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 west virginia department of environmental protection
 

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Office of Oil and Gas  
 601 57<sup>th</sup> Street, S.E.  
 Charleston, WV 25304  
 (304) 926-0450  
 fax: (304) 926-0452

Austin Caperton, Cabinet Secretary  
[www.dep.wv.gov](http://www.dep.wv.gov)

Friday, January 18, 2019  
 WELL WORK PERMIT  
 Vertical / Plugging

ANTERO RESOURCES CORPORATION  
 1615 WYNKOOP STREET  
 DENVER, CO 80202

Re: Permit approval for 1  
 47-017-02619-00-00

This well work permit is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to any additional specific conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas Inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days of completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

Per 35 CSR 4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin  
 Chief

Operator's Well Number: 1  
 Farm Name: CALDWELL HEIRS  
 U.S. WELL NUMBER: 47-017-02619-00-00  
 Vertical Plugging  
 Date Issued: 1/18/2019

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## PERMIT CONDITIONS

West Virginia Code §22-6-11 allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

### CONDITIONS

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1. All pits must be lined with a minimum of 20 mil thickness synthetic liner.
2. In the event of an accident or explosion causing loss of life or serious personal injury in or about the well or while working on the well, the well operator or its contractor shall give notice, stating the particulars of the accident or explosion, to the oil and gas inspector and the Chief within twenty-four (24) hours.
3. Well work activities shall not constitute a hazard to the safety of persons.
4. This well is under a consent order and must be plugged under the terms of that agreement.

WW-4B  
Rev. 2/01

1) Date November 9, 2018  
2) Operator's Well No. Caldwell #1  
3) API Well No. 47-017-02619

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS

APPLICATION FOR A PERMIT TO PLUG AND ABANDON

4) Well Type: Oil \_\_\_/ Gas x/ Liquid injection \_\_\_/ Waste disposal \_\_\_/  
(If "Gas, Production \_\_\_ or Underground storage \_\_\_) Deep \_\_\_/ Shallowx

5) Location: Elevation 291.2m Watershed Cabin Run-North Fork River  
District Central County Doddridge Quadrangle Pennsboro 7.5'

6) Well Operator Antero Resources Corporation 7) Designated Agent CT Corporation System - Dianna Stamper  
Address 1615 Wynkoop Street Address 5400 D Big Tyler Road  
Denver, CO 80202 Charleston, WV 25313

8) Oil and Gas Inspector to be notified Name Daniel Flack  
Address 601 57th Street SE  
Charleston, WV 25304  
9) Plugging Contractor Name N/A - Antero will plug well  
Address \_\_\_\_\_

10) Work Order: The work order for the manner of plugging this well is as follows:

\*Please See Attached Work Order

GEL SPACERS ARE FRESH WATER MIXED W/ 6% BENTONITE (BY WEIGHT)

for  
1/18/19

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DEC 20 2018  
WV Department of  
Environmental Protection

Notification must be given to the district oil and gas inspector 24 hours before permitted work can commence.

Work order approved by inspector Jul [Signature] Date 12/10/18

01/18/2019

Antero Resources  
 1615 Wynkoop St.  
 Denver, CO 80202  
 Office: 303.357.7310  
 Fax: 303.357.7315



**Caldwell #1**  
**Doddridge County, WV**  
 API #47-017-02619

**Objective:** Plug and Abandon Wellbore.

**Pipe Schedule:**

- Conductor Set @ 268' – 8 5/8" cemented to surface
- Production Casing @ 2,339' – 4.5"

**Water Zone**

1. Fresh Water: 80'

**Oil and Gas Zones:**

1. Big Injun: 1,866' - 1,962'; Perfs @ 1,957'
2. Weir: 2,160'-2,282'; Perfs @ 2,258'

**Procedure:**

1. Check and record all casing/annular pressures into Wellview.
2. Coordinate and schedule casing jacks.
3. Notify WVDEP prior to commencing work, for plug witnessing (Doddridge County Inspector – Daniel Flack)
4. Move in and rig up flat tank and frac tank (No pits will be utilized).
5. Move in rig up service unit.
6. Rig up JU head and test - check and report surface pressure including bradenhead pressure
7. Bleed off any pressure & shut in to monitor pressure buildup. If zero, continue with procedure and pick up tubing.
8. TIH with tubing to 2,290'. Do not wash down if tubing cannot get past 2,280'.
9. MIRU cement services. Mix and pump 52 sacks (Class A cement + 2% CaCl<sub>2</sub>, 20% excess included yield = 1.18 ft<sup>3</sup>/sk, WR=5.2 gal/sk) Plug should cover from 1,720'-2,290'.
  - a. Displace to balance plug
  - b. Slowly pull out of cement plug and LD 200' of tubing.
  - c. Reverse circulate tubing clear of cement
  - d. Wait on cement 8hrs.
  - e. RIH w/ tubing and tag TOC at approximately 1,720'.
  - f. If top of cement is deeper than 1,720', mix and spot cement so top is a minimum depth of 1,720'.
  - g. Tag TOC after each/every plug set.
10. POOH with tubing.
11. Rig up and TIH with cement bond log tool under a packoff to evaluate cement behind 4 1/2" casing. Estimate the amount of 4 1/2" casing to be recovered.
12. If needed, RIH with wireline and free point tool above top of cement (in 4 1/2" casing).
  - a. Chemical or mechanical cut at xxxx' (depth as determined via freepoint and CBL)
  - b. RU casing jacks and POOH and LD 4.5" casing.
13. Determine if cement plugs can be pumped down 4 1/2" casing after the cut and while laying down the casing. If so, pump the following plugs from surface down casing.

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14. If pumping plug down 4 ½" casing, pump a 400' elevation plug using 87 sks (Class A cement + 2% CaCl<sub>2</sub>, 20% excess included yield =1.18 ft<sup>3</sup>/sk, WR=5.2 gal/sk). Plug should cover 400' above cut casing.
  - a. Trip out of hole and wait on cement
  - b. Tag TOC 400' above 4.5" casing cut.
15. If cement plug is required 200' above casing cut and 200' below casing cut, 2-3/8" tubing will have to be run back in the hole after 4 ½" casing is laid down.
16. If pumping plug down 2-3/8" tubing, pump a 400' elevation plug using 87 sks (Class A cement + 2% CaCl<sub>2</sub>, 20% excess included yield =1.18 ft<sup>3</sup>/sk, WR=5.2 gal/sk). Plug should cover 200' above cut casing and 200' below cut casing.
  - a. Trip out of hole and wait on cement
17. Tag TOC 200' above 4.5" casing cut.
18. Pull up to 368'
19. Mix and pump 135 sacks from 318'-3' (Class A cement + 2% CaCl<sub>2</sub>, 20% excess included yield =1.18 ft<sup>3</sup>/sk, WR=5.2 gal/sk)
  - a. TOOH
  - b. Wait on cement 8 hrs.
20. Weld marker plate with API number (API No.: 47-017-02619).
21. Establish remote dry hole marker & provide direction and distance to DEP.

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### Wellbore Diagram

7/7/2016

Elev.: 962'

Spud: 3/17/1980

Plug from 368' to 3'

400' Plug across casing cut

7-7/8" open hole →



8 5/8" Conductor Casing  
Set @ 268'  
80 Sks cement

TOC @ ?

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Set CIBP @ 1,720'

Plug from 1,720' - 2,290' (52 sks)  
570

Big Injun Perforations:
1,957'

Weir Perforations:
2,258'

4-1/2" Production Casing  
Set @ 2,339' w/ 175 sks

TD @ 2,367'

*NO CIBP  
JSM  
1/17/19*

*JSM  
1/18/19*

Antero Resources Corporation

Caldwell #1

API: 47-017-02619

WELL TYPE: Oil  Gas  Liquid Injection  Waste Disposal   
 (IE "Gas", Production  Underground storage  Deep  Shallow )  
 LOCATION: Elevation: 962 Watershed: Gum Run  
 District: Central County: Doddridge Quadrangle: West Union 7 1/2  
 WELL OPERATOR Magnum Oil Corporation DESIGNATED AGENT Magnum Oil Corporation  
 Address Box 4295 Address Box 4295  
Parkersburg, WV 26101 Parkersburg, WV 26101

PERMITTED WORK: Drill  Convert  Drill deeper  Redrill  Fracture or stimulate   
 Plug off old formation  Perforate new formation   
 Other physical change in well (specify) \_\_\_\_\_

PERMIT ISSUED ON March 7, 19 80 OIL & GAS INSPECTOR FOR THIS WORK:  
 (IF APPLICABLE: PLUGGING OF DRY HOLE OR CONTINUOUS PROGRESSION FROM DRILLING OR NETWORKING. VERBAL PERMISSION OBTAINED) Name Paul Garrett  
 Address 321 Beech Street  
Clarksburg, WV

GEOLOGICAL TARGET FORMATION: Injun & Weir Depth 2400 feet  
 Depth of completed well, 2367 feet Rotary  Cable Tools   
 Water strata depth: Fresh, 80 feet; salt, N/A feet.  
 Coal seam depths: N/A Is coal being mined in the area? No  
 Work was commenced March 17, 19 80, and completed March 21, 19 80

CASING AND TUBING PROGRAM

CASING OR TUBING TYPE	SPECIFICATIONS				FOOTAGE INTERVALS		CEMENT FILL-UP OR SACKS (Cubic feet)	PACKERS	
	Size	Grade	Weight per ft	New	Used	For drilling			Left in well
Conductor								Kinds	
Fresh water	5/8	CW	22	X		268	268	80 sks	Circ.
Coal									Sizes
Intermediate									
Production	1/2	CW	10.5	X			2339	175 sks	Depth set
Tubing	1/2	smf	3.5	X			2150		
Liners									Perforations:
									Top Bottom
									1913 2258

OPEN FLOW DATA  
 Producing formation Weir OIL & GAS DIVISION DEPT. OF MINES  
 Pay zone depth 2164-2258 feet  
 Gas: Initial open flow, 200 Mcf/d Oil: Initial open flow, 3 Bbl/d  
 Final open flow, \_\_\_\_\_ Mcf/d Final open flow, \_\_\_\_\_ Bbl/d  
 Time of open flow between initial and final tests, 4 hours  
 Static rock pressure, 575 psig (surface measurement) after 24 hours shut in  
 (If applicable due to multiple completion--)  
 Second producing formation Injun Pay zone depth 1913-1957 feet  
 Gas: Initial open flow, 350 Mcf/d Oil: Initial open flow, \_\_\_\_\_ Bbl/d  
 Final open flow, \_\_\_\_\_ Mcf/d Final open flow, \_\_\_\_\_ Bbl/d  
 Time of open flow between initial and final tests, 4 hours  
 Static rock pressure, 575 psig (surface measurement) after 24 hours shut in

APR 0 1980

(Reverse)  
[08-78]

DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC.

Weir - Fraced with 23,000# Sand - 500 gal. Perforations:  
 Acid and 198,000 SCF N<sup>2</sup>  
 0.39 Glass  
 2230-36 6 holes  
 2248-52 5 holes  
 2305-09 3 holes  
 2311-16 3 holes  
 2329-34 5 holes

Injun - Fraced with 23,000# Sand 500 gal. Perforation:  
 Acid and 198,000 SCF N<sup>2</sup>  
 0.39 Glass  
 2010-14 5 holes  
 2024-28 5 holes  
 2038-32 5 holes  
 2045-49 5 holes

WELL LOG

FORMATION	Color	Hard or Soft	Top Feet	Bottom Feet	Remarks Including indication of all fresh and salt water, coal, oil and gas
Sand & Soil	brown	soft	0	10	
Sand & Shale	brown	soft	10	328	
Sand Horseneck	white	soft	328	370	
Shale	black	soft	370	1071	
Sand-2nd Cow Run	white	hard	1071	1112	
Sand & Sand	brown	soft	1112	1750	
Sand Maxon	white	hard	1750	1773	
Shale	black	soft	1773	1820	
Lime -Big Lime	white	hard	1820	1866	
Sand Big Injun	white	med.	1866	1962	
Shale	black	soft	1962	2160	
Sand weir	black	soft	2160	2282	
Shale	black	soft	2282	2334	
Sand - Berea	white	hard	2334	2338	
Shale	black	soft	2338	2367	
TD				2367	

(Attach separate sheets to complete as necessary)

Magnum Oil Corporation  
 Well Operator  
 By John C. Curley  
 Its Agent

NOTE: Regulation 2.02(f) provides as follows:  
 "The term 'log' or 'well log' shall mean a systematic, detailed geological record of all formations, including coal, encountered in the drilling of a well."



WW-4A  
Revised 6-07

1) Date: 11/9/2018  
2) Operator's Well Number  
Caldwell #1

3) API Well No.: 47 - 017 - 02619

**STATE OF WEST VIRGINIA**  
**DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS**  
**NOTICE OF APPLICATION TO PLUG AND ABANDON A WELL**

4) Surface Owner(s) to be served:	5) (a) Coal Operator
(a) Name <u>Antero Resources Corporation (8-23.1,8-38,32-1.2,32-1.1)</u>	Name _____
Address <u>1615 Wynkoop St</u>	Address _____
<u>Denver, CO 80202</u>	_____
(b) Name <u>PLEASE SEE ATTACHMENT</u>	(b) Coal Owner(s) with Declaration
Address _____	Name _____
_____	Address _____
(c) Name <u>PLEASE SEE ATTACHMENT</u>	Name _____
Address _____	Address _____
_____	_____
6) Inspector <u>Daniel Flack</u>	(c) Coal Lessee with Declaration
Address <u>601 57th Street SE</u>	Name _____
<u>Charleston, WV 25304</u>	Address _____
Telephone <u>304 575-0109</u>	_____

**TO THE PERSONS NAMED ABOVE: You should have received this Form and the following documents:**

- (1) The application to Plug and Abandon a Well on Form WW-4B, which sets out the parties involved in the work and describes the well its and the plugging work order; and
- (2) The plat (surveyor's map) showing the well location on Form WW-6.

The reason you received these documents is that you have rights regarding the application which are summarized in the instructions on the reverses side. However, you are not required to take any action at all.

Take notice that under Chapter 22-6 of the West Virginia Code, the undersigned well operator proposes to file or has filed this Notice and Application and accompanying documents for a permit to plug and abandon a well with the Chief of the Office of Oil and Gas, West Virginia Department of Environmental Protection, with respect to the well at the location described on the attached Application and depicted on the attached Form WW-6. Copies of this Notice, the Application, and the plat have been mailed by registered or certified mail or delivered by hand to the person(s) named above (or by publication in certain circumstances) on or before the day of mailing or delivery to the Chief.

MEGAN GRIFFITH  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 20184011666  
MY COMMISSION EXPIRES MARCH 13, 2022

Well Operator Antero Resources Corporation  
By: Diana Hoff *Diana O. Hoff*  
Its: VP of Operations  
Address 1615 Wynkoop Street  
Denver, CO 80202  
Telephone 303-357-7310

Subscribed and sworn before me this 9<sup>th</sup> day of NOVEMBER 2018  
*[Signature]* Notary Public  
My Commission Expires 3/13/2022

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**Oil and Gas Privacy Notice**

The Office of Oil and Gas processes your personal information, such as name, address and phone number, as a part of our regulatory duties. Your personal information may be disclosed to other State agencies or third parties in the normal course of business or as needed to comply with statutory or regulatory requirements, including Freedom of Information Act requests. Our office will appropriately secure your personal information. If you have any questions about our use of your personal information, please contact DEP's Chief Privacy Officer at [depprivacyoffier@wv.gov](mailto:depprivacyoffier@wv.gov).

WV Department of  
Environmental Protection

## WW-4A NOTICE OF APPLICATION TO PLUG &amp; ABANDON A WELL ATTACHMENT:

**Surface Owners:**

**Tax Parcel ID:** 3-32-1  
**Owner:** Gene Carol & Carol J. Coger  
**Address:** 1029 Cabin Run Road  
Pennsboro, West Virginia, 26415

**Tax Parcel ID:** 1-11-1  
**Owner:** Eric S. Smith  
**Address:** 1484 Gum Run Road  
Pennsboro, West Virginia, 26415

**Tax Parcel ID:** 1-8-9999.2 (West Virginia DOH  
Right of Way)  
**Owner:** West Virginia Department of  
Transportation  
**Address:** Division of Highways  
c/o Mike Davis  
P.O. Box 4220  
Clarksburg, WV 26302

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**SURFACE OWNER WAIVER**

Operator's Well  
Number

Caldwell #1

**INSTRUCTIONS TO SURFACE OWNERS NAMED ON PAGE WW4-A**

The well operator named on page WW-4A is applying for a permit from the State to plug and abandon a well. (Note: If the surface tract is owned by more than three persons, then these materials were served on you because your name appeared on the Sheriff's tax ticket on the land or because you actually occupy the surface tract. In either case, you may be the only owner who will actually receive these materials.) See Chapter 22 of the West Virginia Code. Well work permits are valid for 24 months. If you do not own any interest in the surface tract, please forward these materials to the true owner immediately if you know who it is. Also, please notify the well operator and the Office of Oil and Gas.

**NOTE: YOU ARE NOT REQUIRED TO FILE ANY COMMENT.  
WHERE TO FILE COMMENTS AND OBTAIN ADDITIONAL INFORMATION:**

Chief, Office of Oil and Gas  
Department of Environmental Protection  
601 57<sup>th</sup> St. SE  
Charleston, WV 25304  
(304) 926-0450

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NOV 14 2018  
WV Department of  
Environmental Protection

**Time Limits and methods for filing comments.** The law requires these materials to be served on or before the date the operator files his Application. You have **FIVE (5) DAYS** after the filing date to file your comments. Comments must be filed in person or received in the mail by the Chief's office by the time stated above. You may call the Chief's office to be sure of the date. Check with your postmaster to ensure adequate delivery time or to arrange special expedited handling. If you have been contacted by the well operator and you have signed a "voluntary statement of no objection" to the planned work described in these materials, then the permit may be issued at any time.

**Comments must be in writing.** Your comments must include your name, address and telephone number, the well operator's name and well number and the approximate location of the proposed well site including district and county from the application. You may add other documents, such as sketches, maps or photographs to support your comments.

The Chief has the power to deny or condition a well work permit based on comments on the following grounds:

- 1) The proposed well work will constitute a hazard to the safety of persons.
- 2) The soil erosion and sediment control plan is not adequate or effective;
- 3) Damage would occur to publicly owned lands or resources;
- 4) The proposed well work fails to protect fresh water sources or supplies;
- 5) The applicant has committed a substantial violation of a previous permit or a substantial violation of one or more of the rules promulgated under Chapter 22, and has failed to abate or seek review of the violation...".

**If you want a copy of the permit as it is issued or a copy of the order denying the permit, you should request a copy from the Chief.**

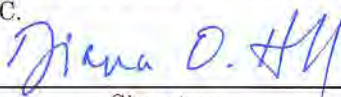
**VOLUNTARY STATEMENT OF NO OBJECTION**

I hereby state that I have read the instructions to surface owners and that I have received copies of a Notice and Application For A Permit To Plug And Abandon on Forms WW-4A and WW-4B, and a survey plat.

I further state that I have no objection to the planned work described in these materials, and I have no objection to a permit being issued on those materials.

FOR EXECUTION BY A NATURAL PERSON  
ETC.

FOR EXECUTION BY A CORPORATION,

<u></u>	Date	11/9/2018	Name	Antero Resources Corporation
Signature			By	Diana Hoff
			Its	VP of Operations
				Date

WW-9  
(5/16)

API Number 47 - 017 - 02619  
Operator's Well No. \_\_\_\_\_ Caldwell #1 \_\_\_\_\_

STATE OF WEST VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OFFICE OF OIL AND GAS  
FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name Antero Resources Corporation OP Code 494507062

Watershed (HUC 10) Cabin Run-North Fork River Quadrangle Pennsboro 7.5'

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes  No

Will a pit be used? Yes  No

If so, please describe anticipated pit waste: \_\_\_\_\_

Will a synthetic liner be used in the pit? Yes  No  If so, what ml.? \_\_\_\_\_

Proposed Disposal Method For Treated Pit Wastes:

- Land Application (if selected provide a completed form WW-9-GPP)
- Underground Injection ( UIC Permit Number                      \*UIC Permit # will be provided on Form WR-34 )
- Reuse (at API Number                      Future permitted well locations when applicable. API# will be provided on Form WR-34 )
- Off Site Disposal (Supply form WW-9 for disposal location) (Meadowfill Landfill Permit #SWF-1032-98)
- Other (Explain                      Northwestern Landfill Permit #SWF-1025/WV0109410)

Will closed loop system be used? If so, describe: Yes, fluids stored in tanks, cuttings removed off site and taken to landfill.

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc.

-If oil based, what type? Synthetic, petroleum, etc.

Additives to be used in drilling medium? \_\_\_\_\_

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc.

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) \_\_\_\_\_

-Landfill or offsite name/permit number? \_\_\_\_\_

Permittee shall provide written notice to the Office of Oil and Gas of any load of drill cuttings or associated waste rejected at any West Virginia solid waste facility. The notice shall be provided within 24 hours of rejection and the permittee shall also disclose where it was properly disposed.

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on April 1, 2016, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

Company Official Signature S. Donovan for Gretchen Kohler  
Company Official (Typed Name) Gretchen Kohler  
Company Official Title Senior Environmental & Regulatory Manager

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DEC 20 2018  
WV Department of  
Environmental Protection

Subscribed and sworn before me this 9th day of NOVEMBER, 2018

Chaseh

Notary Public

My commission expires MARCH 13, 2022

MEGAN GRIFFITH  
NOTARY PUBLIC  
STATE OF COLORADO  
NOTARY ID 2018401666  
MY COMMISSION EXPIRES MARCH 13, 2022

Form WW-9

Operator's Well No. \_\_\_\_\_ Caldwell #1

Proposed Revegetation Treatment: Acres Disturbed 8.06 Prevegetation pH \_\_\_\_\_

Lime 2-3 Tons/acre or to correct to pH 6.5

Fertilizer type \_\_\_\_\_

Fertilizer amount 500 lbs/acre

Mulch 2-3 Tons/acre

Seed Mixtures

Temporary

Permanent

Seed Type	lbs/acre
Annual Ryegrass	40
Field Bromegrass	40

Seed Type	lbs/acre
Crownvetch	10-15
Tall Fescue	30

Please reference Table IV-3 on page 7 of the Well #1 Plugging Plan

Please reference Table IV-4A on page 7 of the Well #1 Plugging Plan

\*or type of grass seed requested by surface owner

Attach:

Maps(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided). If water from the pit will be land applied, provide water volume, include dimensions (L, W, D) of the pit, and dimensions (L, W), and area in acres, of the land application area.

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: \_\_\_\_\_

*[Handwritten signature]*

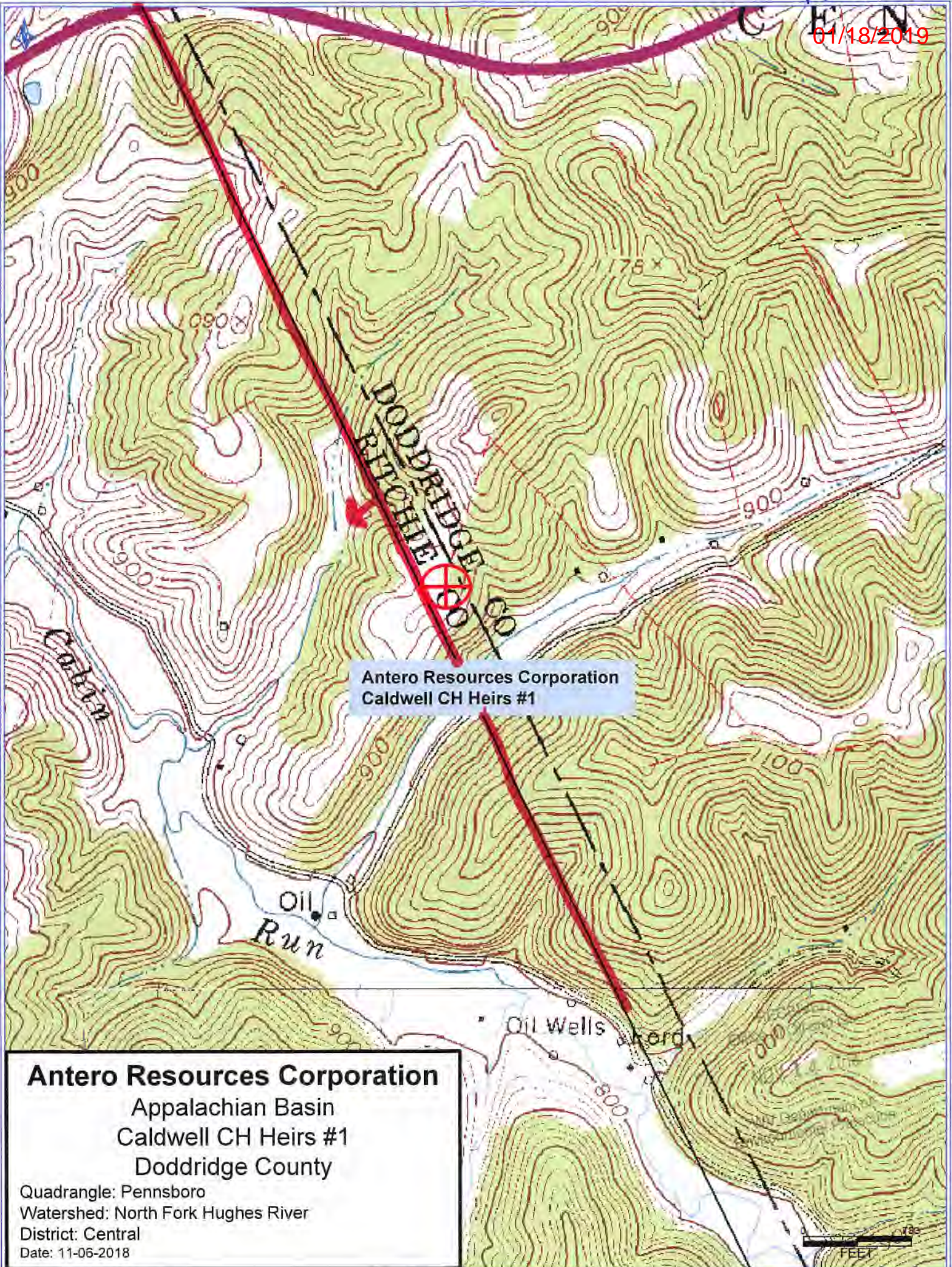
Comments: Make every effort to pull as much pipe as possible

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DEC 20 2018  
WW Department of  
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Title: D: 1 + Gas Inspector

Date: 12/10/18

Field Reviewed? ( ) Yes ( ) No

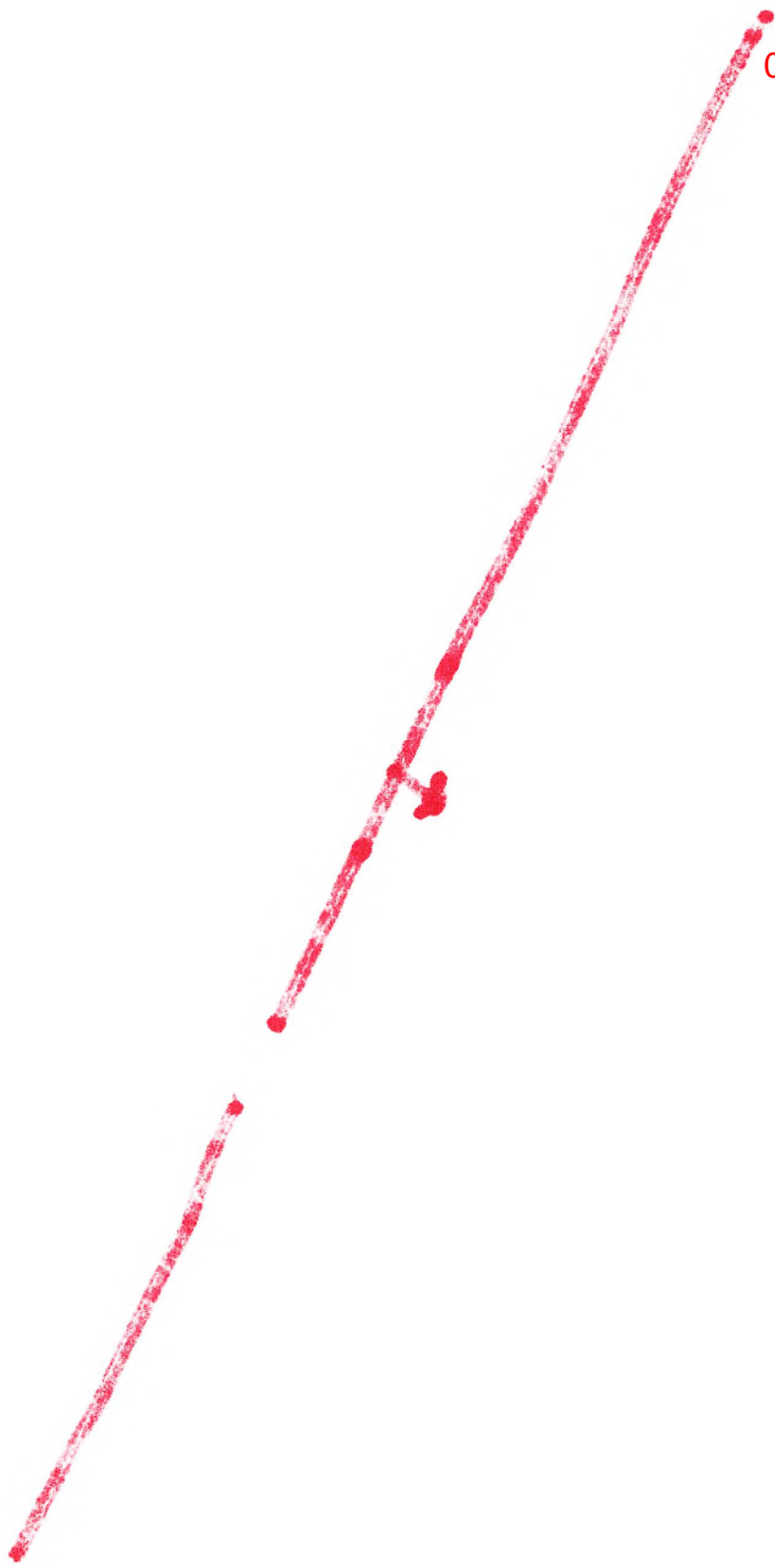


Antero Resources Corporation  
Caldwell CH Heirs #1

**Antero Resources Corporation**  
 Appalachian Basin  
 Caldwell CH Heirs #1  
 Doddridge County

Quadrangle: Pennsboro  
 Watershed: North Fork Hughes River  
 District: Central  
 Date: 11-06-2018

01/18/2019



WW-7  
8-30-06



West Virginia Department of Environmental Protection  
Office of Oil and Gas

**WELL LOCATION FORM: GPS**

API: 47-017-02619 WELL NO.: 1

FARM NAME: N/A

RESPONSIBLE PARTY NAME: Antero Resources Corporation

COUNTY: Doddridge DISTRICT: Central

QUADRANGLE: Pennsboro

SURFACE OWNER: Eric S. Smith

ROYALTY OWNER: N/A

UTM GPS NORTHING: 4345465.15 m

UTM GPS EASTING: 508257.90m GPS ELEVATION: 291.2 m

The Responsible Party named above has chosen to submit GPS coordinates in lieu of preparing a new well location plat for a plugging permit or assigned API number on the above well. The Office of Oil and Gas will not accept GPS coordinates that do not meet the following requirements:

1. Datum: NAD 1983, Zone: 17 North, Coordinate Units: meters, Altitude: height above mean sea level (MSL) – meters.
2. Accuracy to Datum – 3.05 meters
3. Data Collection Method:

Survey grade GPS  : Post Processed Differential \_\_\_\_\_  
Real-Time Differential

Mapping Grade GPS  : Post Processed Differential \_\_\_\_\_  
Real-Time Differential

4. Letter size copy of the topography map showing the well location.

I the undersigned, hereby certify this data is correct to the best of my knowledge and belief and shows all the information required by law and the regulations issued and prescribed by the Office of Oil and Gas.

[Signature]  
Signature

Permitting Supervisor  
Title

10/9/18  
Date

RECEIVED  
Office of Oil and Gas  
NOV 14 2018  
WV Department of  
Environmental Protection



01/18/2019

# API#47-017-0 WELL #1 WELL PLUGGING

CLAY & CENTRAL DISTRICTS, RITCHIE & DOODRIDGE  
CABIN RUN-NORTH FORK RIVER

PENNSBORO & WEST UNION USGS 7

**LOCATION COORDINATES:**

EXISTING ACCESS ROAD ENTRANCE  
LATITUDE: 39.270624 LONGITUDE: -80.890409 (NAD 83)  
N 4346614.49 E 509453.45 (UTM ZONE 17 METERS)

ACCESS ROAD "A" ENTRANCE  
LATITUDE: 39.259021 LONGITUDE: -80.904585 (NAD 83)  
N 4345525.37 E 508231.97 (UTM ZONE 17 METERS)

CENTROID OF PAD  
LATITUDE: 39.259021 LONGITUDE: -80.904585 (NAD 83)  
N 4345459.06 E 508254.83 (UTM ZONE 17 METERS)

**GENERAL DESCRIPTION:**

THE EXISTING ACCESS ROAD AND WELL PAD ARE BEING UPGRADED TO AID IN THE PLUGGING OF EXISTING INDIVIDUAL GAS WELL.

**FLOODPLAIN NOTES:**

THE PROPOSED SITE IS LOCATED WITHIN FEMA FLOOD ZONE "X" PER FEMA FLOOD MAP #54017C0100C.

**MISS UTILITY STATEMENT:**

ANTERO RESOURCES CORPORATION WILL NOTIFY MISS UTILITY OF WEST VIRGINIA FOR THE LOCATING OF UTILITIES PRIOR TO THIS PROJECT DESIGN. IN ADDITION, MISS UTILITY WILL BE CONTACTED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION FOR THIS PROJECT.

**ENTRANCE PERMIT:**

ANTERO RESOURCES CORPORATION WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES, IF REQUIRED.

**GEOTECHNICAL NOTES:**

NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED AND ANALYZED FOR THE DESIGN OF THIS SITE.

**ENVIRONMENTAL NOTES:**

STREAM AND WETLAND DELINEATIONS WERE PERFORMED BY ALLSTAR ECOLOGY, LLC, FROM DELINEATIONS OF THE PROJECT AREA PERFORMED JANUARY 2015. STREAM AND WETLAND DELINEATIONS WERE PERFORMED BY GAI CONSULTANTS, INC. FROM DELINEATIONS OF THE PROJECT AREA PERFORMED MAY 2015.

**PROJECT CONTACTS:**

**OPERATOR:**

ANTERO RESOURCES CORPORATION  
535 WHITE OAKS BLVD.  
BRIDGEPORT, WV 26330  
PHONE: (304) 842-4100  
FAX: (304) 842-4102

ELI WAGONER - ENVIRONMENTAL ENGINEER  
OFFICE: (304) 842-4068 CELL: (304) 478-9770

JON McEVERS - OPERATIONS SUPERINTENDENT  
OFFICE: (303) 357-6799 CELL: (303) 808-2423

AARON KUNZLER - CONSTRUCTION SUPERVISOR  
CELL: (405) 227-8344

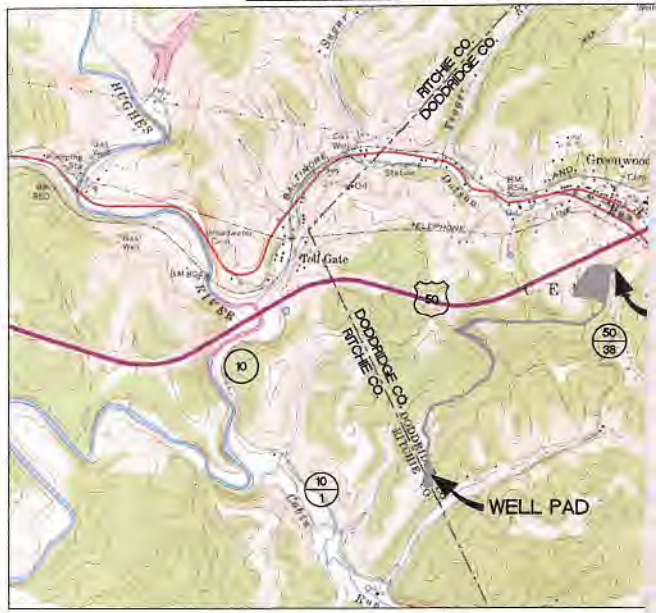
ROBERT B. WIRKS - FIELD ENGINEER  
OFFICE: (304) 842-4100 CELL: (304) 627-7405

CHARLES E. COMPTON, III - SURVEYING COORDINATOR  
CELL: (304) 719-6449

TIM RAINS - LAND AGENT  
OFFICE: (304) 842-4290 CELL: (405) 641-3536

**ENGINEER/SURVEYOR:**

NAVITUS ENGINEERING, INC.  
CYRUS S. KUMP, PE - PROJECT MANAGER/ENGINEER  
OFFICE: (888) 662-4185 CELL: (540) 686-6747



WEST VIRGINIA COUNTY MAP



**REPRODUCTION NOTE**

THESE PLANS WERE CREATED TO BE PLOTTED ON 22"x34" (ANSI D) PAPER. HALF SCALE DRAWINGS ARE ON 11"x17" (ANSI B) PAPER.  
  
THESE PLANS WERE CREATED FOR COLOR PLOTTING AND ANY REPRODUCTIONS IN GRAY SCALE OR COLOR MAY RESULT IN A LOSS OF INFORMATION AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



**CONSTRUCTION NOTES:**

1. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND WILL NOTIFY NAVITUS ENGINEERING AT (888) 662-4165 IMMEDIATELY ON ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN. ANY WORK PERFORMED BY THE CONTRACTOR AFTER THE FINDING OF SUCH DISCREPANCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
2. METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT COUNTY CONSTRUCTION STANDARDS AND SPECIFICATIONS AND/OR CURRENT WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL STANDARDS AND SPECIFICATIONS. SHOULD A CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, AND PLANS OCCUR, THE MOST STRINGENT REQUIREMENT WILL APPLY. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE DEVELOPER OR HIS AGENT OF THE RESPONSIBILITIES CONTAINED IN THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.
3. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO, A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
4. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES.
5. THE LOCATION OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE FROM FIELD LOCATIONS AND/OR GIS DATA. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
6. THE CONTRACTOR SHALL PROVIDE NOTIFICATION TO THE APPROPRIATE UTILITY COMPANY PRIOR TO CONSTRUCTION OF WATER AND/OR GAS PIPELINES. INFORMATION SHOULD ALSO BE OBTAINED FROM THE APPROPRIATE AUTHORITY CONCERNING PERMITS, CUT SHEETS, AND CONNECTIONS TO EXISTING LINES.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGES TO THE EXISTING STREETS AND UTILITIES WHICH OCCURS AS A RESULT OF HIS CONSTRUCTION PROJECT WITHIN OR CONTIGUOUS WITH THE EXISTING RIGHT-OF-WAY.
8. WHEN GRADING IS PROPOSED WITHIN EASEMENTS OF UTILITIES, LETTERS OF PERMISSION FROM ALL INVOLVED COMPANIES MUST BE OBTAINED PRIOR TO GRADING AND/OR SITE DEVELOPMENT.
9. THE DEVELOPER WILL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITIES WHICH IS REQUIRED AS A RESULT OF HIS PROJECT. THE RELOCATION SHOULD BE DONE PRIOR TO CONSTRUCTION.
10. THESE PLANS IDENTIFY THE LOCATION OF ALL KNOWN GRAVESITES. GRAVESITES SHOWN ON THIS PLAN WILL BE PROTECTED IN ACCORDANCE WITH STATE LAW. IN THE EVENT GRAVESITES ARE DISCOVERED DURING CONSTRUCTION, THE OWNER AND ENGINEER MUST BE NOTIFIED IMMEDIATELY.
11. THE CONTRACTOR(S) SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
12. CONTRACTOR TO CONTACT OPERATOR AND ENGINEER IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE EROSION AND SEDIMENT CONTROL INSPECTOR 2 DAYS PRIOR TO THE START OF CONSTRUCTION.
14. THE CONTRACTOR IS RESPONSIBLE FOR ALL FILL MATERIAL PLACEMENT REQUIRED DURING THE CONSTRUCTION OF THIS PROJECT. ALL MATERIAL TESTS SHALL BE CONDUCTED BY THE ON-SITE INSPECTOR. ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THE CONSTRUCTED FACILITY. FAILURE TO CONDUCT THE DENSITY TESTS AND/OR NECESSARY REPAIRS TO DEFICIENT AREAS AS A RESULT OF THE DENSITY TESTING SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE CONSTRUCTED FACILITY.
15. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTING THE SITE IN ACCORDANCE WITH THE DESIGN PLANS AND CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK SHALL CONFORM WITH THE GRADES, BERMS, DEPTHS, DIMENSIONS, ETC. SHOWN HEREON.
16. SUPER SILT FENCE CAN BE USED IN PLACE OF ANY COMPOST FILTER SOCK.
17. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS, INCLUDING THE 1970 OSHA ACT. PRECAUTION FOR THE PROTECTION OF PERSONS, INCLUDING EMPLOYEES AND PROPERTY, SHALL ALWAYS BE EXERCISED BY THE CONTRACTOR. INITIATION, MAINTENANCE, AND SUPERVISION OF ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK, INCLUDING ALL REQUIREMENTS PER CFR 1910.146, SHALL ALSO BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. CONSTRUCTION ACTIVITIES SHALL BE RESTRICTED TO THE AREAS SHOWN ON THE PLANS WITHIN THE LIMITS OF DISTURBANCE, UNLESS OTHERWISE AUTHORIZED BY ANTERO RESOURCES CORPORATION. MODIFICATION PLAN MUST BE SUBMITTED TO THE DEP FOR ANY ACTIVITIES PERFORMED OUTSIDE OF THE LIMITS OF DISTURBANCE.
19. PRESERVATION OF BENCHMARKS, PROPERTY CORNERS, REFERENCE POINTS, STAKES AND OTHER SURVEY REFERENCE MONUMENTS OR MARKERS IS THE RESPONSIBILITY OF THE CONTRACTOR. IN CASES OF WILLFUL OR CARELESS DESTRUCTION THE CONTRACTOR SHALL BE REQUIRED TO REPLACE OR RESTORE SAID MONUMENT OR MARKER. RESETTling OF MARKERS SHALL BE PERFORMED BY A PROFESSIONAL SURVEYOR AS APPROVED BY ANTERO RESOURCES CORPORATION.
20. THE CONTRACTOR SHALL MAINTAIN ADEQUATE CLEARANCE FROM ALL ELECTRIC LINES, IF ANY, IN ACCORDANCE WITH NATIONAL ELECTRICAL SAFETY CODE.
21. THE CONTRACTOR SHALL MINIMIZE ALL CLEARING AND DISTURBANCE TO THE ENVIRONMENT TO THE MAXIMUM EXTENT POSSIBLE. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE.
22. ANY DIGITAL FILES PROVIDED TO THE CONTRACTOR BY NAVITUS ENGINEERING, INC. ARE PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONSTRUCTION OF THE SITE SHALL MEET ALL DESIGN PARAMETERS OF THE WV DEP APPROVED NAVITUS ENGINEERING, INC. DESIGN PLANS. NAVITUS ENGINEERING, INC. WILL NOT BE HELD LIABLE FOR THE CONTRACTOR USING THE DIGITAL FILES TO WAIVER FROM THE APPROVED DESIGN PLANS.
23. ANY CONSTRUCTION ISSUES OR QUESTIONS SHALL BE BROUGHT TO THE ENGINEER IMMEDIATELY. THE CONSTRUCTION INSPECTOR SHALL BE CONTACTED AND MUST RELAY THESE ISSUES OR QUESTIONS TO THE ENGINEER FOR RESOLUTION. TEMPORARY STABILIZATION SHALL BE APPLIED AS NECESSARY.
24. ALL EXISTING AND DESIGNED CULVERTS AND CULVERT SUMPS SHALL BE CLEANED AND CLEARED OF DEBRIS DURING THE COURSE OF CONSTRUCTION. ANY EXCESS EROSION DUE TO THE PLUGGING OF A CULVERT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

**EROSION AND SEDIMENT CONTROL NARRATIVE:**

**PROJECT DESCRIPTION:** THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT A GAS WELL PLUGGING PAD AND TO AID IN THE PLUGGING OF AN EXISTING INDIVIDUAL GAS WELL. THE ACCESS ROAD ENTRANCE TO THE PROPOSED SITE IS LOCATED ON THE EAST SIDE OF WV RT. 50/32, 0.20 MILES SOUTH OF THE INTERSECTION OF INTERSTATE 50 AND CO. RT. 50/32 IN DODDRIDGE COUNTY, WEST VIRGINIA. THE TOTAL APPROXIMATE LAND DISTURBANCE ASSOCIATED WITH THIS PROJECT IS 23.48 ACRES.

**EXISTING SITE CONDITIONS:** THE EXISTING SITE IS APPROXIMATELY 12.3X WOODED. THE TOPOGRAPHY RANGES FROM MODERATE TO STEEP TERRAIN (2% TO 60% SLOPES). PRESENT ON SITE ARE ACCESS ROADS, OVERHEAD UTILITIES, EXISTING STRUCTURES, AN EXISTING GAS WELL, AND TANKS ASSOCIATED WITH THE EXISTING GAS WELL. 3 INTERMITTENT STREAM(S), 3 EPHEMERAL STREAM(S), AND 2 PEM WETLAND(S) ARE LOCATED ONSITE. THE SITE IS LOCATED ON A RIDGE AND DRAINS TO CABIN RUN AND TRIBUTARIES OF CABIN RUN. NO EROSION WAS NOTICED ON SITE.

**ADJACENT PROPERTY:** THE SITE IS BORDERED BY FORESTED LANDS ON THE EAST AND SOUTH, LANDFILL TO THE WEST AND NORTH.

**CRITICAL AREAS:** THE AREA(S) SHOWN ALONG THE FIELD DELINEATED STREAMS, WETLANDS, AND PONDS, AS SHOWN ON THE PLANS, ARE DESIGNATED AS CRITICAL AREA(S), IF PRESENT. ALL 3:1 SLOPES AND STEEPER, DITCHES, AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED AND MAINTAINED DAILY DURING CONSTRUCTION AND AFTER EACH RAINFALL OF 0.5 INCHES OR GREATER. COMPOST FILTER SOCKS ARE TO BE USED TO PROTECT THESE FIELD DELINEATED AREA(S) FROM SEDIMENT LEAVING THE SITE. ADDITIONALLY, ORANGE SAFETY FENCE IS RECOMMENDED TO BE INSTALLED ABOVE/AROUND THESE AREA(S), TO SERVE AS A PHYSICAL BARRIER, ENSURING THE AREA(S) ARE NOT DISTURBED. THE LOCAL GOVERNING AUTHORITY WILL HAVE THE AUTHORITY TO RECOMMEND THE PLACEMENT OF ADDITIONAL EROSION CONTROL MEASURES IN THESE AREAS IF IT BECOMES EVIDENT DURING CONSTRUCTION THAT THE ONES IN PLACE ARE NOT FUNCTIONING SUFFICIENTLY.

**SOILS:** NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED AND ANALYZED FOR THE DESIGN OF THIS SITE.

**OFF SITE AREAS:** THERE ARE NO BORROW AREA(S) OR EXPORT STOCKPILE AREA(S) OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE FOR THIS PROJECT.

**EROSION AND SEDIMENT CONTROL MEASURES:** UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL.

**STRUCTURAL PRACTICES:**

1. INSTALL ORANGE SAFETY FENCE TO ENSURE NO DISTURBANCE TO THE DELINEATED AREA(S).
2. INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
3. INSTALL COMPOST FILTER SOCKS AND/OR SILT FENCE AS SHOWN ON THE PLANS TO REMOVE SEDIMENT FROM RUNOFF. SELECTIVELY REMOVE TREES REQUIRED TO INSTALL COMPOST FILTER SOCK IN WOODED AREAS. CLEARING AND GRUBBING SHALL BE KEPT AT A MINIMUM TO INSTALL E&S CONTROLS.
4. FILL SLOPE SURFACE SHALL BE LEFT IN A ROUGHENED CONDITION TO REDUCE EROSION. CONTRACTOR SHALL REDIRECT RUNOFF AWAY FROM THE FILL SLOPE BY INSTALLING EARTHEN DIVERSION BERMS AND DIVERTING THE RUNOFF TO SEDIMENT TRAPPING DEVICES.
5. INSTALL V-DITCHES, DITCH RELIEF CULVERTS, AND OUTLET PROTECTION (RIP-RAP APRONS) AS SHOWN ON THE PLANS.

DEVICES LISTED ABOVE ARE CONSIDERED MINIMUM EROSION AND SEDIMENT CONTROLS. ADDITIONAL CONTROL MEASURES MAY BE NECESSARY DUE TO CONTRACTOR PHASING OR OTHER UNFORESEEN CONDITIONS. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMP'S TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION. ALL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. ALL RUNOFF FROM DISTURBED AREAS SHALL PASS THROUGH A SEDIMENT FILTERING DEVICE LOCATED BELOW THE DISTURBED AREA. AT NO TIME WILL UNFILTERED SEDIMENT LADEN RUNOFF BE ALLOWED TO LEAVE THE SITE AND ENTER STATE WATERS.

**PERMANENT STABILIZATION:** ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN SEVEN (7) DAYS. AT NO TIME SHALL LAND LAY DORMANT LONGER THAN TWENTY-ONE (21) DAYS.

**MAINTENANCE PROGRAM:** DURING CONSTRUCTION ACTIVITIES, ALL CONTROL MEASURES SHALL BE INSPECTED DAILY BY THE SITE SUPERINTENDENT OR HIS REPRESENTATIVE AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY SIGNIFICANT RAIN EVENT, WHICH SHALL BE DEFINED AS RAINFALL OF TWO (2) INCHES OR MORE IN A SIX (6) HOUR PERIOD. ONCE CONSTRUCTION ACTIVITIES HAVE CONCLUDED, THE SITE SHALL BE INSPECTED EVERY TWO (2) WEEKS FOR THE LIFE OF THE FACILITY AND WITHIN TWENTY-FOUR (24) HOURS OF A SIGNIFICANT RAIN EVENT AS DEFINED ABOVE. ANY DAMAGED STRUCTURAL MEASURES ARE TO BE REPAIRED, BY THE END OF THE DAY, OR AT THE EARLIEST TIME IN WHICH IT IS SAFE TO DO SO. SEEDING AREAS SHALL BE CHECKED REGULARLY TO ENSURE THAT A GOOD STAND OF GRASS IS MAINTAINED. ALL AREAS SHALL BE FERTILIZED AND RESEEDING AS NEEDED UNTIL GRASS IS ESTABLISHED.

TRAPPED SEDIMENT IS TO BE REMOVED AS REQUIRED TO MAINTAIN 50% TRAP AND/OR SOCK EFFICIENCY AND DISPOSED OF AS ENGINEERED FILL ON THE STOCKPILES.

INLETS AND OUTLETS OF DITCH RELIEF CULVERTS SHALL BE CHECKED REGULARLY FOR SEDIMENT BUILD-UP. IF THE INLET AND/OR OUTLET IS CLOGGED BY 50% OR GREATER, IT SHALL BE REMOVED AND CLEANED OR REPLACED IMMEDIATELY.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED OR SWEEPED INTO ANY ROADSIDE DITCH, CULVERT OR SURFACE WATER.

ANY DISTURBED AREAS ALONG THE ACCESS ROAD SHALL BE STABILIZED AS CONSTRUCTION PROCEEDS, PRIOR TO CONTINUING FURTHER ACCESS ROAD CONSTRUCTION, WITH EITHER ROCK STABILIZATION OR SEEDING AND MULCHING METHODS.

NOTE: THE WV DEP RETAINS THE RIGHT TO ADD AND/OR MODIFY THESE EROSION AND SEDIMENT CONTROL MEASURES DURING THE CONSTRUCTION PROCESS, WITHIN REASON, TO ENSURE ADEQUATE PROTECTION TO THE PUBLIC AND THE ENVIRONMENT.

**SEEDING (SOIL STABILIZATION):**

1. CONTRACTOR SHALL APPLY SEED AND STABILIZATION IN ACCORDANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE (BMP) MANUAL, BASED UPON SITE SPECIFIC SOIL CHARACTERISTICS.
2. WHEREVER SEEDING IS TO BE APPLIED TO STEEP SLOPES ( $\geq$  3H:1V), SEED MIXTURES SHOULD BE SELECTED THAT ARE APPROPRIATE FOR STEEP SLOPES.

**DUST CONTROL:**

1. TEMPORARY SEEDING SHALL BE APPLIED TO ALL DISTURBED AREAS SUBJECT TO LITTLE OR NO CONSTRUCTION TRAFFIC.
2. ALL HAUL ROADS AND OTHER HEAVY TRAFFIC ROUTES SHALL BE SPRINKLED WITH WATER UNTIL THE SURFACE IS WET AND REPEATED AS NEEDED TO CONTROL DUST.

# CONTROL NOTES

**CONSTRUCTION SEQUENCE.**  
 WORK ON THIS SITE SHALL BE CONSISTENT WITH THE FOLLOWING GENERAL CONSTRUCTION. THE CONTRACTOR SHALL IMPLEMENT, MAINTAIN, AND OPERATE ALL EROSION AND SEDIMENT CONTROL MEASURES TO EFFECTIVELY MITIGATE THE HAZARDOUS EROSION AND SEDIMENTATION TO ACCEPTABLE LEVELS. MINOR DEVIATIONS FROM THIS SEQUENCE SHALL BE EXECUTED BY THE PROJECT'S SUPERINTENDENT AS NEEDED TO CORRECT ANY POTENTIAL EROSION CONDITION THAT MAY ARISE FOR THE DURATION OF THE PROJECT. THE WV DEP OFFICE OF OIL AND GAS SHALL BE NOTIFIED OF ANY AND ALL SUCH DEVIATIONS FROM THE APPROVED PLANS.

CONSTRUCTION CONFERENCE WITH THE CONTRACTOR AND THE APPROPRIATE EROSION CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.

THE LIMITS OF CONSTRUCTION AND MARK/FLAG ALL IDENTIFIED WETLANDS, STREAMS, AND OTHER AREAS OF CONCERN FOR CONSTRUCTION ACTIVITIES. INSTALL SIGNS TO MARK THE AREAS AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT LIMITS SUCH AS APPROVED ACCESS ROADS, NO REFORING ZONES, WETLANDS/STREAM BEDS, ETC.

STRUCTURE THE ROCK CONSTRUCTION ENTRANCE. ALL VEHICLES ENTERING AND EXITING THE SITE SHALL DO SO VIA THE ROCK CONSTRUCTION ENTRANCE.

STRUCTURE ALL BMP'S AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW ONCE THE AREA ENCOMPASSING THE BMP'S OUTSIDE OF THE GRADING LIMITS SHALL BE DRAINAGE AND MULCHED IMMEDIATELY.

LOCATE, CONVEY UPSLOPE DRAINAGE AROUND THE ACCESS ROAD AND WELL PAD AREAS BY INSTALLING ALL DIVERSION BERM(S) AND/OR COMPOST FIBER SOCK DIVERSION(S) AS SHOWN ON THE PLANS.

CLEAR AND GRUB THE SITE. ALL WOODY MATERIAL, BRUSH, TREES, STUMPS, LARGE ROOTS, LIMBS, AND DEBRIS SHALL BE CLEARED FROM THE SITE AREA AND KEPT TO THE MINIMUM NECESSARY FOR PROPER CONSTRUCTION, INCLUDING THE INSTALLATION OF NECESSARY EROSION CONTROL. TREES SIX INCHES IN DIAMETER AND LARGER SHALL BE CUT AND LOGGED. SMALLER TREES, BRUSH, AND STUMPS SHALL BE CUT AND/OR GRUBBED AND CROWNED IN APPROPRIATE AREAS FOR USE AS SEDIMENT BARRIERS AT WATER DRAINAGE POINTS (AS SHOWN ON THE PLANS). WINDOWED BELOW THE WELL SITE, USED FOR WILDLIFE HABITAT, BURNED (AS PER WV FOREST FIRE LAWS), REMOVED FROM SITE, OR DISPOSED OF BY METHODS APPROVED BY WV DEP.

LOCATE, INSTALL ALL WETLAND OR STREAM CROSSINGS AS SHOWN ON THE PLANS.

STRIP THE TOPSOIL FROM THE ACCESS ROAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT ACCESS ROAD. PRIOR TO PLACING ANY FILL, THE ROAD SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE. ALL STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS OR RE-SPREAD AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED  $\geq 1$  OR  $\geq 2$  SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE INSTALLED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

STRUCTURE THE ACCESS ROAD. ALL FILL AREAS INCLUDING EXCESS MATERIAL STOCKPILES, SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D998). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D998) RESULTS. IT IS ALSO RECOMMENDED THAT EACH LIFT BE PROOF ROLLED WITH A LOADED HAUL TRUCK WHERE AVAILABLE. DITCH RELIEF CULVERTS SHALL BE INSTALLED AT A GRADE OF 1-6% TO MAINTAIN OUTLET VELOCITIES TO THE EXTENT POSSIBLE. INSTALL OUTLET PROTECTION ONCE RELIEF CULVERTS ARE INSTALLED, AS SHOWN ON PLANS. STABILIZE THE ROAD WITH GEOTEXTILE FABRIC AND STONE AND SIDE SLOPES AS SPECIFIED WITH PERMANENT SEEDING. EXCESS MATERIAL SHALL BE STOCKPILED (IF NECESSARY) IN AREAS SHOWN IN THE PLANS AND IMMEDIATELY STABILIZED. TOPSOIL SHALL BE STRIPPED FROM ALL STOCKPILE AREAS PRIOR TO CONSTRUCTION OF STOCKPILES. AFTER STOCKPILES ARE CONSTRUCTED, TOPSOIL IS REAPPLIED AT A DEPTH OF 2"-4". SLOPES SHALL BE TRACKED BY RUNNING TRACKED VEHICLES UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. TRACK LINES SHALL BE CLEARED PRIOR TO INSTALLATION OF LINED PROTECTION.

STRIP THE TOPSOIL FROM THE WELL PAD. TOPSOIL STRIPPING SHALL BE KEPT TO A MINIMUM NECESSARY TO CONSTRUCT WELL PAD. PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE. STRIPPED TOPSOIL SHALL BE STOCKPILED IN AREAS SHOWN IN THE PLANS OR RE-SPREAD AT AN APPROXIMATE DEPTH OF 2-4 INCHES ON ALL PROPOSED  $\geq 1$  OR FLATTER SLOPES, AND IMMEDIATELY STABILIZED. ADDITIONAL BMP MEASURES SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES, IF NECESSARY.

THE WELL PAD AREA AS SHOWN ON THE PLANS. INSTALL PAD DUMPS (WITH 4" PVC PIPE AND OUTLET PROTECTION) AND CONTAINMENT BERM LEVER SYSTEM. IMMEDIATELY STABILIZE THE OUTER AREAS OF THE WELL PAD. THE WELL PAD AREA SHALL BE STABILIZED WITH GEOTEXTILE FABRIC AND STONE AND THE SIDE SLOPES WITH SEED AND MULCH. INSTALL "RAW WATTLES" AS SHOWN ON PLANS. APPLY SEED AND MULCH TO ALL DISTURBED AREAS. THIS SHALL INCLUDE ALL AREAS THAT WILL NOT BE SUBJECT TO REGULAR TRAFFIC (TO BE STABILIZED WITH STONE), OR ANY DISTURBED AREA THAT WILL NOT BE STABILIZED BEFORE SITE RECLAMATION BEGINS.

PREVENT WELL DRILLING ACTIVITY.

BMP'S MUST REMAIN IN PLACE AND FUNCTIONAL UNTIL ALL AREAS WITHIN THE LIMIT OF CONSTRUCTION ARE COMPLETE AND PERMANENTLY STABILIZED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT IN ACCORDANCE WITH THE WV DEP OFFICE OF OIL AND GAS ON A WEEKLY BASIS.

CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION OF CONSTRUCTION. FINAL STABILIZATION MUST BE INITIATED NO LATER THAN 7 DAYS AFTER COMPLETION OF FINAL GRADE. FINAL STABILIZATION MEANS THAT ALL SOIL-DISTURBING ACTIVITIES ARE COMPLETED, AND THAT EITHER A PERMANENT VEGETATIVE COVER WITH A DENSITY OF 75% OR GREATER HAS BEEN ESTABLISHED OR THAT THE SURFACE HAS BEEN STABILIZED BY COVER SUCH AS PAVEMENT OR BUILDINGS. IT SHOULD BE NOTED THAT THE 75% PERCENT REFERS TO THE TOTAL AREA VEGETATED AND NOT JUST A PERCENT OF THE DISTURBED AREA.

PERMANENT SEDIMENT CONTROL MEASURES CAN BE REMOVED AFTER THE SITE IS PERMANENTLY STABILIZED AND APPROVAL IS RECEIVED FROM THE WV DEP.

AREAS DISTURBED BY REMOVAL OF CONTROLS SHALL BE REPAIRED, STABILIZED, AND PERMANENTLY SEEDDED.

## CONSTRUCTION STANDARDS:

THE DESIGN, CONSTRUCTION, AND REMOVAL OF FILL FOR OIL AND GAS SITES MUST BE ACCOMPLISHED IN SUCH A MANNER AS TO PROTECT THE HEALTH AND SAFETY OF THE PEOPLE, THE NATURAL RESOURCES, AND ENVIRONMENT OF THE STATE. THE SITE SHALL BE DESIGNED, CONSTRUCTED, AND MAINTAINED TO BE STRUCTURALLY SOUND AND REASONABLY PROTECTED FROM UNAUTHORIZED ACTS OF THIRD PARTIES.

1. ALL FILL AREAS SHOULD BE CLEARED OF TREES, STUMPS, AND ANY VEGETATION AND STRIPPED OF TOPSOIL/ORGANIC SOILS PRIOR TO THE START OF FILL PLACEMENT.
2. ANY GROUNDWATER ENCOUNTERED DURING CONSTRUCTION SHALL BE DRAINED TO THE OUTSIDE/DOWNSTREAM JOE OF THE SLOPE. CONSTRUCTED DRAIN SECTION SHALL BE AN EXCAVATED 2' x 2' TRENCH AND BACK FILLED WITH #57 STONE. COMPACTED BY HAND TAMPER. GEOTEXTILE FABRIC SHALL BE USED TO LINE TRENCH.
3. SATISFACTORY MATERIALS FOR USE AS FILL FOR PAD AREAS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS GW, GP, GM, GC, SW, SP, SM, SC, ML AND CL GROUPS.
4. GENERALLY UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH, AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER.
5. ALL FILL AREAS SHALL BE "KEYED IN" AND COMPACTED IN HORIZONTAL LIFTS WITH A MAXIMUM LOOSE LIFT THICKNESS OF 12" AND MAXIMUM PARTICLE SIZE AS OUTLINED IN THE GEOTECHNICAL REPORT. ALL FILL SHALL BE COMPACTED BY A VIBRATING SHEEPSFOOT ROLLER TO 95% PER THE STANDARD PROCTOR TEST (ASTM-D998). MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE STANDARD PROCTOR TEST (ASTM-D998) RESULTS.
6. ROCK LIFTS ARE NOT PROPOSED FOR THE CONSTRUCTION OF THIS SITE. HOWEVER, LARGER ROCK PARTICLES OR BOULDERS THAT ARE ENCOUNTERED DURING CONSTRUCTION NEED TO BE BROKEN DOWN TO A MANAGEABLE SIZE (MAXIMUM 3'x3'x1' THICK) TO BE PLACED AS FILL. DURING PLACEMENT OF FILL CONTAINING LARGE SIZE ROCK PARTICLES IT IS CRITICAL THAT NO VOID SPACES BE LEFT BETWEEN THE ROCKS. SMALLER ROCK FRAGMENTS AND SOIL MUST BE WORKED INTO ANY OPENINGS BETWEEN THE BOULDERS AFTER THEY ARE PLACED IN PLACE. ADDITIONAL GUIDANCE REGARDING ENCOUNTERED ROCK CAN BE FOUND IN THE GEOTECHNICAL REPORT.
7. THE PLACEMENT OF ALL FILL MATERIAL SHALL BE FREE OF WOOD, STUMPS AND ROOTS, LARGE ROCKS AND BOULDERS, AND ANY OTHER NONCOMPACTABLE SOIL MATERIAL. NO FILL SHALL CONTAIN OR BE PLACED ON FROZEN MATERIAL. THE FILL SHALL BE COMPACTED TO A MINIMUM OF VISIBLE NON-MOVEMENT. HOWEVER, THE COMPACTION EFFORT SHALL NOT EXCEED THE OPTIMUM MOISTURE LIMITS.
8. ALL EXPOSED AREAS, NOT COVERED BY COMPACTED GRAVEL OR RDP-RAP SHALL BE LIMED, FERTILIZED, SEEDED AND MULCHED. PERMANENT VEGETATIVE GROUND COVER IN COMPLIANCE WITH THE WV DEP EROSION AND SEDIMENT CONTROL FIELD MANUAL MUST BE ESTABLISHED UPON THE COMPLETION OF CONSTRUCTION. SLOPES SHALL BE MAINTAINED WITH A GRASSY VEGETATIVE COVER AND FREE OF BRUSH AND/OR TREES.
9. IF STANDING WATER IS PRESENT ON SITE, CONTRACTOR TO CORRECT DRAINAGE ISSUES BY DIRECTING WATER TO PROPER EWS CONTROLS OR OUTLET WITH POSITIVE DRAINAGE. IF NECESSARY, CONTACT ENGINEER FOR GUIDANCE IN CORRECTING DRAINAGE ISSUES.
10. ALL DRAINAGE DITCHES, DIVERSIONS, AND CULVERTS SHALL HAVE POSITIVE DRAINAGE AND OUTLET INTO THE PROPER OUTLET PROTECTION OR LEVEL SPREADING DEVICE. SUPER SILT FENCE, OR APPROVED ALTERNATIVE, SHALL BE INSTALLED WITHIN 5 FEET OF THE OUTLET PROTECTION OR LEVEL SPREADING DEVICE TO PREVENT EROSION DOWNSTREAM IF EROSION IS PRESENT DOWNSTREAM OF AN EROSION CONTROL DEVICE. CONTRACTOR TO INSTALL ADDITIONAL EROSION CONTROLS AND STABILIZATION TO PREVENT FURTHER EROSION.
11. ALL DRAINAGE DITCHES AND DIVERSIONS THAT ARE ROCK LINED SHALL BE INSTALLED PER THE DETAILS ON THIS PLAN INCLUDING THE NECESSARY INSTALLATION OF ANY GEOTEXTILE FABRIC UNDERNEATH THE ROCK LINING.
12. IF THE EROSION CONTROL DEVICES SHOW EVIDENCE OF BEING INADEQUATE DUE TO CONSTRUCTION MEANS AND METHODS, THE CONTRACTOR IS TO INSTALL ADDITIONAL DRAINAGE DEVICES OR EROSION CONTROLS TO PREVENT FURTHER EROSION FROM OCCURRING.
13. CONTRACTOR IS TO EXTEND ALL KEYWAY AND BONDING BENCH OUTLET DRAINS A MINIMUM OF ONE FOOT PAST THE FINISHED GRADE OF THE SLOPE AND INSTALL THE PROPER OUTLET PROTECTION PER THE DETAIL ON THESE PLANS. ALL OUTLET DRAINS ARE TO BE CLEARLY VISIBLE AND MARKED.
14. ALL SLOPES SHALL BE TRACKED IN PER THE DETAILS ON THESE PLANS. CONTRACTOR SHALL REPEAT THIS METHOD ANY TIME AN AREA HAS BEEN DISTURBED PRIOR TO THAT AREA BEING STABILIZED.
15. ALL MAINTENANCE OF EROSION AND SEDIMENT CONTROLS MUST BE PERFORMED IMMEDIATELY ONCE THE CONTRACTOR IS NOTIFIED OF THE DISCREPANCY. CONTRACTOR TO PERFORM MAINTENANCE OR IMMEDIATELY NOTIFY THE SUB-CONTRACTOR PERFORMING THE EAS TASKS. ANY EROSION CONTROL MAINTENANCE THAT IS DEEMED TO BE AN EMERGENCY SHALL BE PERFORMED IMMEDIATELY UPON THE CLIENT, ENGINEER, OR STATE'S REQUEST.
16. ALL LANDOWNER ACCESS ROADS AND EXISTING WELL ROADS THAT ARE BEING MAINTAINED SHALL BE KEPT OPEN DURING THE ENTIRE COURSE OF CONSTRUCTION TO PROVIDE CONTINUOUS ACCESS. IF CLOSURE IS NECESSARY, THE CONTRACTOR SHALL PROVIDE AN EQUIVALENT DETOUR ROUTE TO THE SATISFACTION OF THE LANDOWNER OR WELL OWNER.
17. ANY WATER INFILTRATING AROUND THE WELL PAD DEWATERING SYSTEM SHALL BE CORRECTED IMMEDIATELY TO PREVENT THE FAILURE OF THE SOILS AND DESIGN ASPECTS OF THE DEWATERING SYSTEM. ANY EXCESS EROSION OR SLOPE FAILURES DUE TO THE WATER INFILTRATION IN THE SUMP AREA SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL DITCH RELIEF AND STREAM CROSSING CULVERTS SHALL MEET ALL MANUFACTURER SPECIFICATIONS INCLUDING THE MINIMUM AND MAXIMUM COVER. IF MANUFACTURER SPECIFICATIONS CANNOT BE MET, CONTRACTOR SHALL CONSULT THE ENGINEER OR MANUFACTURER FOR ALTERNATIVES.

## SITE CLEANUP & RECYCLE PROGRAM:

1. GARBAGE, FUELS OR ANY SUBSTANCE HARMFUL TO HUMAN, AQUATIC OR FISH LIFE, WILL BE PREVENTED FROM ENTERING SPRINGS, STREAMS, PONDS, LAKES, WETLANDS OR ANY WATER COURSE OR WATER BODY.
2. OILS, FUELS, LUBRICANTS AND COOLANTS WILL BE PLACED IN SUITABLE CONTAINERS AND DISPOSED PROPERLY.
3. ALL TRASH AND GARBAGE WILL BE COLLECTED AND DISPOSED PROPERLY.
4. ALL SEDIMENT REMOVED FROM SEDIMENT CAPTURING DEVICES SHALL BE PLACED ON THE TOPSOIL STOCKPILE, THEN SEEDED AND MULCHED, AS NECESSARY. ALTERNATIVELY, THE REMOVED SEDIMENT CAN BE TRANSPORTED TO A SITE WITH AN APPROVED PERMIT.
5. ALL POLLUTION AND EMERGENCY SPILLS SHALL BE IMMEDIATELY REPORTED TO ANTERO RESOURCES CORPORATION AND THE WV DEP OFFICE OF OIL AND GAS. (EMERGENCY #1-800-642-3074)



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REVISION	DATE



CONSTRUCTION AND E&S CONTROL NOTES  
**API#47-017-02619**  
 WELL #1  
 CLAY & CENTRAL DISTRICTS  
 RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA

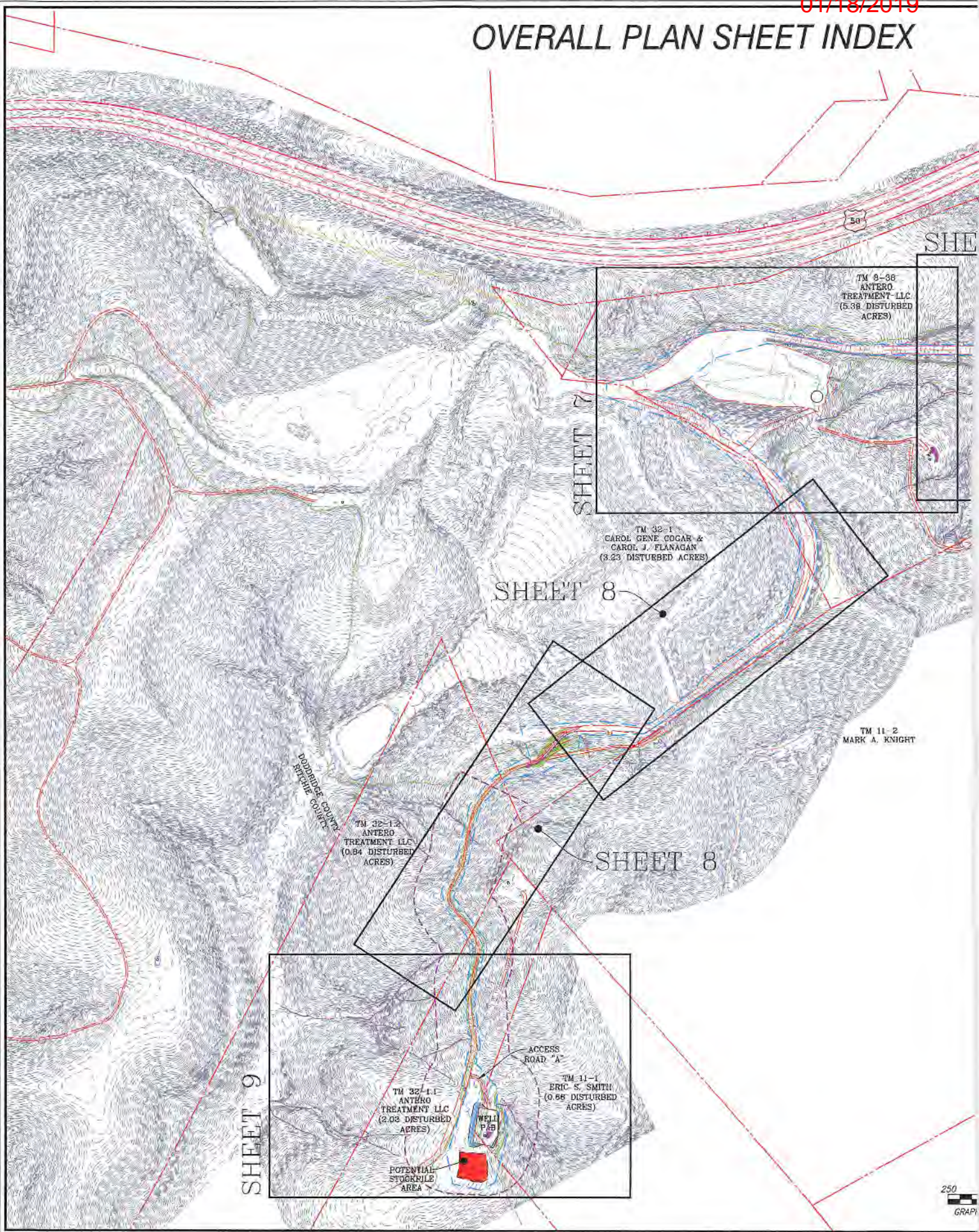


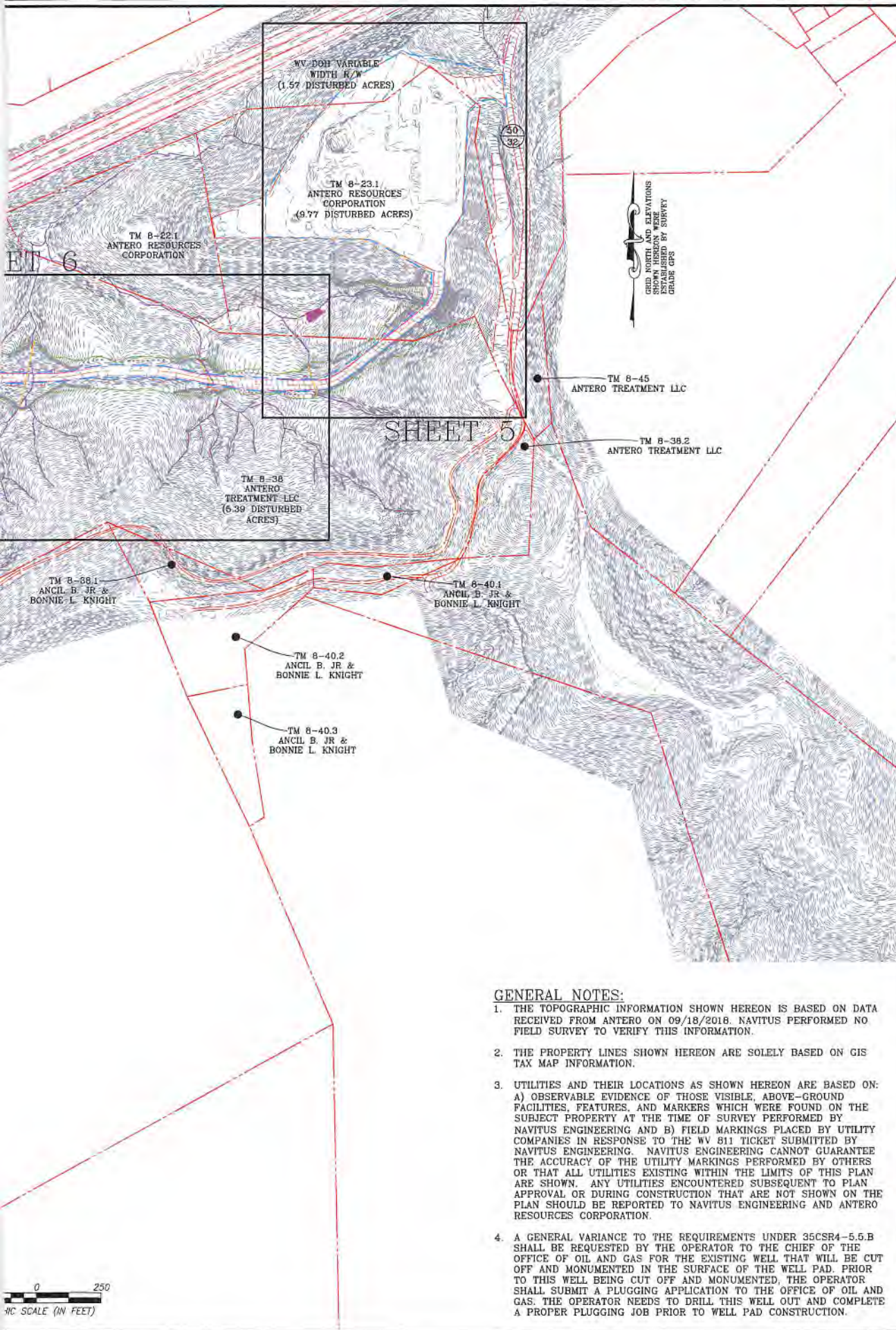
DATE: 10/31/2018  
 SCALE: N/A  
 SHEET 2 OF 10

LEGEND		
EX. INDEX CONTOUR & CONTOUR LABEL		PR. INDEX CONTOUR
EX. INTERMEDIATE CONTOUR		PR. INTERMEDIATE
EX. PROPERTY LINE		PR. INTERMEDIATE
EX. EDGE OF GRAVEL/DIRT		PR. INDEX ROAD C
EX. EDGE OF PAVEMENT		PR. INTERMEDIATE
EX. ROAD CENTERLINE		PR. PADS/STOCKPI
EX. EDGE OF CONCRETE		PR. LIMITS OF DIS
EX. GUARDRAIL		PR. ROAD/IMPOUN
EX. BRIDGE		PR. ROAD CENTER
EX. DITCHLINE/DRAINAGE FEATURE		PR. GUARDRAIL
EX. RIP-RAP		PR. ROCK CONSTR
EX. CULVERT		PR. AIR BRIDGE
EX. TREELINE		PR. CULVERT
EX. BUILDING		PR. DITCH
EX. MISCELLANEOUS FEATURE		PR. RIP-RAP TRAI
EX. 100-YR FEMA FLOODPLAIN		PR. OUTLET PROTI
EX. DELINEATED STREAM		PR. DIVERSION
EX. DELINEATED WETLAND/POND		PR. ROCK FILTER
100' WETLAND/STREAM BUFFER		PR. COMPOST FILT
STREAM/WETLAND DELINEATION STUDY AREA		PR. SMART FENCE
EX. FENCELINE/PERIMETER SAFETY FENCE		PR. SMART FENCE
EX. GATE		PR. STRAW WATTL
EX. ACCESS GATE WITH EMERGENCY LIFELINE		PR. WELL HEAD
EX. WELL HEAD ON DESIGNED PAD		PR. PAD DEWATER
EX. GAS WELL		PR. TOP OF PAD
EX. PIPELINE		PR. SPOT SHOT
EX. PIPELINE R/W		PR. PERIMETER SA
EX. PIPELINE METER		PR. ACCESS GATE
EX. PIPELINE VALVE		PR. PIPELINE
EX. PIT		PR. PIPELINE R/W
EX. POWER POLE/GUY WIRE		PR. OVERHEAD UT
EX. OVERHEAD UTILITY		PR. POWER POLE/
EX. UNDERGROUND ELECTRIC		PR. OVERHEAD UT
EX. UNDERGROUND TELEPHONE		PR. TELEPHONE L
EX. UNDERGROUND FIBER OPTIC		PR. WATERLINE
EX. UTILITY R/W		PR. RIGHT-OF-WA
EX. WATERLINE		PR. PERMANENT D
EX. SANITARY LINE		PR. TEMPORARY C
EX. WATER WELL/EX. SPRING		BORING LOCATION
EX. COMPOST SOCK		X-SECTION/PROFI
EX. SUPER SILT FENCE		X-SECTION/PROFI
EX. SILT FENCE		X-SECTION/PROFI
EX. STRAW WATTLE		X-SECTION/PROFI
EX. RIGHT-OF-WAY		X-SECTION/PROFI
MATCHLINE		X-SECTION/PROFI



# OVERALL PLAN SHEET INDEX





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ENERGY ENGINEERING

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THIS DOCUMENT WAS PREPARED FOR:  
ANTERO RESOURCES CORPORATION

OVERALL PLAN SHEET INDEX

**API#47-017-02619**

WELL #1

CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA



DATE: 10/31/2018

SCALE: 1" = 250'

SHEET 4 OF 10

**GENERAL NOTES:**

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON DATA RECEIVED FROM ANTERO ON 09/18/2018. NAVITUS PERFORMED NO FIELD SURVEY TO VERIFY THIS INFORMATION.
2. THE PROPERTY LINES SHOWN HEREON ARE SOLELY BASED ON GIS TAX MAP INFORMATION.
3. UTILITIES AND THEIR LOCATIONS AS SHOWN HEREON ARE BASED ON: A) OBSERVABLE EVIDENCE OF THOSE VISIBLE, ABOVE-GROUND FACILITIES, FEATURES, AND MARKERS WHICH WERE FOUND ON THE SUBJECT PROPERTY AT THE TIME OF SURVEY PERFORMED BY NAVITUS ENGINEERING AND B) FIELD MARKINGS PLACED BY UTILITY COMPANIES IN RESPONSE TO THE WV 811 TICKET SUBMITTED BY NAVITUS ENGINEERING. NAVITUS ENGINEERING CANNOT GUARANTEE THE ACCURACY OF THE UTILITY MARKINGS PERFORMED BY OTHERS OR THAT ALL UTILITIES EXISTING WITHIN THE LIMITS OF THIS PLAN ARE SHOWN. ANY UTILITIES ENCOUNTERED SUBSEQUENT TO PLAN APPROVAL OR DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE PLAN SHOULD BE REPORTED TO NAVITUS ENGINEERING AND ANTERO RESOURCES CORPORATION.
4. A GENERAL VARIANCE TO THE REQUIREMENTS UNDER 35CSR4-5.5.B SHALL BE REQUESTED BY THE OPERATOR TO THE CHIEF OF THE OFFICE OF OIL AND GAS FOR THE EXISTING WELL THAT WILL BE CUT OFF AND MONUMENTED IN THE SURFACE OF THE WELL PAD PRIOR TO THIS WELL BEING CUT OFF AND MONUMENTED. THE OPERATOR SHALL SUBMIT A PLUGGING APPLICATION TO THE OFFICE OF OIL AND GAS. THE OPERATOR NEEDS TO DRILL THIS WELL OUT AND COMPLETE A PROPER PLUGGING JOB PRIOR TO WELL PAD CONSTRUCTION.



MATCHLINE "A"  
SEE SHEET 6

EPHEMERAL  
STREAM 02

LIMITS OF  
DISTURBANCE

EX  
CULVERT

TM 8-38  
ANTERO  
TREATMENT LLC  
DB 361 PG 320  
85.19 ACRES

INTERMITTENT  
STREAM 05

RR

APPROX. PROPERTY LINE

TM 8-23.1  
ANTERO RESOURCES  
CORPORATION  
DB 349 PG 207  
21.34 ACRES

PEM  
WETLAND  
D2

EX  
GUARDRAIL

INTERMITTENT  
STREAM 01

RR

EX ACCESS ROAD

EPHEMERAL  
STREAM 04

LIMITS OF  
DISTURBANCE

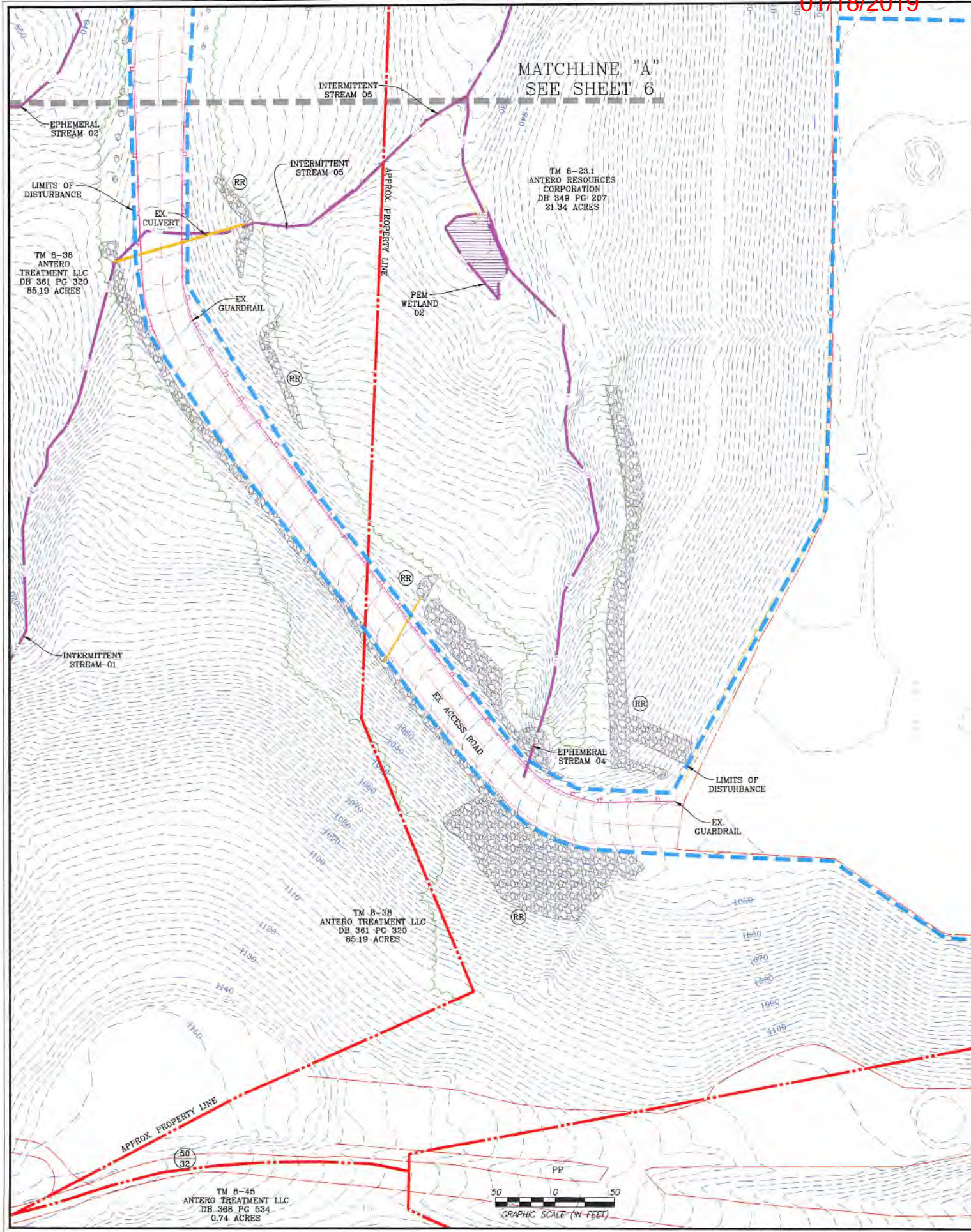
EX  
GUARDRAIL

TM 8-38  
ANTERO TREATMENT LLC  
DB 361 PG 320  
85.19 ACRES

APPROX. PROPERTY LINE


50  
32

TM 8-15  
ANTERO TREATMENT LLC  
DB 368 PG 534  
0.74 ACRES



01/18/2019

# ACCESS ROAD PLAN



GRID NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
ESTABLISHED BY SURVEY  
GRADE GPS

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DATE	REVISION



THIS DOCUMENT  
WAS PREPARED FOR:  
ANTERO RESOURCES  
CORPORATION

ACCESS ROAD PLAN  
**API#47-017-02619**  
WELL #1  
CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA



DATE: 10/31/2018  
SCALE: 1" = 50'  
SHEET 5 OF 10

TM 8-23.1  
ANTERO RESOURCES  
CORPORATION  
DB 349 PG 207  
21.34 ACRES

APPROX. PROPERTY LINE

1050  
1060  
1070  
1080  
1090

WV DOH VARIABLE  
WIDTH R/W

50  
32

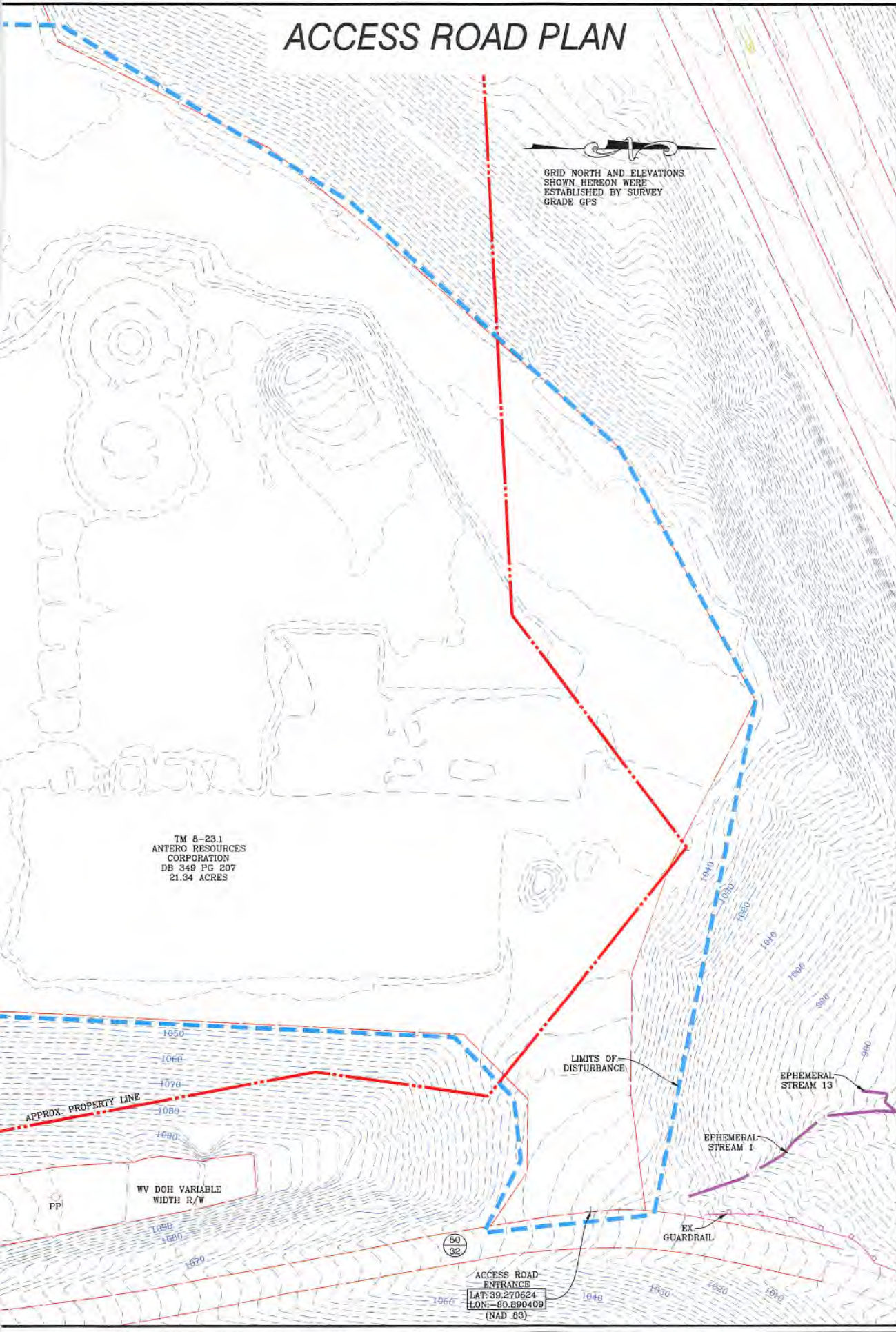
ACCESS ROAD  
ENTRANCE  
LAT: 39.270624  
LON: -80.890409  
(NAD 83)

LIMITS OF  
DISTURBANCE

EPHEMERAL  
STREAM 13

EPHEMERAL  
STREAM 1

EX  
GUARDRAIL



# ACCESS ROAD

MATCHLINE "B"  
SEE SHEET 7

GRID NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
OBTAINED BY SURVEY  
GRADE GPS

EPHEMERAL  
STREAM 14

INTERMITTENT  
STREAM 13

EX  
CULVERT

EX. ACCESS ROAD

EX  
GUARDRAIL

LIMITS OF  
DISTURBANCE

INTERMITTENT  
STREAM 13

EX. ACCESS ROAD

INTERMITTENT  
STREAM 15

EPHEMERAL  
STREAM 16

TM 8-38  
ANTERO TREATMENT LLC  
DB 361 PG 320  
85.19 ACRES

INTERMITTENT  
STREAM 22

INTERMITTENT  
STREAM 17

EX. GAS WELL  
API#47-017-03069  
(ANTERO)  
TO BE PLUGGED &  
MONUMENTED PER  
WVDEP REQUIREMENTS

EPHEMERAL  
STREAM 15

EPHEMERAL  
STREAM 18

EX 2"  
GAS LINE

EX  
TANK

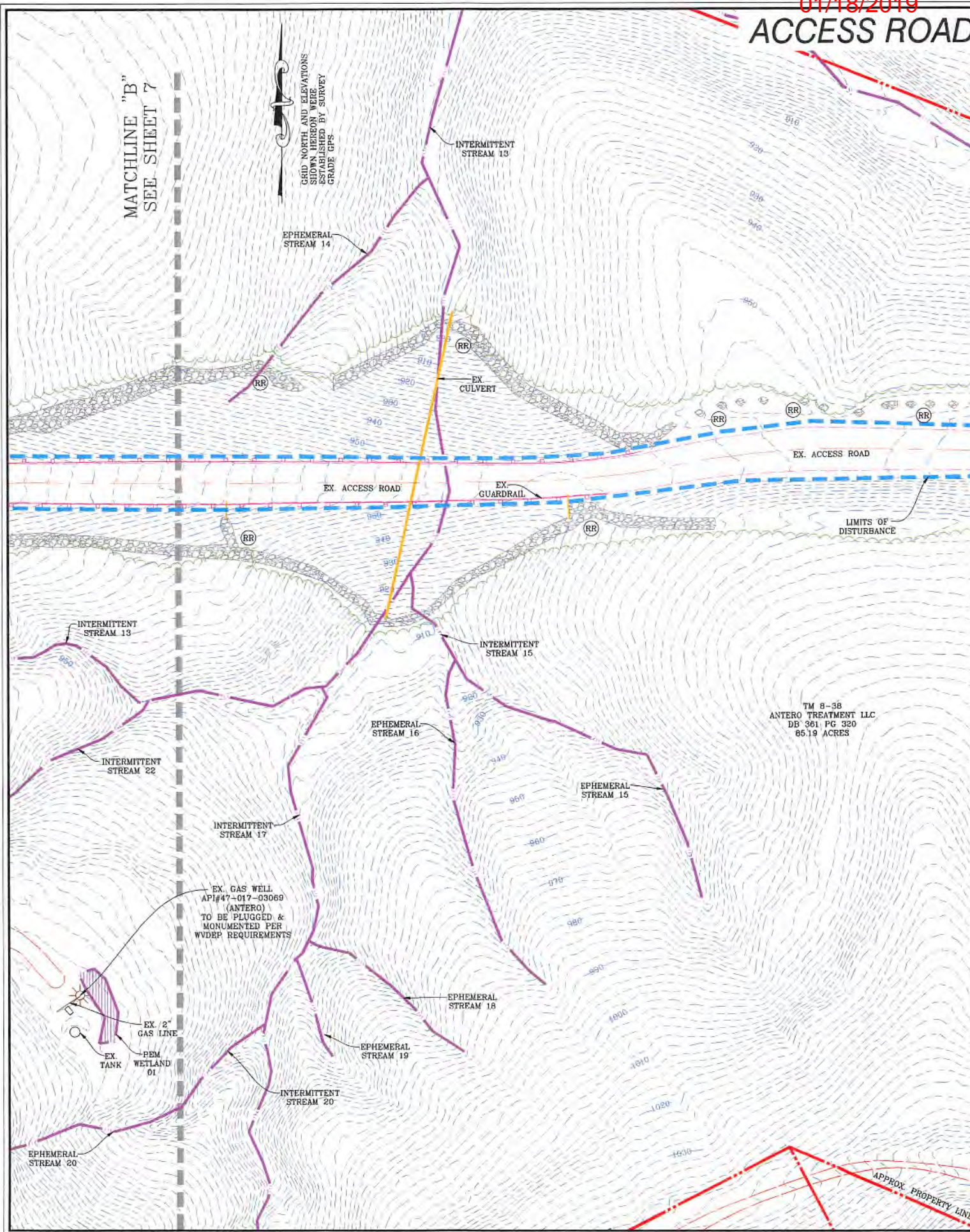
PEM  
WETLAND  
01

EPHEMERAL  
STREAM 19

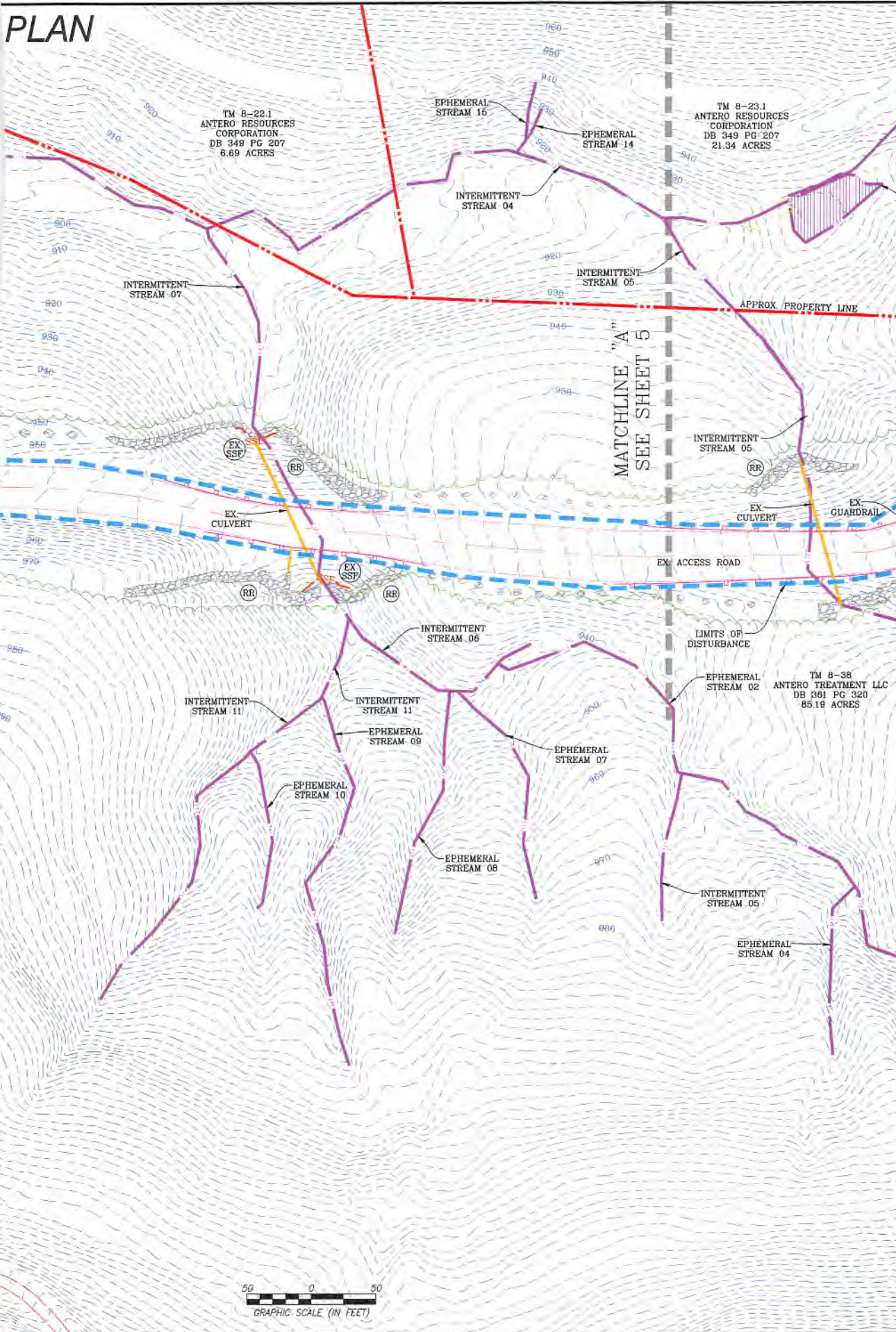
INTERMITTENT  
STREAM 20

EPHEMERAL  
STREAM 20

APPROX. PROPERTY LINE



# PLAN



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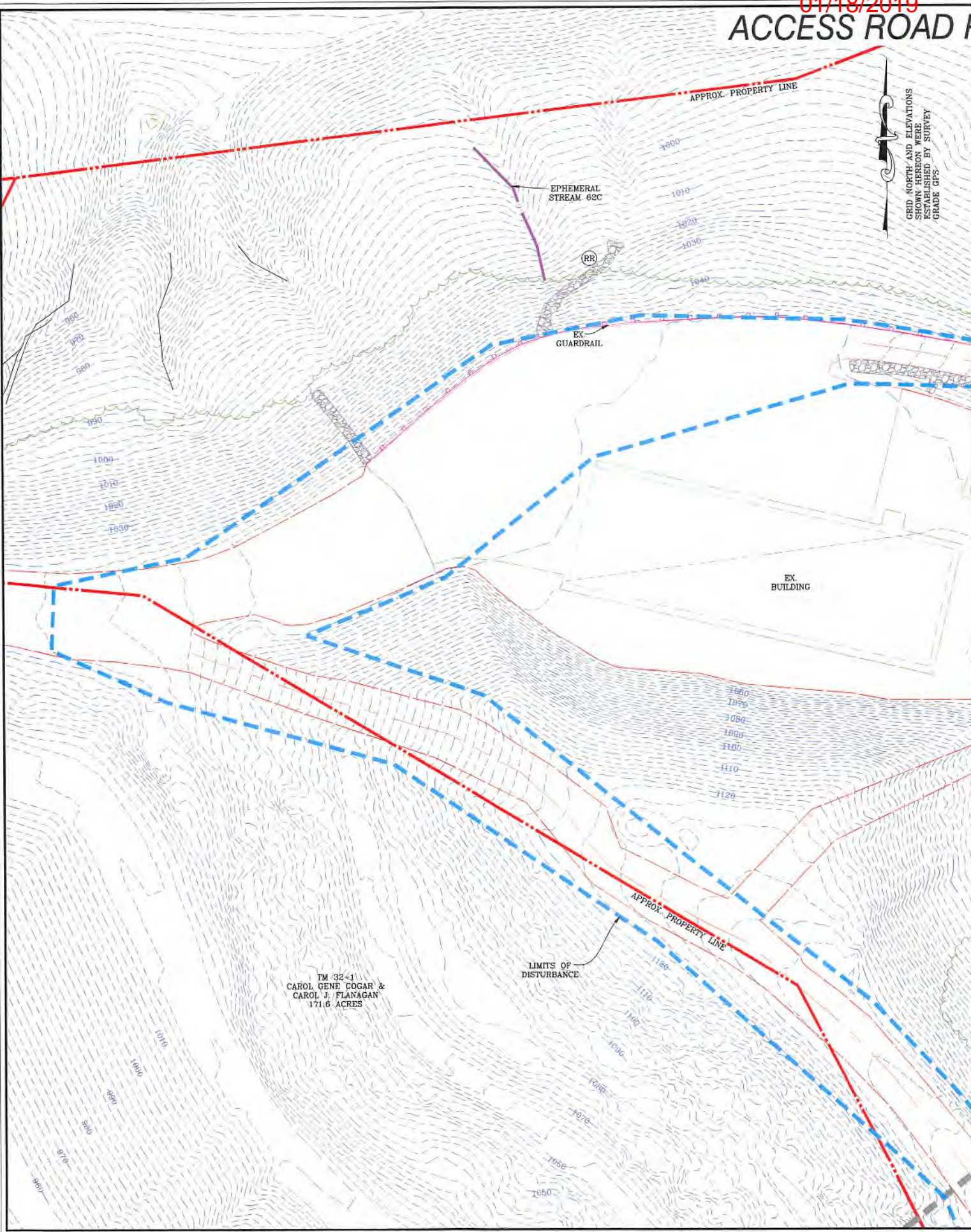
ACCESS ROAD PLAN  
**API#47-017-02619**  
WELL #1  
CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA



DATE: 10/31/2018  
SCALE: 1" = 50'  
SHEET 6 OF 10

01/18/2019

# ACCESS ROAD P



GRID NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
ESTABLISHED BY SURVEY  
GRADE GPS

TM 32-1  
CAROL GENE ODGAR &  
CAROL J. FLANAGAN  
1711.6 ACRES

LIMITS OF  
DISTURBANCE

APPROX. PROPERTY LINE

EPHEMERAL  
STREAM 62C

EX.  
GUARDRAIL

EX.  
BUILDING

APPROX. PROPERTY LINE

# PLAN

TM 8-38  
ANTERO TREATMENT LLC  
DB 361 PG. 320  
65.19 ACRES

MATCHLINE "B"  
SEE SHEET 6



REVISION	DATE

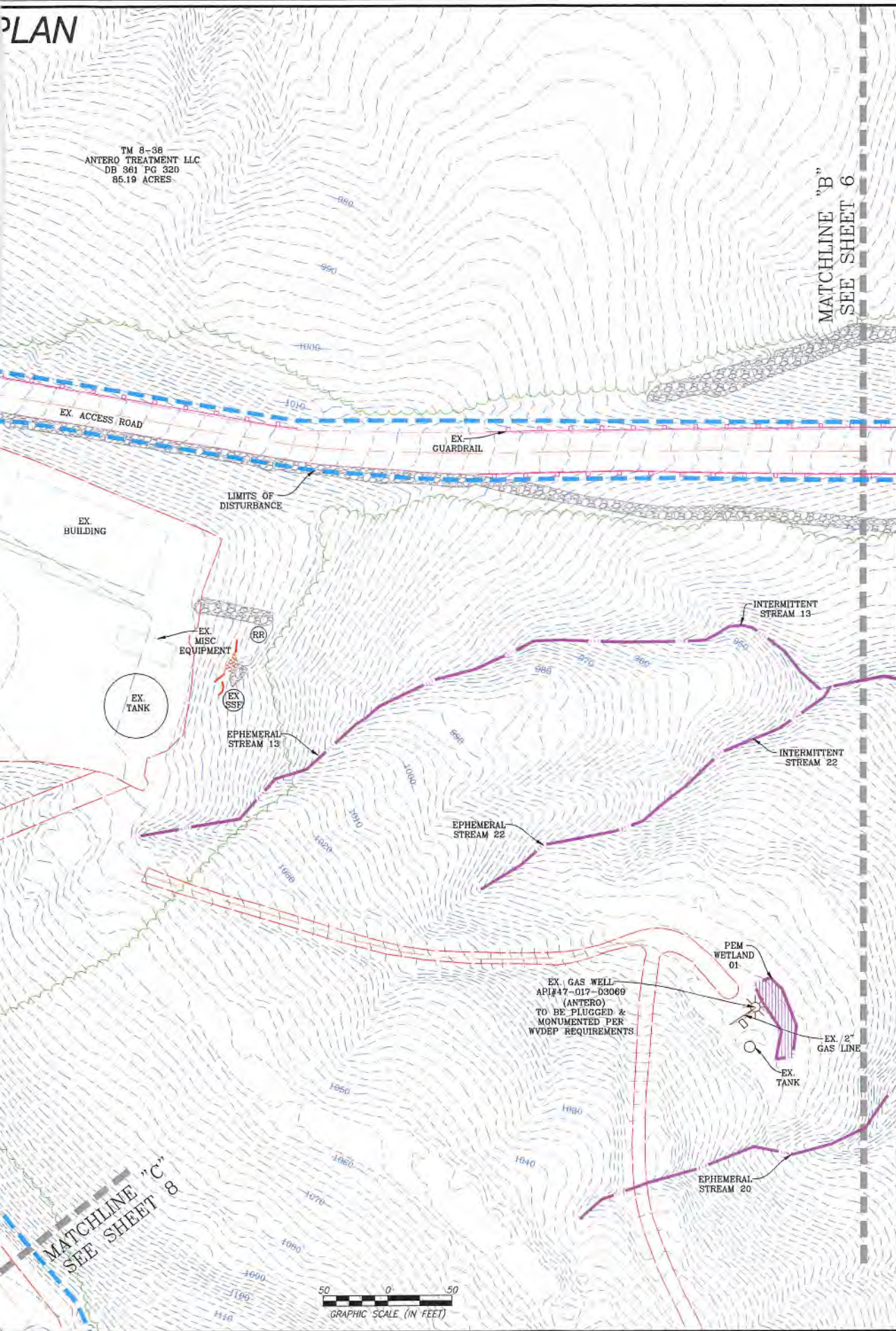


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CORPORATION

ACCESS ROAD PLAN  
**API#47-017-02619**  
WELL #1  
CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA

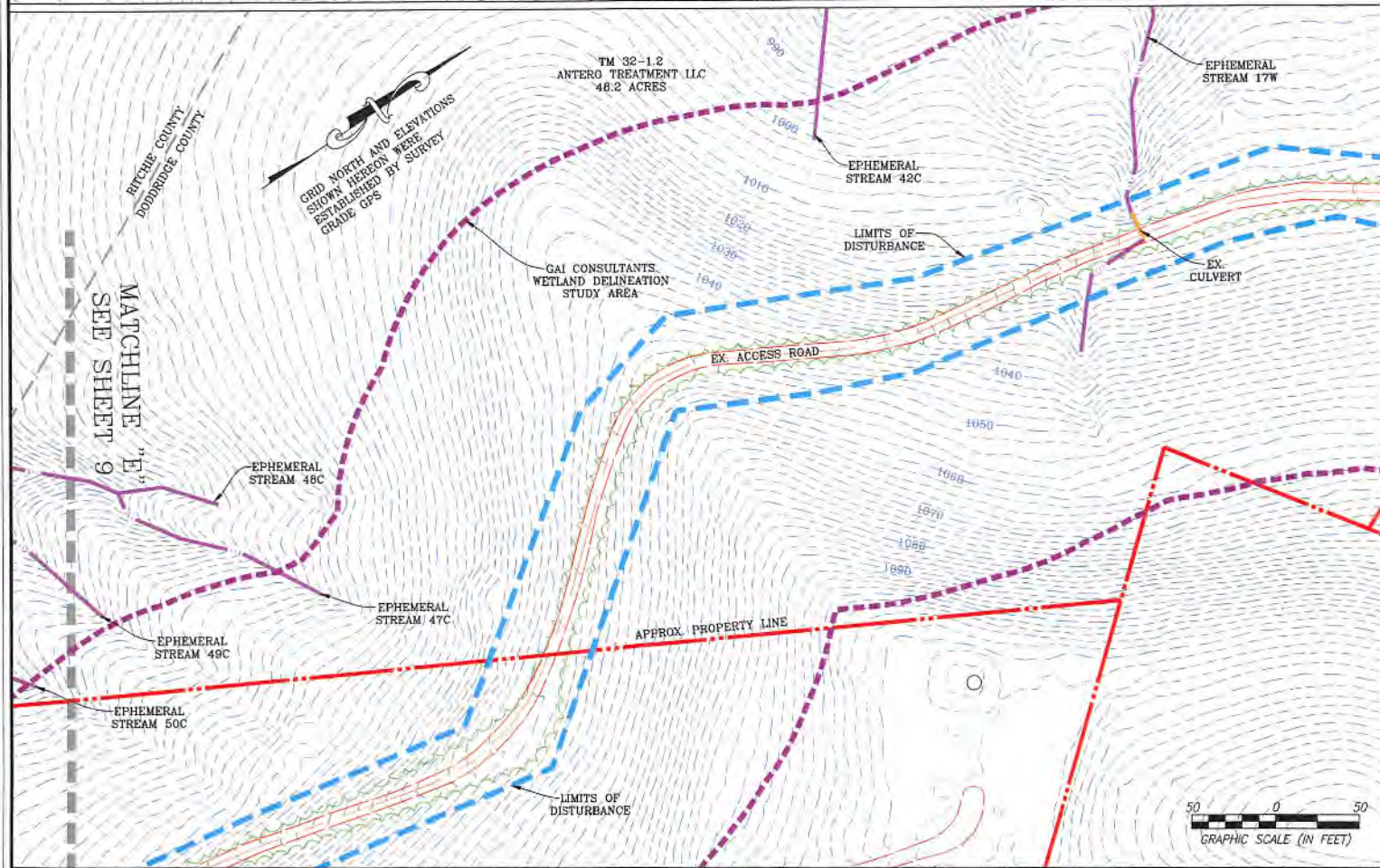
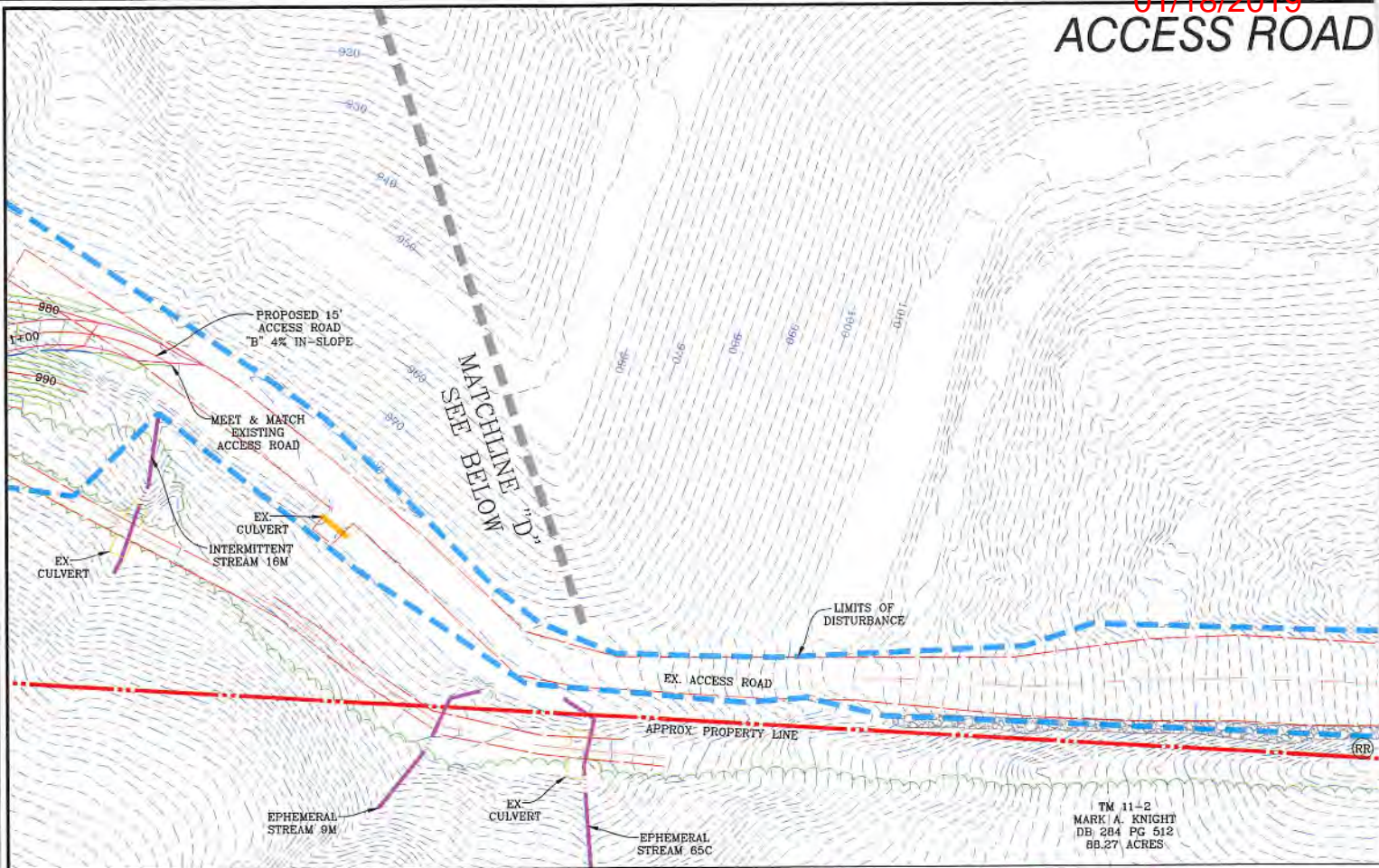


DATE: 10/31/2018  
SCALE: 1" = 50'  
SHEET 7 OF 10

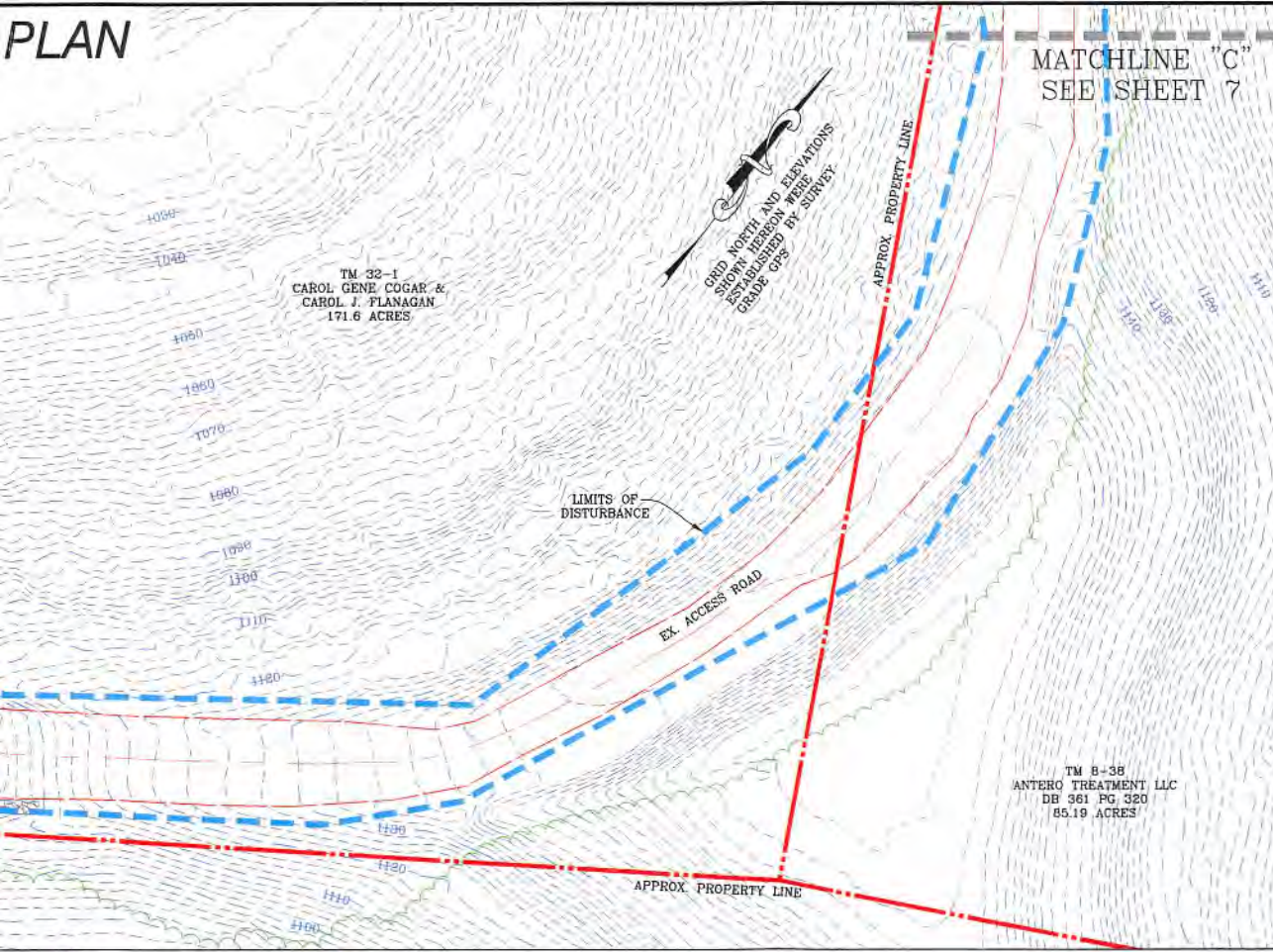


01/18/2019

# ACCESS ROAD



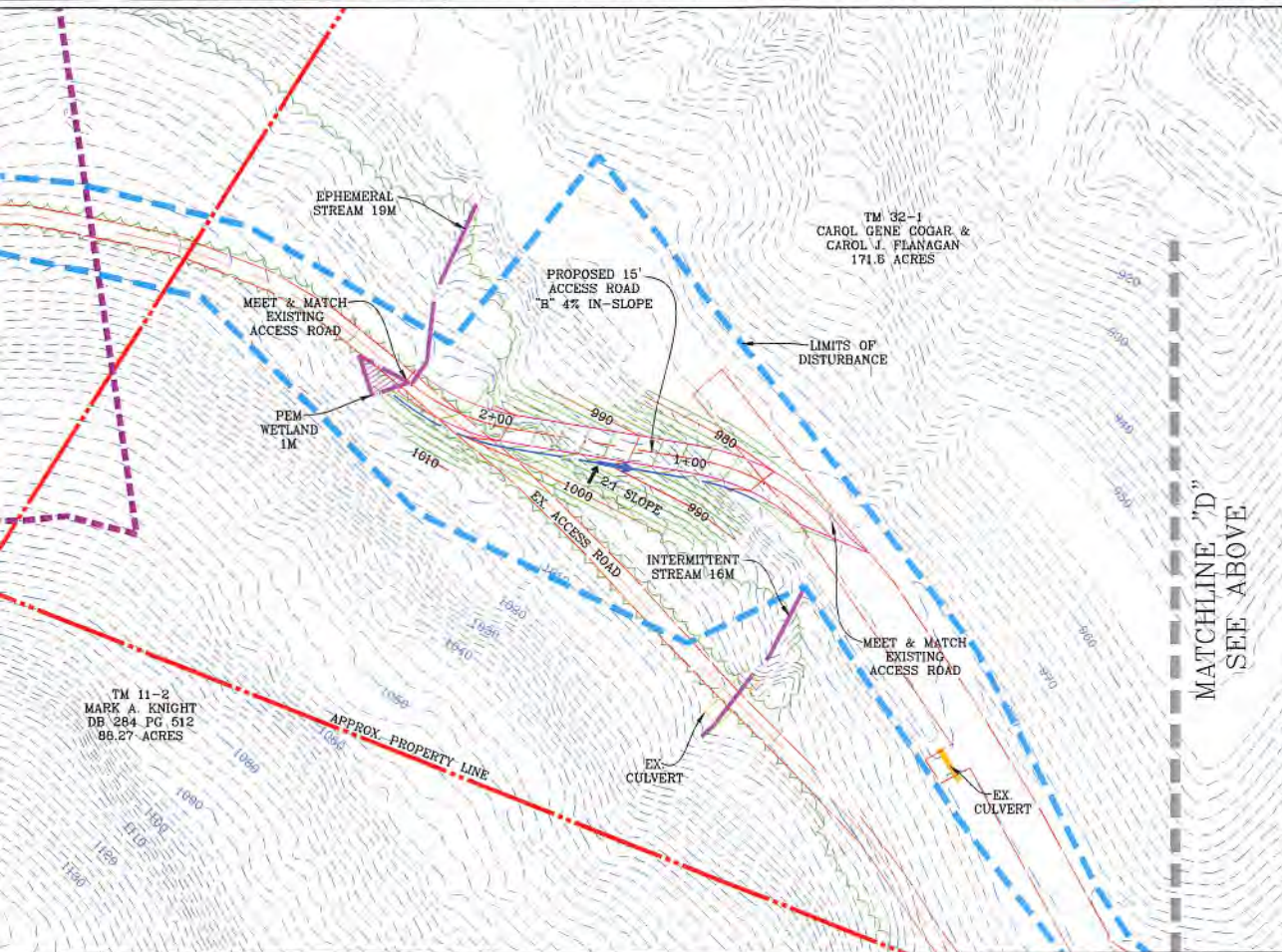
# PLAN



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REVISION	DATE



**Antero**

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ANTERO RESOURCES CORPORATION

ACCESS ROAD PLAN

**API#47-017-02619**

WELL #1

CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA



DATE: 10/31/2018

SCALE: 1" = 50'

SHEET 8 OF 10



GRID, NORTH AND ELEVATIONS  
SHOWN HEREON WERE  
ESTABLISHED BY SURVEY  
GRADE GPS

MATCHLINE "E"  
SEE SHEET 8

TM 32-1.2  
ANTERO TREATMENT LLC  
48.2 ACRES

INTERMITTENT  
STREAM 47C

EPHEMERAL  
STREAM 48C

EPHEMERAL  
STREAM 49C

EPHEMERAL  
STREAM 50C

EPHEMERAL  
STREAM 46C

LIMITS OF  
DISTURBANCE

EPHEMERAL  
STREAM 44C

INTERMITTENT  
STREAM 44C

ACCESS ROAD  
ENTRANCE  
LAT: 39.259021  
LON: -80.904589  
(NAD 83)

EPHEMERAL  
STREAM 45C

GAI PEM  
WETLAND 2

APPROX. PROPERTY LINE

INTERMITTENT  
STREAM 52C

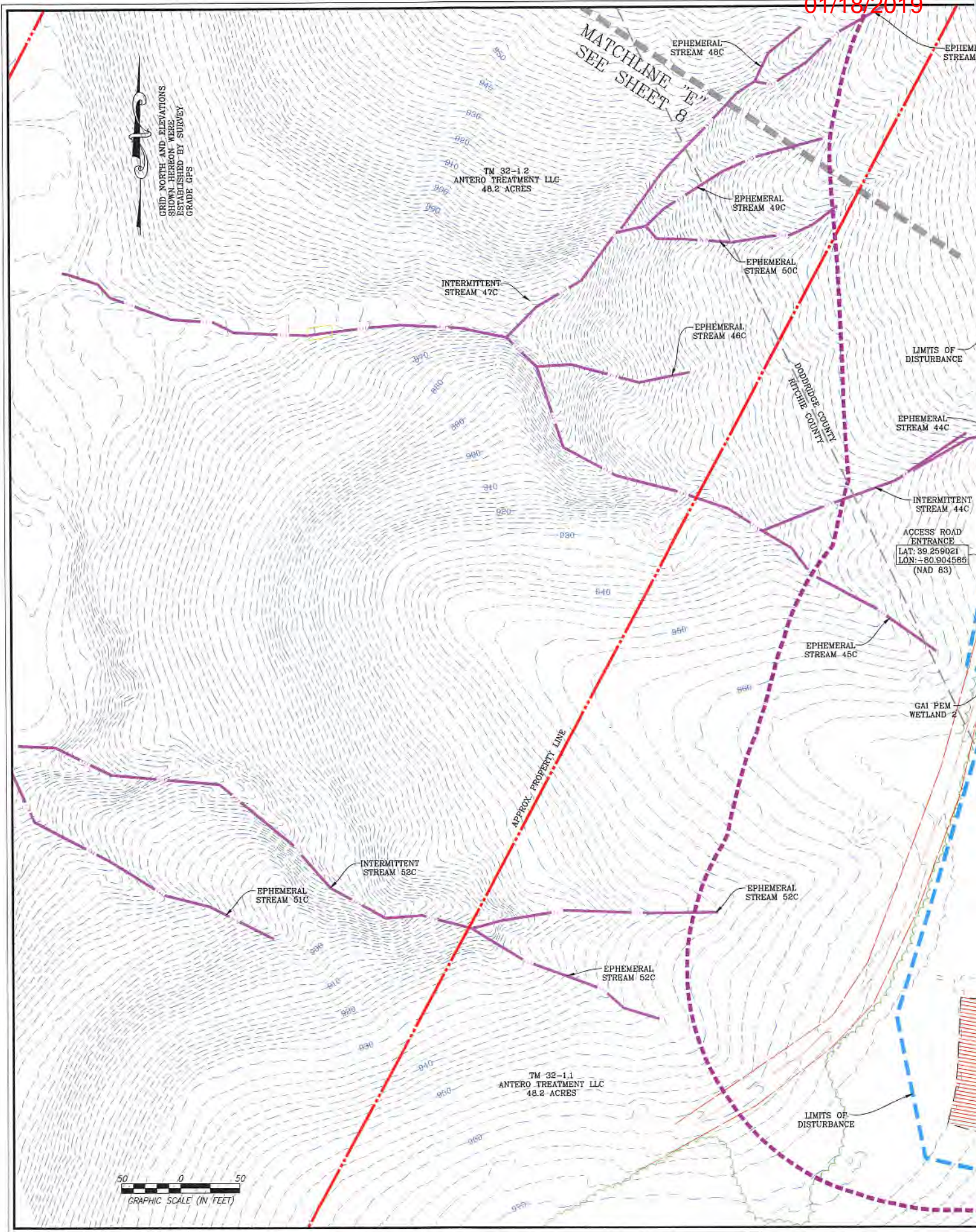
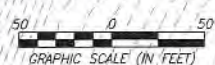
EPHEMERAL  
STREAM 51C

EPHEMERAL  
STREAM 52C

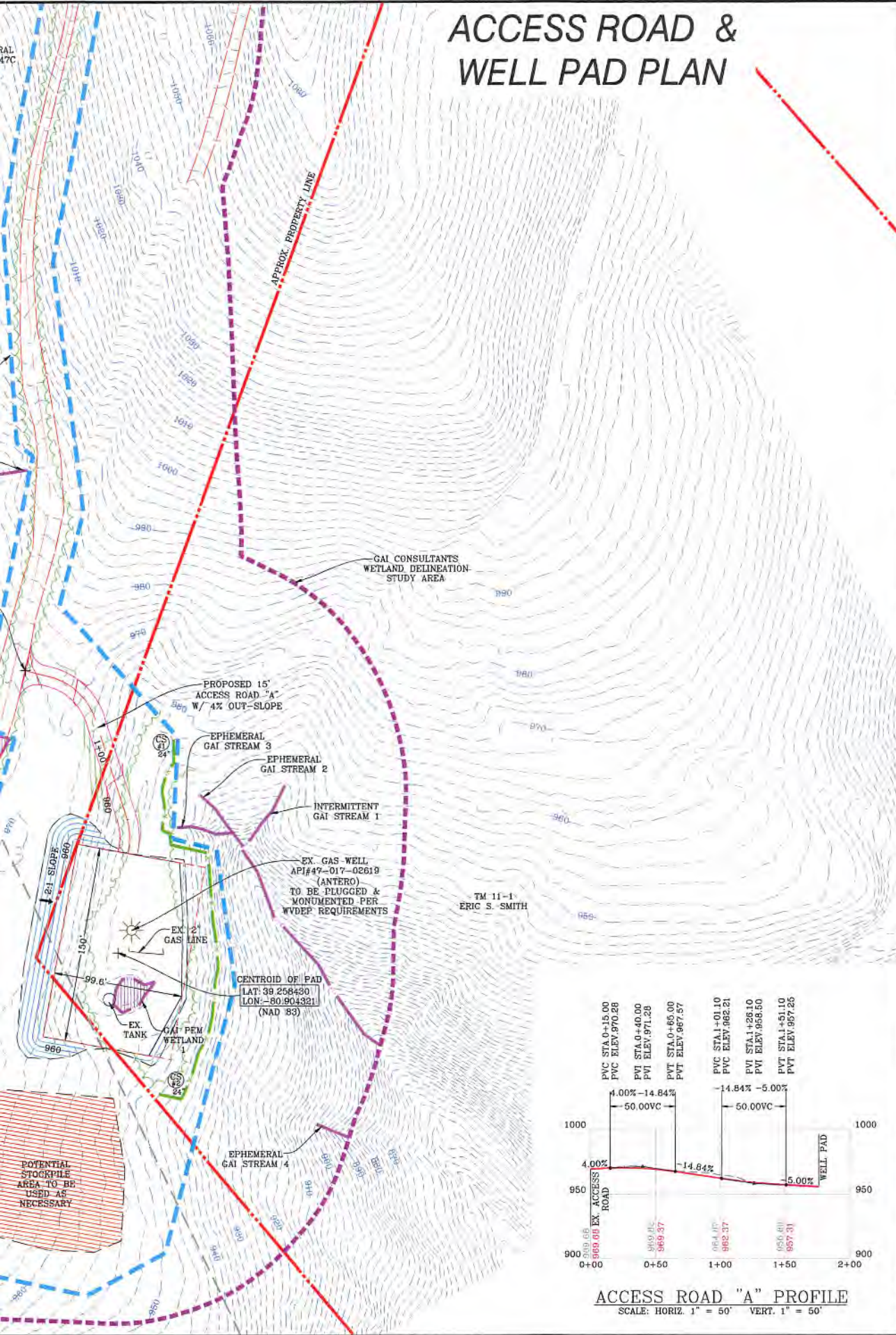
EPHEMERAL  
STREAM 52C

TM 32-1.1  
ANTERO TREATMENT LLC  
48.2 ACRES

LIMITS OF  
DISTURBANCE



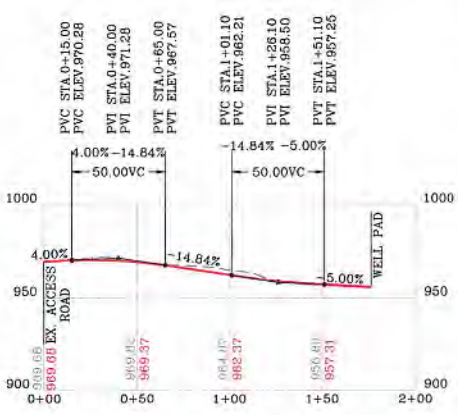
# ACCESS ROAD & WELL PAD PLAN



DATE	REVISION

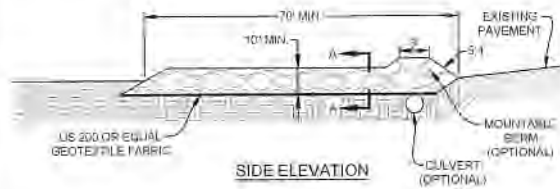


ACCESS ROAD & WELL PAD PLAN  
**API#47-017-02619**  
WELL #1  
CLAY & CENTRAL DISTRICTS  
RITCHIE & DODDRIDGE COUNTIES, WEST VIRGINIA

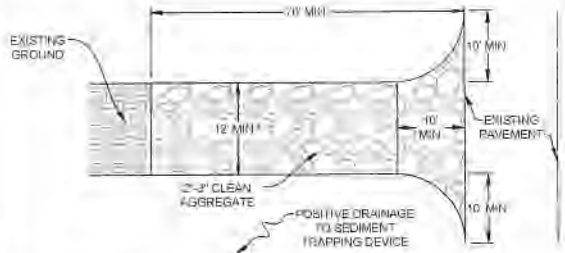


### ROCK CONSTRUCTION ENTRANCE

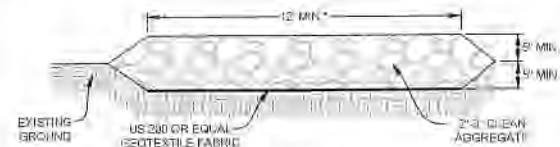
N.T.S.



SIDE ELEVATION



PLAN VIEW



SECTION A-A

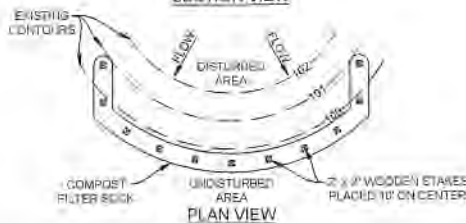
NOTES: 1. ROCK SHALL BE PRODUCE AND PLACED FROM THE BULK PILE WITH 2\"/>

### COMPOST FILTER SOCK

N.T.S.



SECTION VIEW



PLAN VIEW

ADAPTED FROM FILTREXX  
SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1. COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANISMATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	±5.0
MOISTURE CONTENT	38%-55%
PARTICLE SIZE	38% PASS THROUGH 1\"/>
SOLUBLE SALT CONCENTRATION	5.0 (8% MAXIMUM)

NOTES

1. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 2' UP THE SLOPE OR TO A HEIGHT EQUAL TO THE EFFECTIVE SOCK HEIGHT, WHICHEVER IS GREATER, AT 45° TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED MANUFACTURER'S MAXIMUM PERMISSIBLE SLOPE LENGTH.
2. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
3. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
4. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
5. BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS. PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
6. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.
7. IN THE EVENT THE GROUND IS FROZEN, AS REBAR WITH SAFETY CAPS SHALL BE USED INSTEAD OF WOODEN STAKES TO ANCHOR THE FILTER SOCK. ONCE THE GROUND THAWS, THE REBAR ANCHORS SHALL BE REMOVED AND REPLACED WITH 2\"/>

### REVEGETATION

TAKEN FROM THE  
WEST VIRGINIA EROSION AND SEDIMENT CONTROL  
WEST VIRGINIA DIVISION OF ENVIRONMENTAL PROTECTION  
CHARLESTON, W.VA.  
SECTION IV

#### TEMPORARY SEEDINGS

1. GENERAL CONDITIONS WHERE PRACTICE APPLIES  
WHERE EXPOSED SOIL SURFACES ARE NOT TO BE TIME-GRADED OR WORKED FOR PERIODS LONGER THAN 21 DAYS. TEMPORARY SEEDING SHALL GO DIRECTLY INTO A STREAM. IMMEDIATELY UPON CONSTRUCTION OF THE SITE (SITE INCLUDES ROAD AND LOCATION), VEGETATIVE COVER SHALL BE APPLIED TO AREAS THAT WILL BE LEFT UNWORKED FOR A PERIOD OF MORE THAN 30 MONTHS.
2. SEED MIXTURES AND PLANTING DATES  
REFER TO TABLES IV-2 THROUGH IV-4 FOR RECOMMENDED DATES TO ESTABLISH VEGETATIVE COVER AND THE APPROVED LIST OF RECOMMENDED TYPES OF TEMPORARY VEGETATION, RATES OF APPLICATION, AND OPTIMUM SEEDING DATES. IN SITUATIONS WHERE RECOMMENDATIONS ARE NOT AVAILABLE, THE FOLLOWING SHALL APPLY:
3. SEED APPLICATION  
APPLY SEED BY BROADCASTING, DRILLING, OR BY HYDROSEED ACCORDING TO THE RATES INDICATED IN TABLE IV-1. PERFORMANCE AND TOUCHING UP OF THE SOIL SURFACE SHOULD BE DONE JUST PRIOR TO SEEDING. SITE PREPARATION MAY NOT BE REQUIRED.

#### PERMANENT SEEDINGS

1. GENERAL  
PERMANENT VEGETATIVE COVER WILL BE ESTABLISHED WHERE NO FURTHER SOIL DISTURBANCE IS ANTICIPATED OR NEEDED. SPECIES PLANTED, PLANTING OF PERMANENT VEGETATIVE COVERS MUST BE PERFORMED ON ALL DISTURBED AREAS AFTER TOPSOIL SHALL HAVE THE TOPSOIL REMOVED AND STOCK PILED WHEN FEASIBLE. TOPSOIL SHOULD NOT BE ADDED TO SLOPES, PROPER GRADING AND SEEDBED PREPARATION, THE VEGETATION WILL REESTABLISH GROUND COVER FOR THE CONTROL OF EROSION. ALL REQUIRED SEEDS, PREPARATION AND LOOSENING OF SOIL BY DISKING OR DOZER TRACKING SHOULD BE PERFORMED JUST PRIOR TO SEEDING. ADD TO THE RECOMMENDED RATES SHOWN IN TABLES IV-3 AND IV-4 WHEN HYDROSEEDING. SEEDBED PREPARATION MAY NOT BE NECESSARY IF ADEQUATE SITE PREPARATION WAS PERFORMED WHEN HYDROSEEDING. FIRST MIX THE LIME, FERTILIZER, AND HYDRO-MULCH IN THE RECOMMENDED AMOUNT OF WATER. MIX SLURRY JUST BEFORE SEEDING. APPLY THE SLURRY UNIFORMLY OVER THE PREPARED SITE. ASSURE THAT AGITATION IS COMPLETED BEFORE SEEDING.
2. LIME AND FERTILIZER  
LIME SHALL BE APPLIED TO ALL PERMANENT SEEDINGS. THE PH OF THE SOIL IS TO BE DETERMINED AND LIME APPLIED ACCORDING TO TABLE IV-5.  
FERTILIZER SHALL BE APPLIED IN ALL PERMANENT SEEDINGS. APPLY THE EQUIVALENT FOR 200 LBS. MINIMUM 10-20-20 FERTILIZER PER ACRE.  
APPLICATION FOR BEST RESULTS AND MAXIMUM BENEFITS, THE LIME AND FERTILIZER ARE TO BE APPLIED AT THE TIME OF SEEDING.
3. PERMANENT SEED MIXTURES  
PLANNERS SHOULD TAKE INTO CONSIDERATION THE SPECIES MAKEUP OF THE EXISTING PASTURE AND THE LANDOWNER'S PREFERENCES. TABLES IV-3A AND IV-4A PERMANENT SEEDING MIXTURES SUITABLE FOR ESTABLISHMENT IN WEST VIRGINIA.  
NOTES:  
1. ALL LEGUMES MUST BE PLANTED WITH THE PROPER INOCULANTS PRIOR TO SEEDING.  
2. LATHYRUS PASTURE IS POTENTIALLY POISONOUS TO SOME LIVESTOCK.  
3. ONLY ENDOPHYTE FREE VARIETIES OF TALL FESCUE SHOULD BE USED. TALL FESCUE AND CROWNWITCH ARE ALSO VERY SENSITIVE TO SOIL BORERS.  
4. FOR UNPREPARED SEEDBEDS OR SEEDING OUTSIDE THE OPTIMUM TIMEFRAMES, ADD 50% MORE SEED TO THE SPECIFIED RATES. RATES ARE SUITABLE FOR USE IN SHADY WOODLAND SETTINGS. MIXTURES IN ITALIC ARE SUITABLE FOR USE IN FILTER SOCKS.
4. GUIDANCE FOR WILDLIFE HABITAT  
CONSIDER THE USE OF THE NATIVE PLANTS OR LOCALLY ADAPTED PLANTS WHEN SELECTING COVER TYPES AND SPECIES FOR SEEDING. WILDLIFE FRIENDLY SPECIES MIXTURES IN TABLE IV-4B. CONSIDER SELECTING NO OR LOW MAINTENANCE EQUIPMENT.

#### MULCHING

1. GENERAL  
THE APPLICATION OF STRAW, HAY, OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION. STRAW MUST BE ENOUGH AS WATERWAYS OR STEEP SLOPES. ADDITIONAL OR SUBSTITUTE SOIL PROTECTIVE MEASURES MAY BE USED IF DEEMED NECESSARY. CONTROL MATTING AREAS THAT HAVE BEEN TEMPORARILY OR PERMANENTLY SEEDING SHOULD BE MULCHED IMMEDIATELY FOLLOWING SEEDING, CRUSING AND SEALING OF THE SOIL SURFACE, AND PROVIDE A SUITABLE MICROCLIMATE FOR SEED GERMINATION. AREAS THAT CANNOT BE SEEDING BECAUSE OF THE SEASON SHOULD BE MULCHED TO PROVIDE SOME PROTECTION TO THE SOIL. SEEDS AS SOON AS WEATHER OR SEASONAL CONDITIONS PERMIT. DO NOT USE FIBER MULCH (CELLULOSE/HYDROSEED) AND PROTECTIVE COVER OF OTHER TYPES OF MULCH.  
WOOD CELLULOSE FIBER MULCH IS USED IN HYDROSEEDING OPERATIONS AND APPLIED AS PART OF THE SLURRY. IT CREATES A NEWLY SEEDING MEDIA. FIBER MULCH DOES NOT ALONE PROVIDE SUFFICIENT PROTECTION ON HIGHLY ERODIBLE SOILS, OR DURING THE DRY SUMMER MONTHS OR WHEN USED FOR LATE FALL. MULCH COVER. USE STRAW/MULCH DURING THESE MONTHS IS WELL SUITED FOR STEEP SLOPES, CRITICAL AREAS, AND AREAS SUSCEPTIBLE TO WIND.
2. CHEMICAL MULCHES, SOIL BINDERS, AND TACKIFIERS  
A WIDE RANGE OF SYNTHETIC SPRAY ON MATERIALS ARE MARKETED TO STABILIZE AND PROTECT THE SOIL SURFACE. THESE ARE USED ALONE IN SOME CASES AS TEMPORARY STABILIZERS, OR IN COMBINATION WITH FIBER MULCH, STRAW, OR HAY. WHEN USED ALONE, MOST CHEMICAL MULCHES DO NOT HAVE THE CAPABILITY TO INSULATE THE SOIL OR RETAIN SOIL MOISTURE.
3. SPECIFICATIONS  
FROM TABLE IV-6 SELECT THE TYPE OF MULCH AND RATE OF APPLICATION THAT WILL BEST SUIT THE CONDITIONS AT THE SITE.
4. ANCHORING  
DEPENDING ON THE FIELD SITUATION, MULCH MAY NOT STAY IN PLACE BECAUSE OF WIND ACTION OR RAPID WATER RUNOFF.  
1. MECHANICAL ANCHORING  
APPLY MULCH AND PULL MULCH ANCHORING TOOL OVER THE MULCH. WHEN A DISK IS USED, SET THE DISK STRAIGHT AND FOLLOW MANUFACTURER'S RECOMMENDATION WHEN POSITIONING AND STAMPING THE MULCH NETTING IN THE SOIL.

### ANTERO'S PREFERRED SEED MIXTURE

HALL'S #1 PASTURE MIXTURE			
Species/containers	Pure Seed	Germination	Origin
Bestfor Intermediate Ryegrass	29.95%	90%	OR
Climax Timothy	29.95%	90%	CAN
Annual Ryegrass	24.92%	50%	OR
Medium Red Clover*	9.99%	90%	OR
Potomac Orchardgrass	9.46%	90%	OR
Other Crop Seeds:	0.01%		* Variety Not Stated
Inert Matter:	0.69%		
Weed Seeds:	0.02%		AMS: 5143

Table IV-1  
Recommended Seeding Dates

Planting Date:	Suitability:
March 1 - April 15 and August 1 - October 1	Best Seeding Periods
April 15 - August 1	HIGH RISK - moisture stress likely
October 1 - December 1	HIGH RISK - freeze damage to young seedlings
December 1 - March 1	Good seeding period. Dormant seeding

Spe  
Annual  
Field  
Spring  
Summer  
Winter  
Japanese  
Re  
Annual  
Spring

NOTE: TH



# VOID

Section

01/18/2019



November 9, 2018

West Virginia Department of Environmental Protection  
Office of Oil and Gas  
Attn: Mr. Jeff McLaughlin  
601 57<sup>th</sup> Street, SE  
Charleston, WV 25304

Antero Resources  
1615 Wynkoop Street  
Denver, CO 80202  
Office 303.357.7310  
Fax 303.357.7315

**RE: Existing Caldwell #1 Well (API# 47-017-02619)**

Mr. McLaughlin:

Antero Resources Corporation (Antero) would like to submit the following application for a permit to plug and abandon the existing well located on property owned by Antero Resources Corporation in Doddridge County, West Virginia.

Attached you will find the following:

- Plug and Abandon Permit Application package
- Form WW-7 Well Location Form: GPS and Topo Map

If you have any questions please feel free to contact me at (303) 357-7223.

Thank you in advance for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "Megan Griffith", written over a light blue horizontal line.

Megan Griffith  
Permitting Agent  
Antero Resources Corporation

Enclosures

RECEIVED  
Office of Oil and Gas  
NOV 14 2018  
WV Department of  
Environmental Protection

**CERTIFIED MAIL RECEIPT  
CALDWELL #1  
WW-4A NOTICE OF APPLICATION TO PLUG & ABANDON A  
WELL TO SURFACE OWNER**

### Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. **DO NOT PHOTO COPY OR ALTER LABEL.**
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

<b>USPS TRACKING # :</b>	
<b>9405 5036 9930 0322 8254 58</b>	
Trans. #:	448380628
Print Date:	11/09/2018
Ship Date:	11/09/2018
Expected	
Delivery Date:	11/13/2018
Priority Mail® Postage:	<b>\$6.70</b>
Total	<b>\$6.70</b>
<b>From:</b>	MEGAN GRIFFITH ANTERO RESOURCES 1615 WYNKOOP ST DENVER CO 80202-1106
<b>To:</b>	GENE CAROL 1029 CABIN RUN RD PENNSBORO WV 26415-7060
<small>* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.</small>	

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Check the status of your shipment on the USPS Tracking® page at [usps.com](http://usps.com)

NOV 14 2018

WV Department of  
Environmental Protection

**CERTIFIED MAIL RECEIPT  
CALDWELL #1  
WW-4A NOTICE OF APPLICATION TO PLUG & ABANDON A  
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5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

USPS TRACKING # :	
<b>9405 5036 9930 0322 8254 65</b>	
Trans. #:	446380628
Print Date:	11/09/2018
Ship Date:	11/09/2018
Expected	
Delivery Date:	11/13/2018
Priority Mail® Postage:	<u>\$6.70</u>
Total	<u>\$6.70</u>
<b>From:</b>	MEGAN GRIFFITH ANTERO RESOURCES 1615 WYNKOOP ST DENVER CO 80202-1106
<b>To:</b>	ERIC S SMITH 1484 GUM RUN RD PENNSBORO WV 26415-7063
* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.	



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Environmental Protection



01/18/2019

CERTIFIED MAIL RECEIPT  
CALDWELL #1  
WW-4A NOTICE OF APPLICATION TO PLUG & ABANDON A  
WELL TO SURFACE OWNER

*Cut on dotted line.*

### Instructions

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2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, **DO NOT TAPE OVER BARCODE.** Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

### Click-N-Ship® Label Record

<b>USPS TRACKING # :</b>	
<b>9405 5036 9930 0322 8254 72</b>	
Trans. #: 448380628	Priority Mail® Postage: <b>\$6.70</b>
Print Date: 11/09/2018	Total: <b>\$6.70</b>
Ship Date: 11/09/2018	
Expected Delivery Date: 11/13/2018	
<b>From:</b> MEGAN GRIFFITH ANTERO RESOURCES 1615 WYNKOOP ST DENVER CO 80202-1106	
<b>To:</b> MIKE DAVIS WV DEPARTMENT OF TRANSPORTATION PO BOX 4220 CLARKSBURG WV 26302-4220	
* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.	

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WV Department of  
Environmental Protection