constitution of West Virginia. As such, this Application is fatally flawed and cannot be granted (EQT is, of course, welcome to resubmit another floodplain application that gives my clients proper Notice, but this Application cannot be fixed....the damage has been done). Accordingly, my clients object to this Application, they object to any further processing of this fatally flawed Application, and they request that the Application be immediately denied.

In above-referenced case, the Doddridge County Circuit Court has specifically ruled that my clients (and people like them) are entitled to certain Due Process rights. The Court held that my clients (and people like them) are entitled to the right to proper notice (not accidental notice, not notice from friends, not happenstance notice....actual and proper notice from the County) as well as the right to be heard regarding floodplain permit applications for projects planned for their property and/or for the neighbors' property (see Exhibit "A"). My clients spent over a year and a half in Court litigating that case, and they spent a great deal of energy, effort, and money litigating that case. The Ordinance was amended in response to the Court's ruling to specifically provide a mechanism for guaranteeing those rights. Until this Application was brought to their attention by others, my clients thought their hard earned Due Process rights were safe. But if this Application is granted, it will be a blatant deprivation of my clients Due Process rights. Given everything they have previously endured and given what is at stake, my clients will not just to sit back and let their Due Process rights be trampled. In the event that this flawed Application is issued in violation of my clients' Due Process rights, my clients will not hesitate to seek intervention to protect said rights.

The Due Process at issue here is two fold: 1. Notice, and 2. an opportunity to be heard. The Ordinance contains simple and straightforward provisions that must be followed in order to ensure that Notice is provided to surface owners and adjacent property owners. Per the Ordinance, the applicant MUST provide the County with the names and addresses of any and all surface owners of the subject property(ies) where the development will occur (Ordinance pg. 35 Section 7.3 (D)(1)) and the names and addresses of the adjacent landowners (Ordinance pg. 35

Section 7.3 (D)(2)). The County then uses that information provide notice of permit applications to any and all surface owners and adjacent landowners via certified mail (Ordinance pg. 36-37 Section 7.3 (F)(1)(a) and (1)(b)). Note, the language regarding the Notice provisions is mandatory (i.e., "the applicant shall" and "the County Clerk shall"), and the Notice requirements of such great importance that the Ordinance even takes care to reiterate the mandatory nature of the Notice provisions ("All Notice provisions in this Section are mandatory...((Ordinance pg. 38 Section 7.3 (H)).

Here, EQT violated the Ordinance by failing to identify my clients as surface owners and/or adjacent landowners and by failing to provide their names and addresses to the County so that the County could provide Notice to my clients via certified mail (see pg. 4 of the Application form). As a result, my clients were NOT provided the required Notice as mandated by the Ordinance, and my clients have been denied their Constitutional Due Process rights as to Notice. Further, the lack of proper Notice has adversely affected my clients by limiting the time and ability they have to object to this Application and submit comments regarding this Application. Because they did not receive proper Notice (and instead had to wait to learn of the Application through third parties other than the County and EQT), my clients lost a significant amount of time to gather information, review the Application, and prepare this objection/comment letter. Further, because of the lack of proper Notice, my clients were not afforded enough time to retain an engineer of their own to review this Project and prepare his/her own study of the Project to submit for the Floodplain Administrator's review. In short, my clients' right to Notice has been deprived, and their opportunity to be heard has been substantially curtailed and harmed. As such, the issuance of a floodplain permit based on the Application would violate the Ordinance

and would unconstitutionally violate my clients' Due Process rights.

1. Joye Huff - Mrs. Huff owns one half of the Huff Farm (i.e., she and William Huff are co-owners of the Huff Farm's surface and the minerals). She maintains her ownership interest in the Huff Farm in a family trust (the "Huff Trust"). The Huff Farm is the surface on which a substantial portion of the 60+ acre Project is proposed to be built, the surface on which a portion of the well-pad would be built on, and the site of a substantial amount of proposed floodplain development.

Accordingly, in order to comply with the Notice provisions of the Ordinance, EQT Application's must identify as an owner of the surface on which the Project would be built and also an owner of an adjacent property to other properties on which portions of the Project will be built. In turn, the County Clerk must mail her notice of the Application via certified mail as mandated by the Ordinance and as mandated by the Due Process. However, her name is nowhere to be found in EQT's Application (i.e., she is not identified as a surface owner or an adjacent landowner, despite the fact she is both in regards to this Project). Further, the County Clerk never provided her with Notice of the Application via certified mail. As such, EQT's Application fails to comply with the Ordinance, and Mrs. Huff has been deprived Due Process.

Further, the omission of Mrs. Huff from the Application is inexcusable for several reasons, including, but not limited to the following. One, EQT is well aware that Mrs. Huff is a surface owner and an adjacent landowner in regards to the Project (EQT was recently involved in two separate lawsuits with Mrs. Huff regarding EQT's previous failed floodplain project plans

for the Huff Farm). Two, EQT mails royalty checks each month to Mrs. Huff, and as a result, EQT has her address. Three, the Doddridge County Circuit Court denied EQT's request for an injunction ordering the return of a floodplain permit for a proposed development on Mrs. Huff's farm because her Due Process rights were violated by a lack of notice regarding EQT's application for a floodplain permit for said floodplain project (i.e., the same situation as we have here...). Four, even if EQT was unaware of the foregoing, a simple search of tax records and/or a parcel map search would have identified Mrs. Huff and provided EQT with her address.

2. William Huff - the information provided on the Application regarding Mr. Huff, Mrs. Huff's brother-in-law and the co-owner of the Huff Farm, is inexcusably incorrect. Like Mrs. Huff, he should have been identified on the Application as both a surface owner and an adjacent landowner (and provided Notice as such). Instead, Mr. Huff is listed on the Application as only an adjacent property owner despite the fact that the majority of the Project is planned for the Huff Farm.

Even more troubling, the address that EQT provided for Mr. Huff in its Application is NOT his addresses. It isn't even close to being his address. The address provided is for Coronado, California. Meanwhile, Mr. Huff is a resident of Midland, Texas. Mr. Huff has never been a resident of Coronado, California and he has never received mail there. As a result, the information provided by EQT in its Application regarding Mr. Huff is incorrect, and Mr. Huff did NOT receive a copy of the Notice of the Application via certified mail as mandated by the Ordinance (the addresses listed in EQT's Application is a UPS Store, and the clerk there signed for without comparing the name on the envelope to the name on the P.O. Box). As such,

EQT's Application violates the Ordinance because it failed to identify Mr. Huff as a surface owner and because it failed to provide a correct address for Mr. Huff. Moreover, because Mr. Huff has not received the Notice mandated by the Ordinance, Mr. Huff has been deprived his Constitutional right to Due Process.

Similar to Mrs. Huff, there is simply no excuse for EQT's errors and omissions in regards to providing information regarding Mr. Huff in its Application. One, EQT is well aware that Mr. Huff is a surface owner and an adjacent landowner in regards to the Project (EQT was recently involved in two separate lawsuits with Mr. Huff regarding EQT's previous failed floodplain project plans for the Huff Farm). Two, EQT mails royalty checks each month to Mr. Huff, and as a result, EQT has his address. Three, the Doddridge County Circuit Court denied EQT's request for an injunction ordering the return of a floodplain permit for a proposed development on Mr. Huff's farm because her Due Process rights were violated by a lack of notice regarding EQT's application for a floodplain permit for said floodplain project (i.e., the same situation as we have here...). Four, even if EQT was unaware of the foregoing, a simple search of tax records and/or parcel maps would have identified Mr. Huff and provided EQT with her address.

3. James and Earlene Foster - the Fosters own and live on a property that is directly adjacent to the Huff Farm (the Fosters' Farm and the Huffs' Farm connect along Short Run). As such, both of the Fosters were entitled to written notice as adjacent property owners. However, their names and addresses are nowhere to be found on EQT's Application. As such, EQT has violated the Notice provisions of the Ordinance, and the Fosters have been denied Due Process.

Again, there is no excuse for EQT's failure to identify the Fosters on the Application. EQT is well aware that the Fosters are adjacent property owners. Namely, the Doddridge County Circuit Court allowed the Fosters to intervene (i.e., join) the EQT v. DCC and Huff/Foster lawsuit specifically because the Fosters were adjacent property owners who had been denied Due Process due to a lack of notice regarding the floodplain project at issue in that lawsuit. Further, even if that lawsuit never took place, a simple tax record and/or parcel map search would have identified the Fosters' names and address.

OTHER ISSUES

Note, by commenting on and further objecting to the Application, my clients are not waiving their Due Process objections. My clients were deprived proper Notice, and nothing will change that in regards to this Application. The Due Process issue (i.e., lack of proper notice) is the biggest issue (and defect) with this Application, and it is an issue that was primarily created because EQT submitted false and/or incorrect information about the most important part of the Application, the identity of the persons who may be affected by the planned project (i.e., surface owners and adjacent property owners). Note, the lack of Notice may have been avoided if the Ordinance did not rely on the veracity or competency of the applicant in determining the identities of the surface owners and adjacent landowners.

Unfortunately, there are numerous other material issues with EQT's Application, and like the Navitus floodplain study that EQT submitted to the County regarding EQT's previous plans for the Huff Farm, this Application is false, misleading, and/or inaccurate. The following is by no means intended to be a full accounting of all of the other issues with EQT's Application. It is

merely intended to point out some of the more egregious (and/or potentially dangerous) issues with EQT's Application.

Note, it is important to keep in mind that the Ordinance requires "strict compliance" (Ordinance pg. 17 (c)). As such, any violation of the Ordinance and/or failure to abide by the provisions of the Ordinance should automatically require the denial of EQT's Application. Simply put, no development can be permitted in a Doddridge County floodplain if the Ordinance is not followed exactly as written. It is also important to note that "permits and plans shall be approved only after it has been determined that the proposed work undertaken will be in conformance with the requirements of this Ordinance..." (Ordinance pg. 14, Section 7.2 (B)).

A. EQT doesn't have all of the other permits it needs to build the planned Project as is required by the Ordinance before a floodplain permit application may be granted.

Pursuant to the Ordinance, a floodplain permit cannot be issued unless and until all other permits that require site approval are issued by the various applicable Federal, State, or Local government agencies. Additionally, per the Ordinance, no floodplain permit application may be granted unless and until the applicant has provided copies of the issued permits to the County Clerk and to the Floodplain Application Permit File (Ordinance pg. 34, Section 7.2 (e)).

Here, EQT does not have the other permits it needs in order to lawfully build the project, and as such, the Application must be denied. Said permits include but are not limited to the following:

1. West Virginia Department of Environmental Protection – Office of Oil and Gas permits authorizing EQT to drill the planned wells and build the planned sites for the Project (it is absolutely mindboggling that EQT went ahead and applied for the Doddridge County

Floodplain Permit prior to even obtaining the requisite WVDEP drilling permits for the planned gas wells),

2. West Virginia Department of Environmental Protection – Department of Air Quality permit authorizing the estimated/projected emissions from the Project,

3. West Virginia Office of Land and Stream Activity permit allowing EQT to build the culverts proposed for Mud Lick as well as any bridges over Mud Lick, and

4. USACE 401 Water Quality Certification permit allowing EQT to do its planned work in Mud Lick (and any other streams) and allowing EQT to do its planned work in the various identified wetlands that are present in the areas EQT seeks to develop pursuant to this Project.

Each of the above permits requires site approval, and each of the above must be obtained by EQT before a floodplain permit can be lawfully granted under the Ordinance. Note, the above is not intended to be a complete list of the various permits EQT must obtained before it can even qualify for a floodplain permit. It is entirely possible that there are other permits that EQT needs. What is clear is that EQT does not have the above permits and has not provided copies of the above permits to the County Clerk and to the Floodplain Application Permit File as mandated by the Ordinance. What is also clear is that unless and until EQT obtains the above permits and provides copies of said permits, no floodplain permit may be granted for this Project. As such, this Application must be denied because EQT has not obtained and provided copies of the other permits that are required for the Project.

B. EQT's Project does not comply with the Ordinance's Flood Protection Setback Requirements, and as such, the Application must be denied.

The Ordinance mandates that there be a 100 foot flood protection setback with any and all natural gas development (Ordinance pg. 32, Section 6.2 (H) (i.e., as for ALL natural gas operations...none may be "prepared, constructed or located within 100 feet of a stream or wetland). As such, nothing EQT is building for the Project (i.e., ALL natural gas operations...not just the pad...ALL operations) may be within 100 feet of a stream/watercourse and/or wetland. For some reason, EQT incorrectly/mistakenly used the 50 foot setback standard (and even then EQT doesn't comply with the 50 foot standard). As can be seen from the attached pages from EQT's WVDEP application, there are countless streams/watercourses and wetlands that are within 100 feet of EQT's various developments related to the Project (and, as can be, seen, there are several within 50 feet) (see Exhibit "D"). A project that does not comply with the setback requirement is not incompliance with the Ordinance and must be denied. As can be seen from the attached drawings, EQT's Project does not comply with the Flood Protection Setback Requirement (and not just in one spot, but in dozens of spots). Accordingly, the Application must be denied because it fails to comply with the flood protection setback requirements of the Ordinance.

B. EQT incorrectly states that there are no buildings located on the "subject property", i.e., the Huff Farm, and its "study" apparently fails to model the cumulative impact of the existing buildings/structures in the floodplain and the proposed Project developments.

EQT claims in its application that there are no buildings located at the Huff Farm (i.e., the subject property) (see Application pg. 2). EQT's floodplain "studies" also claim that there

are no buildings in the floodplain (see EQT's "study" and Application generally, but especially pg. 2 of the Application). These assertions would be comical if we weren't talking about something as serious as altering a floodplain. EQT's own drawings prove that the Huffs' farmhouse, garage, and barns are all on the "subject property". These are obviously buildings. Said buildings are also in the floodplain right next to portions of Mud Lick that EQT seeks to alter as part of its Project and right across the road from the massive planned "spoil stockpile", which as will be discussed later, is also in the floodplain (see attached drawing contained in EQT's Application which attached hereto as Exhibit "E"). Again, the veracity and accuracy of EQT's entire Application is serious doubt when absurdly false statements like this are made in its Application. Further, EQT could NOT have modeled the cumulative impact of the project correctly since it failed to include the Huffs' farmhouse, garage, and barns (i.e., existing structures) in its calculations when determining the base flood elevation increase from the floodplain developments planned for this Project (see Ordinance "Adversely Affected" requires calculation cumulative impact).

Additionally, there is a multi-acre EQT well-pad located in the Huff Meadow that is not far from the planned "spoil stockpile". But I see no mention of said existing well-pad having been modeled by EQT's floodplain "study", and it is not shown on the drawings submitted to the Floodplain Administrator in EQT's Application packet. Said existing well-pad is sited a very short distance from the "spoil stockpile", and it is also located in the same floodplain as the proposed stockpile and other proposed developments will be sited (and the same floodplain as the Huff buildings). Like the Huff buildings, this well-pad must be modeled to include its impact the base flood elevation level with that of the proposed Project developments in order to determine the cumulative impact of the existing buildings/structures/development and the

proposed developments. EQT's apparent failure to model the existing well-site (and failure to reference it in its Application) is inexcusable (especially considering the fact that it is an EQT well-pad, and it is sitting there out in the wide open for the whole world to (and shows up on satellite maps) so it isn't like EQT can plead ignorance as to its existence). This is yet another example of EQT failing/incorrectly modeling the impact of the Project, and yet another reason why the Application must be denied.

C. EQT's Application incorrectly states that the massive "spoil stockpile" planned for the Huff Meadow is outside of the floodplain and does not model it correctly.

EQT's Application contains a drawing showing that the "spoil stockpile" is outside of the floodplain, and EQT's floodplain "study" attached to its application claims that the "spoil stockpile" is outside of the floodplain. Both the drawing and the floodplain "study" are incorrect. In fact, amazingly, both the drawing and the "study" are directly contradicted by the work of the same engineer responsible for each. Per the attached WVDEP site plans that were signed and stamped/sealed by the same engineer who signed and stamped/sealed the floodplain drawing and floodplain "study", the "spoil stockpile" is IN the floodplain (attached hereto as Exhibit "F" is a copy of the Huff Meadow site plans that EQT submitted to WVDEP to obtain a drilling permit for the Project). Amazingly, the same engineer signed off on and stamped the floodplain drawing, the floodplain "study", and the site plans (i.e., Mr. Eric Hershey, P.E. of Rettew Associates, Inc.). I guess Mr. Hershey couldn't be bothered to be consistent.... Regardless, this blatant misrepresentation of the floodplain and blatant attempt at misleading the Floodplain Administrator cannot be tolerated, and it is proof that nothing submitted by and/or on behalf of EQT in regards to the Huff Farm can be trusted (see also the Navitus Consent Order).

Further, this misrepresentation of the floodplain is inexcusable, irresponsible, and a danger to the Public Health, Welfare, and Safety (and it is Navitus all over again). Frankly, not only is this a blatant violation of the Rules of Professional Engineering, it is also an insulting attempt to trick the Floodplain Administrator into issuing a floodplain permit. Mr. Hershey's own contradictory drawings and EQT's willingness to use them is also an example of the fraud that some people are willing perpetrate in order to seek profit even at the expense of public safety.

Moreover, EQT is not allowed to make up its own floodplain. The Huff Farm is an Approximated Floodplain (Zone "A"), and as such, per the Ordinance, said floodplain is "those areas identified as an A Zone on the Flood Insurance Rate Map (FIRM) included in the Flood Insurance Study (FIS) prepared by FEMA" (the "FEMA Floodplain" aka the real floodplain) (Ordinance pg. 15, Section 3.2 (D) "Description of Floodplain Areas") (see attached as Exhibit "G" a floodplain map prepared by Seward Gilbert showing the real floodplain, per FIRM, as well as the present base flood elevation). It is clear from looking at the real floodplain that the vast majority of the Huff Meadow is in the floodplain, and at least of substantial portion of the "spoil stockpile" would also be in the floodplain.

It is also abundantly clear that the studied submitted by EQT has not modeled the impact to the floodplain caused by its proposed "spoil stockpile". If the "spoil stockpile" is calculated in a proper and accurate floodplain study, then the base flood elevation increase from that development alone (i.e., "the spoil stockpile") would easily exceed a foot. Per EQT's site plans, the "spoil stockpile" planned for the meadow will be 3 acres in size, will contain 55,000 cubic yards of fill (see EQT WVDEP site plans attached as Exhibit "H"), and per the elevation data in the WVDEP site plans it will be much higher than the surrounding floodplain (i.e., per EQT's site plans, the elevation of the Spoil Stockpile will be 900 feet, which is dozens of feet higher

than the present elevation of the Huff Meadow (see Exhibit "F")).

Interestingly, EQT's floodplain "study" appears to calculate the "spoil stockpile's" elevation as being less than 860 feet (see Rettew Study table showing pre and post-development elevations). As such, EQT's "study" either ignores the impact of the stockpile or failed to model it.

Additionally, the "spoil stockpile" will be a mound of rock and compacted soil. As such, the "spoil stockpile" is essentially a giant dam plopped down in the middle of a floodplain directly across the street from the Huffs' farmhouse, garage, and barns. A giant dam that EQT conveniently excluded from its inaccurate floodplain, and a giant dam that EQT did not bother to correctly model (as noted below, and as will be noted below when discussing the fundamental flaws in EQT's grossly insufficient use of cross-sections in its floodplain "study"). This incorrect/false information alone warrants denying the Application. Moreover, EQT's failure/refusal to be honest about the floodplain in the Huff Meadow, and its failure/refusal to model it correctly mandates denial of the Application.

E. **EQT's Application incorrectly states that "fill" won't be placed in the floodplain.**

Regardless of whether the FEMA Floodplain is used or EQT's inaccurate and misleading (and inconsistent) floodplain is used, they both show EQT incorrectly/falsely stated that fill will not be going in the floodplain. Fill will be going into the floodplain. In fact, an enormous amount of fill will be going into the floodplain. One, fill will be placed in the floodplain because of the development of the "spoil stockpile" (see Gilbert floodplain map and EQT WVDEP floodplain map Exhibits) (and additionally, EQT cannot claim it is "storing" the spoil stockpile in the Huff Meadow...see Ordinance pg. 32, (I)(3) "material that resembles fill shall not be

considered 'storage'). Two, there will be an additional fill introduced into the floodplain as part of the development of the "MudLick Run Access Road" (see Exhibit "I" site plans showing fill used to build MudLick Run Access Road, and see both the Rettew floodplain Maps and the Gilbert floodplain Map showing significant portions of the Road will be built in the floodplain, and see "H" fill tables). All told, "Mudlick Run Access Road" will include 37,000 cubic yards of fill. A substantial amount of "Mudlick Run Access Road" will be built in the floodplain, and as such, fill will be added to the floodplain. Note, the provisions of the Ordinance apply to all natural gas developments (see Ordinance pg. 6, #12 definition development...."Any man-made change", and note, there is no requirement that the change be permanent). As such, it is inexcusable for EQT's floodplain Application to fail to admit that fill is going in the floodplain, and it is inexcusable that EQT's floodplain study failed to model said fill. Accordingly, the Application must be denied.

F. No cover letter is provided as required by 4.4(B).

EQT is required to submit a "cover letter, signed by the responsible professional, providing a statement of findings in basic terms", but per my review of the Application file, no such letter was submitted by the engineer responsible for the floodplain study (Ordinance pg. 17, section 4.4(B)). This is a mandatory requirement, and a floodplain permit application cannot be granted unless and until the requirement is fulfilled by the applicant. As EQT failed to provide said cover letter when it submitted the Application, the Application must be denied.

G. EQT failed to accurately model Mud Lick and the Huff Meadow together.

Mud Lick and the Huff Meadow are all part of the same floodplain, and instead of treating them as such, EQT's "study" modeled them separately. This was, at best, a mistake.

This was also an issue that the DCC, acting as the Floodplain Appeals Board, identified in its Final Decision (see Exhibit "B", County's Final Decision, pg. 6, paragraph 3 – "EQT/Navitus failed to model Mudlick Run (which has been "mapped" by FEMA as Flood Zone A) which is a contributary to the subject floodplain and would contribute to a rise in the base flood elevation even higher). As such, like the Navitus Study, EQT's current "study" fails to accurately model the Project. Accordingly, the Application must be denied.

H. EQT has not followed the requirements set forth in the Ordinance in regards to the Project's plans to alter Mud Lick and any other streams or watercourses.

The Application specifically states that EQT intends to remove a culvert from the section of Mud Lick that is located right next the Huffs' farmhouse, garage, and barns and then replace said culvert, add another culvert to Mud Lick, add a bridge to Mud Lick, and build a road on the banks Mud Lick (i.e., alter Mud Lick). Pursuant to the Ordinance, anyone who seeks to alter a stream must take certain mandatory actions (and also, if so requested by the Floodplain Administrator, take OTHER actions). EQT has not followed the mandatory requirements contained in the Ordinance regarding altering streams like Mud Lick, and as such, the Application must be denied. Section 4.5 of the Ordinance contains the requirements that must be followed when altering a stream (Ordinance pgs. 17-19). The applicable requirements are as follows:

1. Per Section 4.5 (A), EQT was required to (and failed to) "notify in writing, by certified mail the Doddridge County Floodplain Administrator, the State Coordinating Office, any adjacent communities, and any adjacent property owners" of any intended alterations to Mud

Lick (and any other streams EQT intends to modify). Copies must also be sent to the Federal Emergency Management Authority.

This provision is designed to provide notice to the relevant governmental entities and provide notice (and Due Process) to persons who may be impacted by stream alteration. This is a mandatory provision of the Ordinance. Despite being required to follow this requirement, I haven't seen any proof that EQT has followed this requirement. There was nothing in the Application file when I obtained a full and complete copy that indicated that EQT mailed certified notice of its plans to alter Mud Lick (or any other streams as part of this Project) to the Floodplain Administrator, the State Coordinating Office, any adjacent communities, and/or FEMA. Further, I know for a fact that none of my clients (i.e., adjacent property owners) ever received certified notice of EQT's plans regarding altering streams. As a result, this Application must be denied because EQT failed to provide the mandatory notice regarding its plans to alter Mud Lick and any other applicable stream(s).

2. Per Section 4.5 (B), EQT must show, in writing, that the flood carrying capacity within Mud Lick will be maintained if so requested by the Floodplain Administrator. While this requirement only becomes mandatory if the Floodplain Administrator so requires it to be, my clients strongly urge the Floodplain Administrator to require EQT to provide written assurance and a letter proving that Mud Lick's capacity to carry floodwater will meet or exceed its present capacity after EQT completes altering it as part of this Project. Moreover, this is an issue of whether the Huffs' property (i.e., the subject property) will be "reasonably safe from flooding" following EQT's development of the Project. My clients are greatly concerned about EQT's plans for Mud Lick because of its close proximity to the Huffs' farmhouse, garage, and barns.

My clients are also greatly concerned because, per EQT's Application, after EQT replaces the culvert presently in the section of Mud Lick that is located right next the Huffs' farmhouse, garage, and barns, the new culvert's flood capacity will barely exceed the minimum threshold of a 2 year flood and won't come anywhere near to handling a 100 year flood (see Rettew's project description, page 1). As such, EQT seeks to greatly alter Mud Lick and then place a culvert that barely handles of the flow of a two year flood directly adjacent to the Huffs' house, barns, and garage. My clients fail to see how these buildings will or can be "reasonably safe from flooding" if EQT is permitted to develop this Project.

3. Pursuant to Section 4.5(D), EQT must adhere to the anchoring requirements of the Ordinance in regards to the culverts, bridges, or other stream crossings EQT has planned for Mud Lick and/or any other streams that EQT plans to alter as part of this Project. But nothing in the Application contains any information regarding anchoring, and as such, there is no way to tell if EQT's planned culverts, bridges, and/or other stream crossings will adhere to the anchoring requirements mandated by the Ordinance.

4. The Ordinance mandates that EQT provide "a legal agreement detailing all scheduled inspections and maintenance to be performed on altered or relocated watercourse including permanent culverts, bridges or other stream crossing". Per the Application file, EQT has not provided the County (or the Floodplain Administrator) with this mandatory legal agreement as required by the Ordinance (Section 4.5 (E)).

Because EQT has not complied with several of the mandatory provisions of the Ordinance in regards to the alteration of Mud Lick and any other streams EQT plans to alter as

part of this Project, EQT has not complied with the Ordinance, and this Application must be denied. Further, should EQT submit another floodplain permit application, then my clients respectfully request that the Floodplain Administrator require EQT to follow the provisions contained in 4.5 (C) and 4.5 (D) in regards to the use of "best practices" and ensuring the flood carrying capacity of Mud Lick and any other streams remains at least at the level it is Today.

I. There are numerous issues related to the EQT's "study's" use of Cross-Sections.

One cannot accurately model a floodplain and the impact caused by a floodplain without using adequate and accurate cross-sections. Similarly to the Navitus study, the study EQT submitted with this Application uses precious few cross-sections to model the floodplain and to model the impact of the planned development on the floodplain (and the resulting increase to flooding). Simply put, EQT's "study" of Mud Lick does not use enough cross-sections to accurately model the floodplain and the effect the Project will have on the floodplain (and on the base flood elevation). Additionally, of the precious few cross-sections used in the Rettew Study, many of said cross-sections are "interpolated" cross-sections (i.e., not real cross-sections). Further, the cross-sections used to model the existing conditions and the proposed conditions differ in number and location (see Existing Condition Analysis summary table contained in EQT's Application).

EQT's "study" of the existing condition at the Huff Meadow only uses 14 (fourteen) cross-sections, 8 (eight) of which are "interpolated" cross-sections. EQT's study then only uses 12 (twelve) cross-sections to model proposed conditions, 5 (five) of which are "interpolated". Note, the Navitus Study was found to be flawed by the DCC acting as the Floodplain Appeals Board and Navitus and Mr. Smith were forced to enter into a Consent Order with the

Engineering Board because the Navitus Study only used 9 (nine) cross-sections to model this same area.

"Interpolated" cross-sections are not real cross-sections and are not to be relied upon as the primary cross-sections in a study (they can be used to help with calculations, but only if there are a sufficient number of real cross-sections used in the study as well....the handful of real cross-sections used in Rettew's study are not sufficient to justify the use of "interpolated" cross-sections). "Interpolated" cross-sections are essentially computer generated guesstimates. "Interpolated" cross-sections are nowhere near as accurate as cross-sections that are based on actual survey work, and they contain a margin of error that is higher than cross-sections based on actual survey work (and said margin of error should make it impossible for the Floodplain Administrator to accept the Rettew study's base flood elevation increase evaluation as accurate). Apparently, EQT could not be bothered to use a sufficient number of cross-sections and could not be bothered to use cross-sections that are the product of actual survey work and that accurately reflect the real conditions in the floodplain (i.e., contours, slopes, terrain, etc.) of the floodplain. There is simply no way that EQT's "study" can be accurate when a grossly insufficient amount of cross-sections are used, when that many "interpolated" cross-sections are used, and when the number of cross-sections used differs between the existing and proposed conditions, and when EQT fails to model all floodplain developments planned for this Project, fails to model the cumulative impact of the existing and proposed structures/buildings/developments, etc.).

Note, EQT's separate "study" of the proposed Mud Lick developments also uses an insufficient number of cross-sections and uses different cross-sections to model the pre and post conditions. This separate "study" used only 11 cross-sections to model the existing conditions

and used only 13 cross-sections to model the post-development conditions.

Again, it bears repeating, the failure to use an adequate number of cross-sections is a recurring theme with EQT and its attempts to develop the floodplain at the Huff Farm. In its Final Decision during the EQT v. Doddridge and Huff/Foster matter, the Doddridge County Floodplain Appeals Board specifically held that the Navitus Study was "flawed" (i.e., a study that EQT used to model a previous project for the Huff Meadow). One of the primary reasons why the Appeals Board deemed the Navitus Study flawed AND inaccurate was the fact that Navitus only used 9 (nine) cross-sections to model the Huff Meadow (i.e., only a few less than the current study). Meanwhile the study submitted by the Huffs and prepared by Seward Gilbert, P.E. used 58 (fifty-eight) cross-sections, and in turn, was rightly deemed to be much more accurate (see Appeal's Board Final Decision at #1, pg 8).

A brief comparison of the Navitus study and the Gilbert study is an excellent example of how using too few cross-sections can result in a floodplain study that is inaccurate and masks the true impact of floodplain development (and given the similarities of the well-pad planned in that project and the spoil stockpile planned for this Project (i.e., placement, size, use of fill, etc.), the Gilbert study is also relevant as evidence that an accurate study will show a much higher increase in the base flood elevation). The Navitus study, using not enough cross-sections, showed a base flood elevation increase of well under a foot. Meanwhile, the Gilbert study with its proper use of cross-sections showed a base flood elevation increase of multiple feet.

If the Rettew Study used a sufficient number of cross-sections (and made other necessary material corrections to its flawed study) then it is almost certain that the post-construction base flood elevation increase would be much higher. For example, during the course of the Engineering Board's investigation, Navitus agreed to run its floodplain study again but this time

use the same cross-sections as were used in the Gilbert report. Lo and behold, when Navitus ran its study using a sufficient amount of cross-sections, the base flood elevation increase caused by the EQT project skyrocketed and easily exceeded a foot (see Navitus Consent Order).

J. EQT failed to delineate the floodway as required by the Ordinance.

The Huff Meadow and the Mud Lick area are located in an Approximated Floodplain (Zone "A"). It is clear from the site plans that the combined acreage of the "spoil stockpile" and the "Mudlick Road" that will be sited in the floodplain exceeds 2 acres total. When an Applicant seeks to develop sites that are 2 acres or larger in Approximated Floodplains, the Applicant must delineate the floodway in order to determine whether fill would be going into the floodway. This is a mandatory provision of the Ordinance, and EQT's failure to do so should mandate denial of the Application Ordinance pg. 24, Section D)). . Further, if EQT did delineate the floodway as mandated in the Ordinance, then it is an almost certainty that the results would show that fill would be going into the floodway and would result in an impermissible increase to the base flood elevation in the floodway (i.e., more than zero...Ordinance pg. 16, Section 4.1).

Conclusion

EQT's Application must be denied because of the deprivation of my clients' rights to Notice (and Due Process).

EQT's Application must also be denied because of the various inaccuracies,

inconsistencies, and misleading information contained in its Application and its floodplain "studies". The Ordinance requires that the Applicant submitted accurate and truthful information, data, and analyses so that the Floodplain Administrator can make the determinations as to whether everything on the subject property is "reasonably safe from flooding" and whether any other properties will be "adversely affected". EQT has clearly failed to provide accurate and truthful information, data, and analyses in its Application, and as such, the Application must be denied for that reason alone (and EQT has demonstrated a pattern of submitting false/misleading information, data, and analyses to the Floodplain Administrator and others in regards to its plans for the Huff Farm...see this Application and the "studies" submitted therewith by EQT and see also the Navitus study and subsequent Consent Order). The Application must also be denied because this lack of accurate information, data, and analyses simply makes it impossible for the Floodplain Administrator to conclude that the subject property is "reasonably safe from flooding" and that no other properties will be "adversely affected" (as required by the Ordinance). Additionally, the floodplain study prepared by Seward Gilbert, P.E. of a similar EQT project (both in terms of location, area, and amount of fill) shows that, if this Project were accurately modeled, then the base flood elevation increase would definitely exceed the one foot threshold, and the Huffs' farmhouse (and other structures) would not "be reasonably safe from flooding" (see Gilbert's study attached hereto as Exhibit "J"). Moreover, the Application must be denied because of the other violations of the Ordinance outlined above, and the proposed Project's inability to comply with the Ordinance.

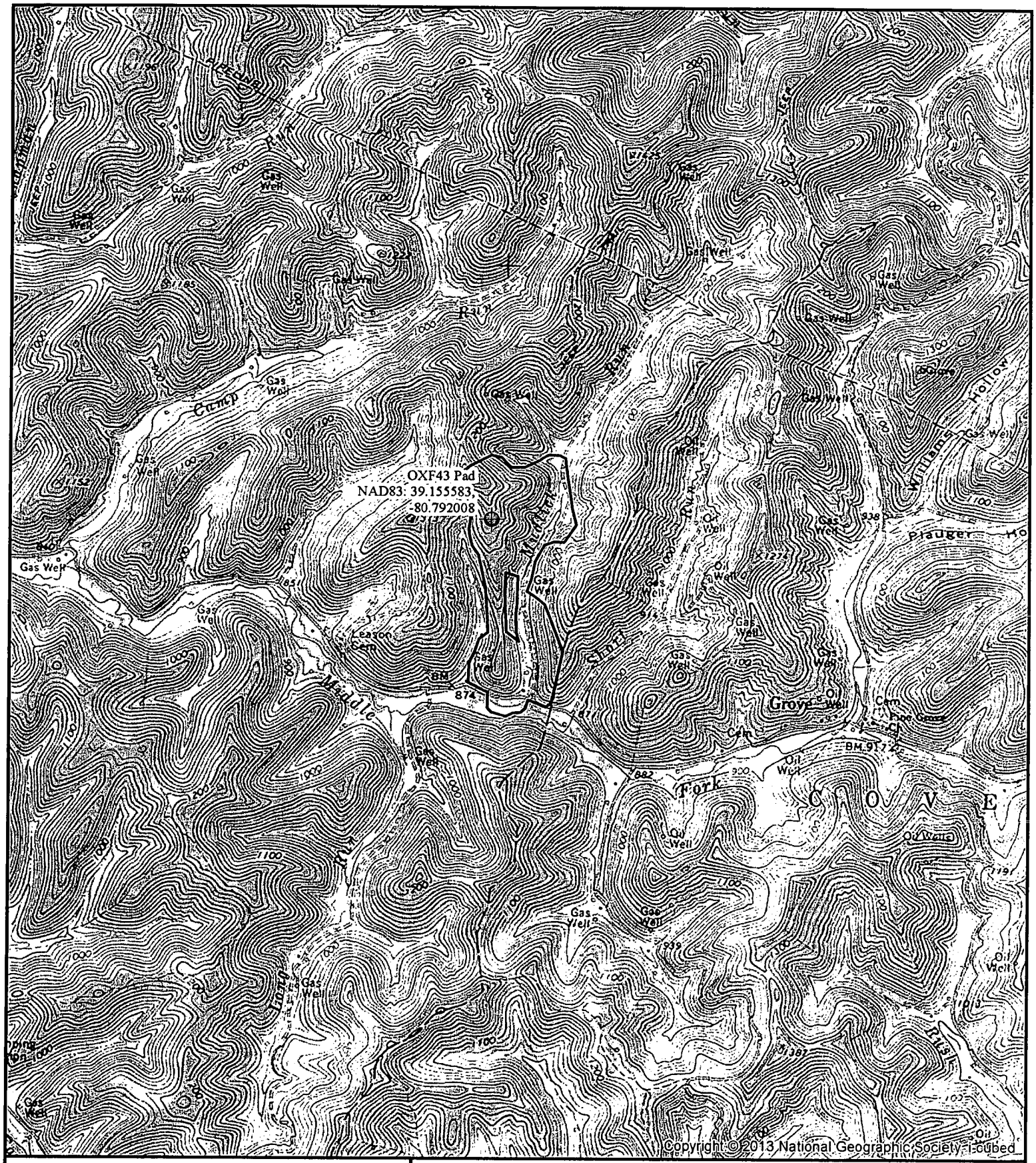
Thank you very much for your time and attention with this matter. Please let me know if

you have any questions and/or require additional information.

Best regards,

/s/David Richardson/s/

David T. Richardson, Esq.



Area of Investigation
(107 Acres)

Southwest Tax District, Doddridge County, WV
Oxford, WV USGS 7.5' Topographic Quadrangle

4/15/2014

EQT Production Company

OXF 43 Pad

Figure 1 - Topographic Basemap

Project No: 092612027

N
W E
S

0 1,000 2,000 Feet

1 inch = 2,000 feet

EQT Where energy meets innovation.

RETTEW

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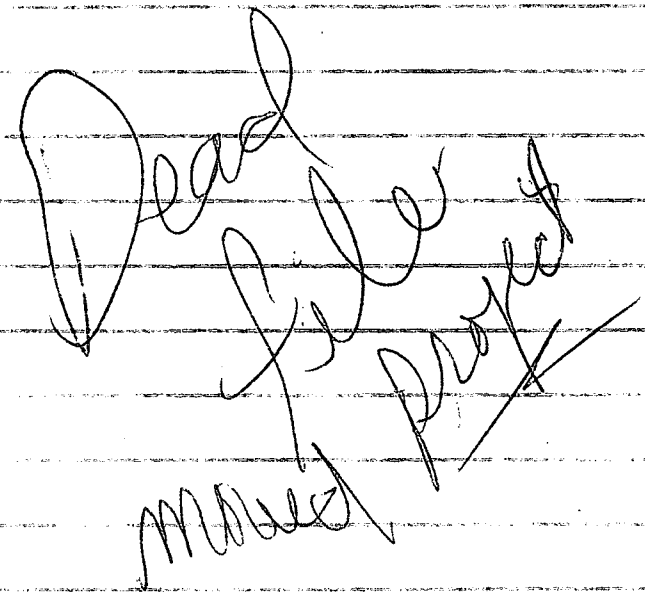
Jon [redacted] Hoff

432-559-1556



FILED

2014 SEP 22 PM 12:25

BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

Flood Plain Permit
For 14-264

EXHIBIT A

Submitted by
D.T. Richardson
DTR Law APC

Hand delivered by
Mirijana Beram 9/22/2014

IN THE CIRCUIT COURT OF DODDRIDGE COUNTY, WEST VIRGINIA

EQT PRODUCTION COMPANY,
a Pennsylvania Corporation,

Petitioner/Plaintiff,

vs.

DODDRIDGE COUNTY COMMISSION,

Respondent/Defendant,

vs.

JOYE HUFF, as trustee of the Randy E. Huff Decedent's Trust B, WILLIAM LEE HUFF, JAMES FOSTER, JENNIE FOSTER,

Respondents/Intervenors.

CASE NO. 12-C-17

ORDER

Upon mature consideration and upon careful consideration of the material before the Court and the arguments of counsel, the Amended Motion for Summary Judgment of the Intervenors, Huff, and EQT Production Company's Motion for Summary Judgment are hereby DENIED. Furthermore, plaintiff's Motion for Injunction is hereby denied.

In support of this ruling, the Court FINDS that:

1. The Doddridge County Flood Plain Ordinance is in violation of the West Virginia Constitution to the extent that the Ordinance fails to provide Due Process to surface and

adjoining landowners potentially affected by the development for which EQT Production Company seeks a permit.

2. To the extent that the Ordinance addresses surface owners who desire to construct floodplain compliant structures within relevant FEMA requirements, the Ordinance is constitutional inasmuch as it appropriately advances a legitimate public interest and is an appropriate exercise of governmental authority and power.

3. In order to comply with standard requirements of due process afforded property owners under the West Virginia Constitution the subject Ordinance when being applied under circumstances involving the request for a permit which potentially affects surface owners who are situate within or adjoining the subject floodplain must afford notice and an opportunity to be heard upon the requested permit to this class of property owners.

4. Without such notice and opportunity to be heard being afforded to this class of property owners, Plaintiff would NOT be entitled to the relief prayed for in the form of an injunction requiring the issuance of a permit for development within the floodplain, due to the subject Ordinance's failure to provide such notice, which failure

cannot be cured by the happenstance discovery and intervention of such property owners.

5. In the absence of a clear right to the relief sought in these proceedings, being one of the most harsh and extraordinary remedies recognized, a mandatory injunction cannot be granted by this Court. Plaintiff has no clear right to the permit notwithstanding plaintiff's compliance with the subject ordinance. Compliance with an unconstitutional ordinance is insufficient to grant plaintiff such right since the Ordinance is constitutionally deficient. *Lamp v. Locke*, 89 W.Va. 138, 108 S.E. 889, (1921), and its progeny.

6. Given the violation of Due Process Rights of the class of individual property owners affected by these proceedings and the circumstances of the parties, the balance of equities does not favor the Plaintiff as the moving party and it would be totally inequitable to award the requested permit under these proceedings in their current form.

7. Therefore, the Plaintiff's Request for Injunctive Relief must be **DENIED** as a matter of law.

8. There is no necessity to proceed with the talking of evidence on the matter, which factual matters are rendered moot inasmuch as none of the proceedings before the Appeal Board in the form of the Doddridge County Commission or the

. Flood Plain Administrator provided due process to constitutionally necessary parties to those proceedings.

9. The Court has no jurisdiction, as previously ruled, to hear an Appeal and has no jurisdiction to make a determination on the merits of whether a permit should issue and furthermore has no jurisdiction to issue such a permit under the Flood Plain Ordinance. To award a permit or recognize a permit previously awarded then later revoked would be improper, based upon the unconstitutionally of the Ordinance.

The plaintiff's exceptions and objections to all adverse rulings by the Court are hereby reserved.

The Clerk of this Court is directed to submit a true and correct copy of this Order to:

EQT PRODUCTION COMPANY
David K. Hendrickson, Esq.
Stephen E. Hastings, Esq.
Hendrickson & Long, PLLC
P.O. Box 11070
Charleston, WV 25339.

BODDRDGE COUNTY COMMISSION
Donald J. Tenant, Esq.
Tennant Law Office
38 Fifteenth Street, Suite 100
Wheeling, WV 26003

JOYE HUFF, as Trustee for the Randy E. Huff Decedent's Trust B, and **WILLIAM LEE HUFF**
David T. Richardson, Esq.
Law Office of David T. Richardson
826 Orange Ave, #546

Coronado, CA 92118

JAMES H. FOSTER and JENNIE FOSTER
Bradley W. Stephens, Esq.
Stephens Law Office, PLLC
#518 Monongahela Building
235 High Street
Morgantown, WV 26505

ENTERED: 12/17/12

TIMOTHY L. SWEENEY, THIRD CIRCUIT JUDGE

I hereby certify that the annexed instrument is a true and correct copy of the original on file in this office.
Attest: DWIGHT E. MOORE
Circuit Court Doddridge County of West Virginia
Dwight E. Moore
Clerk

ENTERED IN Civil BOOK
No. 18 AT PAGE 536
THIS 17th DAY OF December,
YEAR 2012
DWIGHT E. MOORE
CIRCUIT CLERK

EXHIBIT B

THE DODDRIDGE COUNTY FLOODPLAIN APPEAL BOARD FINAL DECISION IN EQT's FLOODPLAIN PERMIT #0444

The Doddridge County Floodplain Appeal Board, comprising of Commission President Shirley Williams and Commissioner Ralph Sandora[1] in compliance with the Order of the Circuit Court of Doddridge County dated September 27, 2012, in the style of EQT Production Company v. Doddridge County Commission et al., Civil Action No. 12-C-17, hereby issues this decision regarding EQT Production Company's Application for a Floodplain Permit and EQT's Appeal of the Rescission of said Permit.

The Floodplain Appeals Board is obligated by the Doddridge County Floodplain Ordinance adopted September 6, 2011 to sit as the final administrative body in determining whether an application for a floodplain permit shall be granted or denied. The Floodplain Ordinance is intended in this instance to:

(A) promote the general health, welfare and safety of the community;

(B) encourage the utilization of appropriate construction practices in order to prevent or minimize flood damage in the future;

(C) minimize danger to public health and safety by protecting the water supply . . . and to protect natural drainage; and

(D) reduce the financial burdens imposed on the community, its governmental units, and its residents, by preventing the unwise design and construction of development in areas subject of flooding.

In the aforementioned legal action in the Circuit Court of Doddridge County, the parties thereto agreed to proceed with the extension of the timeframe for submission of evidence by any

[1] Commissioner Gerald Evans recused himself from this Permit appeal due to his participation as the Floodplain Manager upon the filing of the original application.

party to the Doddridge County Floodplain Appeals Board to and including September 28, 2012 with the intent/consent that the Doddridge County Floodplain Appeals Board would reconsider its prior ruling in this matter wherein the Doddridge County Floodplain Appeals Board denied EQT's Appeal of the Floodplain Manager's (Evans) rescission of the previously granted Permit Application #0444. In addition to materials filed and evidence presented at the properly noticed Public Hearing on May 22, 2012, wherein any and all witnesses, statements and evidence were heard, the Doddridge County Floodplain Appeals Board has before it the following materials:

I. Documents submitted by Attorney Hastings on Behalf of EQT by letter dated August 15, 2012:

1. Floodplain Permit Application (dated November 16, 2011) with three attachments as follows:

   a. OXF 43 Floodplain Study computations

   b. Site Plan

   c. FEMA FIRMette maps of area

2. Email from Stephen Hastings to Kevin Sneed and Dan Wellings dated May 17, 2012 with three attachments as follows:

   a. Floodplain Study Exhibits

   b. Navitus Engineering – Floodplain Study Computations

   c. Letter to Sneed and Wellings

3. Email from Stephen Hastings to Kevin Sneed and Dan Wellings dated May 21, 2012 enclosing engineering stamped copy of Navitus Engineering – Floodplain Study Computations.

4. Email dated May 22, 2012 which Kevin Sneed testified he sent to Shirley Williams and attempted to send to Dan Wellings.

II. Documents submitted by Attorney Richardson on behalf of landowner Huff by letter dated September 17, 2012:

1. Letter dated September 14, 2012 from retained expert Wayne Chang, M.S., P.E. entitled "Review Comments of EQT Production Company's OXF 43-Well Site"

2. Wayne Chang's Resume

III. Documents submitted by Attorney Hastings on behalf of EQT entitled:

1. Navitus Engineering, Inc.'s Comment Response Letter dated September 21, 2012 (responding to Wayne Chang's letter Reviewing EQT's OXF 43-Well Site).

IV. Documents submitted by Attorney Richardson on behalf of landowner Huff entitled:

1. Hydrologic and Hydraulic Investigation for Proposed Natural Gas Development Site – Middle Fork, Mudlick and Long Run Vicinity of Summers – Doddridge County, West Virginia prepared by Engineering Perfection, PLLC, authored by S.G. (Jerry) Gilbert, P.E., DEE, CFM dated September 20, 2012.

V. Documents submitted directly by S.G. (Jerry) Gilbert, P.E., DEE, CFM by letter dated September 21, 2012 on behalf of Ms. Huff entitled:

1. Comparison of Engineering Studies – Flood Impact of Proposed Natural Gas Development Near Middle Fork, Mudlick and Long Runs, Doddridge County, West Virginia.

VI. Documents submitted by Attorney Hastings on behalf of EQT by letter dated September 28, 2012 entitled:

1. Navitus Engineering, Inc.'s Response to Mr. Gilbert's Comparison Study Report (#V. 1. above) under the signature of Cyrus S. Kump, P.E. dated September 28, 2012.

VII. Deposition of Kevin Sneed dated August 9, 2012 in case styled "EQT Production Company vs. Doddridge County Commission", Civil Action No. 12-C-17.

While this permit application process has been a long and winding road, the Doddridge County Floodplain Appeals Board is convinced that it has given sufficient opportunity to all persons and entities to submit any documents, evidence, studies, photographs, affidavits, testimony and comment and now the time has come to make a **final** decision on EQT's Floodplain Application for Permit.

The Doddridge County Floodplain Appeals Board's duty is to uphold the mandates of the Doddridge County Floodplain Ordinance without consideration of favoritism and/or bias to landowners, mineral rights owners, mineral rights lessees or lessors, and without consideration of economic impact. The Doddridge County Floodplain Appeals Board is not against industrial development and the proper and sound harvesting of natural resources so long as the same is conducted in compliance with the Doddridge County Floodplain Ordinance.

The Doddridge County Floodplain Appeals Board is mindful of its obligations and appreciates the separate duties and responsibilities of the Federal Emergency Management

Agency and Kevin L. Sneed, CFM's duty as a "technical advisor" to counties in West Virginia as the National Flood Insurance Program Coordinator from his position within the West Virginia Floodplain Management Program. **However**, as acknowledged by Kevin Sneed in Exhibit I. 4. (referenced above) (email from Kevin L. Sneed to Shirley Williams dated 5/22/12) the ultimate decision on a Floodplain Application is "up to Doddridge County".[2]

The Doddridge County Commission has the legal authority to install requirements by ordinance that are more restrictive than FEMA requirements or other agencies of the State of West Virginia on Floodplain Management.

While it is true that Kevin Sneed held the position that EQT's Application should be granted, he only possessed items submitted by EQT's engaged engineering firm, Navitus. He did not have in his possession for review items II, IV and V as referenced above as submitted by landowner Huff. Thus, with all due respect, Mr. Sneed's opinion is severely minimized and not given substantial weight by the Doddridge County Floodplain Appeals Board herein.

The Doddridge County Floodplain Appeals Board reviewed all of the aforementioned evidence and also consulted with current Doddridge County Floodplain Manager Dan Wellings and consulted with an independent outside engineering firm through counsel and Dan Wellings in order to formulate an opinion on the relevant issues.

After a review of all the filed materials, it is abundantly clear:

[2] Further, but similarly, Kevin Sneed testified under oath under cross examination in the Circuit Court Case referenced above, on August 9, 2012, that he has no authority to direct the Floodplain Manager to grant or deny a Floodplain Permit Application (Sneed at depos. pp. 61-62) nor does he have authority to direct the County Floodplain Appeals Board to grant or deny a Floodplain Permit Application (Sneed depos. p. 62, Lines 4 – 6).

1. That on a whole[3] the ground survey and studies (by nature and scope in comparison to the EQT Site Plan) performed by EQT's engaged engineering firm, Navitus, were not as detailed and thus lacked sufficient proof to support the overall opinions espoused by Navitus; i.e. (a) failure to perform analysis cross sections on approximately 800 linear feet in the exact area of the proposed drill pad; (b) utilization of only 9 cross sections to Gilbert's (landowner Huff's engaged expert) 30 terrain specific and 28 interpolated cross sections; and (c) that Navitus utilized a study of nearly 1 square mile less of land than Gilbert's study.

2. EQT/Navitus' own study at Section 5 confirms that a 100 year flood would "top over" the berms of the retention pond thus introducing potentially hazardous liquid into the water flow.

3. EQT/Navitus failed to model Mudlick Run (which had been "mapped" by FEMA as Flood Zone A) which is a contributary to the subject floodplain and would contribute to a rise in the base flood evaluation even higher.

4. EQT failed to bring forward evidence to demonstrate that no reasonable alternatives other than the floodway encroachment exists.

5. EQT/Navitus failed to model other contributaries to the main stream.

A primary purpose of the Doddridge County Floodplain Ordinance is to ensure that a proposed project will not adversely affect the Floodplain.[4] Specifically, a project must not

[3] Even though Gilbert utilized a higher Manning's n number than Navitus it is still believed that the base flood elevation would rise in excess of 1 foot. A "Manning's n Factor" is a factor for flow resistance given the slope, roughness of flow surface and obstructive vegetation in the channel. A higher Manning's n Number indicates a higher degree of impeded flow by the slope, surface and vegetation present.

[4] It is noted that Navitus Engineer Cyrus S. Krump, P.E. concluded based on the Navitus studies that there will be "no adverse affect" to adjacent properties, however, as noted above, the Navitus studies are flawed.

increase the flood risk to adjacent properties by raising water surface elevations, thus adversely affecting said property. It is clear from the evidence that the EQT project will encroach within the 100 year Floodplain of the Middle Fork and thus the project is subject to the Doddridge County Floodplain Ordinance.

The affected area has not been fully studied and mapped in detail by FEMA to formally designate the Floodway, and thus the area is designated as an "A" Zone or Special Flood Hazard Area. However, it is noted by Gilbert's study that the EQT Project will in fact encroach into the Floodway based on FEMA's mapping of the approximate Floodway. If there is encroachment into the Floodway, in this case considerable amount of fill, then the Doddridge County Floodplain Ordinance has a strict test that one must show that the encroachment will not result in any increase in the Base Flood Elevation. Essentially, a zero tolerance type test. However, given the current FEMA designation of this area as "A" Zone and not "Floodway" under the Fill section of the Doddridge County Floodplain Ordinance, a less stringent test is utilized when fill is to be placed within the Floodplain (not Floodway). The party introducing fill must demonstrate with engineering studies that adjacent properties will not be adversely affected.

Due to the lack of completed FEMA Detailed Mapping the EQT Project comes under a less restrictive test as utilized within the industry and by FEMA. The test is that no new construction is permitted unless it is demonstrated that the cumulative effect of the proposed project, when combined with all other existing and anticipated development, will not increase the elevation of the 100 year flood more than one foot at any point.

Gilbert's more detailed analysis shows that there would be flood elevation rise above the cumulative one foot measurement at any one point.

Further, it is clear that the fill will be utilized by EQT in the Floodway which is strictly prohibited by the Doddridge County Floodplain Ordinance (Article VI 6.1.E). Given that the Floodway is not designated by FEMA Mapping, the second requirement with respect to fill in the Floodplain is that any fill shall not adversely affect adjacent properties. Clearly, by the Gilbert study, adjacent properties will be greatly impacted by the introduction of fill in the Floodplain. In addition, fill shall only be used to the extent to which it does not adversely affect the capacity of channels. Here the volume flow and speed of flow will greatly increase.

Thus, the Doddridge County Floodplain Appeals Board **DENIES** EQT's Appeal and/or **DENIES** to grant EQT's Application for a Floodplain Permit.

Oct. 05, 2012
Date

Shirley J. Williams
President, Shirley Williams

Ralph Sandora
Commissioner, Ralph Sandora

EXHIBIT C

BEFORE THE WEST VIRGINIA STATE BOARD
OF REGISTRATION FOR PROFESSIONAL ENGINEERS

IN RE: **MARK D. SMITH**
NAVITUS ENGINEERING, INC. **C2013-05**

CONSENT ORDER

Comes now the West Virginia State Board of Registration for Professional Engineers (hereinafter "Board"), by Edward L. Robinson, P.E., its President, and its attorney, Debra L. Hamilton, Deputy Attorney General for the State of West Virginia, for the purpose of agreeing to disciplinary action to be taken against Respondents Mark D. Smith ("Respondent Smith") and Navitus Engineering ("Respondent Firm"), together "Respondents". As reflected in this document, the parties have reached an agreement concerning the proper disposition of the above-referenced matter, and the Board, upon approval of such agreement, does hereby **FIND** the following:

1. The matters set forth herein are within the jurisdiction of the Board, which is the state entity with the power and duty to regulate the practice of engineering in the State of West Virginia.
2. Respondent Smith is a licensed professional engineer in the State of West Virginia holding license number 11709.
3. Respondent Smith is the owner of Navitus Engineering, Inc., which is organized under the laws of the State of Virginia with its principal place of business in Winchester.
4. Respondent Firm applied for and was issued Certificate of Authorization (COA) #C04277 activated on April 23, 2012.

5. This complaint relates to Respondents' Floodplain Study Computations prepared in connection with the permitting of horizontal wells in Doddridge County, West Virginia which is referred to herein as the "Doddridge County Floodplain proceeding" (hereinafter at times referred to as the "original floodplain analysis").

6. This Complaint was initially brought on October 22, 2012, by a third-party intervener in the Doddridge County Floodplain proceeding against only the Respondent Firm, but the Board considers it necessary to also bring disciplinary action against Respondent Smith, who sealed the original computations, and therefore includes him as a named Respondent.

7. The Complaint was served on October 29, 2012, alleging that Respondents performed work (relevant to and reviewed in the Doddridge County Floodplain proceeding) at a time when they did not have a COA and also alleging that two independent engineers found the work to be inaccurate and incomplete.

8. Respondent Smith filed a timely response on November 26, 2012, which addressed only the aspect of the complaint relating to practicing without a COA, explaining that he was also the owner of another company which had a COA and that this work occurred during a transition period when its oil and gas business was being transitioned to Respondent Firm.

9. The Board was provided documents regarding the Doddridge County Floodplain proceeding from several sources as part of its investigation of the Complaint, including "THE DODDRIDGE COUNTY FLOODPLAIN APPEAL BOARD FINAL DECISION IN EQT'S FLOODPLAIN PERMIT #0444 entered on October 5, 2012, which found, among other things, that on the whole the ground survey and studies performed by Respondents were insufficient to support the overall opinions they espoused due to an

insufficient number of cross sections and area of land and that tributaries to the main stream of the subject floodplain, had they been included, would have impacted Respondents' base floodplain evaluation.

10. This Order was appealed and on December 17, 2012, the Circuit Court of Doddridge County held that the Doddridge County Floodplain proceeding was moot (thereby voiding the Appeal Board's decision) since constitutionally necessary parties had not been provided due process and the Court had no jurisdiction regarding the permit based on the unconstitutionality of Doddridge County's Floodplain Ordinance.

11. In March of 2013 Respondents provided the Board with a revised floodplain analysis, including additional cross sections and concluded: "Once all adjustments were made, we ... found that the proposed pad area would in fact cause a greater increase in water surface elevations and would be more than a foot higher than what we had initially modeled in our original study."

12. Respondent Smith, in part due to the instant Complaint, subsequently initiated communications with one of the opposing experts in the "Doddridge County Floodplain proceeding" which were provided to the Board, and the Board notes that the opposing expert also modified his conclusions regarding offsite impact.

13. Respondents admit that all work conducted by Respondent Firm prior to April 23, 2012, including the original floodplain analysis, was done without the required COA, in violation of West Virginia engineering law.

14. Respondents admit that the original floodplain analysis violated the Rules of Professional Responsibility in that the services were not in accordance with current standards of technical competence, did not conform to accepted engineering standards, may have

impacted the life, health, property and welfare of the public, did not include all relevant and pertinent information, and was founded upon an inadequate knowledge of the facts and evaluation of the subject matter.

15. The Board has taken the following factors into consideration in determining the appropriate discipline agreed to herein, including the amount of civil penalty:

a. requiring an amount that will alleviate any economic benefit gained by Respondents as a result of the non-compliance and be a substantial economic deterrent to future violations;

b. the circumstances leading to the violation;

c. the interest of and risk of harm to the public, on which point the Board finds that while the floodplain analysis may have posed a potential risk of harm, there was no such risk in that no permit was issued;

d. that Respondents have no previous history of violations in this State;

e. Respondents' cooperation in providing information to the Board; and

f. other appropriate matters.

16. While Respondent Smith has admitted to violations of several Rules of Professional Responsibility, all the violations are encompassed in the one original floodplain analysis and the Board, in its discretion, has treated this as a single violation of the Rules of Professional Responsibility for the purpose of determining the appropriate discipline agreed to herein.

17. The Board incurred substantial administrative costs in the investigation and prosecution of this Complaint in an amount in excess of $4,000.00.

CONCLUSIONS OF LAW

18. The Board is a state entity created by West Virginia Code § 30-13-1 *et seq.* and is empowered to regulate the practice of professional engineering in the State of West Virginia.

19. The Board, in its discretion, is authorized to take disciplinary action against any person or firm found to be in violation of West Virginia engineering law and may suspend or revoke or refuse to issue, restore or renew a license, impose a civil penalty upon or reprimand any person or firm who has failed to comply with any of the provisions of W. Va. Code § 30-13-1 *et seq.* or any of the rules promulgated under that article. W. Va. Code § 30-13-21(a)(4).

20. West Virginia engineering law allows a firm to practice or offer to practice engineering only upon the issuance of a certificate of authorization by the Board. W. Va. Code § 30-13-17.

21. The rules promulgated under W. Va. Code § 30-13-1 *et seq.* include the Rules of Professional Responsibility, which are binding on every professional engineer, which each professional engineer must be familiar with, and which delineate specific obligations each professional engineer must meet. W. Va. Code R 7-1-12.2 and 12.2(a).

22. The Rules of Professional Responsibility require that a professional engineer exercise the privilege of performing engineering services "only in the areas of their competence according to current standards of technical competence." W. Va. Code R 7-1-12.2(b).

23. A professional engineer's "Obligations to Society" requires the professional engineer to:

    a. "approve and seal only those design documents that conform to accepted engineering standards and safeguard the life, health, property and welfare of the public." W. Va. Code R 7-1-12.3(b).

b. include all relevant and pertinent information in reports ..." W. Va. Code R 7-1-12.3(d).
c. express a professional opinion publicly only when it is founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter." W. Va. Code R 7-1-12.3(e).

24. The Board is authorized to assess civil penalties against any person who violates any provisions of this article or any rule promulgated by this Board for each offense in an amount determined by the Board. W. Va. Code § 30-13-21(b); *see also* W. Va. Code § 30-13-21(d)(4).

25. Practicing or offering to practice engineering, as defined by W. Va. § 30-13-1 et seq., without a valid Certificate of Authorization is an action that may subject a firm to discipline by the Board, including a civil penalty up to Five Thousand Dollars ($5000.00). W. Va. Code R. § 7-1-15.1.

26. A violation of the Rules of Professional Responsibility is an action that could subject Respondents to discipline by the Board, including a civil penalty up to $5,000.00 for each offense. W. Va. Code R. § 7-1-15.1.

27. Each day of continued violation may constitute a separate offense. W. Va. Code R. § 7-1-15.3.

28. The Board, in its discretion, may assess administrative costs incurred in the performance of its enforcement or investigatory activities against any person or entity who violates any provision of West Virginia engineering law, which costs shall be paid to the West Virginia State Board of Registration for Professional Engineers by check or money order within a period of thirty (30) days from the date of the order entered by the Board. W. Va. Code R § 7-1-14.4.

29. In determining the amount of a civil penalty to be assessed, the Board may consider such factors as:

(a) Whether the amount imposed will be a substantial economic deterrent to the violation;
(b) The circumstances leading to the violation;
(c) The nature and severity of the violation and the risk of harm to the public;
(d) The history of previous violations;
(e) The extent to which the cited person or firm has cooperated with the Board and the Board's investigation;
(f) The economic benefits gained by the violator as a result of the noncompliance;
(g) The interest of the public; and
(h) Other matters as may be appropriate.

W. Va. Code R § 7-1-15.4.

CONSENT OF RESPONDENTS

Mark D. Smith, individually and as the owner of Navitus Engineering, Inc., by affixing his signature hereon, agrees to the following:

30. Respondents are aware of their right to be represented by counsel and their option to pursue this matter through appropriate administrative and/or court procedures and Respondents intelligently and voluntarily waive their right to do so.

31. Respondents admit that they practiced and offered to practice engineering in West Virginia without the required COA, in violation of West Virginia engineering law.

32. Respondent Smith admits he violated the Rules of Professional Responsibility in connection with the original floodplain analysis by (1) performing engineering services which did not conform to current standards of technical competence in violation of W. Va. Code R 7-1-12.2(b); (2) approving and sealing design documents that did not conform to accepted engineering standards and thus may have impacted the life, health, property and welfare of the public in violation of W. Va. Code R 7-1-12.3(b); (3) not

including all relevant and pertinent information in the original floodplain analysis in violation of W. Va. Code R 7-1-12.3(d); and (4) expressing a professional opinion publicly that was not founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter in violation of W. Va. Code R 7-1-12.3(e).

33. Respondents accept the findings set forth above and consent to the entry of this Consent Order freely and voluntarily and without duress, restraint or compulsion.

34. Respondents acknowledge that the Board may reject this proposal and may hold a hearing to impose such sanctions of a disciplinary nature as it deems appropriate.

35. Respondents acknowledge that entering into the negotiation of this Consent Order constitutes a waiver of any and all objections regarding the timeliness of Board action on Complaint Number C2013-05. This paragraph is binding on Respondents even in the event that the Board does not approve this Consent Order.

36. This Consent Order is executed by Respondents for the purposes of avoiding further administrative action with respect to this Complaint. In this regard, Respondents authorize the Board to review and examine all investigative file materials concerning Respondents prior to or in conjunction with consideration of this Consent Order.

37. Should the Consent Order not be accepted by the Board, it is agreed that presentation to and by the Board shall not unfairly or illegally prejudice the Board or any of its members from further participation, consideration or resolution of these proceedings and that any knowledge obtained by the Board shall not form the basis of any objection to any Board member serving on the hearing panel in the event this matter goes to hearing, any such objection being knowingly waived by Respondents. This paragraph is binding on Respondents even if the Board does not approve this Consent Order.

38. Respondents acknowledge that this Consent Order, the underlying Complaint, their submissions to the Board, and the public records of the Doddridge County Floodplain proceeding provided to the Board are public records which must be made available upon legal request in accordance with the West Virginia Freedom of Information Act.

39. Respondents agree that the sum and substance of the Complaint and this agreement in part or in their entirety will be set forth in Board publications and on the Board website, as well as other appropriate placements, including the non-public enforcement exchange database administered by the National Council of Examiners for Engineering and Surveying (NCEES).

40. Respondents acknowledge this Consent Order constitutes a full and final settlement of this matter and that they cannot appeal or bring any other civil or administrative action regarding the circumstances of same except an action to enforce the terms of this Consent Order.

41. Respondents acknowledge that non-compliance with this Consent Order may result in the rescission of this agreement, the reinstatement of the Complaint, the summary revocation of any license or certification which may be issued to Respondents by the Board, and the addition of any other charges which may arise or ensue from Respondents' non-compliance with this Consent Order.

42. Respondents acknowledge that proof of any misstatement or misrepresentation made in connection with this matter will result in the rescission of this agreement, the reinstatement of Complaint C2013-05, the summary suspension or revocation of any license or certificate of authorization issued to the Respondents, and the addition of any

other charges which may arise or ensue from providing false information to the Board in violation of West Virginia engineering law.

43. Any violation of the terms of this Consent Order shall be immediate cause for further disciplinary action by the Board.

ORDER

1. On the basis of the foregoing the Board hereby **ORDERS** that this Consent Order shall serve as an informal settlement of Complaint #C2013-05 pursuant to West Virginia Code § 30-13-22(b).
2. The Board **ORDERS** Respondent Firm to pay a civil penalty in the amount of Two Hundred Fifty Dollars ($250.00) for practicing and offering to practice engineering in West Virginia without a certificate of authorization.
3. The Board **REPRIMANDS** Respondent Smith for his violations of the Rules of Professional Responsibility admitted to herein.
4. The Board **ORDERS** Respondent Smith to pay a civil penalty of Four Thousand Dollars ($4,000.00) for violating the Rules of Professional Responsibility admitted to herein.
5. The Board **ORDERS** Respondents to pay administrative costs in the discounted amount of Two Thousand Dollars ($2,000.00).
6. The administrative costs agreed to herein must be paid within thirty (30) days from the date of the Board's entry of this Consent Order evidenced by the date of the President's signature, such payment to be made payable to the W. Va. P.E. Board.
7. The civil penalties agreed to herein in the total amount of Four Thousand Two Hundred Fifty Dollars ($4,250.00) must be paid within sixty (60) days from the date of the Board's entry of this Consent Order evidenced by the date of the President's signature, such

payments to be made separately from the administrative costs and payable to the W. Va. P.E. Board for transfer to the general fund of the State of West Virginia upon receipt.

8. The sum and substance of the Complaint and this agreement in part or in their entirety shall be set forth in Board publications and on the Board website, as well as other appropriate placements, including the non-public enforcement exchange database administered by NCEES.

9. Any violation of the terms of this Consent Order shall be immediate cause for summary suspension or revocation of Respondent's professional engineering license and Respondent Firm's certificate of authorization and grounds for further disciplinary action by the Board.

10. This Consent Order constitutes a full and final settlement of this matter, and nothing in this Consent Order or the circumstances giving rise to same may be the subject of any appeal or other civil or administrative action by Respondent, although either party may bring an action to enforce the terms of this Consent Order and the Board may take this disciplinary action into consideration as may be relevant to future issues regarding Respondents which may arise.

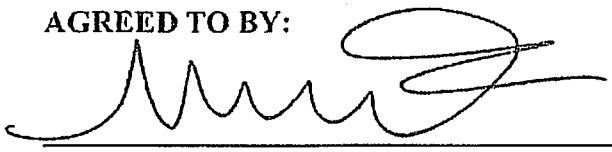
11. If the civil penalties and administrative costs agreed to herein are not timely paid, this Consent Order may be summarily enforced in the Circuit Court of Kanawha County without further notice to Respondent upon application by the Board for the entry of a Judgment Order for the total amount of the payments agreed to herein of Six Thousand Two Hundred Fifty Dollars ($6,250.00) that remain unpaid, together with pre-judgment interest from the date of the President's signature hereon, post-judgment interest from the

date of entry of the Judgment Order, and all costs of any enforcement action(s), which judgment shall be fully executable in accordance with applicable law.

12. This matter shall be closed upon execution of this Consent Order by both parties and the full payment of the civil penalties and administrative costs agreed to herein.

13. This Consent Order relates solely to matters within the jurisdiction of the West Virginia Board of Registration for Professional Engineers and does not evidence compliance with any other laws of the State of West Virginia or its political subdivisions, nor should any such compliance be implied.

AGREED TO BY:



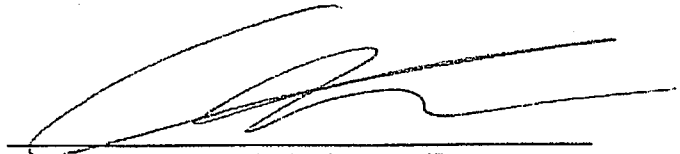
11.25.13

MARK D. SMITH — **DATE**
Individually and as Owner of Navitus Engineering, Inc.

ENTERED into the records of the West Virginia State Board of Registration for Professional Engineers this 6th **day of** December, **2013.**

WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

By:



12-6-13

EDWARD L. ROBINSON, P.E. — **DATE**
BOARD PRESIDENT

FW: OXF 43 Flood Study

Mark Smith [msmith@navituseng.com]

Sent: Friday, March 15, 2013 9:32 AM
To: Don Johnson
Cc: Cyrus Kump [ckump@navituseng.com]; Kurt Pennington [kpennington@navituseng.com]

Don

Below is the analysis of combining our study 1 and 2 into one and showing the same cross section location as Gilbert did. Kurt in my office did a good job explaining the detail which you can read below. Please give me a call to discuss I will be in the office all day today, my cell will be the best number to catch me, 540 974 0335.

Thank you

Mark D. Smith, PE, LS
Navitus Engineering, Inc.
President
Eagle BSA

NAVITUS ENGINEERING INC.

DESIGNING for AMERICAN ENERGY INDEPENDENCE

FINALIST OIL & GAS AWARDS 2012

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Navitus is Latin for Energy
Visit us on the web at www.navituseng.com to see other locations, and to learn more about the services we offer.

Mark,

As requested, I have completed my revised analysis of the OXF 43 Floodplain Study so that we may address the concerns of Mr. Don Johnson. In an effort to address his concerns, I have prepared the revised analysis to include both original models (Floodplain Study 1 and Floodplain Study 2) that were reported in our submitted Floodplain Study. Mr. Johnson had asked us to address specific issues that were raised in the "Doddridge County Floodplain Appeal Board Final Decision in EQT's Floodplain Permit #0444".

The Appeal Board had five stated issues of concern as follows:

1. The ground survey and studies were not of sufficient detail to support the conclusions found in the submitted Floodplain Study
    a. 800 linear feet of the exact pad area was not analyzed

b. Insufficient number of cross sections were used in the analysis
c. The study did not analyze the entire contributing drainage area

2. The 100-year flood would "top over" the proposed retention pond at Section 5
3. The study did not model Mudlick Run as a contributary to the subject floodplain
4. EQT failed to demonstrate that no reasonable alternative sites were available
5. The study failed to model other contributaries to the main stream

Based on my revised study, my responses are as follows:

1. The ground survey that was used for the proposed development area (area of interest) was prepared by Smith Land Surveying. Inc. This survey was a field shot topographic survey for 2' contours, industry standard for normal engineering design (vertical accuracy factor of ±1') sufficient enough for a detailed floodplain analysis. Topography for those areas beyond the project area was taken from an available Digital Elevation Model for the Oxford Ouad obtained from the West Virginia GIS Technical Center. The DEM used is 3 meter data and is reported from the WVGIS Technical Center to have vertical accuracy of ±10' (The use of field shot survey data is always paramount to DEM data per WVGIS TC). The (Jerry) Gilbert, Engineering Perfection, PLLC Study, as referenced in the Appeal Board Decision, relies entirely on the 3 meter DEM data and a few field recorded elevations (no topographical survey was preformed). The Gilbert studies' vertical datum is at best ±10'. Therefore, the ground survey concern is unwarranted.
   - (1a) I am not sure of the 800 linear feet reference being made since the exact pad area is only 465' long (our original study did include a cross section within this exact pad area)
   - (1b) Reference was made to the (Jerry) Gilbert, Engineering Perfection, PLLC flood analysis which included 30 terrain specific cross sections (±10' vertically), derived from the DEM information, and 28 cross sections interpolated from the DEM derived sections (It is not known at what accuracy these sections would be). As stated in his report, Mr. Gilbert's study also indicates that stream channel information for these sections were hand manipulated since the 3 meter DEM was unable to define these features. I have in response to this concern revised our original study to include additional cross sections, which were derived from the field shot data, to mimic the horizontal location of those sections as shown in the Gilbert study. The Gilbert's section locations within our proposed site area were replicated and, as a result, added 19 additional sections to our original study. Again, these sections were derived from our field shot topography and were not interpolated.
   - (1c)Our original study was modeled in two parts and did include the entire 5.02 square miles of drainage for this project. The portion that drains through the pad site (Study 1), including the Mudlick Run tributary, accounts for 4.2 square miles of drainage and is identical to the Gilbert study, and, the remaining 0.8 square mile is accounted for in Study 2 (Completion Pit #2 along Long Run). My revised study now includes both original studies 1 and 2 and addresses the entire 5.02 sq. miles of drainage within a single model.
2. The "top over" issue at Section 5 is a misunderstanding of the submitted cross section data. The Section 5 in question is located just downstream of Mudlick Run, perpendicular to County Route 19 and extends up the Mudlick Run basin. This particular cross section is showing a backwater condition up Mudlick Run and the road

area of County Route 19 does appear as an "embankment" but is simply the road cross section. Nowhere in our original model do we show a retention pond, flowback pit, or completion pit to "top over".

3. Mudlick Run was in fact accounted for in our original study, as being a part of the overall drainage area for Middle Fork. This may have been missed since our original study was conducted in two parts, but was submitted as a single analysis. Originally, we had looked at this area but were not concerned with potential impacts beyond the Middle Fork floodplain boundary across County Route 19 due to the fact that flows along Mudlick Run are being controlled by an existing 60" CMP cross culvert and the elevation of County Route 19. Based on the calculated flows for Mudlick Run, this drainage would be restricted by headwater conditions at the existing 60" culvert. With this in mind, we did not deem it necessary to model cross sections in HEC-RAS for this tributary (neither did Gilbert, based on his report). However, in order to further confirm the impacts, I have included cross sections up the Mudlick Run channel in the revised model and have analyzed it with the Middle Fork flood event. The headwater restrictions, as expected, were prevalent and were not impacted by the Middle Fork flooding, under existing and proposed site conditions.
4. The assessment of alternate site locations for this project was not a part of our scope of services for EQT. We were told that EQT had independently evaluated several alternative site locations but we were not privy to their findings. We were sub-contracted to engineer this site and assume that it was the optimal site for development.
5. As stated in item #3, the contributing drainage areas to Middle Fork were included in its overall drainage calculations. The Long Run drainage area was looked at as a separate model in the original study but I have included it into the revised model to clarify the issue. The other drainage areas, Short Run, and an unnamed area below Mudlick Run were not modeled separately like Mudlick Run because of the controlling features of the county road. Again, these areas were included in the overall drainage calculations used for the original study. There is no evidence that these areas were modeled any different by the Gilbert study.

Results and Conclusions:

Our original study was conducted to assure that we did not create any adverse impacts or affects to those properties adjacent to the proposed project area within the floodplain. Adverse impacts to adjacent properties were not allowed by the County Ordinance and we took particular care to assure that our proposed development would not affect those properties upstream and downstream of the site. In addition to the upstream and downstream properties, we were also interested in protecting the adjacent County Route 19 and the onsite dwelling located on the north side of County Route 19 adjacent to Mudlick Run. Our main objective was to not increase the base flood elevations on any of these properties and to contain all flood elevation increases within the project area, which was achieved.

Mrs. Joye Huff, owner of the land where the proposed pad site is to be located and owner of the onsite dwelling along Mudlick Run, hired Mr. Jerry Gilbert to prepare an independent floodplain study for the proposed development area. The Gilbert study suggested that additional cross sections should be analyzed to assess the full impacts of the proposed development.

At the request of Mr. Johnson, we have prepared a revised HEC-RAS model to address Mr. Gilbert's concerns, those concerns of the Doddridge County Floodplain Appeal Board, and to further evaluate the proposed development impacts. To achieve this, we added 19 additional cross sections to our original HEC-RAS model of Middle Fork, we have incorporated the Long Run sections from study #2, and we added Mudlick Run sections to the revised HEC-RAS model (Mudlick Run sections are in addition to the original study). We have utilized the same flows as previously used in our original studies (those flows being consistent with those shown in the Gilbert study), and maintained all Manning's n values used in our original HEC-RAS models (the Manning's n values used in the Gilbert study we believe were not representative of existing site conditions). Once all adjustments were made, we ran the revised model to evaluate the proposed development impacts and found that the proposed pad area would in fact cause a greater increase in water surface elevations and would be more than a foot higher than what we had initially modeled in our original study. This increase was found to have an effect on the previously calculated changes in water surface elevations upstream of the pad for approximately 350' in the area of the Mudlick Run confluence. However, changes in base flood elevations upstream of this point agree with those previously calculated in the original study and continue to show a zero increase at the property boundary upstream of the project area. This zero increase matches the original study and confirms our original findings at the upstream end of our project. From the pad area and moving downstream, the increase in water surface elevations quickly dissipate to a zero increase. The first cross section immediately downstream of the pad area records the water surface elevations returning to the pre-developed base flood elevations, zero increase, and remains at a zero increase to the lower limits of the model. Since the increases in water surface elevations were occurring at the pad location and upstream for 350', we took a detailed look at the Mudlick Run tributary. As stated before, flows from Mudlick Run cross County Route 19 by way of a 60" culvert before entering Middle Fork. This crossing was modeled based on field locations, and it was determined that the culvert and road grades were in fact controlling the upstream flows from Mudlick Run. Per the HEC-RAS model, base flood elevations at the existing dwelling and garage in the pre-developed condition remain the same in the post-development condition, with no impact on those flows upstream of County Route 19 (BFE's remained unchanged on the north side of County Route 19).

In conclusion, the revised model did show an increase in base flood elevations beyond what we had originally modeled. Even though there was an increase to the change in water surface elevations, this change only effects flood elevations at the pad location and 350' upstream of the pad. Impacts to the adjacent properties have remained unchanged, zero increases in the base flood elevations, as previously reported with our original study. The increase in water surface elevations at the pad are completely contained within the pasture area and existing floodplain where the development site is to be located between the county road and the far stream bank. The revised model did not show any flooding of the adjacent roadway other than what normally occurs at the Mudlick Run crossing. Flood impacts at Completion Pit #2 on Long Run remained unchanged and do not impact properties upstream and downstream. Based on the evidence of this revised study, we feel that we have adequately addressed and refuted those claims being brought against us. We have clearly demonstrated that all adjacent properties beyond the limits of this project, including the adjacent public roadway and the subject property owner's dwelling, have not been adversely affected or in fact affected at all by the proposed construction.

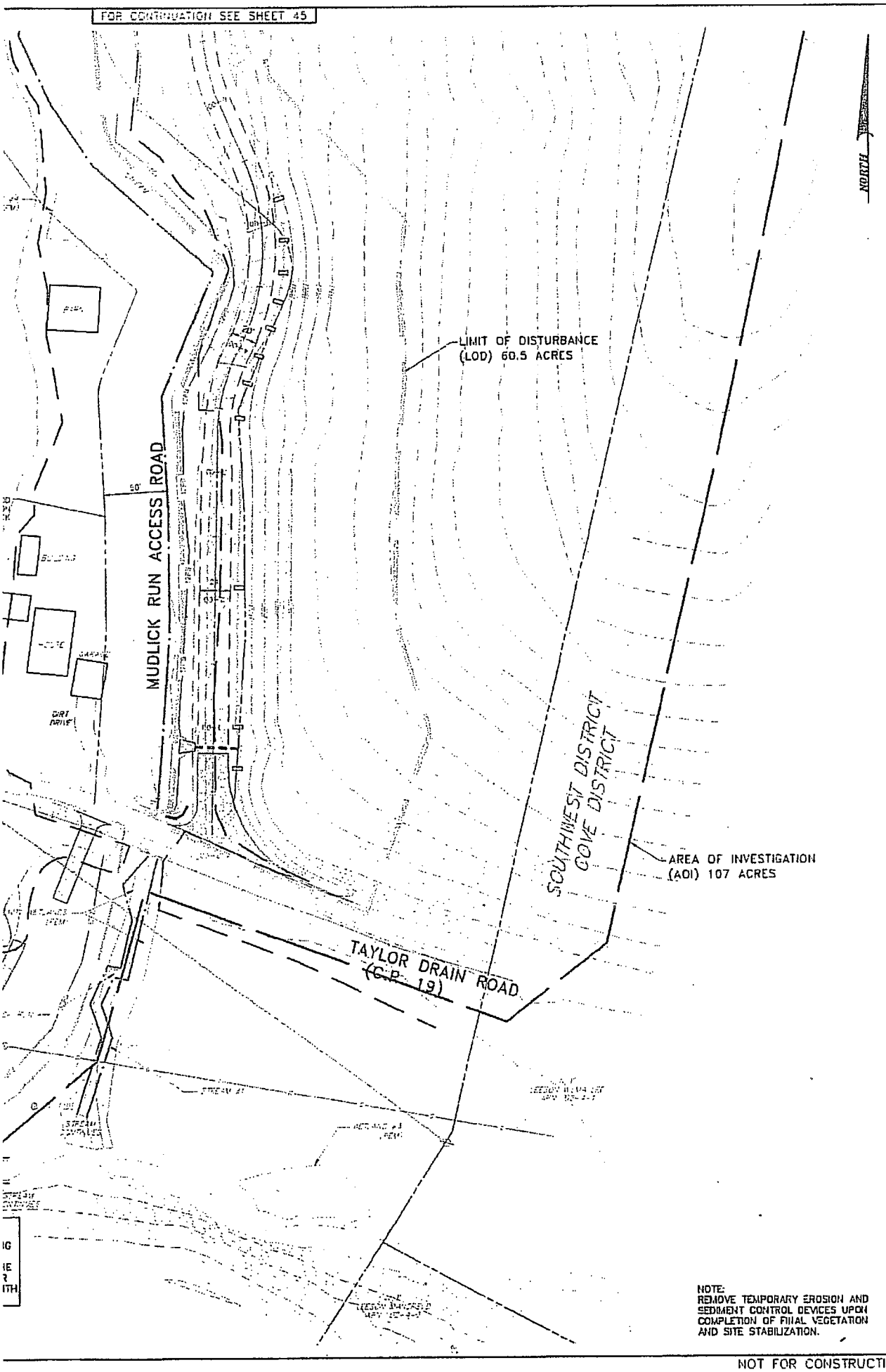
Furthermore, this gas well drilling site is exactly that, a site constructed for the purpose of

drilling and development of gas wells. The majority of the features proposed for this site, completion pits, flowback pits, and the majority of the pad site are temporary features and will be removed upon the completion of the drilling process. As a part of this whole process we have prepared a drill site reclamation plan for the benefit of the operator. These plans are now being required by the WVDEP Office of Oil and Gas, but were not required at the time of this plan submission. This reclamation plan shows the removal of both completion pits, the removal of the flowback pit, and the removal of the entire pad area beyond the immediate well head area. It is this well head area that will remain as a permanent production feature, which minimizes overall impacts to the floodplain.

Kurt Pennington

EXHIBIT D

FOR CONTINUATION SEE SHEET 45



NOTE:
REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.

RECLAMATION PLAN
FOR
OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 44 OF 50
DWG. NO 092612027

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE 0 25' 50' 1"=50' 100' 150'

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
SURV. CHF.
CHKD BY: CWW
CHKD BY: CWW
FIELDBOOK NO.
DRAWING REFERENCE:

FOR RETTEW ASSOCIATES BY:

COMMONWEALTH OF PENNSYLVANIA REGISTERED 15074 STATE OF WEST VIRGINIA

NO.	DATE	REVISION

RETTEW
RETTEW Associates, Inc.
Twin Towers, 4955 Steubenville Pike, Suite 300
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

NOT FOR CONSTRUCTION/NOT FOR BIDDING

LEGEND

- EXISTING PROPERTY LINE
- EXISTING ADJACENT LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING PAVEMENT EDGE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STREAM
- EXISTING 100-YR FLOODPLAIN
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING DECIDUOUS\EVERGREEN TREE
- EXISTING STONEWALL
- EXISTING WETLANDS
- EXISTING OVERHEAD TELEPHONE
- EXISTING U/G TELEPHONE
- EXISTING OVERHEAD ELECTRIC
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- EXISTING GAS PIPELINE
- EXISTING SANITARY LINE
- EXISTING SANITARY MANHOLE
- EXISTING STORM PIPE
- EXISTING STORM MANHOLE
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- EXISTING IRON ROD
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- PROPOSED MINOR CONTOUR
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- PROPOSED CHANNEL LINING
- PROPOSED ORANGE CONSTRUCTION FENCE
- PROPOSED FENCE LINE
- TEMPORARY FILTER SOCK
- TEMPORARY FILTER SOCK - 12"
- TEMPORARY FILTER SOCK - 18"
- TEMPORARY FILTER SOCK - 24"
- TEMPORARY FILTER SOCK - 32"
- LIMIT OF DISTURBANCE
- (AOI) AREA OF INVESTIGATION

100 YEAR FLOOD PLAIN

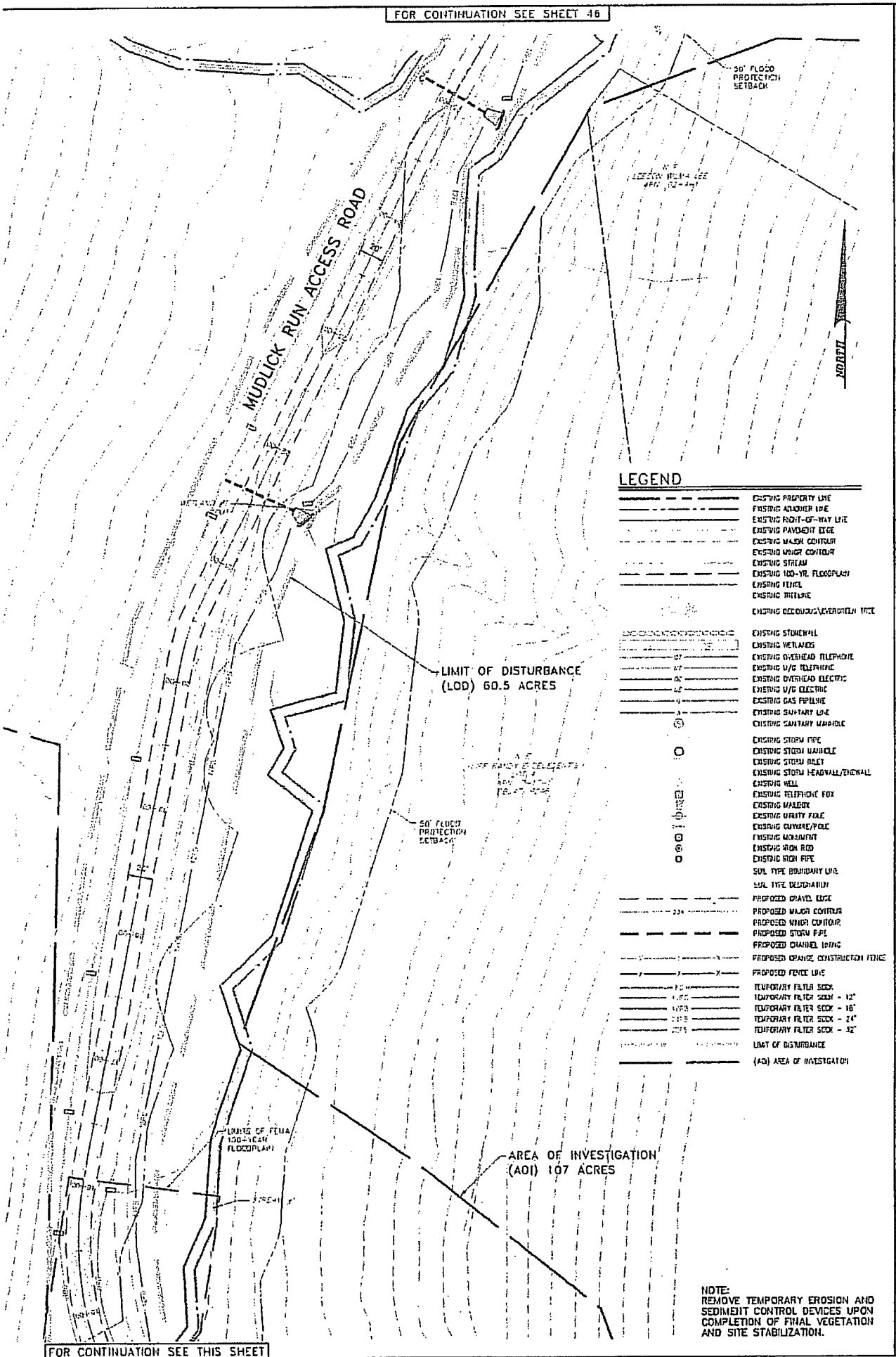
100-YEAR FLOODPLAIN

EXISTING 6" GAS PIPELINE (FSSD) APPROXIMATE LOCATION

STREAM

REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR SITE RECLAMATION, RESTORE TO EXI GRADE, ROUND OR SHAPE ALL DISTURBED AREAS TO CONFORI SITE TO ADJACENT TERRAIN, CI WITH TOPSOIL, AND REVEGETAT PERENNIAL VEGETATION.

FOR CONTINUATION SEE SHEET 46



NOTE:
REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.

FOR CONTINUATION SEE THIS SHEET

NO	DATE	REVISION

FOR RETIEW ASSOCIATES BY:

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
CHKD BY: CWW
CHKD BY: CWW
SURV. CHIEF: FIELDBOOK NO.
DRAWING REFERENCE:

CLIENT: EQT

EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

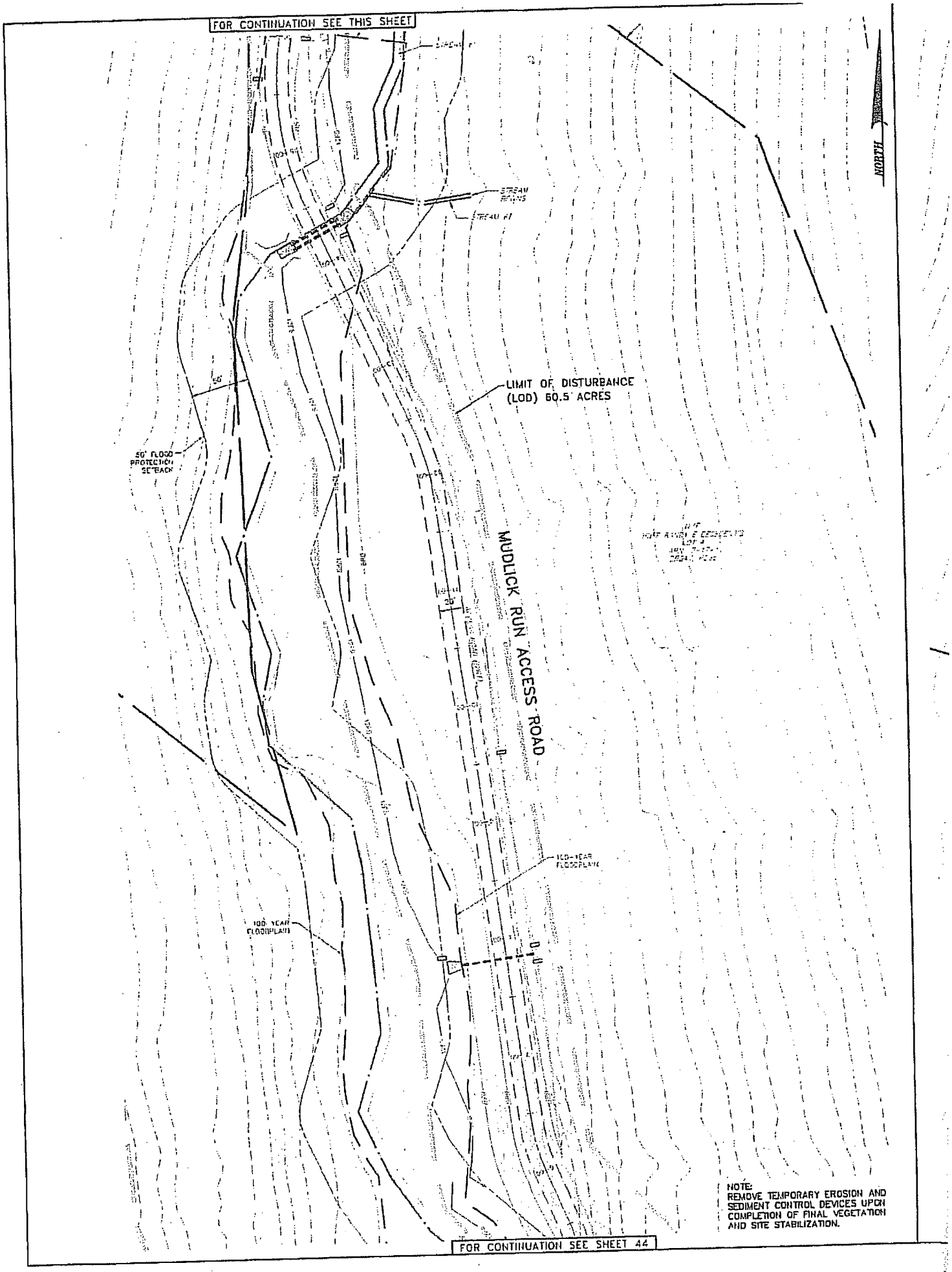
SCALE 0' 25' 50' 1"=50' 100' 150'

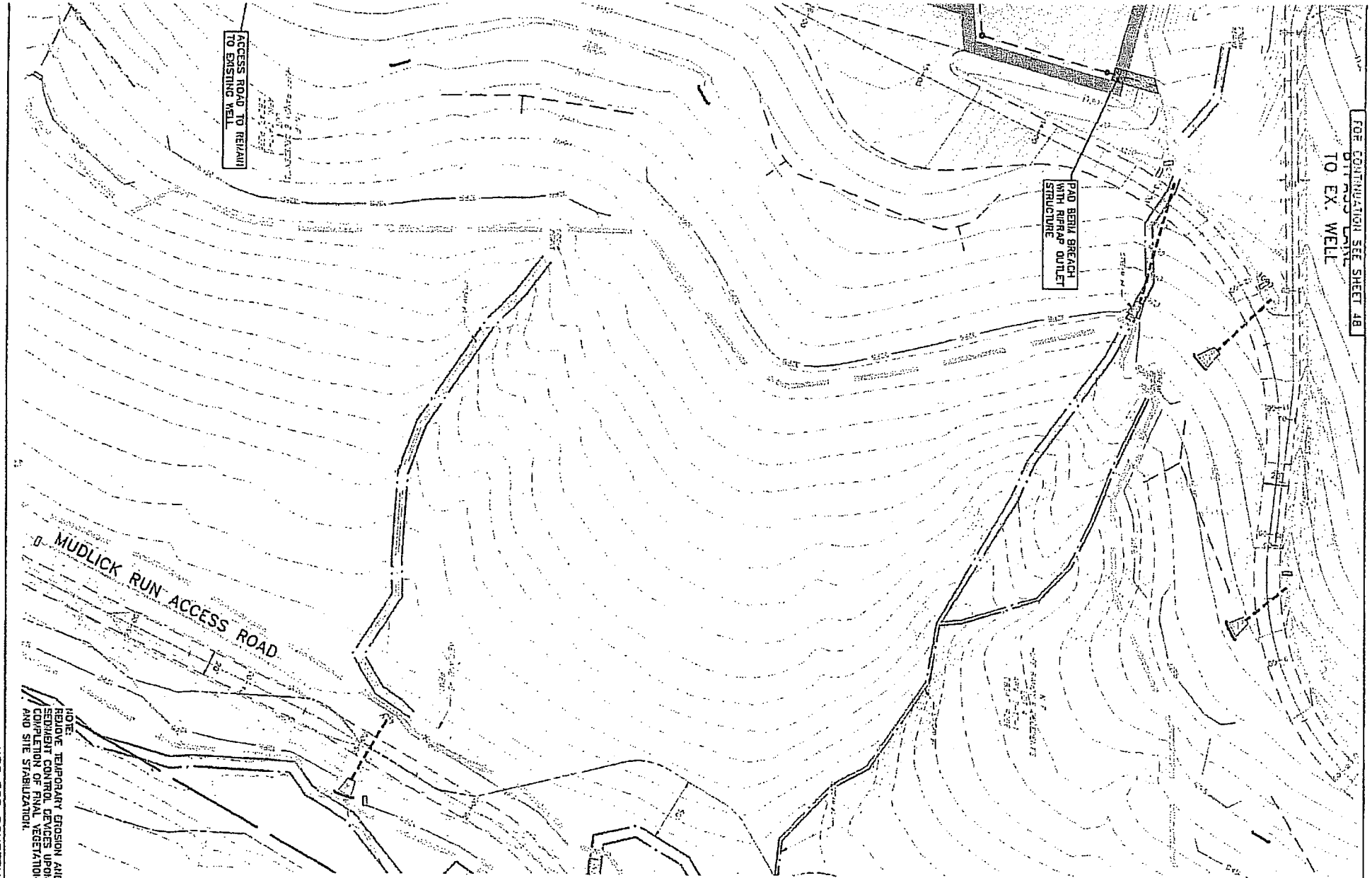
RETIEW
RETIEW Associates, Inc.
Twin Towers, 4955 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: retiew@retiew.com
Website: www.retiew.com

RECLAMATION PLAN
FOR
OXF-43 WELL PAD
SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 45 OF 50
DWG. NO. 092012027

NOT FOR CONSTRUCTION/NOT FOR BIDDING


FOR CONTINUATION SEE THIS SHEET
NORTH
LIMIT OF DISTURBANCE
(LOD) 60.5 ACRES
50' FLOOD
PROTECTION
SETBACK
MUDLICK RUN ACCESS ROAD
100-YEAR
FLOODPLAIN
100-YEAR
FLOODPLAIN
NOTE:
REMOVE TEMPORARY EROSION AND
SEDIMENT CONTROL DEVICES UPON
COMPLETION OF FINAL VEGETATION
AND SITE STABILIZATION.
FOR CONTINUATION SEE SHEET 44



NOT FOR CONSTRUCTION/NOT FOR BIDDING

RECLAMATION PLAN

FOR

OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT — DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014

SHEET NO. 4B OF 50

DWG. NO. 09261202?

RETTEW

RETTEW Associates, Inc.
Twin Towers, 4955 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

SCALE: 1"=50'
0 25' 50' 100' 150'

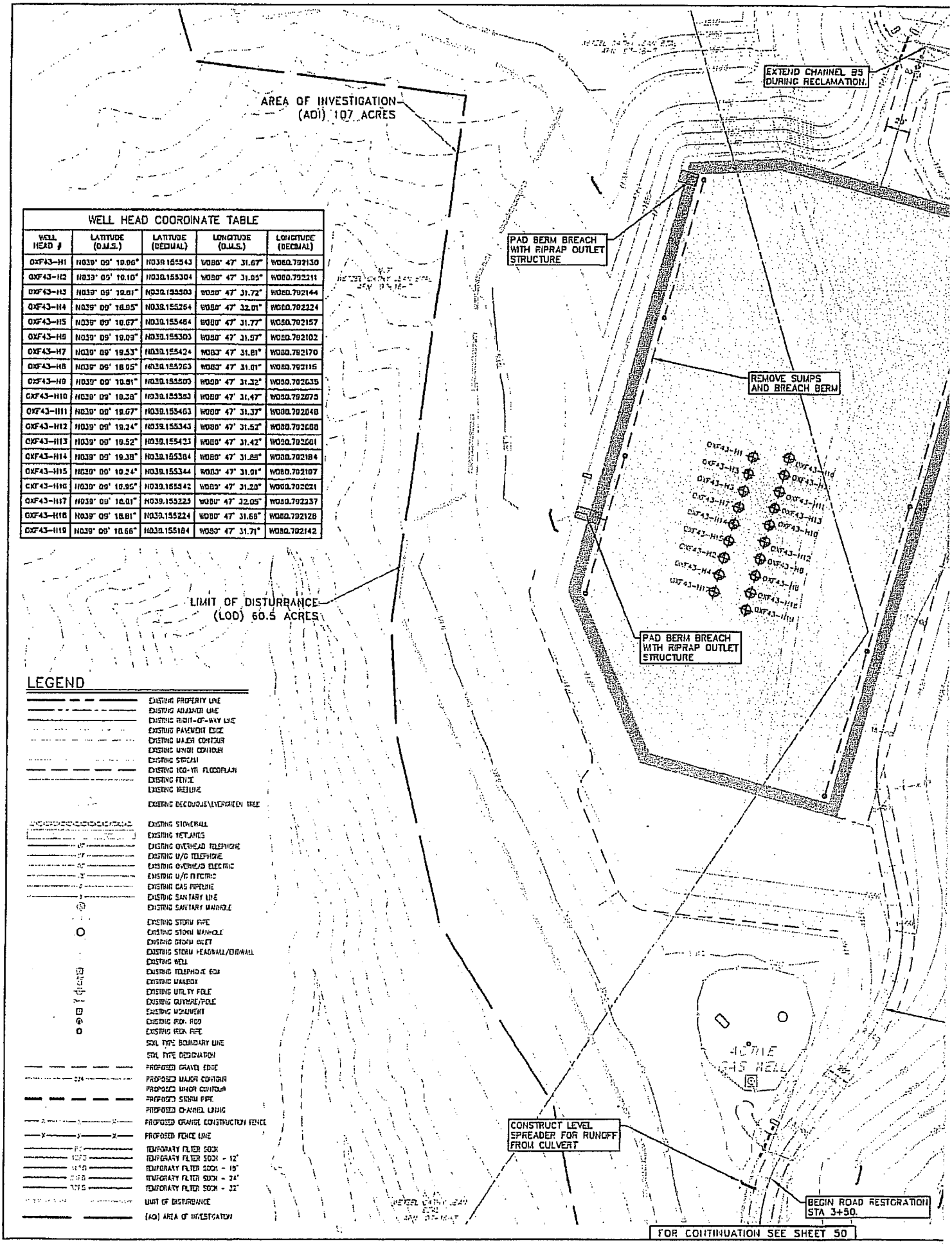
CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW | CHKD BY: CWW
DRAWN BY: DAW | CHKD BY: CWW
SURV. CHIEF: | FIELDBOOK NO.
DRAWING REFERENCE:

FOR RETTEW ASSOCIATES BY:

BRIAN D. SPRAY, REGISTERED PROFESSIONAL ENGINEER, 15074, STATE OF WEST VIRGINIA

NO.	DATE	REVISION



WELL HEAD COORDINATE TABLE				
WELL HEAD #	LATITUDE (D.M.S.)	LATITUDE (DECIMAL)	LONGITUDE (D.M.S.)	LONGITUDE (DECIMAL)
OXF43-H1	N039° 09' 19.96"	N039.155543	W080° 47' 31.67"	W080.792130
OXF43-H2	N039° 09' 19.10"	N039.155304	W080° 47' 31.95"	W080.792211
OXF43-H3	N039° 09' 19.01"	N039.155303	W080° 47' 31.72"	W080.792144
OXF43-H4	N039° 09' 18.95"	N039.155284	W080° 47' 32.01"	W080.792224
OXF43-H5	N039° 09' 19.67"	N039.155484	W080° 47' 31.77"	W080.792157
OXF43-H6	N039° 09' 19.09"	N039.155303	W080° 47' 31.97"	W080.792102
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OXF43-H10	N039° 09' 19.38"	N039.155383	W080° 47' 31.47"	W080.792075
OXF43-H11	N039° 09' 19.67"	N039.155463	W080° 47' 31.37"	W080.792048
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LEGEND

- EXISTING PROPERTY LINE
- EXISTING ADJOINER LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING PAVEMENT EDGE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STREAM
- EXISTING 100-YR FLOODPLAIN
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING DECIDUOUS\EVERGREEN TREE
- EXISTING STONEWALL
- EXISTING WETLANDS
- EXISTING OVERHEAD TELEPHONE
- EXISTING U/G TELEPHONE
- EXISTING OVERHEAD ELECTRIC
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- EXISTING STORM MANHOLE
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- EXISTING TELEPHONE BOX
- EXISTING MAILBOX
- EXISTING UTILITY POLE
- EXISTING GUYWIRE/POLE
- EXISTING MONUMENT
- EXISTING IRON ROD
- EXISTING IRON PIPE
- SOIL TYPE BOUNDARY LINE
- SOIL TYPE DESIGNATION
- PROPOSED GRAVEL EDGE
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- TEMPORARY FILTER SOCK - 18"
- TEMPORARY FILTER SOCK - 24"
- TEMPORARY FILTER SOCK - 32"
- LIMIT OF DISTURBANCE
- (ADI) AREA OF INVESTIGATION

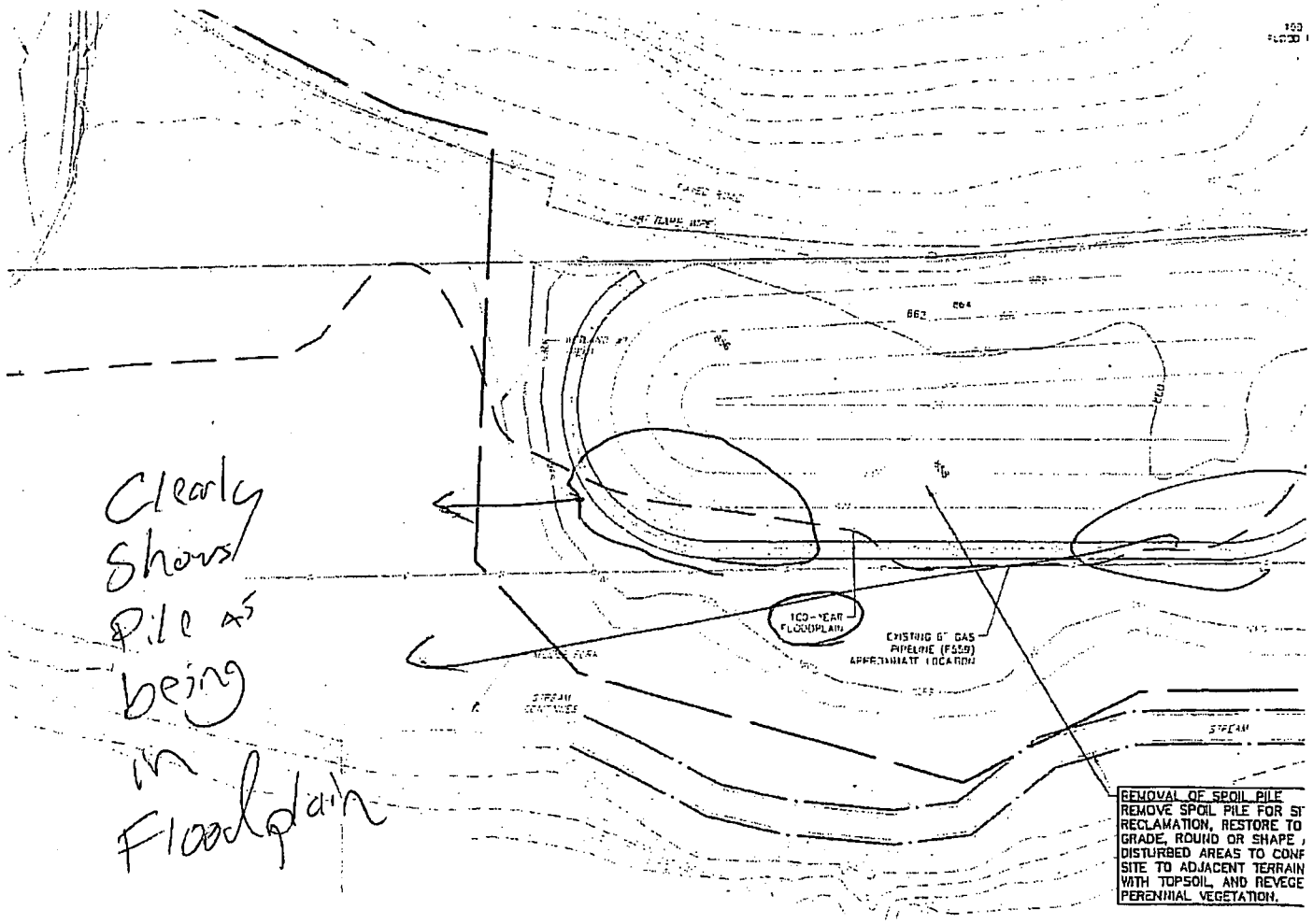
EXHIBIT E

100 YEAR FLOOD PLAIN
100 YEAR FLOOD PLAIN
SOUTHWEST
COVE DISTRICT

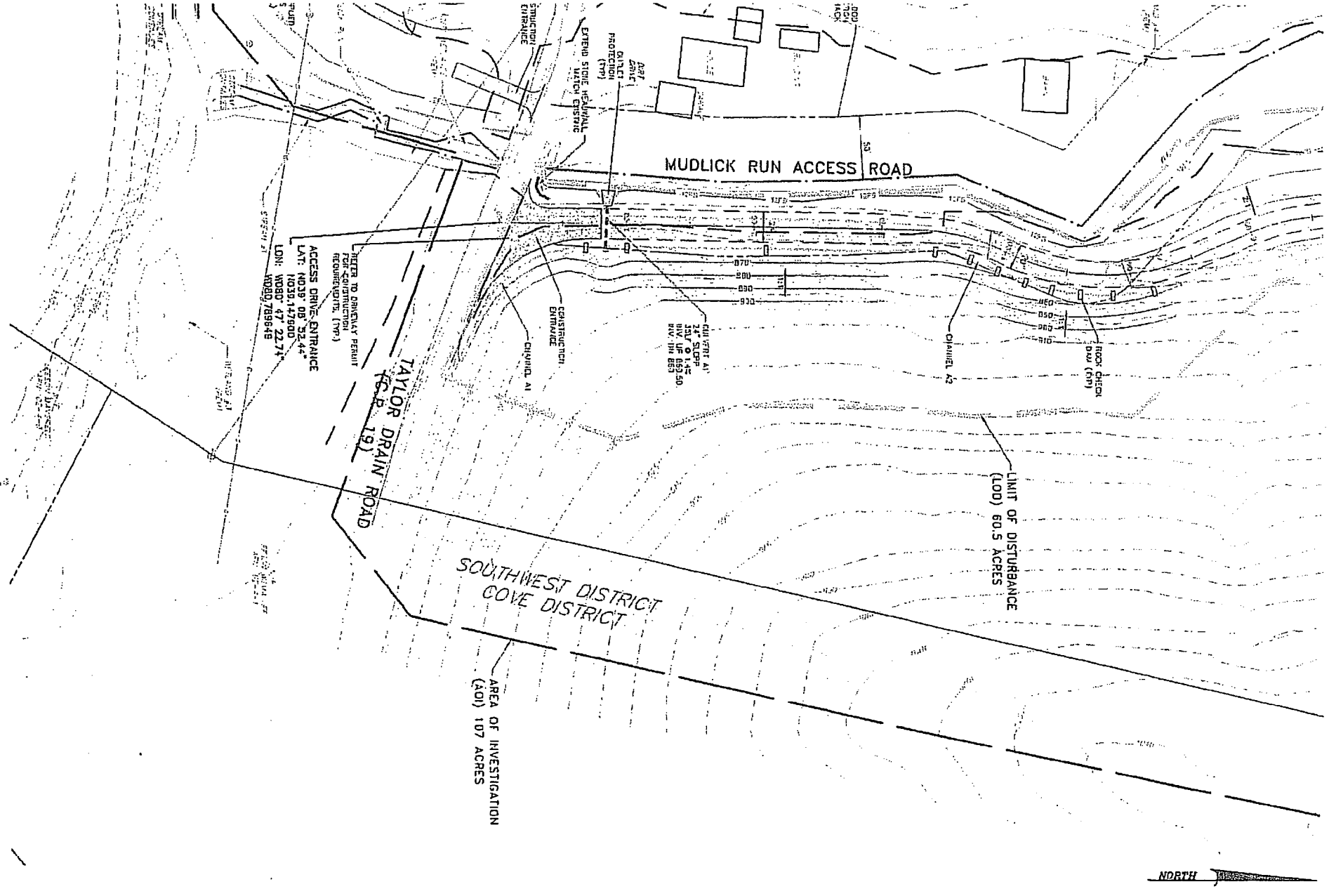
EXHIBIT F

LEGEND

- EXISTING PROPERTY LINE
- EXISTING ADJOINER LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING PAVEMENT EDGE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STREAM
- EXISTING 100-YR. FLOODPLAIN
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING DECIDUOUS/EVERGREEN TREE
- EXISTING STONEWALL
- EXISTING WETLANDS
- OE — EXISTING OVERHEAD TELEPHONE
- UT — EXISTING U/G TELEPHONE
- OE — EXISTING OVERHEAD ELECTRIC
- UE — EXISTING U/G ELECTRIC
- G — EXISTING GAS PIPELINE
- S — EXISTING SANITARY LINE
- EXISTING SANITARY MANHOLE
- EXISTING STORM PIPE
- EXISTING STORM MANHOLE
- EXISTING STORM INLET
- EXISTING STORM HEADWALL/ENDWALL
- EXISTING WELL
- EXISTING TELEPHONE BOX
- EXISTING MAILBOX
- EXISTING UTILITY POLE
- EXISTING GUYWIRE/POLE
- EXISTING MONUMENT
- EXISTING IRON ROD
- EXISTING IRON PIPE
- SOIL TYPE BOUNDARY LINE
- SOIL TYPE DESIGNATION
- PROPOSED GRAVEL EDGE
- 234 — PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED STORM PIPE
- PROPOSED CHANNEL LINING
- PROPOSED ORANGE CONSTRUCTION FENCE
- A — A — PROPOSED FENCE LINE
- TEMPORARY FILTER SOCK
- 12"FS — TEMPORARY FILTER SOCK - 12"
- 18"FS — TEMPORARY FILTER SOCK - 18"
- 24"FS — TEMPORARY FILTER SOCK - 24"
- 32"FS — TEMPORARY FILTER SOCK - 32"
- LIMIT OF DISTURBANCE
- (AOI) AREA OF INVESTIGATION



REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR ST
RECLAMATION, RESTORE TO
GRADE, ROUND OR SHAPE,
DISTURBED AREAS TO CONF
SITE TO ADJACENT TERRAIN
WITH TOPSOIL, AND REVEGE
PERENNIAL VEGETATION.



FOR CONTINUATION SEE SHEET 20

NOT FOR CONSTRUCTION/NOT FOR BIDDING

EROSION AND SEDIMENT CONTROL PLAN

FOR

OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT — DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014

SHEET NO. 10 OF 50

DWG. NO. 09261027

RETTEW Associates, Inc.
Twin Towers, 4955 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

CLIENT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE
0 25' 50' 1"=50' 100' 150'

MANAGER:	BRIAN D. SPRAY, PE
DESIGN BY: DAW	CHKD BY: CWW
DRAWN BY: DAW	CHKD BY: CWW
SURV. CHIEF:	FIELDBOOK NO.
DRAWING REFERENCE:	

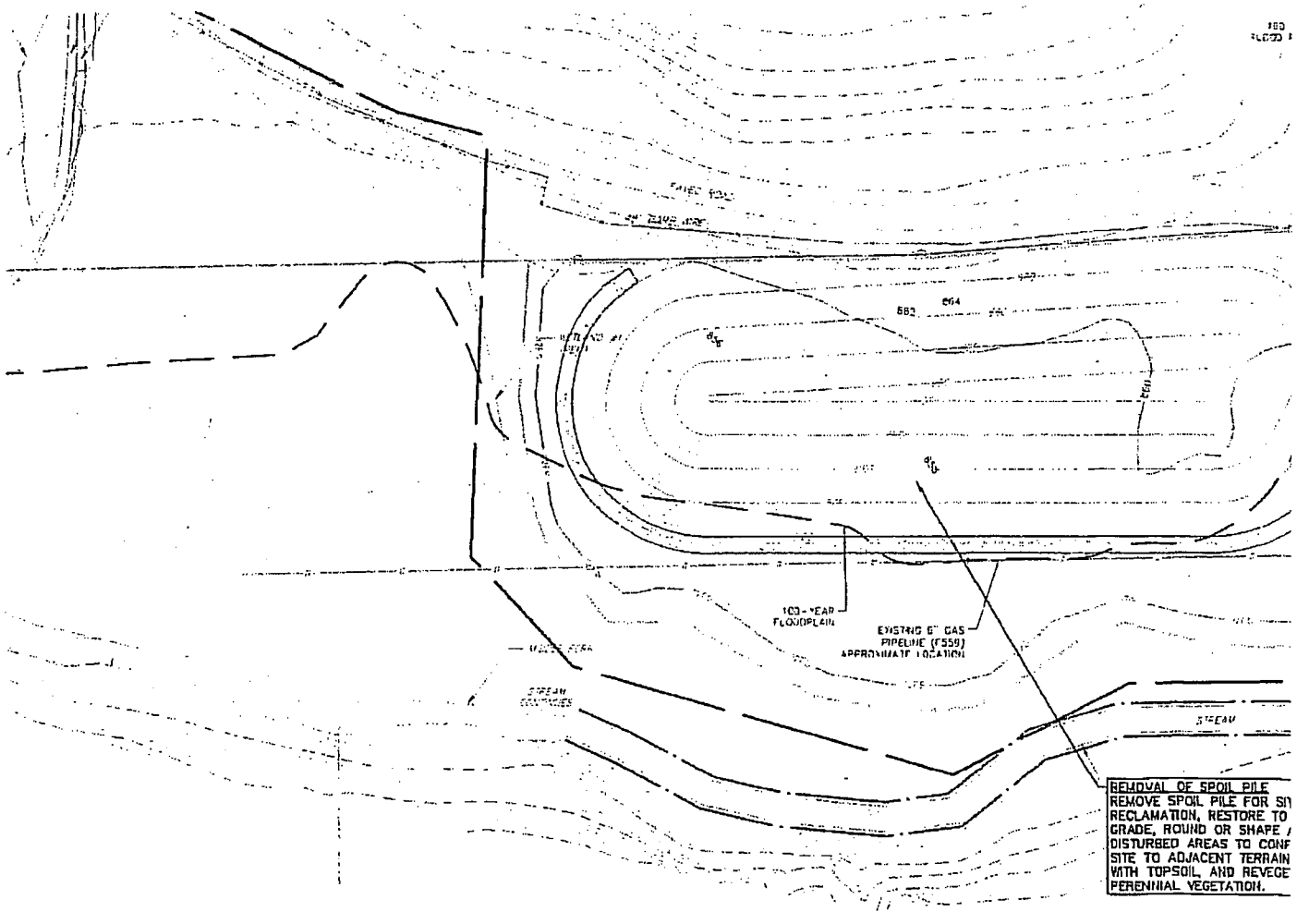
FOR RETTEW ASSOCIATES BY:

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER 15074 STATE

NO.	DATE	REVISION

LEGEND

- EXISTING PROPERTY LINE
- EXISTING ADJOINER LINE
- EXISTING RIGHT-OF-WAY LINE
- EXISTING PAVEMENT EDGE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STREAM
- EXISTING 100-YR. FLOODPLAIN
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING DECIDUOUS\EVERGREEN TREE
- EXISTING STONEWALL
- EXISTING WETLANDS
- EXISTING OVERHEAD TELEPHONE
- EXISTING U/G TELEPHONE
- EXISTING OVERHEAD ELECTRIC
- EXISTING U/G ELECTRIC
- EXISTING GAS PIPELINE
- EXISTING SANITARY LINE
- EXISTING SANITARY MANHOLE
- EXISTING STORM PIPE
- EXISTING STORM MANHOLE
- EXISTING STORM INLET
- EXISTING STORM HEADWALL/ENDWALL
- EXISTING WELL
- EXISTING TELEPHONE BOX
- EXISTING MAILBOX
- EXISTING UTILITY POLE
- EXISTING GUYWIRE/POLE
- EXISTING MONUMENT
- EXISTING IRON ROD
- EXISTING IRON PIPE
- SOIL TYPE BOUNDARY LINE
- SOIL TYPE DESIGNATION
- PROPOSED GRAVEL EDGE
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED STORM PIPE
- PROPOSED CHANNEL LINING
- PROPOSED ORANGE CONSTRUCTION FENCE
- PROPOSED FENCE LINE
- TEMPORARY FILTER SOCK
- TEMPORARY FILTER SOCK - 12"
- TEMPORARY FILTER SOCK - 18"
- TEMPORARY FILTER SOCK - 24"
- TEMPORARY FILTER SOCK - 32"
- LIMIT OF DISTURBANCE
- (AO) AREA OF INVESTIGATION



REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR SI
RECLAMATION, RESTORE TO
GRADE, ROUND OR SHAPE /
DISTURBED AREAS TO CONF
SITE TO ADJACENT TERRAIN
WITH TOPSOIL, AND REVEGE
PERENNIAL VEGETATION.

EXHIBIT G

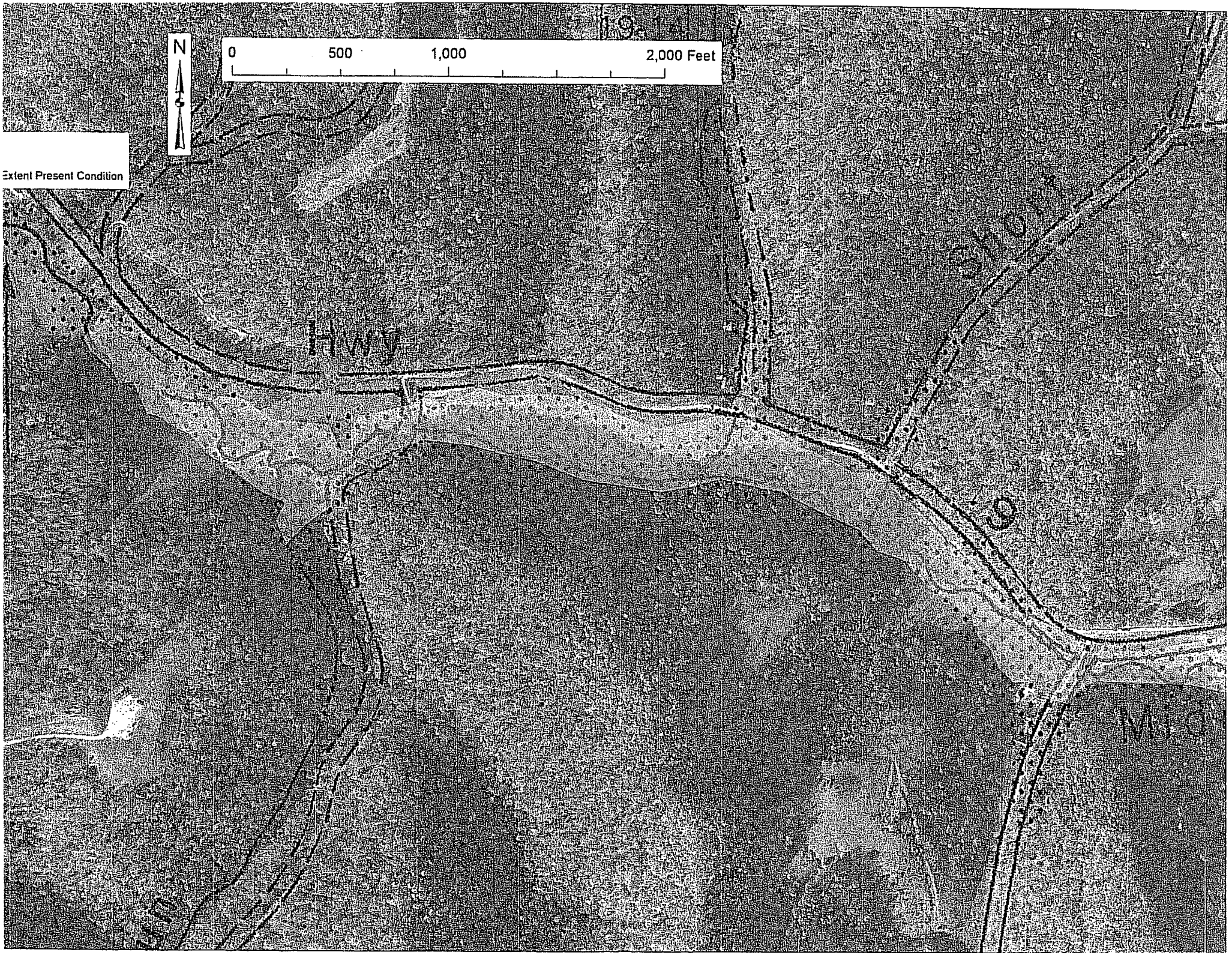

N
0
500
1,000
2,000 Feet
Extent Present Condition
HWY

EXHIBIT H

Mudlick ed Fill

GRADING

	2:1
	2:1
	3:1
CONTAINMENT BERM SLOPE	2:1
L FACTOR	1.30
K FACTOR	1.10

Mudlick @ 50 acres

LOD AREAS

DESCRIPTION	AREA
ON RUN ACCESS ROAD	6.66 AC
PAD ACCESS ROAD	9.40 AC
PIT ACCESS ROAD	8.73 AC
BYPASS LANE	0.80 AC
PAD CONNECTOR	0.46 AC
ESS ROAD TO EX. WELL	1.16 AC
WELL PAD	10.59 AC
TANK PAD	2.05 AC
FLOWBACK PIT	4.18 AC
SPOIL STOCKPILE #1	3.00 AC
SPOIL STOCKPILE #2	0.87 AC
SPOIL STOCKPILE #3	0.81 AC
SPOIL STOCKPILE #4	2.72 AC
SPOIL STOCKPILE #5	4.70 AC
SPOIL STOCKPILE #6	1.84 AC
TOTAL	60.5 AC
TOTAL WOODED AREA	48.6 AC

Spoil stockpile full

Spoil Stockpile on road

EARTHWORK VOLUMES SUMMARY

AREA	CUT (CY)	STONE (CY)	FILL (CY)	COMPACTION (CY)	NET (CY)	TOPSOIL (CY)	TOE/BENCHING (CY)
[illegible]	[illegible]	3,627	57,379	3,788	[illegible]	3,811	0
[illegible]	89,705	385	2,845	785	[illegible]	1,939	8,575
WELL PAD ACCESS ROAD	89,705	1,025	14,739	1,479	[illegible]	694	2,690
PIT ACCESS ROAD	4,346	80	0	0	[illegible]	120	0
BYPASS LANE	5,881	192	0	0	[illegible]	119	0
PAD CONNECTOR	10,884	165	0	0	[illegible]	253	0
ACCESS ROAD TO EX.	26,045	6,360	49,466	4,949	[illegible]	1,844	16,722
WELL PAD	193,488	1,759	9,174	917	[illegible]	555	5,260
TANK PAD	57,125	281	16,036	1,604	[illegible]	381	12,285
FLOWBACK PIT	28,555	0	55,200	5,520	[illegible]	387	0
SPOIL STOCKPILE #1	0	0	7,226	723	[illegible]	137	0
SPOIL STOCKPILE #2	0	0	9,859	986	[illegible]	139	0
SPOIL STOCKPILE #3	0	0	16,012	1,601	[illegible]	284	7,400
SPOIL STOCKPILE #4	0	0	83,843	8,384	[illegible]	694	19,100
SPOIL STOCKPILE #5	0	0	7,426	743	[illegible]	293	9,222
SPOIL STOCKPILE #6	0	0					
TOTAL	547,352	12,206	334,275	31,429	13,851	9,370	81,207

NOTES:
1. THE EARTHWORK SUMMARY CALCULATIONS PRESENTED ON THIS PLAN ARE FOR PERMITTING AND INFORMATIONAL PURPOSES ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY EXISTING GRADES AND TO VERIFY EARTHWORK VOLUMES, METHODS, AND PROCEDURES. ANY ISSUES ARE TO BE BROUGHT TO THE ENGINEERS AND OWNERS ATTENTION PRIOR TO COMMENCEMENT OF WORK.
2. THE STONE VOLUME LISTED IS ASSUMED TO COME FROM OFF-SITE SOURCES.
3. ASSUMED AVERAGE EXISTING TOPSOIL DEPTH IS 2 INCHES. TOPSOIL IS TO BE SPREAD ON-SITE.
4. CUT AND FILL VOLUMES ARE TO FINISHED GRADE. TOPSOIL AND BENCH VOLUMES ARE NOT INCLUDED IN THE CUT AND FILL VOLUMES LISTED.

OWBACK PIT VOLUMES

	ELEV	VOLUMES		
		AC FT	M G	BBLS
ON ELEV	1032	–	–	–
STORAGE	1011	4.25	1.38	32,940
STORAGE	1014	2.44	0.79	18,869
TOTAL STORAGE	1014	6.69	2.18	51,844
DI STORAGE	1012	4.97	1.62	38,586

DRAINAGE PIPE SUMMARY TABLE

PIPE	LOCATION (C/L STATIONING)	SIZE	TYPE	LENGTH
CULVERT A1	0+54 MUDLICK RUN ACCESS ROAD	24"	SLCPP	35 LF
CULVERT A2	7+83 MUDLICK RUN ACCESS ROAD	24"	SLCPP	63 LF
CULVERT A3	21+61 MUDLICK RUN ACCESS ROAD	18"	SLCPP	56 LF
CULVERT A4	29+08 MUDLICK RUN ACCESS ROAD	24"	SLCPP	48 LF
CULVERT A5	33+00 MUDLICK RUN ACCESS ROAD	18"	SLCPP	35 LF
CULVERT B1	5+14 WELL PAD ACCESS ROAD	24"	SLCPP	42 LF
CULVERT B2	8+47 WELL PAD ACCESS ROAD	24"	SLCPP	59 LF
CULVERT B3	11+74 WELL PAD ACCESS ROAD	18"	SLCPP	99 LF
CULVERT B4	12+85 WELL PAD ACCESS ROAD	18"	SLCPP	30 LF
CULVERT C1	0+16 ACCESS TO EX. WELL	18"	SLCPP	23 LF
CULVERT C2	3+10-3+37 PIT ACCESS ROAD	30"	SLCPP	2 @ 46 LF
CULVERT M1	14+27 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 47 LF
CULVERT M2	26+07 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 55 LF
CULVERT M3	34+04 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 55 LF
TOE DRAINS	ALL	8"	PERF CPP	3,830 LF
PAD SUMPS	ALL	4"	PVC	343 LF

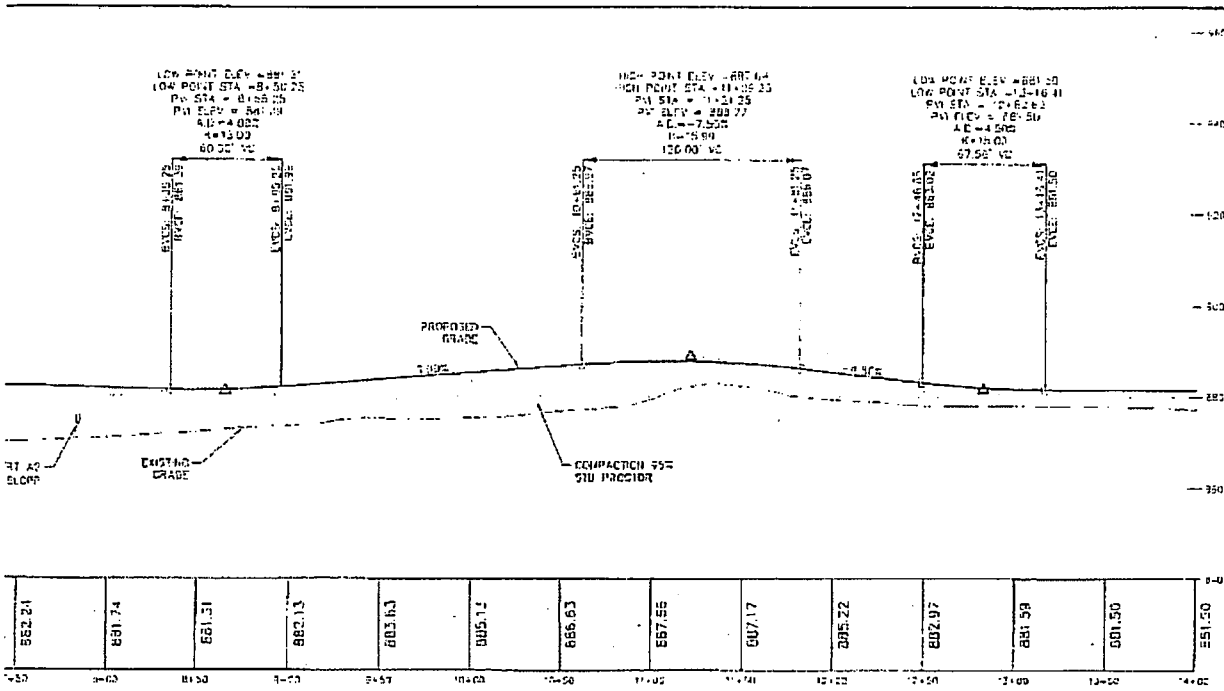
SOILS CLASSIFICATION

CH: CHARGRIN SILT LOAM, 0 TO 3% SLOPES, HSG "A"
Co: COTACO SILT LOAM, 0 TO 3% SLOPES, HSG "B/D"
GrE: GILPIN-PEABODY COMPLEX, 15 TO 35% SLOPES, HSG "C/D"
GsF: GILPIN-PEABODY COMPLEX, 35 TO 70% SLOPES, HSG "C/D"
GuD: GILPIN-UPSHUR COMPLEX, 15 TO 25% SLOPES, HSG "C"
SaA: SUNSABAUGH SILT LOAM, 0 TO 3% SLOPES, HSG "A"

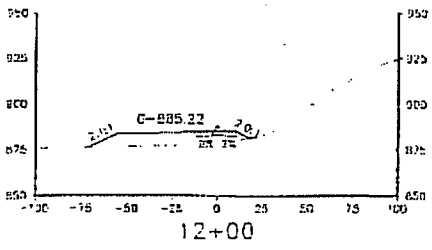
SOIL CHARACTERISTICS

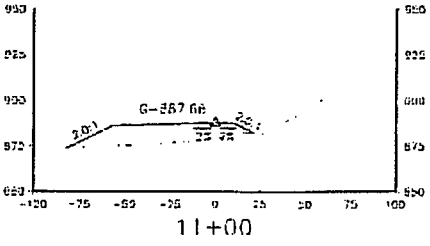
SOIL TYPE	pH	RESTRICTIVE LAYER DEPTH TO	RESTRICTIVE LAYER TYPE	DEPTH TO ASHES (FT)
CH	5.6-7.8	------	------	48"-72"
Co	5.6-6.5	------	------	48"-72"
GrE	4.5-6.0	20"-40"	LITHIC BEDROCK	>72"
GsF	4.5-6.0	20"-40"	LITHIC BEDROCK	>72"
GuD	4.5-6.5	40"-60"	PARALITHIC SEDATOR	>72"
SaA	5.6-7.0	------	------	48"-72"

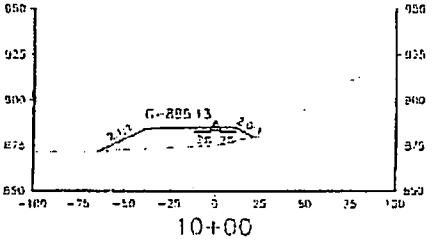
EXHIBIT I

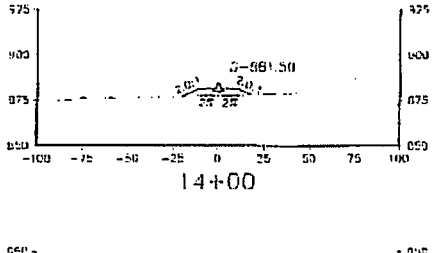


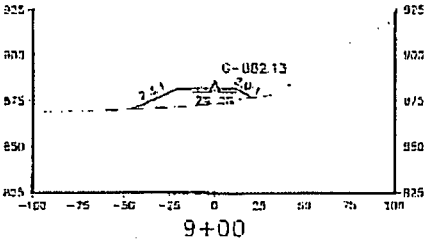
OR
ROAD

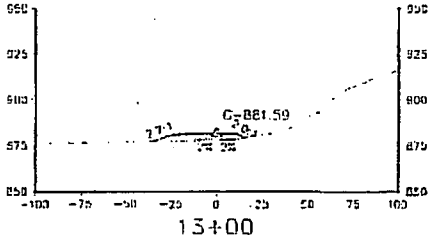












ROAD

NOT FOR CONSTRUCTION/NOT FOR BIDDING

NO.	DATE	REVISION

FOR RETTEW ASSOCIATES DT:

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
CHKD BY: CWW
CHKD BY: CWW
SURV. SHEET: MIDDORN INC.
DRAWING REFERENCE:

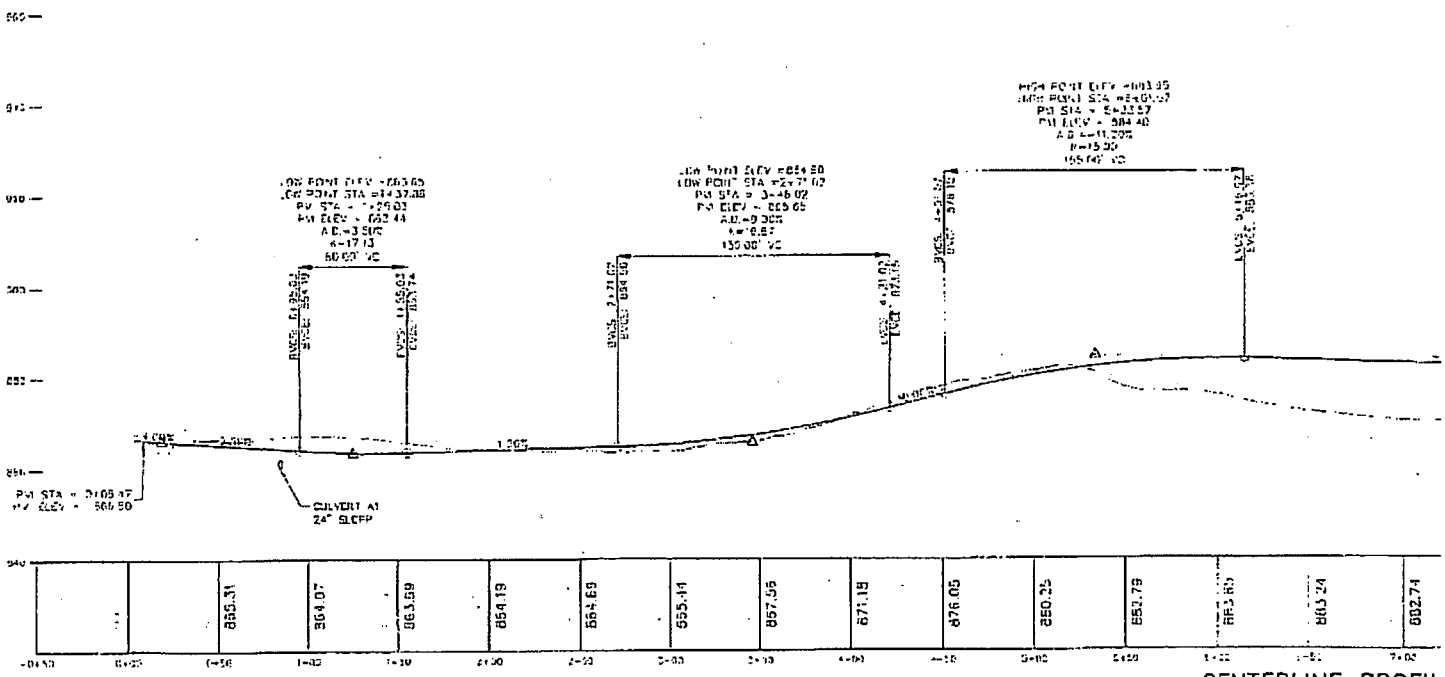
CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE: AS NOTED

RETTEW
RETTEW Associates, Inc.
Iron Towers, 4855 Steubenville Pike, Suite 265
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD
SOUTHWEST T-X DISTRICT DOODRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 33 OF 50
DWG NO. 092612027



CENTERLINE PROFIL
MUDLICK RUN ACCES

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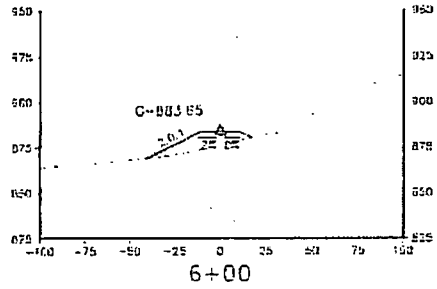
VERTICAL SCALE = 1"=20'



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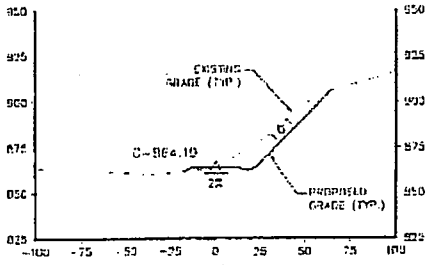

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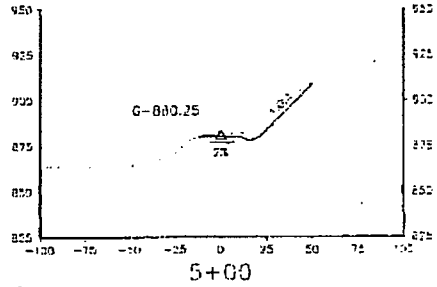

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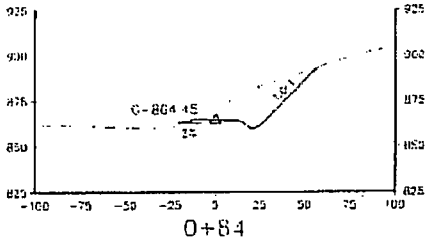

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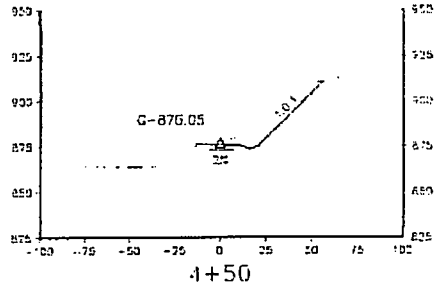

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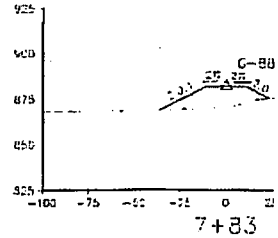

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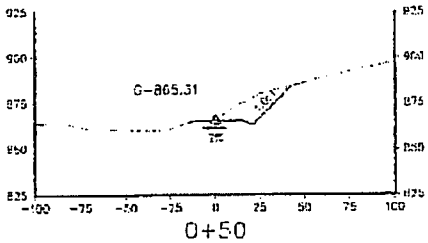

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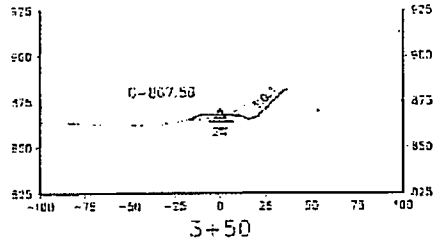

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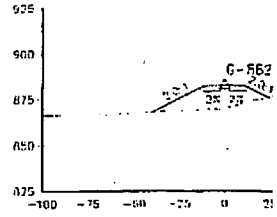

7+00

CROSS SECTI
MUDLICK RUN ACC

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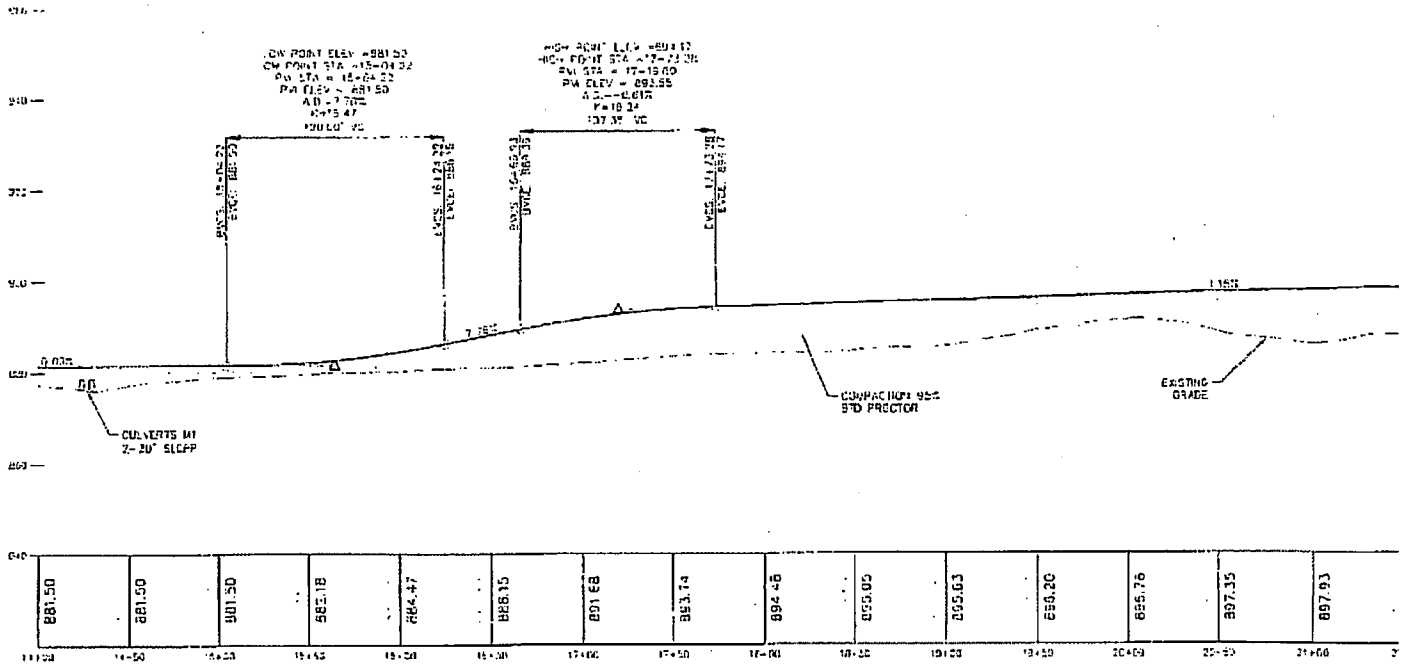
VERTICAL SCALE = 1"



CENTERLINE PROFIL
MUDLICK RUN ACCES

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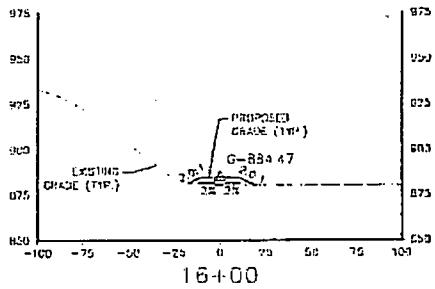

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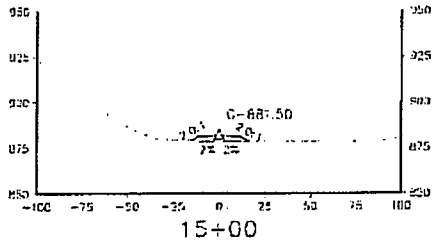

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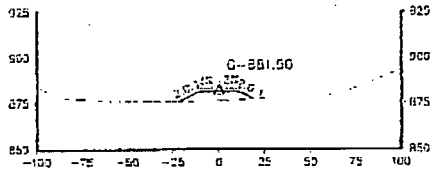

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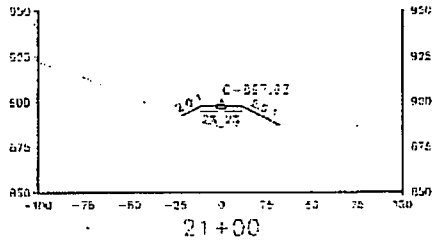

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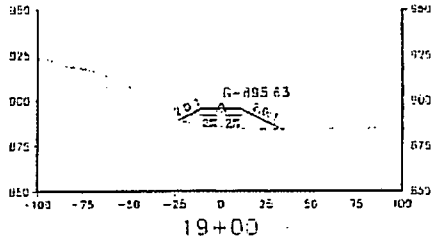

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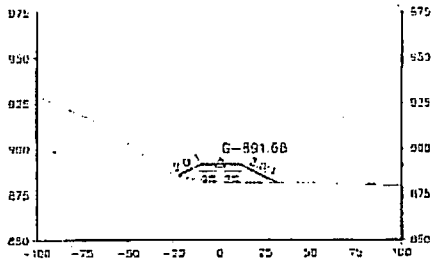

17+00

CROSS SECTIOI
MUDLICK RUN ACCES

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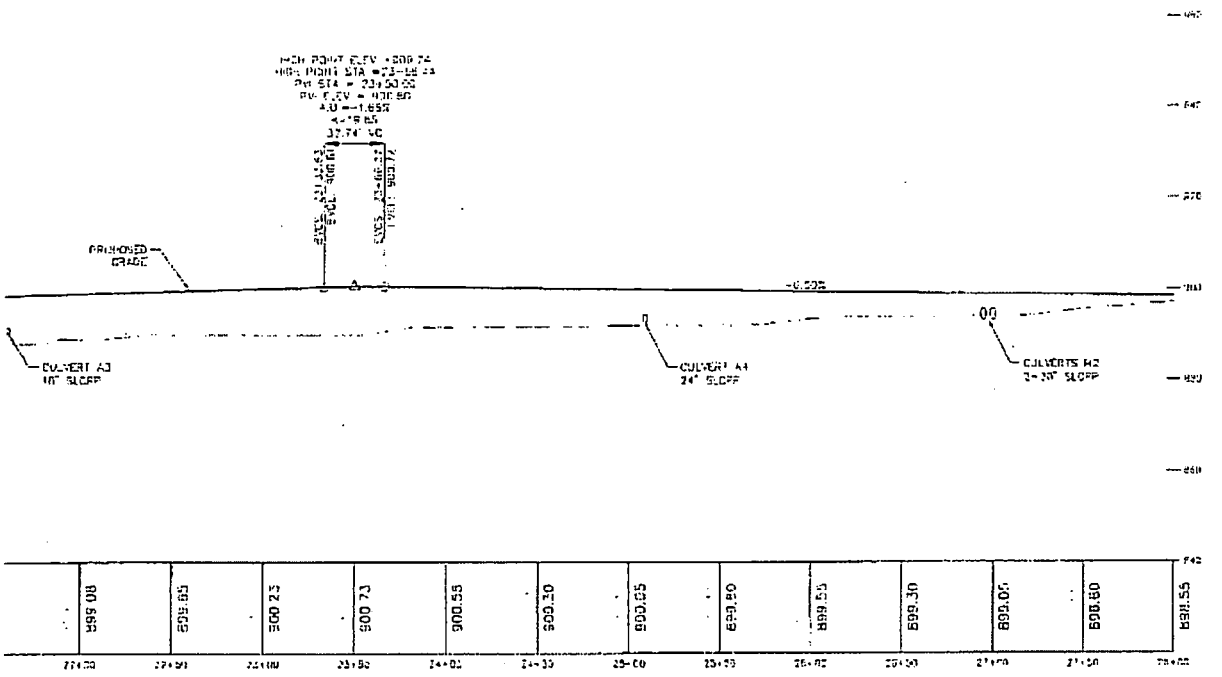
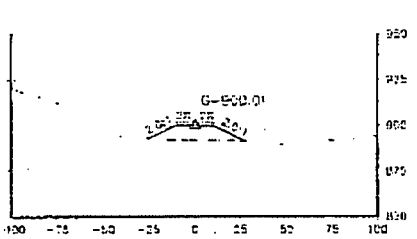
VERTICAL SCALE = 1"=5



FOR
ROAD



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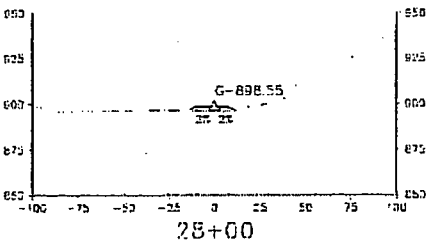

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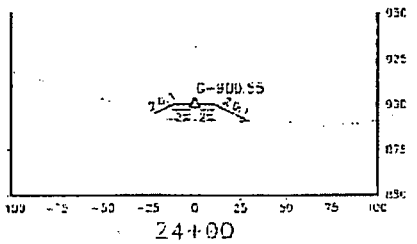

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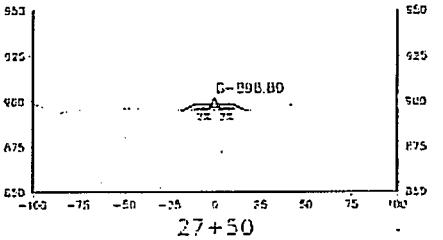

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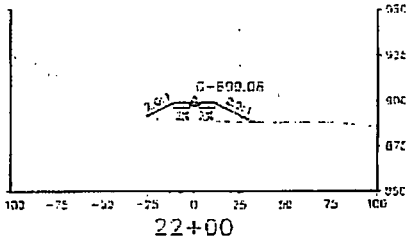

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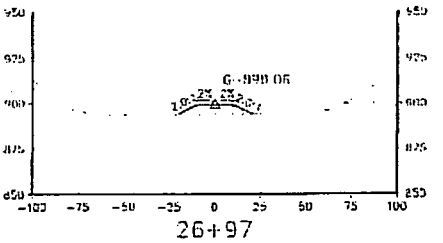

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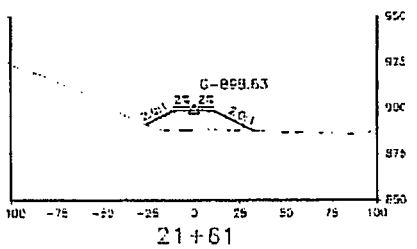

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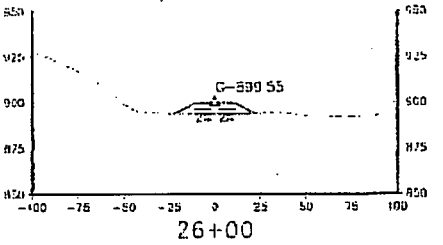

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REVISIONS

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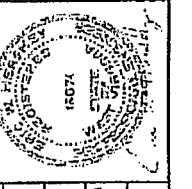


MANAGER:	BRIAN D. SPRAY, PE
DESIGN BY:	CHD BY: CWW
DRAWN BY:	CHD BY: CWW
SURV. CHIEF:	FIELDBOOK NO.
DRAWING REFERENCE:	

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE: AS NOTED

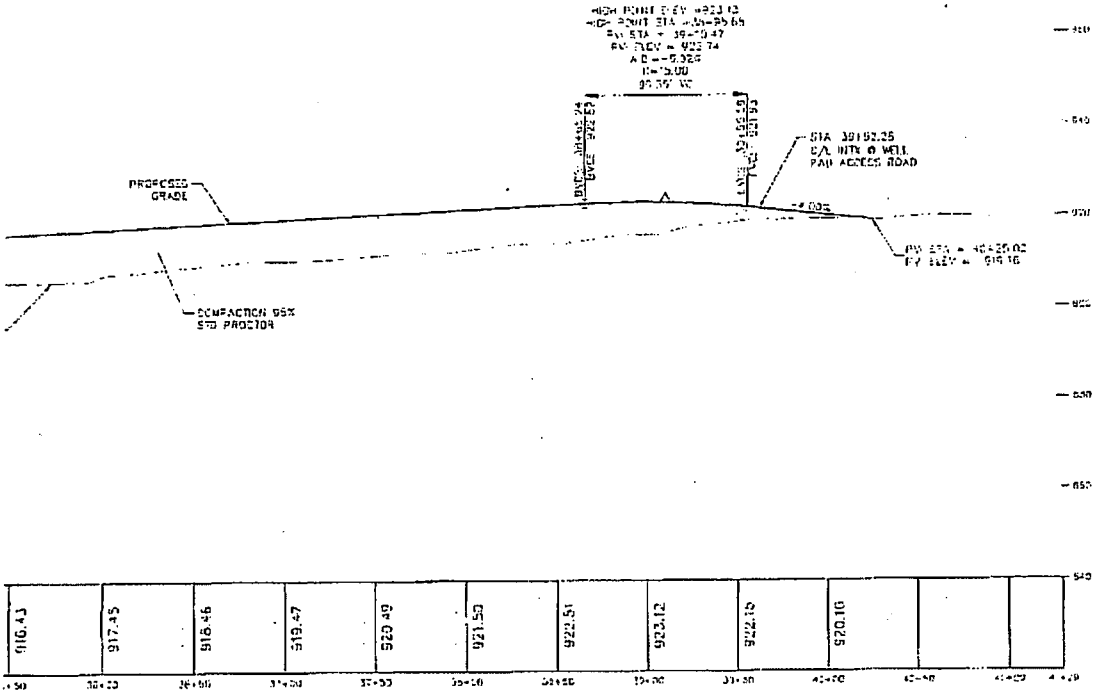
RETTEW
RETTEW Associates, Inc.
Iron Towers, 4058 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 449-1720
Email: rettew@rettew.com
Website: www.rettew.com

PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD
SOUTHWEST TAP DISTRICT OCCURRENCE COUNTY, WV

DATE AUGUST 5, 2014

SHEET NO. 34 OF 50

DWG. NO. 092612027



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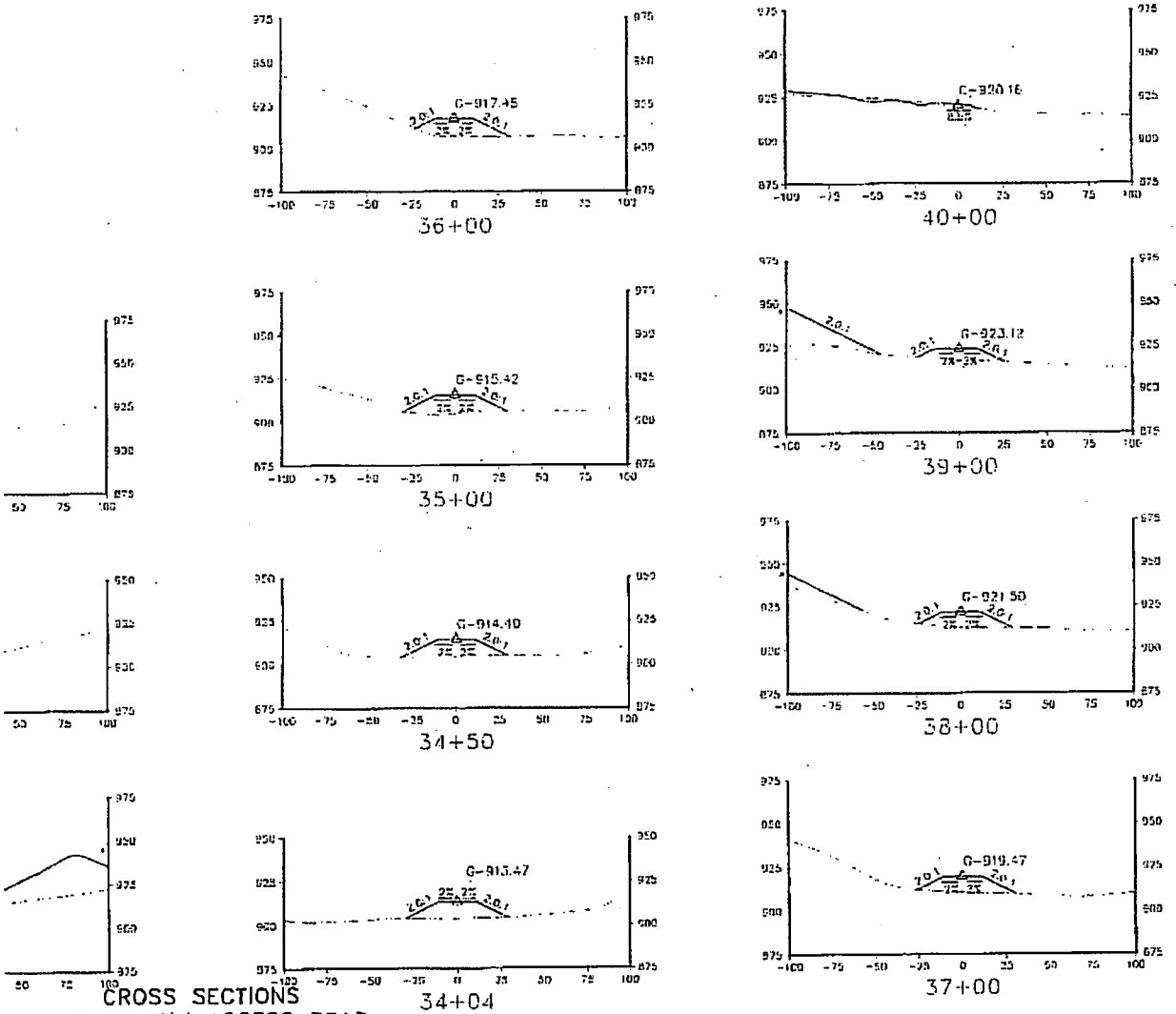

CROSS SECTIONS
MUDLICK RUN ACCESS ROAD

HORIZONTAL SCALE = 1"=50'
VERTICAL SCALE = 1"=50'

NO.	DATE	REVISION

FOR RETIEW ASSOCIATES BY:

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: CAW
CHKD BY: CWW
CHKD BY: CWW
SUPV. CHKR: RELEASE NO.
DRAWING REFERENCE:

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE
1" = 45' HORIZ
1" = 45' VERT

RETIEW
RETIEW Associates, Inc.
Technical Consultants
Pittsburgh, PA 15205
Phone (412) 446-1725
Email: retiew@retiew.com
Website: www.retiew.com

PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 35 OF 50
DWG NO. DEZ612027

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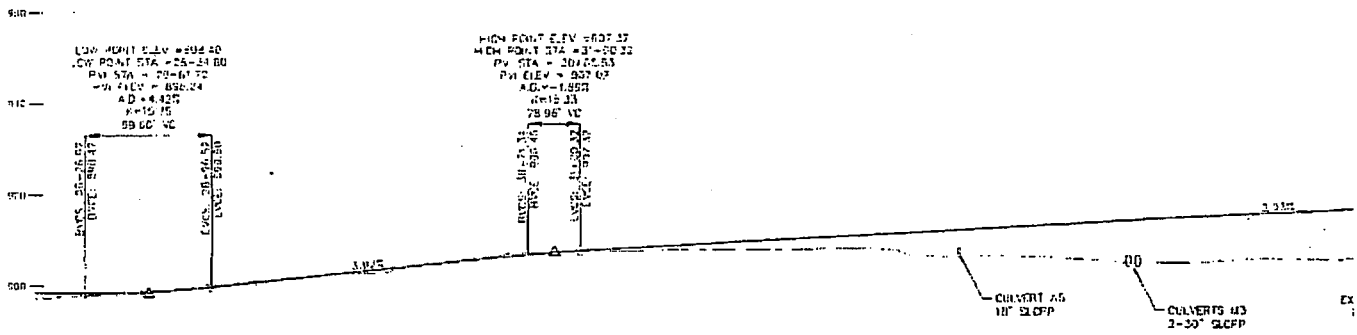

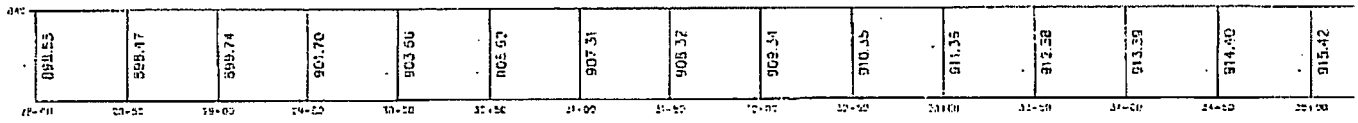

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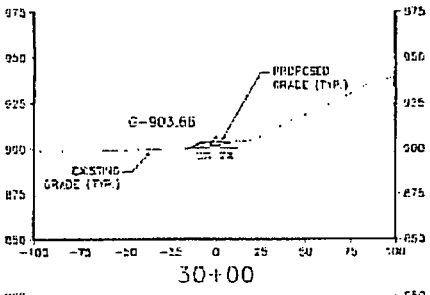

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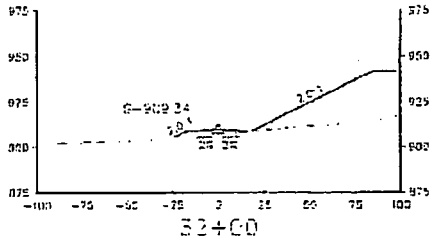

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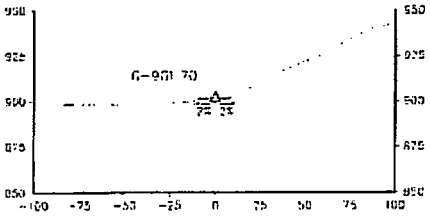

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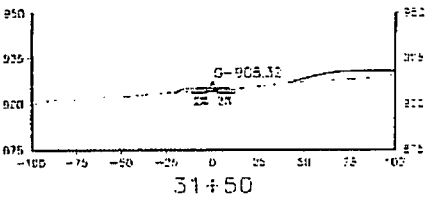

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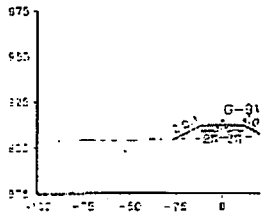

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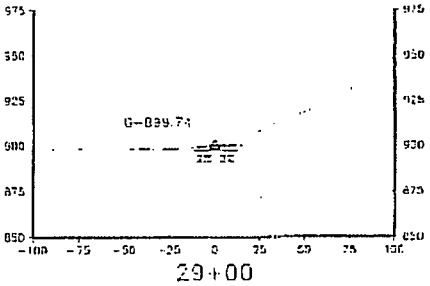

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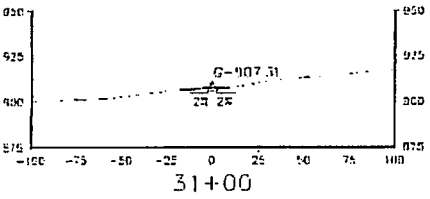

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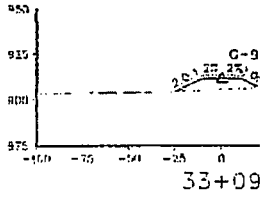

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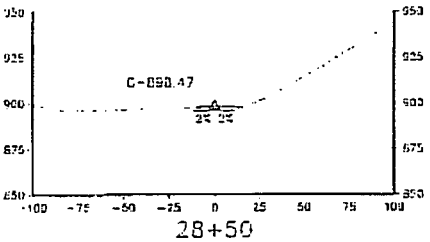

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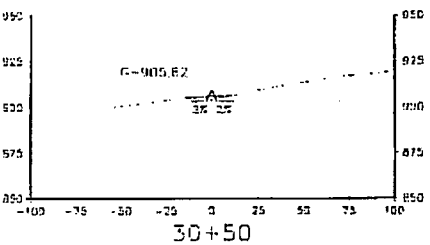

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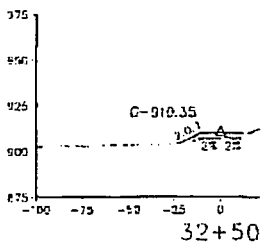

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EXHIBIT J

HYDROLOGIC AND HYDRAULIC INVESTIGATION

for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

Prepared for:

Mr. David Richardson, Esquire
826 Orange Avenue, #546
Coronado, CA 92118

Prepared by:

ENGINEERING PERFECTION, PLLC
781 Echo Road
South Charleston, WV 25303
jerry@engineeringperfection.net

September 20, 2012

HYDROLOGIC AND HYDRAULIC INVESTIGATION
for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

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HYDROLOGIC AND HYDRAULIC INVESTIGATION
for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

EXECUTIVE SUMMARY

Engineering Perfection was requested by Mrs. Joye Huff on August 28, 2012 to perform a hydrologic and hydraulic analysis of a natural gas development site located near Middle Fork, in the vicinity of Summers, Doddridge County, West Virginia. An analysis of the change in water surface elevation for the Base Flood event resulting from the construction of improvements for natural gas development was included in the request. Also included in the request was the determination of the Floodway in the vicinity of the project.

The results of mapping, hydrologic and hydraulic studies indicate significant increases of the depth of flooding as a consequence of the proposed natural gas development. For the Base Flood event, the water surface is calculated to be 2.3 feet higher just upstream of the Well Pad Containment Berm.

The results also indicate that the proposed development would place significant quantities of fill in the area that should be designated as Floodway.

INTRODUCTION

The proposed project is the subject of Civil Action No. 12-C-17 in the Circuit Court of Doddridge County, West Virginia. In this Action, EQT Production Company is the Petitioner, and Doddridge County Commission is the Respondent. Joye Huff (as a Trustee) and James H. Foster are Intervenors in the Action.

A central point in this Civil Action is the analysis of potential flooding impacts from the proposed natural gas developments. Mrs. Huff requested our hydrologic and hydraulic analysis to determine if the proposed natural gas well development will be in compliance with the Doddridge County floodplain Ordinance, especially the floodway fill restrictions and requirements

We received and reviewed numerous documents from the Client (see Appendix A).

The Area of Interest is located in part in the Special Flood Hazard Area as designated on Doddridge County floodplain maps. The area is designated as an Approximate or "A" Zone, where no Base Flood Elevations or Floodways have been determined. Development is proposed by EQT Production on both Middle Fork and a tributary, Long Run.

With her authorization to proceed with this work, Mrs. Huff directed Engineering Perfection to direct the final report to Mr. David Richardson, Esquire.

MAPPING

Project data were compiled and processed in an Arc Map Geographic Information System. The program employed was Arc Map version 10.0[1]. Data sources include:

Table 1 Project Data Sources

Data	Source
Ground Surface Elevation	West Virginia GIS Technical Center, 2003 Digital Elevation Model for Oxford, 3 meter data
Aerial Photography	West Virginia GIS Technical Center, Bing open source photography
Drainage Areas	National Hydrography Database Plus
Geometries of Proposed Structures	Engineering Drawings prepared by Navitus Engineering, Inc.[2]
Field Photography and Elevation Survey	Engineering Perfection

A field reconnaissance and elevation survey was conducted by Engineering Perfection on September 14. Site photographs were taken. Measurements of elevations were taken in the field, with emphasis on the existing oil well pad to the west of the proposed project site. The elevation data were collected with a Trimble survey grade Global Positioning System instrument.

The Area Of Interest is indicated on the two figures below. The locations of the proposed EQT Production facilities are shown on the Figures 3 and 4 below. EQT Production engineering drawings have been superimposed on aerial photography in these figures, to provide an overall project orientation.

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[1] http://www.esri.com/software/arcgis/arcgis10

[2] Navitus Engineering, Inc., OXF 43 H1-H12 Site Plan EQT Production Company, November 15, 2011.

Figure 1 Region Topographic Map

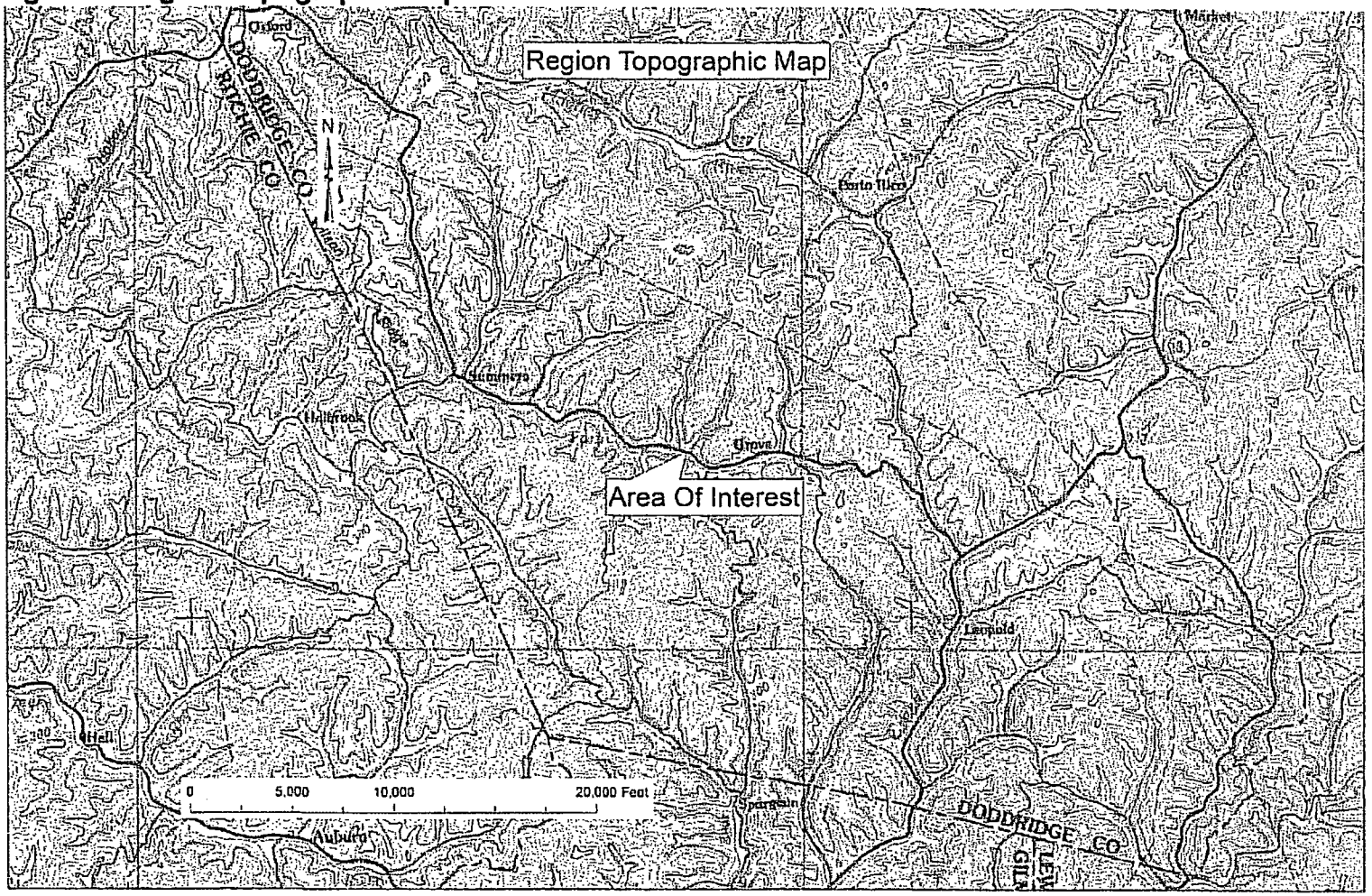


Figure 2 Location Topographic Map

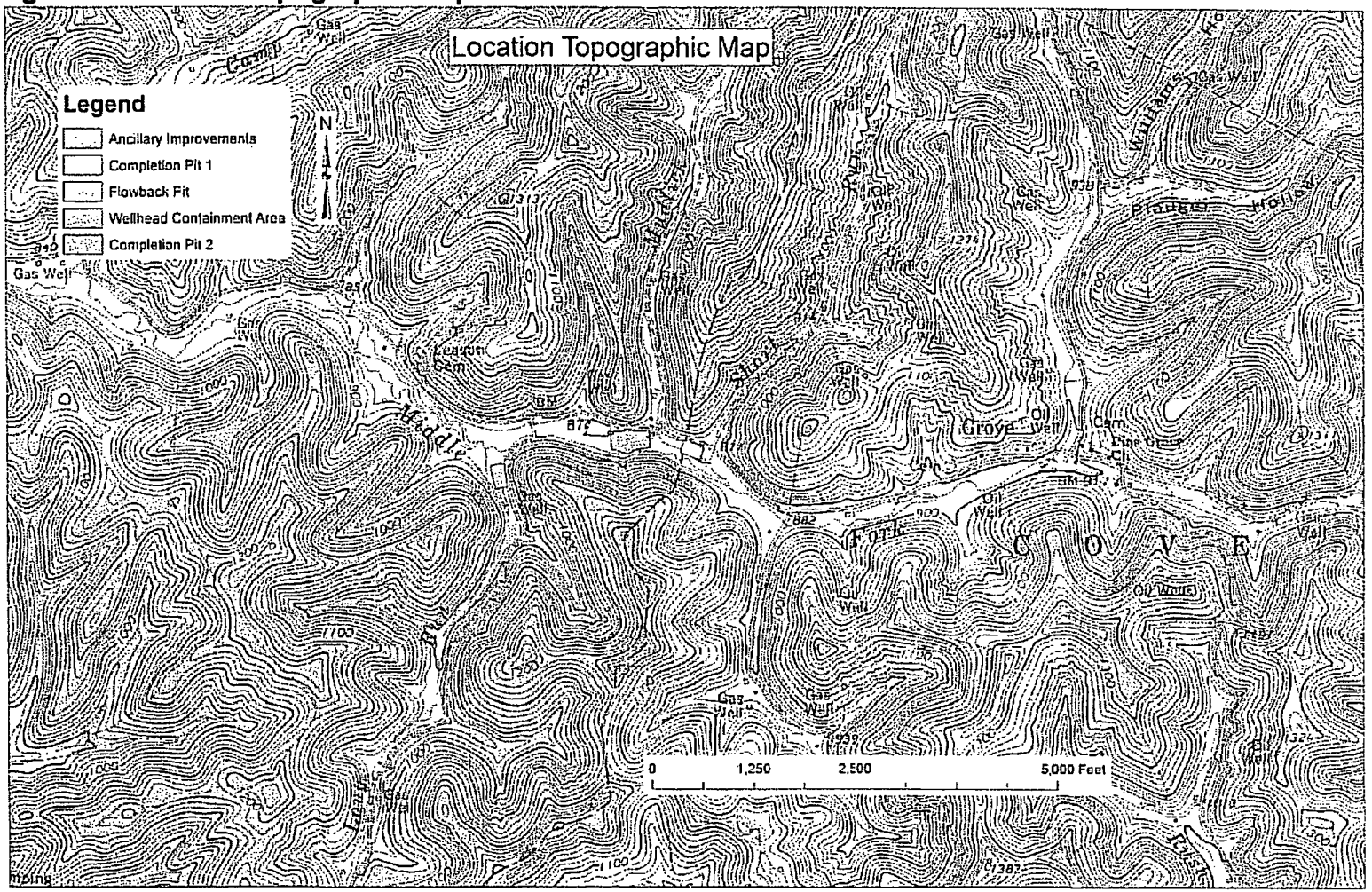


Figure 3 Locations of EQT Production Facilities – Wellpad Area

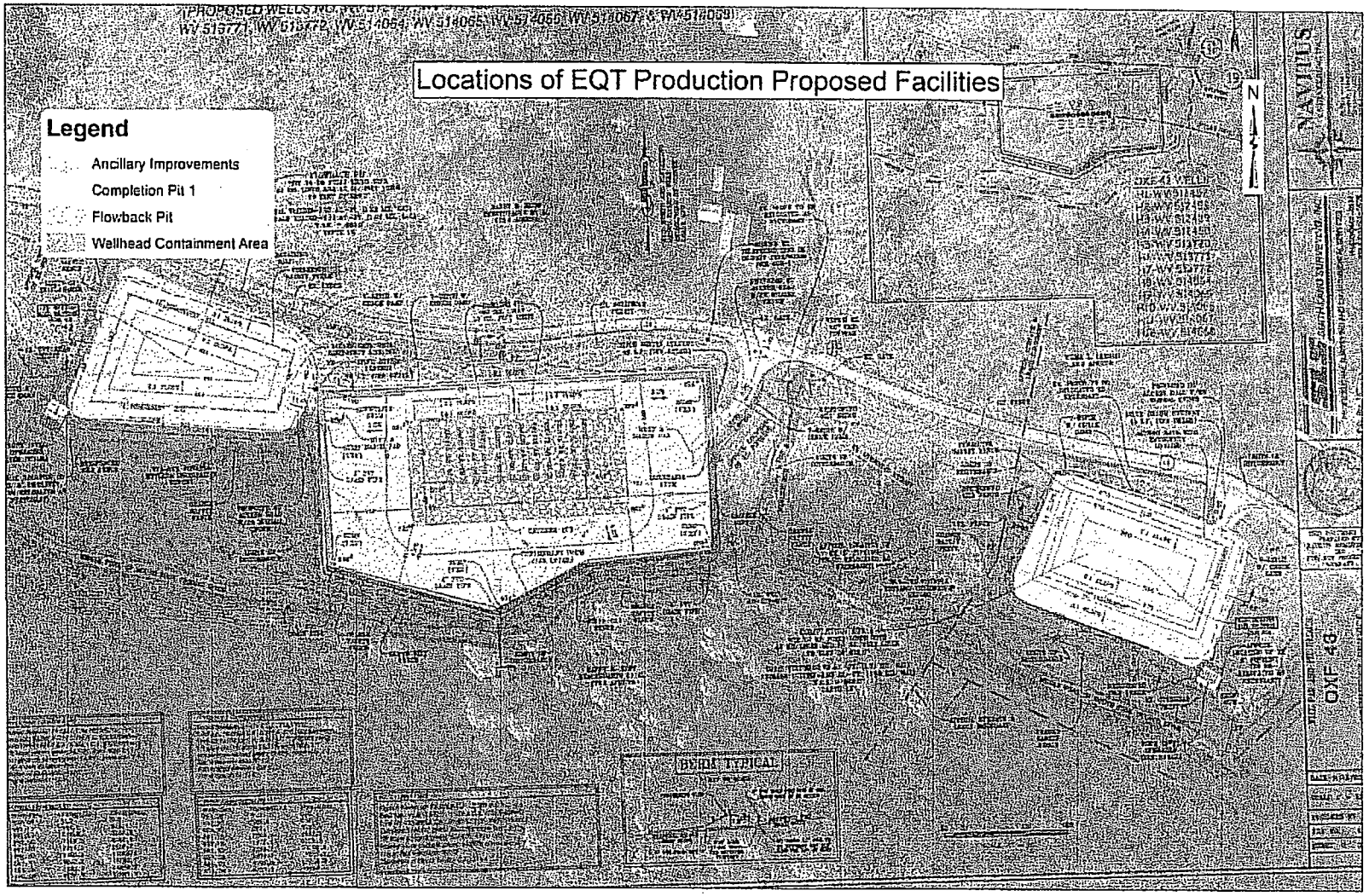
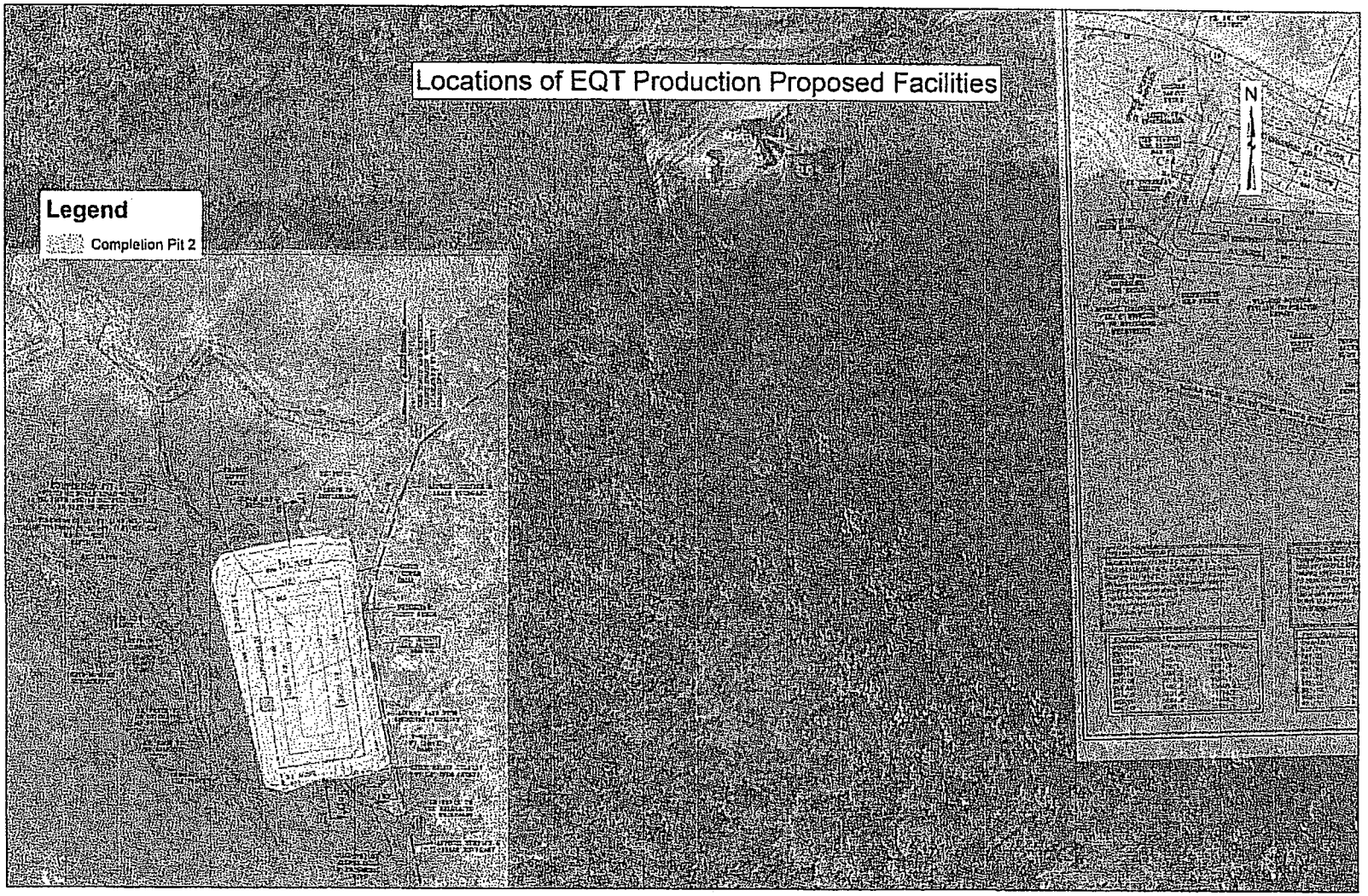


Figure 4 Locations of EQT Production Facilities – Completion Pit #2



HYDROLOGY

Flows were computed for two reaches of Middle Fork, one reach for Mudlick Run and one reach for Long Run. The flows were computed using the US Army Corps of Engineers Hydrology Modeling System (HMS) version 3.5[3].

Drainage areas, slopes and drainage path lengths were determined in Arc Map. The model precipitation for the 1% annual recurrence event was determined from a National Atmospheric and Oceanic Administration report[4]. The drainage areas, slopes, drainage path lengths and model precipitation data are all shown in Appendix B.

Land use and unit hydrographs values were determined from NRCS publication TR-55, Urban Hydrology for Small Watersheds[5]. Soil conditions were obtained from Soil Survey of Doddridge County West Virginia[6].
The flows for the three studied streams are presented in the table below.

Table 2 Stream Flows for Middle Fork Basin

Stream	Stream Station, feet	Drainage Area, sq. mi.	Flow, cfs
Middle Fork	0 to 963	5.02	3729
Middle Fork	963 to 6391	4.20	3108
Mudlick Run	3460	0.82	770
Long Run	963	0.83	854

HYDRAULIC MODELS – 2012 CONDITION AND PROPOSED CONDITION WITH BASE FLOOD CHANGE

The term Base Flood is the predicted flood event with a one percent probability of being equaled or exceeded in any given year and is used extensively by the Federal Emergency Management Agency program for flood insurance. The Base Flood has also been incorporated in local ordinances, including the floodplain ordinance for Doddridge County.

---

[3] http://www.hec.usace.army.mil/software/hec-hms/index.html

[4] "Rainfall Frequency Atlas of the United States for Durations 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years", May 1961
http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf

[5] . Urban Hydrology for Small Watersheds Technical Release No. 55, Soil Conservation Service, June 1987.

[6] . Soil Survey of Doddridge County, West Virginia, United States Department of Agriculture, Natural Resources Conservation Service, September 2005.

The Base Flood Elevation is an estimate of the peak elevation of the water surface as a result of the Base Flood. The Base Flood Elevation varies along the length of the stream. It is customarily reported in a profile of the stream.

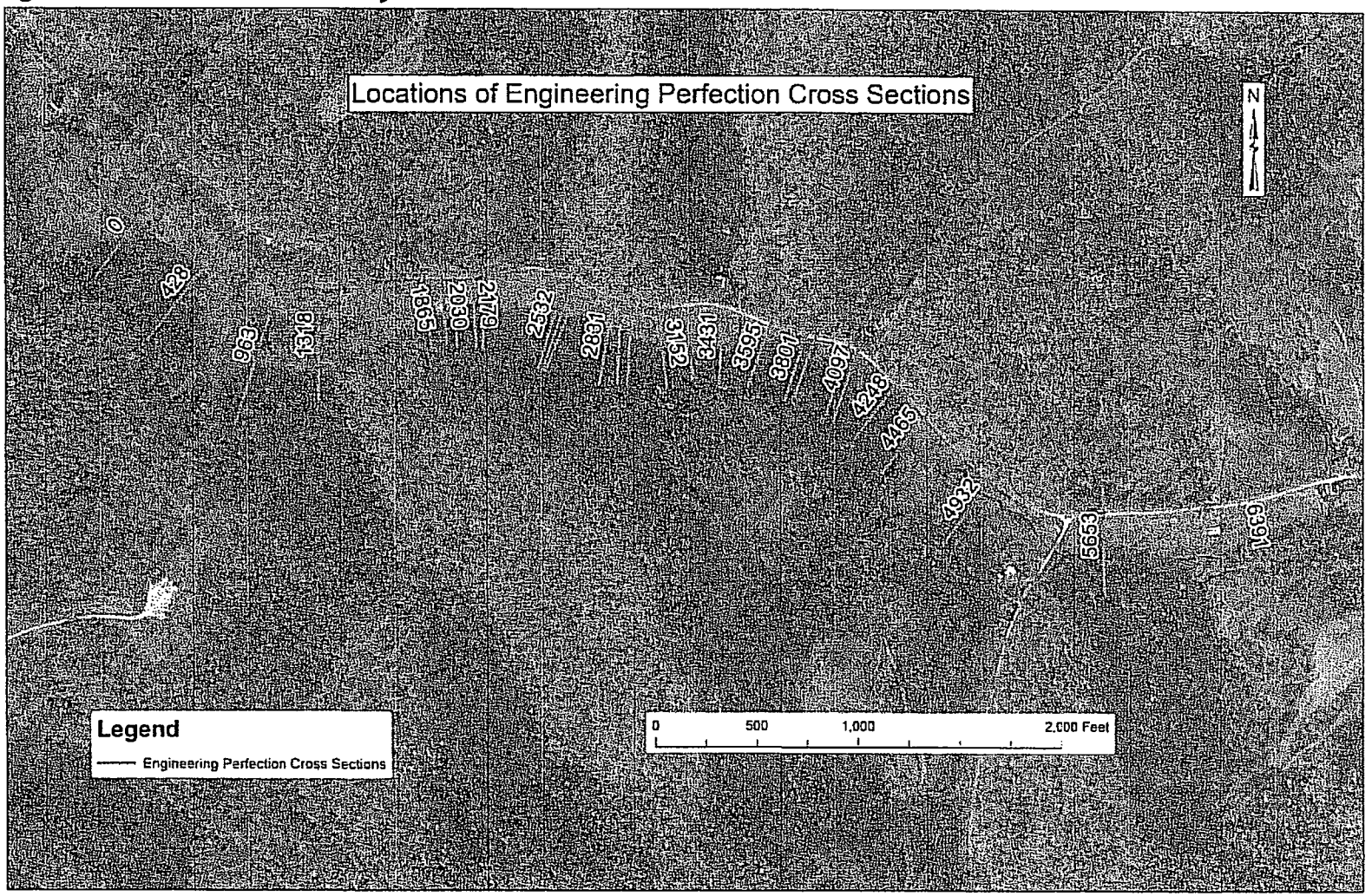
The Base Flood Elevation Change that was determined in this project is the difference between the 2012 ground surface condition and the condition after implementation of the EQT Production project. Increases in the Base Flood Elevation generally increase the amount of damage to structures and property when flooding occurs.

The GIS files were utilized to organize and process the data necessary for the hydraulic analysis. In addition to Arc Map version 10.0, the extension HEC geoRAS[7] was employed for processing. After defining the 2012 site geometry in GIS, the data were exported to the hydraulic model developed by the Corps of Engineers, the Hydraulic Engineering Center River Analysis System, or HECRAS[8].

Hydraulic modeling is nearly always an iterative process. Initial analysis will indicate data gaps that must be filled for accurate results. For the model of Middle Fork, the initial analysis indicated that additional cross sections were needed; this was expected. The data for the additional sections were extracted using Arc Map, processed in EXCEL, and then inserted into the HECRAS model. For the model of Middle Fork, a total of 30 cross sections with unique geographic data were utilized. The cross sections were adjusted slightly in the HECRAS geometry editor to incorporate the stream channel; the channel is not well defined in the 3 meter Digital Elevation Model data.

[7] http://www.hec.usace.army.mil/software/hec-ras/hec-georas.html
[8] http://www.hec.usace.army.mil/software/hec-ras/

Figure 5 Locations of Initial Hydraulic Cross Sections



Interpolation and copying of cross sections was also employed to fill model data gaps, as is standard practice in hydraulic modeling. For Middle Fork, a total of 28 interpolated cross sections were added with data derived from adjacent sections. This results in a total of 58 cross sections in the hydraulic model.

Two site conditions were modeled for Middle Fork and are reported herein. They are the 2012 Condition, and the Proposed site condition.

The 2012 Condition includes consideration for an existing natural gas development located between stations 1950 and 2179 on Middle Fork. The cross sections for this condition were created using the 2003 Digital Elevation Model data, adjusted for GPS and field observations on September 13, 2012.

The Proposed site condition is a modification of the 2012 Condition, with the modifications reflecting the proposed natural gas developments[9]. The hydraulic analysis assumed that the Containment Berm at the perimeter of the Well Pad would be overtopped in the Base Flood event. This is a conservative assumption, if this Containment Berm must be designed to not be overtopped for the Base Flood condition and flood levels would be significantly higher.

The flows utilized for the hydraulic modeling were those obtained from the hydrologic study, as reported above.

The data entered in the HECRAS model, as well as model results, are all reported in on a Compact Disk. Examples of the data and model results are provided in Appendix C.

Comparison of the Base Flood water surface elevations of the 2012 and proposed site conditions indicates the following differences.

Table 3 Comparison of Base Flood Elevations

Station, ft.	2012 Site Condition, ft.	Proposed Site Condition, ft.	Increase, ft.
7	848.4	848.4	0.0
428	849.7	849.7	0.0
963	850.6	850.6	0.0
1054.*	850.8	850.8	0.0
1145.*	851.0	851.0	0.0
1236.*	851.8	851.8	0.0
1327.*	852.9	852.9	0.0
1418	854.0	854.0	0.0
1507.4*	855.6	855.6	0.0

[9] Navitus Engineering, Inc., OXF 43 H1-H12 Site Plan EQT Production Company, November 15, 2011.

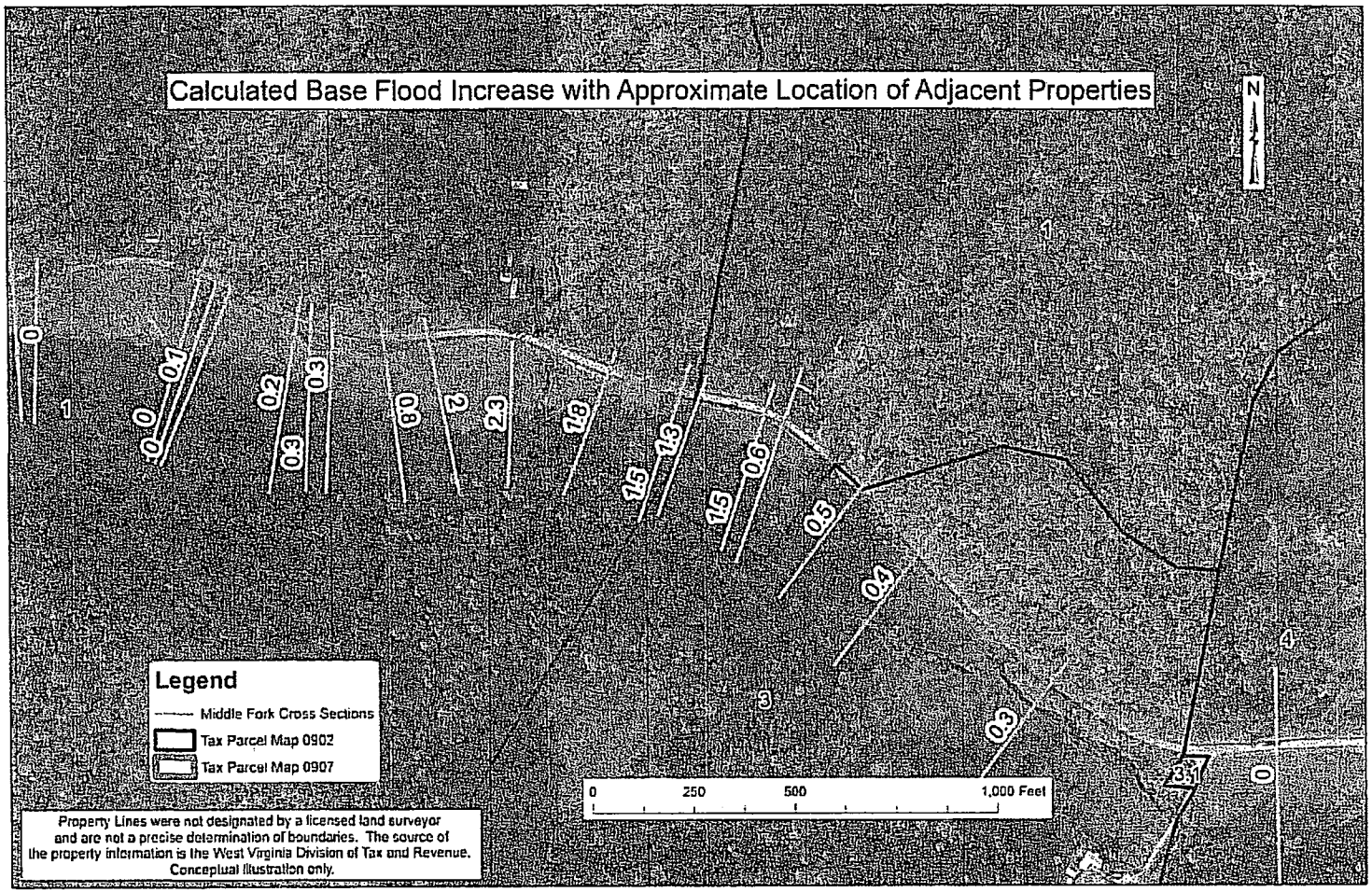
1596.8*	856.2	856.2	0.0
1686.2*	856.5	856.5	0.0
1775.6*	856.8	856.8	0.0
1865	857.1	857.1	0.0
1950	857.1	857.1	0.0
1907.5*	857.2	857.2	0.0
2030	858.0	858.0	0.0
2084	858.1	858.1	0.0
2179	859.1	859.1	0.0
2219	859.1	859.3	0.2
2532	860.7	860.7	0.0
2556	860.7	860.8	0.0
2577	860.8	860.8	0.0
2831	861.0	861.2	0.2
2911	861.1	861.4	0.2
2963	861.2	861.5	0.3
3152	861.5	862.3	0.8
3286	862.0	864.0	2.0
3411	862.4	864.5	2.1
3431	862.4	864.7	2.3
3595	863.0	864.8	1.8
3801	863.5	865.0	1.5
3852	863.7	865.0	1.3
3885.16*	863.7	865.1	1.4
4017.83*	863.7	865.6	1.9
3918.33*	863.7	865.2	1.5
3951.5*	863.8	865.3	1.5
3984.66*	863.8	865.4	1.6
4051	864.1	865.6	1.6
4097	865.7	866.3	0.6
4248	866.1	866.6	0.5
4465	866.3	866.7	0.4
4932	867.3	867.6	0.3
5022.12*	867.5	867.7	0.2
5112.25*	868.0	868.2	0.1
5202.37*	869.1	869.1	0.0
5292.5*	870.3	870.3	0.0
5382.62*	871.5	871.5	0.0
5472.75*	872.7	872.7	0.0

5562.87*	873.8	873.8	0.0
5653	874.8	874.8	0.0
5745.25*	876.0	876.0	0.0
5837.5*	876.8	876.8	0.0
5929.75*	877.4	877.4	0.0
6022.*	878.0	878.0	0.0
6114.25*	878.5	878.5	0.0
6206.5*	879.0	879.0	0.0
6298.75*	879.5	879.5	0.0
6391	880.0	880.0	0.0

* indicates an interpolated cross section
Cells highlighted in yellow indicate increases greater than one foot

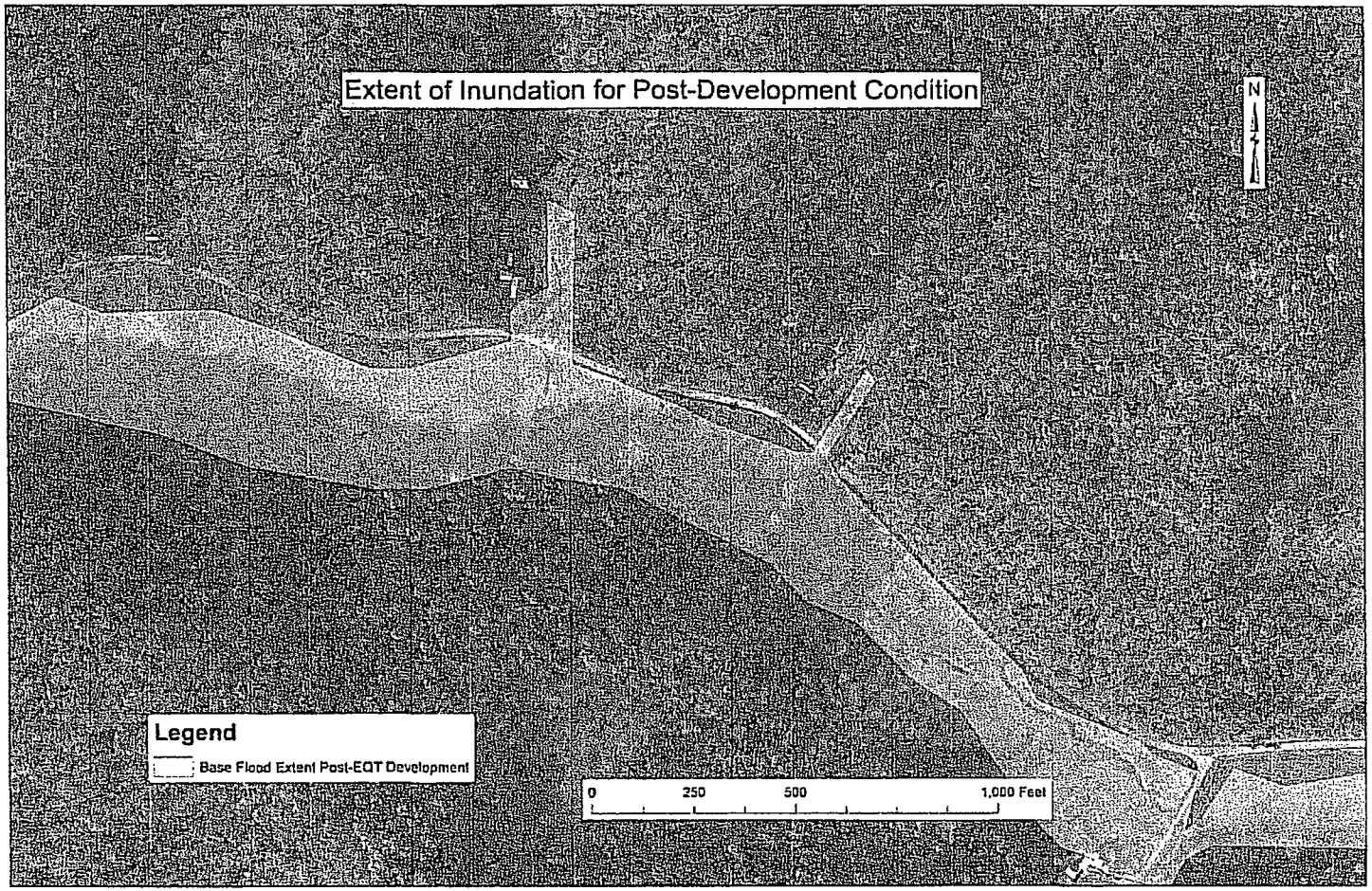
The Doddridge County floodplain ordinance includes requirements specific to adjacent properties. Figure 7 below conceptually illustrates the locations of property lines in the vicinity of the proposed project. The property lines were not designated by a licensed surveyor and are not a precise determination of boundaries. The source of the property information is the West Virginia Division of Tax and Revenue, commonly referred to as "tax maps."

Figure 7 Estimated Base Flood Increase with Approximate Location of Adjacent Properties



The increase in elevation of the water surface for the base flood affects the areal extent of the Base Flood event. This area is often referred to as the Special Flood Hazard Area for zones where detailed engineering studies have been performed and accepted by the Federal Emergency Management Agency. Figure 8 below indicates the extent of the Base Flood for the Proposed Condition. Note that the extent on Mudlick Run considers only backwater affects from Middle Fork; no hydraulic modeling was performed for Mudlick Run

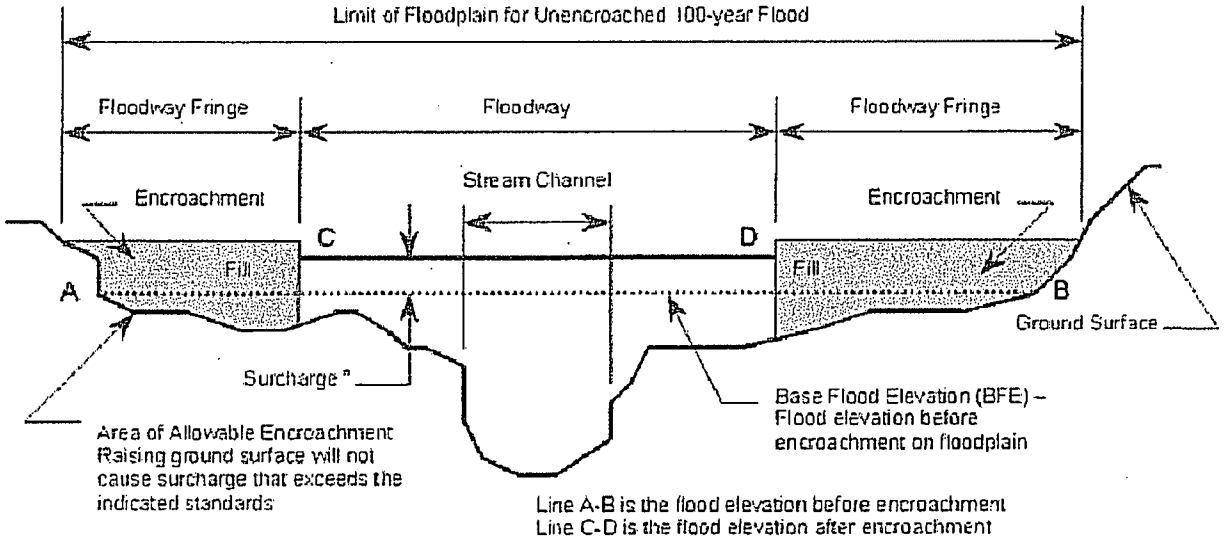
Figure 8 Extent of Inundation for the Proposed Site Condition



HYDRAULIC MODEL – FLOODWAY DETERMINATION

The term Floodway is "the channel of a river or other watercourse and the adjacent land area that must be reserved to discharge the base flood without increasing the water surface elevation more than one foot at any point"[10]. The land area outside the Floodway is commonly called the Flood Fringe. These terms are illustrated in the figure below[11]: Regulatory floodplain requirements for placement of fill and structures in the Floodway are much more stringent than for the Flood Fringe.

Figure 9 Schematic Of Floodway, Cross Section View



*Surcharge not to exceed 1.0 ft. (FEMA requirement) or lesser height if specified by community

Floodplain Encroachment and Floodway

The determination of the limits of the Floodway for Middle Fork was performed with the HECRAS model. The 2012 Condition was utilized. The determination is an iterative (repeated calculations, each getting closer to an acceptable answer) process.

The process entails blocking water flow in part of the floodplain, and observing the resulting change in Base Flood Elevation. Generally, the more of the floodplain that is blocked from flow, the greater the increase in the Base Flood Elevation. The limit of the Floodway is known when the resulting change in Base Flood Elevation is slightly less than one foot. In practice, determining the limits of the Floodway is very complex because the analyst is working in three dimensions and on both sides of the stream.

The flows utilized for the hydraulic modeling of the floodway were the same as those from the hydrologic study, as reported above.

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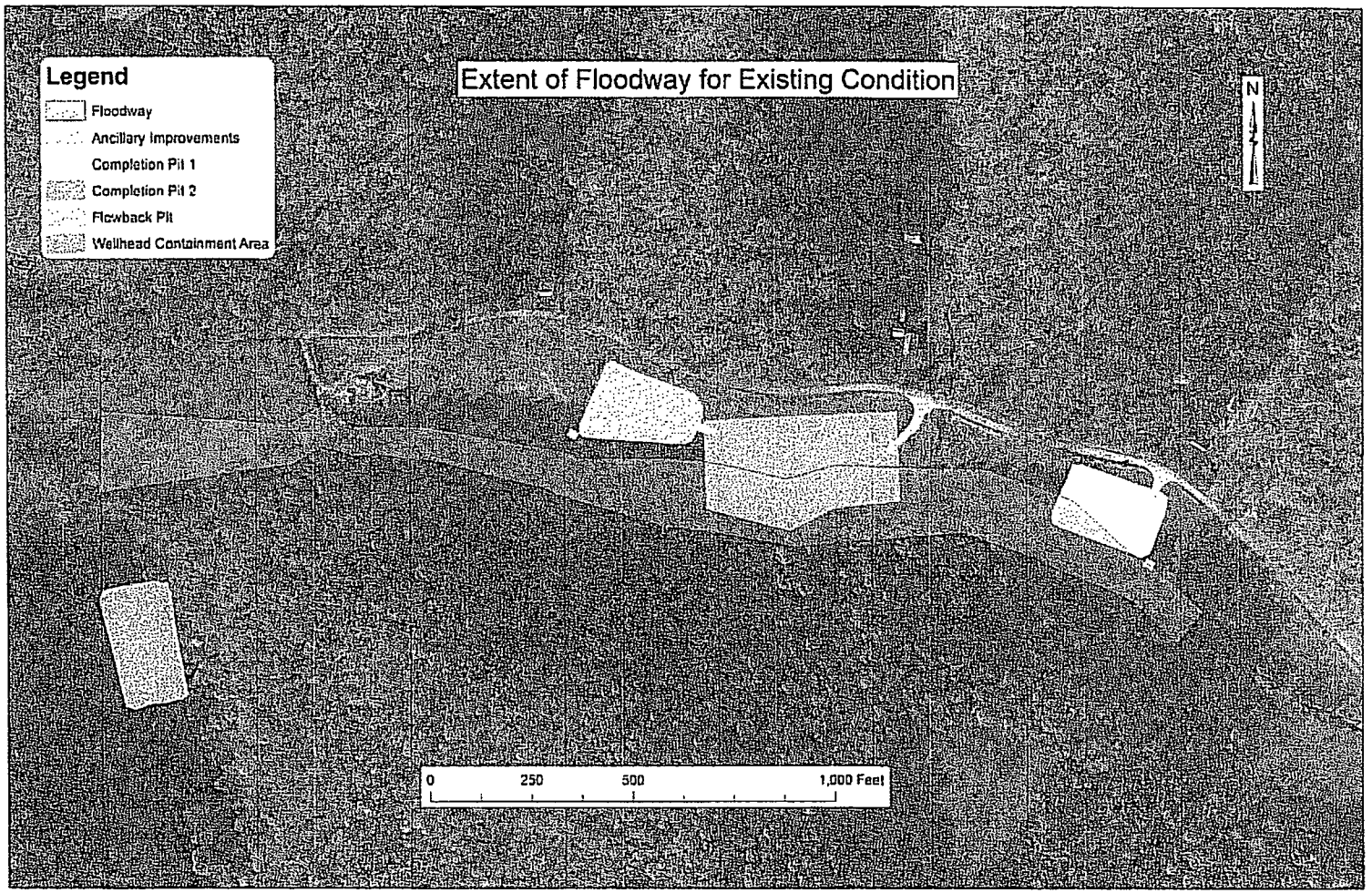
[10] Doddridge County Floodplain Ordinance, Passed by the County Commission on September 21, 2011

[11] Source of Figure is http://epg.modot.org/index.php?title=748.9_national_flood_insurance_program_(nfip)

The data entered in the HECRAS model, as well as model results, are all reported in on a Compact Disk. Examples of the data and model results are provided in Appendix D..

The areal extent of the Floodway for the present site conditions is shown in Figure 10 below. The Doddridge County floodplain ordinance includes requirements specific to Floodways and the placement of fill. Also shown in the figure are the locations of proposed structures.

Figure 10 Extent of Floodway for 2012 Condition and Proposed Structures



CONCLUSIONS

The following conclusions may be drawn from the studies reported above:

1. The site development proposed by EQT Production would result in an increase of the water surface elevation of Middle Fork of up to 2.3 feet during the Base Flood. The location of greatest increase is just upstream from the proposed Wellhead Containment Area, at the mouth of Mudlick Run.
2. The proposed structure causing the greatest rise in the water surface elevation is the Wellhead Containment Berm.
3. The Wellhead Containment Berm will be overtopped in the Base Flood.
4. The elevation of the ground surface at the location of the proposed 12 wells, as shown on the Navitus Engineering drawings, will be 862 feet. The elevation of the Base Flood at this location will be 864.7 feet. There will be approximately 2.7 feet of standing water at the location of the proposed wells.
5. The extent of flooding from the Proposed Condition encompasses two residential structures adjacent to the site.
6. The extent of a floodway for the Area Of Interest was determined. Construction of the Wellhead Containment Area and Completion Pit #1 would entail placement of significant quantities of fill in this floodway.

Appendix A
Data Sources

Data Provided by Mrs. Huff

Drawings
Well Pad Map 1A
Well Pad Map 1B
Well Pad Map 2A
Well Pad Map 2B
Well Pad Map 3A
Well Pad Map 3B
Well Pad Map 4A
Well Pad Map 4B
Well Pad Map 5A
Well Pad Map 5B
Well Pad Map 6A
Well Pad Map 6B
Well Pad Map 7A
Well Pad Map 7B

Data Provided by Mr. David McMahon

(A) Letter to County Clerk re Resubmission 08-15-12
1 - Floodplain Permit Application 11-16-11
1a - OXF 43 Floodplain Study Computations
1b - Site Plan
1c - FEMA FIRMette Maps of Area
2 - Email from S Hastings to K Sneed and D Wellings 05-17-12
2a - Floodplain Study Exhibits
2b - Navitus Engineering - Floodplain Study Computations
2c - Letter to Sneed and Wellings
3 - Email from S Hastings to K Sneed and D Wellings with att
4 - Email from K Sneed to S Williams and D Wellings 05-22-12
EQT & DODDRIDGE CO COUNTERCLAIM & CROSSCLAIM v 12 FINAL.pdf
EQT & DODDRIDGE CO COUNTERCLAIM & CROSSCLAIM v 12 FINAL
Numerous photographs of Middle Fork and Mudlick Run in flooding condition

Data Provided by Mrs. Erlene Foster

Numerous photographs taken September 10, 2012 of Middle Fork

Appendix B
Hydrology Computations

Item	Middle Fork Below Long Branch	Middle Fork Above Long Branch	Long Branch	Mudlick
Drainage Area (sq. mi.)	5.02	4.20	0.82	0.83
Longest Watercourse (ft.)	n/a	15,509	7,857	9,821
Basin Slope (%)	n/a	24	24	24
SCS Curve Number (CN)	n/a	72	72	72
24-hr, 100-yr rain (in.)	n/a	5.3	5.3	5.3
Excess Rainfall (in.)	2.43	2.43	2.43	2.43
SCS Lag (minutes)	n/a	43	26	31
Flow (cfs)	3729	3108	854	770

HMS Computed Flow for Middle Fork and Long Branch.

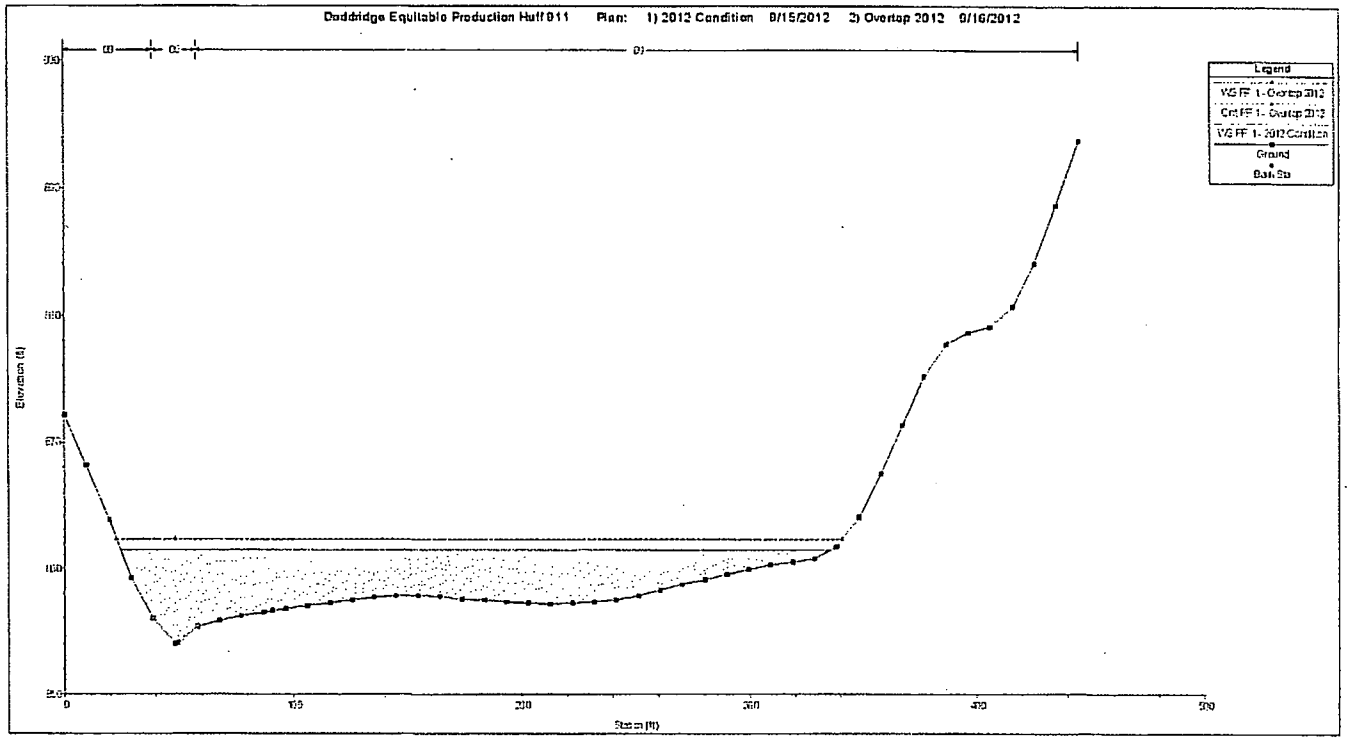
Time	Upper Middle Fork (cfs)	Long Branch (cfs)	Lower Middle Fork (cfs)
09:20	0	0	0
09:25	1	0	1
09:30	1	1	2
09:35	2	1	3
09:40	3	1	4
09:45	4	2	6
09:50	5	2	8
09:55	7	3	10
10:00	9	4	13
10:05	12	4	16
10:10	15	5	20
10:15	18	6	24
10:20	21	7	29
10:25	25	8	34
10:30	30	10	39
10:35	34	11	45
10:40	40	12	52
10:45	46	14	59

10:50	52	16	68
10:55	59	18	77
11:00	67	20	87
11:05	76	23	99
11:10	86	26	112
11:15	98	29	126
11:20	110	33	143
11:25	125	37	163
11:30	142	43	185
11:35	163	50	213
11:40	193	62	255
11:45	241	85	326
11:50	327	133	460
11:55	484	225	710
12:00	734	369	1103
12:05	1070	547	1616
12:10	1479	717	2197
12:15	1938	827	2765
12:20	2384	854	3237
12:25	2744	815	3559
12:30	2982	734	3716
12:35	3098	631	3729
12:40	3108	529	3636
12:45	3021	446	3468
12:50	2862	383	3245
12:55	2653	330	2984
13:00	2407	287	2694
13:05	2151	251	2403
13:10	1923	222	2145
13:15	1731	199	1931
13:20	1568	180	1749
13:25	1427	165	1592
13:30	1302	152	1454
13:35	1190	141	1331
13:40	1091	132	1222
13:45	1004	124	1128
13:50	929	117	1046

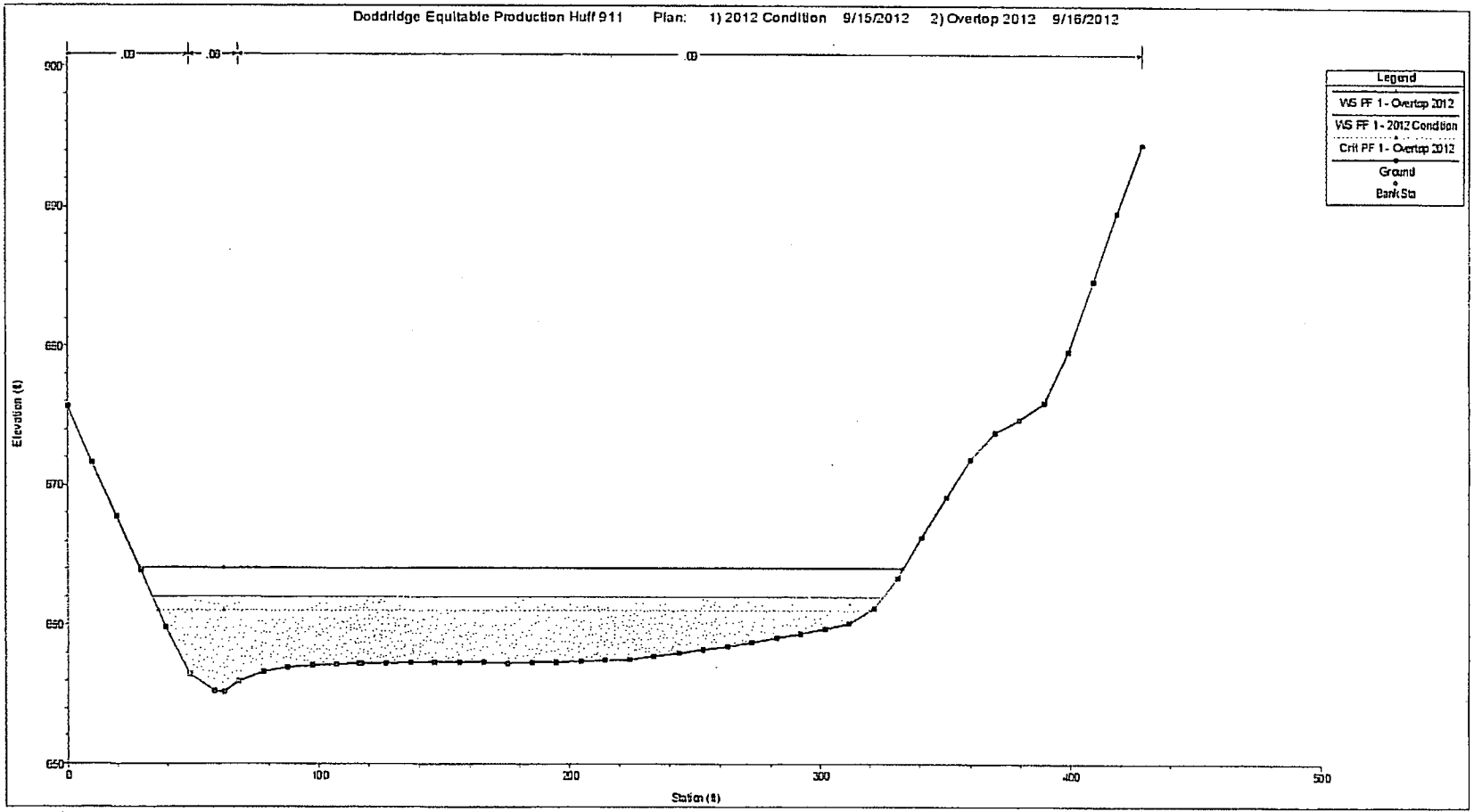
13:55	861	110	972
14:00	801	105	906
14:05	748	99	847

Appendix C
Hydraulic Computations – Base Flood Elevation Change
(Note that "Overtop" is the Proposed Condition, in which the Containment Berm is Overtopped

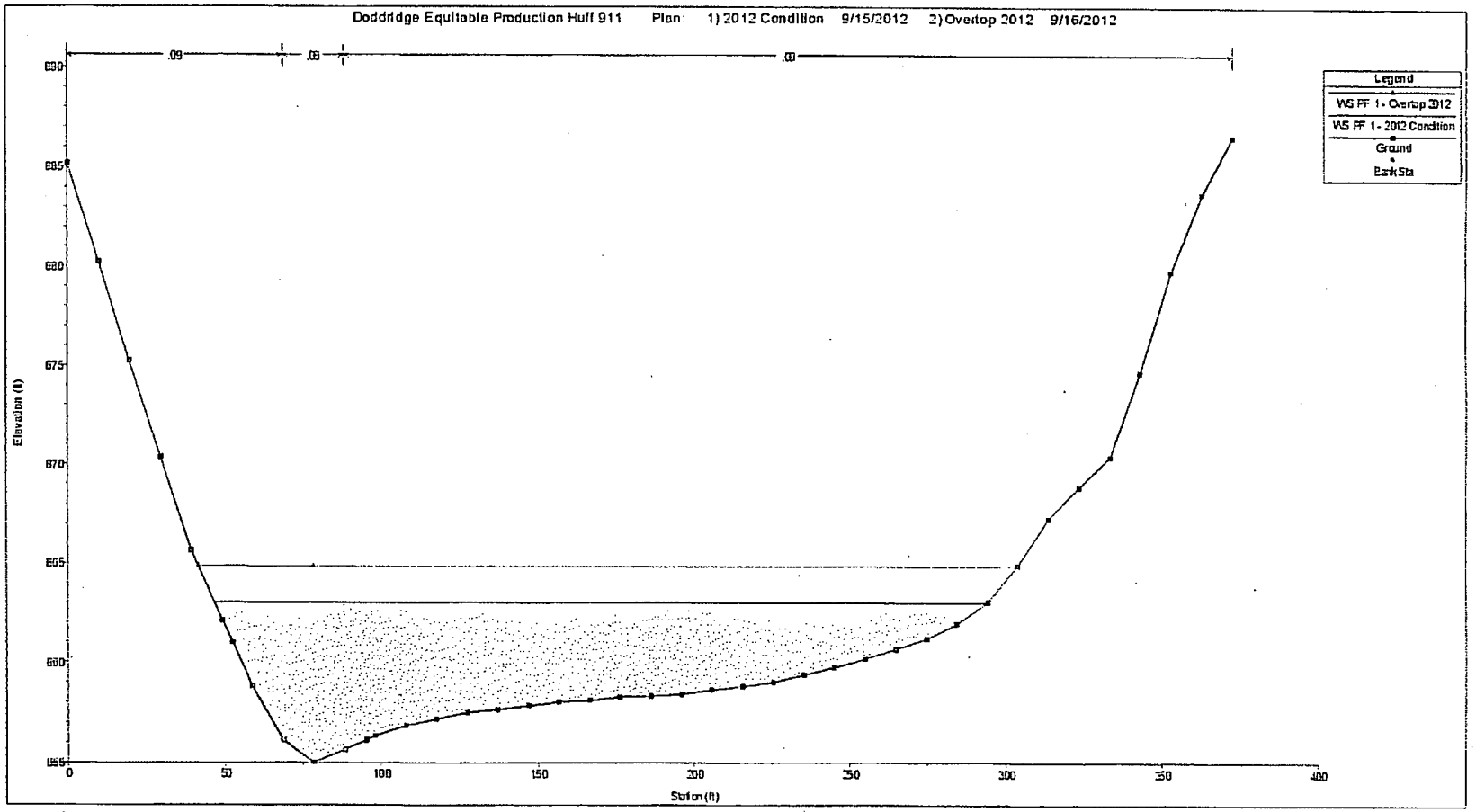
Middle Fork, 2012 and Overtop Conditions



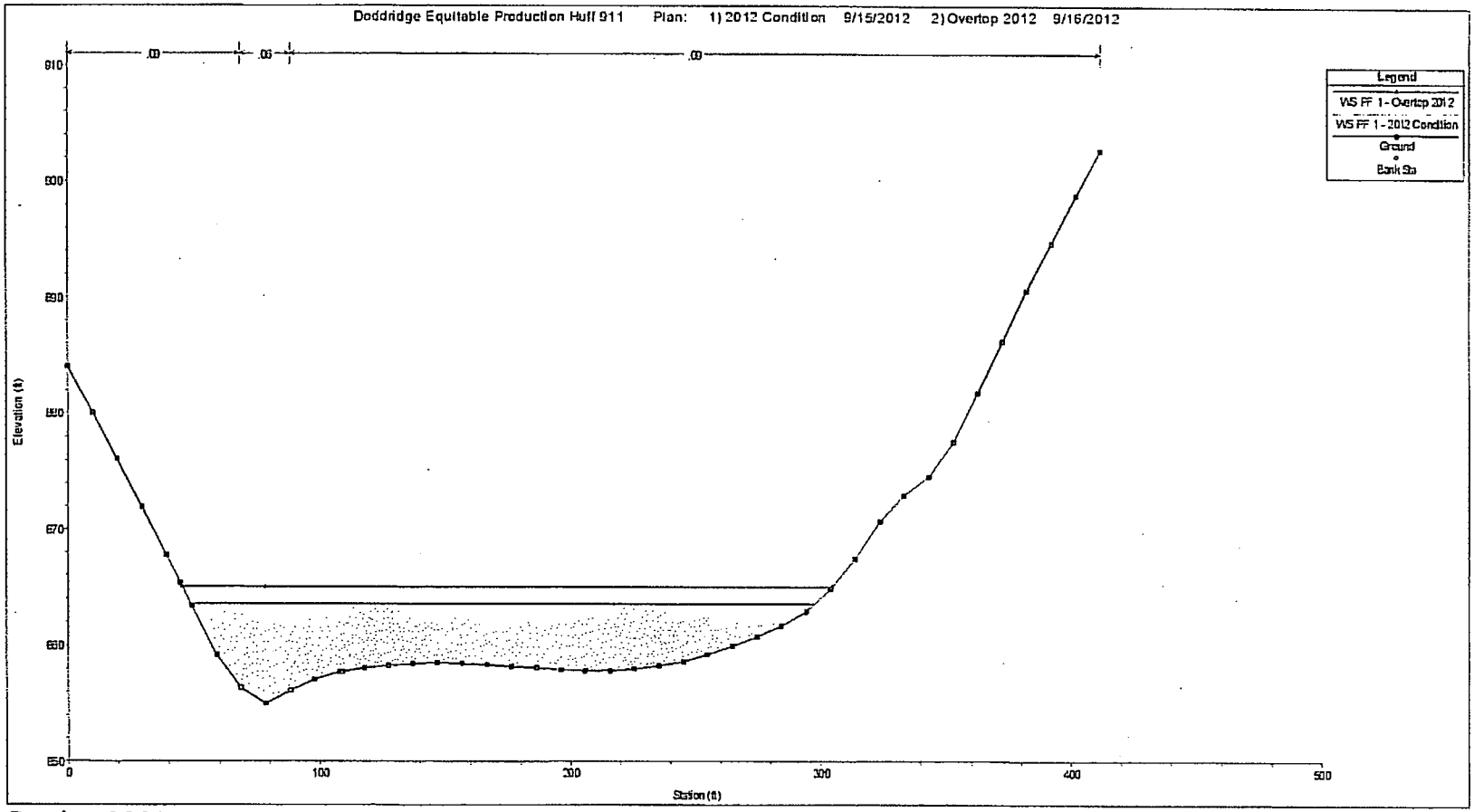
Section 3152



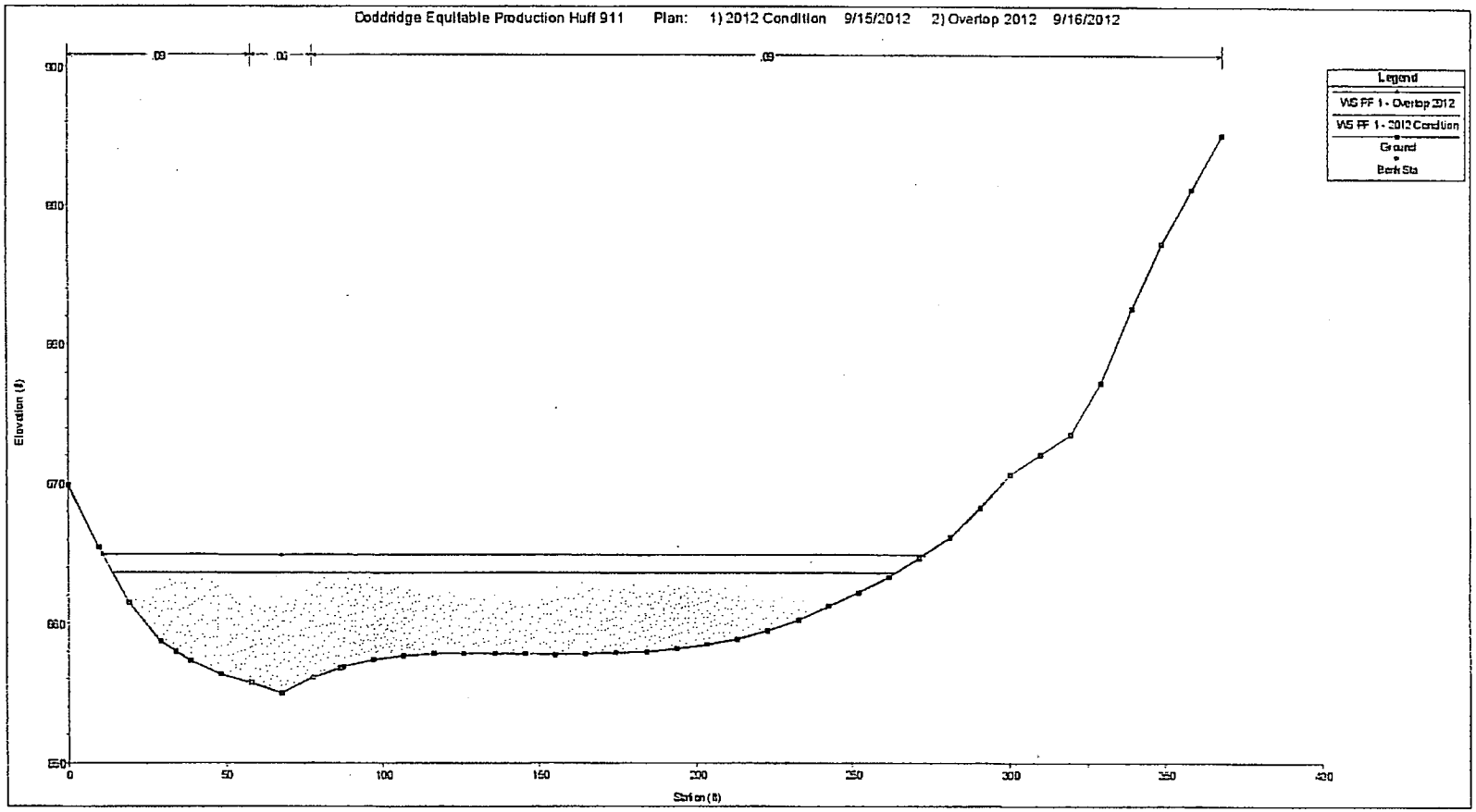
Section 3286



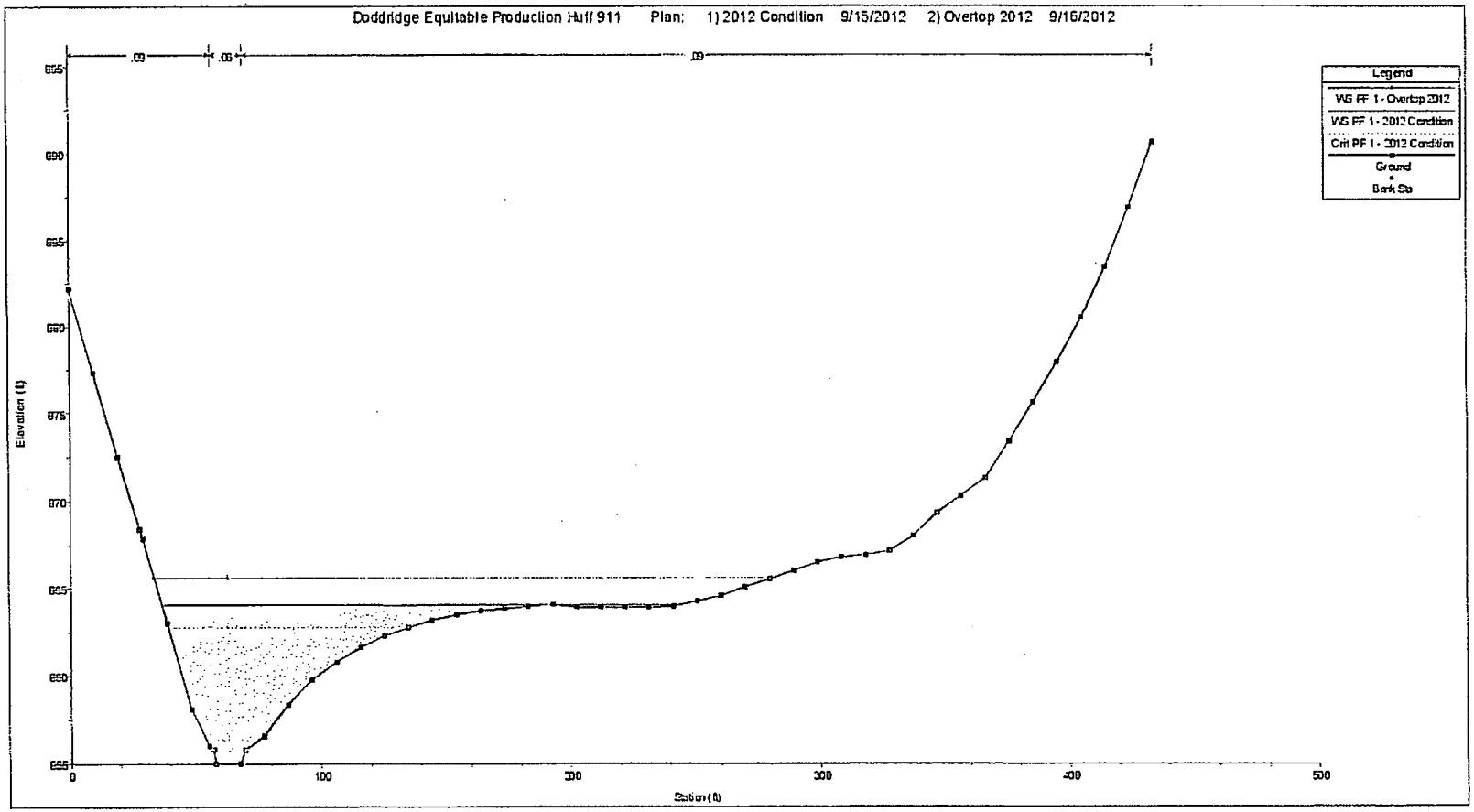
Section 3595



Section 3801



Section 3852



Section 4051

Attention: Honorable County Clerk Beth Rogers

From: Daniel T Richardson, Esq.
Attorney for Joyce Huff, William Huff, James Foster, and Earline Foster

Re: Doddridge County Floodplain
Permit Application: EQT OXF-43 at Huff Farm
Permit # 14-264

Fax #: 304-873-1840

Please call me at 619-569-4514 if you have any questions and/or concerns

David T. Richardson
Attorney at Law
DTR LAW APC
(Licensed in California and West Virginia)
826 Orange Ave, #546
Coronado, CA 92118
(619) 991-5290
Fax: (619) 522-9260

September 21, 2014

Via email, facsimile, usps, and hand delivery
Doddridge County Clerk and Doddridge County Floodplain Administrator
135 Court Street, #102
West Union, WV 26456

14-264 PS

RE: EQT Floodplain Application for OXF-43 (Permit # 12-264)
Subject Property – Huff Farm

Dear Sir and Madam,

Please be advised that my office represents the following persons in regards to the above-referenced floodplain permit application: Mrs. Joye Huff, as Trustee of the Trust that owns half of the Huff Farm, Mr. William Huff, Mrs. Earlene Foster, and Mr. Jim Foster. My clients have authorized me to submit their objections and comments to the above-referenced Application. As such, please allow the following to constitute my clients' comments and objections to the above-referenced floodplain permit application (the "Application"). Please note, much of the information contained in the Application is erroneous, incorrect, and/or misleading. Additionally, the Application fails to comply with several basic and extremely important provisions of the Doddridge County Floodplain Ordinance (the "Ordinance"). Accordingly, the Application must be denied.

BACKGROUND

Note, my clients and the applicant, EQT Production Company ("EQT") were parties to a lawsuit regarding a floodplain permit that was issued and then revoked by the Doddridge County Commission (the "DCC"). The case title of that action is EQT vs. the DCC and Huff/Foster, and the case number is 12-C-17. The case was resolved in favor of the DCC, the Huffs, and the Fosters. The Honorable Judge Sweeney refused to grant EQT's request for an injunction ordering the return of EQT's floodplain permit because the Ordinance in effect at the time was unconstitutional in that it violated the due process rights of surface owners and adjacent landowners by not providing them notice of floodplain permit applications and an opportunity to be heard (i.e., a chance to comment and object) (a copy of Judge Sweeney's Order with the relevant portions highlighted is attached hereto as Exhibit "A"). Ultimately, the Court dismissed EQT's lawsuit for "want of prosecution" (EQT apparently abandoned its lawsuit, and the Court dismissed it because EQT did nothing in the case in the year after its injunction request was denied).

Prior to the Court denying EQT's request for an objection, the parties were provided an opportunity to present expert studies and reports of EQT's floodplain project to the DCC acting in its capacity as the Floodplain Appeals Board (there like here EQT sought to radically alter the Huffs' meadow, which happens to primarily located be in an Approximated Zone "A" Floodplain). On October 5, 2012, the DCC issued a Final Decision denying EQT's floodplain permit request. There were many reasons for the DCC's refusal to grant EQT a floodplain permit, but the primary reasons were as follows: (a) EQT submitted a flawed floodplain study (e.g., the study failed to use a sufficient number of cross-section, among other things), (b) EQT's floodplain study was inaccurate (e.g., it claimed the base flood elevation increase would not

exceed a foot), and (c) when accurate engineering work was done (i.e., by the Huffs' expert Seward Gilbert, P.E.), EQT's planned project would have caused a base flood elevation increase in well excess of a foot (a copy of the County's Final Decision with the relevant portions highlighted is attached hereto as Exhibit "B"). The Huffs and the Fosters urge the Floodplain Administrator to review said Final Decision, and if he does, he will notice significant similarities between the study at issue there and the study at issue here.

Following the denial of EQT's request for an injunction ordering the return of its revoked floodplain permit, the West Virginia State Board of Registration for Professional Engineers (the "Engineering Board") opened an investigation into the same floodplain study that the Appeals Board found to be flawed, the floodplain study by EQT's engineering firm, Navitus (the "Navitus Study") regarding EQT's prior proposed floodplain project at the Huff Farm. On December 6, 2013, the Engineering Board, Navitus and the engineer responsible for floodplain study, Mark Smith, P.E., entered into a Consent Order whereby Navitus and Mr. Smith effectively plead guilty to violating the Rules of Professional Engineering in regards to the floodplain study prepared on behalf of EQT. Specifically, Mr. Smith admitted that the "original floodplain analysis violated the Rules of Professional Responsibility in that the services were not in accordance with current standards of technical competence, did not conform to accepted engineering standards, may have impacted the life, health, property, and welfare of the public, did not include all relevant and pertinent information, and was founded upon an inadequate knowledge of the facts and evaluation of the subject matter" (see pgs. 3-4 of the Consent Order at # 14 and pg. 7-8 at #32 attached with Navitus email as Exhibit "C"). The Consent Order cited the Appeals Board's Final Decision finding that the "ground survey and studies performed

by" Navitus and Mr. Smith "were insufficient to support the overall opinions they espoused due to an insufficient number of cross sections and area of land and that tributaries to the main stream of the subject floodplain, had they been included, would have impacted" Navitus and Mr. Smith's "base floodplain evaluation" (Exhibit "C", pg. 2-3, paragraph 9). Mr. Smith agreed to be fined several thousand dollars by the Engineering Board because of his flawed/incompetent/inaccurate engineering work in regards to the floodplain at the Huff Farm. Many of these same flaws, mistakes, and incompetence are present in the Rettew floodplain study submitted by EQT with this Application (i.e., insufficient cross-sections, studies insufficient to support opinions, failure to model, etc.). Note, these unfortunate similarities between the Navitus Study and the Rettew Study will be discussed below, and will likely result in a complaint being filed against Rettew and its responsible engineer in regards to the floodplain study and other information/analyses attached to this Application.

I bring up the issues regarding EQT's previous attempt to build a development in the floodplain at the Huff Farm for the purpose of putting the current Application in perspective. More importantly, I bring up the EQT's previous attempt and previous application (and previous floodplain study) because, unfortunately, many of the same issues that were present there are present here with this Application. For example, as was the case with EQT's previous floodplain application, my clients have again been denied Due Process as to this Application, and the data/analyses provided by EQT's engineering firm (in this case Rettew Associates) is inaccurate, incorrect, and misleading and as will also be discussed below, mindboggling contradictory (i.e., on the one hand Rettew tells the Doddridge County Floodplain Administrator that EQT's plans for the Huff Meadow are outside of the floodplain, but on the

other hand Rettew tells WVDEP that EQT's plans for the Huff Meadow do involve the floodplain).

OBJECTIONS AND COMMENTS

A. The Huffs and Fosters were denied the Notice mandated by the Ordinance, and as a result, they were denied Due Process.

Perhaps the most egregious and troubling violations of the Ordinance was EQT's failure to comply with the mandatory requirement of identifying the surface owners and/or adjacent landowners who are entitled to notice of the Application via certified mail, and the subsequent failure to provide my clients with notice of the Application as mandated by the Ordinance ("Notice"). EQT violated the Ordinance by providing false and/or incorrect information as to the identities and addresses of the surface owners and adjacent landowners. Specifically, EQT failed (or refused) to identify my clients as surface owners and/or adjacent landowners who are entitled to notice (and Due Process) in regards to this Application. In turn, the County has denied my clients the mandatory Notice required by the Ordinance, and as such, the County has denied my clients the Due Process afforded to them by the Constitution of West Virginia. As such, this Application is fatally flawed and cannot be granted (EQT is, of course, welcome to resubmit another floodplain application that gives my clients proper Notice, but this Application cannot be fixed....the damage has been done). Accordingly, my clients object to this Application, they object to any further processing of this fatally flawed Application, and they request that the Application be immediately denied.

In above-referenced case, the Doddridge County Circuit Court has specifically ruled that my clients (and people like them) are entitled to certain Due Process rights. The Court held that my clients (and people like them) are entitled to the right to proper notice (not accidental notice, not notice from friends, not happenstance notice....actual and proper notice from the County) as well as the right to be heard regarding floodplain permit applications for projects planned for their property and/or for the neighbors' property (see Exhibit "A"). My clients spent over a year and a half in Court litigating that case, and they spent a great deal of energy, effort, and money litigating that case. The Ordinance was amended in response to the Court's ruling to specifically provide a mechanism for guaranteeing those rights. Until this Application was brought to their attention by others, my clients thought their hard earned Due Process rights were safe. But if this Application is granted, it will be a blatant deprivation of my clients Due Process rights. Given everything they have previously endured and given what is at stake, my clients will not just to sit back and let their Due Process rights be trampled. In the event that this flawed Application is issued in violation of my clients' Due Process rights, my clients will not hesitate to seek intervention to protect said rights.

The Due Process at issue here is two fold: 1. Notice, and 2. an opportunity to be heard. The Ordinance contains simple and straightforward provisions that must be followed in order to ensure that Notice is provided to surface owners and adjacent property owners. Per the Ordinance, the applicant MUST provide the County with the names and addresses of any and all surface owners of the subject property(ies) where the development will occur (Ordinance pg. 35 Section 7.3 (D)(1)) and the names and addresses of the adjacent landowners (Ordinance pg. 35

Section 7.3 (D)(2)). The County then uses that information provide notice of permit applications to any and all surface owners and adjacent landowners via certified mail (Ordinance pg. 36-37 Section 7.3 (F)(1)(a) and (1)(b)). Note, the language regarding the Notice provisions is mandatory (i.e., "the applicant shall" and "the County Clerk shall"), and the Notice requirements of such great importance that the Ordinance even takes care to reiterate the mandatory nature of the Notice provisions ("All Notice provisions in this Section are mandatory...((Ordinance pg. 38 Section 7.3 (H)).

Here, EQT violated the Ordinance by failing to identify my clients as surface owners and/or adjacent landowners and by failing to provide their names and addresses to the County so that the County could provide Notice to my clients via certified mail (see pg. 4 of the Application form). As a result, my clients were NOT provided the required Notice as mandated by the Ordinance, and my clients have been denied their Constitutional Due Process rights as to Notice. Further, the lack of proper Notice has adversely affected my clients by limiting the time and ability they have to object to this Application and submit comments regarding this Application. Because they did not receive proper Notice (and instead had to wait to learn of the Application through third parties other than the County and EQT), my clients lost a significant amount of time to gather information, review the Application, and prepare this objection/comment letter. Further, because of the lack of proper Notice, my clients were not afforded enough time to retain an engineer of their own to review this Project and prepare his/her own study of the Project to submit for the Floodplain Administrator's review. In short, my clients' right to Notice has been deprived, and their opportunity to be heard has been substantially curtailed and harmed. As such, the issuance of a floodplain permit based on the Application would violate the Ordinance

and would unconstitutionally violate my clients' Due Process rights.

1. Joye Huff - Mrs. Huff owns one half of the Huff Farm (i.e., she and William Huff are co-owners of the Huff Farm's surface and the minerals). She maintains her ownership interest in the Huff Farm in a family trust (the "Huff Trust"). The Huff Farm is the surface on which a substantial portion of the 60+ acre Project is proposed to be built, the surface on which a portion of the well-pad would be built on, and the site of a substantial amount of proposed floodplain development.

Accordingly, in order to comply with the Notice provisions of the Ordinance, EQT Application's must identify as an owner of the surface on which the Project would be built and also an owner of an adjacent property to other properties on which portions of the Project will be built. In turn, the County Clerk must mail her notice of the Application via certified mail as mandated by the Ordinance and as mandated by the Due Process. However, her name is nowhere to be found in EQT's Application (i.e., she is not identified as a surface owner or an adjacent landowner, despite the fact she is both in regards to this Project). Further, the County Clerk never provided her with Notice of the Application via certified mail. As such, EQT's Application fails to comply with the Ordinance, and Mrs. Huff has been deprived Due Process.

Further, the omission of Mrs. Huff from the Application is inexcusable for several reasons, including, but not limited to the following. One, EQT is well aware that Mrs. Huff is a surface owner and an adjacent landowner in regards to the Project (EQT was recently involved in two separate lawsuits with Mrs. Huff regarding EQT's previous failed floodplain project plans

for the Huff Farm). Two, EQT mails royalty checks each month to Mrs. Huff, and as a result, EQT has her address. Three, the Doddridge County Circuit Court denied EQT's request for an injunction ordering the return of a floodplain permit for a proposed development on Mrs. Huff's farm because her Due Process rights were violated by a lack of notice regarding EQT's application for a floodplain permit for said floodplain project (i.e., the same situation as we have here...). Four, even if EQT was unaware of the foregoing, a simple search of tax records and/or a parcel map search would have identified Mrs. Huff and provided EQT with her address.

2. William Huff - the information provided on the Application regarding Mr. Huff, Mrs. Huff's brother-in-law and the co-owner of the Huff Farm, is inexcusably incorrect. Like Mrs. Huff, he should have been identified on the Application as both a surface owner and an adjacent landowner (and provided Notice as such). Instead, Mr. Huff is listed on the Application as only an adjacent property owner despite the fact that the majority of the Project is planned for the Huff Farm.

Even more troubling, the address that EQT provided for Mr. Huff in its Application is NOT his addresses. It isn't even close to being his address. The address provided is for Coronado, California. Meanwhile, Mr. Huff is a resident of Midland, Texas. Mr. Huff has never been a resident of Coronado, California and he has never received mail there. As a result, the information provided by EQT in its Application regarding Mr. Huff is incorrect, and Mr. Huff did NOT receive a copy of the Notice of the Application via certified mail as mandated by the Ordinance (the addresses listed in EQT's Application is a UPS Store, and the clerk there signed for without comparing the name on the envelope to the name on the P.O. Box). As such,

EQT's Application violates the Ordinance because it failed to identify Mr. Huff as a surface owner and because it failed to provide a correct address for Mr. Huff. Moreover, because Mr. Huff has not received the Notice mandated by the Ordinance, Mr. Huff has been deprived his Constitutional right to Due Process.

Similar to Mrs. Huff, there is simply no excuse for EQT's errors and omissions in regards to providing information regarding Mr. Huff in its Application. One, EQT is well aware that Mr. Huff is a surface owner and an adjacent landowner in regards to the Project (EQT was recently involved in two separate lawsuits with Mr. Huff regarding EQT's previous failed floodplain project plans for the Huff Farm). Two, EQT mails royalty checks each month to Mr. Huff, and as a result, EQT has his address. Three, the Doddridge County Circuit Court denied EQT's request for an injunction ordering the return of a floodplain permit for a proposed development on Mr. Huff's farm because her Due Process rights were violated by a lack of notice regarding EQT's application for a floodplain permit for said floodplain project (i.e., the same situation as we have here...). Four, even if EQT was unaware of the foregoing, a simple search of tax records and/or parcel maps would have identified Mr. Huff and provided EQT with her address.

3. James and Earlene Foster - the Fosters own and live on a property that is directly adjacent to the Huff Farm (the Fosters' Farm and the Huffs' Farm connect along Short Run). As such, both of the Fosters were entitled to written notice as adjacent property owners. However, their names and addresses are nowhere to be found on EQT's Application. As such, EQT has violated the Notice provisions of the Ordinance, and the Fosters have been denied Due Process.

Again, there is no excuse for EQT's failure to identify the Fosters on the Application. EQT is well aware that the Fosters are adjacent property owners. Namely, the Doddridge County Circuit Court allowed the Fosters to intervene (i.e., join) the EQT v. DCC and Huff/Foster lawsuit specifically because the Fosters were adjacent property owners who had been denied Due Process due to a lack of notice regarding the floodplain project at issue in that lawsuit. Further, even if that lawsuit never took place, a simple tax record and/or parcel map search would have identified the Fosters' names and address.

OTHER ISSUES

Note, by commenting on and further objecting to the Application, my clients are not waiving their Due Process objections. My clients were deprived proper Notice, and nothing will change that in regards to this Application. The Due Process issue (i.e., lack of proper notice) is the biggest issue (and defect) with this Application, and it is an issue that was primarily created because EQT submitted false and/or incorrect information about the most important part of the Application, the identity of the persons who may be affected by the planned project (i.e., surface owners and adjacent property owners). Note, the lack of Notice may have been avoided if the Ordinance did not rely on the veracity or competency of the applicant in determining the identities of the surface owners and adjacent landowners.

Unfortunately, there are numerous other material issues with EQT's Application, and like the Navitus floodplain study that EQT submitted to the County regarding EQT's previous plans for the Huff Farm, this Application is false, misleading, and/or inaccurate. The following is by no means intended to be a full accounting of all of the other issues with EQT's Application. It is

merely intended to point out some of the more egregious (and/or potentially dangerous) issues with EQT's Application.

Note, it is important to keep in mind that the Ordinance requires "strict compliance" (Ordinance pg. 17 (c)). As such, any violation of the Ordinance and/or failure to abide by the provisions of the Ordinance should automatically require the denial of EQT's Application. Simply put, no development can be permitted in a Doddridge County floodplain if the Ordinance is not followed exactly as written. It is also important to note that "permits and plans shall be approved only after it has been determined that the proposed work undertaken will be in conformance with the requirements of this Ordinance..." (Ordinance pg. 14, Section 7.2 (B)).

A. EQT doesn't have all of the other permits it needs to build the planned Project as is required by the Ordinance before a floodplain permit application may be granted.

Pursuant to the Ordinance, a floodplain permit cannot be issued unless and until all other permits that require site approval are issued by the various applicable Federal, State, or Local government agencies. Additionally, per the Ordinance, no floodplain permit application may be granted unless and until the applicant has provided copies of the issued permits to the County Clerk and to the Floodplain Application Permit File (Ordinance pg. 34, Section 7.2 (e)).

Here, EQT does not have the other permits it needs in order to lawfully build the project, and as such, the Application must be denied. Said permits include but are not limited to the following:

1. West Virginia Department of Environmental Protection – Office of Oil and Gas permits authorizing EQT to drill the planned wells and build the planned sites for the Project (it is absolutely mindboggling that EQT went ahead and applied for the Doddridge County

Floodplain Permit prior to even obtaining the requisite WVDEP drilling permits for the planned gas wells),

2. West Virginia Department of Environmental Protection – Department of Air Quality permit authorizing the estimated/projected emissions from the Project,

3. West Virginia Office of Land and Stream Activity permit allowing EQT to build the culverts proposed for Mud Lick as well as any bridges over Mud Lick, and

4. USACE 401 Water Quality Certification permit allowing EQT to do its planned work in Mud Lick (and any other streams) and allowing EQT to do its planned work in the various identified wetlands that are present in the areas EQT seeks to develop pursuant to this Project.

Each of the above permits requires site approval, and each of the above must be obtained by EQT before a floodplain permit can be lawfully granted under the Ordinance. Note, the above is not intended to be a complete list of the various permits EQT must obtained before it can even qualify for a floodplain permit. It is entirely possible that there are other permits that EQT needs. What is clear is that EQT does not have the above permits and has not provided copies of the above permits to the County Clerk and to the Floodplain Application Permit File as mandated by the Ordinance. What is also clear is that unless and until EQT obtains the above permits and provides copies of said permits, no floodplain permit may be granted for this Project. As such, this Application must be denied because EQT has not obtained and provided copies of the other permits that are required for the Project.

B. EQT's Project does not comply with the Ordinance's Flood Protection Setback Requirements, and as such, the Application must be denied.

The Ordinance mandates that there be a 100 foot flood protection setback with any and all natural gas development (Ordinance pg. 32, Section 6.2 (H) (i.e., as for ALL natural gas operations...none may be "prepared, constructed or located within 100 feet of a stream or wetland). As such, nothing EQT is building for the Project (i.e., ALL natural gas operations...not just the pad...ALL operations) may be within 100 feet of a stream/watercourse and/or wetland. For some reason, EQT incorrectly/mistakenly used the 50 foot setback standard (and even then EQT doesn't comply with the 50 foot standard). As can be seen from the attached pages from EQT's WVDEP application, there are countless streams/watercourses and wetlands that are within 100 feet of EQT's various developments related to the Project (and, as can be, seen, there are several within 50 feet) (see Exhibit "D"). A project that does not comply with the setback requirement is not incompliance with the Ordinance and must be denied. As can be seen from the attached drawings, EQT's Project does not comply with the Flood Protection Setback Requirement (and not just in one spot, but in dozens of spots). Accordingly, the Application must be denied because it fails to comply with the flood protection setback requirements of the Ordinance.

B. EQT incorrectly states that there are no buildings located on the "subject property", i.e., the Huff Farm, and its "study" apparently fails to model the cumulative impact of the existing buildings/structures in the floodplain and the proposed Project developments.

EQT claims in its application that there are no buildings located at the Huff Farm (i.e., the subject property) (see Application pg. 2). EQT's floodplain "studies" also claim that there

are no buildings in the floodplain (see EQT's "study" and Application generally, but especially pg. 2 of the Application). These assertions would be comical if we weren't talking about something as serious as altering a floodplain. EQT's own drawings prove that the Huffs' farmhouse, garage, and barns are all on the "subject property". These are obviously buildings. Said buildings are also in the floodplain right next to portions of Mud Lick that EQT seeks to alter as part of its Project and right across the road from the massive planned "spoil stockpile", which as will be discussed later, is also in the floodplain (see attached drawing contained in EQT's Application which attached hereto as Exhibit "E"). Again, the veracity and accuracy of EQT's entire Application is serious doubt when absurdly false statements like this are made in its Application. Further, EQT could NOT have modeled the cumulative impact of the project correctly since it failed to include the Huffs' farmhouse, garage, and barns (i.e., existing structures) in its calculations when determining the base flood elevation increase from the floodplain developments planned for this Project (see Ordinance "Adversely Affected" requires calculation cumulative impact).

Additionally, there is a multi-acre EQT well-pad located in the Huff Meadow that is not far from the planned "spoil stockpile". But I see no mention of said existing well-pad having been modeled by EQT's floodplain "study", and it is not shown on the drawings submitted to the Floodplain Administrator in EQT's Application packet. Said existing well-pad is sited a very short distance from the "spoil stockpile", and it is also located in the same floodplain as the proposed stockpile and other proposed developments will be sited (and the same floodplain as the Huff buildings). Like the Huff buildings, this well-pad must be modeled to include its impact the base flood elevation level with that of the proposed Project developments in order to determine the cumulative impact of the existing buildings/structures/development and the

proposed developments. EQT's apparent failure to model the existing well-site (and failure to reference it in its Application) is inexcusable (especially considering the fact that it is an EQT well-pad, and it is sitting there out in the wide open for the whole world to (and shows up on satellite maps) so it isn't like EQT can plead ignorance as to its existence). This is yet another example of EQT failing/incorrectly modeling the impact of the Project, and yet another reason why the Application must be denied.

C. EQT's Application incorrectly states that the massive "spoil stockpile" planned for the Huff Meadow is outside of the floodplain and does not model it correctly.

EQT's Application contains a drawing showing that the "spoil stockpile" is outside of the floodplain, and EQT's floodplain "study" attached to its application claims that the "spoil stockpile" is outside of the floodplain. Both the drawing and the floodplain "study" are incorrect. In fact, amazingly, both the drawing and the "study" are directly contradicted by the work of the same engineer responsible for each. Per the attached WVDEP site plans that were signed and stamped/sealed by the same engineer who signed and stamped/sealed the floodplain drawing and floodplain "study", the "spoil stockpile" is IN the floodplain (attached hereto as Exhibit "F" is a copy of the Huff Meadow site plans that EQT submitted to WVDEP to obtain a drilling permit for the Project). Amazingly, the same engineer signed off on and stamped the floodplain drawing, the floodplain "study", and the site plans (i.e., Mr. Eric Hershey, P.E. of Rettew Associates, Inc.). I guess Mr. Hershey couldn't be bothered to be consistent.... Regardless, this blatant misrepresentation of the floodplain and blatant attempt at misleading the Floodplain Administrator cannot be tolerated, and it is proof that nothing submitted by and/or on behalf of EQT in regards to the Huff Farm can be trusted (see also the Navitus Consent Order).

Further, this misrepresentation of the floodplain is inexcusable, irresponsible, and a danger to the Public Health, Welfare, and Safety (and it is Navitus all over again). Frankly, not only is this a blatant violation of the Rules of Professional Engineering, it is also an insulting attempt to trick the Floodplain Administrator into issuing a floodplain permit. Mr. Hershey's own contradictory drawings and EQT's willingness to use them is also an example of the fraud that some people are willing perpetrate in order to seek profit even at the expense of public safety.

Moreover, EQT is not allowed to make up its own floodplain. The Huff Farm is an Approximated Floodplain (Zone "A"), and as such, per the Ordinance, said floodplain is "those areas identified as an A Zone on the Flood Insurance Rate Map (FIRM) included in the Flood Insurance Study (FIS) prepared by FEMA" (the "FEMA Floodplain" aka the real floodplain) (Ordinance pg. 15, Section 3.2 (D) "Description of Floodplain Areas") (see attached as Exhibit "G" a floodplain map prepared by Seward Gilbert showing the real floodplain, per FIRM, as well as the present base flood elevation). It is clear from looking at the real floodplain that the vast majority of the Huff Meadow is in the floodplain, and at least of substantial portion of the "spoil stockpile" would also be in the floodplain.

It is also abundantly clear that the studied submitted by EQT has not modeled the impact to the floodplain caused by its proposed "spoil stockpile". If the "spoil stockpile" is calculated in a proper and accurate floodplain study, then the base flood elevation increase from that development alone (i.e., "the spoil stockpile") would easily exceed a foot. Per EQT's site plans, the "spoil stockpile" planned for the meadow will be 3 acres in size, will contain 55,000 cubic yards of fill (see EQT WVDEP site plans attached as Exhibit "H"), and per the elevation data in the WVDEP site plans it will be much higher than the surrounding floodplain (i.e., per EQT's site plans, the elevation of the Spoil Stockpile will be 900 feet, which is dozens of feet higher

than the present elevation of the Huff Meadow (see Exhibit "F")).

Interestingly, EQT's floodplain "study" appears to calculate the "spoil stockpile's" elevation as being less than 860 feet (see Rettew Study table showing pre and post-development elevations). As such, EQT's "study" either ignores the impact of the stockpile or failed to model it.

Additionally, the "spoil stockpile" will be a mound of rock and compacted soil. As such, the "spoil stockpile" is essentially a giant dam plopped down in the middle of a floodplain directly across the street from the Huffs' farmhouse, garage, and barns. A giant dam that EQT conveniently excluded from its inaccurate floodplain, and a giant dam that EQT did not bother to correctly model (as noted below, and as will be noted below when discussing the fundamental flaws in EQT's grossly insufficient use of cross-sections in its floodplain "study"). This incorrect/false information alone warrants denying the Application. Moreover, EQT's failure/refusal to be honest about the floodplain in the Huff Meadow, and its failure/refusal to model it correctly mandates denial of the Application.

E. **EQT's Application incorrectly states that "fill" won't be placed in the floodplain.**

Regardless of whether the FEMA Floodplain is used or EQT's inaccurate and misleading (and inconsistent) floodplain is used, they both show EQT incorrectly/falsely stated that fill will not be going in the floodplain. Fill will be going into the floodplain. In fact, an enormous amount of fill will be going into the floodplain. One, fill will be placed in the floodplain because of the development of the "spoil stockpile" (see Gilbert floodplain map and EQT WVDEP floodplain map Exhibits) (and additionally, EQT cannot claim it is "storing" the spoil stockpile in the Huff Meadow...see Ordinance pg. 32, (I)(3) "material that resembles fill shall not be

considered 'storage'). Two, there will be an additional fill introduced into the floodplain as part of the development of the "MudLick Run Access Road" (see Exhibit "I" site plans showing fill used to build MudLick Run Access Road, and see both the Rettew floodplain Maps and the Gilbert floodplain Map showing significant portions of the Road will be built in the floodplain, and see "H" fill tables). All told, "Mudlick Run Access Road" will include 37,000 cubic yards of fill. A substantial amount of "Mudlick Run Access Road" will be built in the floodplain, and as such, fill will be added to the floodplain. Note, the provisions of the Ordinance apply to all natural gas developments (see Ordinance pg. 6, #12 definition development...."Any man-made change", and note, there is no requirement that the change be permanent). As such, it is inexcusable for EQT's floodplain Application to fail to admit that fill is going in the floodplain, and it is inexcusable that EQT's floodplain study failed to model said fill. Accordingly, the Application must be denied.

F. No cover letter is provided as required by 4.4(B).

EQT is required to submit a "cover letter, signed by the responsible professional, providing a statement of findings in basic terms", but per my review of the Application file, no such letter was submitted by the engineer responsible for the floodplain study (Ordinance pg. 17, section 4.4(B)). This is a mandatory requirement, and a floodplain permit application cannot be granted unless and until the requirement is fulfilled by the applicant. As EQT failed to provide said cover letter when it submitted the Application, the Application must be denied.

G. EQT failed to accurately model Mud Lick and the Huff Meadow together.

Mud Lick and the Huff Meadow are all part of the same floodplain, and instead of treating them as such, EQT's "study" modeled them separately. This was, at best, a mistake.

This was also an issue that the DCC, acting as the Floodplain Appeals Board, identified in its Final Decision (see Exhibit "B", County's Final Decision, pg. 6, paragraph 3 – "EQT/Navitus failed to model Mudlick Run (which has been "mapped" by FEMA as Flood Zone A) which is a contributary to the subject floodplain and would contribute to a rise in the base flood elevation even higher). As such, like the Navitus Study, EQT's current "study" fails to accurately model the Project. Accordingly, the Application must be denied.

H. EQT has not followed the requirements set forth in the Ordinance in regards to the Project's plans to alter Mud Lick and any other streams or watercourses.

The Application specifically states that EQT intends to remove a culvert from the section of Mud Lick that is located right next the Huffs' farmhouse, garage, and barns and then replace said culvert, add another culvert to Mud Lick, add a bridge to Mud Lick, and build a road on the banks Mud Lick (i.e., alter Mud Lick). Pursuant to the Ordinance, anyone who seeks to alter a stream must take certain mandatory actions (and also, if so requested by the Floodplain Administrator, take OTHER actions). EQT has not followed the mandatory requirements contained in the Ordinance regarding altering streams like Mud Lick, and as such, the Application must be denied. Section 4.5 of the Ordinance contains the requirements that must be followed when altering a stream (Ordinance pgs. 17-19). The applicable requirements are as follows:

1. Per Section 4.5 (A), EQT was required to (and failed to) "notify in writing, by certified mail the Doddridge County Floodplain Administrator, the State Coordinating Office, any adjacent communities, and any adjacent property owners" of any intended alterations to Mud

Lick (and any other streams EQT intends to modify). Copies must also be sent to the Federal Emergency Management Authority.

This provision is designed to provide notice to the relevant governmental entities and provide notice (and Due Process) to persons who may be impacted by stream alteration. This is a mandatory provision of the Ordinance. Despite being required to follow this requirement, I haven't seen any proof that EQT has followed this requirement. There was nothing in the Application file when I obtained a full and complete copy that indicated that EQT mailed certified notice of its plans to alter Mud Lick (or any other streams as part of this Project) to the Floodplain Administrator, the State Coordinating Office, any adjacent communities, and/or FEMA. Further, I know for a fact that none of my clients (i.e., adjacent property owners) ever received certified notice of EQT's plans regarding altering streams. As a result, this Application must be denied because EQT failed to provide the mandatory notice regarding its plans to alter Mud Lick and any other applicable stream(s).

2. Per Section 4.5 (B), EQT must show, in writing, that the flood carrying capacity within Mud Lick will be maintained if so requested by the Floodplain Administrator. While this requirement only becomes mandatory if the Floodplain Administrator so requires it to be, my clients strongly urge the Floodplain Administrator to require EQT to provide written assurance and a letter proving that Mud Lick's capacity to carry floodwater will meet or exceed its present capacity after EQT completes altering it as part of this Project. Moreover, this is an issue of whether the Huffs' property (i.e., the subject property) will be "reasonably safe from flooding" following EQT's development of the Project. My clients are greatly concerned about EQT's plans for Mud Lick because of its close proximity to the Huffs' farmhouse, garage, and barns.

My clients are also greatly concerned because, per EQT's Application, after EQT replaces the culvert presently in the section of Mud Lick that is located right next the Huffs' farmhouse, garage, and barns, the new culvert's flood capacity will barely exceed the minimum threshold of a 2 year flood and won't come anywhere near to handling a 100 year flood (see Rettew's project description, page 1). As such, EQT seeks to greatly alter Mud Lick and then place a culvert that barely handles of the flow of a two year flood directly adjacent to the Huffs' house, barns, and garage. My clients fail to see how these buildings will or can be "reasonably safe from flooding" if EQT is permitted to develop this Project.

3. Pursuant to Section 4.5(D), EQT must adhere to the anchoring requirements of the Ordinance in regards to the culverts, bridges, or other stream crossings EQT has planned for Mud Lick and/or any other streams that EQT plans to alter as part of this Project. But nothing in the Application contains any information regarding anchoring, and as such, there is no way to tell if EQT's planned culverts, bridges, and/or other stream crossings will adhere to the anchoring requirements mandated by the Ordinance.

4. The Ordinance mandates that EQT provide "a legal agreement detailing all scheduled inspections and maintenance to be performed on altered or relocated watercourse including permanent culverts, bridges or other stream crossing". Per the Application file, EQT has not provided the County (or the Floodplain Administrator) with this mandatory legal agreement as required by the Ordinance (Section 4.5 (E)).

Because EQT has not complied with several of the mandatory provisions of the Ordinance in regards to the alteration of Mud Lick and any other streams EQT plans to alter as

part of this Project, EQT has not complied with the Ordinance, and this Application must be denied. Further, should EQT submit another floodplain permit application, then my clients respectfully request that the Floodplain Administrator require EQT to follow the provisions contained in 4.5 (C) and 4.5 (D) in regards to the use of "best practices" and ensuring the flood carrying capacity of Mud Lick and any other streams remains at least at the level it is Today.

I. There are numerous issues related to the EQT's "study's" use of Cross-Sections.

One cannot accurately model a floodplain and the impact caused by a floodplain without using adequate and accurate cross-sections. Similarly to the Navitus study, the study EQT submitted with this Application uses precious few cross-sections to model the floodplain and to model the impact of the planned development on the floodplain (and the resulting increase to flooding). Simply put, EQT's "study" of Mud Lick does not use enough cross-sections to accurately model the floodplain and the effect the Project will have on the floodplain (and on the base flood elevation). Additionally, of the precious few cross-sections used in the Rettew Study, many of said cross-sections are "interpolated" cross-sections (i.e., not real cross-sections). Further, the cross-sections used to model the existing conditions and the proposed conditions differ in number and location (see Existing Condition Analysis summary table contained in EQT's Application).

EQT's "study" of the existing condition at the Huff Meadow only uses 14 (fourteen) cross-sections, 8 (eight) of which are "interpolated" cross-sections. EQT's study then only uses 12 (twelve) cross-sections to model proposed conditions, 5 (five) of which are "interpolated". Note, the Navitus Study was found to be flawed by the DCC acting as the Floodplain Appeals Board and Navitus and Mr. Smith were forced to enter into a Consent Order with the

Engineering Board because the Navitus Study only used 9 (nine) cross-sections to model this same area.

"Interpolated" cross-sections are not real cross-sections and are not to be relied upon as the primary cross-sections in a study (they can be used to help with calculations, but only if there are a sufficient number of real cross-sections used in the study as well....the handful of real cross-sections used in Rettew's study are not sufficient to justify the use of "interpolated" cross-sections). "Interpolated" cross-sections are essentially computer generated guesstimates. "Interpolated" cross-sections are nowhere near as accurate as cross-sections that are based on actual survey work, and they contain a margin of error that is higher than cross-sections based on actual survey work (and said margin of error should make it impossible for the Floodplain Administrator to accept the Rettew study's base flood elevation increase evaluation as accurate). Apparently, EQT could not be bothered to use a sufficient number of cross-sections and could not be bothered to use cross-sections that are the product of actual survey work and that accurately reflect the real conditions in the floodplain (i.e., contours, slopes, terrain, etc.) of the floodplain. There is simply no way that EQT's "study" can be accurate when a grossly insufficient amount of cross-sections are used, when that many "interpolated" cross-sections are used, and when the number of cross-sections used differs between the existing and proposed conditions, and when EQT fails to model all floodplain developments planned for this Project, fails to model the cumulative impact of the existing and proposed structures/buildings/developments, etc.).

Note, EQT's separate "study" of the proposed Mud Lick developments also uses an insufficient number of cross-sections and uses different cross-sections to model the pre and post conditions. This separate "study" used only 11 cross-sections to model the existing conditions

and used only 13 cross-sections to model the post-development conditions.

Again, it bears repeating, the failure to use an adequate number of cross-sections is a recurring theme with EQT and its attempts to develop the floodplain at the Huff Farm. In its Final Decision during the EQT v. Doddridge and Huff/Foster matter, the Doddridge County Floodplain Appeals Board specifically held that the Navitus Study was "flawed" (i.e., a study that EQT used to model a previous project for the Huff Meadow). One of the primary reasons why the Appeals Board deemed the Navitus Study flawed AND inaccurate was the fact that Navitus only used 9 (nine) cross-sections to model the Huff Meadow (i.e., only a few less than the current study). Meanwhile the study submitted by the Huffs and prepared by Seward Gilbert, P.E. used 58 (fifty-eight) cross-sections, and in turn, was rightly deemed to be much more accurate (see Appeal's Board Final Decision at #1, pg 8).

A brief comparison of the Navitus study and the Gilbert study is an excellent example of how using too few cross-sections can result in a floodplain study that is inaccurate and masks the true impact of floodplain development (and given the similarities of the well-pad planned in that project and the spoil stockpile planned for this Project (i.e., placement, size, use of fill, etc.), the Gilbert study is also relevant as evidence that an accurate study will show a much higher increase in the base flood elevation). The Navitus study, using not enough cross-sections, showed a base flood elevation increase of well under a foot. Meanwhile, the Gilbert study with its proper use of cross-sections showed a base flood elevation increase of multiple feet.

If the Rettew Study used a sufficient number of cross-sections (and made other necessary material corrections to its flawed study) then it is almost certain that the post-construction base flood elevation increase would be much higher. For example, during the course of the Engineering Board's investigation, Navitus agreed to run its floodplain study again but this time

use the same cross-sections as were used in the Gilbert report. Lo and behold, when Navitus ran its study using a sufficient amount of cross-sections, the base flood elevation increase caused by the EQT project skyrocketed and easily exceeded a foot (see Navitus Consent Order).

J. EQT failed to delineate the floodway as required by the Ordinance.

The Huff Meadow and the Mud Lick area are located in an Approximated Floodplain (Zone "A"). It is clear from the site plans that the combined acreage of the "spoil stockpile" and the "Mudlick Road" that will be sited in the floodplain exceeds 2 acres total. When an Applicant seeks to develop sites that are 2 acres or larger in Approximated Floodplains, the Applicant must delineate the floodway in order to determine whether fill would be going into the floodway. This is a mandatory provision of the Ordinance, and EQT's failure to do so should mandate denial of the Application Ordinance pg. 24, Section D)). . Further, if EQT did delineate the floodway as mandated in the Ordinance, then it is an almost certainty that the results would show that fill would be going into the floodway and would result in an impermissible increase to the base flood elevation in the floodway (i.e., more than zero...Ordinance pg. 16, Section 4.1).

Conclusion

EQT's Application must be denied because of the deprivation of my clients' rights to Notice (and Due Process).

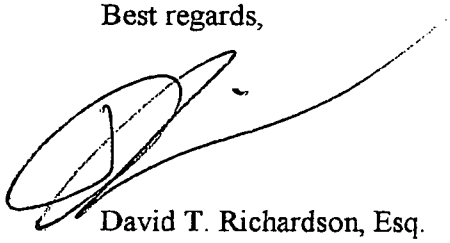
EQT's Application must also be denied because of the various inaccuracies,

inconsistencies, and misleading information contained in its Application and its floodplain "studies". The Ordinance requires that the Applicant submitted accurate and truthful information, data, and analyses so that the Floodplain Administrator can make the determinations as to whether everything on the subject property is "reasonably safe from flooding" and whether any other properties will be "adversely affected". EQT has clearly failed to provide accurate and truthful information, data, and analyses in its Application, and as such, the Application must be denied for that reason alone (and EQT has demonstrated a pattern of submitting false/misleading information, data, and analyses to the Floodplain Administrator and others in regards to its plans for the Huff Farm...see this Application and the "studies" submitted therewith by EQT and see also the Navitus study and subsequent Consent Order). The Application must also be denied because this lack of accurate information, data, and analyses simply makes it impossible for the Floodplain Administrator to conclude that the subject property is "reasonably safe from flooding" and that no other properties will be "adversely affected" (as required by the Ordinance). Additionally, the floodplain study prepared by Seward Gilbert, P.E. of a similar EQT project (both in terms of location, area, and amount of fill) shows that, if this Project were accurately modeled, then the base flood elevation increase would definitely exceed the one foot threshold, and the Huffs' farmhouse (and other structures) would not "be reasonably safe from flooding" (see Gilbert's study attached hereto as Exhibit "J"). Moreover, the Application must be denied because of the other violations of the Ordinance outlined above, and the proposed Project's inability to comply with the Ordinance.

Thank you very much for your time and attention with this matter. Please let me know if

you have any questions and/or require additional information.

Best regards,



David T. Richardson, Esq.

EXHIBIT A

IN THE CIRCUIT COURT OF DODDRIDGE COUNTY, WEST VIRGINIA

EQT PRODUCTION COMPANY,
a Pennsylvania Corporation,

Petitioner/Plaintiff,

vs.

DODDRIDGE COUNTY COMMISSION,

Respondent/Defendant,

vs.

JOYE HUFF, as trustee of the Randy E. Huff Decedent's Trust B, WILLIAM LEE HUFF, JAMES FOSTER, JENNIE FOSTER,

Respondents/Intervenors.

CASE NO. 12-C-17

ORDER

Upon mature consideration and upon careful consideration of the material before the Court and the arguments of counsel, the Amended Motion for Summary Judgment of the Intervenors, Huff, and EQT Production Company's Motion for Summary Judgment are hereby **DENIED**. Furthermore, plaintiff's Motion for Injunction is hereby denied.

In support of this ruling, the Court FINDS that:

1. The Doddridge County Flood Plain Ordinance is in violation of the West Virginia Constitution to the extent that the Ordinance fails to provide Due Process to surface and

adjoining landowners potentially affected by the development for which EQT Production Company seeks a permit.

2. To the extent that the Ordinance addresses surface owners who desire to construct floodplain compliant structures within relevant FEMA requirements, the Ordinance is constitutional inasmuch as it appropriately advances a legitimate public interest and is an appropriate exercise of governmental authority and power.

3. In order to comply with standard requirements of due process afforded property owners under the West Virginia Constitution the subject Ordinance when being applied under circumstances involving the request for a permit which potentially affects surface owners who are situate within or adjoining the subject floodplain must afford notice and an opportunity to be heard upon the requested permit to this class of property owners.

4. Without such notice and opportunity to be heard being afforded to this class of property owners, Plaintiff would NOT be entitled to the relief prayed for in the form of an injunction requiring the issuance of a permit for development within the floodplain, due to the subject Ordinance's failure to provide such notice, which failure

cannot be cured by the happenstance discovery and intervention of such property owners.

5. In the absence of a clear right to the relief sought in these proceedings, being one of the most harsh and extraordinary remedies recognized, a mandatory injunction cannot be granted by this Court. Plaintiff has no clear right to the permit notwithstanding plaintiff's compliance with the subject ordinance. Compliance with an unconstitutional ordinance is insufficient to grant plaintiff such right since the Ordinance is constitutionally deficient. *Lamp v. Locke*, 89 W.Va. 138, 108 S.E. 889, (1921), and its progeny.

6. Given the violation of Due Process Rights of the class of individual property owners affected by these proceedings and the circumstances of the parties, the balance of equities does not favor the Plaintiff as the moving party and it would be totally inequitable to award the requested permit under these proceedings in their current form.

7. Therefore, the Plaintiff's Request for Injunctive Relief must be **DENIED** as a matter of law.

8. There is no necessity to proceed with the talking of evidence on the matter, which factual matters are rendered moot inasmuch as none of the proceedings before the Appeal Board in the form of the Doddridge County Commission or the

. Flood Plain Administrator provided due process to constitutionally necessary parties to those proceedings.

9. The Court has no jurisdiction, as previously ruled, to hear an Appeal and has no jurisdiction to make a determination on the merits of whether a permit should issue and furthermore has no jurisdiction to issue such a permit under the Flood Plain Ordinance. To award a permit or recognize a permit previously awarded then later revoked would be improper, based upon the unconstitutionally of the Ordinance.

The plaintiff's exceptions and objections to all adverse rulings by the Court are hereby reserved.

The Clerk of this Court is directed to submit a true and correct copy of this Order to:

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Stephen E. Hastings, Esq.
Hendrickson & Long, PLLC
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Charleston, WV 25339.

DODDRIDGE COUNTY COMMISSION
Donald J. Tennant, Esq.
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JOYE HUFF, as Trustee for the Randy E. Huff Decedent's Trust B, and **WILLIAM LEE HUFF**
David T. Richardson, Esq.
Law Office of David T. Richardson
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JAMES H. FOSTER and JENNIE FOSTER
Bradley W. Stephens, Esq.
Stephens Law Office, PLLC
#518 Monongahela Building
235 High Street
Morgantown, WV 26505

ENTERED: 12/17/12

TIMOTHY L. SWEENEY, THIRD CIRCUIT JUDGE

I hereby certify that the annexed instrument is a true and correct copy of the original on file in this office.
Attest: DWIGHT E. MOORE
Circuit Court Doddridge County of West Virginia
Dwight E. Moore
Clerk

ENTERED IN Civil **BOOK**
No. 18 **AT PAGE** 536
THIS 17th **DAY OF** December,
YEAR 2012
DWIGHT E. MOORE
CIRCUIT CLERK

EXHIBIT B

THE DODDRIDGE COUNTY FLOODPLAIN APPEAL BOARD
FINAL DECISION IN EQT's FLOODPLAIN PERMIT #0444

The Doddridge County Floodplain Appeal Board, comprising of Commission President Shirley Williams and Commissioner Ralph Sandora[1] in compliance with the Order of the Circuit Court of Doddridge County dated September 27, 2012, in the style of EQT Production Company v. Doddridge County Commission et al., Civil Action No. 12-C-17, hereby issues this decision regarding EQT Production Company's Application for a Floodplain Permit and EQT's Appeal of the Rescission of said Permit.

The Floodplain Appeals Board is obligated by the Doddridge County Floodplain Ordinance adopted September 6, 2011 to sit as the final administrative body in determining whether an application for a floodplain permit shall be granted or denied. The Floodplain Ordinance is intended in this instance to:

(A) promote the general health, welfare and safety of the community;

(B) encourage the utilization of appropriate construction practices in order to prevent or minimize flood damage in the future;

(C) minimize danger to public health and safety by protecting the water supply . . . and to protect natural drainage; and

(D) reduce the financial burdens imposed on the community, its governmental units, and its residents, by preventing the unwise design and construction of development in areas subject of flooding.

In the aforementioned legal action in the Circuit Court of Doddridge County, the parties thereto agreed to proceed with the extension of the timeframe for submission of evidence by any

[1] Commissioner Gerald Evans recused himself from this Permit appeal due to his participation as the Floodplain Manager upon the filing of the original application.

party to the Doddridge County Floodplain Appeals Board to and including September 28, 2012 with the intent/consent that the Doddridge County Floodplain Appeals Board would reconsider its prior ruling in this matter wherein the Doddridge County Floodplain Appeals Board denied EQT's Appeal of the Floodplain Manager's (Evans) rescission of the previously granted Permit Application #0444. In addition to materials filed and evidence presented at the properly noticed Public Hearing on May 22, 2012, wherein any and all witnesses, statements and evidence were heard, the Doddridge County Floodplain Appeals Board has before it the following materials:

I. Documents submitted by Attorney Hastings on Behalf of EQT by letter dated August 15, 2012:

1. Floodplain Permit Application (dated November 16, 2011) with three attachments as follows:

   a. OXF 43 Floodplain Study computations

   b. Site Plan

   c. FEMA FIRMette maps of area

2. Email from Stephen Hastings to Kevin Sneed and Dan Wellings dated May 17, 2012 with three attachments as follows:

   a. Floodplain Study Exhibits

   b. Navitus Engineering – Floodplain Study Computations

   c. Letter to Sneed and Wellings

3. Email from Stephen Hastings to Kevin Sneed and Dan Wellings dated May 21, 2012 enclosing engineering stamped copy of Navitus Engineering – Floodplain Study Computations.

4. Email dated May 22, 2012 which Kevin Sneed testified he sent to Shirley Williams and attempted to send to Dan Wellings.

II. Documents submitted by Attorney Richardson on behalf of landowner Huff by letter dated September 17, 2012:

1. Letter dated September 14, 2012 from retained expert Wayne Chang, M.S., P.E. entitled "Review Comments of EQT Production Company's OXF 43-Well Site"

2. Wayne Chang's Resume

III. Documents submitted by Attorney Hastings on behalf of EQT entitled:

1. Navitus Engineering, Inc.'s Comment Response Letter dated September 21, 2012 (responding to Wayne Chang's letter Reviewing EQT's OXF 43-Well Site).

IV. Documents submitted by Attorney Richardson on behalf of landowner Huff entitled:

1. Hydrologic and Hydraulic Investigation for Proposed Natural Gas Development Site – Middle Fork, Mudlick and Long Run Vicinity of Summers – Doddridge County, West Virginia prepared by Engineering Perfection, PLLC, authored by S.G. (Jerry) Gilbert, P.E., DEE, CFM dated September 20, 2012.

V. Documents submitted directly by S.G. (Jerry) Gilbert, P.E., DEE, CFM by letter dated September 21, 2012 on behalf of Ms. Huff entitled:

1. Comparison of Engineering Studies – Flood Impact of Proposed Natural Gas Development Near Middle Fork, Mudlick and Long Runs, Doddridge County, West Virginia.

VI. Documents submitted by Attorney Hastings on behalf of EQT by letter dated September 28, 2012 entitled:

1. Navitus Engineering, Inc.'s Response to Mr. Gilbert's Comparison Study Report (#V. 1. above) under the signature of Cyrus S. Kump, P.E. dated September 28, 2012.

VII. Deposition of Kevin Sneed dated August 9, 2012 in case styled "EQT Production Company vs. Doddridge County Commission", Civil Action No. 12-C-17.

While this permit application process has been a long and winding road, the Doddridge County Floodplain Appeals Board is convinced that it has given sufficient opportunity to all persons and entities to submit any documents, evidence, studies, photographs, affidavits, testimony and comment and now the time has come to make a **final** decision on EQT's Floodplain Application for Permit.

The Doddridge County Floodplain Appeals Board's duty is to uphold the mandates of the Doddridge County Floodplain Ordinance without consideration of favoritism and/or bias to landowners, mineral rights owners, mineral rights lessees or lessors, and without consideration of economic impact. The Doddridge County Floodplain Appeals Board is not against industrial development and the proper and sound harvesting of natural resources so long as the same is conducted in compliance with the Doddridge County Floodplain Ordinance.

The Doddridge County Floodplain Appeals Board is mindful of its obligations and appreciates the separate duties and responsibilities of the Federal Emergency Management

Agency and Kevin L. Sneed, CFM's duty as a "technical advisor" to counties in West Virginia as the National Flood Insurance Program Coordinator from his position within the West Virginia Floodplain Management Program. **However**, as acknowledged by Kevin Sneed in Exhibit I. 4. (referenced above) (email from Kevin L. Sneed to Shirley Williams dated 5/22/12) the ultimate decision on a Floodplain Application is "up to Doddridge County".[2]

The Doddridge County Commission has the legal authority to install requirements by ordinance that are more restrictive than FEMA requirements or other agencies of the State of West Virginia on Floodplain Management.

While it is true that Kevin Sneed held the position that EQT's Application should be granted, he only possessed items submitted by EQT's engaged engineering firm, Navitus. He did not have in his possession for review items II, IV and V as referenced above as submitted by landowner Huff. Thus, with all due respect, Mr. Sneed's opinion is severely minimized and not given substantial weight by the Doddridge County Floodplain Appeals Board herein.

The Doddridge County Floodplain Appeals Board reviewed all of the aforementioned evidence and also consulted with current Doddridge County Floodplain Manager Dan Wellings and consulted with an independent outside engineering firm through counsel and Dan Wellings in order to formulate an opinion on the relevant issues.

After a review of all the filed materials, it is abundantly clear:

[2] Further, but similarly, Kevin Sneed testified under oath under cross examination in the Circuit Court Case referenced above, on August 9, 2012, that he has no authority to direct the Floodplain Manager to grant or deny a Floodplain Permit Application (Sneed at depos. pp. 61-62) nor does he have authority to direct the County Floodplain Appeals Board to grant or deny a Floodplain Permit Application (Sneed depos. p. 62, Lines 4 – 6).

1. That on a whole[3] the ground survey and studies (by nature and scope in comparison to the EQT Site Plan) performed by EQT's engaged engineering firm, Navitus, were not as detailed and thus lacked sufficient proof to support the overall opinions espoused by Navitus; i.e. (a) failure to perform analysis cross sections on approximately 800 linear feet in the exact area of the proposed drill pad; (b) utilization of only 9 cross sections to Gilbert's (landowner Huff's engaged expert) 30 terrain specific and 28 interpolated cross sections; and (c) that Navitus utilized a study of nearly 1 square mile less of land than Gilbert's study.
2. EQT/Navitus' own study at Section 5 confirms that a 100 year flood would "top over" the berms of the retention pond thus introducing potentially hazardous liquid into the water flow.
3. EQT/Navitus failed to model Mudlick Run (which had been "mapped" by FEMA as Flood Zone A) which is a contributary to the subject floodplain and would contribute to a rise in the base flood evaluation even higher.
4. EQT failed to bring forward evidence to demonstrate that no reasonable alternatives other than the floodway encroachment exists.
5. EQT/Navitus failed to model other contributaries to the main stream.

A primary purpose of the Doddridge County Floodplain Ordinance is to ensure that a proposed project will not adversely affect the Floodplain.[4] Specifically, a project must not

[3] Even though Gilbert utilized a higher Manning's n number than Navitus it is still believed that the base flood elevation would rise in excess of 1 foot. A "Manning's n Factor" is a factor for flow resistance given the slope, roughness of flow surface and obstructive vegetation in the channel. A higher Manning's n Number indicates a higher degree of impeded flow by the slope, surface and vegetation present.

[4] It is noted that Navitus Engineer Cyrus S. Krump, P.E. concluded based on the Navitus studies that there will be "no adverse affect" to adjacent properties, however, as noted above, the Navitus studies are flawed.

increase the flood risk to adjacent properties by raising water surface elevations, thus adversely affecting said property. It is clear from the evidence that the EQT project will encroach within the 100 year Floodplain of the Middle Fork and thus the project is subject to the Doddridge County Floodplain Ordinance.

The affected area has not been fully studied and mapped in detail by FEMA to formally designate the Floodway, and thus the area is designated as an "A" Zone or Special Flood Hazard Area. However, it is noted by Gilbert's study that the EQT Project will in fact encroach into the Floodway based on FEMA's mapping of the approximate Floodway. If there is encroachment into the Floodway, in this case considerable amount of fill, then the Doddridge County Floodplain Ordinance has a strict test that one must show that the encroachment will not result in any increase in the Base Flood Elevation. Essentially, a zero tolerance type test. However, given the current FEMA designation of this area as "A" Zone and not "Floodway" under the Fill section of the Doddridge County Floodplain Ordinance, a less stringent test is utilized when fill is to be placed within the Floodplain (not Floodway). The party introducing fill must demonstrate with engineering studies that adjacent properties will not be adversely affected.

Due to the lack of completed FEMA Detailed Mapping the EQT Project comes under a less restrictive test as utilized within the industry and by FEMA. The test is that no new construction is permitted unless it is demonstrated that the cumulative effect of the proposed project, when combined with all other existing and anticipated development, will not increase the elevation of the 100 year flood more than one foot at any point.

Gilbert's more detailed analysis shows that there would be flood elevation rise above the cumulative one foot measurement at any one point.

Further, it is clear that the fill will be utilized by EQT in the Floodway which is strictly prohibited by the Doddridge County Floodplain Ordinance (Article VI 6.1.E). Given that the Floodway is not designated by FEMA Mapping, the second requirement with respect to fill in the Floodplain is that any fill shall not adversely affect adjacent properties. Clearly, by the Gilbert study, adjacent properties will be greatly impacted by the introduction of fill in the Floodplain. In addition, fill shall only be used to the extent to which it does not adversely affect the capacity of channels. Here the volume flow and speed of flow will greatly increase.

Thus, the Doddridge County Floodplain Appeals Board **DENIES** EQT's Appeal and/or **DENIES** to grant EQT's Application for a Floodplain Permit.

Oct. 05, 2012
Date

Shirley J. Williams
President, Shirley Williams

Ralph Sandora
Commissioner, Ralph Sandora

EXHIBIT C

BEFORE THE WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

IN RE: MARK D. SMITH
NAVITUS ENGINEERING, INC. **C2013-05**

CONSENT ORDER

Comes now the West Virginia State Board of Registration for Professional Engineers (hereinafter "Board"), by Edward L. Robinson, P.E., its President, and its attorney, Debra L. Hamilton, Deputy Attorney General for the State of West Virginia, for the purpose of agreeing to disciplinary action to be taken against Respondents Mark D. Smith ("Respondent Smith") and Navitus Engineering ("Respondent Firm"), together "Respondents". As reflected in this document, the parties have reached an agreement concerning the proper disposition of the above-referenced matter, and the Board, upon approval of such agreement, does hereby **FIND** the following:

1. The matters set forth herein are within the jurisdiction of the Board, which is the state entity with the power and duty to regulate the practice of engineering in the State of West Virginia.
2. Respondent Smith is a licensed professional engineer in the State of West Virginia holding license number 11709.
3. Respondent Smith is the owner of Navitus Engineering, Inc., which is organized under the laws of the State of Virginia with its principal place of business in Winchester.
4. Respondent Firm applied for and was issued Certificate of Authorization (COA) #C04277 activated on April 23, 2012.

5. This complaint relates to Respondents' Floodplain Study Computations prepared in connection with the permitting of horizontal wells in Doddridge County, West Virginia which is referred to herein as the "Doddridge County Floodplain proceeding" (hereinafter at times referred to as the "original floodplain analysis").

6. This Complaint was initially brought on October 22, 2012, by a third-party intervener in the Doddridge County Floodplain proceeding against only the Respondent Firm, but the Board considers it necessary to also bring disciplinary action against Respondent Smith, who sealed the original computations, and therefore includes him as a named Respondent.

7. The Complaint was served on October 29, 2012, alleging that Respondents performed work (relevant to and reviewed in the Doddridge County Floodplain proceeding) at a time when they did not have a COA and also alleging that two independent engineers found the work to be inaccurate and incomplete.

8. Respondent Smith filed a timely response on November 26, 2012, which addressed only the aspect of the complaint relating to practicing without a COA, explaining that he was also the owner of another company which had a COA and that this work occurred during a transition period when its oil and gas business was being transitioned to Respondent Firm.

9. The Board was provided documents regarding the Doddridge County Floodplain proceeding from several sources as part of its investigation of the Complaint, including "THE DODDRIDGE COUNTY FLOODPLAIN APPEAL BOARD FINAL DECISION IN EQT'S FLOODPLAIN PERMIT #0444 entered on October 5, 2012, which found, among other things, that on the whole the ground survey and studies performed by Respondents were insufficient to support the overall opinions they espoused due to an

insufficient number of cross sections and area of land and that tributaries to the main stream of the subject floodplain, had they been included, would have impacted Respondents' base floodplain evaluation.

10. This Order was appealed and on December 17, 2012, the Circuit Court of Doddridge County held that the Doddridge County Floodplain proceeding was moot (thereby voiding the Appeal Board's decision) since constitutionally necessary parties had not been provided due process and the Court had no jurisdiction regarding the permit based on the unconstitutionality of Doddridge County's Floodplain Ordinance.

11. In March of 2013 Respondents provided the Board with a revised floodplain analysis, including additional cross sections and concluded: "Once all adjustments were made, we ... found that the proposed pad area would in fact cause a greater increase in water surface elevations and would be more than a foot higher than what we had initially modeled in our original study."

12. Respondent Smith, in part due to the instant Complaint, subsequently initiated communications with one of the opposing experts in the "Doddridge County Floodplain proceeding" which were provided to the Board, and the Board notes that the opposing expert also modified his conclusions regarding offsite impact.

13. Respondents admit that all work conducted by Respondent Firm prior to April 23, 2012, including the original floodplain analysis, was done without the required COA, in violation of West Virginia engineering law.

14. Respondents admit that the original floodplain analysis violated the Rules of Professional Responsibility in that the services were not in accordance with current standards of technical competence, did not conform to accepted engineering standards, may have

impacted the life, health, property and welfare of the public, did not include all relevant and pertinent information, and was founded upon an inadequate knowledge of the facts and evaluation of the subject matter.

15. The Board has taken the following factors into consideration in determining the appropriate discipline agreed to herein, including the amount of civil penalty:

a. requiring an amount that will alleviate any economic benefit gained by Respondents as a result of the non-compliance and be a substantial economic deterrent to future violations;

b. the circumstances leading to the violation;

c. the interest of and risk of harm to the public, on which point the Board finds that while the floodplain analysis may have posed a potential risk of harm, there was no such risk in that no permit was issued;

d. that Respondents have no previous history of violations in this State;

e. Respondents' cooperation in providing information to the Board; and

f. other appropriate matters.

16. While Respondent Smith has admitted to violations of several Rules of Professional Responsibility, all the violations are encompassed in the one original floodplain analysis and the Board, in its discretion, has treated this as a single violation of the Rules of Professional Responsibility for the purpose of determining the appropriate discipline agreed to herein.

17. The Board incurred substantial administrative costs in the investigation and prosecution of this Complaint in an amount in excess of $4,000.00.

CONCLUSIONS OF LAW

18. The Board is a state entity created by West Virginia Code § 30-13-1 *et seq.* and is empowered to regulate the practice of professional engineering in the State of West Virginia.

19. The Board, in its discretion, is authorized to take disciplinary action against any person or firm found to be in violation of West Virginia engineering law and may suspend or revoke or refuse to issue, restore or renew a license, impose a civil penalty upon or reprimand any person or firm who has failed to comply with any of the provisions of W. Va. Code § 30-13-1 *et seq.* or any of the rules promulgated under that article. W. Va. Code § 30-13-21(a)(4).

20. West Virginia engineering law allows a firm to practice or offer to practice engineering only upon the issuance of a certificate of authorization by the Board. W. Va. Code § 30-13-17.

21. The rules promulgated under W. Va. Code § 30-13-1 *et seq.* include the Rules of Professional Responsibility, which are binding on every professional engineer, which each professional engineer must be familiar with, and which delineate specific obligations each professional engineer must meet. W. Va. Code R 7-1-12.2 and 12.2(a).

22. The Rules of Professional Responsibility require that a professional engineer exercise the privilege of performing engineering services "only in the areas of their competence according to current standards of technical competence." W. Va. Code R 7-1-12.2(b).

23. A professional engineer's "Obligations to Society" requires the professional engineer to:

    a. "approve and seal only those design documents that conform to accepted engineering standards and safeguard the life, health, property and welfare of the public." W. Va. Code R 7-1-12.3(b).

b. include all relevant and pertinent information in reports ..." W. Va. Code R 7-1-12.3(d).
c. express a professional opinion publicly only when it is founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter." W. Va. Code R 7-1-12.3(e).

24. The Board is authorized to assess civil penalties against any person who violates any provisions of this article or any rule promulgated by this Board for each offense in an amount determined by the Board. W. Va. Code § 30-13-21(b); *see also* W. Va. Code § 30-13-21(d)(4).

25. Practicing or offering to practice engineering, as defined by W. Va. § 30-13-1 et seq., without a valid Certificate of Authorization is an action that may subject a firm to discipline by the Board, including a civil penalty up to Five Thousand Dollars ($5000.00). W. Va. Code R. § 7-1-15.1.

26. A violation of the Rules of Professional Responsibility is an action that could subject Respondents to discipline by the Board, including a civil penalty up to $5,000.00 for each offense. W. Va. Code R. § 7-1-15.1.

27. Each day of continued violation may constitute a separate offense. W. Va. Code R. § 7-1-15.3.

28. The Board, in its discretion, may assess administrative costs incurred in the performance of its enforcement or investigatory activities against any person or entity who violates any provision of West Virginia engineering law, which costs shall be paid to the West Virginia State Board of Registration for Professional Engineers by check or money order within a period of thirty (30) days from the date of the order entered by the Board. W. Va. Code R § 7-1-14.4.

29. In determining the amount of a civil penalty to be assessed, the Board may consider such factors as:

(a) Whether the amount imposed will be a substantial economic deterrent to the violation;
(b) The circumstances leading to the violation;
(c) The nature and severity of the violation and the risk of harm to the public;
(d) The history of previous violations;
(e) The extent to which the cited person or firm has cooperated with the Board and the Board's investigation;
(f) The economic benefits gained by the violator as a result of the noncompliance;
(g) The interest of the public; and
(h) Other matters as may be appropriate.

W. Va. Code R § 7-1-15.4.

CONSENT OF RESPONDENTS

Mark D. Smith, individually and as the owner of Navitus Engineering, Inc., by affixing his signature hereon, agrees to the following:

30. Respondents are aware of their right to be represented by counsel and their option to pursue this matter through appropriate administrative and/or court procedures and Respondents intelligently and voluntarily waive their right to do so.

31. Respondents admit that they practiced and offered to practice engineering in West Virginia without the required COA, in violation of West Virginia engineering law.

32. Respondent Smith admits he violated the Rules of Professional Responsibility in connection with the original floodplain analysis by (1) performing engineering services which did not conform to current standards of technical competence in violation of W. Va. Code R 7-1-12.2(b); (2) approving and sealing design documents that did not conform to accepted engineering standards and thus may have impacted the life, health, property and welfare of the public in violation of W. Va. Code R 7-1-12.3(b); (3) not

including all relevant and pertinent information in the original floodplain analysis in violation of W. Va. Code R 7-1-12.3(d); and (4) expressing a professional opinion publicly that was not founded upon an adequate knowledge of the facts and a competent evaluation of the subject matter in violation of W. Va. Code R 7-1-12.3(e).

33. Respondents accept the findings set forth above and consent to the entry of this Consent Order freely and voluntarily and without duress, restraint or compulsion.

34. Respondents acknowledge that the Board may reject this proposal and may hold a hearing to impose such sanctions of a disciplinary nature as it deems appropriate.

35. Respondents acknowledge that entering into the negotiation of this Consent Order constitutes a waiver of any and all objections regarding the timeliness of Board action on Complaint Number C2013-05. This paragraph is binding on Respondents even in the event that the Board does not approve this Consent Order.

36. This Consent Order is executed by Respondents for the purposes of avoiding further administrative action with respect to this Complaint. In this regard, Respondents authorize the Board to review and examine all investigative file materials concerning Respondents prior to or in conjunction with consideration of this Consent Order.

37. Should the Consent Order not be accepted by the Board, it is agreed that presentation to and by the Board shall not unfairly or illegally prejudice the Board or any of its members from further participation, consideration or resolution of these proceedings and that any knowledge obtained by the Board shall not form the basis of any objection to any Board member serving on the hearing panel in the event this matter goes to hearing, any such objection being knowingly waived by Respondents. This paragraph is binding on Respondents even if the Board does not approve this Consent Order.

38. Respondents acknowledge that this Consent Order, the underlying Complaint, their submissions to the Board, and the public records of the Doddridge County Floodplain proceeding provided to the Board are public records which must be made available upon legal request in accordance with the West Virginia Freedom of Information Act.

39. Respondents agree that the sum and substance of the Complaint and this agreement in part or in their entirety will be set forth in Board publications and on the Board website, as well as other appropriate placements, including the non-public enforcement exchange database administered by the National Council of Examiners for Engineering and Surveying (NCEES).

40. Respondents acknowledge this Consent Order constitutes a full and final settlement of this matter and that they cannot appeal or bring any other civil or administrative action regarding the circumstances of same except an action to enforce the terms of this Consent Order.

41. Respondents acknowledge that non-compliance with this Consent Order may result in the rescission of this agreement, the reinstatement of the Complaint, the summary revocation of any license or certification which may be issued to Respondents by the Board, and the addition of any other charges which may arise or ensue from Respondents' non-compliance with this Consent Order.

42. Respondents acknowledge that proof of any misstatement or misrepresentation made in connection with this matter will result in the rescission of this agreement, the reinstatement of Complaint C2013-05, the summary suspension or revocation of any license or certificate of authorization issued to the Respondents, and the addition of any

other charges which may arise or ensue from providing false information to the Board in violation of West Virginia engineering law.

43. Any violation of the terms of this Consent Order shall be immediate cause for further disciplinary action by the Board.

ORDER

1. On the basis of the foregoing the Board hereby **ORDERS** that this Consent Order shall serve as an informal settlement of Complaint #C2013-05 pursuant to West Virginia Code § 30-13-22(b).
2. The Board **ORDERS** Respondent Firm to pay a civil penalty in the amount of Two Hundred Fifty Dollars ($250.00) for practicing and offering to practice engineering in West Virginia without a certificate of authorization.
3. The Board **REPRIMANDS** Respondent Smith for his violations of the Rules of Professional Responsibility admitted to herein.
4. The Board **ORDERS** Respondent Smith to pay a civil penalty of Four Thousand Dollars ($4,000.00) for violating the Rules of Professional Responsibility admitted to herein.
5. The Board **ORDERS** Respondents to pay administrative costs in the discounted amount of Two Thousand Dollars ($2,000.00).
6. The administrative costs agreed to herein must be paid within thirty (30) days from the date of the Board's entry of this Consent Order evidenced by the date of the President's signature, such payment to be made payable to the W. Va. P.E. Board.
7. The civil penalties agreed to herein in the total amount of Four Thousand Two Hundred Fifty Dollars ($4,250.00) must be paid within sixty (60) days from the date of the Board's entry of this Consent Order evidenced by the date of the President's signature, such

payments to be made separately from the administrative costs and payable to the W. Va. P.E. Board for transfer to the general fund of the State of West Virginia upon receipt.

8. The sum and substance of the Complaint and this agreement in part or in their entirety shall be set forth in Board publications and on the Board website, as well as other appropriate placements, including the non-public enforcement exchange database administered by NCEES.

9. Any violation of the terms of this Consent Order shall be immediate cause for summary suspension or revocation of Respondent's professional engineering license and Respondent Firm's certificate of authorization and grounds for further disciplinary action by the Board.

10. This Consent Order constitutes a full and final settlement of this matter, and nothing in this Consent Order or the circumstances giving rise to same may be the subject of any appeal or other civil or administrative action by Respondent, although either party may bring an action to enforce the terms of this Consent Order and the Board may take this disciplinary action into consideration as may be relevant to future issues regarding Respondents which may arise.

11. If the civil penalties and administrative costs agreed to herein are not timely paid, this Consent Order may be summarily enforced in the Circuit Court of Kanawha County without further notice to Respondent upon application by the Board for the entry of a Judgment Order for the total amount of the payments agreed to herein of Six Thousand Two Hundred Fifty Dollars ($6,250.00) that remain unpaid, together with pre-judgment interest from the date of the President's signature hereon, post-judgment interest from the

date of entry of the Judgment Order, and all costs of any enforcement action(s), which judgment shall be fully executable in accordance with applicable law.

12. This matter shall be closed upon execution of this Consent Order by both parties and the full payment of the civil penalties and administrative costs agreed to herein.

13. This Consent Order relates solely to matters within the jurisdiction of the West Virginia Board of Registration for Professional Engineers and does not evidence compliance with any other laws of the State of West Virginia or its political subdivisions, nor should any such compliance be implied.

AGREED TO BY:

MARK D. SMITH 11·25·13
Individually and as Owner of Navitus Engineering, Inc. **DATE**

ENTERED into the records of the West Virginia State Board of Registration for Professional Engineers this 6th **day of** December, **2013.**

WEST VIRGINIA STATE BOARD OF REGISTRATION FOR PROFESSIONAL ENGINEERS

By: 12-6-13
EDWARD L. ROBINSON, P.E. **DATE**
BOARD PRESIDENT

FW: OXF 43 Flood Study

Mark Smith [msmith@navituseng.com]

Sent: Friday, March 15, 2013 9:32 AM
To: Don Johnson
Cc: Cyrus Kump [ckump@navituseng.com]; Kurt Pennington [kpennington@navituseng.com]

Don

Below is the analysis of combining our study 1 and 2 into one and showing the same cross section location as Gilbert did. Kurt in my office did a good job explaining the detail which you can read below. Please give me a call to discuss I will be in the office all day today, my cell will be the best number to catch me, 540 974 0335.

Thank you

Mark D. Smith, PE, LS
Navitus Engineering, Inc.
President
Eagle BSA

NAVITUS ENGINEERING INC.

DESIGNING for AMERICAN ENERGY INDEPENDENCE

SERVING: NY-OH-PA-VA-WV

Cell (540) 974-0335
Phone (888) 662-4185
msmith@navituseng.com

Member: ASCE, IOGANY, IOGAWV, OOGA, PIOGA, WVPS, VAS, REGISTERED
Navitus is Latin for Energy
Visit us on the web at www.navituseng.com to see other locations, and to learn more about the services we offer.
Please consider the environment before printing this email

Mark,

As requested, I have completed my revised analysis of the OXF 43 Floodplain Study so that we may address the concerns of Mr. Don Johnson. In an effort to address his concerns, I have prepared the revised analysis to include both original models (Floodplain Study 1 and Floodplain Study 2) that were reported in our submitted Floodplain Study. Mr. Johnson had asked us to address specific issues that were raised in the "Doddridge County Floodplain Appeal Board Final Decision in EQT's Floodplain Permit #0444".

The Appeal Board had five stated issues of concern as follows:

1. The ground survey and studies were not of sufficient detail to support the conclusions found in the submitted Floodplain Study
    a. 800 linear feet of the exact pad area was not analyzed

b. Insufficient number of cross sections were used in the analysis
c. The study did not analyze the entire contributing drainage area

2. The 100-year flood would "top over" the proposed retention pond at Section 5
3. The study did not model Mudlick Run as a contributary to the subject floodplain
4. EQT failed to demonstrate that no reasonable alternative sites were available
5. The study failed to model other contributaries to the main stream

Based on my revised study, my responses are as follows:

1. The ground survey that was used for the proposed development area (area of interest) was prepared by Smith Land Surveying. Inc. This survey was a field shot topographic survey for 2' contours, industry standard for normal engineering design (vertical accuracy factor of ±1') sufficient enough for a detailed floodplain analysis. Topography for those areas beyond the project area was taken from an available Digital Elevation Model for the Oxford Ouad obtained from the West Virginia GIS Technical Center. The DEM used is 3 meter data and is reported from the WVGIS Technical Center to have vertical accuracy of ±10' (The use of field shot survey data is always paramount to DEM data per WVGIS TC). The (Jerry) Gilbert, Engineering Perfection, PLLC Study, as referenced in the Appeal Board Decision, relies entirely on the 3 meter DEM data and a few field recorded elevations (no topographical survey was preformed). The Gilbert studies' vertical datum is at best ±10'. Therefore, the ground survey concern is unwarranted.
   - (1a) I am not sure of the 800 linear feet reference being made since the exact pad area is only 465' long (our original study did include a cross section within this exact pad area)
   - (1b) Reference was made to the (Jerry) Gilbert, Engineering Perfection, PLLC flood analysis which included 30 terrain specific cross sections (±10' vertically), derived from the DEM information, and 28 cross sections interpolated from the DEM derived sections (It is not known at what accuracy these sections would be). As stated in his report, Mr. Gilbert's study also indicates that stream channel information for these sections were hand manipulated since the 3 meter DEM was unable to define these features. I have in response to this concern revised our original study to include additional cross sections, which were derived from the field shot data, to mimic the horizontal location of those sections as shown in the Gilbert study. The Gilbert's section locations within our proposed site area were replicated and, as a result, added 19 additional sections to our original study. Again, these sections were derived from our field shot topography and were not interpolated.
   - (1c)Our original study was modeled in two parts and did include the entire 5.02 square miles of drainage for this project. The portion that drains through the pad site (Study 1), including the Mudlick Run tributary, accounts for 4.2 square miles of drainage and is identical to the Gilbert study, and, the remaining 0.8 square mile is accounted for in Study 2 (Completion Pit #2 along Long Run). My revised study now includes both original studies 1 and 2 and addresses the entire 5.02 sq. miles of drainage within a single model.
2. The "top over" issue at Section 5 is a misunderstanding of the submitted cross section data. The Section 5 in question is located just downstream of Mudlick Run, perpendicular to County Route 19 and extends up the Mudlick Run basin. This particular cross section is showing a backwater condition up Mudlick Run and the road

area of County Route 19 does appear as an "embankment" but is simply the road cross section. Nowhere in our original model do we show a retention pond, flowback pit, or completion pit to "top over".

3. Mudlick Run was in fact accounted for in our original study, as being a part of the overall drainage area for Middle Fork. This may have been missed since our original study was conducted in two parts, but was submitted as a single analysis. Originally, we had looked at this area but were not concerned with potential impacts beyond the Middle Fork floodplain boundary across County Route 19 due to the fact that flows along Mudlick Run are being controlled by an existing 60" CMP cross culvert and the elevation of County Route 19. Based on the calculated flows for Mudlick Run, this drainage would be restricted by headwater conditions at the existing 60" culvert. With this in mind, we did not deem it necessary to model cross sections in HEC-RAS for this tributary (neither did Gilbert, based on his report). However, in order to further confirm the impacts, I have included cross sections up the Mudlick Run channel in the revised model and have analyzed it with the Middle Fork flood event. The headwater restrictions, as expected, were prevalent and were not impacted by the Middle Fork flooding, under existing and proposed site conditions.
4. The assessment of alternate site locations for this project was not a part of our scope of services for EQT. We were told that EQT had independently evaluated several alternative site locations but we were not privy to their findings. We were sub-contracted to engineer this site and assume that it was the optimal site for development.
5. As stated in item #3, the contributing drainage areas to Middle Fork were included in its overall drainage calculations. The Long Run drainage area was looked at as a separate model in the original study but I have included it into the revised model to clarify the issue. The other drainage areas, Short Run, and an unnamed area below Mudlick Run were not modeled separately like Mudlick Run because of the controlling features of the county road. Again, these areas were included in the overall drainage calculations used for the original study. There is no evidence that these areas were modeled any different by the Gilbert study.

Results and Conclusions:

Our original study was conducted to assure that we did not create any adverse impacts or affects to those properties adjacent to the proposed project area within the floodplain. Adverse impacts to adjacent properties were not allowed by the County Ordinance and we took particular care to assure that our proposed development would not affect those properties upstream and downstream of the site. In addition to the upstream and downstream properties, we were also interested in protecting the adjacent County Route 19 and the onsite dwelling located on the north side of County Route 19 adjacent to Mudlick Run. Our main objective was to not increase the base flood elevations on any of these properties and to contain all flood elevation increases within the project area, which was achieved.

Mrs. Joye Huff, owner of the land where the proposed pad site is to be located and owner of the onsite dwelling along Mudlick Run, hired Mr. Jerry Gilbert to prepare an independent floodplain study for the proposed development area. The Gilbert study suggested that additional cross sections should be analyzed to assess the full impacts of the proposed development.

At the request of Mr. Johnson, we have prepared a revised HEC-RAS model to address Mr. Gilbert's concerns, those concerns of the Doddridge County Floodplain Appeal Board, and to further evaluate the proposed development impacts. To achieve this, we added 19 additional cross sections to our original HEC-RAS model of Middle Fork, we have incorporated the Long Run sections from study #2, and we added Mudlick Run sections to the revised HEC-RAS model (Mudlick Run sections are in addition to the original study). We have utilized the same flows as previously used in our original studies (those flows being consistent with those shown in the Gilbert study), and maintained all Manning's n values used in our original HEC-RAS models (the Manning's n values used in the Gilbert study we believe were not representative of existing site conditions). Once all adjustments were made, we ran the revised model to evaluate the proposed development impacts and found that the proposed pad area would in fact cause a greater increase in water surface elevations and would be more than a foot higher than what we had initially modeled in our original study. This increase was found to have an effect on the previously calculated changes in water surface elevations upstream of the pad for approximately 350' in the area of the Mudlick Run confluence. However, changes in base flood elevations upstream of this point agree with those previously calculated in the original study and continue to show a zero increase at the property boundary upstream of the project area. This zero increase matches the original study and confirms our original findings at the upstream end of our project. From the pad area and moving downstream, the increase in water surface elevations quickly dissipate to a zero increase. The first cross section immediately downstream of the pad area records the water surface elevations returning to the pre-developed base flood elevations, zero increase, and remains at a zero increase to the lower limits of the model. Since the increases in water surface elevations were occurring at the pad location and upstream for 350', we took a detailed look at the Mudlick Run tributary. As stated before, flows from Mudlick Run cross County Route 19 by way of a 60" culvert before entering Middle Fork. This crossing was modeled based on field locations, and it was determined that the culvert and road grades were in fact controlling the upstream flows from Mudlick Run. Per the HEC-RAS model, base flood elevations at the existing dwelling and garage in the pre-developed condition remain the same in the post-development condition, with no impact on those flows upstream of County Route 19 (BFE's remained unchanged on the north side of County Route 19).

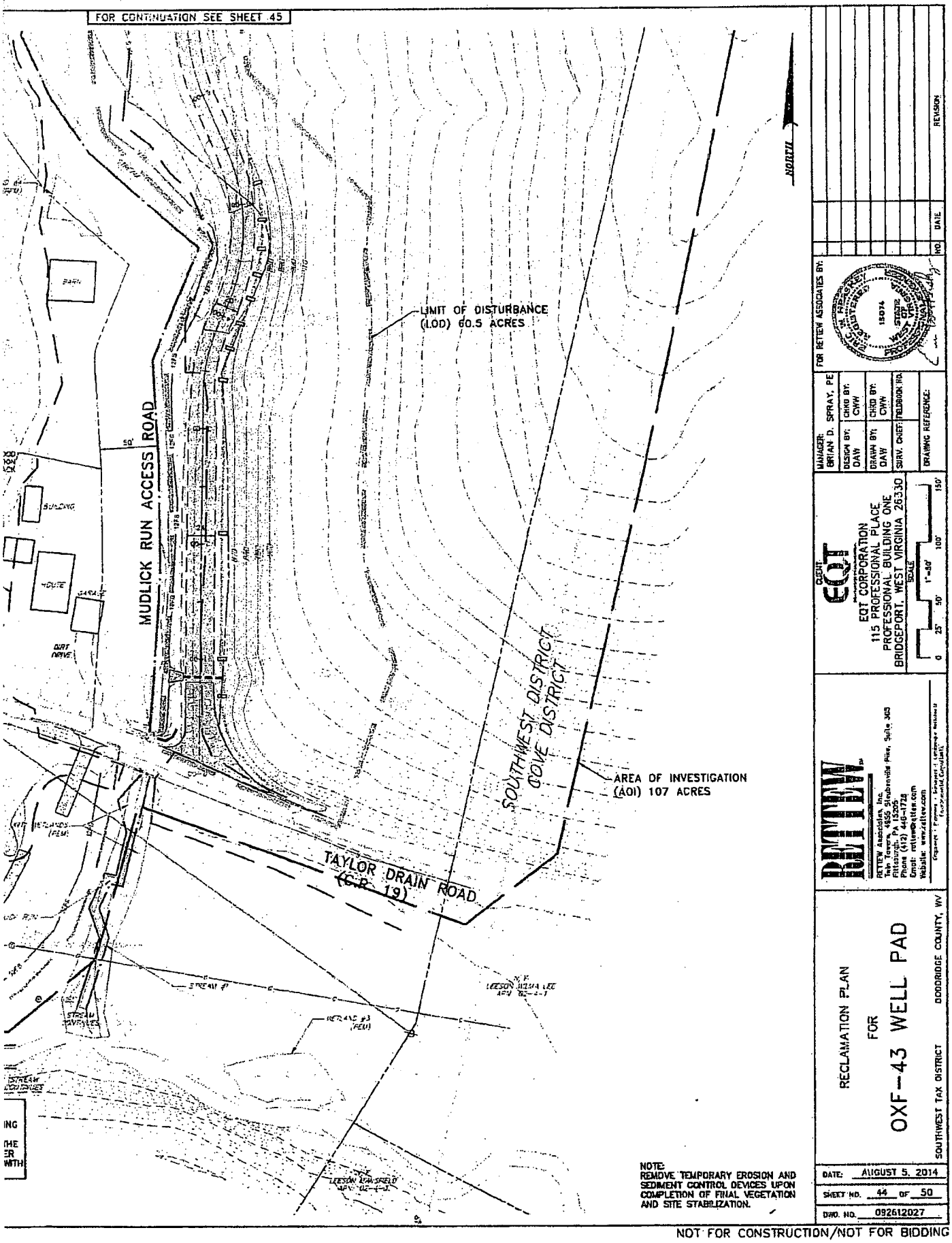
In conclusion, the revised model did show an increase in base flood elevations beyond what we had originally modeled. Even though there was an increase to the change in water surface elevations, this change only effects flood elevations at the pad location and 350' upstream of the pad. Impacts to the adjacent properties have remained unchanged, zero increases in the base flood elevations, as previously reported with our original study. The increase in water surface elevations at the pad are completely contained within the pasture area and existing floodplain where the development site is to be located between the county road and the far stream bank. The revised model did not show any flooding of the adjacent roadway other than what normally occurs at the Mudlick Run crossing. Flood impacts at Completion Pit #2 on Long Run remained unchanged and do not impact properties upstream and downstream. Based on the evidence of this revised study, we feel that we have adequately addressed and refuted those claims being brought against us. We have clearly demonstrated that all adjacent properties beyond the limits of this project, including the adjacent public roadway and the subject property owner's dwelling, have not been adversely affected or in fact affected at all by the proposed construction.

Furthermore, this gas well drilling site is exactly that, a site constructed for the purpose of

drilling and development of gas wells. The majority of the features proposed for this site, completion pits, flowback pits, and the majority of the pad site are temporary features and will be removed upon the completion of the drilling process. As a part of this whole process we have prepared a drill site reclamation plan for the benefit of the operator. These plans are now being required by the WVDEP Office of Oil and Gas, but were not required at the time of this plan submission. This reclamation plan shows the removal of both completion pits, the removal of the flowback pit, and the removal of the entire pad area beyond the immediate well head area. It is this well head area that will remain as a permanent production feature, which minimizes overall impacts to the floodplain.

Kurt Pennington

EXHIBIT D



NOTE:
REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.

FOR RETTEW ASSOCIATES BY:

NO.	DATE	REVISION

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW | CHKD BY: CWW
DRAWN BY: DAW | CHKD BY: CWW
SURV. CHIEF: | FIELDBOOK NO.
DRAWING REFERENCE:

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE 0 25' 50' 1"=40' 100' 150'

RETTEW
RETTEW Associates, Inc.
Trek Towers, 4855 Stoneridge Pkwy, Suite 303
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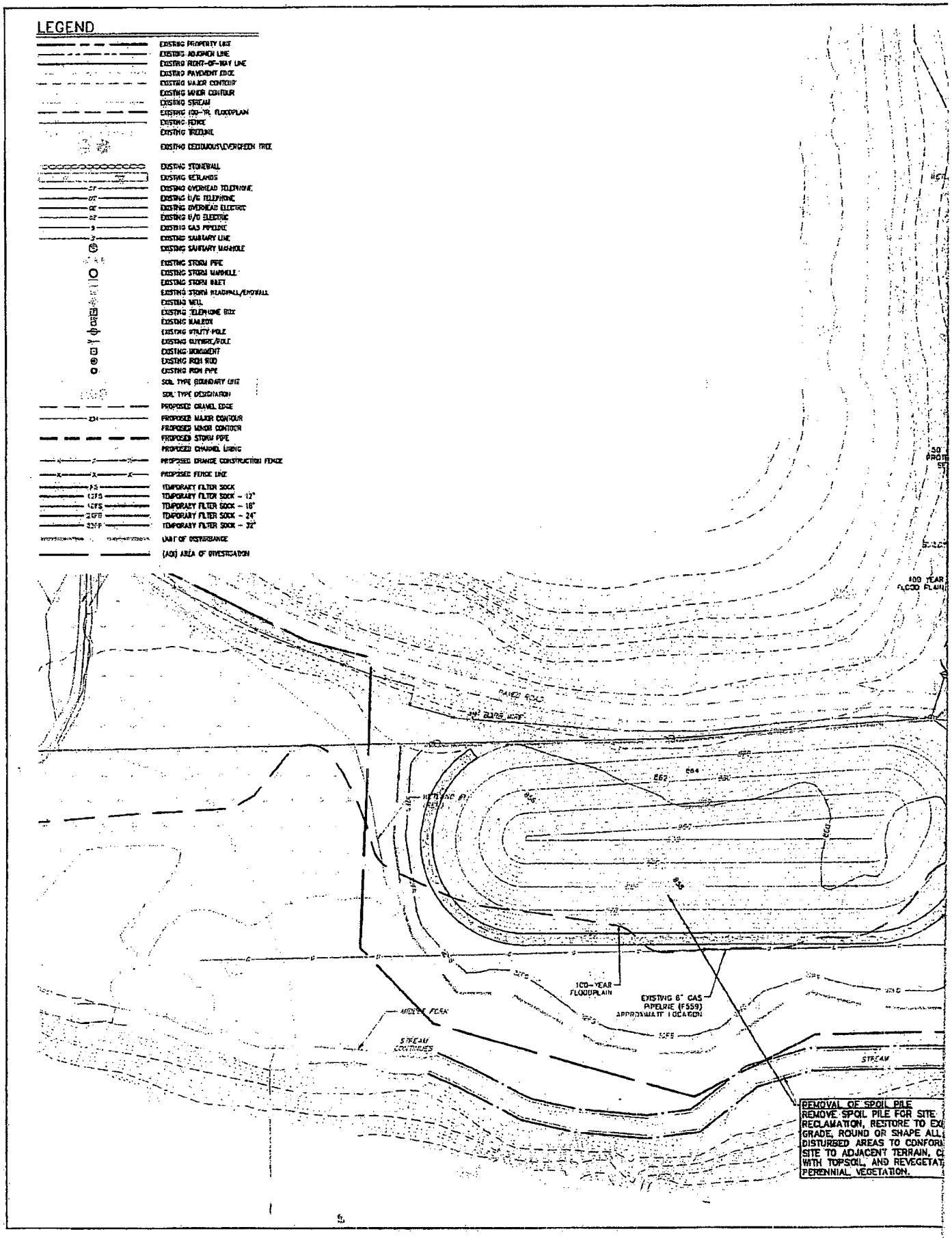
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

RECLAMATION PLAN
FOR
OXF-43 WELL PAD
SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 44 OF 50
DWG. NO. 092612027

NOT FOR CONSTRUCTION/NOT FOR BIDDING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EXISTING ADJOINER LINE
EXISTING RIGHT-OF-WAY LINE
EXISTING PAVEMENT EDGE
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
EXISTING STREAM
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EXISTING FENCE
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PROPOSED GRAVEL EDGE
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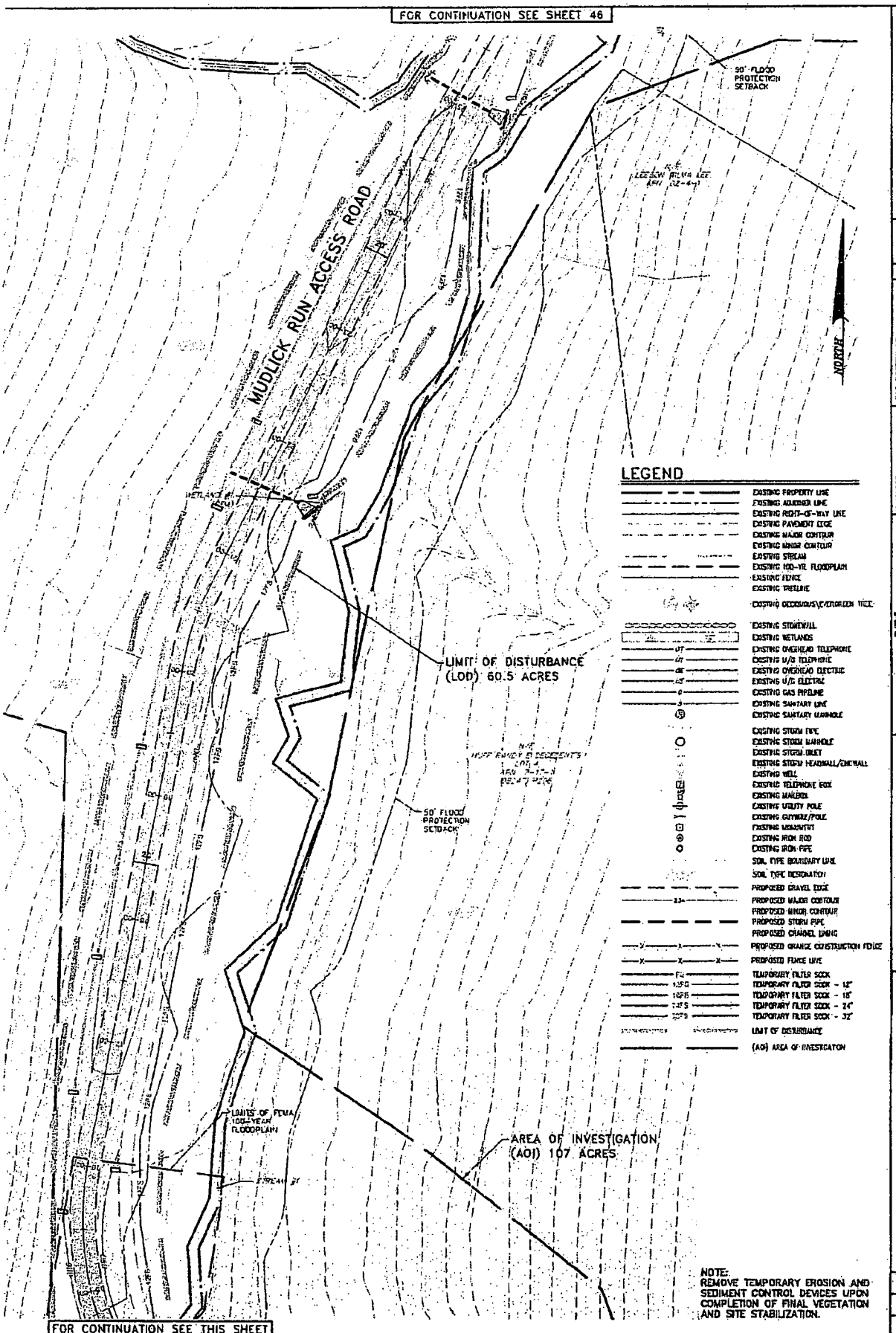
PROPOSED ORANGE CONSTRUCTION FENCE
PROPOSED FENCE LINE
TEMPORARY FILTER SOCK
TEMPORARY FILTER SOCK - 12"
TEMPORARY FILTER SOCK - 18"
TEMPORARY FILTER SOCK - 24"
TEMPORARY FILTER SOCK - 32"
LIMIT OF DISTURBANCE
(ADI) AREA OF INVESTIGATION
100 YEAR FLOOD PLAIN
PAVED ROAD
100-YEAR FLOODPLAIN
EXISTING 6" GAS PIPELINE (F559) APPROXIMATE LOCATION
MIDDLE FORK
STREAM CONTINUES
STREAM
REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR SITE RECLAMATION, RESTORE TO EX GRADE, ROUND OR SHAPE ALL DISTURBED AREAS TO CONFORM SITE TO ADJACENT TERRAIN, C WITH TOPSOIL, AND REVEGETAT PERENNIAL VEGETATION.

FOR CONTINUATION SEE SHEET 46



NOTE:
REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.

FOR CONTINUATION SEE THIS SHEET

FOR RETTEW ASSOCIATES BY:

NO.	DATE	REVISION

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
SURV. CHIEF: ROBISON HD.
CHKD BY: CWW
CHKD BY: CWW
DRAWING REFERENCE:

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE 0 25' 50' 1"=50' 100' 150'

RETTEW
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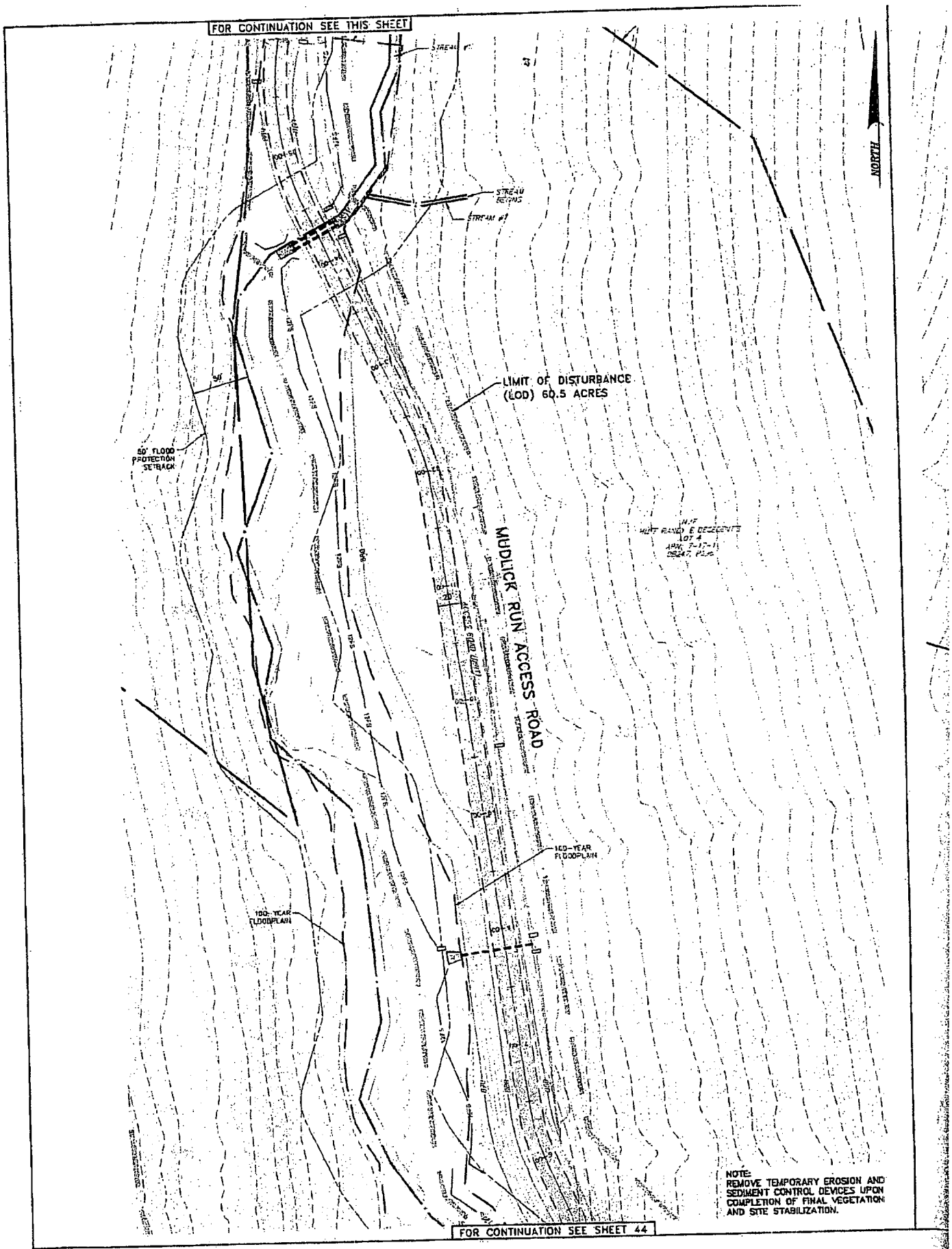
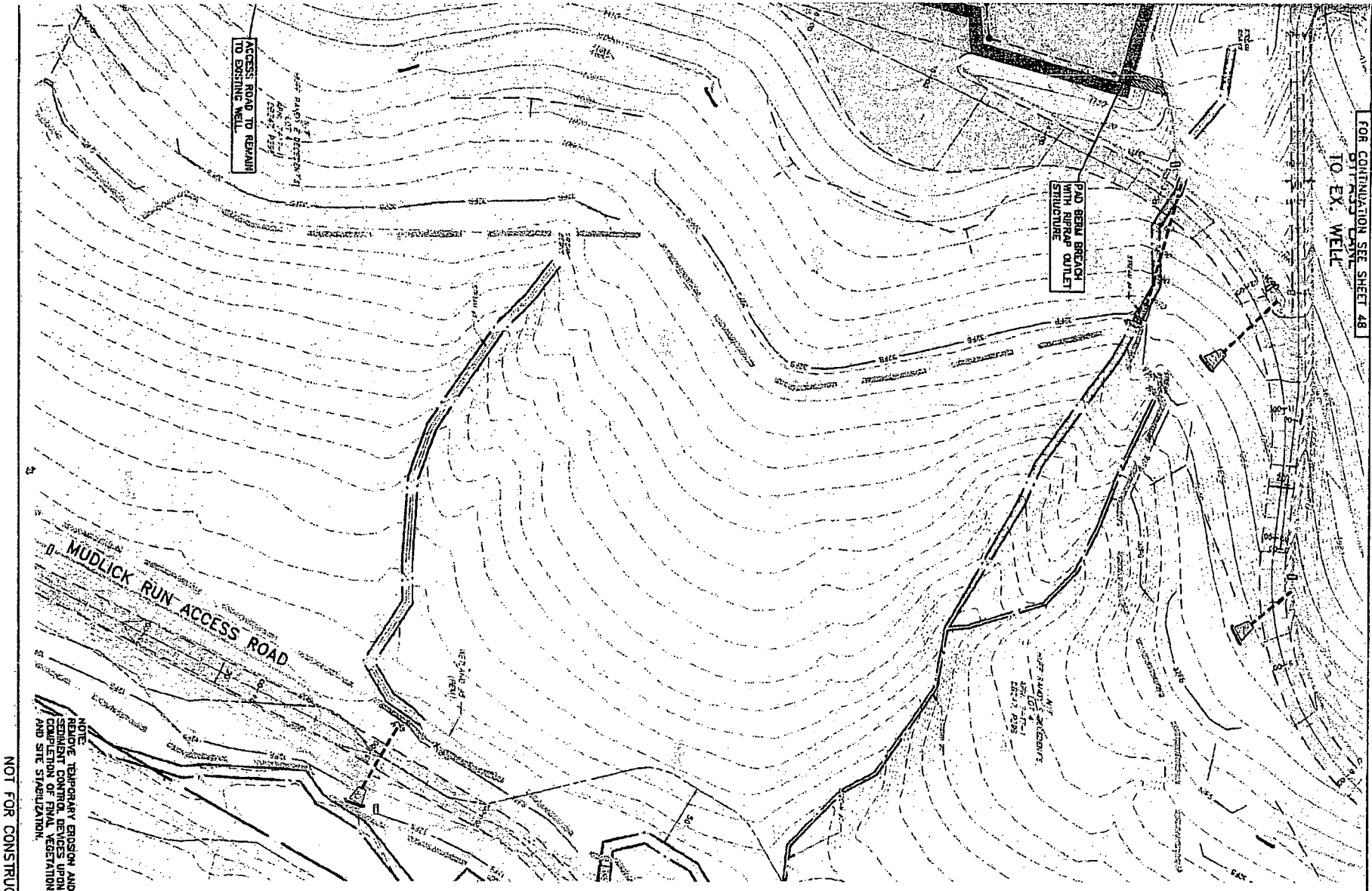
Email: rettew@rettew.com
Website: www.rettew.com
Engineers • Surveyors • Geologists • Environmental Scientists
Landscape Architects

RECLAMATION PLAN
FOR
OXF-43 WELL PAD
SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 45 OF 50
DWG. NO. 092812027

NOT FOR CONSTRUCTION/NOT FOR BIDDING


FOR CONTINUATION SEE THIS SHEET
NORTH
LIMIT OF DISTURBANCE (LOD) 60.5 ACRES
50' FLOOD PROTECTION SETBACK
MUDLICK RUN ACCESS ROAD
100-YEAR FLOODPLAIN
100-YEAR FLOODPLAIN
FOR CONTINUATION SEE SHEET 44
NOTE:
REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES UPON COMPLETION OF FINAL VEGETATION AND SITE STABILIZATION.



RECLAMATION PLAN

FOR

OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014

SHEET NO. 49 OF 50

DWG. NO. 09261202J

RETTEW

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Website: www.rettew.com

Engineers • Planners • Surveyors • Landscape Architects
Environmental Consultants

CLIENT
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EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE
0 25' 50' 100' 150'
1"=50'

MANAGER: BRIAN D. SPRAY, PE

DESIGN BY:	CHKD BY:
DAW	CWW
DRAWN BY:	CHKD BY:
DAW	CWW
SURV. CHIEF:	FIELDBOOK NO.

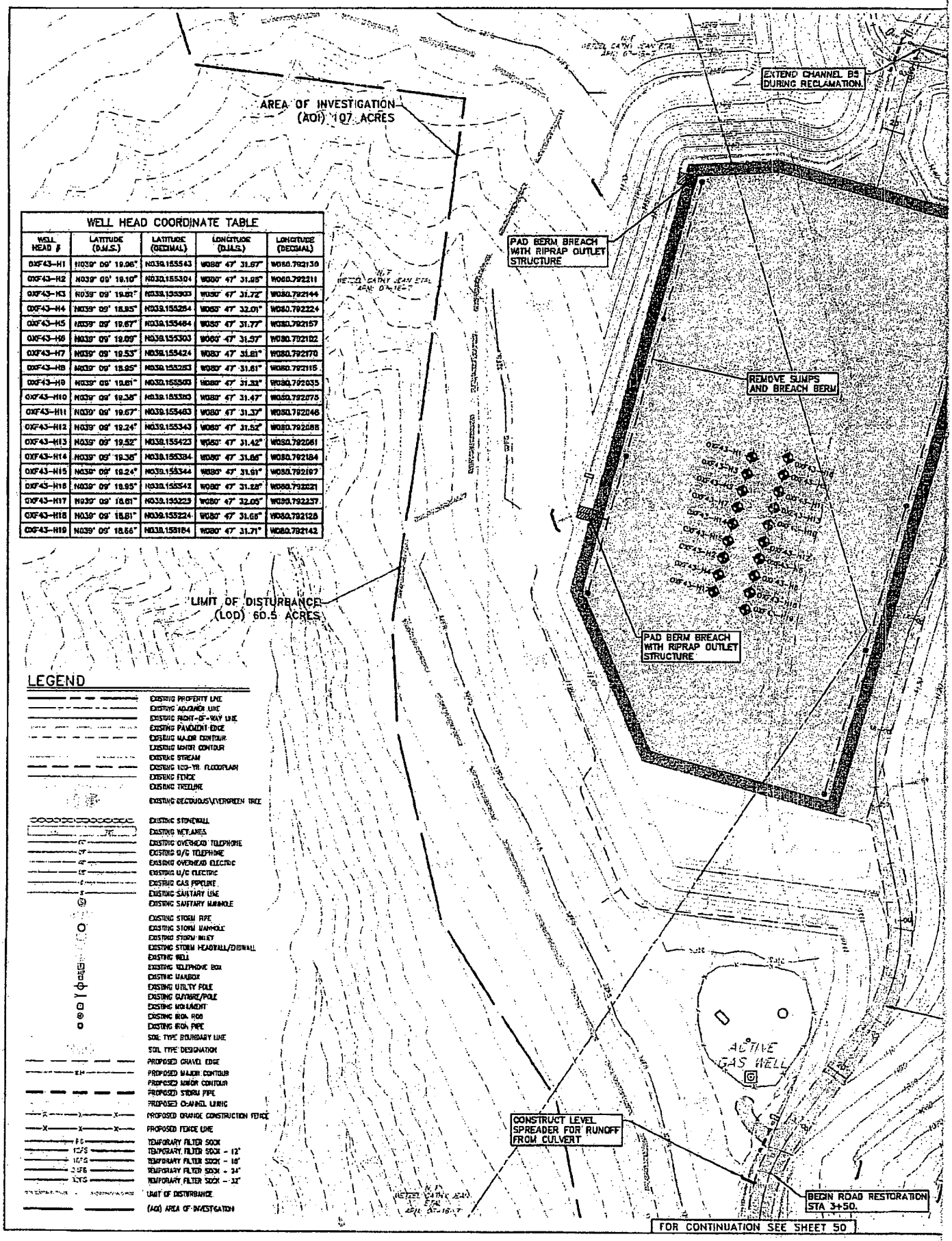
DRAWING REFERENCE:

FOR RETTEW ASSOCIATES BY:

ERIC W. HERSHEY REGISTERED 18074 STATE OF VIRGINIA PROFESSIONAL ENGINEER

NO.	DATE	REVISION

NOT FOR CONSTRUCTION/NOT FOR BIDDING



WELL HEAD COORDINATE TABLE

WELL HEAD #	LATITUDE (D.M.S.)	LATITUDE (DECIMAL)	LONGITUDE (D.M.S.)	LONGITUDE (DECIMAL)
OXF43-H1	N039° 09' 19.96"	N039.155543	W080° 47' 31.97"	W080.792136
OXF43-H2	N039° 09' 19.10"	N039.155304	W080° 47' 31.95"	W080.792211
OXF43-H3	N039° 09' 19.61"	N039.155903	W080° 47' 31.72"	W080.792144
OXF43-H4	N039° 09' 18.95"	N039.155284	W080° 47' 32.01"	W080.792224
OXF43-H5	N039° 09' 19.67"	N039.155484	W080° 47' 31.77"	W080.792157
OXF43-H6	N039° 09' 19.09"	N039.155303	W080° 47' 31.97"	W080.792102
OXF43-H7	N039° 09' 19.53"	N039.155424	W080° 47' 31.81"	W080.792170
OXF43-H8	N039° 09' 18.95"	N039.155283	W080° 47' 31.81"	W080.792115
OXF43-H9	N039° 09' 19.61"	N039.155903	W080° 47' 31.33"	W080.792035
OXF43-H10	N039° 09' 19.38"	N039.155363	W080° 47' 31.47"	W080.792075
OXF43-H11	N039° 09' 19.67"	N039.155483	W080° 47' 31.37"	W080.792046
OXF43-H12	N039° 09' 19.24"	N039.155343	W080° 47' 31.52"	W080.792088
OXF43-H13	N039° 09' 19.52"	N039.155423	W080° 47' 31.42"	W080.792061
OXF43-H14	N039° 09' 19.36"	N039.155384	W080° 47' 31.66"	W080.792184
OXF43-H15	N039° 09' 19.24"	N039.155344	W080° 47' 31.61"	W080.792167
OXF43-H16	N039° 09' 18.95"	N039.155542	W080° 47' 31.28"	W080.792021
OXF43-H17	N039° 09' 18.81"	N039.155225	W080° 47' 32.05"	W080.792237
OXF43-H18	N039° 09' 18.81"	N039.155224	W080° 47' 31.68"	W080.792128
OXF43-H19	N039° 09' 18.66"	N039.155184	W080° 47' 31.71"	W080.792142

LEGEND

EXISTING PROPERTY LINE
EXISTING ADJOINER LINE
EXISTING RIGHT-OF-WAY LINE
EXISTING PAVEMENT EDGE
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
EXISTING STREAM
EXISTING 100-YR. FLOODPLAIN
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SOIL TYPE DESIGNATION
PROPOSED GRAVEL EDGE
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PROPOSED STORM PIPE
PROPOSED CHANNEL LINING
PROPOSED ORANGE CONSTRUCTION FENCE
PROPOSED FENCE LINE
TEMPORARY FILTER SOCK
TEMPORARY FILTER SOCK - 12"
TEMPORARY FILTER SOCK - 18"
TEMPORARY FILTER SOCK - 24"
TEMPORARY FILTER SOCK - 32"
LIMIT OF DISTURBANCE
(AOI) AREA OF INVESTIGATION

EXHIBIT E

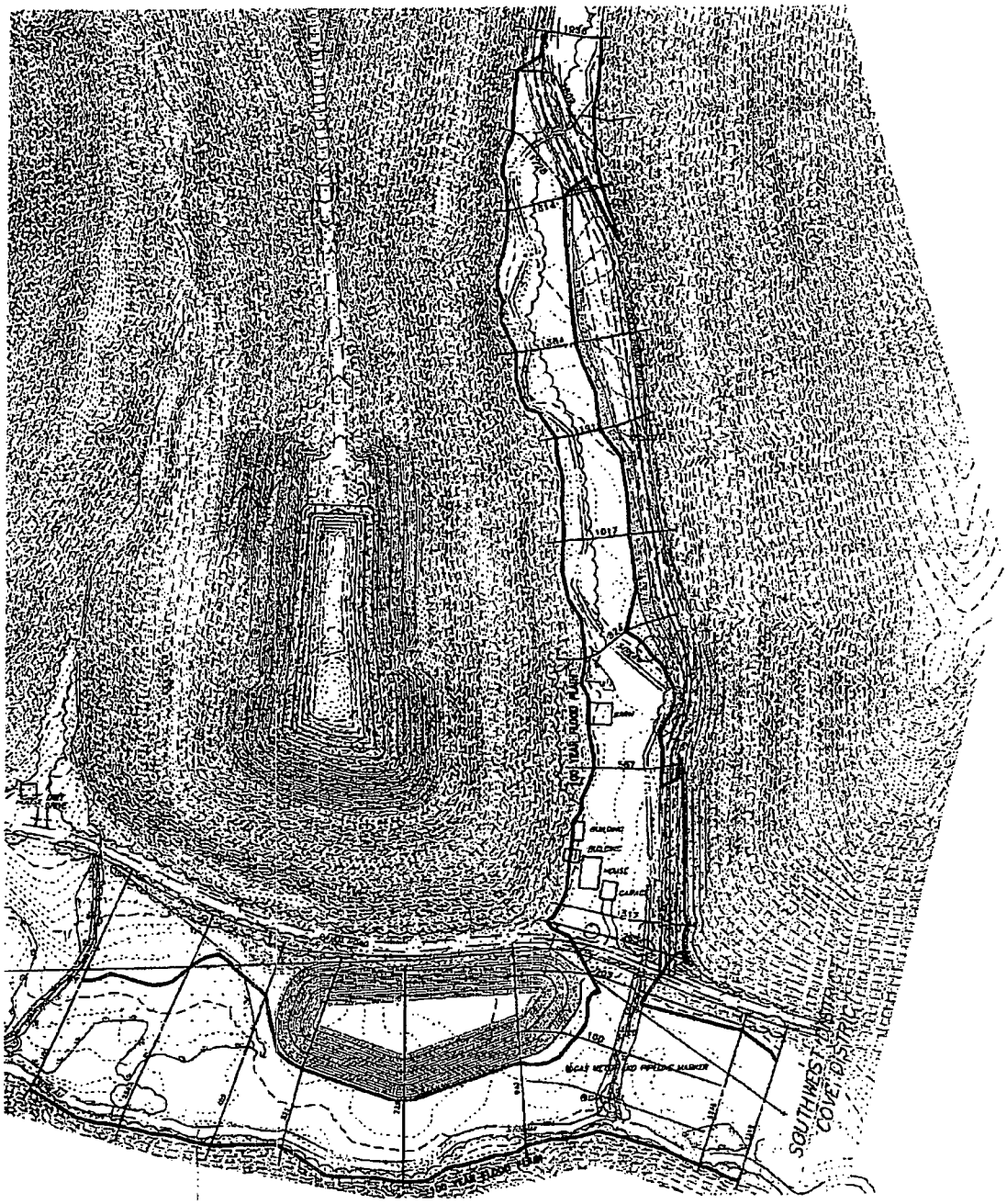
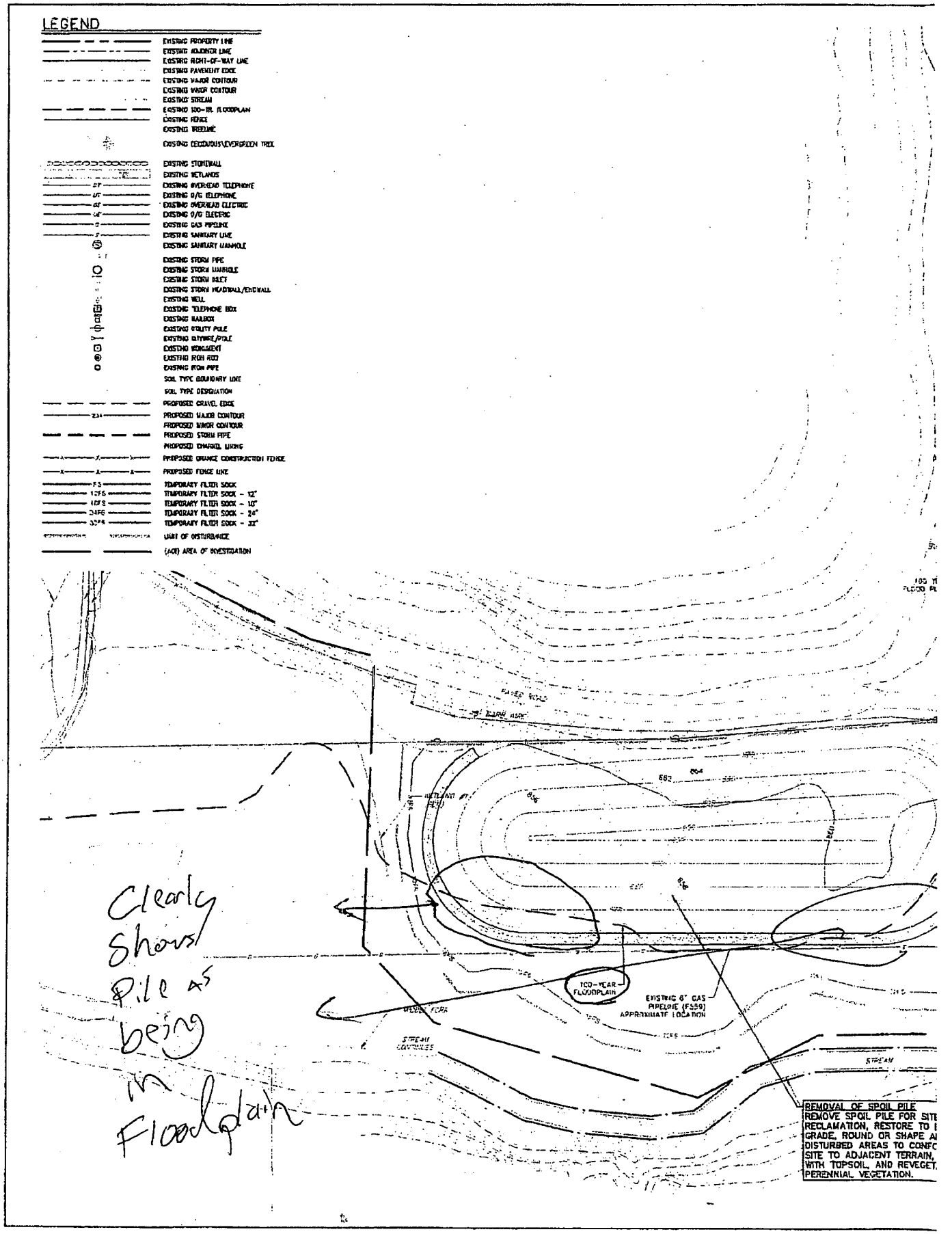

SOUTHWEST
COVE DISTRICT

EXHIBIT F


LEGEND
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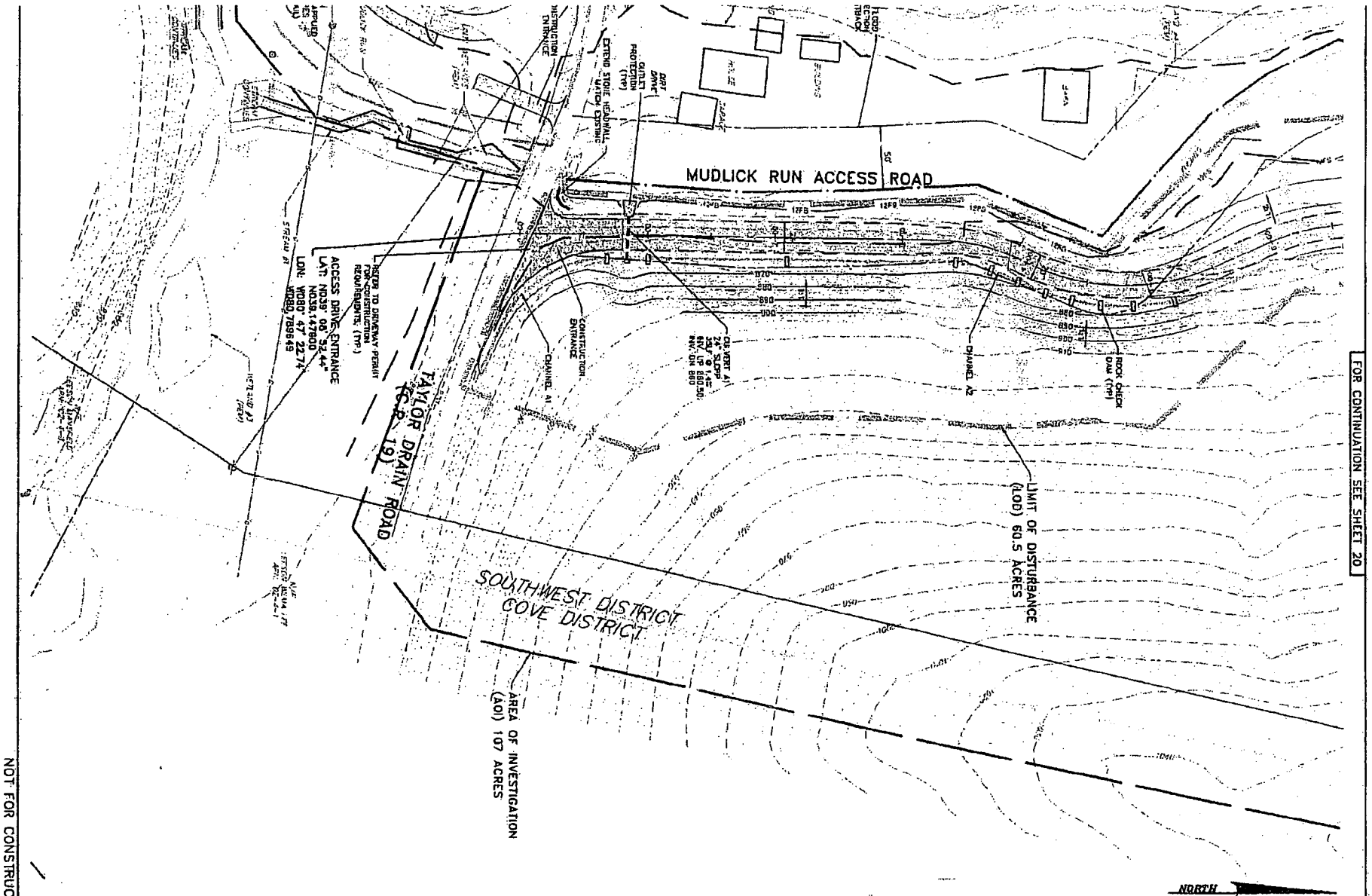
TEMPORARY FILTER SOCK - 18"
TEMPORARY FILTER SOCK - 24"
TEMPORARY FILTER SOCK - 32"
LIMIT OF DISTURBANCE
(AOI) AREA OF INVESTIGATION
100-YEAR FLOODPLAIN
EXISTING 6" GAS PIPELINE (FS89) APPROXIMATE LOCATION
STREAM
REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR SITE RECLAMATION, RESTORE TO GRADE, ROUND OR SHAPE AL DISTURBED AREAS TO CONFO SITE TO ADJACENT TERRAIN, WITH TOPSOIL, AND REVEGET PERENNIAL VEGETATION.
Clearly Shows Pile as being in Floodplain



NOT FOR CONSTRUCTION/NOT FOR BIDDING

EROSION AND SEDIMENT CONTROL PLAN

FOR

OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DWG. NO. 09261/2027 | SHEET NO. 19 OF 50 | DATE: AUGUST 5, 2014

RETTEW

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Twin Towers, 4955 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1728
Email: rettew@rettew.com
Website: www.rettew.com

CLIENT:
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

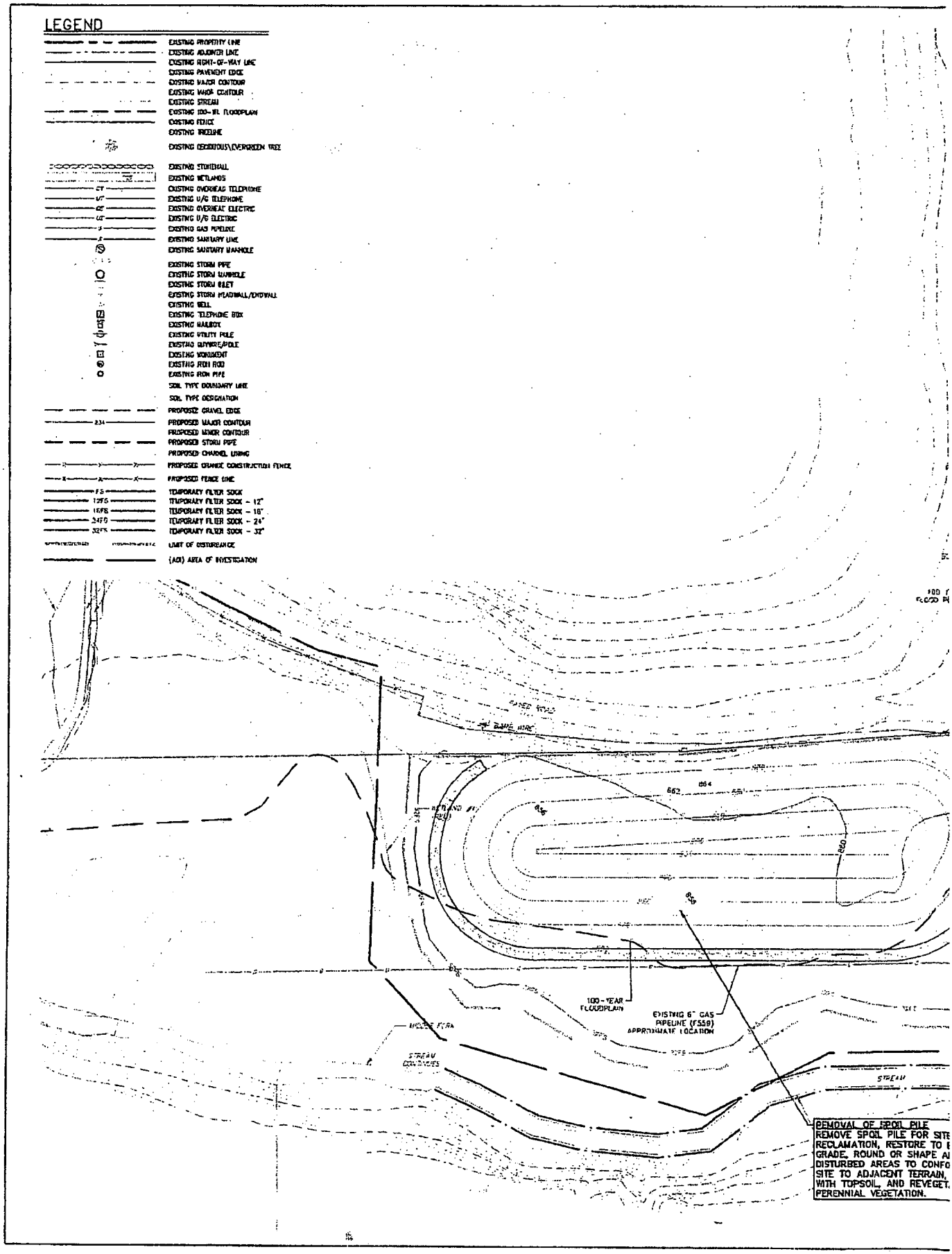
SCALE
1"=50'
0 25' 50' 100' 150'

MANAGER: BRIAN D. SPRAY, PE	
DESIGN BY: DAW	CHKD BY: CWW
DRAWN BY: DAW	CHKD BY: CWW
SURV. CHIEF:	FIELDBOOK NO.
DRAWING REFERENCE:	

FOR RETTEW ASSOCIATES BY:

ERIC W. HERMAN REGISTERED 18074 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

NO.	DATE	REVISION


LEGEND
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EXISTING STORM HEADWALL/ENDWALL
EXISTING WELL
EXISTING TELEPHONE BOX
EXISTING MAILBOX
EXISTING UTILITY POLE
EXISTING GUYWIRE/POLE
EXISTING MONUMENT
EXISTING IRON ROD
EXISTING IRON PIPE
SOIL TYPE BOUNDARY LINE
SOIL TYPE DESIGNATION
PROPOSED GRAVEL EDGE
PROPOSED MAJOR CONTOUR
PROPOSED MINOR CONTOUR
PROPOSED STORM PIPE
PROPOSED CHANNEL LINING
PROPOSED ORANGE CONSTRUCTION FENCE
PROPOSED FENCE LINE
TEMPORARY FILTER SOCK
TEMPORARY FILTER SOCK - 12"
TEMPORARY FILTER SOCK - 18"
TEMPORARY FILTER SOCK - 24"
TEMPORARY FILTER SOCK - 32"
LIMIT OF DISTURBANCE
(AOI) AREA OF INVESTIGATION
100-YEAR FLOODPLAIN
EXISTING 6" GAS PIPELINE (1559) APPROXIMATE LOCATION
STREAM CONTINUES
REMOVAL OF SPOIL PILE
REMOVE SPOIL PILE FOR SITE RECLAMATION, RESTORE TO E GRADE, ROUND OR SHAPE AI DISTURBED AREAS TO CONFO SITE TO ADJACENT TERRAIN, WITH TOPSOIL, AND REVEGET, PERENNIAL VEGETATION.

EXHIBIT G


0
500
1,000
2,000 Feet
N
Extent Present Condition

EXHIBIT H

Mudlick Ed Fill

GRADING

[illegible] SLOPE	2:1
[illegible] SLOPE	2:1
[illegible]	3:1
CONTAINMENT BERM SLOPE	2:1
[illegible] FACTOR	1.00
[illegible] FACTOR	1.10

Mudlick 9.56 acres

LOD AREAS

DESCRIPTION	AREA
[illegible] RUN ACCESS ROAD	9.56 AC
[illegible] PAD ACCESS ROAD	5.48 AC
PIT ACCESS ROAD	6.73 AC
BYPASS LANE	0.50 AC
PAD CONNECTOR	0.46 AC
[illegible] ROAD TO EX. WELL	1.19 AC
WELL PAD	10.59 AC
TANK PAD	2.95 AC
FLOWBACK PIT	4.18 AC
SPOIL STOCKPILE #1	3.00 AC
SPOIL STOCKPILE #2	0.57 AC
SPOIL STOCKPILE #3	0.81 AC
SPOIL STOCKPILE #4	2.72 AC
SPOIL STOCKPILE #5	4.70 AC
SPOIL STOCKPILE #6	1.64 AC
TOTAL	60.5 AC
TOTAL WOODED AREA	48.5 AC

Spoil stockpile Full

Spoil stockpile on road

EARTHWORK VOLUMES SUMMARY

AREA	CUT (CY)	STONE (CY)	FILL (CY)	COMPACTION (CY)	NET (CY)	TOPSOIL (CY)	TOE/BONDING BENCHES (CY)
[illegible] RUN ACCESS ROAD	[illegible]	2,377	37,379	3,739	[illegible]	1,311	0
WELL PAD ACCESS ROAD	[illegible]	995	7,845	785	[illegible]	1,539	8,578
PIT ACCESS ROAD	4,346	1,025	14,793	1,479	[illegible]	654	2,606
BYPASS LANE	9,331	80	0	0	[illegible]	120	0
PAD CONNECTOR	12,554	192	0	0	[illegible]	116	0
ACCESS ROAD TO EX. WELL	26,048	155	0	0	[illegible]	253	0
WELL PAD	193,469	5,390	49,486	4,949	84,343	[illegible]	16,722
TANK PAD	37,129	1,719	9,174	917	23,757	[illegible]	5,700
FLOWBACK PIT	26,555	231	16,036	1,604	9,127	[illegible]	12,289
SPOIL STOCKPILE #1	0	0	55,200	5,520	-60,720	[illegible]	[illegible]
SPOIL STOCKPILE #2	0	0	7,126	723	-7,539	[illegible]	[illegible]
SPOIL STOCKPILE #3	0	0	9,859	986	-10,845	159	[illegible]
SPOIL STOCKPILE #4	0	0	16,012	1,601	-17,613	284	7,100
SPOIL STOCKPILE #5	0	0	83,843	8,384	-92,227	654	19,100
SPOIL STOCKPILE #6	0	0	7,426	743	-8,169	295	9,222
TOTAL	347,352	12,206	314,279	31,428	13,851	9,320	81,207

NOTES:
1. THE EARTHWORK SUMMARY CALCULATIONS PRESENTED ON THIS PLAN ARE FOR PERMITTING AND INFORMATIONAL PURPOSES ONLY. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY EXISTING GRADES AND TO VERIFY EARTHWORK VOLUMES, METHODS, AND PROCEDURES. ANY ISSUES ARE TO BE BROUGHT TO THE ENGINEERS AND OWNERS ATTENTION PRIOR TO COMMENCEMENT OF WORK.
2. THE STONE VOLUME LISTED IS ASSUMED TO COME FROM OFF-SITE SOURCES.
3. ASSUMED AVERAGE EXISTING TOPSOIL DEPTH IS 2 INCHES. TOPSOIL IS TO BE SPREAD ON-SITE.
4. CUT AND FILL VOLUMES ARE TO FINISHED GRADE. TOPSOIL AND BENCH VOLUMES ARE NOT INCLUDED IN THE CUT AND FILL VOLUMES LISTED.

[FL]OWBACK PIT VOLUMES

	ELEV.	VOLUMES		
		AC FT	M.G	BBLS
[BOT]TOM ELEV.	1002	–	–	–
[illegible] STORAGE	1011	4.25	1.38	32,947
[illegible] STORAGE	1014	2.44	0.79	18,897
[MA]X TOTAL STORAGE	1014	6.69	2.18	51,444
[illegible]ON STORAGE	1012	4.97	1.62	38,385

DRAINAGE PIPE SUMMARY TABLE

PIPE	LOCATION (C/L STATIONING)	SIZE	TYPE	LENGTH
CULVERT A1	0+84 MUDLICK RUN ACCESS ROAD	24"	SLCPP	35 LF
CULVERT A2	7+83 MUDLICK RUN ACCESS ROAD	24"	SLCPP	63 LF
CULVERT A3	21+61 MUDLICK RUN ACCESS ROAD	18"	SLCPP	60 LF
CULVERT A4	25+08 MUDLICK RUN ACCESS ROAD	24"	SLCPP	56 LF
CULVERT A5	33+09 MUDLICK RUN ACCESS ROAD	18"	SLCPP	48 LF
CULVERT B1	3+14 WELL PAD ACCESS ROAD	24"	SLCPP	36 LF
CULVERT B2	9+47 WELL PAD ACCESS ROAD	24"	SLCPP	42 LF
CULVERT B3	11+74 WELL PAD ACCESS ROAD	18"	SLCPP	59 LF
CULVERT B4	12+85 WELL PAD ACCESS ROAD	18"	SLCPP	99 LF
CULVERT C1	0+16 ACCESS TO EX. WELL	18"	SLCPP	39 LF
CULVERT C2	3+10–3+37 PIT ACCESS ROAD	18"	SLCPP	23 LF
CULVERT M1	14+27 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 46 LF
CULVERT M2	26+07 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 47 LF
CULVERT M3	34+04 MUDLICK RUN ACCESS ROAD	30"	SLCPP	2 @ 65 LF
TOE DRAINS	ALL	6"	PERF. CPP	2,250 LF
PAD SUMPS	ALL	4"	PVC	983 LF

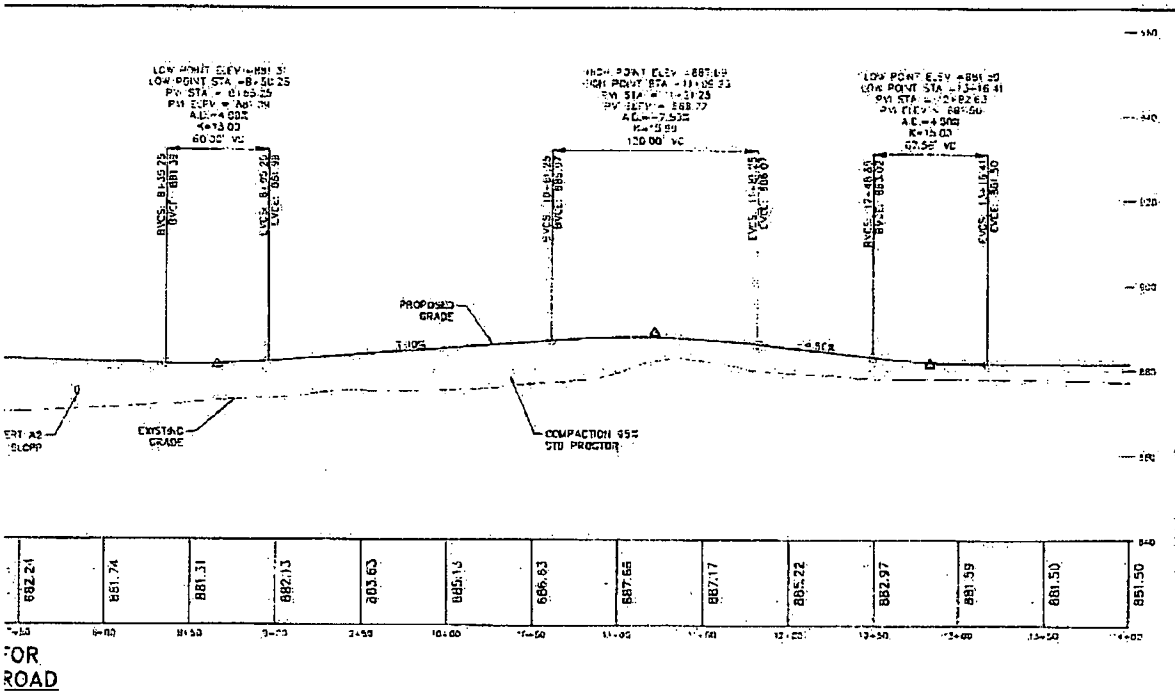
SOILS CLASSIFICATION

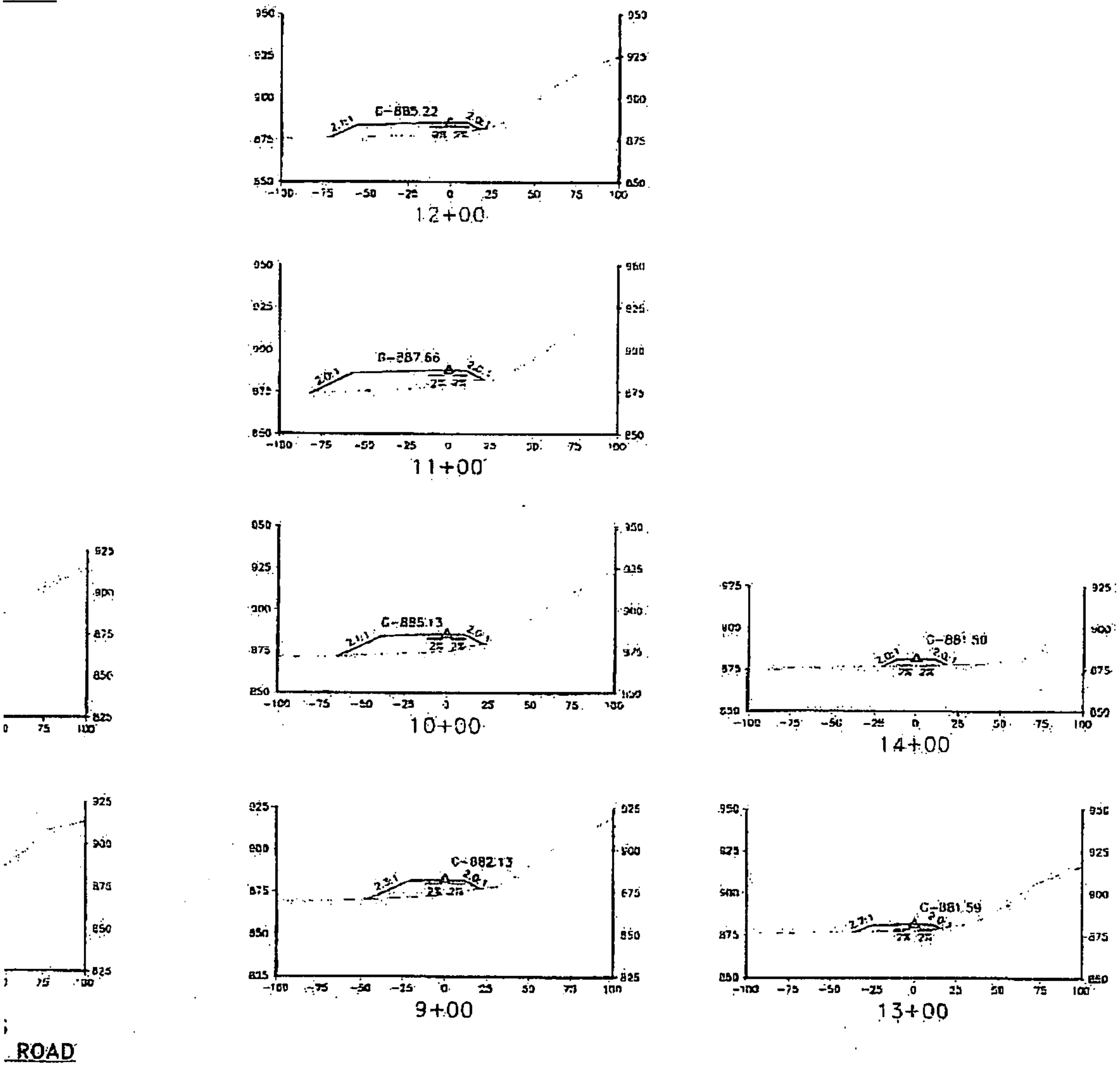
Ch: CHARGRIN SILT LOAM, 0 TO 3% SLOPES, HSG "A"
Co: COTACO SILT LOAM, 0 TO 3% SLOPES, HSG "B/D"
CdE: GILPIN-PEABODY COMPLEX, 15 TO 35% SLOPES, HSG "C/D"
GdF: GILPIN-PEABODY COMPLEX, 35 TO 70% SLOPES, HSG "C/D"
GuD: GILPIN-UPSHUR COMPLEX, 15 TO 25% SLOPES, HSG "C"
SeB: SENSABAUGH SILT LOAM, 3 TO 8% SLOPES, HSG "A"

SOIL CHARACTERISTICS

SOIL TYPE	pH	RESTRICTIVE LAYER		DEPTH TO WATER TABLE
		DEPTH TO	TYPE	
Ch	5.6–7.0	------	------	48"–72"
Co	3.6–6.5	------	------	8"–[illegible]
CdE	4.5–6.3	20"–40"	LITHIC BEDROCK	>72"
GdF	4.5–6.3	20"–40"	LITHIC BEDROCK	>72"
GuD	4.5–6.5	40"–60"	PARALITHIC BEDROCK	>72"
SeB	5.6–7.0	------	------	48"–72"

EXHIBIT I





MANAGER:	BRIAN D. SPRAY, PE
DESIGN BY: DAW	CHKD BY: CWW
DRAWN BY: DAW	CHKD BY: CWW
SURV. CHIEF:	FIELDBOOK NO.:
DRAWING REFERENCE:	

FOR RETTEW ASSOCIATES BY:

NO.	DATE	REVISION

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE: AS NOTED

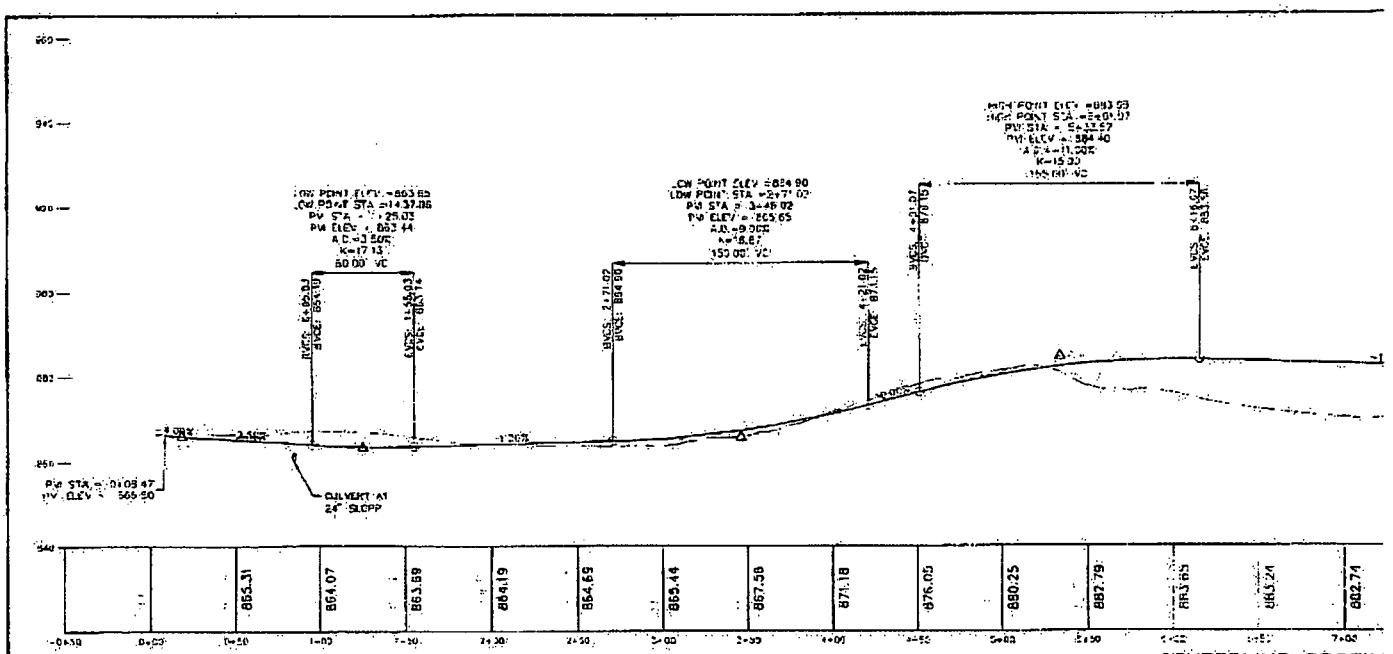
RETTEW
RETTEW Associates, Inc.
Twin Towers, 4055 Steubenville Pike, Suite 305
Pittsburgh, PA 15205
Phone (412) 446-1778
Email: rettew@rettew.com
Website: www.rettew.com

PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD

SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 33 OF 50
DWG. NO. 052612027

NOT FOR CONSTRUCTION/NOT FOR BIDDING



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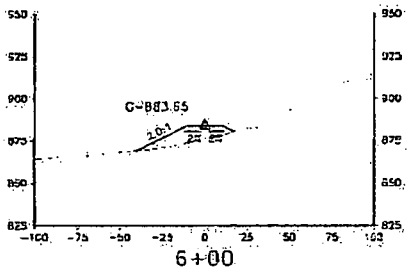
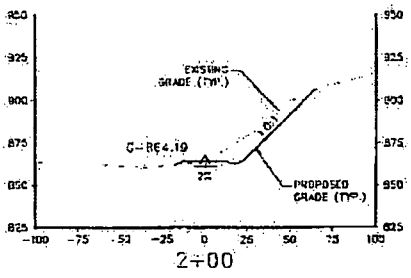
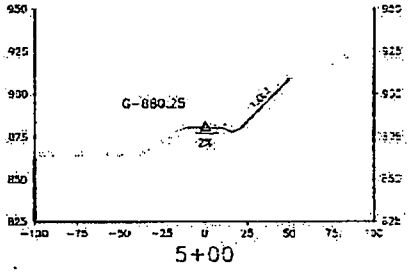
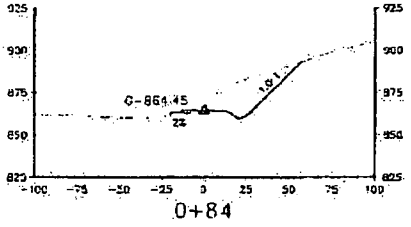
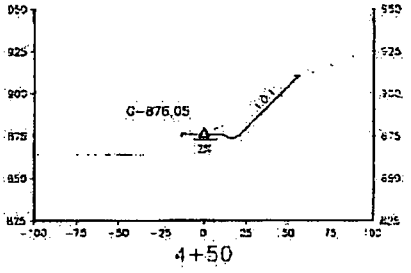
MUDLICK RUN ACCESS

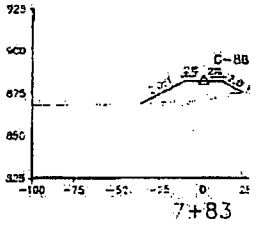


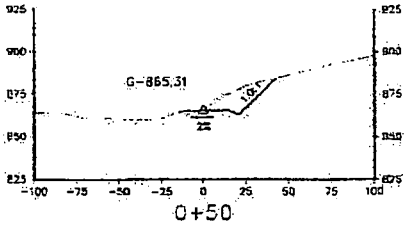


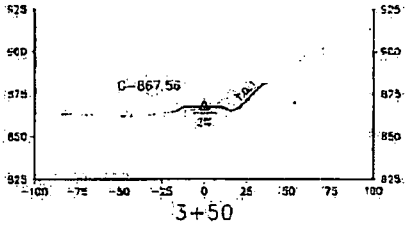


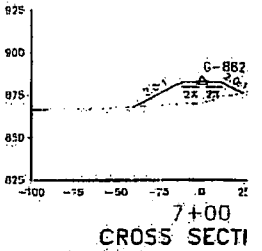




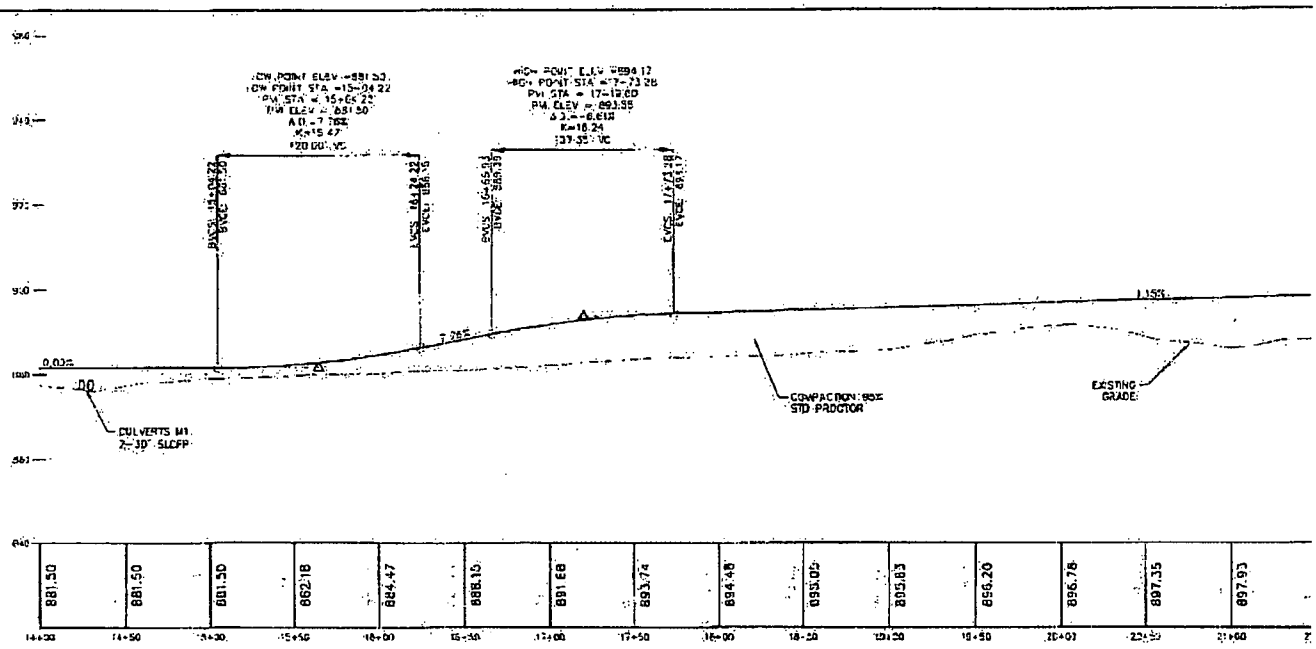






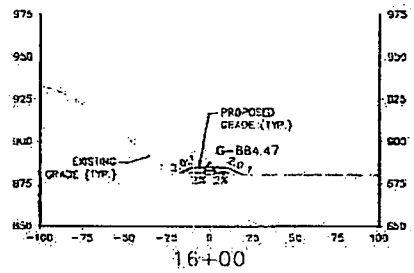


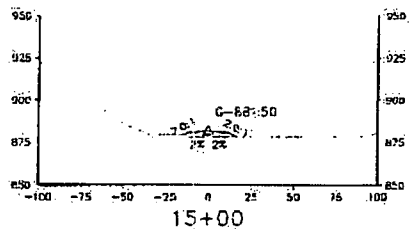
CROSS SECTI
MUDLICK RUN ACC

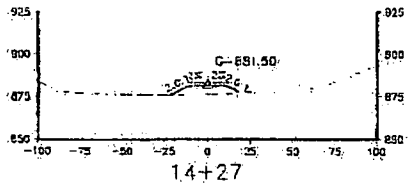


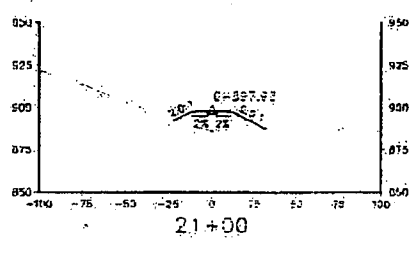
CENTERLINE PROFIL
MUDLICK RUN ACCES

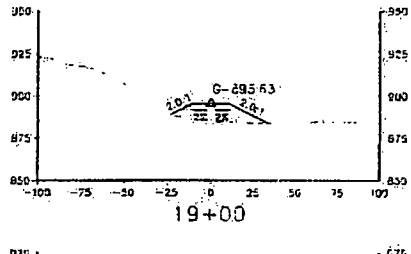
HORIZONTAL SCALE :- 1"=5
VERTICAL SCALE - 1"=2

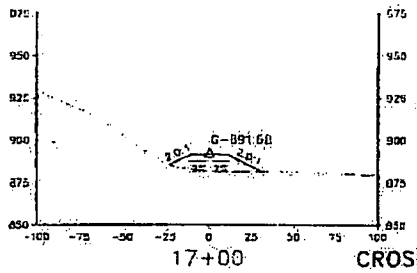






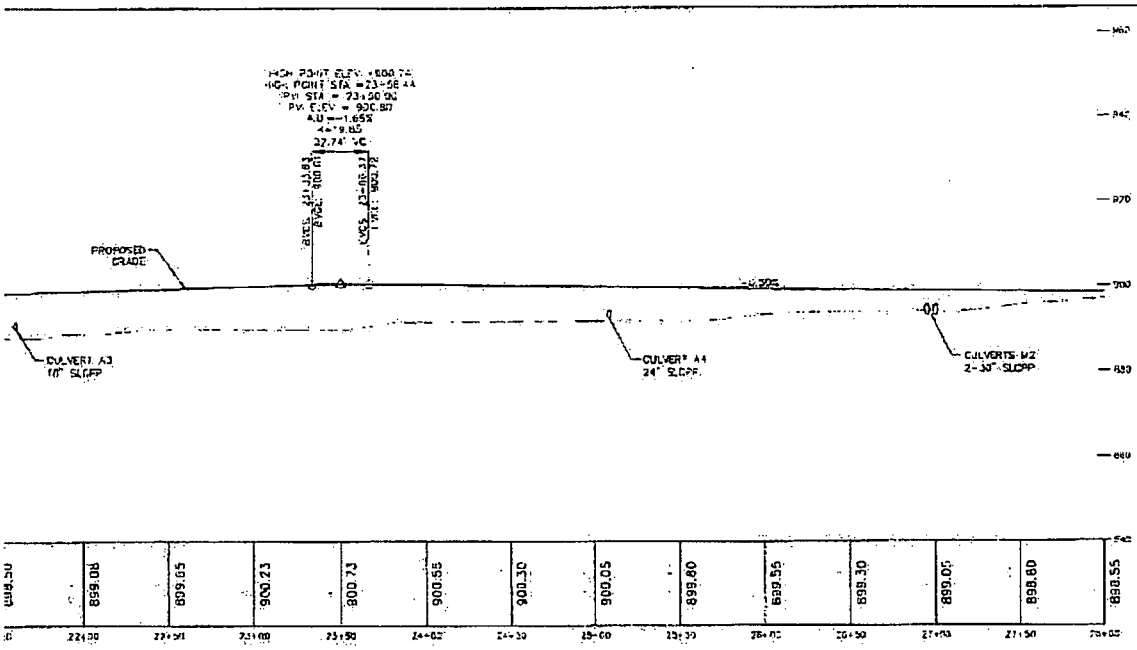




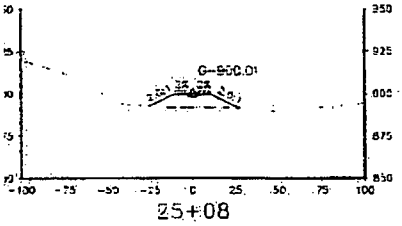


CROSS SECTIOI
MUDLICK RUN ACCES

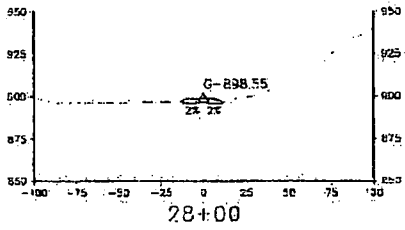
HORIZONTAL SCALE :- 1"=5
VERTICAL SCALE - 1"=5



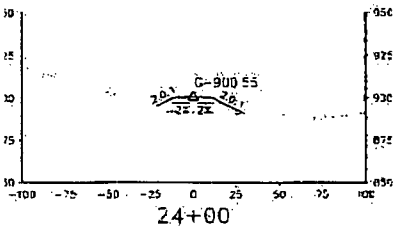
FOR
ROAD



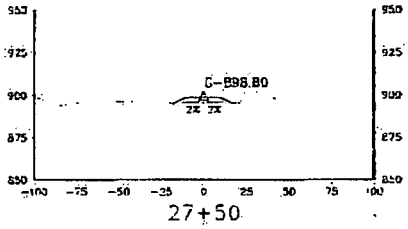
25+08



28+00



24+00



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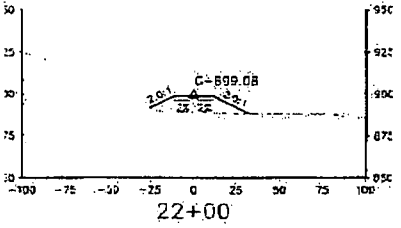

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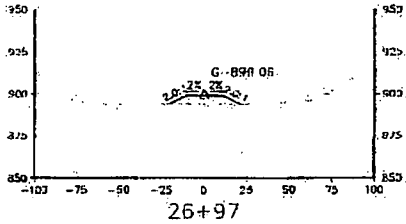

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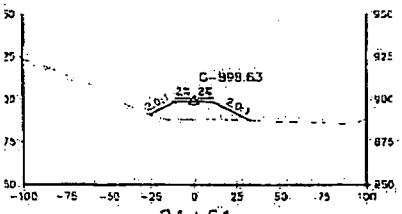

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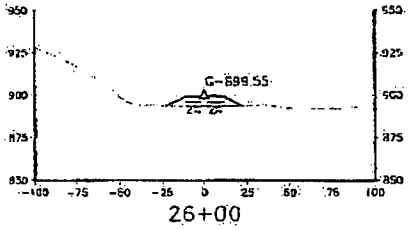


26+00

S
ROAD

FOR REITEW ASSOCIATES, BY:

NO.	DATE	REVISION

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
SURV. CHIEF:
CHKD BY: CHW
CHKD BY: CHW
HORIZONTAL NO.
DRAWING REFERENCE:

CLIENT: EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

SCALE: AS NOTED

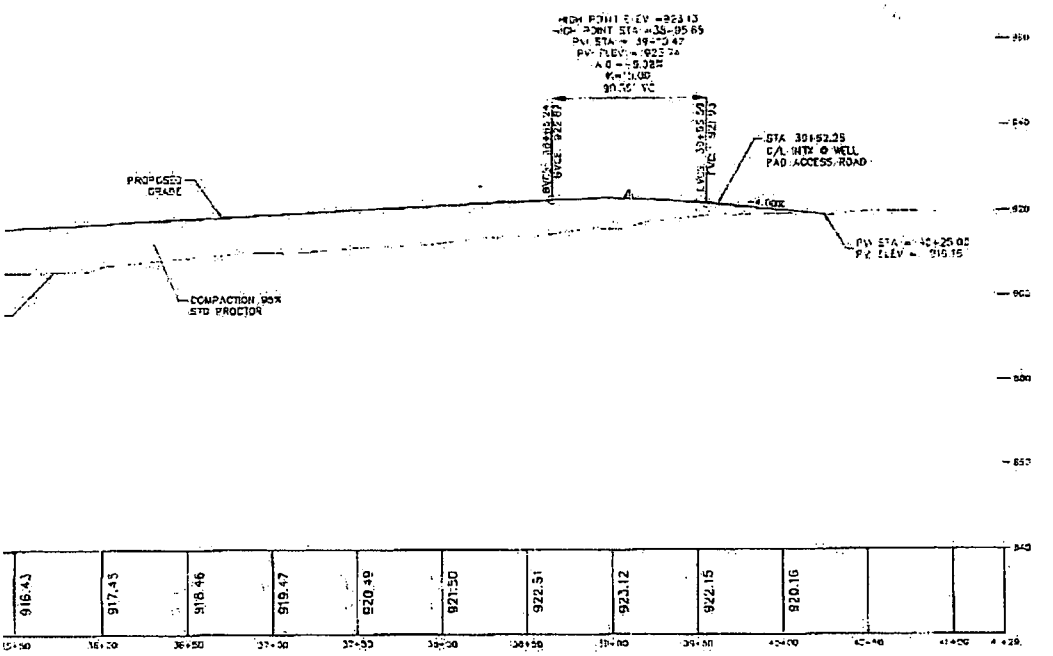
REITEW

REITEW Associates, Inc.
Park Towers, 4955 Steubenville Pike, Suite 355
Pittsburgh, PA 15205-3728
Phone: (412) 490-4220
Email: reitew@reitew.com
Website: www.reitew.com

PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD
SOUTHWEST TAX DISTRICT DODDRIDGE COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 34 OF 50
DSC. NO. 09262027

NOT FOR CONSTRUCTION/NOT FOR BIDDING



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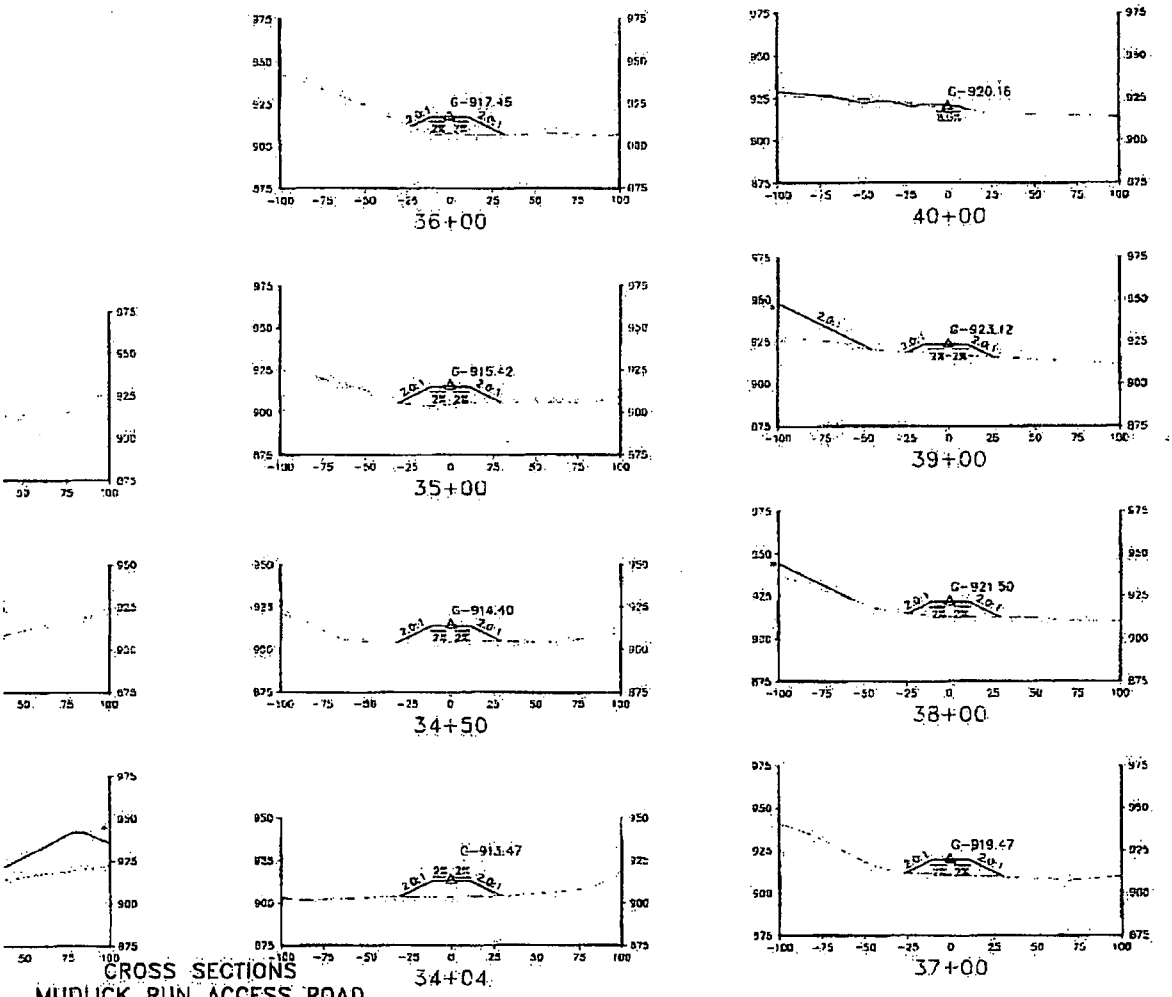


CROSS SECTIONS
MUDLICK RUN ACCESS ROAD
HORIZONTAL SCALE - 1"=50'
VERTICAL SCALE - 1"=50'

FOR REVIEW: ASSOCIATES DY.

NO.	DATE	REVISION

MANAGER: BRIAN D. SPRAY, PE
DESIGN BY: DAW
DRAWN BY: DAW
SURV. CHIEF:
CHKD BY: CWW
CHKD BY: CWW
FIELDBOOK NO.
DRAWING REFERENCE:

CLIENT
EQT
EQT CORPORATION
115 PROFESSIONAL PLACE
PROFESSIONAL BUILDING ONE
BRIDGEPORT, WEST VIRGINIA 26330

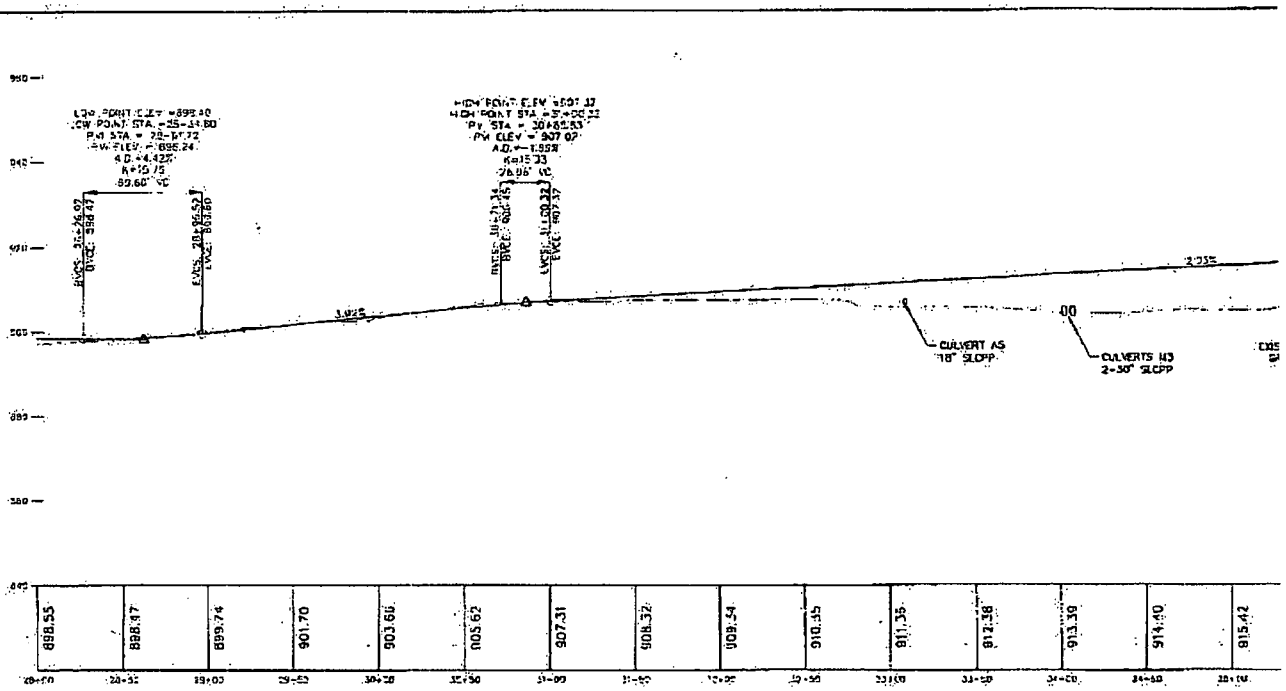
SCALE: AS NOTED

REITEN
REITEN Associates, Inc.
Tele-Towers, 1958 Stebenville Pike, Suite 303
Pittsburgh, PA 15205
Phone (412) 440-1720
Email: reiten@reiten.com
Website: www.reiten.com

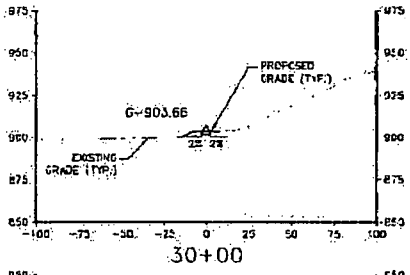
PROFILES AND CROSS SECTIONS
FOR
OXF-43 WELL PAD
SOUTHWEST TAX DISTRICT WOODWARD COUNTY, WV

DATE: AUGUST 5, 2014
SHEET NO. 35 OF 50
DRG. NO. 032612027

NOT FOR CONSTRUCTION/NOT FOR BIDDING



CENTERLINE PROFI
MUDLICK RUN ACCES
HORIZONTAL SCALE - 1"=
VERTICAL SCALE - 1"=3



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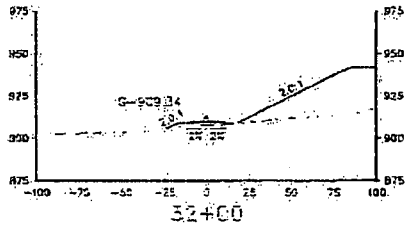
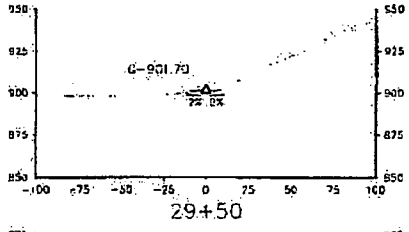


32+00

* SEE PLAN SHEETS
GRADING CONTINUA



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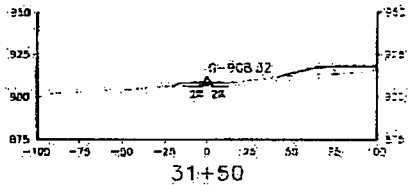

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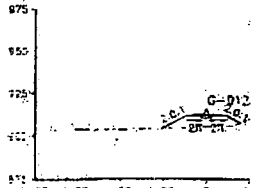

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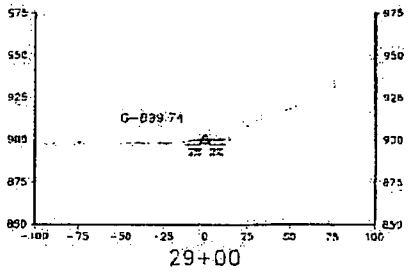

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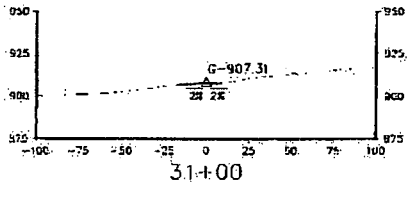

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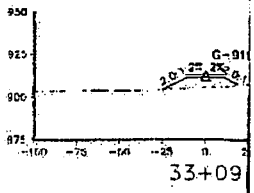

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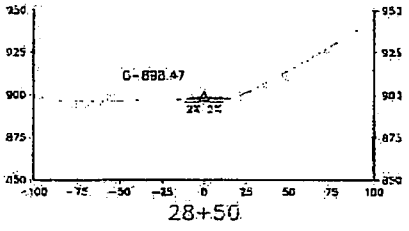

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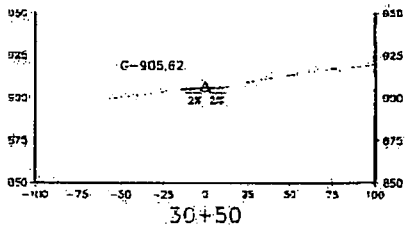

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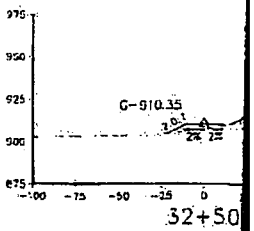

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EXHIBIT J

HYDROLOGIC AND HYDRAULIC INVESTIGATION

for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

Prepared for:

Mr. David Richardson, Esquire
826 Orange Avenue, #546
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Prepared by:

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781 Echo Road
South Charleston, WV 25303
jerry@engineeringperfection.net

September 20, 2012

HYDROLOGIC AND HYDRAULIC INVESTIGATION
for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

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HYDROLOGIC AND HYDRAULIC INVESTIGATION
for Proposed Natural Gas Development Site
Middle Fork, Mudlick and Long Run
Vicinity of Summers
Doddridge County, West Virginia

EXECUTIVE SUMMARY

Engineering Perfection was requested by Mrs. Joye Huff on August 28, 2012 to perform a hydrologic and hydraulic analysis of a natural gas development site located near Middle Fork, in the vicinity of Summers, Doddridge County, West Virginia. An analysis of the change in water surface elevation for the Base Flood event resulting from the construction of improvements for natural gas development was included in the request. Also included in the request was the determination of the Floodway in the vicinity of the project.

The results of mapping, hydrologic and hydraulic studies indicate significant increases of the depth of flooding as a consequence of the proposed natural gas development. For the Base Flood event, the water surface is calculated to be 2.3 feet higher just upstream of the Well Pad Containment Berm.

The results also indicate that the proposed development would place significant quantities of fill in the area that should be designated as Floodway.

INTRODUCTION

The proposed project is the subject of Civil Action No. 12-C-17 in the Circuit Court of Doddridge County, West Virginia. In this Action, EQT Production Company is the Petitioner, and Doddridge County Commission is the Respondent. Joye Huff (as a Trustee) and James H. Foster are Intervenors in the Action.

A central point in this Civil Action is the analysis of potential flooding impacts from the proposed natural gas developments. Mrs. Huff requested our hydrologic and hydraulic analysis to determine if the proposed natural gas well development will be in compliance with the Doddridge County floodplain Ordinance, especially the floodway fill restrictions and requirements

We received and reviewed numerous documents from the Client (see Appendix A).

The Area of Interest is located in part in the Special Flood Hazard Area as designated on Doddridge County floodplain maps. The area is designated as an Approximate or "A" Zone, where no Base Flood Elevations or Floodways have been determined. Development is proposed by EQT Production on both Middle Fork and a tributary, Long Run.

With her authorization to proceed with this work, Mrs. Huff directed Engineering Perfection to direct the final report to Mr. David Richardson, Esquire.

MAPPING

Project data were compiled and processed in an Arc Map Geographic Information System. The program employed was Arc Map version 10.0[1]. Data sources include:

Table 1 Project Data Sources

Data	Source
Ground Surface Elevation	West Virginia GIS Technical Center, 2003 Digital Elevation Model for Oxford, 3 meter data
Aerial Photography	West Virginia GIS Technical Center, Bing open source photography
Drainage Areas	National Hydrography Database Plus
Geometries of Proposed Structures	Engineering Drawings prepared by Navitus Engineering, Inc.[2]
Field Photography and Elevation Survey	Engineering Perfection

A field reconnaissance and elevation survey was conducted by Engineering Perfection on September 14. Site photographs were taken. Measurements of elevations were taken in the field, with emphasis on the existing oil well pad to the west of the proposed project site. The elevation data were collected with a Trimble survey grade Global Positioning System instrument.

The Area Of Interest is indicated on the two figures below. The locations of the proposed EQT Production facilities are shown on the Figures 3 and 4 below. EQT Production engineering drawings have been superimposed on aerial photography in these figures, to provide an overall project orientation.

[1] http://www.esri.com/software/arcgis/arcgis10
[2] Navitus Engineering, Inc., OXF 43 H1-H12 Site Plan EQT Production Company, November 15, 2011.

Figure 1 Region Topographic Map

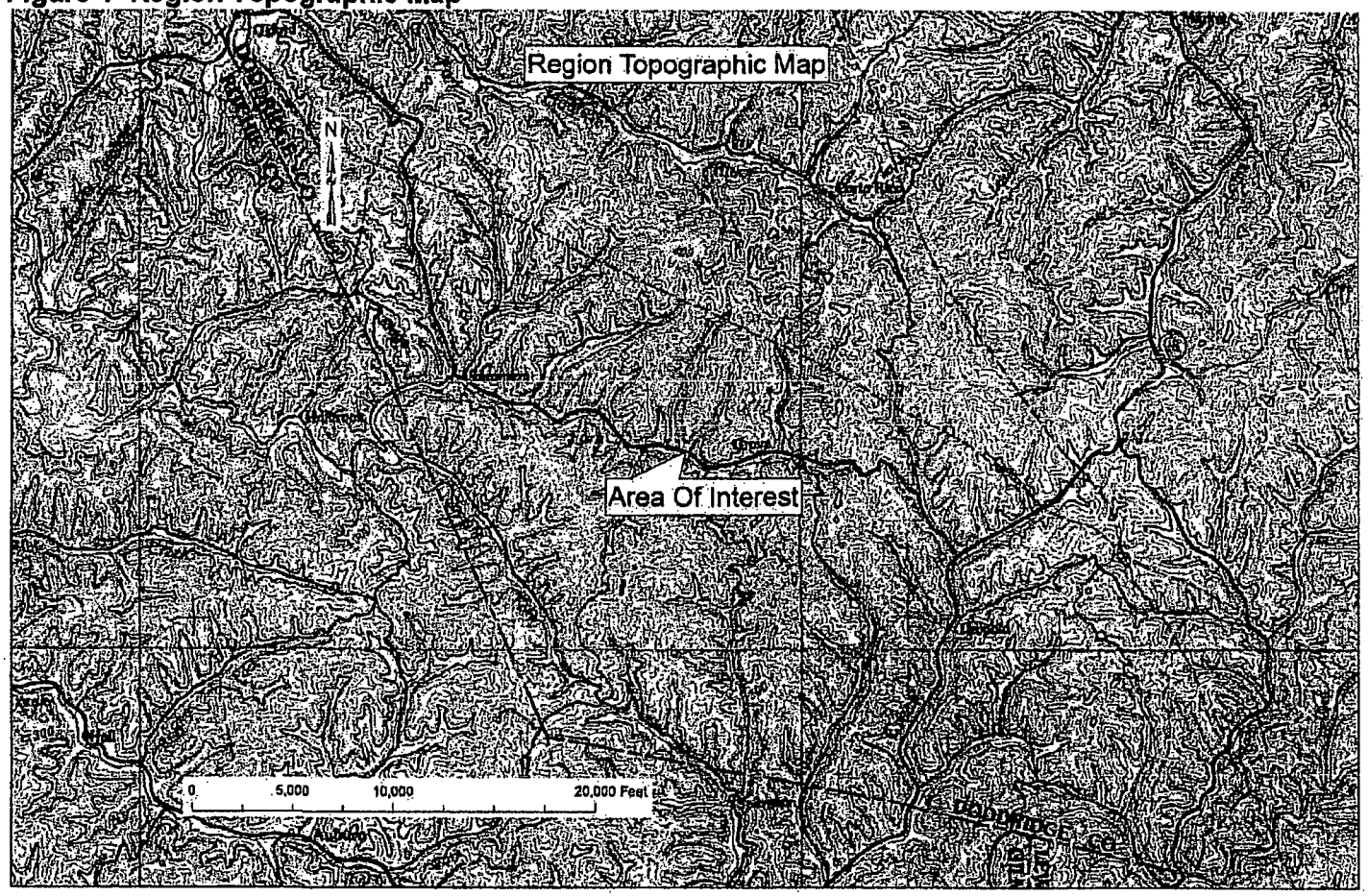


Figure 2 Location Topographic Map

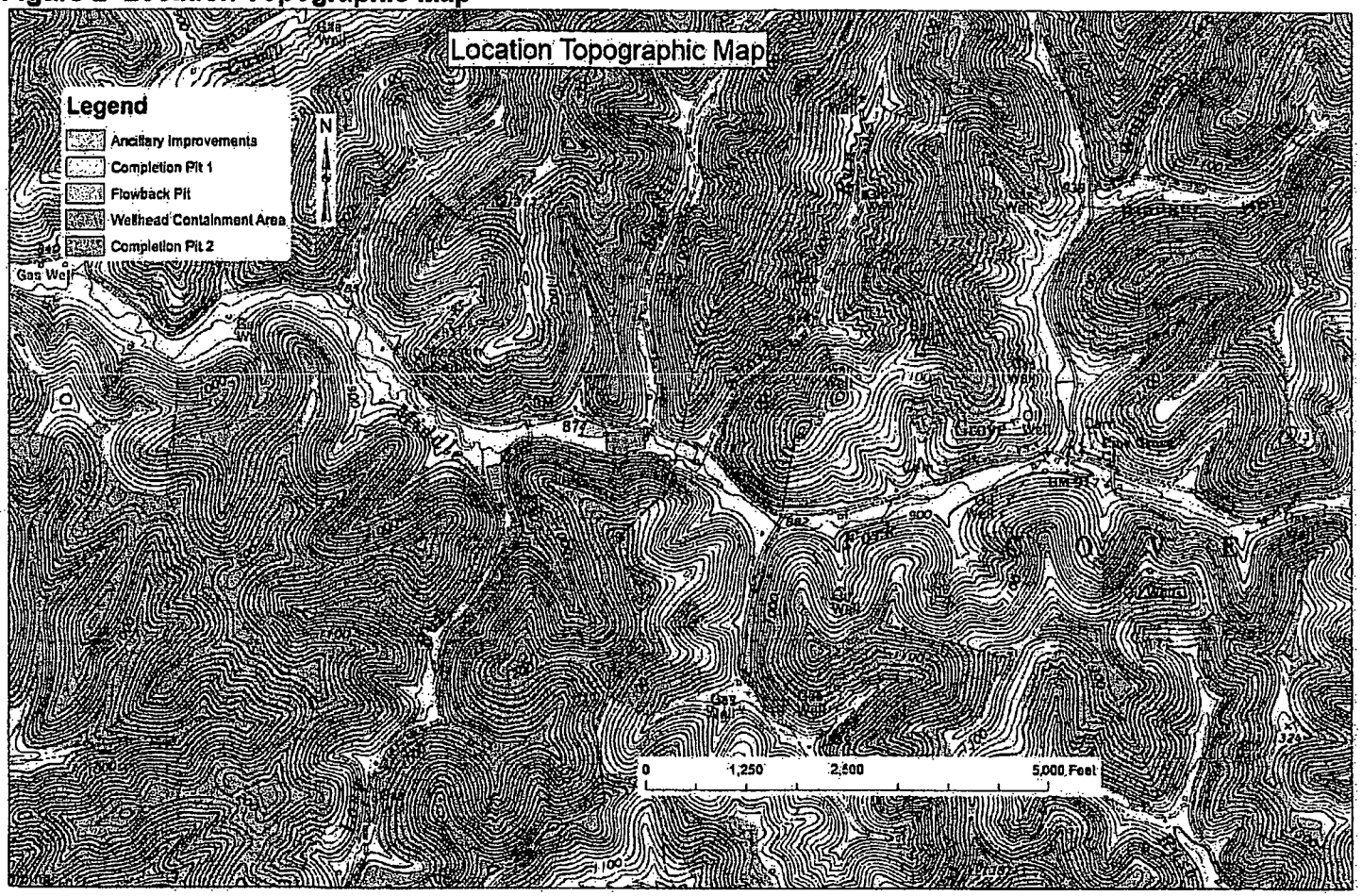


Figure 3 Locations of EQT Production Facilities – Wellpad Area

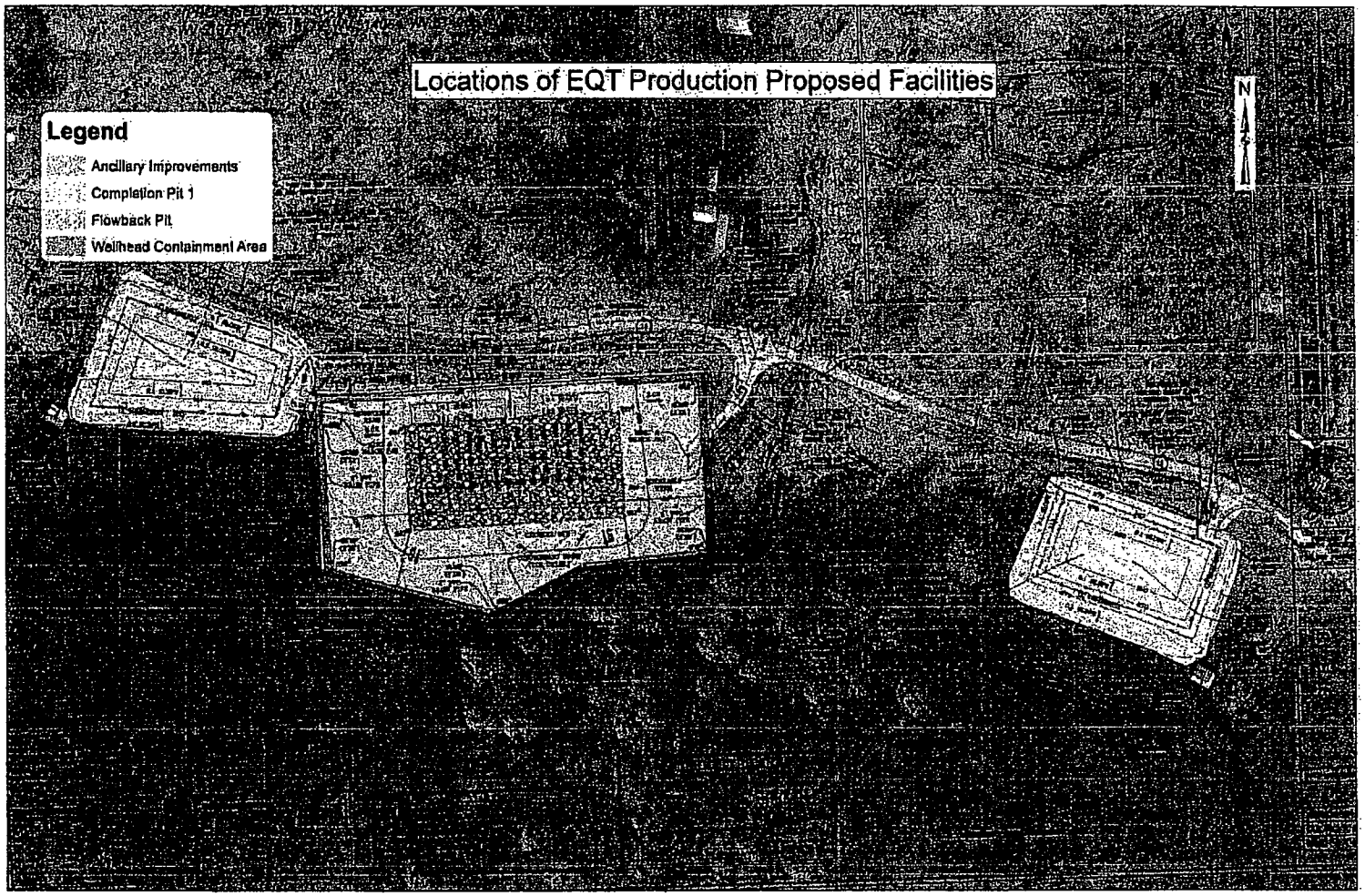
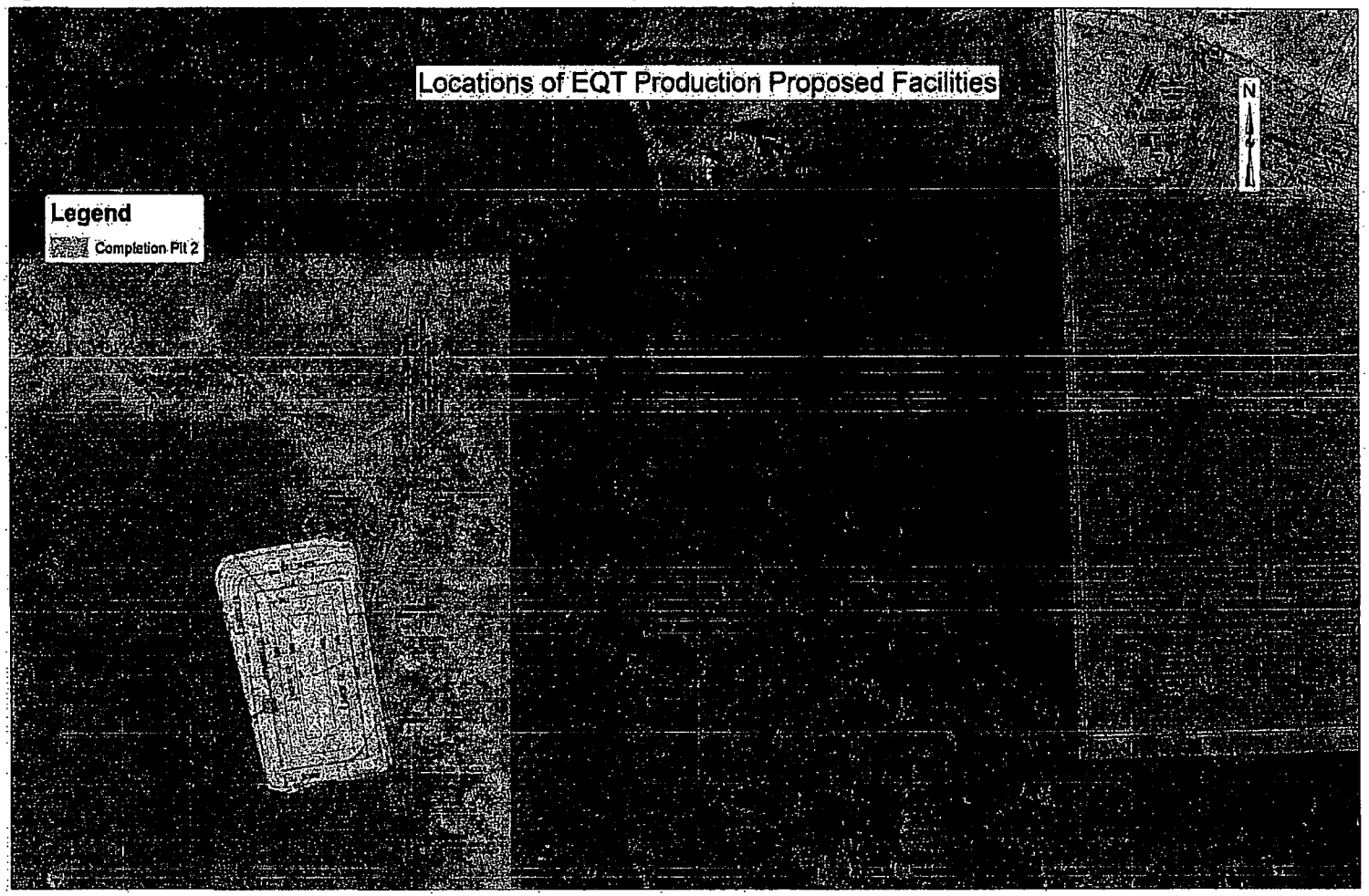


Figure 4 Locations of EQT Production Facilities – Completion Pit #2



HYDROLOGY

Flows were computed for two reaches of Middle Fork, one reach for Mudlick Run and one reach for Long Run. The flows were computed using the US Army Corps of Engineers Hydrology Modeling System (HMS) version 3.5[3].

Drainage areas, slopes and drainage path lengths were determined in Arc Map. The model precipitation for the 1% annual recurrence event was determined from a National Atmospheric and Oceanic Administration report[4]. The drainage areas, slopes, drainage path lengths and model precipitation data are all shown in Appendix B.

Land use and unit hydrographs values were determined from NRCS publication TR-55, Urban Hydrology for Small Watersheds[5]. Soil conditions were obtained from Soil Survey of Doddridge County West Virginia[6].
The flows for the three studied streams are presented in the table below.

Table 2 Stream Flows for Middle Fork Basin

Stream	Stream Station, feet	Drainage Area, sq. mi.	Flow, cfs
Middle Fork	0 to 963	5.02	3729
Middle Fork	963 to 6391	4.20	3108
Mudlick Run	3460	0.82	770
Long Run	963	0.83	854

HYDRAULIC MODELS – 2012 CONDITION AND PROPOSED CONDITION WITH BASE FLOOD CHANGE

The term Base Flood is the predicted flood event with a one percent probability of being equaled or exceeded in any given year and is used extensively by the Federal Emergency Management Agency program for flood insurance. The Base Flood has also been incorporated in local ordinances, including the floodplain ordinance for Doddridge County.

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[3] http://www.hec.usace.army.mil/software/hec-hms/index.html

[4] "Rainfall Frequency Atlas of the United States for Durations 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years", May 1961
http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf

[5] . Urban Hydrology for Small Watersheds Technical Release No. 55, Soil Conservation Service, June 1987.

[6] . Soil Survey of Doddridge County, West Virginia, United States Department of Agriculture, Natural Resources Conservation Service, September 2005.

The Base Flood Elevation is an estimate of the peak elevation of the water surface as a result of the Base Flood. The Base Flood Elevation varies along the length of the stream. It is customarily reported in a profile of the stream.

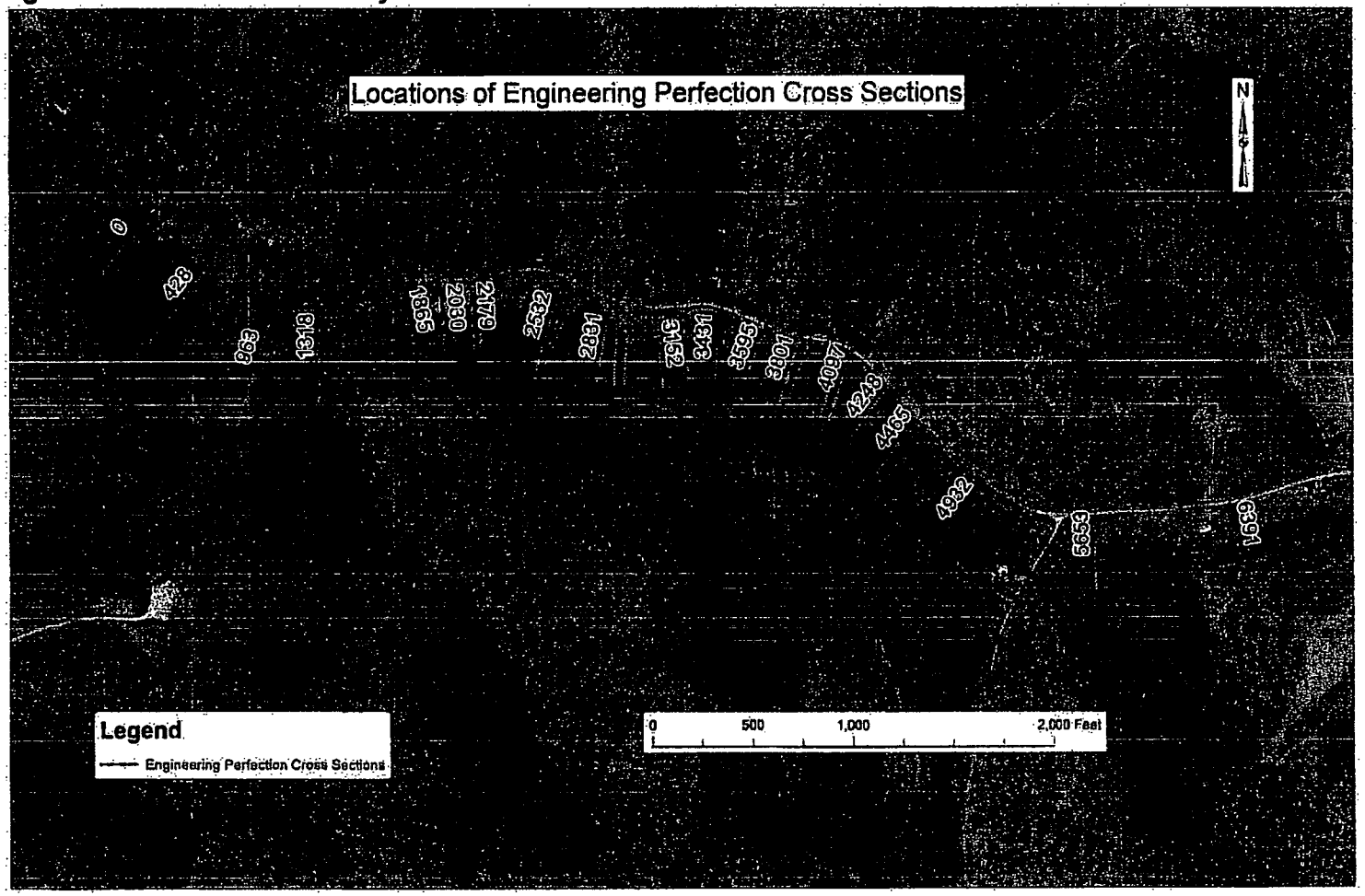
The Base Flood Elevation Change that was determined in this project is the difference between the 2012 ground surface condition and the condition after implementation of the EQT Production project. Increases in the Base Flood Elevation generally increase the amount of damage to structures and property when flooding occurs.

The GIS files were utilized to organize and process the data necessary for the hydraulic analysis. In addition to Arc Map version 10.0, the extension HEC geoRAS[7] was employed for processing. After defining the 2012 site geometry in GIS, the data were exported to the hydraulic model developed by the Corps of Engineers, the Hydraulic Engineering Center River Analysis System, or HECRAS[8].

Hydraulic modeling is nearly always an iterative process. Initial analysis will indicate data gaps that must be filled for accurate results. For the model of Middle Fork, the initial analysis indicated that additional cross sections were needed; this was expected. The data for the additional sections were extracted using Arc Map, processed in EXCEL, and then inserted into the HECRAS model. For the model of Middle Fork, a total of 30 cross sections with unique geographic data were utilized. The cross sections were adjusted slightly in the HECRAS geometry editor to incorporate the stream channel; the channel is not well defined in the 3 meter Digital Elevation Model data.

[7] http://www.hec.usace.army.mil/software/hec-ras/hec-georas.html
[8] http://www.hec.usace.army.mil/software/hec-ras/

Figure 5 Locations of Initial Hydraulic Cross Sections



Interpolation and copying of cross sections was also employed to fill model data gaps, as is standard practice in hydraulic modeling. For Middle Fork, a total of 28 interpolated cross sections were added with data derived from adjacent sections. This results in a total of 58 cross sections in the hydraulic model.

Two site conditions were modeled for Middle Fork and are reported herein. They are the 2012 Condition, and the Proposed site condition.

The 2012 Condition includes consideration for an existing natural gas development located between stations 1950 and 2179 on Middle Fork. The cross sections for this condition were created using the 2003 Digital Elevation Model data, adjusted for GPS and field observations on September 13, 2012.

The Proposed site condition is a modification of the 2012 Condition, with the modifications reflecting the proposed natural gas developments[9]. The hydraulic analysis assumed that the Containment Berm at the perimeter of the Well Pad would be overtopped in the Base Flood event. This is a conservative assumption, if this Containment Berm must be designed to not be overtopped for the Base Flood condition and flood levels would be significantly higher.

The flows utilized for the hydraulic modeling were those obtained from the hydrologic study, as reported above.

The data entered in the HECRAS model, as well as model results, are all reported in on a Compact Disk. Examples of the data and model results are provided in Appendix C.

Comparison of the Base Flood water surface elevations of the 2012 and proposed site conditions indicates the following differences.

Table 3 Comparison of Base Flood Elevations

Station, ft.	2012 Site Condition, ft.	Proposed Site Condition, ft.	Increase, ft.
7	848.4	848.4	0.0
428	849.7	849.7	0.0
963	850.6	850.6	0.0
1054.*	850.8	850.8	0.0
1145.*	851.0	851.0	0.0
1236.*	851.8	851.8	0.0
1327.*	852.9	852.9	0.0
1418	854.0	854.0	0.0
1507.4*	855.6	855.6	0.0

[9] Navitus Engineering, Inc., OXF 43 H1-H12 Site Plan EQT Production Company, November 15, 2011.

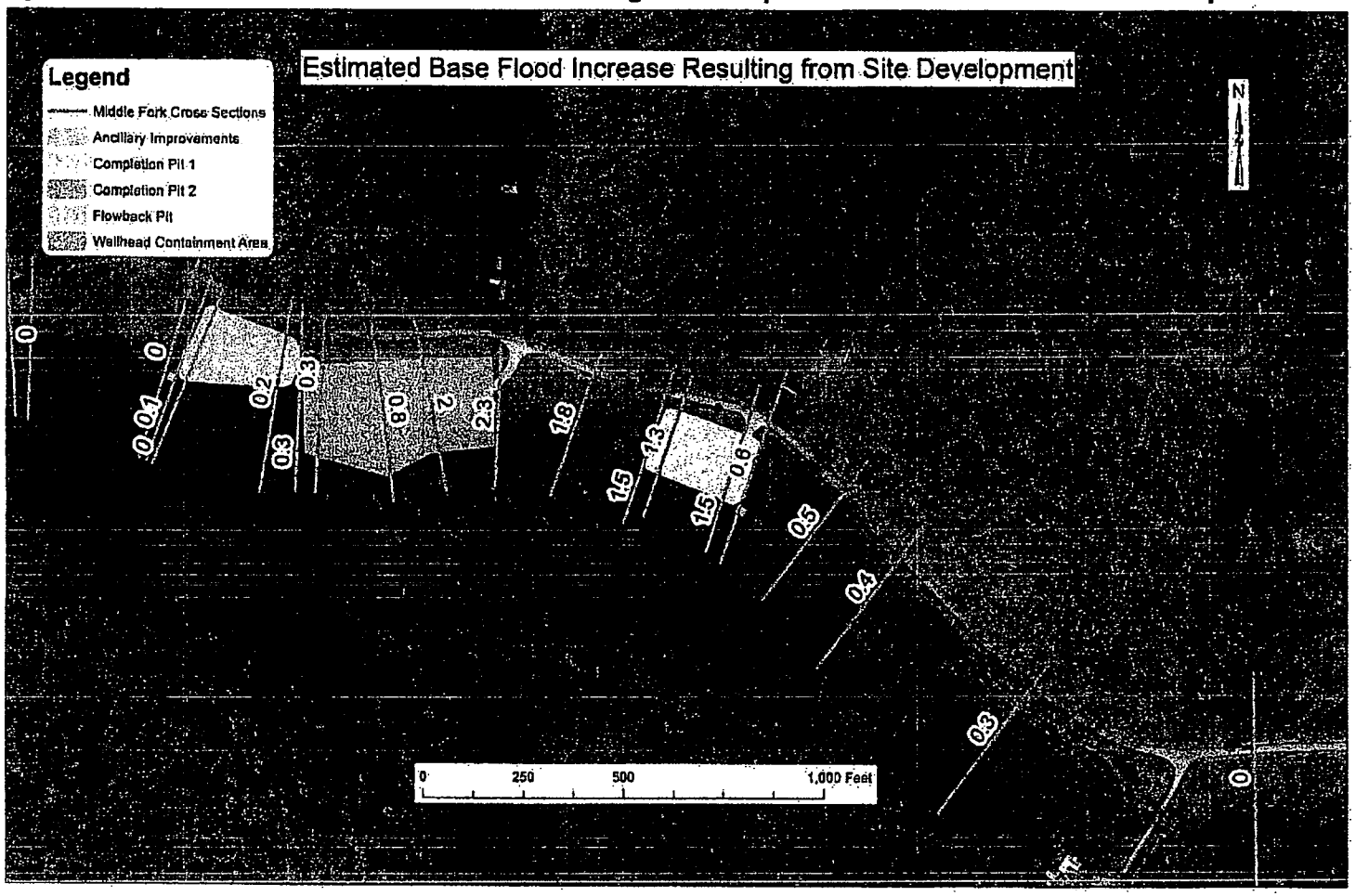
1596.8*	856.2	856.2	0.0
1686.2*	856.5	856.5	0.0
1775.6*	856.8	856.8	0.0
1865	857.1	857.1	0.0
1950	857.1	857.1	0.0
1907.5*	857.2	857.2	0.0
2030	858.0	858.0	0.0
2084	858.1	858.1	0.0
2179	859.1	859.1	0.0
2219	859.1	859.3	0.2
2532	860.7	860.7	0.0
2556	860.7	860.8	0.0
2577	860.8	860.8	0.0
2831	861.0	861.2	0.2
2911	861.1	861.4	0.2
2963	861.2	861.5	0.3
3152	861.5	862.3	0.8
3286	862.0	864.0	2.0
3411	862.4	864.5	2.1
3431	862.4	864.7	2.3
3595	863.0	864.8	1.8
3801	863.5	865.0	1.5
3852	863.7	865.0	1.3
3885.16*	863.7	865.1	1.4
4017.83*	863.7	865.6	1.9
3918.33*	863.7	865.2	1.5
3951.5*	863.8	865.3	1.5
3984.66*	863.8	865.4	1.6
4051	864.1	865.6	1.6
4097	865.7	866.3	0.6
4248	866.1	866.6	0.5
4465	866.3	866.7	0.4
4932	867.3	867.6	0.3
5022.12*	867.5	867.7	0.2
5112.25*	868.0	868.2	0.1
5202.37*	869.1	869.1	0.0
5292.5*	870.3	870.3	0.0
5382.62*	871.5	871.5	0.0
5472.75*	872.7	872.7	0.0

5562.87*	873.8	873.8	0.0
5653	874.8	874.8	0.0
5745.25*	876.0	876.0	0.0
5837.5*	876.8	876.8	0.0
5929.75*	877.4	877.4	0.0
6022.*	878.0	878.0	0.0
6114.25*	878.5	878.5	0.0
6206.5*	879.0	879.0	0.0
6298.75*	879.5	879.5	0.0
6391	880.0	880.0	0.0

* indicates an interpolated cross section
Cells highlighted in yellow indicate increases greater than one foot

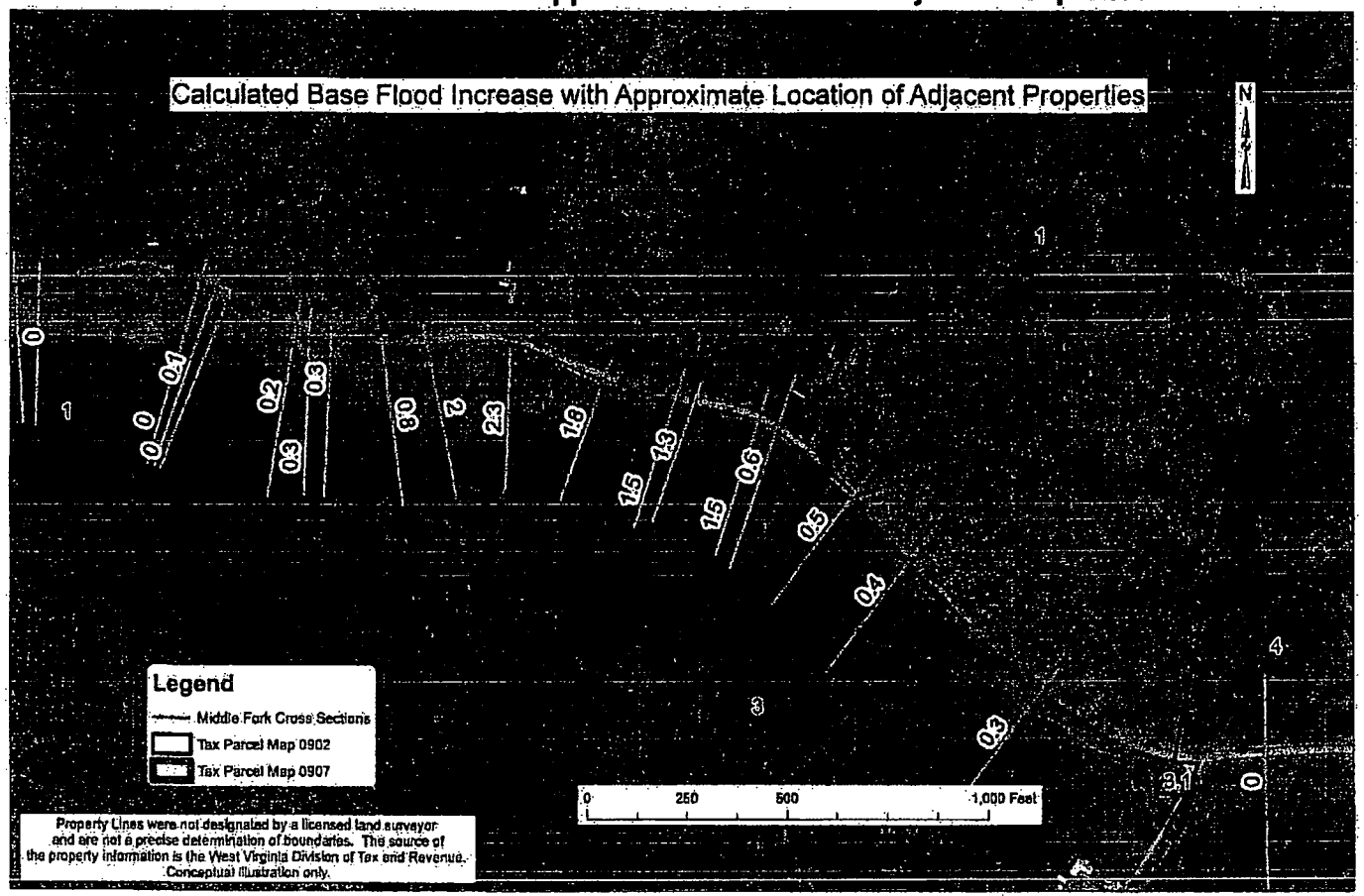
The maximum increase in the elevation of the water surface of Middle Fork is 2.3 feet for the Base Flood event. This occurs at Station 3431, in close proximity to the confluence of Middle Fork and Mudlick Run. The increases in elevation of the water surface are illustrated in Figure 6 below:

Figure 6 Estimated Base Flood Increase Resulting from Proposed EQT Production Site Development



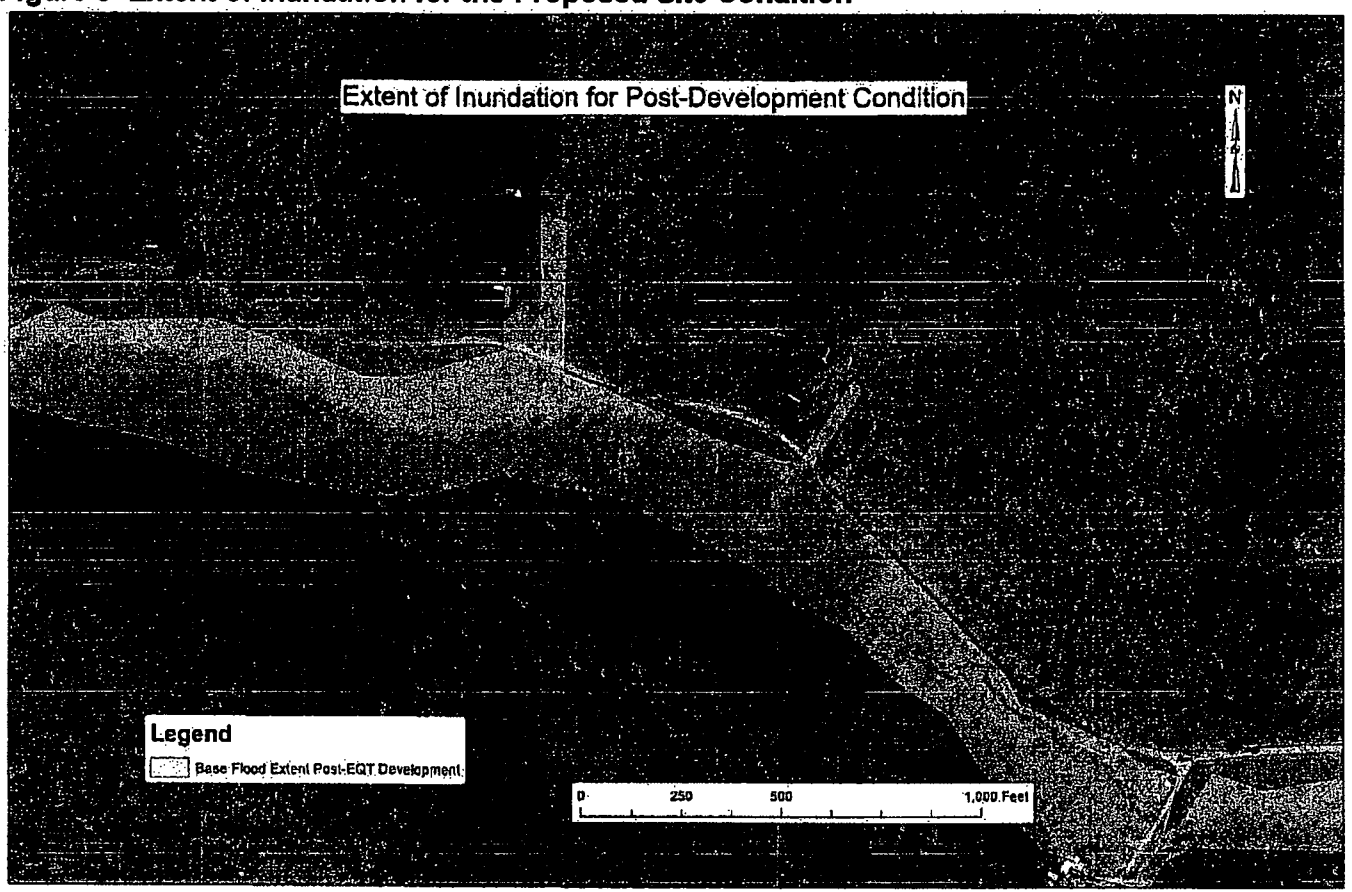
The Doddridge County floodplain ordinance includes requirements specific to adjacent properties. Figure 7 below conceptually illustrates the locations of property lines in the vicinity of the proposed project. The property lines were not designated by a licensed surveyor and are not a precise determination of boundaries. The source of the property information is the West Virginia Division of Tax and Revenue, commonly referred to as "tax maps."

Figure 7 Estimated Base Flood Increase with Approximate Location of Adjacent Properties



The increase in elevation of the water surface for the base flood affects the areal extent of the Base Flood event. This area is often referred to as the Special Flood Hazard Area for zones where detailed engineering studies have been performed and accepted by the Federal Emergency Management Agency. Figure 8 below indicates the extent of the Base Flood for the Proposed Condition. Note that the extent on Mudlick Run considers only backwater affects from Middle Fork; no hydraulic modeling was performed for Mudlick Run

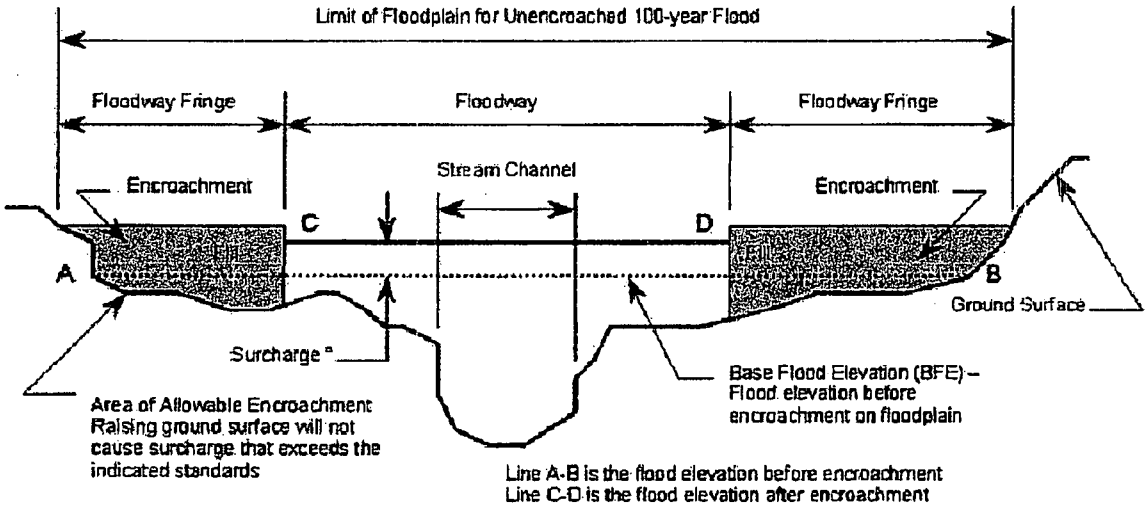
Figure 8 Extent of Inundation for the Proposed Site Condition



HYDRAULIC MODEL – FLOODWAY DETERMINATION

The term Floodway is "the channel of a river or other watercourse and the adjacent land area that must be reserved to discharge the base flood without increasing the water surface elevation more than one foot at any point"[10]. The land area outside the Floodway is commonly called the Flood Fringe. These terms are illustrated in the figure below[11]: Regulatory floodplain requirements for placement of fill and structures in the Floodway are much more stringent than for the Flood Fringe.

Figure 9 Schematic Of Floodway, Cross Section View



*Surcharge not to exceed 1.0 ft. (FEMA requirement) or lesser height if specified by community

Floodplain-Encroachment-and-Floodway

The determination of the limits of the Floodway for Middle Fork was performed with the HECRAS model. The 2012 Condition was utilized. The determination is an iterative (repeated calculations, each getting closer to an acceptable answer) process.

The process entails blocking water flow in part of the floodplain, and observing the resulting change in Base Flood Elevation. Generally, the more of the floodplain that is blocked from flow, the greater the increase in the Base Flood Elevation. The limit of the Floodway is known when the resulting change in Base Flood Elevation is slightly less than one foot. In practice, determining the limits of the Floodway is very complex because the analyst is working in three dimensions and on both sides of the stream.

The flows utilized for the hydraulic modeling of the floodway were the same as those from the hydrologic study, as reported above.

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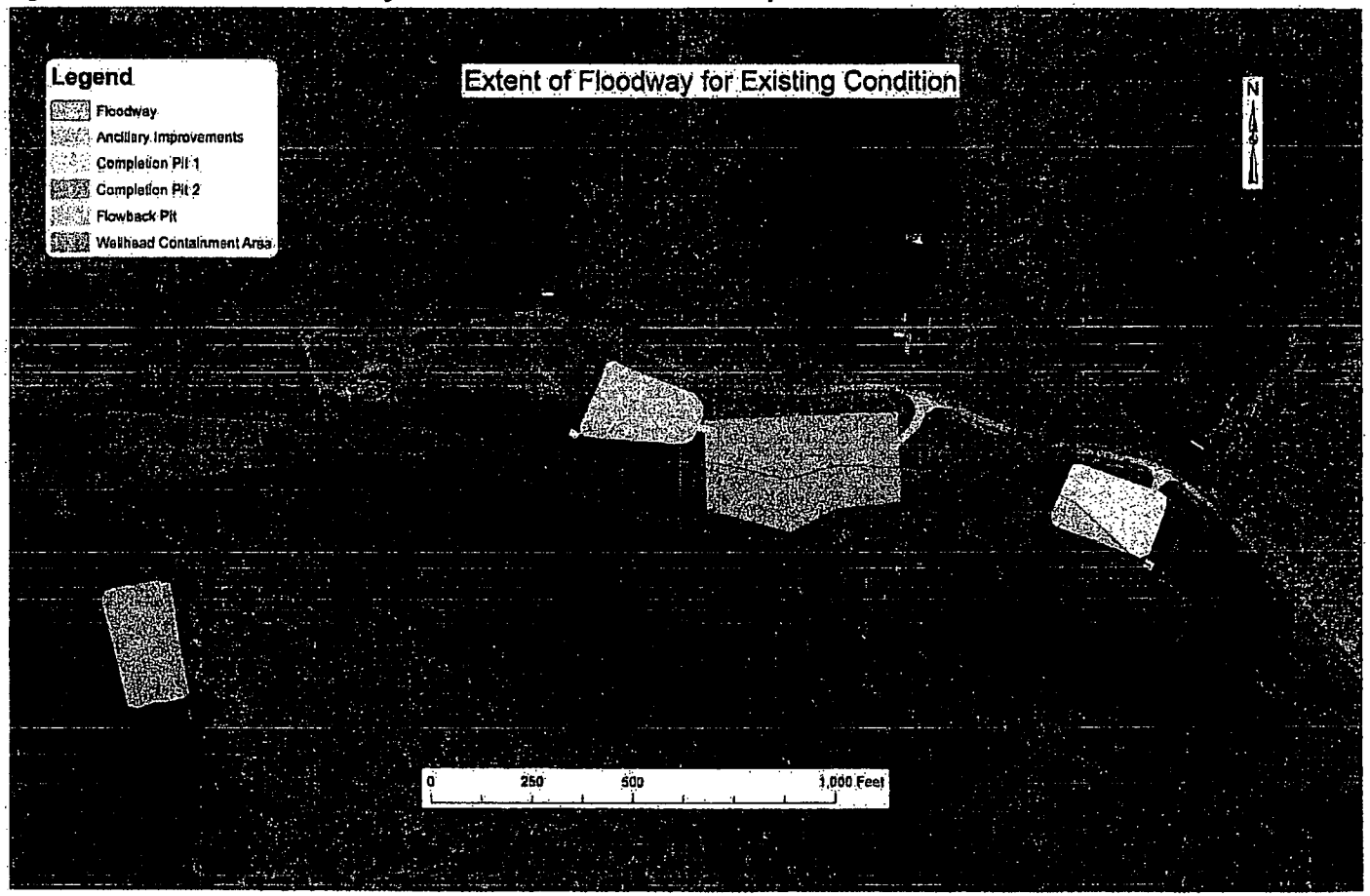
[10] Doddridge County Floodplain Ordinance, Passed by the County Commission on September 21, 2011
[11] Source of Figure is http://epg.modot.org/index.php?title=748.9_national_flood_insurance_program_(nfip)

The data entered in the HECRAS model, as well as model results, are all reported in on a Compact Disk. Examples of the data and model results are provided in Appendix D..

The areal extent of the Floodway for the present site conditions is shown in Figure 10 below. The Doddridge County floodplain ordinance includes requirements specific to Floodways and the placement of fill. Also shown in the figure are the locations of proposed structures.

Figure 10 Extent of Floodway for 2012 Condition and Proposed Structures



CONCLUSIONS

The following conclusions may be drawn from the studies reported above:

1. The site development proposed by EQT Production would result in an increase of the water surface elevation of Middle Fork of up to 2.3 feet during the Base Flood. The location of greatest increase is just upstream from the proposed Wellhead Containment Area, at the mouth of Mudlick Run.
2. The proposed structure causing the greatest rise in the water surface elevation is the Wellhead Containment Berm.
3. The Wellhead Containment Berm will be overtopped in the Base Flood.
4. The elevation of the ground surface at the location of the proposed 12 wells, as shown on the Navitus Engineering drawings, will be 862 feet. The elevation of the Base Flood at this location will be 864.7 feet. There will be approximately 2.7 feet of standing water at the location of the proposed wells.
5. The extent of flooding from the Proposed Condition encompasses two residential structures adjacent to the site.
6. The extent of a floodway for the Area Of Interest was determined. Construction of the Wellhead Containment Area and Completion Pit #1 would entail placement of significant quantities of fill in this floodway.

Appendix A
Data Sources

Data Provided by Mrs. Huff

Drawings
Well Pad Map 1A
Well Pad Map 1B
Well Pad Map 2A
Well Pad Map 2B
Well Pad Map 3A
Well Pad Map 3B
Well Pad Map 4A
Well Pad Map 4B
Well Pad Map 5A
Well Pad Map 5B
Well Pad Map 6A
Well Pad Map 6B
Well Pad Map 7A
Well Pad Map 7B

Data Provided by Mr. David McMahon

(A) Letter to County Clerk re Resubmission 08-15-12
1 - Floodplain Permit Application 11-16-11
1a - OXF 43 Floodplain Study Computations
1b - Site Plan
1c - FEMA FIRMette Maps of Area
2 - Email from S Hastings to K Sneed and D Wellings 05-17-12
2a - Floodplain Study Exhibits
2b - Navitus Engineering - Floodplain Study Computations
2c - Letter to Sneed and Wellings
3 - Email from S Hastings to K Sneed and D Wellings with att
4 - Email from K Sneed to S Williams and D Wellings 05-22-12
EQT & DODDRIDGE CO COUNTERCLAIM & CROSSCLAIM v 12 FINAL.pdf
EQT & DODDRIDGE CO COUNTERCLAIM & CROSSCLAIM v 12 FINAL
Numerous photographs of Middle Fork and Mudlick Run in flooding condition

Data Provided by Mrs. Erlene Foster

Numerous photographs taken September 10, 2012 of Middle Fork

Appendix B
Hydrology Computations

Item	Middle Fork Below Long Branch	Middle Fork Above Long Branch	Long Branch	Mudlick
Drainage Area (sq. mi.)	5.02	4.20	0.82	0.83
Longest Watercourse (ft.)	n/a	15,509	7,857	9,821
Basin Slope (%)	n/a	24	24	24
SCS Curve Number (CN)	n/a	72	72	72
24-hr, 100-yr rain (in.)	n/a	5.3	5.3	5.3
Excess Rainfall (in.)	2.43	2.43	2.43	2.43
SCS Lag (minutes)	n/a	43	26	31
Flow (cfs)	3729	3108	854	770

HMS Computed Flow for Middle Fork and Long Branch.

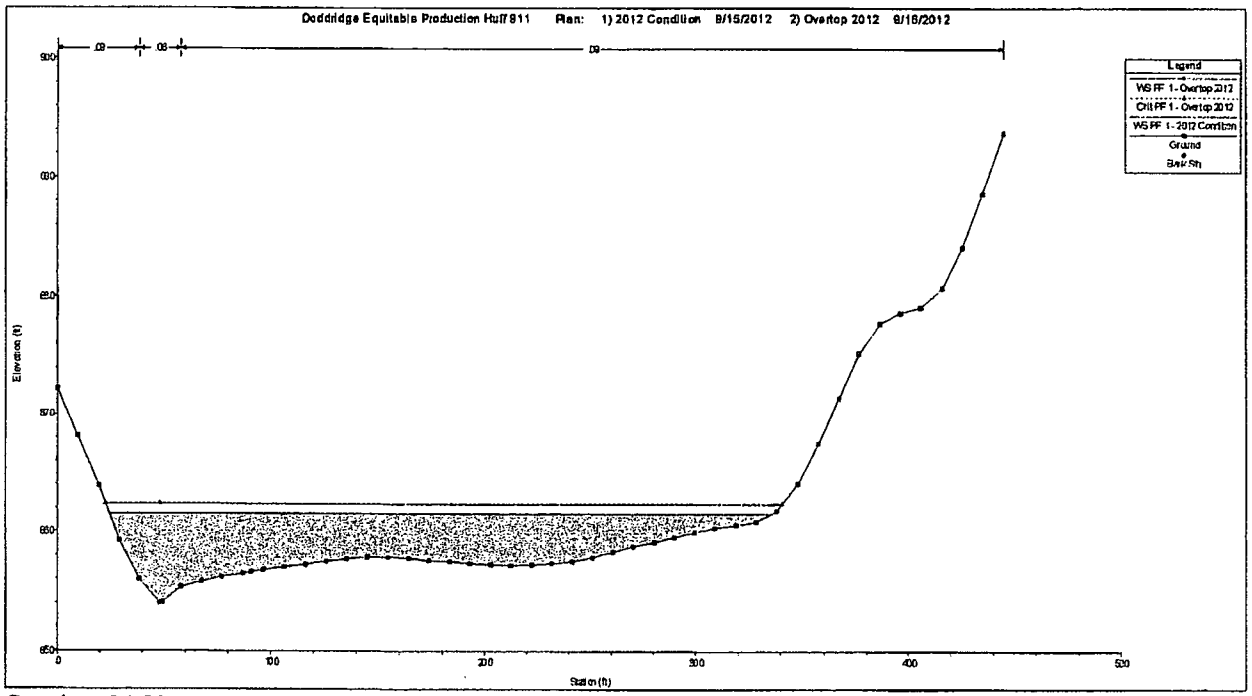
Time	Upper Middle Fork (cfs)	Long Branch (cfs)	Lower Middle Fork (cfs)
09:20	0	0	0
09:25	1	0	1
09:30	1	1	2
09:35	2	1	3
09:40	3	1	4
09:45	4	2	6
09:50	5	2	8
09:55	7	3	10
10:00	9	4	13
10:05	12	4	16
10:10	15	5	20
10:15	18	6	24
10:20	21	7	29
10:25	25	8	34
10:30	30	10	39
10:35	34	11	45
10:40	40	12	52
10:45	46	14	59

10:50	52	16	68
10:55	59	18	77
11:00	67	20	87
11:05	76	23	99
11:10	86	26	112
11:15	98	29	126
11:20	110	33	143
11:25	125	37	163
11:30	142	43	185
11:35	163	50	213
11:40	193	62	255
11:45	241	85	326
11:50	327	133	460
11:55	484	225	710
12:00	734	369	1103
12:05	1070	547	1616
12:10	1479	717	2197
12:15	1938	827	2765
12:20	2384	854	3237
12:25	2744	815	3559
12:30	2982	734	3716
12:35	3098	631	3729
12:40	3108	529	3636
12:45	3021	446	3468
12:50	2862	383	3245
12:55	2653	330	2984
13:00	2407	287	2694
13:05	2151	251	2403
13:10	1923	222	2145
13:15	1731	199	1931
13:20	1568	180	1749
13:25	1427	165	1592
13:30	1302	152	1454
13:35	1190	141	1331
13:40	1091	132	1222
13:45	1004	124	1128
13:50	929	117	1046

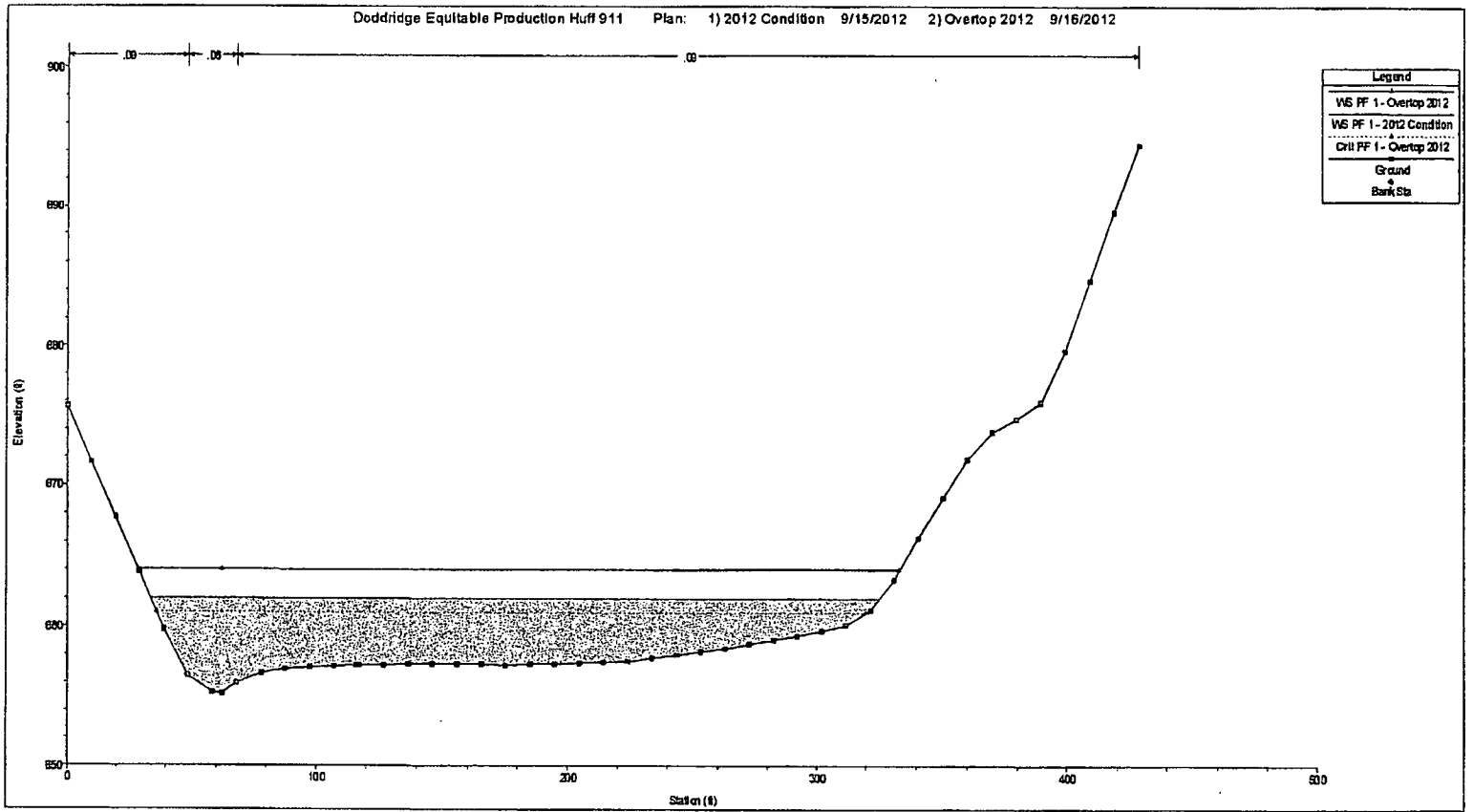
13:55	861	110	972
14:00	801	105	906
14:05	748	99	847

Appendix C
Hydraulic Computations – Base Flood Elevation Change
(Note that "Overtop" is the Proposed Condition, in which the Containment Berm is Overtopped

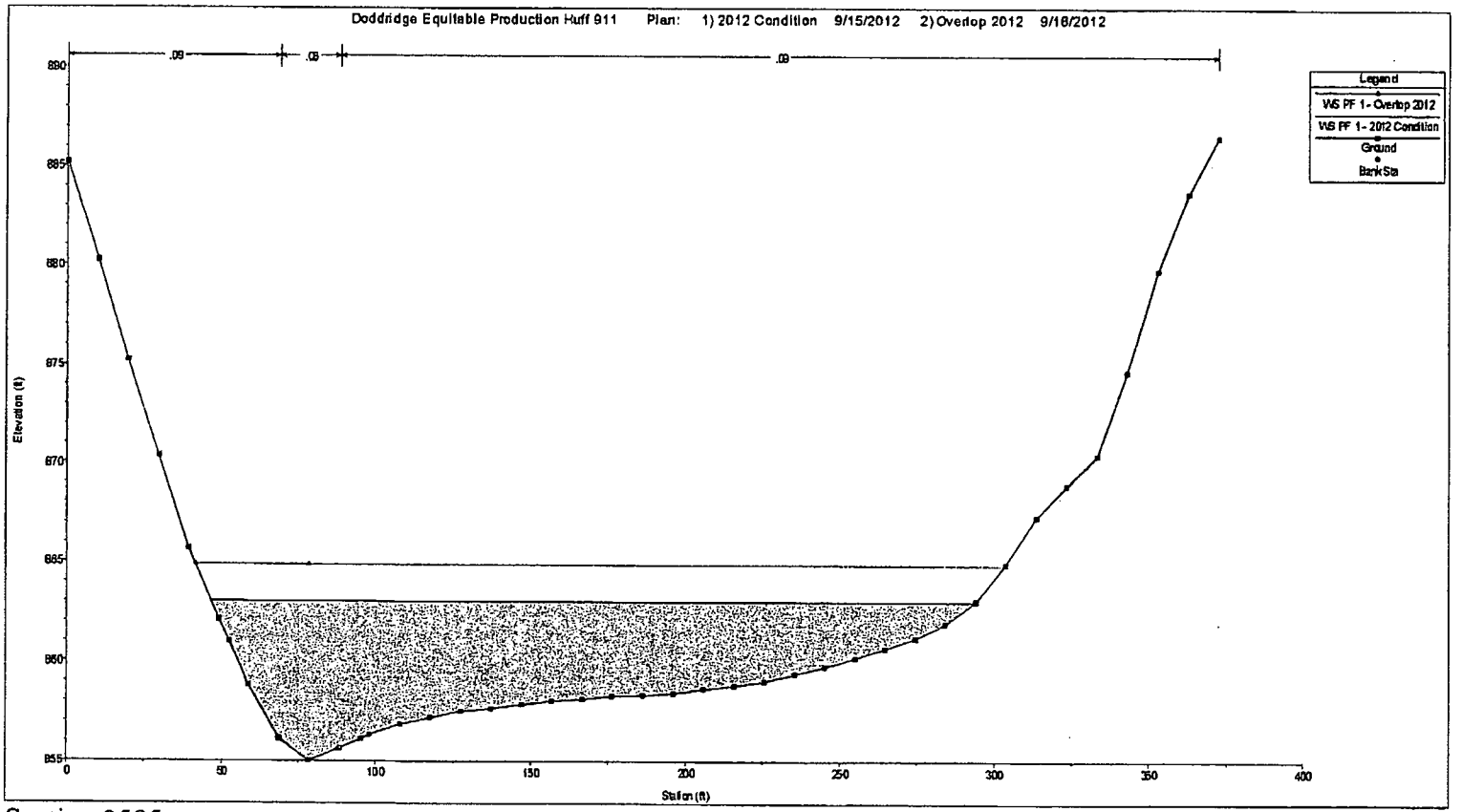
Middle Fork, 2012 and Overtop Conditions



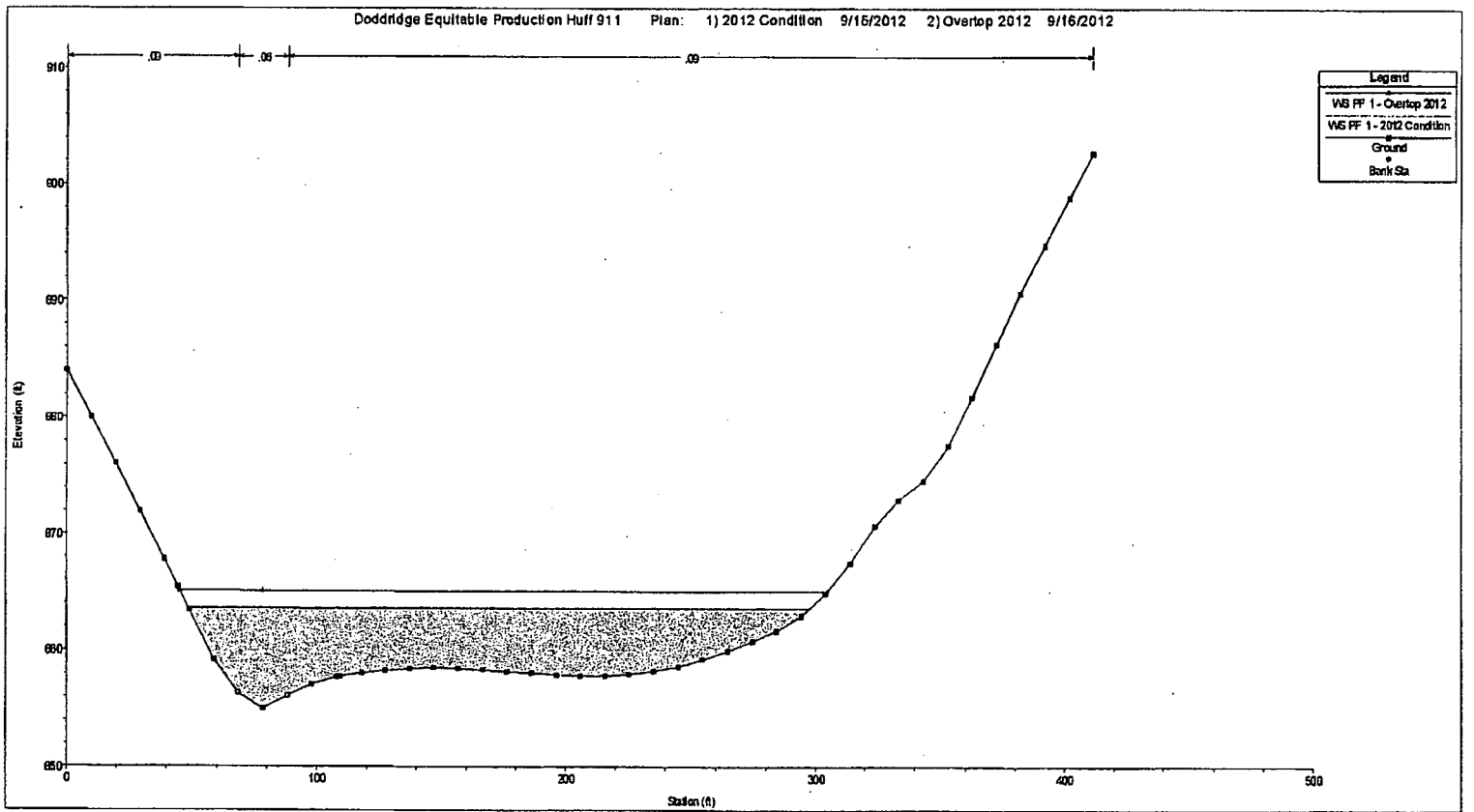
Section 3152



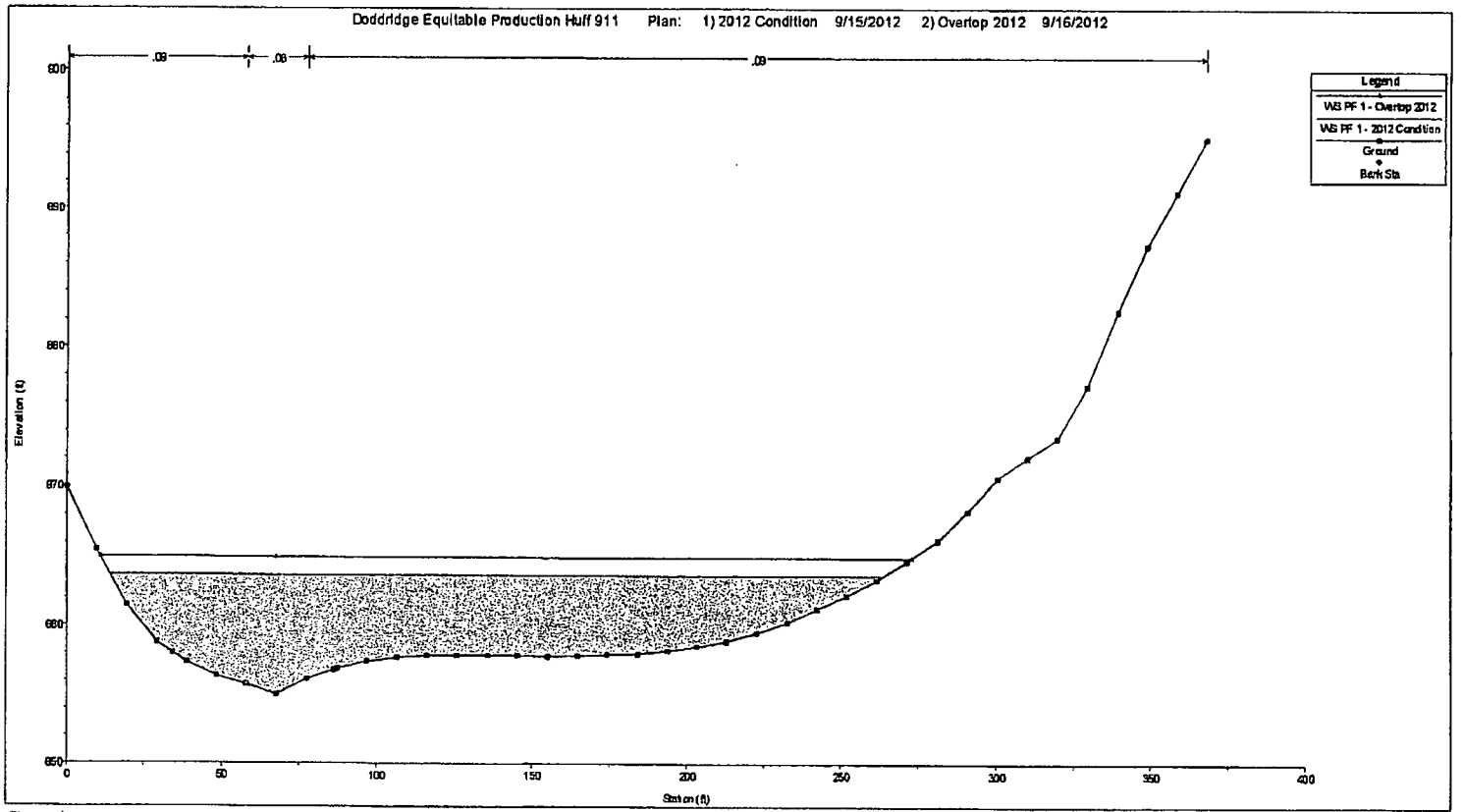
Section 3286



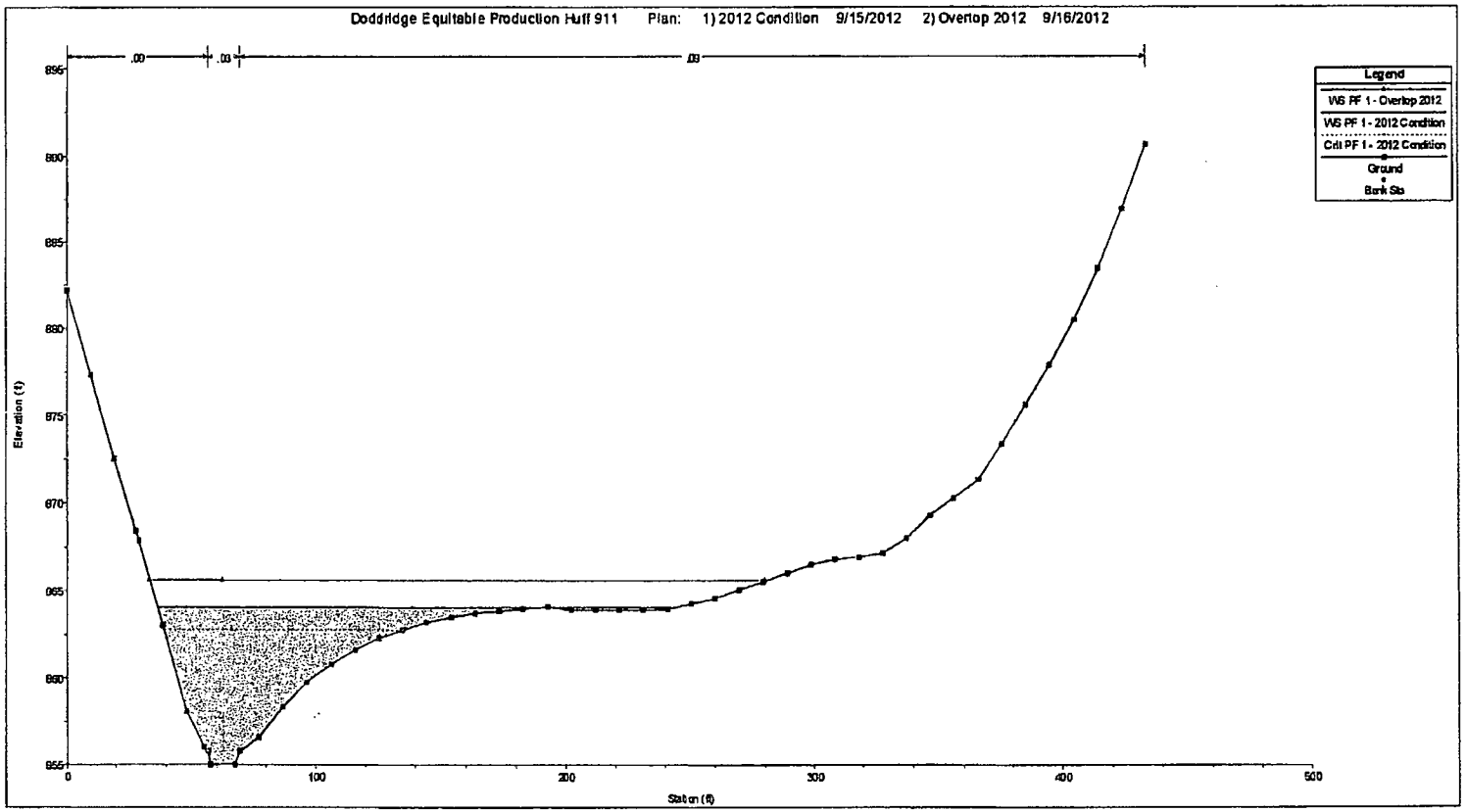
Section 3595



Section 3801



Section 3852



Section 4051

#14-264

RETTEW
We answer to you.
4955 Steubenville Pke Ste 305, Pittsburgh PA 15205 • Phone: (412) 446-1728
E-mail: rettew@rettew.com • Web site: rettew.com

Engineers
Planners
Surveyors
Landscape Architects
Environmental Consultants

August 25, 2014

11/24/14
90 DAY

Mr. Edwin "Bo" Wristen
Doddridge County Commissioner / Floodplain Manager
Doddridge County Courthouse
118 East Court Street
West Union, WV 26456
304-873-2631

FILED
2014 AUG 26 PM 1:45
BETH A. ROGERS
COUNTY CLERK
DODDRIDGE COUNTY, WV

RE: OXF-43 Well Pad
Floodplain Permit Application Submission
Southwest District, Doddridge County, WV
RETTEW Project No. 092612027

Dear Mr. Wristen:

On behalf of EQT Production Company; RETTEW Associates, Inc. is pleased to submit the enclosed permit application referenced above. Included with this submission are the following:

- Floodplain Development Permit Application
- $3,250 Check (Application Fee)
- Location Map showing the site on USGS mapping
- Floodplain Study with site plans included

A gravel well pad and related infrastructure will be constructed within the Mudlick Run / Middle Fork watershed. The proposed access road will encroach within the mapped floodplain. The impact on the floodplain due to the proposed development is within acceptable limits as shown in the floodplain study included with this submission. The increase in water surface elevation was calculated to be less than one foot. Calculated change in water surface elevations are tabulated in the study, pages 2. Cross section locations are shown on the map included in the study, page 7.

Permits from the USACE will also be necessary for this Project. An application was sent to the USACE Huntington office on August 8, 2014. A copy of the approval letter will be forwarded to your office upon receipt.

If you have any questions or require clarification regarding this submission, please do not hesitate to contact me at 412-446-1728 or via email at bspray@rettew.com or Megan Landfried at 304-848-0061 or MLandfried@eqt.com.

Sincerely,

Brian D. Spray
Project Manager

Eric Hershey, P.E.
Senior Engineer

Enclosures

copy: Megan Landfried, EQT Production Company
File

\\CHOWDER\Share\Projects\09261\092612027\LD\Permits\Doddridge Floodplain\LTR-Submit-OXF43 Doddridge Floodplain.docx